A guide to demand-driven agricultural research

ROYAL TROPICAL INSTITUTE, THE NETHERLANDS

INSTITUT D'ECONOMIE RURAL, MALI

DEPARTMENT OF RESEARCH AND DEVELOPMENT, TANZANIA

A guide to demand-driven agricultural research

The Client-Oriented Research Management Approach:
Rural service delivery for agricultural development

Willem Heemskerk, Ninatubu Lema, Doré Guindo, Chira Schouten, Zainab Semgalawe, Hugo Verkuijl, Bart de Steenhuijsen Piters and Petra Penninkhoff

Amsterdam, 2003

The Rural Economy Institute (IER) of Bamako, Mali, is a Public, Scientific and Technologic Establishment (EPST). The main missions are among several the following: - contribute to define and set up objectives, research means and studies to serve agricultural development, - to assure technical support to agricultural development, - to develop appropriate technologies to increase production and ameliorate farmers productivity, - to disseminate research and studies results thru training, technical and scientific information of agricultural researchers and extension agents, - to give services in several fields. The agronomic research program of IER inspires on the following principal: - regionalized research, - decentralised decision taking, - reorganized financial management procedures, - separation of administrative and technical function in research work.

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DRD is responsible for coordination, and execution of agricultural research, also in close collaboration with the Department of Livestock Research and Training of the Ministry of Water and Livestock Development. The DRD accomplishes its tasks through a network of seven zonal agricultural research centres that are responsible for all aspects of research with special emphasis on location specific adaptive research.

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The Royal Tropical Institute, KIT, Amsterdam, The Netherlands, is an international institute, which is specialised in the generation and sharing of knowledge and expertise through institutional cooperation. The objectives of KIT are to contribute to sustainable development for poverty reduction; information dissemination; and, the preservation and exchange of culture.

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List of Abbreviations and Acronyms

AA	Adaptability Analysis
AKIS	Agricultural Knowledge and Information System
ARC	Agricultural Research Centre
ARD	Agricultural Research and Development
ARF	Agricultural Research Fund
ARI	Agricultural Research Institute
CBRD	Community-Based Rural Development
CDD	Community-Driven Development
CGIAR	Consultative Group on International Agricultural Research
CIMMYT	International Centre for Maize and Wheat Improvement
COR	Client-Oriented Research
CORMA	Client-Oriented Research Management Approach
DALDO	District Agriculture and Livestock Development Officer
DED	District Executive Director, Tanzania
DESC	District Extension Steering Committee
DRD	Department of Research and Development
DRDP	District Rural Development Programme
DSA	Daily Subsistence Allowance
EARO	Ethiopia Agricultural Research Organisation
FEG	Farmer Extension Group
FHH	Female-headed Household
FM	Financial management
FN	Field Note
FRG	Farmer Research Group
FSA	Farming Systems Approach
FSR	Farming Systems Research (also short for: Farming Systems Approach to Research)
GoT	Government of Tanzania
HoP	Head of Programme
HRD	Human Resource Development
HRM	Human Resource Management
IARC	International Agricultural Research Centre
IDA	International Development Association
IER	Institut d'Economie Rurale
IMF	International Monetary Fund
INIA	Mozambique National Institute for Agricultural Research
INRAB	Institut National de Recherche Agricole du Bénin
IPM	Integrated Pest Management
IPNM	Integrated Plant Nutrient Management
IPR	Internal Programme Review
ISFM	Integrated Soil Fertility Management
ISNAR	International Service for National Agricultural Research
ISP	Information Service Provider
KARI	Kenya Agricultural Research Institute
KIT	Koninklijk Instituut voor de Tropen (Royal Tropical Institute)
M&E	Monitoring and Evaluation
MAFS	Ministry of Agriculture and Food Security-Tanzania
NAEP II	(Tanzania) National Agricultural Extension Project (Phase II), Tanzania

NARI	National Agricultural Research Institute
NARO	National Agricultural Research Organisation
NARS	National Agricultural Research System
NEPAD	New Economic Partnership for African Development
NGO	Non-Governmental Organisation
NPRS	National Poverty Reduction Strategy
NRM	Natural Resource Management
NSS	National Soil Service, Tanzania
OFR	On-Farm-Research
PI	Principal Investigator
PIME	Planning, Implementation, Monitoring and Evaluation
PLAR	Participatory Learning and Action Research
PR	Public Relations
PRA	Participatory Rural Appraisal
PRSC	Poverty Reduction Support Credits
PTD	Participatory Technology Development
RAAKS	Rapid Analysis of Agricultural Knowledge Systems
RARI	Regional Agricultural Research Institute
RAS	Regional Administrative Secretary, Tanzania
RELO	Research Extension Liaison Officer
RNE	Royal Netherlands Embassy
SAC	Suivi Appui Conseil
SAP	Structural Adjustment Programme
SARI	Selian Agricultural Research Institute, Tanzania
SHF	Self help fund
SUA	Sokoine University of Agriculture, Tanzania
SWOT	Strengths, Weaknesses, Opportunities and Threats
TA	Technical Assistance
TAMACO	Tanzania Malting Company
TARP II	Tanzania Agricultural Research Project (Phase II)
TBL	Tanzania Breweries Ltd
TDT	Technology Dissemination and Transfer
ToR	Terms of Reference
VLPA	Village Level Participatory Approach
WB	World Bank
WTO	World Trade Organisation
ZARF	Zonal Agricultural Research Fund
ZARF-MC	ZARF Management Committee
ZDRD	Zonal Director for Research and Development
ZEC	Zonal Executive Committee, Tanzania
ZILO	Zonal Information and Liaison Officer
ZRC	Zonal Research Co-ordinator
ZTC	Zonal Technical Committee

Foreword

Agricultural research and extension in sub-Sahara Africa have been subject to repeated organisational and institutional reforms during the last few decades. Donors and central governments were the main drivers of reorganisation and re-structuring processes. Mostly "blueprints" based on "western" models were applied; although sometimes a perceived lack of impact was given as the rationale, the actual reasons for change were often of an ambiguous nature. During the last decade, in order to reduce government expenditures and to enhance client involvement, there has also been a rapid de-concentration and privatisation of research and extension. Insufficient attention was however, paid to the empowerment and capacity strengthening of producer organisations. Rural service delivery therefore remained largely supply-driven. With a few exceptions, reorganisations failed to effectively contribute to the real goal of providing more efficient and effective quality services for farmers to enhance rural development.

In Mali and Tanzania, the rationale for organisational change of the NARS was the challenge to improve service delivery in a sustainable way. By the mid nineties, sub-national research centres in these countries were facing serious budget constraints and were losing their best staff. Dependency on a few donors became an increasing burden for the coherence, effectiveness and continuity of research. Turning their attention to local clients for funding of research, these centres realised that they were not properly equipped for a more dynamic market in which clients control the funds and 'do not pay if there is no cure'. Financial systems were not transparent, decision-making on research priorities had remained paternalistic and results were not communicated in client-friendly ways. In order to better serve their clientele, achieve a demand-driven portfolio and become more sustainable, these sub-national institutes decided to implement fundamental change. In the context of a bilateral support program financed by The Netherlands, the Royal Tropical Institute provided assistance in this change process.

In line with Nyerere's statement of 'no shortcuts to development', it quickly transpired that there were no blueprints for success in institutional change. Although the regional institutes learned from international experiences, the major challenge was to develop an approach that matched lessons learned from elsewhere with local experiences, culture, physical assets and contextual limitations. In about a decade, a flexible approach was developed that provides management with a menu of options, but leaves the choice to key stakeholders who are both object and subject to change. The Client Oriented Research Management Approach is therefore based on respect for diversity and autonomous development.

This Guide is the result of years of experimentation with organisational change by a great number of people. It shows the dynamism and vitality of African organisations that are not afraid to face challenges and change. Demand-driven research is all about improving rural service delivery while sustaining the service providers and this message is well understood at local levels. It also shows that if conditions of client involvement and empowerment are met, investments in agricultural research can be effective and rates of return highly satisfactory.

The CORMA Guide paints an entirely different image than the black and white picture of static, non-transparent and ineffective African research bodies prevailing among many donors. The Guide provides an impressionist view of African research institutions re-inventing themselves and that research managers can adapt, add colour to and shape to better satisfy the needs of rural producers.

We would like to thank all people that have contributed to the CORMA Guide. We acknowledge the courage and efforts of hundreds of researchers, technicians and support staff, as well as the challenging advisors from KIT, who together believed in the change process and made it work. We hope to have helped to shape institutions to be responsive to local needs and steer their own development towards greater effectiveness and sustainability.

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We would especially like to thank Jeroen van 't Zant, John Belt and Margo Kooyman for their contributions in the practitioners workshop in June 2002 which was at the basis of documenting CORMA experiences for this guide.
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The authors
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Executive Summary

The environment in which agricultural research in Sub Sahara Africa operates is changing rapidly. Under budgetary pressure and demand from the agro-industrial sector many National Agricultural Research Organisations face serious financial crises. The effects of (research) globalisation and trade liberalisation, and the need to contribute to poverty alleviation as indicated in the millennium development goals have further aggravated the challenges for research organisations. In order to face these challenges research organisations increasingly pursue options for decentralisation and privatisation, as well as increased client participation in technology development. The participation of stakeholders and clients in the agricultural research and development process is not new. In particular the Farming Systems Approach and the formation of research- stakeholder committees has contributed to a more demand-driven research agenda. However, participatory approaches practiced by Agricultural Research Centres are often not institutionalised. This has led to the recognition of the need for a more comprehensive research management approach in order to achieve the necessary organisational change for enhanced client-orientation.

The IER in Mali, and the DRD in Tanzania, in collaboration with KIT in the Netherlands developed the Client-Oriented Research Management Approach (CORMA) for the facilitation of this organisational change process. CORMA aims to strengthen the management and organisation of ARCs and the facilitation of research service performance (not sure what this means) through a process of organisational change. CORMA embraces the participatory approach and the systems approach of FSR, but goes beyond these approaches in terms of the overall management of a research organisation.
In CORMA five main management areas are distinguished with a corresponding objective. These contribute to the overall goal of making research more client-oriented through increased efficiency and effectiveness:

1. human resource development and management to adapt staff capacities and skills to the demand for services, as well as to stimulate and remunerate staff according to performance;
2. financial management to enhance efficiency, transparency and accountability of the ARC. Improved financial management is a prerequisite for involving clients in funding research, attracting sponsors and investors, and sustaining the ARC financially;
3. development and enhancement of linkages, stakeholder participation and networks to improve the long-term viability of an ARC and communicate more effectively with civil society, the national agricultural research system and the international community;
4. planning, co-ordination , monitoring and evaluation to improve research quality and efficiency; and,
5. output production, dissemination and monitoring of impact to enhance the effective use of research results.

Within each of these five management areas different management capacities are required, which, if developed, will contribute to the five management area objectives. For all the management capacities (some 25 in Mali and Tanzania) a large number of management activities, which are options, can be developed.

A CORMA action plan is an essential prerequisite to start a CORMA change process. Others are staff recognition of the need for change; the appointment of a CORMA change team; commitment of research managers and beyond for institutional change and strong stake-

holder involvement in the process. The action plan can be developed in a joint stakeholders/researchers workshop building on research staff self- and stakeholder assessment tools. These should result in strengths, weaknesses, opportunities and threats analysis of the ARC. This guide provides tools for the development of the CORMA action plan and the implementation of many management activities. The guide is illustrated with many cases and references for the implementation of the CORMA management activities. Tools are also provided for monitoring and evaluation of the change process with references of similar activities and suggested indicators. This may prove helpful in setting up an effective monitoring structure.

The CORMA continues to evolve in Tanzania and Mali, while Ethiopia and Benin show a very strong interest in the approach. Preliminary lessons of the introduction of CORMA show that a number of conditions have to be met before changes can be successfully effected (e.g. some level of ARC autonomy, agreed need for change , etc.). Others need to be addressed simultaneously, such as leadership, stakeholder commitment and joint capacity building.
Efficient and effective feedback between implementation, funding, and planning, monitoring and evaluation of research, remains a major challenge. In this context special attention will be required to establish sustainable financing mechanisms and strong producer organisations that can monitor technology development on behalf of stakeholders and end users.

1 Introduction

1.1 Background

1.1.1 THE RATIONALE FOR THIS BOOK.

At the beginning of the third Millennium, food insecurity, poverty, natural resource degradation and lagging economic development continue to affect the lives of hundreds of millions of people in the developing world. The 'green revolution' raised high expectations for the potential of agricultural research, including livestock and natural resource management (NRM) research, to effectively contribute to solving these problems. However, during the last two decades, research impact on the productivity of smallholders has been much below expectations, especially in Sub Sahara Africa. This is firstly due to several reasons such as small and weak National Agricultural Research Systems (NARSs) and a lack of dependable funding for research with poor incentives for researchers. Secondly the limited access to inputs (and high cost) and markets for Sub Saharan Africa farmers has been crucial, partly because of continued highly subsidised agriculture in OECD countries (notwithstanding a series of WTO agreements on 'liberalisation' and the creation of a so-called 'level playing field'). Thirdly the impact has been small due to the ineffectiveness of extension services and the link between research and dissemination partners. Since the early nineties, staff of the Royal Tropical Institute, in close collaboration with many researchers in several Sub Saharan Africa NARSs, has experimented with a more 'Client-Oriented Research' (COR) approach (see Annex 1.1 for definitions) to facilitate rural development. In the process, overwhelming evidence has been created of the importance of a much stronger client-orientation of applied agricultural research as a pre-condition for technology adoption and impact. COR and an adapted research management approach (CORMA), have shown to have significant capacity to make agricultural technology development more effective ands efficient in addressing the real concerns of smallholder farmers, including women and in improving their livelihoods. The purpose of this book is to share the CORMA experience and in so doing, help build stronger NARSs through better equipping researchers and other stakeholders in agricultural development to grapple with the core constraints facing rural people.

1.1.2 THE SCOPE OF THIS BOOK

A 'reference guide' on CORMA

This book is a reference guide on how to enhance client orientation of agricultural research institutes in Sub Sahara Africa. CORMA encompasses an approach where research agendas become more demand-driven because clients are assigned a pivotal role in deciding priorities and planning research for improved agricultural technologies and knowledge, including monitoring progress, the dissemination of improved practices and impact evaluation. The guide aims to provide practical tools to facilitate processes that strengthen client orientation in publicly and privately funded (at least in part), agricultural research services. It explicitly focuses on Agricultural Research Centres (ARCs) that operate at the sub-national administrative and/ or agro-ecological zonal level. The authors are convinced that increased client orientation can lead to significant improvements in the relevance, sustainability, efficiency, effectiveness and impact of agricultural research. This is considered particularly relevant in the current setting where in much of Sub Sahara Africa there is a renewed awareness that the generation of appropriate technology is a crucial

input into agricultural and overall economic development (see for example the framework document of the recently established 'New Economic Partnership for African Development, NEPAD).

The target audience
This reference guide aims to assist ARC research managers in the implementation of the COR management approach. The intended audience for this book therefore comprises foremost the managers of public and semi-public research centres at sub-national level in African countries and the broader community of stakeholders. The material can also be used by University Departments involved in agricultural research management training. In addition, scientists, practitioners, policy makers, lobbyists and students, involved in the management and impact of applied and adaptive agricultural research will find the approach and tools useful. Although the book draws on experiences from Africa, the authors believe that a substantial part of the information provided will be relevant to agricultural research practitioners in developing countries outside Africa as well.

Building on experience
This book reflects upon experience gained during the last ten years with implementing CORMA approaches in various agricultural research institutes across Sub Sahara Africa. It also draws on the worldwide pool of knowledge that has recently been generated concerning more demand-driven and incentive-based Agricultural Knowledge and Information Systems (AKIS's). This guide uses examples from change management experiments where staff of the Department of Development Policy and Practice of KIT (then "Rural Change"), KIT DEV for short, was actively involved, particularly in Mali with the Institut d'Economie Rurale (IER) and in Tanzania with the Department of Research and Development (DRD) of the Ministry of Agriculture and Food Security (MAFS), and (to a lesser extent) with the Kenya Agricultural Research Institute (KARI), the Ethiopia Agricultural Research Organisation (EARO), the Mozambique National Institute for Agricultural Research (INIA) and the Institut National des Recherches Agricoles du Bénin (INRAB) in Benin.

How to use this reference guide?
For those who do not have the time to read the entire manual, it may be helpful to use some 'shortcuts' to those sections of particular concern. If you:

- are interested in a quick introduction to the CORMA concepts, read chapter 1;
- intend to evaluate client orientation and client satisfaction at your institute, review chapter 2;
- aim to plan actions to increase COR at your institute, study chapter 3;
- wish to understand Monitoring and Evaluation (M&E) of the COR change process, see chapter 4.;
- are interested in concrete CORMA experiences, review the Chapter 3 boxes;
- are interested in various tools and formats, see the annexes of Chapter 2,3 and 4;
- are interested in some conclusions and perspectives on the future of the approach, see chapter 5; and,
- are interested in up-to-date further reading refer to the list of consulted documents;

1.1.3 WHY THE CLIENT-ORIENTED RESEARCH MANAGEMENT APPROACH IMPORTANCE

A changing macro-economic environment
In order to achieve greater fiscal sustainability developing countries, during the last decade, worldwide and cutting across sectors, have increasingly limited the funds allocated to support 'public' services (World Bank, 2002). Most governments in Africa have reduced direct funding for agricultural support services such as rural credit, research and extension, and have started to separate funding from implementation, among others to create greater opportunity for private sector involvement. The international donor community, spearheaded by the International Monetary Fund (IMF) and the World Bank (WB) played important roles in accelerating this trend since they made rationalisation of government expenditu-

res and market liberalisation their leading paradigms. During the early nineties, implementation of Structural Adjustment Programmes (SAPs) became a pre-requisite for donor support in many Sub-Saharan African countries. Although it is clear that the new policies helped to reduce public sector deficits, both the short-term and medium-term effects of these macro-economic changes on rural and urban peoples' livelihoods are debated. Especially in Sub Sahara Africa, food security continues to be elusive and if current trends continue, the number of malnourished children is expected to increase during the next decade; poverty remains pervasive particularly in rural areas, and there is a serious threat of soil fertility decline and natural resource degradation in many Sub Sahara Africa regions. Today, most development experts would therefore agree that new and more effective strategies and programmes are needed for AKISs to fill the growing vacuum left by national governments.

Lately, Sub Sahara Africa Governments have re-confirmed their commitment to sustainable development in the context of NEPAD. National Poverty Reduction Strategies (NPRSs) have replaced the SAPs as prerequisites for financial donor support. There is greater emphasis on sector-wide approaches with an attempt to closely link macro, meso and micro levels, increased priority for policymaking and institutional development, and more attention to participation by a pluriform group of stakeholders operating within and across the sectors. Multi-lateral and bilateral donors show a renewed interest in addressing rural poverty and in establishing government policies and implementation modalities to improve the delivery of basic services, such as for health care, education and agricultural research and extension. However, the focus is different from before in that this is not a return to exclusively supporting government investment but an attempt to involve a much broader community of stakeholders in development both in the public and private sector. 'Community-driven Development', (CDD), 'Community-based Rural Development' (CBRD) and 'Poverty Reduction Support Credits (PRSCs) have become the new buzzwords and funds are increasingly put in the hands of intended beneficiaries for them to control and monitor development activities. Service providers are frequently financed on more or less 'commercial terms', often in the context of a formal contract, to provide basic services to the rural (and urban) poor. Government has changed its role from financier and provider of services to partial financier (often through 'matching funds'), legislator, regulator, co-ordinator, and facilitator of a supportive development environment. A crucial question in this new context concerns the identity and the role of the client and how to ensure that the client will have access to the range of information, knowledge and skills that will empower him or her to make rational decisions. In the context of this reference guide, it is important to determine if and to what extent the institutional sustainability of 'traditional' local agricultural research centres (ARCs) is at odds with the new reality.

Agricultural research in a changing environment

During the eighties and early nineties, many NARSs in Sub Sahara Africa continued to rapidly expand both in terms of physical infrastructure and staff numbers, in part with donor support. When financial restraints were imposed on Governments and donor support declined, an increasing proportion of the budgets for agricultural research had to be allocated to the fixed costs of personnel and physical facilities. The desired changes in Government policy and the need for liberalisation, decentralisation and privatisation of research were often not clearly communicated to the NARSs, farmers and other actors in the agricultural sector. In most cases, the reduced funding to ARCs was not synchronised with new policies and programmes to effectively support the operation of agricultural research systems.

Since the early nineties, the NARSs in Africa have therefore faced drastic budget reductions especially to cover non-salary research-operating costs; declines by a factor of 2 or 3 were not uncommon. Simultaneously, staff remuneration rapidly fell below the levels required to cover basic needs and the lack of reasonably attractive incentive-based salaries caused a significant 'brain drain' of the most qualified researchers. The donor community often defended their decreasing interest in AKIS support on the basis of a declining faith in agricultural research as an effective contributing factor to rural development. For some time, a more polemic than factual discussion about the merits of agricultural research in

Sub Sahara Africa dominated the international debate. Rather than recognising the crucial importance of a level playing field between the developed and developing world and of remunerative prices for the products produced by Sub Sahara Africa smallholders in order for agricultural intensification and diversification to occur, the seemingly ineffective NARSs were increasingly made the scapegoat for the lack of progress in rural Africa.

However, during the past two decades, the Sub Sahara Africa NARS scientists have not done as badly as some may suggest; their attitudes and perspectives have changed tremendously and mostly for the better. In the "traditional" approach, research priorities were essentially determined by scientists on the basis of rather exclusive debates among themselves; society then provided the means to implement research programmes, the specific purpose of which could remain rather obscure based on the belief that some day the outcomes would prove to be useful. Most African scientists were trained overseas and adopted these approaches and ideas. Since the late 1980s, there has been a revolution in African agricultural science through the widespread adoption of the 'Farming Systems Approach to Research' (FSR). In a relatively short time span, a totally new concept to research and development in rural areas was identified, adapted, diffused and broadly accepted by agricultural researchers across the continent. All over Africa, national scientists were involved in the analysis and diagnosis of priority problems of indigenous farming systems, the details and rich heritage of which were unknown both to science and governments. In a sense, the seventies and eighties were the decades of discovering the 'anatomy' of African agriculture and through that, laying a basis for a truly participative research approach.[1]

The majority of African scientists, who recognised the deep understanding on which traditional farming systems were built and farmers' ability to identify key constraints adopted the Farming Systems Approach to Research. This was in part a result of the close collaboration of many Sub Sahara Africa NARSs with several International Agricultural Research Centres (IARCs), especially the International Centre for Maize and Wheat Improvement (CIMMYT) in Mexico, and Centres of Excellence such as Agricultural Universities in Europe and the US, KIT and others. This happened in spite of a lack of status of Sub Sahara Africa agricultural scientists, meagre salaries and marginal research budgets. 'Participatory Rural Appraisal' (PRA) became an effective research tool linked closely to African traditions. The African farmers' capacity to cope with economic, social and climatic disasters and he/ she having in place effective survival strategies in a wide diversity of environments was increasingly being recognised. This profound change in scientific attitude would later, when incorporated in CORMA, have a tremendous impact on the efficiency and effectiveness of applied and adaptive research in generating viable technologies that can be adopted with advantage by a majority of farmers in a given agro-ecological and socio-economic setting (see annex 1.1. for definitions of different types of research).
During the last decade, publicly funded National Agricultural Research Organisations (NAROs) and/ or Institutes (NARIs) have become increasingly autonomous in order to meet the new challenges. Many also started de-centralisation through the establishment of local level often agro-ecology-based ARCs (see Box 1.1).

Box 1-1
Examples of decentralised NARSs

In Tanzania the seven sub-national ARCs are assigned administrative mandate areas such as the "Northern" or "Lake" Zone. The mandate areas are a compromise between administrative boundaries (several regions) and agro-ecological zones. In such systems, responsibility for the same agro-ecological zones is divided between different ARCs. In Ethiopia agricultural research is being decentralised to regional governments; each Regional Institute has a specific mandate to serve the clients within the regional state. In Kenya, the mandates of a number of agricultural research institutes that serve specific districts have recently been organised along agro-ecological lines recognising specific 'key enterprise systems' in each mandate area. Mozambique's agricultural deconcentration process is following roughly Tanzania's model of (semi-) autonomous ARCs.

Source: Various KIT experiences

[1] Although capacity for participatory planning, implementation, M&E, ex-ante and ex-post assesments, economic and gender analysis, etc. still requires further development.

The main reasons for decentralisation and deconcentration of national agricultural research systems were (Nickel, 1998):

- a need for greater administrative flexibility to pursue funding from diverse sources, apply funds efficiently, ensure timely disbursement of resources and provide for a system of open and merit-based staff recruitment, pay and promotion;
- a requirement for greater involvement by stakeholders to help focus research on client needs, enhance scientific rigour and promote a sense of stakeholder ownership in the research institution and its work;

However, not all attempts to achieve greater research flexibility and improve farmer involvement were entirely successful and/ or could be sustained. For example, the 'project approach' in agricultural research led to greater flexibility but diminished stakeholder involvement; the FSR approach in some countries resulted in flexible research teams with enhanced advocacy roles for farmers but little institutional stakeholder control and ownership; and, 'participatory technology development' led to strong farmers' ownership of parts of the research process, but not with regard to the entire agricultural research system. Thus lasting institutional improvements proved to be few.

Experience has shown that enhanced opportunity for greater impact of agricultural research in Sub Sahara Africa cannot be achieved by the introduction of FSR and deconcentration alone. In order to significantly improve the way research facilitates rural and peri-urban development, the following core actions with regard to certain aspects of the research system also need to be taken:

- let rural society play a greater role in directing and guiding agricultural research;
- greatly improve research efficiency and effectiveness;
- empower clients to finance and evaluate research results; and,
- reward scientists when they make substantial contributions to development.

This publication will illustrate that these goals can be achieved by implementing the basic principles of CORMA.

1.1.4 THE ROOTS OF COR AND THE INFORMATION BASE FOR THIS STUDY

1. From FSR to CORMA

Although a step in the right direction, researchers using the FSR approach have played a rather paternalistic advocacy role in serving smallholder farmers. The assumption that improved understanding of farmers' knowledge, problems and priorities would lead to more demand-driven research proved to be false for two main reasons:

- the establishment of separate FSR teams in ARCs led to the marginalisation of on-farm programmes despite (or maybe due to) strong financial (donor) support.
- farmers and their organisations were not fully empowered in the agricultural technology development system. They were not effectively involved in the research process beyond participatory diagnostics (the actual planning, implementation and M&E of research remained largely a task of researchers), neither did they 'own' the research in terms of (financial) resource control and allocation.

During the past twenty years, KIT staff was closely involved with FSR in Sub Sahara Africa. KIT scientists initially were often directly involved with African scientists in the actual fieldwork. Later they increasingly focused on advisory tasks in long-term agricultural services projects. Most projects to which KIT staff contributed were financed through Netherlands' bilateral development assistance. A major objective of KIT's staff involvement throughout has been to make research programmes more responsive to the needs of (small) farmers. In the course of the early nineties, the experience gained in the context of these projects gradually led to the conviction that the institutional development element in the farmer-centred approaches needed much greater emphasis and elaboration. At the same time, involvement of a broader community of stakeholders (in addition to farmers), became a key issue for effective research. This resulted in the conceptualisation of CORMA. Thus,

CORMA attempts to address FSR's shortcomings; it does not replace the holistic Farming Systems Approach to Agricultural Research and development (ARD), but rather builds on it.

2. CORMA-related activities in Sub Sahara Africa countries and beyond
This reference guide builds on experience from Tanzania and Mali, where KIT-RC was involved in a CORMA change process through partnerships with DRD and IER respectively. This comprises all main local agricultural research centres in each country (7 in Tanzania and 6 in Mali). Features of CORMA are applied by NARSs in several other Sub Sahara Africa countries (see 1.1.2 above) and the approach has received attention in Yemen (among others with the Water and Environment Centre) and in Bolivia (with "Sistema Boliviano de Tecnologia Agropecuaria"). Key players involved in COR, reviewed and discussed the CORMA experience in a mid-2002 'practitioners workshop' in Holland. This guide is an outcome of that exercise.

3. Tanzania's experience with CORMA
One of the main objectives of the joint-donor supported Tanzania Agricultural Research Project-Phase II (TARPII), implemented by DRD and initiated in 1998, is sustainable institutional development in agricultural research (MOAC, 1996; WB 1997). Primarily through 'right-sizing' and de-concentrating the research system this goal is fulfilled. In addition to the usual infrastructure development and staff training, important mechanisms to achieve the project goals have been: (i) transferring the responsibility for research in several cash and/or export crops to the private sector; (ii) establishment of competitive 'Zonal Agricultural Research Funds' (ZARFs); and, (iii) introduction of the CORMA approach. In contrast to the first phase project that exclusively supported the ARCs under DRD, TARP II focused on strengthening important components of the entire National Agricultural Research System, including incorporating Sokoine University of Agriculture (SUA) in the zonal research centre network and strengthening its strategic functions. Achieving these objectives required significant investments, which are laid out in an investment plan for the period 1998-2003 financed by the Government and supported by a World Bank IDA Credit and grants provided by bilateral donors, including The Netherlands. The period 1998-2003 is considered a transition period to a re-structured and reformed research system that is expected to have the following key characteristics (MOAC, 1996):

- the research agenda is demand-driven with farmers effectively influencing the design of research projects and resource allocation;
- the research system becomes more diversified regarding suppliers of technology (Zonal and National Institutes, Universities, the private sector and others through ARF/ ZARFs), and also in the demand for research output (not only public extension, but also farmer/ producer organisations, the private sector, agro-industry and NGOs);
- the Zonal Research Institutes concentrate on adaptive research; and,
- the Research Institutes are increasingly financially sustainable in the sense that the demand for technology is connected to funding responsibility in order to cover (at least part of) the operating costs of the research.

At the beginning of TARP II, stakeholder involvement by Extension, Farmer Research Groups (FRGs), NGOs, etc. in all phases of the research cycle had only just started (e.g. in 1993 in the Lake Zone). Even at this stage, it was realized that FSR had contributed strongly in all zones to a better understanding of the prevailing farming systems and had led to improved priority setting. MAFS/ DRD however, launched the Tanzania CORMA effort in response to a perceived lack of demand-drivenness of research, the poor institutional performance of DRD and the segregation between FSR (mainly bilaterally funded) and 'commodity' and 'factor' research which was partly multilaterally and nationally funded (DRT, 1994). The COR approach was defined as follows:

> *'The client-oriented research approach is iterative and dynamic and feedback of the client/ farmer will determine to a large extent the research content and process, but without forsaking the researchers' own technical responsibility: farmer/ client participation requires effective interaction with research.'*

Later this concept was further developed into a management approach e.g. through empowerment of clients in 'Zonal Executive' Committees (concerned with resource allocation and control) and in 'Zonal Technical' committees (assigned with technical evaluation through peer review). In the Lake Zone and Northern Zone, the emphasis on the COR management approach resulted in a specific bilateral (Netherlands) assistance project to the ARC responsible for the zone (Mutsaers et al., 1997). This project emphasised direct resource control by research clients through 'contract' research, ZARFs, etc. (Ashby et al., 1994).

4. Mali's experience with CORMA

Initiated in 1999, the main objective of the Dutch-supported agricultural research programme with the Institut d'Economie Rural (IER) is to facilitate the organisational change processes through strategies of balanced interventions in all domains of the organisation. The organisational domains that are covered by these change strategies are i) the organisational structure, ii) the division of responsibilities, iii) the organisational culture, iv) the management of human resources, v) the motivation of personnel, vi) the management information system for M&E, and vii) the control system (financial auditing and quality control cycles). Over the years, a series of carefully facilitated change processes have aimed at:

1. enhancing client orientation of agricultural research through increased involvement of end-users in the research cycle;
2. improving the quality of agricultural research; and,
3. improving management of the institute (e.g. increase its transparency).

The major interventions within the IER and the NARS focussed on:

- the deconcentration of its organisational structure (which started earlier in the 1990-ies), granting the sub-national centres a large degree of autonomy, and the more recent creation of regional business units responsible for marketing of agricultural services;
- the contracting of research projects, making clients partially responsible for M&E of research and for research funding;
- adjustment of the dominant empiric research culture through the involvement of FSR units in the agenda setting of subject matter programmes, through client participation in defining problems and setting priorities, and through the promotion of participatory research to assure that farmers' knowledge contributes to the quality of agricultural research;
- the appointment and training of regional heads of the business units;
- using economic interests of researchers as the basis for a new policy on the institute's consultancy fees and diversification of agricultural research funding through contracting with clients, development of business plans and regular assessment of client satisfaction;
- the development of realistic indicators regarding the client contacts and contracts in the M&E system; participation of the clients in the monitoring of research projects, thus improving the dissemination of research results; and,
- the description of the contracting procedures and its integration in the scientific management manual laid a sound foundation for a systematic control of both the quality of the activities and the transparency of the procedures.

In an effort to monitor the first effects of the above described change process, the heads of the regional business units in five out of six regional research centres carried out an internal assessment of the degree of client orientation. To monitor the effects of the above described interventions.

They concluded that:

- compared to other agricultural research organizations in Africa, the IER has achieved a considerable re-orientation of its research towards the needs of its clients;
- there is a good understanding of the concept of client orientation and it is well integrated in the various domains of the organization;
- the participation of clients in problem identification/definition, decision making as well as in the planning of research programmes is well organised;

Minor improvements were proposed in relation to human resource and financial management, research methodologies, external communications and transfer of research results. Major changes were suggested to enhance access to internet and agricultural information.

1.2 The main principles of CORMA

1.2.1 A BRIEF DESCRIPTION OF THE CLIENT-ORIENTED RESEARCH MANAGEMENT APPROACH

CORMA is a research management approach to strengthen the client orientation of research institutions. CORMA is all about establishing flexible and effective interfaces between agricultural stakeholders and their organisations, and research bodies. CORMA is seen as the logical step beyond FSR and building on the FSR approach to accelerate agriculture and rural development. Where the focus of FSR was on research capacity, diagnosis and on-farm experimentation, the goal of CORMA is to reinforce institutional linkages, strengthen the management of research organisations, improve the management of resources and improve output and impact, in part through strengthening stakeholder participation and empowerment. CORMA focuses on reform of publicly funded ARCs, which provide public services and goods for agricultural development in their mandate region. CORMA should however, not be seen as standing alone, it is an essential part of sound public sector reform with its emphasis on institutional autonomy and decentralisation, good governance, a transparent institutional culture and performance-based management (Nickel, 1998).

The CORMA approach is not entirely unknown to most African scientists and research managers because they are already familiar with its basic ingredients. CORMA is an effort to bring about institutional change and the strengthening of research organisations, based on traditions shared by both Western and African societies. CORMA is sometimes called a 'hybrid' approach, because it merges different cultural backgrounds as well as experiences from science and business. CORMA is not a blueprint model, but a guide through a complex maze of public and private initiatives in agricultural research, creating organisations that are more responsive to the environment in which they operate. CORMA recognises that change is a gradual process that can only succeed if people involved feel they own this process. CORMA is about people and about the conditions that allow them to perform. CORMA, if well implemented, provides opportunity to institutionalise output-oriented remuneration and introduces innovative and variable modalities of financing research. Among these is "contract research" which allows for supply of services on demand according to specific agreements and payment of reward on satisfactory delivery.

1.2.2 THE CORE ELEMENTS OF CORMA

CORMA is a management approach for ARCs to become more client-oriented and to institutionalise Client-Oriented Research or service delivery, it involves eight guiding principles and paradigms:

- the ARCs provide services (research = service);
- the ARCs have to know their clients (know your clients);
- clients have to know ARCs and their outputs (clients know you);
- strong clients improve research;
- performance-based incentives lead to quality output;
- individual initiatives need institutionalisation;
- the ARC helps scientists to perform (efficiency);
- the ARCs do not stand alone;
- strong client-orientation of ARCs leads to financial sustainability.

Box 1-2
Compatibility of science and service delivery

The relationship between 'science' and 'service delivery' is sometimes considered conflicting and the two are seen as incompatible. An often-made statement is: 'if we focus too much on service delivery, we will have nothing to sell if we are successful'. This statement can be contradicted by raising another question, namely: 'how do we define a research service?' The answer is simple: 'any distinct contribution to the development of a technology requested by a client is a service.' This implies that in the end, any type of research, from 'basic' to 'strategic' to 'adaptive', must be acknowledged as of core importance to efficient and effective agricultural service delivery.

Source: Concepts used by DRD in Tanzania

1. The ARC is service oriented

One of the key principles of CORMA is that sustainable and successful agricultural research can only be achieved through empowerment, participation and satisfaction of its clients. Involvement of the latter will ensure that research delivers the services they need and that funds and other strategic resources are made available adequately and in time. As such, agricultural science must be considered as a service to the providers of research funds, as well as to society that has made available other necessary resources, such as education, training, salaries, health care, logistics and infrastructure (see annex 1.1 for definitions).

2. Clients and their needs are known by the ARC

Intimate knowledge of the farming communities and their needs is a pre-requisite for Client-Oriented Research to be effective. Small-scale farmers are often not organised according to economic interests or other shared concerns. Intermediate organisations that represent these farmers are frequently considered the principal clients of research, while farmers themselves are defined as 'end-users' or 'beneficiaries'. Agri-business enterprises, large-scale commercial farmers and other stakeholders also qualify as clients of research.

Box 1-3
Client focus

Clients must always be at the core of the development of a technology and participate in all stages of its generation. This implies among others: proper needs assessments and market analyses; inviting potential clients to the research stations and laboratories, presenting progress and discussing problems; and testing on-farm including involving farmers in the assessment of results. Once ready for diffusion, a 'public relations (PR) campaign' (previously called an 'extension programme' or 'campaign'), is needed to inform the clients and end-users of the benefits and the conditions of application of the newly generated technology. Sometimes, especially when there is risk in adopting a new technology, or when the introduction requires a capital investment, which exceeds the means of the end-users, special measures of risk mitigation or other adoption inducements may be required.

Source: DRD, Tanzania

3. 'Marketing' of ARC services among clients

Most clients do not sufficiently know the ARC and/or are not aware of the range of services that are available. Researchers tend to systematically over-estimate their popular reputation. Potential clients often have subjective, incomplete or incorrect perceptions of the ARC, based on outdated experiences or associations with other interventionists. How can such potential clients request what they need without being prejudiced by what they think they will get? A properly informed and updated clientele presumes that all stakeholders know what is available in terms of agricultural research services as well as the modalities for procurement of these services. This requires active promotion of the ARC, its available services and their costs, and on the methods at clients' disposal to obtain access to them. Public relations of the ARC can be improved in many ways and it depends on the situation and the relationship with the potential client or partner which PR materials and approaches are most effective. However, acknowledged output and impact by research are the most undisputed and appreciated PR materials. Importantly, research output, adoption and impact generate new resources for research and the sustained delivery of services.

4. Clients support the ARC and improve research

Clients should see the ARC as 'their' service provider. The best way to reach this situation is when they are also involved in funding of the ARC programme. Clients will however, only fund research when they are confident and assured of quality output. This implies that co-funding clients must be involved in all stages of the research process, from identification to dissemination and adoption. Continuous and unimpeded communication between the principal investigator and his/ her client(s) is a pre-condition for satisfactory delivery of the requested services. Clients sometimes need additional empowerment through training in order to gain capacity to assess proposals, monitor progress, review output and adopt new technology. All too often farmers and other stakeholders are 'cosmetic' members in formal research bodies and are not enabled to effectively participate in actual research management and/or significantly influence the research agenda. Critical clients who emphasise quality control will improve research.

Most agricultural research and particularly sub-national research at ARCs aims to benefit people in a specific location or jurisdiction. Local stakeholders should determine the priorities of such research as well as of the research projects designed by the ARC researchers involved. Ideally, such ARCs must be funded, regulated, operated and maintained by the local authorities. The devolution of investment responsibility to local stakeholders will help bring about ownership and improve the relevance and sustainability of the research investment (Tollini in Tabor et al., 1998).

5. An ARC is quality output-oriented

CORMA aims at strong involvement of stakeholders in all types of research through priority setting, planning, M&E of research, dissemination and also in mobilising additional resources for research services in particular for those that have a substantial 'private good nature'. Every output requested from the research system should therefore not only be analysed ex-ante for its potential 'recommendation domain' but also for the level of 'excludability' and 'subtractability', associated with the expected results (see annex 1.1 for definitions). This in combination with the market potential of a research output, leads to a better assessment of the stakeholders to be involved and of their responsibility and potential to pay for the service(s) delivered.

Even though science is a vocation, it is also an income generating activity. Every scientist has personal and family needs to take care of for which the financial means have to be provided. Governments and other sponsors often do not adequately reward research output, which has forced agricultural scientists to diversify their sources of income. It is therefore not surprising that most researchers in Africa seek income besides their basic salaries. Many researchers work part-time on research and lack essential economic motivation for their work. As is often said: 'pay peanuts and get monkey business'. In CORMA, it is recognised that individual incentive-based remuneration of output is essential for efficient agricultural research of high quality.

6. Institutionalisation of methods and approaches in ARCs

An ARC is more than a collection of scientists, support staff, equipment and facilities. Until recently, centralised, national management provided guidelines and rules for the management of most ARCs in Sub Sahara Africa. This included the allocation of financial and other resources, maintenance of facilities, training and employment of staff, planning of research, approval of research proposals and their budgets, M&E of progress and the endorsement and release of technical recommendations. In many countries where research systems have been decentralised, or are in a process of decentralisation, there is risk of a 'vacuum' in management. Decentralisation of resources and management sometimes provides ARCs and individual scientists with a freedom of action for which the boundaries often are not (yet) well defined. This often results in 'trial and error' management by active ARC directors, while others wait for instructions from above with the risk of delay in programmes. There are numerous cases of individual scientists engaging in private arrangements with clients, such as chemical companies and resource-rich NGOs, thus affecting the strengths and coherence of the local research organisation, including its priorities. Such private initiatives should not be condemned because these scientists are exploring the boundaries of their freedom of action, thus unconsciously clearing the path for institutionalised client orientation. It also needs to be realized that a certain level of chaos regarding uncontrolled but creative experimentation often precedes rational organisational change. However, for COR to succeed it is important that an 'outward looking' attitude of scientists coincides with an 'inward' re-organisation of the ARC. (see annex 1.1 for definitions).

7. A successful ARC is efficient and transparent

Sub-national research policies are needed to define (new) ARC goals and objectives, the research approach, its targets and modalities. This cannot be done centrally. Effective planning and co-ordination bodies are needed at the local level to involve clients and guarantee efficient research of good quality. Financial management must be reinforced to control and monitor cash flows at ARC level. Human resource management must be enhanced to respond adequately to the needs of the diversified clientele and provide performance incentives. An active acquisition strategy is needed to ensure adequate and timely funds for research services. In other words, each ARC must define its management rules and guidelines with the objective of achieving efficiency and transparency in service delivery and to

create a conducive and sustainable environment for its research staff; this must be done within an overall national context.

8. ARCs are part of networks and systems
ARCs may be decentralised, but they remain an intrinsic component of the global, sub-regional and national research systems. In the continuum of research undertakings, CORMA is operating at the 'client end' of the agricultural research spectrum and mainly concerns itself with applied research, including farmer experimentation. In the 'hierarchy' of agricultural research systems in technology development, CORMA mostly focuses on the sub-national and/ or agro-ecologically-based ARCs. These local level agricultural research institutions with a geographically determined mandate are strongly service-oriented and focus on adaptive research (see annex 1.1).

9. ARCs and financial sustainability
If client-oriented, the ARCs are the effective interface between their clients and the national and sub-regional research organisations, the CGIAR institutes, the international universities and the donors. These other research organisations are also in quest of clients for their technology generation capacity and for effective investments of their financial resources. ARCs that provide good access to local stakeholders are without exception considered as most attractive partners for collaboration and sponsorship. Close and effective client linkages are therefore one of the most valuable assets of an ARC. Client-Oriented ARCs with a demand-driven research agenda are more likely to attract financial resources (through cost-sharing and other arrangements) from National and Local Governments as well as village and producer organisations (see annex 1.1 for definitions)

1.3 The CORMA management areas

An ARC that is committed to the process of change towards more client orientation of research has to review and adapt its management in an integrated manner. Client oriented research is not only a question of conducting more demand-driven research, but touches also on management issues, such as adapting staff competencies and skills to the required services by stakeholders, providing financial transparency to clients and donors, establishing effective systems of communication and participation in decision making, enhancing stakeholder capacities to be involved in M&E and disseminating results in user friendly ways. This implies that the process of change involves not only all ARC staff, but also those stakeholders that have an interest in more active participation in technology generation and dissemination.

In order to assess the current level of performance of an ARC, as well as to identify priority areas for improvement and monitor progress of the change process, five CORMA management areas are defined. A CORMA area refers to a coherent set of management capacities that together cover an important management area. Different management activities can contribute to improved management capacities in the different management areas (see Annex 1.2).. These five management areas are:

1. Human resource development and management to adapt staff capacities and skills to the demand for services, as well as to stimulate and remunerate staff according to performance.
2. Financial management to enhance efficiency, transparency and accountability of the ARC. Improved financial management is a prerequisite for involving clients in funding of research, attracting sponsors and investors and sustaining the ARC financially.
3. Development and enhancement of linkages, stakeholder participation and networks to improve the long-term viability of an ARC and communicate more effectively with civil society, the national agricultural research system and the international community.
4. Planning, co-ordination and stakeholder participation in monitoring and evaluation to improve research quality and efficiency.
5. Output production, dissemination and monitoring of impact to enhance the effective use of research results.

The first two management areas focus on internal management processes of the ARC, while management areas 3, 4 and 5 concentrate on the relationship between the ARC and other actors in the AKIS.

In order to start the process of change, an assessment of current performance by ARC staff and its stakeholders is necessary. This 'organizational base-line analysis' provides information about strengths and weaknesses of the ARC, as well as the perception of the ARC by its staff and by important stakeholders. The procedures and tools for assessment are explained in chapter 2.

Chapter 3 provides ideas, procedures and tools to improve each of the five CORMA management areas. On the basis of the results of the assessment, one can consult specific subchapters that are considered relevant for a specific situation. For example, if ARC staff and stakeholders identify financial management as a priority dimension for improvement, while being satisfied with the current human research management by the ARC, one can skip 3.1 and go directly to sub-chapter 3.2.

The boxes that are inserted provide useful experiences with management activities with CORMA and can therefore be consulted to understand the application and results of management interventions and tools used. Those who wish to know more about innovative research management will find a list of selected documents in the list of references.

2 Assessment of ARC Client Orientation

2.1 Introduction

Before starting actions to enhance the client orientation of research, a comprehensive management diagnosis of the Agricultural Research Centre (ARC) and an assessment of stakeholder perceptions of the ARC and needs for research services is required. In this chapter we will introduce various tools that will provide basic information about the current level of client orientation as perceived by research staff and, importantly, by stakeholders.

Research staff and stakeholders consider the performance of an ARC from different points of view. The scientists are involved as active participants and know much about the internal processes and procedures of the ARC. Their perceptions of the internal organisation and performance of the ARC may differ according to their position, professional background and personal views. An assessment by ARC staff will reveal essential inside information, but will not provide objective results.

Stakeholders often do not have much inside information about the management of an ARC, but they (hopefully) have a perception of the institute's intended functions and performance. An assessment of their experience with the ARC will provide complementary information to the self-assessment by research staff and facilitate comparison and reflection, while a needs assessment by stakeholders will help the ARC to match supply of services with the demand and identify which management areas (see chapter 1.3) need to be strengthened and upgraded in order to achieve more demand-driven research.

The main objective of both types of assessments is to identify and plan activities to better adjust the management and service delivery of the ARC to the demand by stakeholders. Other objectives include:

- identify gaps and deficiencies to be eliminated by targeted actions;
- create transparency and common understanding about the ARC and the process of client orientation;
- provide a basis for enhanced stakeholder participation in the research process; and,
- collect organisational base-line information that can be used for M&E of the change process and ARC's performance.

2.2 ARC self assessment

An assessment of the current level of client orientation of an ARC is the first step in a process to enhance responsiveness to clients. ARC research staff members are actively involved in the assessment, the analysis of its results and the planning of follow-up activities. The self-assessment may take two to three days (or parts thereof) and consists of the following 4 steps:

1. scoring of the five COR dimensions: participants in the workshop assess individually or in small groups the current performance of the ARC using a questionnaire;
2. inventory of services, outputs, assets and resources (in terms of quantity and quality); this includes stocktaking, inspection and interviews of key-informants;
3. a Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis: this analysis is conducted in small groups and results are discussed in plenary; and,

4. identification of potential activities to enhance client orientation in each of the five management dimensions: during a plenary discussion specific actions are endorsed (see chapter 2.4).

It is recommended that an outsider to the ARC facilitate the assessment. Although ARC staff own the process, experience has shown that facilitation from an experienced outsider can greatly enhance the objectivity, transparency, speed and quality of the process.

2.2.1 QUESTIONNAIRE

The questionnaire is one of the central tools of the COR assessment. It focuses on the perception of ARC staff of key performance parameters related to the five different COR management areas (see chapter 1.3).

Firstly facilitators should develop or adapt the questionnaire. An example of a questionnaire that was used in Tanzania is attached (Annex 2.1). These questions however should be checked for relevance in the context of a specific country, region and ARC. For example, the questionnaire developed in Tanzania was tested and subsequently adjusted by staff members of an ARC in Mali before being used there.

A representative selection of ARC research and administrative staff is invited to review, discuss and answer the questions. This is done in small groups (2-5 persons) that are either uniform or mixed (managers, scientists, technicians, support staff, gender, age , etc.) in composition depending on local situations and preferences. Important criteria for group composition are freedom of speech and expression, as well as quality of debate. For example, it depends on local culture whether groups should be uniform according to gender or mixed to obtain representative consensus scores on the questions raised in the questionnaire.

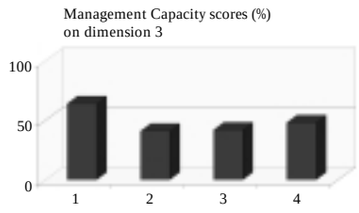
Results of the questionnaire are compiled, analysed in Excel and presented in bar graphs and/ or pie charts (see Box 2-1). They include overall evaluations for each of the five COR dimensions and the specific scores for management capacities related to each management area. The results are discussed in a plenary session, involving all ARC staff interested in the CORMA change process. This is an important step towards ARC-wide consensus for the need to change and plan actions, but also to acknowledge past and on-going efforts, their achievements (and failures).

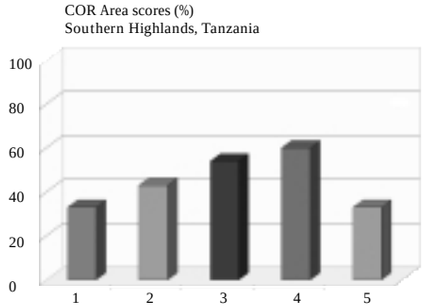
Box 2-1
Examples of results of self-assessment (Tanzania)

An ARC self-assessment was conducted in the Southern Highlands of Tanzania involving representatives from research, technical and other support staff. Groups of 3-5 participants discussed and scored the items in the questionnaire (see table)

Scores by management area

1 = Human resource management 33%)
2 = Financial management (43%)
3 = Linkages and collaboration (54%)
4 = Planning, implementation, monitoring and evaluation 60%)
5 = Output production, dissemination and access to information (33%)





Within the management area 'linkages and collaboration', participants scored the different management capacities of the ARC.

Scores by management capacity

1 = Maintain effective public relations (64%)
2 = Organise active stakeholder involvement (41%)
3 = Acquire research assignments (42%)
4 = Actively develop (inter) national collaboration and networks (48%)

Source: DRD/KIT, 2001

Thus, in summary, the guidelines for adaptation and use of the COR questionnaire are:

- *consider it the first step towards reaching general agreement about the need to change, acknowledge past and on-going efforts and identify management capacities and dimensions that need improvement;*
- *the exercise should be facilitated by an outsider to the ARC;*
- *the questionnaire is a perception analysis by ARC staff members;*
- *questions included should be tested and the questionnaire must be adapted to the specific situation of an ARC;*
- *group composition depends on local preferences, but all categories of employees should be invited and be free to express themselves;.*
- *groups discuss each question until a consensus score can be given;*
- *analysis of results should take into account significant group differences in scoring the results;*
- *results are presented in a plenary session to all ARC staff interested in the change process. Group differences should be carefully discussed and explained;*

2.2.2 REVIEW OF ASSETS AND RESOURCES

In addition to a questionnaire-based scoring the ARC needs to assess its current resource capacity. This entails collection of secondary data on human and financial resources, facilities and assets available at the institute and also what is 'in the pipeline' (e.g. research staff on study leave). A detailed checklist needs to be developed before the actual assessment. Data collection requires active involvement and support of key ARC staff, such as the Director, Heads of Programmes, key support staff (e.g. administration, accounts, personnel, training, MIS , etc.). The review of human resources should focus on the actual availability of staff for research and their capacities. Financial resources include different sources of research funding and their level over at least two years. The quantity and condition of facilities and assets is reviewed to obtain a realistic impression of their availability for research and/ or other purposes. Where possible, the access that research staff has to facilities and assets e.g. vehicles and computers should be assessed. All the data should be analysed and presented in bar graphs and pie charts. Box 2-2 provides an example of the profile of resources and assets of the Southern Highlands Zone in Tanzania.

Box 2-2
Example of review of assets and resources (Southern Highlands zone, Tanzania).

Human resources: The Southern Highlands ARC has a total of 214 staff. These include: 44 scientists 111 technicians and 59 support staff. The ratio between scientists and technicians is approximately 1: 2.5 though the actual ratio is closer to 1 : 3 due to 'absence' of scientists staff. The Socio-economics program has no technicians among their staff.

The research and support staff is male-biased, which is rather common among ARCs in Tanzania (21 % female and 79 % male). The age category of staff below 36 is semi-absent, while a large number of staff is above the age of 41. Scientists with a M.Sc. or Ph.D. degree are well represented at the ARC. Half of all researchers work in the Crops Program, while very few are allocated to the Socio-economics Programme. There is a discrepancy between officially allocated staff and actually available staff due to study leaves, detachments and allocations to ARC management or administration.

Land: The Southern Highlands ARC has about 1000 hectares of land, of which 750 hectares are 'arable'. The available land is allocated to research activities and 'agricultural/ livestock production'. The non-arable land is used for grazing purposes. Part of the arable land is rented to staff as a source of the ARC self-help fund.

Transport facilities and machinery: The Southern zone ARC has a fleet of 31 vehicles. Out of these only 7 (23%) are in good running condition. Three (10%) vehicles are in fair condition (could be easily repaired if funds were available) while 21 (67%) are in poor condition (and should likely be disposed off). The ARC is unable to provide adequate transport to conduct on-farm research activities. Out of 9 tractors only one is in good working condition, 4 need repairs while 4 either need major repairs or replacement.

Computers and communication equipment: Southern Highlands ARC has a total of 24 computers. Most (85%) of these are outdated, 4 computers are in good condition. The ARC has few telephone landlines e-mail is difficult and there is a lack of access to internet facilities.

Research funds: The total Southern Zone ARC annual budget in 2000/ 2001 was 0.8 million US$ equivalent. The most important source of funding: Government, 35 % (salaries) , WB-funded TARP II: 24%.(research planning and activities). Others: Sokoine Agricultural University (SUA): US$ 80,000 (Food Security and Household Income Project), Contract research and 'commercial soil analysis': US$ 30,000.

Source: DRD, 2001

2.2.3 REVIEW OF SERVICES AND PRODUCTS

The services that the ARC provides are an indication of the ability of the institute to respond to the demand of different categories of stakeholders. An inventory of services helps the ARC to identify existing gaps and weaknesses to meeting the needs of its stakeholders.

Services as well as research outputs and/ or products available at the ARC should be listed by research programme. It is important to consider not only conventional services, such as 'trials and experiments' and 'soil analysis', but also less obvious services, such as 'providing access to Internet' or 'giving advice for business plan development'. Box 2-3 provides an example of a service inventory at the Northern Zone ARC in Tanzania.

Box 2-3
Overview of available services at the Northern Zone ARC (Tanzania)

Crops Department • National coffee research • National horticultural research (fruits and vegetables) • Breeding of new crop varieties • Testing and selection of new crop varieties • Crop husbandry improvement • Crop protection (pathology and weed control) and Integrated Pest Management • Post-harvest processing **(P)**	**Livestock Department** • Animal health care **(P)** • Testing and selection of fodder and pasture crops • Livestock management improvement • Pasture management improvement • Animal traction **(P)** • Nutrient recycling • Livestock early warning systems • Processing/ marketing of animal products **(P)** • Assessment of public health risks **(P)**
Special Projects Department • Integrated soil fertility management (ISFM) • Nutrient balance assessment and plant nutrition improvement • Soil- and water conservation • Cartography and GIS **(P)** • Agro-forestry • Agro-meteorology • Agricultural engineering **(P)**	**Socio-economics Department** • Diagnostic surveys and PRAs • Management of information systems **(P)** • Farmer-extension-research linkage • FSA, PRA and gender training • Marketing of agricultural products and sector studies **(P)** • Monitoring and evaluation **(P)** • Adoption and impact studies **(P)**
Laboratory services • Soil analysis (all macro nutrients, various micro nutrients, CEC, organic matter, soil texture) **(P)** • Nutrient analysis with stable isotopes • Plant pathology analysis • Nematode analysis	**Other services** • Documentation and information • Training courses and training facilities • Production of extension materials • Desktop publishing and secretarial services • Quality seed production • Grafting of fruit trees • Testing of agro-chemicals • In-vitro services • Renting land and farm machinery
(P) refers to services that delivered in partnership with a collaborating institution.	

2.2.4 SWOT ANALYSIS

The results from the questionnaire and the review of assets, resources, services and products are complemented by a SWOT analysis for each ARC management dimension. The analysis focuses on research staff perceptions concerning strengths, weaknesses, opportunities and threats that significantly influence a particular dimension. This is also done in groups, each group addressing one specific dimension. The results of the SWOT analysis are presented and discussed in a plenary session and compared with the results of the questionnaire. And the ARC profile results. Differences are analysed and if possible, resolved (see Box 2-4).

Box 2-4
Example of the results of a SWOT analysis (in Tanzania)

Management Area 1: Human resource management	
Strengths	**Weaknesses**
• Well trained staff • At the institutional level a good ratio between researchers and technicians • Staff age is well distributed • Facilities available	• Staffing not balanced in programmes such as oilseeds, cereals, livestock (i.e. too few technicians) • Workshops, seminars and symposia only accessible to researchers, not to technicians and support staff • Lack of an overall training programme • Lack of staff flexibility • Lack of interaction between programmes (too much 'commodity-based') • No job descriptions for ARC staff • Management meetings organised very irregu–larly and minutes not communicated to staff • No zonal research policy
Opportunities	**Threats**
• Prepare a human resource development plan, including job descriptions, training programs and a strategy to improve staff remuneration • Improve internal communications	• Poor remuneration • Lack of promotions • Government does not employ young staff • 'Brain drain' to NGOs

Whereas the CORMA questionnaire is a situation analysis, rather static in nature, focusing on specific issues, SWOT is a more dynamic tool allowing for a reflection on scenarios for the future development and improvement of the ARC's effectiveness and an analysis of the changes in the external environment that are relevant for the ARC's performance.

2.3 Stakeholder assessment

The objective of stakeholder assessments are to increase the understanding of the by ARC management and staff of its stakeholders, to assess stakeholders level of level of satisfaction with the ARC and to identify their specific needs for services and products. Although 'models' for stakeholder assessment are presented in this guide, it is again important to emphasize that the approach needs to be adapted to the specific country and regional conditions. Assessment by stakeholders can be done during a multi-stakeholder workshop with the objective to analyse differences in perception and provide an introduction to the joint SWOT analysis and action plan development (Annex 2.2). Stakeholders include a wide variety of individuals and organisations that use or may have an interest in obtaining research services from an ARC. A more specific checklist can be developed for the analysis of stakeholder specific perceptions outside the context of a workshop (Annex 2.3). The first questionnaire is also more suitable for stakeholders that already know the ARC, while the second is more for stakeholders that are not familiar with the ARC. It is important that more or less uniform categories of stakeholders are defined before embarking on the assessments. For example, one may need to distinguish between small-scale and large farmers, male and female headed households, traders, input suppliers, processors, NGOs , etc. The assessment should also include those stakeholders who have a potential interest in research services.

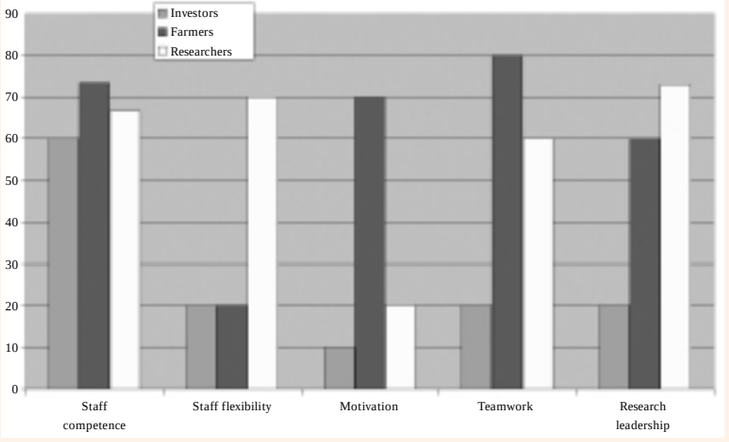
After having categorised the stakeholders, the next step is to visit and interview them. The best way would be that an independent person conducts the interview because ARC staff members may be biased or may unconsciously influence the direction of the interview. However, in case resources are limited, an ARC representative can conduct the interview too; in that case proper instructions need to be provided for the ARC staff to be objective in conducting the assessment. Available resources of course determine the number of organisations that can be interviewed, but it is necessary that all important categories are included.

Annex 2.2 and 2.3 present sample questionnaires that can be adapted to suit any specific situation. The guidelines for the adaptation and use of the stakeholder questionnaire are summarized below.

- *adapt the stakeholder assessment approach to the country/ region/ ARC-specific conditions;*
- *involve a variety of stakeholders: farmer categories, male and female farmers, extension staff, NGOs, traders /processors/ manufacturers, input suppliers , etc.;*
- *in many cases, this is the first formal ARC contact with the stakeholders: take time to introduce the interviewer, the ARC and the purpose of the interview. Bring business cards and other PR –materials;*
- *the interview should not take more than one hour, (otherwise the client may loose interest);*
- *it is recommended to interview a small relatively homogeneous group representing a specific stakeholder group or organisation;*
- *at the end of the interview summarise the deliberations and check these with the interviewees; and,*
- *make sure that the stakeholders interviewed obtain the results of the interview and other feedback and that they have an opportunity to provide further comments.*

Box 2-5
Assessment was done by stakeholders and researchers of the performance of the Amhara Regional Agricultural Research Institute (ARARI), Amhara, Ethiopia, 2003.

The assessments were done through the filling of questionnaires (see Annex 2-1 and 2-2). In comparing the outcome of the questionnaires the following should be kept in mind: (i) two different questionnaires are compared which is comparing to some extent apples and pears; (ii) some of the statements can not be scored by all due to lack of information; and, (iii) in workshops the plenary discussion on the comparison of the results leads to heated debates and is a good warming-up for the SWOT analysis of the five management areas (see example comparison)



Five management capacities of human resource management were compared based on results of three groups: Researchers (of ARARI), Farmers (farmers involved in on-farm research), Investors (Agro-industry, donor-funded project representatives, NGO's).

Source: KIT/ARARI, 2003.

2.4 Developing a CORMA action plan

The self-assessment by research staff provides inside information about the internal organisation, the assets and resources, availability of services, as well as strengths, weaknesses, opportunities and threats, related to the research management at the ARC. The stakeholder assessments have uncovered the perception of the level of performance of the ARC from an external point of view by different stakeholder categories and therefore, much more is now known about clients' needs for research services. To complete the exercise, it is now necessary to compare the perceptions and views of research staff with those of the ARC's stakeholders in order to identify actions to enhance matching demand and supply, and thereby improve the effectiveness of the ARC in delivering client-demanded services (see Box 2-5).

Six steps towards a CORMA action plan

1. List and compare strengths and weaknesses as identified by research staff and stakeholders. Discuss and diagnose the overlap, conflicting views and perceptions, as well as variations between categories. Which events and actions in the past have contributed to matching views on research strengths? How can conflicting perceptions be resolved?

	As perceived by research staff	As perceived by stakeholders
Strengths of the ARC		
Weaknesses of the ARC		

2. Compare the availability of and demand for research services. Discuss in detail 'matches' (effective supply of services demanded) and 'mismatches' (supply of services not demanded or unavailability of demanded services) and tentative solutions. Compare the frequency and priority of demanded services to the volume and quality of "supply" (i.e. number and qualifications of ARC research staff and assets by service).

Services available at the ARC	Services demanded by stakeholders

- present the available services in graphs according to research staff (volume, qualifications and gender), current funding and availability of logistical assets e.g. vehicles;
- present the demanded services in graphs according to frequency and category of stakeholders;
- compare results: does the current distribution of resources reflect the priorities expressed by stakeholders;
- revisit the mission, vision and mandate of the ARC and assess their validity in relation to the identified stakeholders' demands..

3. Identify priority management dimensions for improvement and list in random order the potential actions and investments needed.

Management areas	Potential management activities	Investments needed

4. Plan specific actions and investments (and their timing) according to responsibility, decision level and source.

	ARC management and facilitator(s)	National decision makers	External facilitators and resource people
Actions			
Investments			

5. Prepare a draft stakeholder-oriented action plan (budget included) for discussion. Invite all relevant stakeholders for a one-day presentation, feedback and planning workshop.

6. Organise the stakeholder workshop to objectively present the main conclusions and issues derived from the self-assessment and the stakeholder assessment. Discuss a proposed action plan to enhance demand-drivenness of research and the roles of stakeholders in planning and implementation of research. Discuss targets, time frames, progress monitoring and indicators of organisational change and ARC performance (see also chapter 4 and annexes). Identify who will facilitate the process and report on progress (appoint a COR facilitator or team at the ARC) and who will conduct the essential M&E (create a balanced team of qualified stakeholders).

	Responsible staff and/ or entity	Timing	Key performance indicators
Actions			
Investments			

An important aspect of the change process towards COR is that sufficient time and attention must be taken for the different steps involved; as stated by Nickel (1998) it is important to:

- establish a strategic vision with ARC stakeholders and partners, as well as with the concerned national research institutions. This should be largely based on a needs assessment;
- build commitment for the change process with special attention to political commitment and feasibility as well sustainability over time;
- identify a local 'change manager', 'champion' (or management group). Emphasis is on local, preferably with representatives from different ARC departments, all in order to create a sense of ownership;
- keep expectations realistic. Change processes are by their nature slow and dependent on many conditions for success (e.g. quality of leadership). Realistic expectations will avoid stakeholders to become discouraged early on and give up.

3 CORMA management areas

3.1 Human Resource Management

3.1.1 BACKGROUND AND OBJECTIVES

1. Background

The pace of human resource development (HRD) in third world agricultural research institutions has been impressive since the 1960's (Pardey et al., 1997). However, some important concerns have arisen, particularly in Africa. Firstly the question can be raised whether the human resource mix in terms of graduate and support staff, disciplines, skills, age and gender, is optimal for the implementation of demand-driven research. Secondly, at many ARCs almost the entire budget is used for staff salaries leaving entirely insufficient funding to finance the direct costs of research (notably off-station research) (See Annex 1.1 for definitions). Thirdly, in many situations the lack of an appropriate incentive structure for research staff leads to high rates of absenteeism, many attractive alternative job opportunities for researchers and high rates of turnover of the most capable senior scientific staff.

Human resources constitute the main asset of an ARC; these resources need to be nurtured and managed in such a way that they can efficiently respond to client needs as well as deliver the required output to the satisfaction of the clients. ARCs have a mandate and responsibility to provide agricultural technology options to clients in particular prioritised fields and geographical areas. In order to provide these services, applied agricultural research needs to be undertaken by public and semi-public ARCs in collaboration with the referred clients and other stakeholders. These services can only be provided if the research centres have the right mix of human resources with the necessary skills. An appropriate human resource mix of an ARC needs to have three main capacities; namely:

i. liaise with clients and understand their demands for information and agricultural technology;
ii. generate the required information through (inter)-disciplinary research and/ or partnerships with other research institutions; and,
iii. provide this information in an appropriate manner to the clients for further verification, dissemination and adoption.

These three capacities require other supporting competencies in terms of planning, M&E, provision of support services and purposeful management. For agro-ecological zone-based ARCs, the challenge has always been, whether to have these required capacities in different persons, in specific teams, or in an integrated way across various research teams. The liaison capacity with clients has been implemented in different forms in different countries at different times. Many countries have experimented with separate groups such as 'FSR Teams' or 'Adaptive Research Planning Teams' with responsibility for providing knowledge and information concerning clients' research needs to the disciplinary research teams. Unfortunately, such separation in different teams for diagnosis, planning and feedback to farmers and other clients of research as well as for the actual technology generation has led to numerous problems relating to ownership, resource allocation and research effectiveness (Collinson, 2000, Merrill-Sands and McAllister, 1988). However, the alternative of leaving the liaison functions to disciplinary teams often results in relatively fixed 'researcher-controlled' programmes that lack a client-driven and an output-oriented research agenda. The challenge of local ARCs therefore remains to find a way to manage human resources such that (inter-

disciplinary) teams can address all three core capacities and deliver output according to the demands of the clients. CORMA attempts to respond to these complex requirements by integrating horizontal systems analysis involving the clients with vertical disciplinary sub-sector analysis. This requires the establishment of interdisciplinary teams that are organised along research project lines, which can be facilitated by a specifically tailored HRD programme.

As with any organisational reform process, CORMA's introduction requires three essential conditions for success (Nickel, 1998); it needs to be:

i. *politically desirable (the benefits to the leadership must be clear and outweigh the costs)*[1];
ii. *politically feasible (leadership must be able to enact reform and overcome opposition)*[2]*; and,*
iii. *sustainable over time (COR desirability must endure and opportunities for reversal be limited)*[3].

Other questions that need to be addressed are:

i. *how to achieve critical mass involving a small team and yet have enough authority to lead the change process*[4]*;*
ii. *when and how to move from separate disciplinary research teams and FSR teams to inter-disciplinary teams*[5]*; and,*
iii. *what the internal and external role of the liaison officers will be*[6]*?*

2. Objectives

Human resource management for COR requires the formation of flexible research teams that liaise with clients, generate information on research needs and deliver the requested outputs. This can be achieved through realizing the following main objectives:

i. *to establish ARC access to both long-term expertise and short-term skills to address specific problems;*
ii. *to ensure that the mix of long- and short-term human resources of ARCs can address all-important research needs to the satisfaction of clients;*
iii. *to facilitate the required expertise being available in a sustainable way through increased staff motivation, which will lead to low staff turnover and improved continuity;*
iv. *to make efficient use of the existing human resource base in terms of flexible deployment of staff as well as inter-disciplinary teamwork; and,*
v. *to stimulating transparent research direction and leadership in order to increase staff and stakeholder ownership over the ARC and its activities.*

3.1.2 KEY ISSUES IN HUMAN RESOURCE MANAGEMENT

In order to successfully start a process of change for improved HRD and management, with the objective of strengthened client-orientation of ARCs, some key issues need to be addressed at higher (national) level before the change process can be started; these are:

1. identify the options, risks and opportunities for the human resource management change process;
2. ensure strengthened research programme leadership and management;
3. rightsize the human resource base; and,
4. introduce better management of the human resource base.

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[1] CORMA in Tanzania contributed to the autonomy of zonal research institutions and hence strengthened the position of local leadership.

[2] Capacity to overcome opposition (some with vested interests) was shown to be an extremely important leadership quality in introducing COR in the Tanzania Lake Zone.

[3] Some saw the CORMA approach of Tanzania only as viable only due to external (donor) support. Measures to ensure the sustainability of the approach and to plan donor exit strategies were essential.

[4] A change process needs both strong leadership as well as joint ownership of the process by those involved and affected. Leadership in the change process as well as ownership can be in conflict with vested interests.

[5] In some countries the FS approach to research was mainstreamed from the introduction in all research programmes, while in others capacity was initially built in separate FS programmes before mainstreaming the approach.

[6] For example for research to be become client-oriented will the liaison officer become a facilitator or still have a co-ordinating role? Can he/ she become involved in marketing of research or be more of a public relations officer?

These aspects are discussed in more detail below.

1. Opportunities and risks for the human resource management change process
In order for a local ARC to enter into a process of COR-oriented human resource management change, existing limitations and the room for manoeuvre need to be clearly established. Special attention needs to be given to answering the following questions:

i. what are the options for the change process concerning Human Resource Management (HRM) with regard to national policies, guidelines, etc. in terms of local and national autonomy and the implications of civil service statutes, etc.;
ii. what are the possible obstacles and risks in the HRM change process, such as staff needs for national career development opportunities in a situation where HRM in the context of de-centralised management is left to sub-national, semi- autonomous ARCs;
iii. in addition to incentives, are there other possibilities for re-enforcing COR attitudes;
iv. will there be adequate support for the implementation of (sub) national research policies by the national leadership (e.g. strengthening direct linkages to regional and international networks in relation to (sub) national annual research programmes);
v. will the national AKIS leadership pro-actively support sub-national arrangements as well as facilitate the information flow from sub-national to national and international level; and,
vi. will there clear roles and responsibilities in relation to HRM for sub-national and national 'Personnel Officers' (e.g. concerning the maintenance of the database)?

2. Research programme leadership and management
The COR-related management of change process needs to have strong, clear and transparent leadership, particularly concerning human resource management. A human resource management change process can potentially lead to serious misunderstandings and conflicts and consequently needs to be transparent and open to avoid such problems. Although the actual implementation of the change process can be delegated to a specially appointed team, the ARC management needs to maintain its close involvement and leadership role to ensure that all ARC staff is fully aware of the institutional commitment to make COR work. The national level has an important role in this by appointing qualified and committed sub-national ARC directors.

3. 'Rightsizing' the human resource base
The human resource base often requires to be adjusted in composition or size in order to better respond to the needs of the ARC's clients as well as to permit the allocation of increased financial resources for operationalisation of the technology development process or to improve incentives for researchers. Other reasons for adjustment can be the desire for a better balance in terms of gender and age. On the basis of clients' requests for research, relative priorities and the expected returns of alternative research programmes, some traditional research programmes and/ or scientific disciplines may have to be downsized or even eliminated. In order for this to be of maximum benefit to the local ARC, it is important to have clear agreements with the national AKIS leadership, including the 'parent Ministry' on the allocation of 'freed' resources. In order to maintain morale among staff, retrenchment arrangements, if necessary, have to be reasonable and transparency has to be maintained at all times. When a significant shift is made from station-based research to more off-station COR, ensuring a proper mix of graduate staff and support staff will also need attention.

4. Improving the management of the human resource base
Three important elements related to COR can be distinguished (Byerlee and Alex, 1998): (i) the actual administration of the research staff; (ii) incentives; and (iii) training.

Administration: ARC management needs to provide a scientific environment as well as an overall climate which stimulates innovation on the basis of identified client needs and that leads to a demand-driven output orientation of the ARC. A certain level of autonomy from the regular civil service, (where it is difficult to establish an incentive-based orientation), as well as inputs from outside through regular external reviews and assessments are important. Above all, ARC management needs to maintain awareness of up-to-date HRD approaches through regular training.

Incentives: ARC staff including management is frequently not specifically rewarded for the release of useful new technologies (nor are they punished for a lack of performance); this is often an obstacle to the introduction of COR (Ashby et al., 1994). A demand driven and output-oriented service delivery system indeed requires concrete incentives; these can however in addition to merit-based salary incentives also be of a non-monetary nature. The latter may include improved promotion schemes, opportunities for professional development of scientists through training, a feeling of autonomy and budget 'ownership', consultancy services options, regular sabbaticals, etc.; sometimes they can even be of a less material nature such as professional recognition, altruistic motivation, satisfaction of interest and curiosity etc. (Byerlee and Alex, 1998). However, all such incentives may be difficult to establish in a situation where the local ARC or even the 'mother' NARI lacks (semi)-autonomy.

Training: An important elements in a COR capacity building programme for decentralised ARCs is an intensified effort towards curriculum training and the upgrading of skills and attitudes required for inter-disciplinary COR teams to be capable of addressing the needs of the sector as seen by the clients. Training will also be needed for new staff replacing staff lost due to retirement and other causes (e.g., brain drain, HIV/ AIDS, etc.)

3.1.3 THE HUMAN RESOURCE MANAGEMENT CHANGE PROCESS

In the sections above, different options to address the key questions in CORMA implementation have been provided. In the context of determining exactly how the CORMA change process should be initiated, it is important to review the conditions under which these options can be implemented with the use of suggested tools and the cases and references presented.

1. Provide clear direction and responsive leadership
The national level reform process of agricultural research organisations towards COR and key guidelines for the leadership in the change process have been discussed in the literature (Nickel, 1998). Attention has also been given to these management aspects in Chapter 2. For national and sub-national agricultural research institutions to become more client-oriented, the following questions need to be addressed:

i. Have national policies, mission and strategies been clearly formulated?
To achieve this, it will be necessary to define and establish the appropriate policy, mission and strategies for the collaborative allocation of human resources in client-oriented technology development. Involving stakeholders in joint diagnostics and planning workshops can achieve this. Emphasis also needs to be given to a national framework for upscaling CORMA in order to avoid every ARC proceeding on its own.

ii. Is an appropriate management structure in place?
At minimum, a client-driven agricultural research institution (at national or sub-national level) requires a (semi)-autonomous stakeholder body or 'Board' in which key stakeholders and client groups are represented. There need to be clear TORs for the Board and its sub-Committees in relation to research management, finance and M&E. Research management requires to be organised in a transparent and business-like fashion with clear TORs (including CORMA principles) for the research managers.

iii. Are governance and transparency of leadership well defined and is stakeholder ownership pursued?
It is crucial to ensure transparency of the management structure in COR and it is important to make arrangements such that effective and timely management measures can be taken even when some key managers are absent. All management procedures should be well established and documented to prevent undue delays. Finally, all management procedures and information needs to be formally reported and timely communicated to all scientific and support staff.

2. The COR 'change team'
The strengthening of client-orientation of an ARC requires a management of change process facilitated by a promotion team. Appropriate incentives for the research staff involved as

well as for the change team itself are important. The process of changing an ARC with a researcher-controlled, top-down research agenda to one with a client-driven research agenda requires an institute-wide change from top to bottom and across all departments, divisions or sections. Such a change process needs to be facilitated by a team with the following attributes:

i. mandated by the ARC administration (administrative and governance boards), as well as by all concerned research staff to lead the change process;
ii. drawing participants from all major departments;
iii. team members having some background in client-orientation; and,
iv. team members having been trained in CORMA principles.

The composition of a CORMA change team ideally should comprise a range of staff of different backgrounds (including both graduate and support staff) in terms of gender and experience with client-driven research (COR, FSA, PTD, etc.). It is essential to have strong leadership and evidence of senior management backing; it is therefore important to have a representative of ARC management on the team. Different major research programmes should be equally represented within the CORMA change team. Certain team members may also be selected on the basis of their commitment to the CORMA approach or because of their experience with similar approaches such as the FSA. Linkage and liaison staff members are essential members of such teams (KIT, 1999). Team members with the appropriate skills should be given special assignments for important CORMA management areas like stakeholder linkages, information and communication management, resource management, client need assessment, pro-active acquisition and marketing of research results, etc. (see Box 3.1 and 3.2). The team may also need to employ tools such as a 'Fear map analysis' in order to facilitate smooth management of the change process (Hobbs, 1998). A "management of change" training course is strongly recommended for CORMA change teams (Lema et al., 2003).

Box 3-1
The Importance of CORMA Change Teams; the Tanzania Experience: Lake Zone

After ten years of institutionalised FSR teams actively engaged in all seven Zonal ARCs, it was agreed in 1998 that client-orientation to research should be mainstreamed in all research programmes in Tanzania. Although the newly formed socio-economic department (at national level) was to oversee this change process, in two zones special COR promotion teams were formed.

Lake Zone

The Lake Zone Agricultural Research Institute with a public mandate for all adaptive agricultural research in the Lake Zone developed a strong FSR programme beginning in 1987. A multi-disciplinary team (the "FSR team") took responsibility for all on-farm research co-ordination, research-extension linkages and other stakeholder linkage co-ordination. The Lake Zone ARC experience in developing a demand-driven research agenda was largely concentrated in this team, although the number of 'commodity scientists' involved in on-farm research increased over the years. In 1998, four new departments were formed following disciplinary lines (crops, livestock, soils/ agronomy and socio-economics). Staff-members of the former FSR team were allocated to all four departments and were requested to introduce a demand-driven orientation into the respective programmes. Fortunately, three of the new Department heads were former FSR team members. The old FSR team formed the COR promotion team, which also took responsibility for linkage co-ordination with the FRGs. The team regularly met to analyse progress made with respect to introduction of COR across all programmes of the Lake Zone ARC. The former FSR team members played a crucial role in monitoring linkages and concentrating on client-oriented research output by:

1. co-ordinating interdisciplinary research teams working with farmers in various target FRGs representing main farming system zones, as well as maintaining links with corresponding districts; and,
2. co-ordinating the development of extension messages based on joint analysis (between research, extension and farmers) of results of on-farm activities.

The institutional components such as human resource management, financial management and planning, and the M&E cycle were left to the management team composed of heads of departments.

Source: Lema et al., 2003

Box 3-2
Continuation of Box 3.1: Importance of CORMA Change Teams; the Tanzania Experience: Northern Zone

The introduction of COR in the Northern Zone of Tanzania started in April 1998 and targeted three public sector ARCs within this zone. In order to facilitate the integration of client-oriented activities in existing programmes, the institute set up a 'COR steering committee' and a 'COR promotion team'. The steering committee supervised the implementation of client-oriented activities and aimed to evaluate and direct short and long term programmes, with special attention for their coherence and sustainability within the Zonal ARC. The steering committee met on a quarterly basis and consisted of the Director (ZDRD), chair, Research Co-ordinator (ZRC), heads of research programmes and the heads of all ARCs. The promotion team aimed to improve linkages between scientists and stakeholders in the Northern Zone and consisted of 10 graduate and support staff, both male and female, with various disciplinary backgrounds (chaired by ZRC). Individuals were chosen for their interactive skills, enthusiasm and flexibility.

Within one and a half year, the promotion team achieved the following:

1. preparation of a stakeholder-approved ' Northern Zone Farming Systems Map';
2. improved public relations using a brochure and zonal newsletter;
3. establishment of a stakeholder directory and evaluation of past collaboration with 100 stakeholders;
4. an inventory of available research information and recommendations; and,
5. completion of an assessment of research staff training needs and staff training in skills related to demand-driven research.

In 1999, the COR promotion team was dismantled. Progressively, the needs for internal management changes were addressed as it became clear that improved external relations alone would not suffice to increase the level of client orientation. Issues such as accountability, transparency, and internal quality control of both research and its outputs affected all departments in the institute. The management team (chaired by the Director) of co-ordinators and senior managers of departments such as research, financial administration, information management, and liaison activities took over the role played by the former COR promotion team.

Notwithstanding the successful re-orientation of research in the Northern and Lake Zones, three important problems were identified in the early stages:

1. a large portion of staff felt excluded from active participation in COR activities;
2. investments are required for the stakeholder inventory, farming system zonation map, PR materials, liaison activities and staff training and arrangement for financing need to be made in advance; and,
3. a lack of authority of the team, since conflicts of authority arose between the Socio-economics Department (mandated from the national level with planning and co-ordination) and the COR promotion team (mandated in the zone).

Source: Lema et al., 2003

3. Upgrading of staff competence to respond to stakeholder needs

Key questions to be addressed in implementing CORMA at ARCs are:

i. Have business plans at sub-national level been prepared?

If such plans, preferably with a five-year time frame and including sub-national priorities have not been established for the ARC, then priority setting with intensive stakeholder participation is first required[7].

ii. Has a long-term HRD plan been established in relation to business plan needs?

Based on established priorities and needs assessment with clients, a long-term HRD investment plan needs to be developed. Key elements and options to be considered in such a plan are: training needs assessment, establishment of a training database, required internal reallocations of staff, and recruitment and partnership policies. In order to meet new skill requirements, long-term training contracts may need to be explored as well as alternatives for training sponsorships.

[7] In Tanzania priority setting was implemented with the full range of key stakeholders in all ARC zones. The ranking of commodities and key problems was based on mathematical scoring using previously established criteria, which were determined in close consultation with all stakeholders. The priority setting resulted in a categorisation of key problems and commodities in three groups: (i) 'high priority', requiring increased investment in financial and human resources; (ii) 'medium priority', where investment levels could remain the same; and, (iii), 'low priority' where investment levels could be reduced (Kabissa et al., 1994).

Box 3-3
Incentives for Researcher's Client Commitment; the Tanzania Lake Zone

Different monetary incentives systems have been developed for researchers to become more client-oriented. The incentive can be provided directly by the client (as part of a research contract) or by the ARC;

1. incentives through contract research i.e. when individual researchers or teams are contracted by private farmers, producer organisations or the agro-industrial complex (i.e. 'commercial' research); or,
2. incentives from the ARC based on well-established criteria for client-orientation.

Most situations are however, in between these two extremes: researchers receive some financial incentive for COR either through part of the institutional fees received from clients or through travel allowances for on-farm research etc. A system of incentives for research needs to be related to the output and hence has to be agreed and decided upon by the clients.

In a meeting with stakeholders (District authorities, extension services, farmers) in the Lake Zone in 1995, the following was agreed as 'common practice' in relation to contract research:

1. Lake Zone ARC has a public mandate for adaptive research in the Lake Zone;
2. resources provided by the national level for research are mainly fixed direct costs (salaries) and fixed indirect costs (offices, vehicles, etc.);
3. research is specialised work and it is in the interest of the Lake Zone clients to retain research staff;
4. clients are prepared to pay for research on-top of the agreed minimum core demand-driven research agenda (as established directly with Farmer Research Groups and other producer organisations);
5. contract research paid for by clients is expected to greatly contribute to the client orientation of research;
6. agreed fees for additional contract research at most amount to 50 % of customary fees for local consultants; and.
7. the fees collected are to be used by the research institute for overhead costs and by the researchers as incentives for COR, roughly 50/ 50.

An important element in this agreement with stakeholders is the commitment by all (researchers and stakeholders) to implement research contracts through the agreed system. This was implemented gradually due to commitments under on-going contracts, stakeholder and donor policies and opposition due to personal interests. A first step was to make all contracts and arrangements transparent to the management and indeed the whole ARC.

A financial incentive, as part of a research contract with district authorities, however remained sensitive. Not all district officers are convinced of the special nature of research work and the corresponding incentives paid.

Source: Lema et al., 2003

iii. Does the research staff have the essential skills for COR?

The ARC research teams will need to have skills that have been prioritised by clients and other stakeholders. A disciplinary skill change and corresponding skill development effort in response to established stakeholder needs is often required. The progress in skill development should be regularly assessed and closely monitored through staff contracts; regular feedback from clients also needs to be collected. Certain disciplines or commodity or factor focus areas may become obsolete.

iv. Has a client-oriented attitude and culture been well established with ARC staff?

The impact of training in client-orientation needs to be determined on the basis of client satisfaction surveys. Special attention needs to be given to the (service) attitude and culture of researchers and to the notion that the client always 'has the last word'[8].

[8] Or as Mahatma Gandhi said about clients: 'A client is the most important visitor on our premises. (S)he is not dependent on us. We are dependent on her/ him. (S)he is not an interruption on our work. (S)he is the purpose of it. (S)he is not an outsider to our business. (S)he is the core of it. We are not doing her/ him a favour by serving her/ him, (s)he is doing us a favour by giving us an opportunity to do so' (local bookshop, Mwanza, Tanzania).

4. Increased staff motivation for COR
The following questions need to be considered:

i. Are basic staff remuneration systems well developed and implemented?
It needs to be established what the current situation, trends and problems in staff remuneration are and how they relate to similar institutions. In order to develop recommen dations for improved staff remuneration, there will be a need to analyse key parameters such as: staff turnover rates, the degree to which staff is involved in additional jobs to compensate for low salaries and the absenteeism of senior staff. It will be important to determine management's and staff's views regarding the transparency of the promotion and (annual) increment system and what staff perceptions concerning the criteria for salary increments and/ or access to training opportunities are (see Box 3-3).

ii. Are clear TORs established for all staff and regularly assessed?
For COR to be successful, every staff member (or category of staff) needs to have clear TORs, which are regularly reviewed in consideration of changing market demands. In the individual performance assessment and contract review sessions, personal targets must be considered.

Box 3-4
COR Incentives for Research Staff; an Example from Kagera in Tanzania

Basic staff remuneration in Tanzania is not well developed. Staff salaries are low and promotion opportunities limited. Even though there is a system of annual staff performance assessment this system has not been transparent and recommendations for promotion have not been implemented or have not resulted in salary increase or training opportunities. As a result well-trained staff has been motivated to search for other job opportunities and most researchers in Tanzania have additional sources of income.

Staff can be retained though through additional staff incentives. This has been the case at Maruku ARI, the research station in Kagera Region. In the past 7 years, the institute has successfully retained its staff and staff is highly motivated to remain employed at the station. The following incentives have played a substantial role:
1. Contract research fees: Since 1996, the institute can implement research activities in its mandate area if these are requested and funded by clients (e.g. contracts District Councils and District Development Programmes, CARE, Worldvision and CARITAS) (see also Box 3-3).
2. Output awards: Researchers are awarded for the production of research reports and extension material varying from US$ 100 to US$ 200 per report, to be shared between the authors. Researchers are also awarded for peer reviews of reports and extension material (US$ 10 per review). These awards are included in research budgets and are funded by clients of research.
3. Social incentives: The institute earnings from contracts are paid into the "Self Help Fund". The Self Help Fund has contributed to e.g. purchase of a satellite dish, a television set for the community centre, and the annual New Year's party.
4. Secondary working conditions: The institute has a fair amount of land. Each researcher's household has been allocated land for production of maize and bananas. The research station is relatively far from the nearest town. Staff is not able to bring their small children to nursery schools in town. Instead the institute has set up its' own nursery school. Dilapidated buildings were renovated and a playground was constructed. All staff now send their smallest children to this school.

In the addition to the above incentives, the Northern Zone ARC, introduced:
5. Acquisition fees: Liaison officers who acquire new assignments are awarded 10% of the fees (e.g. policy paper). This has been extended to other staff.
6. Improved working conditions: Through collaboration with the ASARECA AfriLink programme, one of the Northern Zone institutes has been linked to the internet through a cable connection with a local ISP. An internal network has been set up and at present 15 computers have access to Internet services.
7. Service unit incentives: The institute has reorganised support services in independent units. Each unit has a business plan and is managed by the head of the unit, often assisted by one or more other staff. The units manage their services in a commercial manner. Profits are transferred to the Self Help Fund. However, each unit is allowed to retain 20% of the profit as an incentive to its staff on the condition that this does not exceed US$ 50 per person per month

Source: Heemskerk, 1996, NZARDI, 2000, Lema et al., 2003

iii. Are there additional staff incentives facilitating COR impact?

It is important to have incentives different from and additional to, the ones foreseen in the regular civil service schemes (if applicable). It may be useful to consider the introduction of other performance and merit-based incentives such as: output fees, achievement awards, acquisition fees, etc. At the same time, non-monetary incentives such as conducive working conditions (office, transport, computer use etc.) and social incentives (schools and health facilities, access to satellite TV, a Community Centre, social events, sports etc.), may be introduced. Such improved incentives, combined with a people-centred HR management style (e.g. encouraging feedback, personal attention), can provide powerful motivation for CORMA introduction and sustainability (see Box 3-4).

5. Organisation of a flexible workforce

In order to achieve an optimum allocation of research staff, the following questions need to be addressed.

Box 3-5
Organisation of a Flexible Workforce; an Example from the Lake Zone in Tanzania

An important element in COR is that research is implemented through flexible teams. Human resources in research institutes are mostly organised along disciplinary lines. Clients (and in particular farmer organisations such as FRGs) require multidisciplinary teams for the solution of their problems.

Following the institutional change from FSR and Commodity and Factor Research Teams to four main disciplinary programmes in 1998 in Tanzania, there was a need for a flexible team approach. This was implemented in the Lake Zone through the following activities:

1. *COR teams working with FRGs*
   One or more FRGs in the Zonal Agricultural Research System represents each of the major Farming System Zones in the Lake Zone. The link between the FRG and the concerned on-farm research programme, extension staff and the research staff involved, is managed by the FRG linkage co-ordinators. These are mainly former FSR researchers in the new disciplinary programmes. A team is formed with the extension officer and all scientists working with a particular FRG.
2. *Thematic working groups*
   Some major research priority areas require special working groups e.g. Integrated Pest Management and Integrated Soil Fertility Management. Such themes do not fit in disciplinary programmes because they are cutting across different programmes and sometimes included stakeholders from outside the research system.
3. *Annual' team awards'.*
   In Tanzania an award system was introduced in 1998, which allowed awards to individual scientists as well as teams for specific performance such as 'best zonal FRG-researcher team' and 'best interdisciplinary team'.
4. *Monitoring of team performance*
   Researcher teams working with FRGs are monitored on a quarterly basis through (FRG-chairman signed) reports of the extension officer, as well as by analysing the level of staff involved in the activities (a tendency exists for junior staff to be in charge of the on-farm activities).
5. *Team co-ordinators*
   In the Lake Zone the FRG linkage team co-ordinators initially formed the Farming Systems Approach Team (representing different departments) and later the COR promotion team.
6. *Non-research team members*
   In interdisciplinary research teams, extension staff and farmer representatives can be full members. Examples in the Lake Zone are in Integrated Soil Fertility Management (with a farmer expert as a member), FRG linkage groups with extension staff as members and IPM teams with veterinary staff as members.

Source: Lema et al., 2003

i. How are human resources allocated to the research assignments?
It is important that the number of researcher-days for each specific research activity or other required participation is considered and accounted for in the annual ARC planning exercise. The participation of clients and other stakeholders in the research activities also needs to be quantified and jointly planned. The monitoring system should include time management elements and an ARC CV database be maintained. Researchers can be grouped along commodity lines or on a disciplinary basis in order to be easily available for inter-disciplinary teams when the need arises[9].

ii. How are research assignments addressed and implemented by inter-disciplinary teams?
In COR it is not possible for every researcher to have regular contact with all clients involved in the particular research activities. Researchers will therefore be often represented by one of the team-members. Such representation must be well-organised and open communication ensured. Inter-disciplinary teams also often constitute staff from other institutions (District extension staff, semi-public special research centres, etc.) or representatives of client and stakeholder groups (e.g. the private sector or farmers group representatives, etc.); it is crucial to ensure that all team members are adequately trained in COR so that they can work in synergism[10].

6. Enable effective team work and communication among staff
It is useful to consider the following questions.

i. Are there effective internal communication structures?
The communication and information management processes within the COR team are essential for well-functioning inter-disciplinary teams especially when they comprise representatives from different sub-sectors and stakeholders. It is also important for teams to have in place a system of regular technical and (logistics) management meetings. Internal seminars, suggestion boxes or other procedures, such as a calendar of activities, should be used as part of the team learning process.

ii. Is there a system of team performance evaluation and team performance incentives?
The performance of interdisciplinary teams involved with COR requires regular assessment and the key indicators for team performance evaluation should be clear and known to all concerned. If possible, these indicators should simultaneously be used for special team performance awards. It is also helpful if the inter-disciplinary character in teamwork activities can be measured in input terms (financial and human resources involved in joint travel, joint village/ FRG meetings, field days, etc.) and in terms of the quality of output (research results being more effective) (see Box 3.5).

3.2 Financial management

3.2.1 BACKGROUND AND OBJECTIVES

1. Background
Establishment of a more demand-driven research agenda and improved service delivery will contribute to enhanced effectiveness of agricultural research (Tabor et al., 1998). Increased client-control over the research agenda and over resource allocation for research will lead to improved efficiency of research programmes.

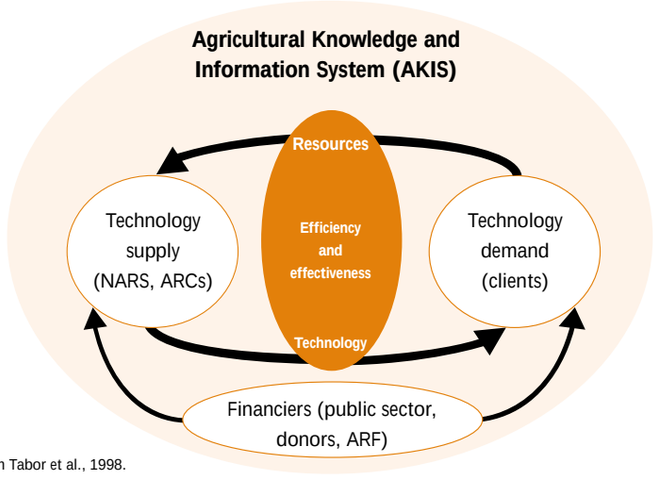
[9] In Tanzania breeders (but also other disciplines) were traditionally allocated exclusively to specific crops e.g. cotton, maize, sorghum etc. In the Lake Zone, the CORMA team decided that breeders should be available to interdisciplinary teams and address breeding problems in crops other than the ones in which they were specialised (if necessary providing these scientists with additional training).

[10] In Zambia (ARPT-WP, 1993) on-farm trial technicians were always seconded to the inter-disciplinary research teams by extension. This resulted in good interaction with extension while it also contributed to a better balance between research and support staff.

Three main groups of actors that are involved with different aspects can be distinguished in an AKIS (Fig. 1):

i. the technology supply by the NARS (National and zonal public sub-national research institutes, private sector, NGOs etc. and also sometimes from elsewhere, e.g. by the IARCs and regional programmes);
ii. the technology demand of clients such as farmers (village and producer organisations), extension services, District Governments, NGOs, etc. ;and,
iii. the financiers of the agricultural research sub-sector such as government (National and increasingly Local Governments), donors, farmers and others.

Figure 1
Supply and Demand for Technology in an AKIS



Source: Adapted from Tabor et al., 1998.

The clients express their technology demand and in some case are enabled to provide all or part of the financial resources required. The supply of technology is still mostly financed by Government and donors, but these financiers are increasingly also financing technology directly demanded by clients, (i.e. they provide financial resources to clients who themselves arrange for the execution of the required research). New financial strategies and modalities for the agricultural technology development process at the local level are being developed by the different actors in order to strengthen client-orientation of the main (i.e. public) technology suppliers, as well as to strengthen the capacity of the technology demand side (by client/ stakeholders such as District Councils in a decentralised system).[11]

2. Objectives

Achieving the following objectives (and corresponding outputs) can greatly contribute to the success of the change process towards improved financial management for COR at the local level ARCs:

i. stimulating the decentralisation of the research system;
ii. increasing the diversification of research funding;
iii. enhancing the efficiency and cost-effectiveness of local level ARCs; and,
iv. improving the transparency of financial management.

3.2.2 KEY-ISSUES IN FINANCIAL MANAGEMENT

1. Issues arising from self-assessment

In the COR assessment phase, an analysis needs to be made at the ARC level of financial management issues as seen by the clients and stakeholders of the research system. The assessment should however, first of all be completed by those directly responsible (i.e. local and national researchers and support staff). Such a self-assessment should relate in particular to the efficiency of the use of existing financial resources such as:

[11] Examples are: a shift from financing research input supply to financing output demanded, cost-sharing as well as contractual arrangements between those that supply and those that require improved technologies, increased financing by the private sector, public-private partnerships in agricultural technology development, etc.

i. success in fiscal decentralisation of the research system from national to local level;
ii. the degree of success in the diversification of research funding and the commitment by all researchers and stakeholders to adhere to an agreed system;
iii. improvements in efficiency and cost-effectiveness of ARCs (e.g. covering current over head, sustaining well-functioning support services, efficiently procuring goods and services, maintaining assets and equipment, and successfully preparing and monitoring activity-based budgets; and,
iv. greater internal transparency in financial management including a single accounting system and ARC budget known to all concerned, etc.

2. Issues arising from stakeholder assessments
Additionally assessment by key stakeholders (including multi-stakeholder Governing and Executive Boards and Committees), of the client-orientation of the local ARCs in relation to financial management will mainly focus on the level of demand-drivenness and the corresponding cost-sharing, cost-recovery and funding mechanisms (e.g. contract research, ARFs, etc.). Clients of research will assess to what extent adaptive research is client-driven, based on the level of client control over a significant proportion of the resources required for the research programme (Ashby et al., 1994).

Important components are:

i. client perception of financial transparency such as the presentation of audited financial reports to a stakeholder committee;
ii. perceived price/quality ratios of services provided with reference to establishment of criteria with stakeholders, ex-ante analysis procedures, etc.;
iii. local ownership of the ARC and the corresponding funding consequences e.g. in relation to decision-making over public resources allocation, involvement in the annual budget and control cycle, etc.; and,
iv. assessment of capacity to translate needs and problems into research requests and proposals, including financial aspects such as evidence of the need for capacity building in budgeting, resource allocation and applying cost-sharing and cost-recovery principles.

3.2.3 THE FINANCIAL MANAGEMENT CHANGE PROCESS

1. De-centralisation and financial autonomy for ARCs
   Client ownership over local adaptive research programmes and institutions can be improved by bringing the research institutions closer to the clients. Decentralisation of authority to the sub-national level will be a sine qua non for achieving this goal. Many NARIs have embarked on a de-centralisation process to improve client-orientation; this often comprises:

i. decentralisation of authority in terms of knowledge/ capacities;
ii. decentralisation of authority in terms of administration; and,
iii. decentralisation of authority in terms of resources (financial, human, infrastructure and communication).

Decentralisation of authority in terms of knowledge and capital has been found to be most critical (van den Dool, 1999). However, only decentralisation of authority of all three elements simultaneously (even if phased over time), can achieve effective local authority and will allow integrated management at ARC level. Local research institutions may have different degrees of autonomy in a NARS but in order to become client-oriented, a level of fiscal autonomy is essential; this is particularly important in a situation of a fiscally decentralised local government system. To diversify research funding and improve efficiency at the local level, at least three conditions for fiscal decentralisation have to be met before financial sustainability at the local level can be effectively achieved; these relate to: (i) authority for financial planning; (ii) revenue retention; and, (iii) financial management capacity. These are discussed below.

i. Authority for financial planning and strategy development.
Rules and regulations for financial planning of public and semi-public institutions are normally established at national level. The national authorities need to determine clear policies in relation to research funding (according to different modalities), ownership of research results/ products e.g. concerning Intellectual Property Rights (IPR), competitive technology development funds or ARFs, the authority to allocate and use these funds, powers to sign and negotiate contracts, use of public funds by other than civil servants, decision making by non-public stakeholders over public resources, etc.

ii. Revenue retention at local level
In relation to the products and services of the ARC, it is necessary to determine the conditions and rules for retaining revenue at local level, the administration of local revenue retained, maintaining transparency and control of funds, planning of local revenue generation and use, etc.(see Box 3-6).

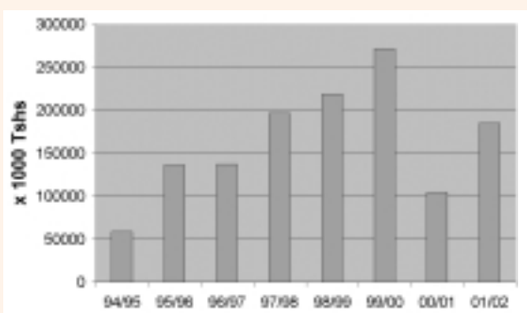
Box 3-6
ARC Revenue Retention - Self Help Funds in Tanzania

Before 1993 all revenues collected from incomes of farm produce, animals and fees from ARCs were sent to the central government treasury for reallocation to any sector; revenues from ARCs were in most cases reallocated to other sectors; this provided little incentive for revenue generation. Since 1994, the government allows ARCs to retain revenues collected from research centre activities. These revenues are retained as 'Self Help Funds' (SHFs) and ARCs are allowed to spend these funds for authorised expenditure like station maintenance, upkeep and research programmes. A circular from the treasury which paved way for the establishment of this fund further elaborated that an Advisory Committee should be established at every ARC with members are appointed by the Principal Secretary. However these committees have not functioned because of a lack of budget and management of SHFs has so far been with the ARC Directors. A recent study revealed that various drawbacks have hindered the generation of optimum revenue, such as old and poor working conditions of ARC machinery, electricity cut-offs and weak staff morale due to a lack of promotions for a long time. The study however also showed that all ARCs have considerable additional potential for revenue generation, although success will be attained only subject to resolving the prevailing problems and sometimes the provision of seed capital to start. At some ARCs a lack of skills to act in a business-like fashion with the objective of generating revenue and poor staff motivation are serious constraints.

New sources of Revenue. During the last few years all Tanzania ARCs relied on revenues use the following assets as sources of income: farm land/ animal farm (renting out farmland to individuals, seed companies etc.); farm machinery and implements (hiring out equipment and cars); buildings and laboratories (workshop and laboratory service fees); human resources (contract research); crop residues and crop produce (food, feed, seeds and breeds).
(Ministry of Finance Tanzania ,1994 and TARP II, 2002).

Although there is impressive growth in gross revenue generation, the net amounts (after deducting related expenditures) that can support research activities are relatively small. This is likely to be less than half the amounts in shown the figure below. Nevertheless, experience from this scheme shows a promising trend that research stations can generate more resources once they focus on client needs. Strategies to generate more as well as effective mechanisms to manage the fund are required to make this scheme a sustainable source of research funds. Currently most of the money raised is used to maintain plant and machinery and for purchase of inputs

See for the aggregate Self Help Fund Revenues (1994/ 95 – 2001/ 02) the following table (Mid-Term Planning, 2003):



Note that the sharp drop in 2001 and 2002 is among others caused by low institutional fee contributions to the cotton, coffee and cashew cess funds, caused by a fall in world market prices and decreased acreage.

Source: MTPPT, 2002.

Box 3-7
Annual Presentation of Self Help Funds; an Example from Kagera in Tanzania

In 1994 the Tanzanian Government authorised sub-national research institutes to retain revenues in a Se/If Help Fund (SHF). Revenue can be generated from a number of sources, but can only be used for station maintenance, purchase of farm inputs and farm equipment, wages for casual labour, expenses connected with research activities e.g. running of motor vehicles, travelling, and station overheads such as electricity and water. Income and expenditure planning and reporting had to be supervised by a Financial Advisory Committee that would be composed of stakeholders in the mandate area. Stakeholders were to be paid honoraria as committee members. For most stations revenues were limited and honoraria could not be paid. As a result, Financial Advisory Committees were never set up.

In order to increase the transparency over the SHF for stakeholders Maruku ARC in Kagera Region introduced an annual presentation of its SHF. Since 1997 the institute organises an annual stakeholder meeting. The meeting is attended by representatives from stakeholders in the region such as government extension services, rural development programmes, NGOs, and traders. Researchers and stakeholder representatives present progress on research and development activities and discuss priorities for the following year. Through contracts and collaborative agreements, stakeholders contribute directly to revenues of the institute. During the meeting, the director of the institute presents income and expenditure statements for the past year that include all fund contributions from donors.

Number of research contracts and their contribution to the self-help fund from 1995 to 2000, Maruku ARC.

Financial year	Number of contracts signed	Revenue for Self Help Fund [TShs]
1995-1996	2	684,000
1996-1997	9	5,576,000
1997-1998	11	4,412,800
1998-1999	7	4,744,800
1999-2000	12	4,868,800
Total	**41**	**20,078,400**

In the 5 years mentioned in the above table, 80% of the revenues for the SHF came from research contracts.

Source: MARI (2000a)

i. Financial management capacity at local level.
Financial administration staff at local level needs to have the capacity to handle de-centralised financial functions. This means training and empowerment of financial and administrative management and accounting staff at local ARCs. Empowerment of technical structures at the local level requires strengthening of the administrative and financial infrastructure if decentralisation is to be effective (Elliot in Tabor et al., 1998).

ii. Fiscal decentralisation: the process
Fiscal decentralisation is a condition for a transparent, diversified financial management system of a NARI and its local level ARCs (see Box 3-8).
The different steps required at ARC level are:

- take account of the status at NARI level, analyse the existing situation at sub-national ARCs concerning handling and authority concerning different types of funds;
- make all financial flows transparent at ARC level in terms of the quantity of flows as well as the regulations and procedures applied;
- compare the current level of revenue retention at the ARC with the potentials;
- negotiate through the NARI with the Ministry of Finance about modes of operation for fiscal autonomy at sub-national level;
- reach agreement with the Ministry of Finance and indeed all partners and stakeholders involved about financial regulations and procedures including internal and external auditing; and,
- develop a financial management plan with stakeholders, which is decentralised, transparent, efficient and diversified.

Box 3-8
Fiscal Decentralisation to ARCs; Examples from Mali and Tanzania

Different NARIs have reached different levels of fiscal decentralisation. The most common initial situation is that any revenue or other source of income of the national research organisation or sub-national research centre has to be reported and transferred to the Ministry of Finance. In some countries special arrangements for revenue retention have been made with the Ministry of Finance (e.g. Tanzania), while in others ad-hoc arrangements are used (e.g. Ethiopia). In some other countries, the NARI has become fully autonomous such as the National Agricultural Research Centre in South Africa, NARO in Uganda and IER in Mali. Some examples are discussed below.

In Mali, The 'Institut de Economie Rural', IER, has recently established full financial autonomy. The new legal framework of IER promotes the development of a strategy of sustainable funding of its activities. The transformation of IER to an « Etablissement Public à Caractère Scientifique et Technologique (EPST), i.e. a public establishment with a scientific and technological mandate » provides it with the legal right to explore sustainable funding. Law no. 001-039 of June 6, 2001 describes the creation of the Institute and article 6 specifies that the institute can explore and use the following financial resources:

- Income from the delivery of services (consultancies, technical assistance, etc.);
- Income from the sale of agricultural products;
- Contributions by Donor agencies;
- Capitalisation of its assets;
- Other sources.

In Tanzania, DRD remains a Division of the Ministry of Agriculture and Food Security. DRD has however, successfully negotiated with the Ministry of Finance a system for revenue retention at the local level (i.e. the ARCs). The system includes clear guidelines for internal and external auditing at the zonal level, as well as a financial 'overhead' contribution of Zonal ARCs to the national DRD.

In Mozambique and Ethiopia fiscal decentralisation is only just starting. Different research institutes (Mozambique) and Research Centres (Ethiopia) have independently negotiated various levels of revenue retention with the Ministry of Finance although the national research organisations in these countries have a certain level of financial autonomy.

Source: Different partnership programmes of KIT with referred organisations

2. Diversification of research funding.

Dependence on a single financier, whether Government, external donors or the private sector is risky in terms of organisational sustainability and the possibility of unbalanced policy pressure such as sometimes happens with externally (donor) funded programmes or in cases of 'produce board' financing which may result in an exclusive cash crop orientation. In order to increase the leverage of clients and other stakeholders over research priorities and to achieve a more client-driven research agenda, financial resources have to be increasingly controlled (and provided) by clients. These are important factors in the drive for diversification of research funding (Ashby et al., 1994). Key elements that need to be addressed are: the levels of divestiture by central government, client contracts, export crop levies, royalties (e.g. plant breeding rights), sale of products and services, competitive grants, legal frameworks for the establishment of public-private sector partnerships to ensure sustainability, etc. ARCs will need to document the present level of diversity in research funding and analyse options for additional funding from non-traditional sources (cf. 3.2.3.1). In the Lake Zone, Tanzania it proved possible to change shares of different modalities of funding in a relatively short period. The total proportional share of direct Ministry of Finance (i.e. "core") funding dropped from 32 to 17 % in a three year period (Figure 2), in favour of contract, collaborative and Zonal Agricultural Research Fund (ZARF) contracts all with strong stakeholder involvement and control[12].

[12] The share did not drop in absolute terms, but in proportion.

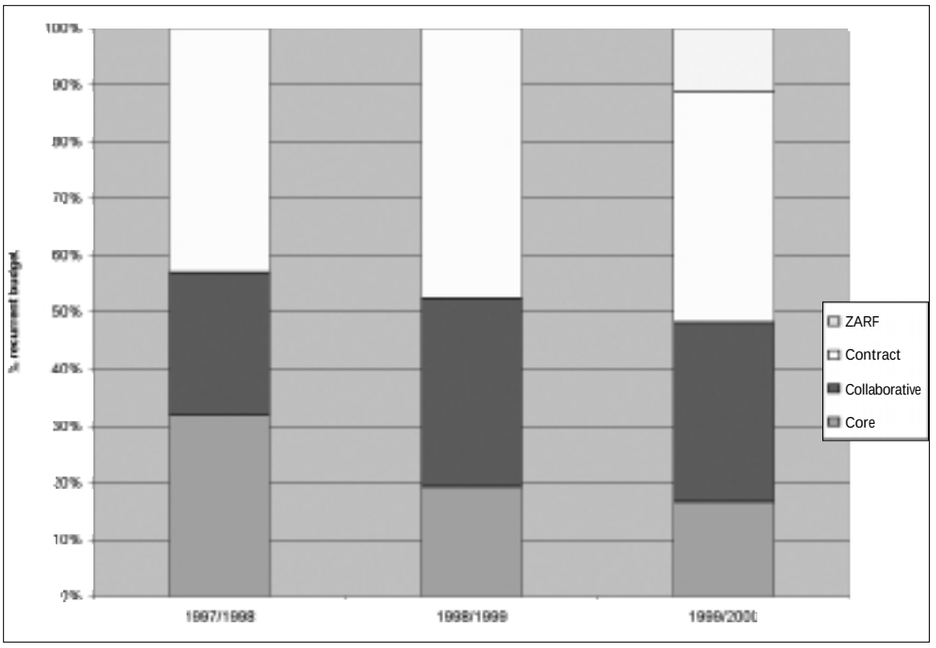


Figure 2
Share of different funding modalities in the total operational research budget of the Lake Zone Agricultural Research Institute, Tanzania over a three-year period. Source: LZARI, Tanzania, 2000.

In reviewing diversification opportunities, several questions need to considered; some of the most critical are:

i. Does the ARC have transparent funding mechanisms?
A study of all financial flows within the ARC as well as of the rules and regulations that determine these flows needs to be completed before the change process can effectively start (Box 3-9).

Box 3-9
Transparent Funding Mechanisms; an Example from the Tanzania Lake Zone

Partly as a result of the limited allocation of operational funds by the National Government, sub-national ARCs and their staff have become quite creative in attracting research resources from a variety of other sources. The following steps were undertaken in the Lake Zone, to streamline the funding situation:

1. the ARC made an inventory of all research activities undertaken by its scientists;
2. source, amount and funding modalities (fees, per diem, transport etc.) for each contractual arrangement were registered and presented to all researchers in the internal planning meetings;
3. new contracts were centralised (signed by ARC management);
4. guidelines were developed by the management team for different funding modalities;
5. these guidelines were enforced by the ARC management in all contracts through (sometimes) very tough negotiations;
6. contributions from all contracts were deposited in a revenue retention fund (SHF), which reported quarterly to all researchers and to national research management; and,
7. overall financial budget and annual financial results were presented to multi-stakeholder research committees (ZTC and ZEC) and reported in annual reports.

Source: Lema et al., 2003

An inventory of all services provided and the real costs of these services in comparison with similar (potential) service providers is also required. It needs to be known how these services are marketed and to what extent the costs are known by clients and stakeholders.

ii. Has the ARC entered into formal agreements concerning contract and collaborative research arrangements with clients and with regard to procedures for their proper management?
If not, contractual arrangements between clients and research need to be established in a stakeholder workshop, as well as procedures for guaranteeing the transparency of contract and collaborative research agreements (cf. Annex 3.3).

Box 3-10
Experience with Zonal ARFs; the Northern and Lake Zones in Tanzania

In 1999, Zonal Agricultural Research Funds (ZARF) were established in the Northern and Lake Zones of Tanzania. In these zones the procedure from ZARF initiation until research project funding included the following:

1. Appointment of a multi-stakeholder ZARF management committee (MC) and a secretariat. The ARC Executive Board approves the appointments.
2. MC-members discuss the constitution, which is then drafted by the secretariat. The constitution specifies a.o. priorities and funding modalities.
3. The MC endorses the constitution, which is submitted to the Executive Board.
4. The ZARF is registered as a foundation and bank accounts are opened.
5. The ZARF is promoted amongst potential sponsors.
6. Once funds are received the MC officially calls for proposals in the zone.
7. The secretariat receives and registers all proposals.
8. Peer reviewers appointed by the ZARF-MC review the proposals for scientific quality.
9. The ZARF-MC reviews proposals of adequate scientific quality using ZARF criteria.
10. Quality proposals are ranked and the MC allocates funds according to rank position.
11. The ZARF-MC informs principal investigators who submitted a proposal of comments made and funding decisions taken.

In 1999 the Northern Zone ARF (NZARF) was promoted among potential sponsors and received a total of US$ 61,000. As IDA had agreed to match funds equally, NZARF funds increased to US$ 122,000 in 2000. The constitution specifies that a maximum of 10% of annual funds can be used for administration (including secretariat, M&E, publicity and independent auditing). Thus US$ 109,800 was available to fund demand-driven research. In 1999 the Northern Zone ARF (NZARF) was promoted among potential sponsors and received a total of US$ 61,000. As IDA had agreed to match funds equally, NZARF funds increased to US$ 122,000 in 2000. The constitution specifies that a maximum of 10% of annual funds can be used for administration (including secretariat, M&E, publicity and independent auditing). Thus US$ 109,800 was available to fund demand-driven research. Proposals had been called for in 1999 and were endorsed by the Executive Board when they were technically sound. These were submitted to the ZARF-MC and assessed using ZARF criteria (see Annex 3-4). The MC members rejected proposals with low scientific quality scores, those that lacked evidence of client demand, and those that were not in line with ZARF priorities. Committee members rejected 32 proposals and accepted 22 proposals for funding (the number of proposals is an indicator for empowerment of stakeholders in the ZARF-MC).

Source: Lema et al., 2003.

Box 3-11
Continuation of 3.10: Experience with Zonal ARFs; Tanzania: Central Zone

In 2000 the Central Zone ARC also set up a ZARF. In this process a slightly different approach was used. To start with, the ARC called for two stakeholder meetings. Participants in the meetings discussed funding for research and development in the zone and agreed to set up a ZARF. The ZARF is chaired by one of the Regional Commissioners from the zone. District Councils committed funds, which IDA matched. None of this is used for administration. Instead MC members are funded by stakeholders that they represent while recurrent costs such as review costs and M&E are borne by approved research projects.

Major lessons learned in Tanzania are:

1. a ZARF needs to be launched in a wide stakeholder meeting to ensure stakeholder awareness and commitment;
2. fund acquisition needs major attention every year;
3. the constitution should be widely discussed with possible sponsors to ensure that sponsors agree with priorities, funding modalities and the MC administrative and managerial set-up;
4. the majority of MC members should be stakeholder representatives;
5. calls for papers should be widely advertised to allow organisations other than public research institutes to submit proposals; and,
6. MC members need training to screen proposals, monitor and evaluate research projects.

Source: Lema et al., 2003

iii. Does the ARC have access to competitive agricultural research funds or ARFs)?
Most ARCs have some degree of access to ARFs at the national or local level. Some ARCs play a role as the secretariat of local ARFs. These ARFs can be 'open' in terms of demand

where different technology clients compete with each other, but also in terms of technology supply where different technology suppliers compete for addressing an identified priority demand (see Annex 3.4 for ARF guidelines) (See Box 3-10 and 3-11).

Box 3-12
Funding Mechanisms; an Example from the Lake Zone in Tanzania

Most ARCs have a capital and operational budget mainly funded by the Central Government or through the Government by multilateral and/ or bilateral donors. Particularly for the operational budget, alternative forms of financing research have developed varying from sale of produce to renting out compound houses and land.

Examples of research funding modalities (of operational costs, excluding full overhead costs) in the Lake Zone, Tanzania.

Modality and type	Financial source	Institutional fees	Researcher incentives	Research priorities established by
1. Core funding	Government/ donors	Core funding of support services	No special incentives	Local researchers, extension, FRGs
2. Collaborative research	(Inter)national agencies/ partners: ASARECA, SACCAR, ICRAF, IITA etc.	10 % of operational costs	International per diems	International and local researchers
3. Contract research	Clients (Districts, NGOs, Coffee and Cotton Produce boards):	50 % of local consultancy rates	60 % of fees plus per diem	Clients
4. Competitive grants	Zonal Agricultural Research Fund (ZARF)	same	60 % of fees plus per diem	Clients and researchers
5. Farmers' requests	Farmers pay 10 % of operational costs (cost-sharing)	Paid from core funding	No special incentives	Farmers
6. Sales (produce, seeds, reports etc.)	Customer pays	Established prices	% for the corresponding research programme, rest for ARC	Customers

In the Lake Zone the diversification in terms of direct cost funding have been very promising over the last few years. The proportion of Modality 1 in the overall budget is gradually decreasing in favour of other sources of funding, notably Collaborative Research and Contract Research.

Follow-up strategies for further development of a financially sustainable ARC have been formulated, which can be grouped as follows:

1. contributions to direct costs for research programmes: further diversification of funding, a greater proportion of costs to be considered as 'direct costs' (computer use, transport etc.), commercialisation of services (seeds, laboratories, documentation etc.); and,
2. contributions to overhead costs: salaries paid by Government but on contract and subject to review, establishing more efficient support services, shared transport pools, training budget (local resources, training fund, strategy etc.).

Source: Lema et al., 2003

iv. What other funding opportunities are available?

Possibilities for the generation of additional funds for non-salary research operating costs depend on the situation of a particular ARC. However, most ARCs have an important role in the production of private goods such as seeds (with or without receiving royalties), and also of other quality planting materials (e.g. fruit tree seedlings) and animal breeding products. Capitalising on such opportunities is to a large extent dependent on existing legislation and rules (which sometime can be modified). There may also be possibilities of cost-sharing arrangements with farmers and farmer organisations or with the private sector, and with the ARC staff (sale of produce to staff and other internal 'services')(see Box 3-12).

3. Improvement of efficiency and cost-effectiveness.

The efficiency of agricultural research can be enhanced through improving the quantity and quality of output with the existing means through enhanced priority setting, client-orientation of services provided and, importantly, improved financial management. The

efficiency of research output can also be improved through maintaining the quality and quantity of output while reducing costs, either direct costs (operational costs) as well as indirect costs (institutional overhead costs)[13]. Costs of research activities and in particular of costly on-farm activities need to be quantified and made transparent and options for cost-reduction considered with the clients. The direct costs of research (actual operational costs of e.g. on-farm research) can be reduced through reducing the number of senior scientists and closer involvement of extension staff. All indirect costs must also be included in research budgets to provide the required information to identify possible reductions of overhead costs. Key actions required for efficiency enhancement are: Ex-ante cost-benefit analysis, impact studies, cost-recovery and cost-sharing, consolidated funding mechanisms, ARC re-structuring and rehabilitation (e.g. through rightsizing) (see Box 3-13).

Box 3-13
Research Efficiency Enhancement; Illustration from the Tanzania Lake and Northern Zones

In the Lake and Northern Zones of Tanzania, different steps were undertaken to start a process of reducing research costs as well as improving research outputs. Actions taken were:

1. analyse the sources of funds whether institutional or 'bilateral' contracts with different donors, NGOs, partners and clients and the results made available to all (transparency);
2. relate the costs (as covered by different sources of funds) to the actual results of the activities;
3. analyse all modalities and contracts with clients and other stakeholders; and,
4. develop a plan for improved effectiveness (research outputs better contributing to research and development objectives) and efficiency (research activities better contributing to outputs).

As a result, there has been significant improvement of research effectiveness and efficiency in the Lake Zone and Northern Zone, Tanzania.

Effectiveness enhancement:

1. client and farmer participatory approaches in all stages of research avoid costly failures in research;
2. research efforts receive effective follow-up by development organisations (e.g. input availability) to ensure research impact. No research programmes are implemented when follow-up cannot be guaranteed; and,
3. district staff is closely involved to help carry out much of the research programme, creating ownership at district level.

Efficiency improvement:

1. reduction of the number of 'researcher-managed/ researcher-implemented' testing sites. Some testing sites (formerly sub-stations) have been closed down;
2. greater emphasis on 'farmer-managed/ farmer implemented' trials, as compared to researcher-managed/ farmer-implemented;
3. diagnostic surveys are only executed in the context of a contracted research programme (i.e. guaranteed follow-up);
4. surveys made more cost-effective by involving only a few senior staff from different disciplines (training of district staff is always a component as well), and using rapid appraisals (RA) and other participatory approaches;
5. few quantitative surveys (e.g. nutrient flow analyses) because they have a low marginal rate of return compared to RAs (however, well focused quantitative surveys are occasionally required);
6. analysis of research results made more cost-effective through 'farmer assessments' and the use of e.g. environmental index or adaptability analysis (Hildebrand and Russell, 1994); this results in flexible recommendations easily adapted by different farmer categories;
7. increased emphasis on adoption analysis, analysis of potential adoption opportunities and constraints, as well as sub-sector analysis;
8. improved (statistical) analysis of data to enhance the results derived e.g. by using farmer's assessment; and,
9. training of local (district) staff to undertake simple technology testing/ evaluation in order to reduce (expensive) senior staff involvement.

Source: Mafuru and Heemskerk (1997)

[13] Operational costs (direct costs): travel costs, allowances and fees, research activity stationary, equipment costs, etc. Overhead costs (mainly indirect costs): overall salaries, internal support services, infrastructure (see also annex 1.1).

Opportunities for greater efficiency and cost-effectiveness may also be identified in areas such as:

i. Cost-effectiveness of support services.
The services of internal service units need to be analysed in view of cost-output ratios. Comparison with similar service providers, including in the private sector need to be made and business-plans for most efficiently acquiring these services need to be developed (e.g. efficient internal service providers or outsourcing options) (see Box 3-14).

Box 3-14
(Re-) organisation of Support Services; Northern Zone Tanzania

Central government contributions to the ARC's in Tanzania have been under increasing pressure. As the financial support from this source decreased, the ARC's own financial resources often proved inadequate and would lead to e.g. disconnection of electricity and telephone. In August 2000, the Northern Zone ARC in Tanzania set up semi-autonomous support units in its two research stations. The internal reorganisation aimed to ensure that:
1. services are provided to researchers at realistic cost and can be sustained;
2. revenue generation is improved;
3. general overhead costs normally borne by the self-help funds of the stations are reduced; and,
4. management efficiency is enhanced.

In the trial stage ten productive units were set up. The management of the institute appointed unit managers and assistants for each unit. Each unit developed a business-plan. These were assessed for viability, financial feasibility and profitability. Four units remained in one ARC, five in the other. These included a laboratory unit, a plant propagation unit, and a publication unit at each ARC, and a shared transport unit and workshop.

Unit managers are free to capitalize on new opportunities for revenue generation. They monitor cash-flows, manage staff in the unit, market their services, and plan essential capital investments to sustain their facilities. All units provide services for cash payment only and station accountants administer financial transactions. Some of these units have 'adopted' support staff that were normally paid by the station and pay their salaries, thus reducing the financial pressure on the SHF. Part of the unit revenues is reserved for capital investments. Profits are determined at the end of each quarter. A portion of the profit is paid to the SHF of the station thus increasing station revenues. Another portion of the profit is used to pay incentives to unit staff.

The above delegation of management responsibilities to the unit managers enhanced ARC efficiency. It also ensured that equipment is being used optimally and maintained (e.g. a vehicle, tractor or photocopy machine), and that support staff salaries are timely paid. However, this internal reorganisation also met a number of obstacles. Firstly it requires a change of staff mentality. All services need to be paid for, irrespective of who the client is. Staff would at times object as they felt certain equipment was provided by the central government and should thus be freely accessible to all staff (e.g. by buying fuel for a vehicle instead of paying a mileage fee to the unit). Secondly, when the units started up some failed to create a profit. As a result they were unable to transfer money to the SHF thus leaving the station management with no resources to pay for use of services themselves. Thirdly, investments were required to start up the various units. All units needed working capital as well as capital investments. The units were allocated Euro 30,000 as working capital and Euro 15,000 for equipment by the DRD. This was far short of what was requested in the business plans of each respective unit. Large investments (vehicles, tractors) and major repairs on e.g. laboratory equipment were not funded

Source: NZARDI, 2002.

ii. Efficiency of goods and services procurement.
Procurement priorities can be established on the basis of an up-to-date inventory of all movable goods (including location, number, value, date of purchase and rate of depreciation) and requests identified by the different research support services, in business-plans and research programmes. Procedures for the purchase of movable capital goods and other goods and services need to be established at ARC level with specific attention for decentralised procurement, outsourcing, tendering procedures, etc. Research staff needs to be made well aware of the acceptable procurement procedures and the methods for active monitoring of compliance need to be established.

iii. Maintenance of assets and equipment.

On the basis of an analysis of the cost structure for maintenance of assets and equipment, a maintenance strategy should be developed. Direct costing rates for different research activities need to be reviewed in this context and options for outsourcing of the maintenance of e.g. transport, laboratory equipment, computers etc. need to be considered. Direct costing rates for the use of assets and equipment for uses other than research, also need to be established, as well as for contract research. This will involve 'activity-based budgeting'. Both in planning and in the monitoring of activities and of their cost-effectiveness, it is necessary to be able to compare expected and realised outputs of activities in relation to budgets and actual expenditure. All pertinent date are required that will provide the necessary parameters for effective activity-based budgeting. The costs of each research activity can then be compared and evaluated by stakeholder representatives (e.g. in agricultural research boards) and farmers (see Box 3-16).

4. Transparent financial management

Research institutions can also become more client-oriented and develop a sense of ownership with clients concerning the technology development process through increased transparency of the financing policies and practices at ARCs. Clients should play key roles in allocating resources and in evaluating performance of research programmes to ensure accountability. This also implies that farmers share in the implementation of some adaptive research and also in the costs (e.g. by contributing their own labour). Only then can effective fiscal decentralisation of ARCs be achieved (see Box 3-15).

Accountability sharing can also be institutionalised by client contracts with research or through monitoring and evaluation by third parties (Ashby and Sperling, 1994). Decentralising technology development requires scientists to shift away from the traditional 'pipeline' model which defines a limited number of end products or technologies towards the development of 'menus of options' and 'prototype technologies' which are then adapted to niche conditions by others, especially farmers themselves. Key actions are: transparent and timely audit, integrated planning, detailed financial monitoring and evaluation at all levels, appropriate incentive policies, and fair cost-sharing arrangements. It is important to determine if the ARC has clear accountancy guidelines, which are being adhered to for all contractual arrangements and funds. Accountants need to be provided with clear unambiguous TORs and staff members and key clients should know them (see annex 3-13).

Box 3-15
Transparency in Financial Management and Procurement; a Case from Mali

Transparency of financial management of an ARC can be improved by establishing clear procurement, internal and external auditing procedures. At IER, Mali, existing budgeting procedures were analysed in terms of transparency and costs (direct and indirect) with stakeholders. As first steps in making the research organisation more efficient and reduce overhead costs, improved procurement and internal auditing procedures were established and made transparent for all relevant stakeholders. This also involved independent auditing of all IER accounts. Concerning procurement, the IER statute, the code of public procurement, and the agreements between the Mali Government and its partners determine the legal framework for the procurement procedures. The framework is based on basic principles and rules of competence. The basic principles are related to: i) the identification of the mode(s) for purchasing goods (purchase direct or through formal procurement), ii) the determination of modalities and conditions of use of the goods, and iii) assuring transparency of procurement with partners. The code of public procurement makes the following difference between goods that should go through the public procurement procedures and those that can be directly purchased .

For purchases with a value of less than 10 000 000 FCFA, IER demands at least three offers. These offers are evaluated for similarity of conditions of delivery and the best offer is chosen. For purchases with a value above 10 000 000 FCFA, IER has to use the office of public procurement procedures and apply the legal framework that is described by law concerning the code of public purchases. There are three types of purchases: purchases of goods and equipment, construction and consultancies. Each of these purchases must be publicly announced

Source: IER, 2002

Box 3-16
Transparent Costing of Research Activities; the Tanzania Lake Zone

In order for clients and stakeholders to clearly understand the range of costs of research activities, three steps must be taken:

1. both direct costs as well as indirect costs (as much as possible) should be explicitly costed for each research activity/ trial/ survey;
2. costs for individual on-farm trials and farmers' contributions should be specifically indicated; and,
3. the costs of trials, numbers of farmers participating, etc. should be included in planning and consultation at village level.

Farmer Research Group members in The Lake Zone, Tanzania changed priorities for the implementation of on-farm trials once confronted with costs. The number of replications was equally increased for some trials in order to get a better balance between costs, participation and research results.

Source: Lake Zone Annual Report, 1999/ 2000

3.3 Stakeholder participation, linkages and networks

3.3.1 BACKGROUND AND OBJECTIVES

1. Background

Agricultural research organisations in the developing world initially largely excluded end-users as real participants in the technology development process. In the early 1970s, during the 'green revolution' and the generation of high input technologies for smallholders, many of the technologies developed by researchers were not adopted by small farmers, especially in SSA (Chambers, 1999). It became clear that these technologies were not adapted to the situations in which most of the smallholder farmers were operating. In part as a result of the introduction of the Farming Systems Approach (FSA) to research and extension, agricultural researchers and extensionists began to appreciate that farmers as the primary clients of the newly developed technologies, should become much more closely involved. Consequently, the technology development process began to incorporate their views in defining the research agenda (Merill Sands et al., 1989). In order to facilitate this, it is essential that researchers, extensionists and end users closely work together through sharing of knowledge, and by collaborating in developing and disseminating new and more appropriate technologies.

Linkages in AKIS are defined as 'ways to connect, join or unite stakeholders through clearly defined mechanisms with the purpose of exchanging knowledge, information and expertise (and often resources)'. If well-developed and properly implemented, such linkages enhance the development and dissemination of new technology. Agricultural researchers in much of the developing world have recently emphasised the need for strengthening linkages between public research organisations, extension institutions and farmers (and to a certain extent the private sector). More effective mechanisms have been developed to enhance the continuous exchange of information and the joint development of technologies. There is an extensive body of literature on experiences with Participatory Technology Development (PTD) approaches (Veldhuizen et al., 1997). The relationships among the actors were however, not always problem free and effective interaction remained elusive with the result that adoption of technologies by the end-users stayed sub-optimal. Intensive analysis of what each AKIS actor needed from the others resulted in revised expectations and adaptation in activities. It was concluded that the quality of leadership was a crucial factor in the process and that, for research priority setting at ARC level and the development of viable technologies, it was very important which party has command over the allocation of the available resources of researchers, money and infrastructure for research (Meindertsma, 1994).

The currently ongoing economic re-structuring and liberalisation processes in developing countries are also having an impact on technology development. The private sector has, with different degrees of effectiveness, become an important player in the generation and dissemination of technology and agricultural research is no longer the exclusive responsibility of public institutions. In many countries, the private sector and the political arena are having a major influence on technology generation. These developments impact on agricultural research systems, resulting in a need for new approaches and institutional arrangements for research/ extension/ client linkages.

Because it is an essential part of the COR approach, there is a logical focus on the management processes required to enhance stakeholder participation in the planning, funding, execution and dissemination of ARC technology development activities. They determine how stakeholders can be involved in the research process through identification of problems by research priority setting, review of research proposals, (co-) funding of projects, assessment of research outputs and their impact, and the dissemination of research outcomes. The long term viability of ARCs can be enhanced through improved external relations, collaboration with others involved in similar activities, a focus on demand-drivenness of all ARC activities, diversification of funding and improvement of adoption and impact rates of developed technologies and practices. All these aspects are directly dependent on efficient and effective linkages of researchers with organisations and people that have a stake in the outcomes of agricultural research.

2. Objectives

This chapter focuses on the links that ARCs need to have with stakeholders in order to develop technologies that are successful, i.e. used and appreciated by clients and adopted with advantage. Apart from the management of effective linkages with the clients, it also discusses ARC linkages through networks of stakeholders, developers and providers of agricultural technologies, and any other organisations with similar objectives. The core business of the ARC i.e. the identification, generation and dissemination of agricultural technologies, stands central in the discussion. The chapter concentrates on what ARCs can do to make research more effective and efficient by improving linkage activities, active stakeholder participation, capacity building of stakeholders and networking. The overall aim is to assist ARCs in 'ensuring long term viability of agricultural research institutes through improved external relations, collaboration and demand-driven research' (NZARDI, 2002).

The more specific objectives are to provide guidelines to enable ARCs to:

i. maintain effective public relations with all stakeholders;
ii. organise active stakeholder involvement;
iii. acquire research assignments from stakeholders and to diversify sources of funding; and,
iv. actively develop (inter-) national and regional networks, and contribute to these.

3.3.2 KEY ISSUES IN LINKAGE MANAGEMENT

Within the perspective of managing linkages, stakeholder participation, stakeholder capacity building and networking, certain participatory principles and values are important (DRD, 2000); some of these are:

1. farmers being the main client, are at the core of the linkages chain and effective means for them to express themselves should be included in any organisational approach;
2. all key actors have important partnership responsibilities and must collaborate as system components to achieve the desired objectives;
3. each actor has an opportunity and obligation to contribute ideas in the Technology Development Transfer (TDT) process;
4. every player needs to feel proud of the degree of ownership dedicated to her/ him and pro-actively support the sharing of responsibilities;
5. the identification of contributing innovators within society is performed in a participatory way;
6. high quality facilitation in the area of linking collaborators and the sharing of information enhances expectations and helps ensure an ARC's sustainable results;
7. each actor needs to be empowered through a learning process aiming at improved performance; and,
8. roles, responsibilities and the provision of required resources should be clearly spelt out for each actor (to do what, when, where and with what means).

A recent publication provides a detailed overview of key management linkage principles in COR, stressing that ARCs are service providers to mainly smallholder farming clients who operate under widely different circumstances (DRD/ KIT, 2000).

Some key issues are discussed in more detail below:

1. Managing the linkages
It is important to spell out how linkages can be most effectively managed with regard to meaningful stakeholder participation, capacity building of stakeholders and networking. After being properly organised and set up, these linkages need continued nurturing and purposeful management. Managing linkages needs to consider the resources available and to ensure that each actor is aware of what he/ she is expected to provide and when. Conflicts and problems if any, should be continuously identified and monitored and evaluated to institute corrective measures. Several models for linking actors in agricultural research and extension have been developed and implemented. Classical approaches featured mostly top-down approaches with farmers placed at the lower (receiving) end of the technology development chain. At the top of such models, technologies are 'invented', they are then dictated to farmers and other end-users to adopt. This model resulted in many misunderstandings and conflicts and produced insufficient success in actual adoption of the new technologies, especially in SSA. In reaction to this 'feedback' was seen as the best way to improve AKIS effectiveness. Extensionists were expected to get feedback from farmers and pass the information on to researchers for improvement of their decision making on what technologies to develop. This model proved not to be very successful either, among others because of the loss of information and the overall low level of real stakeholder participation i.e., farmers' involvement, in the technology development process. Subsequently adapted models to facilitate attention for the need of resource-poor smallholders and client participation emerged (see figure 3); they place the client at the core of the technology generation and dissemination process.

Such more intensive approaches towards stakeholder participation are found to have the following advantages:

i. farmers (including farmers organisations, associations, co-operatives, agro-processors, etc.) are at the centre of the technology development process;
ii. emphasis is placed on what the farmer knows (i.e. takes advantage of the available local indigenous knowledge) and formal scientific knowledge builds on this;
iii. the views and interests of market actors (traders, processors, other agricultural enterprises, input providers etc.) are taken into account; and,
iv. researchers and extensionists rather than controlling the technology generation/dissemination process become catalysts and facilitators.

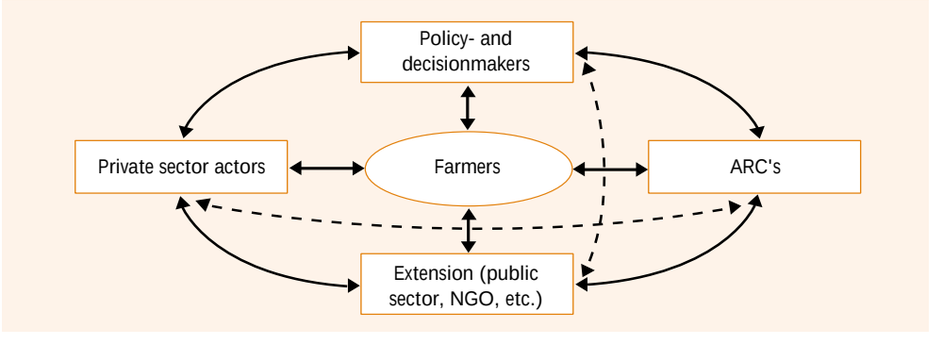


Figure 3
Stakeholder involvement in agricultural research

However, the effectiveness of this model depends on the ability of researchers and extensionists to see the main technology issues in a 'systems perspective' and on the quality of the catalysation and facilitation process. It demands a monumental change in the attitudes of researchers and extensionists, and requires significant upgrading of their communication skills.

As mentioned earlier *'all actors in technology development depend on each other for effective linkages'*. This means that they all have to be aware of the importance of the linkage process and the role each of them is to play in this process. Past experience shows that researchers generally have been rather weak in identifying and addressing real end-user needs while clients have often not been able to effectively express and communicate their requirements. Thus,

the actors have to better identify their priority needs and need to know how to communicate these to others. This can be done by carrying out an analysis of what each actor expects from the other(s) and what the strengths and weaknesses of each are. This is not an easy process and capacity building with all stakeholders is therefore an important element in the technology development and transfer process.

Effective 'networking' is crucial to improving and enhancing the quality and effectiveness of linkage activities. Networking is mainly concerned with activities aimed at exchanging information about 'who is who', what role each player has (or should have), and his/ her importance in enhancing technology development and transfer. All concerned actors should pro-actively identify ways and means for everyone involved to fully and effectively participate in technology development. Each actor should be clear on what to contribute to the process, as well as what others could or should bring in. All actors, from policy makers to end-users, need to be made aware of the roles they are expected to play and taught how to better play these. As far as possible, all important stakeholders have to be involved in the entire technology development process; from identification of problems, research planning and implementation to dissemination. Researchers can effectively use stakeholder meetings and 'tours' to give and receive feedback to/ from stakeholders and identify new items for the research agenda. Stakeholders should also be encouraged to participate in dissemination activities such as farmer field days and demonstrations (on-station and on-farm), training sessions, seminars, and workshops. Interaction among stakeholders themselves is also valuable; they can discuss their current activities, review possible duplication of effort, consider partnerships and opportunities for joint projects, etc.

2. Managing communications

COR encompasses the needs and priorities of different stakeholders, including and especially those outside the ARC (rural society at large). Therefore the ARCs need to continuously interact with policy makers and research managers at national level as well as with national extension staff and donors, while they maintain close linkages with local key stakeholders, clients and partners at community level. When developing the research agenda, ARC management and research staff must include the needs of policy makers/ managers, oriented towards broader national policy and objectives. The ARC should therefore acquire appropriate information concerning the interests, needs and demands of the different stakeholders at national level to ensure that their work is client-driven from that perspective as well.

Unless there is an effective flow of information and communication from stakeholders, the ARC's ability to provide demand-responsive services will be handicapped. In order to improve communication and information flow from key stakeholders both researchers and ARC management need to:

i. develop strategic partnerships with stakeholders both at national and community level;
ii. devise effective communication mechanisms with relevant stakeholders e.g. regular meetings and workshops;
iii. strengthen co-operation and participation of stakeholders in the entire research cycle;
iv. develop capacity of stakeholders to identify and prioritise their needs;
v. involve stakeholders in observation, reflection and decision-making (i.e. M&E); and, last but not least,
vi. empower the stakeholders with knowledge and control of financial resources.

3. Issues arising from self-assessment

Self-assessment by agricultural researchers of an ARC is expected to identify a wide diversity of factors that relate to creating more effective linkages and networks with clients and other stakeholders; some of these are discussed below.

i. Knowing the clients:

- the degree to which the ARC knows the stakeholders;
- the ARC having an active PR strategy; and,
- the ARC having an updated stakeholder directory.

ii. Service orientation and PR:
- the responsiveness of the ARC staff to stakeholder needs;
- the adequacy of responses of the ARC to stakeholder requests for services;
- the effectiveness with which the ARC organises farmer field days, demonstrations, etc. to disseminate research results; and,
- the degree to which the ARC organises exchange visits and supports farmer-to-farmer extension.

iii. Capacity for stakeholder linkages:
- staff training in relation to stakeholder needs; and,
- the appointment of liaison officers enhancing linkages between the institute and the stakeholders and their effectiveness.

iv. Stakeholder empowerment in research process:
- the presence and performance of the 'Centre Executive Committee' or similar body;
- the degree to which stakeholders contribute information about research needs and priorities;
- the effectiveness with which researchers interact with clients during proposal development;
- the level of farmers participation in the implementation of research activities;
- farmers' assessment of the performance of technologies developed and tested;
- the level to which various stakeholders are involved in research M&E;
- the frequency with which progress of research projects is discussed with stakeholders; and,
- how closely research and extension staff co-operate in the generation of extension materials.

v. Partnerships:
- the intensity of collaboration with national and international partners;
- the level of interactions with regional and international research networks;
- the degree to which the ARC acquires research assignments from local and international stakeholders; and,
- the frequency with which researchers participate in national and international research forums.

vi. Issues arising from stakeholders assessment

Stakeholders will identify strengths and weaknesses of the ARC through the assessment of the level of the ARC's client-orientation, such as:
- stakeholders being partners in the identification of research needs;
- the satisfaction level of stakeholders with the ARC services delivered; and,
- the extent to which stakeholders are familiar with the ARC and the services it can provide (see Box 3-17).

Box 3-17
Stakeholder analysis and assessment; an example from the Tanzania Northern Zone

In 1998, the staff at the Selian ARI (an ARC in Northern Tanzania) visited various stakeholders in the agricultural sector and interviewed them concerning their experience with- and knowledge of the institute. On the basis of a sample of 40 stakeholders the following conclusions were drawn:
- 40% of stakeholders had never heard of the Selian ARI or associated the name with Selian Hospital.
- 30% of stakeholders had heard of the institute, but thought it was only dealing with wheat and barley research.
- 20% of stakeholders had previous experience with Selian ARI, but was not satisfied with the services rendered.
- 10% of stakeholders had previous experience with Selian ARI and was satisfied with the services rendered.

Selian researchers were very surprised with the lack of awareness and satisfaction among stakeholders. They believed that the institute was well -known and that its reputation was widely acknowledged. The opposite proved to be true: very few of the stakeholders interviewed were aware of the range of services available at the institute.

Source: Lema et al., 2003

Stakeholders make an analysis of the AKIS e.g. by using various tools of the RAAKS toolbox (Engel et al., 1997). This is expected to lead to an action programme, which will need to include the following elements:

i. a programme for the improvement of COR at the ARC;
ii. a programme for capacity improvement with stakeholders for the effective contribution to a demand-driven research agenda; and,
iii. improvement of participatory M&E.

3.3.3 THE LINKAGE MANAGEMENT CHANGE PROCESS

Based on the ARC self-assessment as well as an evaluation by stakeholders, an action programme for a 'management of linkages change programme' needs to be developed. Different options to respond to the key questions in COR implementation have been provided in the previous sections. Some general strategic issues need however, to be addressed before the actual management of change process concerning linkages can be initiated. Some of these are being discussed in other chapters, as linkage management is key to most if not all of the CORMA' areas'. For example, the ARC needs to develop a strategy on information management and how this can be used to build confidence with researchers to deal with stakeholders as well as to make other stakeholders gain confidence in the ARC. Researchers have to be aware and convinced of the need to involve stakeholders before a management of change programme for improved linkages can be effective. In order to develop proper linkages it has to be clear from the policy level down to the ARC and the corresponding agricultural research systems, what the roles and responsibilities of the different stakeholders are; thus these need to be specified.

Box 3-18
Organising Active Stakeholder Involvement; Examples from Tanzania

'Know your clients' is one of the most important principles of COR. An updated directory of agricultural stakeholders in the ARC mandate area proved to be a prerequisite for effective acquisition and stakeholder participation in agricultural research planning, monitoring and evaluation in the Northern and Lake Zone ARC's in Tanzania. The initial stakeholder list was based on information from regional government offices, community development offices, and liaison officers. A small survey team interviewed 75-100 stakeholders actively involved in agricultural development in the area. Discussions in 1998 and 1999 focused primarily on understanding that stakeholders are (objectives, mandate, target group, sources of funds, main activities) and what research requests they have. In 2001 and 2002, attention shifted to assess stakeholder satisfaction of services provided by the ARC, the effectiveness of communication and dissemination strategies and effective stakeholder participation in research forums. A survey conducted in 2002 showed that stakeholder awareness of research services had increased and that stakeholders were increasingly satisfied with the quality of services on offer. However despite efforts to include non-traditional partners, the ARC continued to focus on involvement of stakeholders from public sector institutions.

In Tanzania the ARC's actively involve stakeholders as indicated below.

- The liaison function of ARC's is institutionalised. A person from extension is seconded to the ARC to fulfil this role (Research Extension Liaison Officer). In two of the zones the office of the ZRELO has liaison officers who are responsible for linkages with a limited number of districts and/ or stakeholders.
- Stakeholders are represented in the Board of the ARC that meets at least once a year.
- Stakeholders participate in annual research planning and debriefing workshops.
- Stakeholder directories have been compiled and distributed to all stakeholders. The directories include a description of the main stakeholders in the mandate area (farmer associations, public sector institutions, NGOs, private commercial sector and international partners) and their research needs.
- Clear formats for memoranda of understanding and contracts have been established, standardised and approved by stakeholders.
- In the Lake Zone, a contract and MoU monitoring committee was established at ARC level to get feedback from clients on contract performance.

Source: Lema et al., 2003

1. Organising active stakeholder involvement
In order to start with facilitating active stakeholder involvement in the technology development process, a number of key institutional issues have to be addressed such as:

i. *Is a 'stakeholder liaison office' institutionalised?* This can vary from a research extension liaison officer to a full-fledged marketing and corporate communication centre. Functional analysis of such an office is a first step in the change process.
ii. *Does the ARC know its stakeholders, their needs, uses and interests?* Stakeholder directories/ inventories are normally available but the question is if these are being used on a regular basis and how they care updated and upgraded with more relevant information.
iii. *Have end-user contacts been formalised?* ARCs can formalise these relationships through working with groups including FRGs, contracts/ MOUs with farmers associations, or through information exchange platforms (e.g. field days, open days etc.)
iv. *Does the ARC have a feedback system on linkages?* How are contracts, MoUs and other formal and informal contacts and partnerships being monitored, evaluated and if necessary, adapted? (see Box 3-18).

2. Maintaining effective public relations
Although the ARC may have linkage management well-institutionalised, the answer to questions concerning the adequacy and effectiveness of linkages remains with the clients of the agricultural research and development service. It is therefore essential to address the following concerns:

i. *Is the ARC well-known by its stakeholders?* In collaboration with clients and other stakeholders, an ARC public relations plan may need to be developed as well as communication materials. Examples are: an ARC logo, business cards, flyers, newsletters, etc. Essential in the development of a public relations strategy is the generation of stakeholder category-specific PR plans.
ii. *Is the output of the ARC well-demonstrated?* For clients to know the ARC is one thing, but being aware of and having access to, ARC results is another. Which mechanisms are being used to demonstrate agricultural research and development results? This can vary from posters to web sites and from village demonstrations to agricultural shows.
iii. *Are services and fees well known by stakeholders?* Does the ARC profile (ARC flyer) include a list of services provided as well as the applicable fees? How is the marketing of the ARC's services taking place and which marketing channels are being used? Research staff will require training in marketing and acquisition of research assignments, cf. ISNAR's: 'How to write a winning ARD proposal'[14].

3. Interacting effectively with clients and financiers.
Although stakeholders and clients may have a strong interest in research this will not automatically lead to a request for services by the ARC. Or in other words, the ARC can be very client-oriented but without effective stimulation of the demand, the research agenda will not be demand-driven. Three main questions need to be given due attention:

3. How to stimulate effective demand?
Effective participation is expected to lead to increased demand for agricultural research services. The participatory approach requires strong blending with empowerment efforts. Well-known approaches in this context are the establishment and empowerment of FRGs, 'Farmer Field Schools', participatory technology development and the 'village participation approach' (World Bank/ KIT, 2000). The RAAKS toolbox also provides various methods and tools to analyse, monitor and evaluate the effectiveness of the demand for ARC services. Special attention is required for the stimulation of demand from non-traditional clients such as the private sector (agro-industry, small-scale enterprises) and consumer organisations (Engel et al., 1997).

4. How to empower stakeholders to review, accept and/ or reject research proposals?
The agricultural research system can become demand-driven only if the clients and stakeholders are in a position to review and reject and, if necessary, suspend research proposals

[14] See ISNAR website at http:/ / www.isnar.cgiar.org/ activities/ training/ 4sci.htm

Box 3-19
Research and Agribusiness Partnership: The Barley Industry in Tanzania

Previously, two separate units one in the Ministry of Agriculture mostly serving smallholders, the Selian Agricultural Research Institute (SARI), and another one serving large farmers, which was part of the Tanzania Breweries Ltd (TBL), conducted barley research in Tanzania. Each unit had its own staff and funding. The link between the two units was weak. Barley production is mostly on a contractual basis between the grower and TBL. It was soon realized that the establishment of a strong coherent relationship between public research and the private sector could be an important means through which the agro-industrial sector could contribute significantly to the growth of the regional economy. TBL entered into a joint venture with South Africa Breweries (SAB) in 1993. It was then recognised that there was a need for research and extension to jointly address the concerns of both large-scale and small-scale farmers involved in barley production; that consolidation of research activities would be cost-effective; and that there existed a need for a partnership between the stakeholders involved in the development and dissemination of improved barley production technologies. Thus came about a partnership between TBL and SARI in implementing a market-driven barley research programme. The primary objective of the programme is to increase production of barley and farmers' incomes by generating and disseminating technologies aimed at the needs of the market and taking into consideration the sustainability of the resource base. This strategy represents a change from traditional approaches of setting priorities and conducting research without considering the clients.

Under the TBL-SAB joint venture, TBL researchers were transferred to SARI to work together with researchers under the ministry on common objectives. The Tanzania Malting Company (TAMACO), a subsidiary of TBL, provides funds for the recurrent research expenditures. As a result, the barley research programme has streamlined its activities and its achievements include the accelerated release of improved varieties and dissemination of agronomic techniques to farmers. Under the new system, barley production technologies, once developed and recommended for release, take a minimum time to reach farmers. An important input in barley production is the use of quality seed of improved varieties. The TAMACO seed unit, which contracts experienced farmers for seed multiplication, controls the seed production, processing and distribution. Contracted farmers can only grow seeds distributed by TAMACO, which ensures the use of the right variety. Currently two varieties are grown, namely Bima and 8519. The farmer-research-extension linkages have been strengthened and farmers are aware of the needs of the barley market. Small-scale, large farmers and the researchers have now a common agenda, which is to attain optimum yields, meet the specifications of the market, gain a profit and protect the environment. The challenge on the researcher's side is to develop varieties and technologies that meet both the farmers' and the brewers' expectations. A unique aspect of malting barley is that it is sold by variety name and its quality determines the price. Researchers therefore assess quality potential and other factors that may affect quality.

Source: DRD, 2003

and programmes. Even if clients control the funds it is important to strengthen the capacity of clients to actually formulate clear terms of reference as well as to review research proposals. Too often researchers dominate the ARC decision making forums and hence also the demand side.

5. How to communicate with potential financiers at different levels and identified categories?
The ultimate beneficiaries such as farmers and agro-processors are often not in a position to directly fund the research request made to the ARC. The ARC must play a facilitating role in making clients aware of the different possible sources of finance that may be available. An up-to-date inventory of potential financiers needs to be maintained. Financiers also need to be informed on different forms of demand for agricultural research financing that may be forthcoming (Chapter 3.2).

Box 3-20
Client and Farmer Empowerment; Example from the Tanzania Lake Zone

In Tanzania's Lake Zone, the formation of FRGs was facilitated in each of the targeted Agro-ecology based Farming Systems Zones. These FRGs were to become partners in adaptive research. The FRG system was complemented by a much larger number of "Farmer Extension Groups". These groups provided the platform for feedback from farmers for agricultural development research.

Gradually Farmer Groups were empowered in the following manner:

- Enhancing participatory planning through FRG priority setting for different farmer categories.
- Capacity building in the FRG on technical issues through farm field days, study tours etc. but also on financial management and data recording etc. as well as training in problem identification and development of TORs for research requests.
- Representatives of the FRGs were invited on ARC field days, participation in workshops and eventually to be on committees and research boards
- Ownership of the (on-farm) research programme was further enhanced by thorough explanation and labelling of treatments
- Agreements were established with farmers on: FRG co-ordination at ARC level, regular meetings, planning meetings, role of different farmer categories, etc.

Some emerging issues were, which need to be addressed are:

- Through capacity building, a FRG becomes less and less representative and will in the end be very different from other groups in the Farming System Zone, is this a problem?
- Capacity building for emancipation of all in order to achieve empowerment remains a major bottleneck for development.
- How do FRGs scale up their experiences to the Farming System Zone level?
- FRGs are village-based organisations, how do these relate to the commodity-based producer organisations.

Source: Kingma and Mafuru, 1997

4. The pro-active development of (inter) national networks.

An ARC requires strong links with the formal knowledge system and the national and international research institutions. The CORMA approach emphasises decentralisation of many research management functions to the sub-national level. The potential danger of isolation needs to be avoided through strong linkage mechanisms with the national and international agricultural research and development community in both the public and the private sector.

Important questions are:

i. How to make the ARC part of a national network?

How do National/ Federal Research Institutes and Sub-national/ Regional adaptive research institutes relate? In the absence of national commodity and factor research institutes (e.g. in Tanzania) is there a system of national lead scientists, peer reviews, national steering committees (see Box)?

Box 3-21
National research and development steering committees in Zambia

In Zambia National steering committees were formed for main themes and commodities with participation of research representatives of different ARC's working on the respective theme or commodity and complemented with some representatives of stakeholders as well as from international agricultural research.
An example is he National Steering Committee on agro-forestry with participation of national research staff, ICRAF staff and some agro-forestry extension programmes in the country. The main objective of the committee was to coordinate agro-forestry research and development in the country, review research activities and analyse programmes, through annual meetings.

Source: ARPT-WP, 1993

ii. How to make the ARC closely linked to (an) international research network(s)?

How does the ARC relate to the relevant regional and international research networks? Are these relationships co-ordinated at the national level or are there direct contacts and exchange of information and materials?

iii. How to stimulate scientists to become members of professional societies?
Many professional societies at national and international levels (International Farming Systems Association, Southern and Eastern African Association for Farming Systems Research and Extension, Crop Science Society, etc.) exist. Membership is mostly on an individual basis. What is the ARC's policy in relation to costs involved, monitoring of membership, publications etc.?

Box 3-22
ARCs are part of the (inter) national research network; Tanzania Examples

Because the earlier system was not very effective and failed to take account of the various priorities of farmers located at different circumstances and agro-ecological conditions around the country, the Tanzania National Agricultural Research System was re-organised in 1989 into seven Zonal Research Institutes. These Zonal Institutes have a responsibility to conduct agricultural research for clients in their mandate areas, which may comprise two or three administrative regions. At the zonal level there are livestock, crops socio-economic and 'special' research programmes. These programmes plan and propose research activities for review by the Zonal Internal Programme Review (IPR) meeting, which is held annually. The IPR meeting has three main functions:

1. review progress reports on each project and new research proposals;
2. determine relevance and applicability of results (new technology developed) with the participation of stakeholders and intended beneficiaries to improve dominant crop/ livestock production systems in the zone, particularly their suitability to women and smallholder farmers; and,
3. assess actual and projected impact of the on-farm action research programme(s) for improving the dominant crop/ livestock production systems and prepare the next season's action research programme(s).

Participants to these meetings comprise of a senior chairperson, all research programme heads, research project leaders, national lead scientists, extension officers, key progressive farmers in the zone, and selected NGOs. In addition, a few selected researchers from other zones and representatives from National headquarters attend Zonal IPRs. Lead scientists co-ordinate nationally some research programmes of national importance. Currently there are 22 lead scientists: 18 for the various crops excluding tea, coffee and tobacco, which are privately run, and 4 for livestock research. These are able and experienced research scientists from the zones where they are also based. The main function of the lead scientists is networking while at the same time act as:

1. national focal or contact person on issues pertaining to collaboration and co-operation in research field activities for the respective programme;
2. research programme liaison officers to assist headquarters on matters relating to programme staffing and training; and,
3. link persons to regional networks and international agricultural research systems relevant to the programme in question.
4. Therefore, the Zonal Internal programme review meeting ensures that there is networking within and outside the zone. Within the zone there is participation of representative stakeholders while national lead scientists and scientists participate to exchange information and provide backstopping.

Source: Lema et al., 2003

3.4 Research planning, implementation, monitoring and evaluation

3.4.1 BACKGROUND AND OBJECTIVES

1. Background
The planning, implementation, monitoring and evaluation (PIME) process of agricultural research in ARCs entails setting of priorities, programme development and their execution, and collecting and analysing information essential for understanding the performance/ progress of different activities undertaken at alternate levels, including the ultimate impact of the research on its clients. In relation to COR, two main issues can be raised. Firstly there is the question on how to establish a client-driven research agenda and secondly how to get feedback from clients to reorient the research priorities and related client-driven research agenda to changing needs, or more broadly, how to make client participation work (Merrill-Sands et al., 1991). This requires above all, an efficient organisation of clients (farmers) so that they can be involved directly or through their representatives (e.g. district authorities and NGOs).

COR planning can be described as an exercise of carefully identifying key problems or constraints to sustainable and equitable agricultural development in a process driven by clients (farmers and their organisations or representatives, agro-processors and other stakeholders), and participatory selection of possible actions to address the priority issues identified.

Participatory monitoring is a continuous assessment with clients and other stakeholders of the implementation quality of research activities using input and activity indicators. The aim is to provide information on whether activities are proceeding according to plans and to warn against deviations from the intended outcome. A key challenge in COR monitoring is to develop ownership and get feedback from clients and stakeholders on whether activities contribute to the planned output of the research programme, while using inputs by all parties as planned. An important monitoring output is the timely adjustment and fine-tuning of research programmes in response to changing needs and circumstances.

Joint evaluation is a much broader concept used to assess the performance, quality, relevance and impact of research activities in progress; this includes the successful completion of activities and ultimate impact of research outputs or results on the achievement of the ultimate development objectives. Evaluation therefore addresses the following performance elements:

i. *efficiency:* achievements with respect to expected output; this is primarily concerned with the effective use of resources and the timeliness of the activity;
ii. *quality:* Adherence to accepted scientific standards and precision through some form of peer expert review of the research activities;
iii. *relevance:* The programme relevance with regard to broader rural development objectives, needs of the target group(s) and local conditions; this ultimately reflects the research objectives;
iv. *effectiveness:* The effect of the output at 'people level' (i.e. target group(s) of end-users) and on the immediate development goal; and,
v. *impact:* The contribution of the project purpose (or immediate development goal) to the overall, long-term development goal.

To make research efforts more client-oriented and demand-driven, the PIME process aims at improving the effectiveness of research by involving stakeholders in various phases of the project cycle. The aim is to ensure that the interests, needs and demands of stakeholders are articulated into the research agenda and that there is continuous joint learning and reflection aimed at improving performance. To attain this, it is necessary to:
i. collect accurate information about needs and priorities of stakeholders;
ii. continuously adapt research programmes to better meet local requirements;
iii. deliver better quality and demand-responsive services to society;
iv. mobilise local (private sector) resources to complement public resources;
v. improve the monitoring of the use of research services; and,
vi. take measures to increase public recognition and confidence.

Only through a joint learning and action programme can true stakeholder participation develop and lead to sustainability and innovation.

2. Objectives
The objectives of the PIME change process, which is intended to lead to improved client-orientation and particularly enhanced demand-drivenness in agricultural research planning, implementation, monitoring and evaluation, are to improve:

i. *collection and assessment of research requests (i.e. accurate information about indigenous knowledge, needs and priorities of stakeholders);*
ii. *participatory, client-oriented research planning;*
iii. *implementation of COR (i.e. continuous adaptation of research to local needs;.*
iv. *joint development of rural innovations on basis of link between knowledge systems;*
v. *participatory monitoring and evaluation of research project; and,*
vi. *research output and progress reporting systems (which are intended to lead to greater public recognition and confidence).*

3.4.2 KEY ISSUES IN PARTICIPATORY RESEARCH CYCLE MANAGEMENT

1. General

In order to improve the client orientation and relevance of research, an effective PIME system, procedures and methods need to be developed and be made an integral part of CORMA. For this to happen, both managers and researchers must have a common understanding of the importance of PIME and the potential contribution of the system to enhance the effectiveness of the technology development process. As such, PIME of research activities needs to be integrated into the technology development cycle, from problem identification to dissemination of recommendations and impact assessment. If research results fail to contribute to development, the PIME system is blamed and at fault. CORMA through its emphasis on real stakeholder and client participation in all phases as well its emphasis on redirecting the process if feedback suggests the need , will lead to a more effective PIME system. If the level of client-orientation of an ARC is to be enhanced, it is of crucial importance to address three particular issues in integrating PIME into the project cycle: participatory planning; implementation of participatory technology development, and participatory monitoring and evaluation.

2. Participatory planning

Empowerment of client stakeholders is essential for effective participatory planning, implementation and M&E of AR&D. Strong involvement of farmers and other stakeholders is required in order to develop and maintain a demand-driven ARD agenda. Capacitating farmers through farmer organisations and farmer training is a main element in the CORMA approach which returns in each phase of the ARD process, whether planning, implementation or M&E. Increasingly, farmers and their organisations are empowered by assigning to them the control over the resource allocation process. This is achieved either by farmers having a majority vote e.g. in 'research boards' and 'management boards' of ARFs, or by delegating control over funds allocated for research to Farmer Organisations or District Development Offices.

Assessment of research needs focuses on major actors and beneficiaries of research. A clear definition of research problems and prioritisation by stakeholders/ clients and translation of priority problems into specific research requests and proposals is required. The aim is to collect accurate information about interests, needs and goals of clients and stakeholders. This also involves the evaluation of requirements for and improvement of, the capacity of stakeholders to identify and translate priorities into researchable problems.

3. Implementation of participatory technology development

In order to conduct farmer-focused research, farmers should actively participate in conducting all research activities initiated to help provide solutions to their specific problems. This process includes implementation of experiments and the M&E of research results, using effective participatory modes (e.g. FRGs and FFSs). Many suggestions have been made in earlier chapters to achieve a more efficient and effective client-responsive on-station and on-farm research programme. The COR approach itself requires strong client and other stakeholder participation during implementation in order to guarantee more appropriate, adoptable technologies. Key words in the COR approach remain technology development in a collegial mode, creation of ownership through joint learning, and action research.

4. Participatory monitoring and evaluation (PME)

Stakeholder participation in M&E of ARC activities is crucial in improving the client orientation of research. All relevant stakeholders' perceptions and interests need to be represented in the ARD process. Effective interactions between researchers and the different stakeholders are critically important in achieving useful output. Through these interactions, stakeholders are able to articulate their perceptions and expectations of the research process and thereby influence its outcome(s). For stakeholder participation to be effective, close co-operation among stakeholders and joint perceptions concerning the performance and desired effects of the research activities are essential. Different independent stakeholders need to communicate regularly to jointly check the progress of research activities as well as assessing the performance and impact of research with regard to the agreed overall goal(s).

Research managers should also effectively monitor and evaluate the actual research projects. PME of research activities provides feedback to researchers and stakeholders on progress. In order to set up an effective M&E of the ARD process, the following basic questions need to be addressed: What, how, and by whom is the monitoring to be done and how should the results be analysed, shared and documented?

The main concern is how to ensure that the process is participatory and client-oriented. It is therefore necessary to develop a reliable system for guiding the COR M&E process. The logical framework can play a key role in achieving this. An important step is the identification of indicators for assessing progress, performance and client orientation at different levels of the project cycle. These key performance indicators must be objectively verifiable and therefore 'SMART' (Simple, Measurable, Achievable, Realistic and Time-bound). SMART indicators need to be developed for the following dimensions of effective stakeholder participation:

i. quality and extent of stakeholder involvement;
ii. costs and benefits of stakeholder involvement;
iii. impact of stakeholder involvement; and,
iv. equity, diversity and gender aspects.

Research managers need to ensure that the participation of stakeholders is well-managed and organised; they should focus on:

i. developing effective communication mechanisms;
ii. encouraging co-operation and participation;
iii. improving capacity of stakeholders to influence the research process;
iv. facilitating information sharing and joint learning;
v. identifying indicators for tracking progress and performance of stakeholder participation; and,
vi. continuously assessing the effectiveness and level of stakeholder involvement.

3.4.3 THE PIME CHANGE PROCESS

1. Before starting the change process.

An ARC's responsiveness refers to its answering clients' and stakeholders' needs by identifying, interpreting and translating their needs into problems that can be addressed by research. It involves the integration of information on these needs with technical and scientific knowledge in order to design detailed research programmes for implementation. This implies that the following activities have to be completed at the national and local managerial level before even starting the change process at ARC level:

i. definition of a research and development policy and objectives (e.g. sub-national strategic action plan and its relation to local needs and the national policies);
ii. development of a research implementation strategy;
iii. formulation of potential programmes that address important problems and opportunities;
iv. targeting of a defined group of users or beneficiaries in a particular AEZ or FSZ;
v. specification of the outputs expected and the delivery time;
vi. preparation of detailed budgets; and,
vii. initiation of a peer-reviewing process.

In order to improve the ARC's responsiveness to stakeholder needs, the PIME process has to address many aspects in problem identification and planning of research and subsequent monitoring and evaluation of research. This section outlines the options and tools for improving the capacity of an ARC to implement a demand-driven research agenda through a client-oriented process. Certain preparatory activities have to be completed before 'actionable' research needs can be effectively established with farmers; two of these are discussed below:

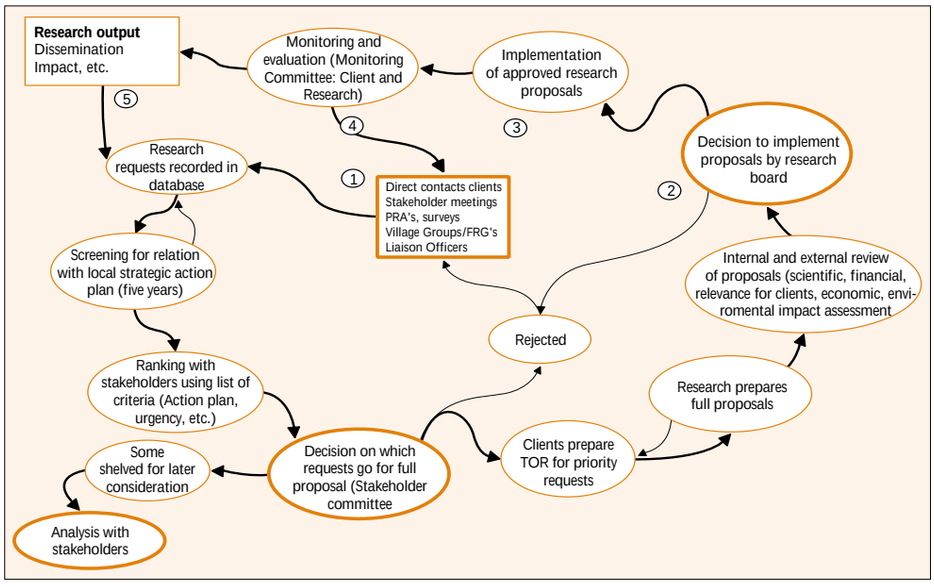
i. Have national and local strategic plans been established?

More specifically, the local strategic plan needs to include a listing of main priority themes and their relation with national policy themes. Target groups need to be identified for the

mandate area in terms of agro-ecological and socio-economic criteria. Targeting research at well-defined farming systems and target groups increases research efficiency; it also guides and enhances the dissemination of results (see 3.4.2).

ii. Has a participatory annual planning cycle been established?
Timing of the different planning, monitoring and evaluation events has to be agreed with all key stakeholders, as well as the composition of any 'committees' that are required (See Annex 3.13 for TOR15). The specifics of the ARC programme need to be analysed to ensure the required level of stakeholder ownership and effective participation in all focus areas. The specific role(s) of the different stakeholders at the various decision-making stages needs to be established and agreed upon.

Figure 4
ARC Annual Planning Cycle: used in Tanzania by DRD's Zonal Research Centres



iii. The development of research programmes and the writing of proposals.
This comprises the formulation of detailed research programmes and development proposals. This process involves the identification and screening of potential solutions and interventions, the translation of feasible solutions into research project themes and the development of a common proposal format. Continuous interaction with stakeholders during this process helps to get additional information and consensus on their needs and interests.

iv. Have clear target zones and target groups been established?
Targeting of research is the identification of relevant target groups on the basis of agro-ecological and/ or socio-economic criteria. The purpose of research targeting is to adapt programmes to the diversity of local conditions. A crucial element in ARD planning is to agree with stakeholders what the priority intervention zones and target groups are. Based on this agreement, strategies for the identification of agro-ecologically and socio-economically stratified groups can be generated. A consensus with key stakeholders needs to be developed for effective ARD in a particular area with regard to three particular levels:
a. geographical zonation;
b. household diversity analysis; and,
c. gender analysis

[15] The planning, monitoring and evaluation process is mostly formulised with three committees:

- An executive committee (with strong stakeholder participation in which research is the secretary for strategic research decisions) e.g. Zonal Executive Committee in Tanzania
- A monitoring and evaluation committee analysing technical proposals and monitoring and evaluation etc. (Zonal Technical Committee in Tanzania)
- A technical in-house pre-review committee (Internal Programme Review in Tanzania)

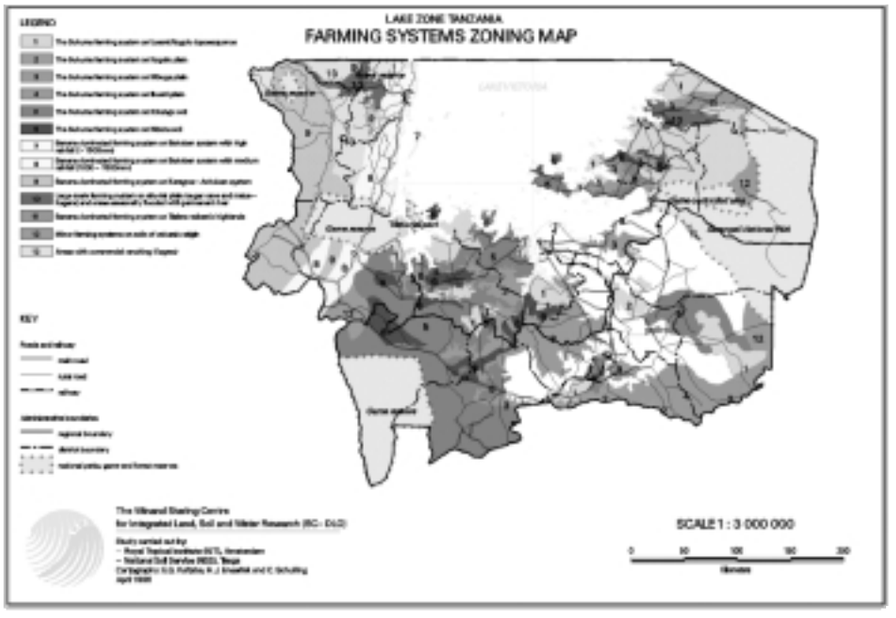
a. Geographical zonation (e.g. 'poverty mapping' (livelihood analysis) or farming systems zonation).
The identification of characteristics and boundaries of existing farming system zones needs biophysical data and informal and/ or formal interviews with farmers and stakeholders. The methodology of how to define farming systems includes the following activities:

- compilation of existing data;
- field visits to the major farming systems;
- observations on farming system parameters;
- interviews with farmers and other stakeholders;
- checking of boundaries of farming systems by using a GPS; and,
- cartography and description of farming systems.

Criteria used to distinguish farming systems include: agro-ecological features (parent material, soils, altitude, climate, landscape, vegetation), demographic features (population density, ethnic composition, mobility), household and farm characteristics (family size and composition, access to resources, average farm acreage, ownership of livestock), types of crops and livestock, dominant cropping practices and kinds of livestock management, off-farm activities, and more broadly, all important constraints and opportunities. Planning criteria can be applied to compare the major farming systems and assess their importance; they may include: area covered, total human and livestock populations, economic importance, standard of living, presence of partners and (organised) clients of research, accessibility, etc. These criteria are sometimes difficult to quantify and should then be considered as indicators only. Special attention may need to be given to poverty indicators, identified in the livelihood analysis. Prioritisation and targeting of farming systems is a matter of policy. There are no objective criteria for assessment of the importance of a particular system. This implies that a zonal research policy is needed to include criteria for targeting research at a limited number of farming systems. A policy implies making choices in relation to a specified objective. When the objective is rural development, all stakeholders should agree about the ARC policy and, as a consequence, at which farming system(s) the ARC's development efforts should be targeted. The farming system zonation map must be made more than a colourful decoration on the wall through its daily use as a planning tool for research and extension.

Figure 5
Farming Systems Zoning Map of the Tanzania Lake Zone

In the Lake Zone 14 major Farming System Zones were identified in this way, out of which nine were targeted (6 in the cotton-based farming system group and three in the banana-based farming systems group).



b. Household diversity analysis e.g. wealth-ranking
Targeting involves social stratification. It is based on the assumption that rural societies are not homogeneous. They are composed of different household categories with specific con-

straints and contrasting interests. Targeting is a tool to identify groups of households with similar socio-economic and cultural features. The objective is to develop appropriate and specific recommendations. Household diversity analysis is applied at different stages of the research process including at the stages of identification of constraints/ research needs, testing of possible solution(s) and the development of recommendations, and dissemination of research results. It is also a useful tool in impact analysis.
Household diversity analysis enables an ARC to:

- assess the significance of household categories and select target categories for research and extension;
- discuss constraints and potential solutions with farmers who have similar socio-economic and cultural conditions
- analyse whether a potential innovation matches with the requirements of the target category;
- determine the potential adoptability of an innovation;
- select farmers belonging to relevant target categories for participation in FRGs and participatory technology testing;
- evaluate test results with farmers of a specific category; and,
- verify adoption of a recommendation among farmers belonging to a target household category.

Box 3-23
Diversity Analysis; Example from the Lake Zone, Tanzania

Different farmer categories can be distinguished at village level in the various farming system zones (FSZs). The farmer categories vary in terms of access to resources such as land and cattle and have differences in availability of labour, which still forms the main constraint in many Farming System Zones.
The following main farmer categories can be distinguished in the grouped (cotton-based versus coffee/ banana based) Farming System Zones in the Tanzania Lake Zone:

Cotton-based farming systems zones (FSZ1-6)(Kingma and Mafuru, 1996):

(i) *Lower stratum/ poor farmers.* No cattle, but some small ruminants, little or no ownership of land, limited access to animal benefits and fertile soils, small household size, sale of labour. Many female-headed households (FHHs).
(ii) *Middle stratum.* Enough land, access to fertile land, few cattle with access to cattle benefits, livestock for food, no use or sale of hired labour.
(iii) *Upper stratum/ rich farmers.* Large number of cattle and oxen, cultivate large areas of fertile land, large HH size, use hired labour.

Coffee/ banana-based farming systems (FSZ 7, 8 and 9)(Ndege and Steenhuijsen Piters, 1996):

(i) *Marginal households.* Resource poor, young HH, part-time farmers, food shortage. Many FHHs.
(ii) *Self-sufficient households.* Moderate access to means of production. Low social status. Decline of production.
(iii) *Surplus producing households.* Household larger, HH older, enough resources. Banana and coffee surplus. Hire labour and are involved in trade. Need inputs.
(iv) *Others such as:* absentee landlords (No clients for research), migrant labourers (not permanently in the village, hired labour), caretaker households (landless, only interested in annual crops).

Source: Mafuru and Heemskerk, 1997.

The methodology to identify household categories and potential solutions to their constraints can be summarised as follows:

- discuss with key-informants, criteria of household differentiation. Start with indicators of wealth or standard of living and discuss the systematic causes of differences between households;
- discuss and describe the various categories with the key-informants in order to achieve consensus about the number of categories and their designation (e.g. 'low-resource' and 'high-resource' households);
- assess the proportional importance of each category by using a (complete) list of households in the village. Take a random sample of households and ask the (group of) key-informants to categorise each household;
- interview farmers by category on their household composition, means of production, productive activities, productive results and key constraints. Apply appropriate interview

techniques and tools to involve all group members in the discussions, such as matrix ranking and pair wise comparison of constraints; and,
- discuss with farmers by category, the potential solutions to their constraints and specific activities, as well as the key-actors, to test or apply these potential solutions.

Box 3-24
Implementation of Gender Analysis; Example from Northern Zone, Tanzania

Gender sensitive research programmes can be developed if gender considerations are translated into the research approach, as is shown here by an example from Tanzania.
In the Northern Zone of Tanzania, as in other research zones, a gender framework was adopted at the Zonal Agricultural Research Institute. One of the actions was increased focus on gender sensitive production constraints.
The Tanzania association of female researchers developed an approach of involving more women in on-farm research.
Village-based problem analysis in the village of Same resulted in a list of production problems, which showed drought tolerance as a first constraint by men and processing problems as a main constraint for women. A programme for the (re-) introduction of drought tolerant crops started subsequently through the analysis by female farmers of the various home- processing options for the requested crops (in this case sorghum). Only when the processing requirements were established varieties were selected for on-farm testing. In most cases this variety testing is done in the "reverse mode" and starts with field testing, here it started with processing requirements. The programme resulted in the adoption of the sorghum variety Macia. Similarly women showed interest in testing different processing options for sunflower ('alizeti'), which was needed by them not only for the oil but also for the seedcake (since women were in charge of animal feeding). The cash crop safflower ('alizeti ndogo'), requested by the men, was rejected because of these considerations by women (processing and animal feed criteria).
Source: Pers. Comm. Dr. Mary Mgonja and Dr. Zubeida Mduruma, 1999

c. Gender analysis
Gender analysis starts with the recognition that the household is not a homogeneous group of people, but rather a complex system in which tasks, resources and benefits are not equally shared among members. Gender analysis is an organised approach (qualitative and quantitative) to understand how female and male persons relate to each other both at household and community level, in terms of roles and responsibilities, access and control over resources and benefits, their needs and priorities. Gender analysis is an instrument to target research and development with the objective to improve the efficiency and effectiveness of research, and to create opportunities for equitable development of women and men in rural society. Gender analysis aims to:
- identify the major gender differentials of the target groups in a given community or field of activity (e.g. agriculture, forestry, water, etc.);
- determine gender-specific constraints and opportunities for female and male members of the household or community to participate in and share benefits from, research and extension activities;
- generate possible strategies or measures to overcome these constraints; and,
- recognise different effects or impacts of research and extension activities on female and male members of the target group(s).

2. Organising the 'processing' of research needs
In determining the priority research requirements, several questions need to be considered; such as:

i. How to prepare for receiving research requests?
Clients are expected to express their research needs. This expression of interest can be facilitated by organised groups of farmers, producer organisations, and other organisations (NGOs, extension services, etc) representing smallholder farmers. Research requests can be identified through various means; three main options can be mentioned:

a. research requests can be directly obtained from clients (client-demanded);
b. research requests may be identified during a stakeholders meeting (e.g. annual ARC planning meeting, village level planning meeting, etc.); and,

c. research needs can also be identified through diagnostic surveys using informal participatory appraisal techniques.

Clients may need to be supported to effectively express their demands. Identified constraints may need to be translated into options for technological improvement with specific TORs for researchers and other identified stakeholders.

ii. How to assess, review and prioritise research requests?
When research requests are received from clients they must be assessed and discussed with these clients and other stakeholders and if found 'actionable', arrangements made for implementation and funding. The use of annual stakeholders meetings involves the formal review and evaluation of research achievements and identification of new research activities. Research request assessment can also be done using participatory techniques/ tools involving the following steps:

a. identification of priority problems with stakeholders and farmers;
b. determination of potential responses (farmers' options/ farmers' knowledge and other options, and joint ex-ante assessments with clients);
c. planning for interventions, which will allow participatory PIME; and,
d. joint formulation of research programme/ proposals.

ii. How to decide on a list of research requests that are to be formalised?
A formal committee representing all stakeholders communicates to the clients the list of research requests that have been prioritised as well as the corresponding options that are to be tested. Clients are then invited to prepare more detailed TORs for the research activity also based on farmers' conditions and farmers' knowledge. The agricultural research agenda cannot be client-driven unless clients have been capacitated to effectively express their demand and expected outputs. Capacity building in this stage therefore, is one of the main pillars of the COR approach. Through joint problem tree analysis, a logical framework is constructed as well as the corresponding "monitoring log"

3. Planning research programmes and writing professional proposals
The following questions need to answered:

i. How are TORs of client-demanded research requests transformed into full proposals?
Terms of references with potential responses must be translated into a research proposal by the respective researcher(s) or principal investigator(s). It is recommended that research proposals are kept simple and are formulated in such a way that different stakeholders are able to understand them. Different formats for writing research proposals exist; in some cases conform to the requirements of potential funding agents. Important components in the proposal format are: clearly defined target group(s), research objectives, expected outputs, budgets, M&E procedures and result dissemination strategies.

ii. How are full proposals screened?
During the research proposal development process, various individuals are involved to provide scientific input related to the problem being focussed on. Clients are also consulted for missing or additional information with regard to the issue being addressed. Once the proposal is formulated, it is subjected to the peer review process within the ARC (sometimes involving outsiders as well), to assess its scientific relevance and quality, using pre-set criteria. Self-assessment of the research proposal asking the key twenty questions is recommended (See Annex 3.6: "Twenty questions for quick assessment of research proposals").

Box 3-25
Proposal approval procedures: An Example from Lake Zone, Tanzania

The Lake Zone ARC (LZA) agreed to use a standard screening procedure for all its' proposals to ensure proposal quality and relevance before any proposal is submitted for funding. The procedure entails:

- assessment if the zonal format is respected;
- quick appraisal of the proposal using a checklist of 20 questions that can be answered either yes or no (see annex qx);
- detailed individual assessment of 14 topics (see annex qx) using a scoring form with a total maximum score of 100 (see annex qx); and,
- screening committee meeting to compile scores, elaborate and discuss comments, and agreement on proposal fate.

The procedure aims to be objective and transparent. The first day of the screening process, the chairperson of the screening committee ensures that all committee members receive proposals and adequate scoring forms. Each proposal is screened by at least 3 committee members. Members appraise the proposals individually and include comments on the scoring forms. Before the committee meeting, individual scores are entered in an Excel summary sheet. The scores are discussed during the meeting. Committee members compare and discuss individual scores and appraisals, and establish a ranking of proposals. It often happens that the ranking of proposals based on scores changes when members explain their scores. In some cases, researchers are given the opportunity to modify their proposal for re-submission. The committee may also specify changes that have to be made (work plan, time frame, budget, additional activities, etc. Results of this discussion are summarised in the minutes. The latter are distributed to the applicants on the day after the screening committee meeting.

In September 2000, the screening committee of the LZA screened 70 research proposals. The committee consisted of 9 members (research co-ordinators and heads of programmes from both stations in the zones). All proposals followed the agreed format and were submitted for detailed screening. 4 team members using the detailed scoring forms screened each proposal. After each committee member had scored the proposals individually, the screening committee met and discussed the scores. Both the quantitative score and team member comments determined the final fate of a proposal. The meeting finally agreed that 21 proposals would be accepted straight away, 22 proposals needed improvements and could be resubmitted, 5 proposals had to be combined, and 22 proposals were rejected.

Source: Lema et al., 2003

Any proposal to be submitted for funding must be reviewed by peer scientists at the ARC using an agreed internal review system. Individual scientists are not permitted to submit their proposals on behalf of the institute without proper assessment and registration. Each proposal must be reviewed by at least two peer scientists applying identical criteria stipulated by the ARC. A proposal qualifies for implementation by having a cumulative score above a defined threshold (e.g. >50%). Important criteria such as evidence of client demand, gender analysis or a well-organised logical framework may be given special consideration during the scoring process.

iii. How are proposals approved?

Once a research proposal has been written, the principal investigator submits it possibly in close collaboration with a 'liaison officer' to the requesting client. The client will review the proposal and inform the principal investigator of any errors, deficiencies or other observations. The proposal can then be improved, scientifically reviewed and considered for funding by the client, or any other sponsor. Once the review process is completed, the research project is either approved for funding or implemented, or delayed/ rejected (e.g. because of a lack of funds). A multi-stakeholder committee at local level gives this approval with representatives of major categories of stakeholders (see Annex 3.11).

4. Effectively implementing participatory technology development

As referred to earlier, an extensive body of references exist as to the implementation of PTD (Veldhuizen et al., 1997). In the implementation of COR, it is also useful to consider the following two questions:

i. How to involve clients in research implementation?

Involvement of farmers in implementation of research projects has been proven to enhance

the effectiveness of the research. However, traditionally in on-station research, farmers are often only involved in design and evaluation of research activities and trials. Key actions to make such research more farmers focused are:

a. regard farmers as equal partners in ARD;
b. incorporate farmers' knowledge in planning the research;
c. involve farmers of different categories in the research processes;
d. enhance effective communication with farmers;
e. monitor and evaluate the effectiveness of farmers' inputs in the ARD process; and
f. facilitate interaction between farmers and service providers; e.g. strengthen links with markets, credit facilities and input suppliers.

ii. How to do farmer-focused on-farm research in an efficient manner?
Farmer involvement in COR also has a research efficiency element. Although likely to be more effective, farmer-participatory technology development is often also more costly. Special attention should therefore be given to the efficiency of the research (see also 3.2). Farmers must be given the opportunity to influence the design of on-farm experiments by having significant leverage over resource allocation.

5. Effectively monitoring and evaluating research projects
The following four questions need to be addressed:

i. Has a monitoring system for research projects been established?
After a research project has been approved for implementation, M&E needs to be initiated to control the quality and relevance of research activities. In most cases, a 'Programme Planning Matrix' (using a logical framework format[16]) and an Annual Work Plan (AWP) guide the M&E process. These are useful monitoring and evaluation tools, which summarise the information required for assessing progress, performance and impact of activities and outputs towards goal achievement. Similar alternatives such as time-bound implementation plans with milestones to be achieved, combined with a good design can however, provide the same results.

The AWP summarises the project implementation framework. It includes information on: what (activities), how (implementation/ techniques), when (timing of activities), who (responsibilities), and with what (sources of resources/ inputs), the project will be implemented. This information helps the principal investigator of the project to monitor, control and if necessary adjust the project implementation process.

The M&E system itself addresses questions such as:
a. did the project (activity) start on time?
b. were resources used as planned?
c. did partners provide resources as agreed?
d. are there reasons to adjust work plan and budget?
e. are the expected outputs delivered?
f. what action(s) should be taken to improve the project?
g. are stakeholders adequately involved and do they actively participate? and,
h. what are the costs of stakeholder involvement?

ii. Is the monitoring system participatory?
Procedures for involvement of stakeholders in project monitoring have to be developed through regular meetings or other forums with FRGs, producer organisations, etc. Stakeholders have to be involved in all stages of the technology development process, consequently in the outputs listed in the LF, there needs to be reference to the degree to which stakeholder goals and expectations have been addressed. Although significant stakeholder participation in COR monitoring is essential, the (often short-time) costs of such involvement need to be in balance with its expected long-term benefits.

[16] A definition of the various terms in the logical framework format and programme planning matrix is provided in Annex 1.1 "Definitions"

iii. How is the monitoring implemented?
A monitoring committee comprising different stakeholders needs to be established at ARC level; this should involve among others, FRGs, now functioning as M&E groups but reporting to the stakeholder monitoring committee. Actual implementation can be through initiating co-ordinated analysis of progress per commodity and ensuring frequent trial visits (on-farm and on-station).

iv. Are evaluations of research projects being implemented?
All COR research projects need to have been subjected to an ex-ante adoptability, gender, socio-economic, etc. analysis based on input from clients and stakeholders[17]. Ex-post analysis is also required to get feedback from clients on the actual adoption of technologies developed and disseminated.

6. Efficient progress reporting systems
Well-organised reporting of the progress of research projects facilitates timely sharing of information with key actors. This needs to include frequent discussion of the status of research projects with various stakeholders and regular (e.g. quarterly and annually) reporting of project progress. The key objectives are to provide feedback on the performance of the project, share lessons learnt, identify constraints and take corrective actions by those involved in project implementation (researchers and farmers e.g. participating in FRGs). Also, regular reporting provides opportunity for stakeholders to exchange information, perceptions and interpretations regarding the project, hence enhancing understanding and co-operation among themselves; it also facilitates the clients' preparation for ultimate technology adoption.

To improve an ARC's ability to organise efficient progress reporting systems, certain actions and tools are needed. Key questions that need to be answered in this context are:

i. How is progress reporting organised with stakeholders?
The ARC needs to develop a system based on the monitoring reports of principal investigators. Agreed formats for progress reports can include M&E sheets, short reports, web-based formats, etc.

ii. What are the responsibilities for progress reporting?
A format for quarterly progress reporting for the entire ARC needs to be agreed upon as well as a division of responsibilities on how to compose it.

iii. How is annual reporting taking place?
Main stakeholders and clients have a right to receive an annual progress report and timely information on the results of the joint technology development programme. Stakeholders need to be involved in this annual reporting. Special tools are web sites and reports with special formats for different audiences, etc.

iv. How are stakeholders informed about research results and how do they provide feedback?
Village gatherings or FRG meetings provide important forums for obtaining feedback from clients on a particular annual programme, including contractual agreements. For such meetings assistance to stakeholders and clients is often required e.g. by developing "debriefing procedures".

[17] Technology markets in Tanzania are a specific form of M&E. Villages are exposed to 'on the shelf' technology and evaluate this in a market situation for possible testing (see also Box 3.5-3)

3.5 Output production, dissemination and access to information

3.5.1 BACKGROUND AND OBJECTIVES

1. Background

Local level adaptive research systems are at the interface of the 'formal' knowledge systems and farmers' (or 'local indigenous') knowledge systems. The effectiveness of the AKIS depends on the extent to which close interaction between the two systems can be established (Sutherland, 1999). The local ARC will require access to knowledge of both systems (formal and indigenous) as a precondition for effectively producing new useful knowledge and for disseminating this knowledge in a user-friendly and client-accessible manner. If local-level adaptive research systems or institutions are to be truly demand-driven, they require a strong output orientation (only results appreciated by clients count). They also need a well-developed dissemination system (technology shelves are actively and continuously 'emptied'), and good access to general information relevant to the agricultural sector and the formal knowledge systems of agricultural researchers (otherwise there is nothing for research to adapt). Based on an assessment of the existing level of client-orientation of the ARC and the inputs from other stakeholders, a management of change process is started which will lead to improvement of client-orientation in output focus and technology extension. The goal of this exercise is to increase the impact of agricultural research on rural development through accelerated output production and better dissemination of information:

2. Objectives

Achieving the following objectives will significantly contribute to the change process towards improved output dissemination:

i. improve information and knowledge management;
ii. enhance production of scientific output;
iii. enhance production of user-friendly output;
iv. strengthen the effectiveness of dissemination of research results and recommendations.

How to realize these objectives is discussed in the sections below.

3.5.2 KEY-ISSUES IN MANAGEMENT OF RESEARCH OUTPUT ORIENTATION

1. Four issues related to the main objectives

i. Information and knowledge management

Local level applied and adaptive agricultural research institutions have a mandate to provide the interface (through creative interaction) between formal and farmer's indigenous knowledge. This can be strengthened by the facilitation of a dialog between farmers and researchers, which will lead to partnerships and create a 'collegiate interface' (Sutherland, 1999). Research managers can improve the quality and effectiveness of this interface through interventions in areas such as the use of farmers' knowledge and terminology, facilitation of improved access to scientific knowledge for researchers and farmers, and the development and institutionalisation of links between farmers and scientific knowledge systems. The management of internal information as well as the actual application or utilisation of information also needs to be institutionalised. To succeed in this process, a well-organised learning process is key and progress indicators need to be developed for each of four important activities:

- Improving access to information (see above).
- Enhancing the availability of the information within the ARC (library, internal seminars etc.).
- Operationalising the information available with the ARC through working groups and guideline preparation.
- Applying the information e.g. by making it part of the research protocols through emphasis on analysis of background information.

ii. Production of scientific output

Applied and adaptive researchers are professionals and they need constant review and critique by colleagues. Technical research findings resulting from an adaptive research process therefore not only need to be disseminated to clients, they also need to be formally published. Progress made in research methods used and approaches followed also needs to be communicated in order to contribute to continuous institutional learning as well as to stimulate the exchange of information within national and regional research and technology development networks. Research managers are expected to contribute to the production of scientific knowledge and information through stimulation of publications by ARC researchers. This should be done not only within the institute but also with (inter) national research systems and professional journals and publications. Managers should actively monitor the output and quality of publications of individual scientists and take these into account in annual evaluations and promotions.

iii. Production and content of user-friendly output

Although the recommendations resulting from demand-driven research may be very 'appropriate', if the output is not user-friendly, the message will not spread or be adopted quickly. Important elements in this are contents, format and language used. Different target groups ("recommendation domains") will have different requirements in terms of contents. A relation needs to be established between expressed needs and the contents of the recommendation message. In order to make scientific output more relevant in relation to expressed client demands, it may require a specifically adapted format for different client stakeholders whether other researchers, extension staff, farmer organisations or different household types and gender categories. The language of the message will, apart from the generic language (local or national), also vary in terms of the target groups (e.g. text or cartoons, 'simple' or 'scientific' language, use of local names or scientific names, etc.). It is essential that the farmers are involved in the development of the message and agreement is required with other stakeholders on the moment of participation of each stakeholder.

iv. Dissemination of research results and recommendations

Although local level research organisations do not have a specific extension mandate, they nevertheless have an important role to play in supporting the dissemination of research results. This has become even more important recently because many Government extension services in SSA are in disarray as a result of repeated re-organisations and (sometimes poorly planned) de-centralisation. Research has to show results and impact at least in those intervention areas where it is deeply involved (e.g. with FRG and FEG members), in order to demonstrate the adoptability of its recommendations, the success of its output-orientation and to obtain essential feedback. Research needs to collaborate with extension organisations, whether public, private or NGOs, whether strong or weak, in order to play its complementary supporting role and get the necessary input and feedback from farmers and other clients. Research also has a facilitating role in relation to capacitating targeted extension staff, farmers and other organisations such as NGOs in the process of up-scaling research results.

The dissemination of research results and recommendations can be improved by research managers through developing specific strategies for technology and information dissemination to different user categories. Public extension services in many SSA countries are also becoming increasingly client-focused and demand-driven, among others by using new modes of operation such as out-sourcing of services, partnerships with private organisations en NGOs, as well as with other farmer groups in villages (e.g. FRGs and FEGs). Local level applied research will have to adapt to its new facilitating and dissemination-supporting roles in this changing extension system with attention for new development such as FFSs, on-farm seed multiplication, group purchase of inputs, revitalised co-operative development, etc.

2. Issues arising from the self-assessment

Many adaptive research scientists consider trial reports as the main output of research. During self-assessment, shortcomings in the production of research publications, extension materials, etc. will be identified and analysed. Researchers will find more effective ways

of disseminating research information as well as to improve access to formal and farmers' knowledge and information. Self-assessment will mainly focus on the relation between investments made and outputs achieved, i.e. input-output ratios. As one ARC director in Tanzania said: 'The investment made in the research activity should be seen as an imprest, if the results are not presented to the client (and prove to be to the satisfaction of the client), then the imprest is not settled and therefore not replenished'.

3. Issues arising from the assessment by stakeholders
Numerous are the complaints from key stakeholders in agricultural development such as public extension, that there are no extension messages available for dissemination or that required inputs (such as seeds, planting material or breeds) can not be obtained by the farmers. The assessment by stakeholders of the perceived output of the ARC should therefore go beyond these general statements and make clear distinctions between availability and access to technologies and information. The access to technologies is likely to different for different stakeholders and different categories of clients. Some of the observations from stakeholder assessment can be verified against the established development objectives of the ARC, e.g. a statement by large-scale farmers that the ARC is not producing any output for them.

3.5.3 THE OUTPUT DISSEMINATION AND INFORMATION MANAGEMENT CHANGE PROCESS

Based on findings from self-assessments and evaluations by stakeholders concerning research output management, dissemination of research results and facilitating access to agricultural information in general, a number of key areas can be recommended for change; these are discussed below.

1. Information and knowledge management.

i. Acquire farmers' knowledge and terminology
In seminars, surveys and through other contacts, farmer's knowledge about and terminology for, natural resource classification (soils, vegetation and land use types), needs to be established and recognised. In on-farm experimentation by farmers it is equally essential to establish what kinds of local weights (or volumes) and measures are used and relate these to 'scientific' quantification and other information. Eventually it will be necessary to identify 'farmer experts', who are to become resource persons and partners in the ARD process.

ii. Ensuring access to scientific (formal) knowledge
Researchers need to have access to formal knowledge; the options to achieve this are many, varying from a well-established library to good Internet connectivity and access to television (cable or satellite TV). Priority is to establish dependable and timely access to national, regional and international knowledge systems (participation in regional and national thematic networks, access to electronically updated scientific journals, etc.). Currently, several publications including scientific journals and other sources are available 'on-line' and in the future this is expected to be a major source of current knowledge. Libraries in ARCs require being equipped with Internet access services. Special attention is also required for the operationalisation of direct access to scientific information by clients and stakeholders.

Box 3-26
Information and Knowledge Management; Tanzania Eastern and Lake Zones

Two examples are provided to illustrate that technology development does not start from scratch but should build upon farmers' knowledge and formal knowledge already generated. Inventories (or reviews) are required to provide a benchmark for technology development as well as making an important contribution to farming system zone-based extension manuals.

Lake Zone

In the Lake Zone in Tanzania recommendations for different commodities and factors have been systematically analysed by farmers and change agencies (public and private). In some cases also the private agro-industrial sector has been involved through stakeholder workshops. 'Recommendation gap analysis' workshops focused on the state of the art in relation to formal and farmers' knowledge. Such workshops have a two-fold objective:

1. provide the basis for a comprehensive loose-leafed-updateable extension manual for different agro-ecological zones; and,
2. develop a basis for the reorientation and priority setting of research programmes

The workshops (a total of about 15 were held), all had a similar focus; main aspects were:

1. the technology gap between research, extension and farmers' practice was analysed and discussed for each relevant farming system zone;
2. as much as possible, farmers' knowledge was used in the recommendation gap analysis: (local names such as land use names, soil names, variety names etc.), farmers' assessment and selection criteria and farmer priorities for development; and,
3. a similar format was used for all workshops to allow the information to fit a loose-leafed updateable extension manual for each farming system zone.

Eastern Zone

The Eastern Zone ARC realised that technology development has to be based on existing practices and knowledge; one aspect of this is to make an inventory of available and appropriate technologies. The appropriateness of the recommendations in the inventory is analysed with stakeholders for the different conditions (farming system zones and household categories). In the process of inventorying, it was discovered that the list of 'available' technologies is too long and would require a huge volume. It was therefore decided to produce a short version guideline. The process of compilation of the technologies followed, focused on a list of attributes of crop varieties or animal breeds and associated management practices for a particular target group or groups of producers.

Guidelines, developed to meet user needs, have proven to be good indicators for the clients to be able to select technologies suitable for their farming situations. Although the intention is to have the inventory distributed to all relevant stakeholders; so far it has only been distributed to researchers, extensionists and a few donors. It was also displayed at a national agricultural show but only a few copies were picked up. There is need for a 'local language version' to be more suitable for the intended target groups i.e. extension, NGOs, district councils and farmers.

Source: Lema et al., 2003, ARI, Ilonga, 2001

iii. Institutionalise the links between farmers and scientific knowledge

Local level ARCs need to pay special attention to institutionalising information management. One important person in this is the information management officer or information systems liaison officer[18]; his/ her tasks need to be specifically defined and ARC management has a special responsibility to monitor quality implementation. Regularly working with FRGs in a process of participatory learning and action research (PLAR) or FFSs are other options for institutionalising links between formal and farmers' knowledge[19] (See Box 3-26).

iv. Managing internal information efficiently

The ARC will need to apply institutional learning principles in order to make information (farmers' and scientific information) operational in all research and dissemination activities.

[18] In Tanzania every zonal ARC has appointed a Zonal Information Liaison Officer (ZILO), supported by an Information Management Committee recruited from staff at each department (Lema et al., 2003).

[19] In Rwanda, in the improvement of bean production, participatory plant breeding was used as an effective way to link indigenous and formal knowledge (Sperling et al., 1996).

Such operationalisation can be facilitated through guideline preparation, the involvement of working groups, and the use of specially prepared intranet or information management software.

Box 3-27
Management Information Systems: an Example from Mali

Agricultural research output needs to be satisfactory for clients but also for other stakeholders (research partners and national/regional research programmes). In relation to clients, emphasis has been given in the Lake Zone of Tanzania to the production of an updateable, loose-leafed technology source book based on leaflet and poster development workshops with stakeholders, including farmers. This source book was based on similar experiences in Kenya (The Extension message source book).Similarly an action programme was developed for the improvement of scientific output of research through suggested activities for improvement of output production, dissemination and access to information in Southern Zone:

Through training, peer review and rewarding of scientific output, access to computers and publication services, and the use of multi-media output production, dissemination and access to information have been improved. An updated MIS is required to enhance the collection and storage of research reports, as well as to track the completion of research programmes.

Key activities for improved output, dissemination and information access are :

- In-house training in scientific writing.
- Submit research reports to peer review.
- Include rewarding of output in zonal research policy.
- Improve access to computers by all research staff.
- Establish a publication unit.
- Conduct training in making user-friendly extension materials.
- Include preparation of user-friendly extension materials in research budgets.
- Diversify the use of media to promote research results.
- Implement an MIS , establish a central database and provide training in database management.

Source: Lema et al., 2003

v. Ensure the application and use of information
Farmers' knowledge needs to be incorporated in research proposals, which are then to be screened by farmers before approval. Farmers, researchers, extensionists and indeed all stakeholders, need to agree on a common terminology to be used for the formulation of extension messages[20].

2. Production of formal scientific (or 'generic') output.
There are a wide range of alternative approaches to making scientific knowledge available to users and other concerned stakeholders; some of these are:

i. Dissemination through regional and/ or international research systems
The entire research continuum from basic research to farmers' research or from on-farm research to international centre research is important for effective ARC programmes and projects. ARC management therefore needs to put in place adequate measures to make sure that information flows from the ARC to other levels of the global research system and visa versa. Publication in national and international journals needs to be particularly stimulated. Special incentives for researchers at ARCs have proved to be very stimulating in this context.

ii. Production of publications and information within the ARC
Every ARC is required to have a publication series. Adaptive research results from collaborative research activities with extension and/ or FRGs are mostly published in annual trial

[20] A specific example of this is the use of farmers' terminology in relation to land use types in the toposequence. Cases from various countries (Zambia, Tanzania, Mali and others) illustrated the importance of this for farmers. Making use of farmers' terminology is often a condition for farmer participation in research and development and ultimately for the adoption of new technology *(Stoop et al., (1997).*

Box 3-28
Production of Scientific Output: Lake and Southern Zones, Tanzania

Output monitoring of the ARC is essential in CORMA. Many MISs exist, varying from a simple monitoring table (with quarterly indicators for the various sub-activities) for each research activity to computer-based (Inform-S) and web-based systems (e.g. in South-Africa's Free State). In Mali, a management information system (MIS) has been developed that monitors and evaluates scientific and organisational performance.

The principal objective is to develop a system of self-monitoring and evaluation that will allow the institute to improve its management of scientific information. A software programme (SAC) has been developed that organises communication of scientific information between all management levels of IER, such as the scientific director, the regional centre director, responsible programme leaders, regional scientific committee, and researchers. SAC contains the following information about research programmes :

1. details of the research proposal (summary, activities, expected results, source of the idea, research objectives, target groups, economic, social, environmental and gender aspects);
2. resources (collaborating scientists, and other organisations, and type of funding);
3. research protocol (materiel and methodologies used, type of technology) ;
4. results (scientific as well as for the end users) ;
5. description of the products generated;
6. presentation of the developed technologies ; and,
7. evaluation (scoring of the project by the regional scientific committees).

SAC allows printing reports about the progress of research programmes. It is possible to print quarterly reports (focusing on the implementation of research programmes) that are discussed during the quarterly management committee of IER. An annual report can be generated for the annual meeting of the Board of Directors that focuses on the research results. In addition, SAC can be used to register the assessment of the quality of research programmes by the national and regional scientific research committees as well as the scientific co-ordinators. Further, consultants of donor agencies can consult SAC during their evaluation missions.

Source: IER, Mali, 2002

and/ or progress reports; without such output, research activities should not be considered completed. A series of conclusive trial reports can result in a 'field note', which is the scientific basis for 'fact sheets' that lead to extension leaflets. Diagnostics studies, synthesis and review documents are normally considered 'working papers'. The production of extension leaflets, booklets and technology source books is the joint responsibility of research and extension staff; trial reports and field notes are the primary responsibility of the researchers involved. Special formats for such reports need to be developed and agreed; these should include indicators for stakeholder participation and client-orientation. In case of contract research and other contractual arrangements, ownership (including IPRs), normally would with the client, but the concerned reports could still appear in the ARC publication series (with the client's consent). The publication policy of the ARC requires regular review by a multi-stakeholder committee. Elements to be analysed are the publication series, formats, distribution, timeliness of reporting, etc. (see Box 3-27).

iii. Improving output quality and monitoring of publications

The quality of research reports (field notes, trial reports, etc.) should be regularly reviewed internally (and sometimes externally) by applying a series of quality indicators. Such indicators should include criteria that measure the accessibility of the presented information to client stakeholders. Regular peer reviews by external reviewers can also help in assessing the scientific quality of the reports. The responsibility for monitoring the output-orientation of research should be assigned to an ARC committee that keeps an inventory of trial reports and field notes that are due. A list of all the ARC's approved publications should be maintained and regularly published. The reports on this list need to be available to clients free of charge or at nominal prices and need to be regularly updated. An incentive system that stimulates the timely production of quality reports has proven to be a useful instrument for the ARC Publications Committee to encourage researcher co-operation and commitment (see Box 3-28).

3. Production of user-friendly output
There is a need for:

i. An inventory of the needs for new technology and of available technologies
In workshops with clients and other stakeholders, a decision will have to be made on the priorities, targeting and formats for extension messages. An up-to-date information base needs to exist on the requirements for specific technology messages and the available technology and information 'on the shelf'. This should be based on a 'gap analysis' between research and development options and farmers' practices specific to different household categories. The database must be based on farmers' knowledge as well as on available technologies from research (the ARC and other (inter) national research institutions).

ii. Production of materials for technology dissemination
The ARC needs to have a system in place that ensures the regular production of agricultural technology options in co-operation with clients and stakeholder from different user categories. Important steps in developing such a system are: production of 'fact sheets', based on on-farm and on-station research, agreements with clients on formats of messages, co-operative research-extension message development, and a joint monitoring committee and agreed procedures for testing the usefulness of messages. Critical in this process is the development of a capacity for message development as well as having in place an incentive scheme for both research and extension that rewards successful message development. Different formats for extension messages need to be analysed with stakeholders for their effectiveness and efficiency (e.g. leaflets, booklets, farming system zone-based technology source books, posters, media, training materials, etc.).Technology recommendations can be disseminated through extension leaflets, which are in principle developed by extension and farmers often with support from research. Comprehensive extension manuals are often 'commodity-based' (e.g. a "cotton handbook" in the Tanzania Lake Zone), 'area-based' (such as the extension handbooks in Kenya) or 'agro-ecological Zone based' (as practiced in Zambia); these are mostly developed in close collaboration between research and extension and verified by farmer organisations. Extension manuals require to be updated regularly and therefore sometimes take the form of loose-leafed updateable manuals.

iii. Approval of the material
The production of user-friendly output needs to be closely co-ordinated by research managers. They need to particularly emphasise preparing up-to-date inventories of technologies released by the ARC, partner organisations and other technology suppliers, that are relevant to the needs of the identified target groups. Research managers need to focus also on the actual production of such material including ensuring that the prescribed (participatory) approval system of the released technologies is implemented. Special attention is often required for the de-centralised approval of locally generated technology. Rules, regulations and procedures for extension message approval at the local (and national) level need to be reviewed in relation to different types of technology release. The analysis should focus on existing legislation (including by-laws), bio-safety regulations and implications with regard to applicable rules at the national level (Ministry of Agriculture and NARI). The rules, regulations and criteria for approval but also the modalities for stakeholder participation in deriving technological recommendations need to be institutionalised. While messages concerning agronomic practices, the use of fertilisers and pesticides, indigenous technical knowledge, etc. are approved at local level, the use of different types of inputs (seeds, pesticides etc.) is traditionally approved at national level. It is expected that similar to pesticides, national approval will increasingly focus on testing of the food safety regulations (pesticide residues, bio-technology, etc.). In this context it would to be expected to become increasingly feasible, to approve simple technical recommendations (including crop varieties) at the local level.

4. Dissemination of research results and recommendations
It is important to distinguish between:

i. A strategy to disseminate research results to primary ARC partners
In order to make ARC research results available to its primary (directly involved) partners, clients and stakeholders, including 'research intervention villages', several opportunities

exist. Examples are: the organisation of field days on-station and/ or on-farm, development of permanent easily accessible exhibitions, establishment of an ARC web-site, joint study tours to other research centres, as well as annual meetings with all stakeholders on results of the programme and the identification and establishment of new programmes. The ARC strategy for the dissemination of research results to these key stakeholders needs to be developed in close collaboration with them.

ii. A strategy to up-scale research results to the full ARC mandate area

Apart from the direct dissemination of research results to key stakeholders involved with a specific research project, a special strategy needs to be developed with the clients at large and with change agents such as extension, for the actual up-scaling of successful ARC research results to different categories of end-users. Such dissemination needs to relate to intermediary organisations such as NGOs and sometimes also to national policy and decision makers. A range of options exists: involvement of mass-media, 'technology markets' (from agricultural shows to village field days), FEGs that liaise with FRGs; and participatory learning methods such as the FFSs. Horizontal modes of extension ('peer extension') require special attention: farmer to farmer extension, technology transfer from extensionist to extensionist, training of trainers etc. The strategy will have to include an agreed approach for the M&E of the dissemination process by a joint stakeholder committee (see Box 3-29).

Box 3-29
Technology Markets and Farmer Extension Groups: Lake Zone, Tanzania

In the Lake Zone in Tanzania the Zonal Agricultural Research Centre closely worked together with a limited number of Farmer Research Groups in corresponding villages, representing the different agro-ecological zones. The FRGs developed technology, which was subsequently made available to other villages in the same agro-ecological zone for farmer assessment and implementation. Most of the corresponding Districts developed special programmes with a limited number of Farmer Extension Groups, which received special attention from district extension subject matter specialists and extension field staff. These FEGs were considered pilot groups in pilot villages.

The technology developed in FRGs was made available to the FEGs through direct contacts of farmers (e.g. FRG farmers instructing FEG farmers to use the animal drawn ox-weeder, or through participation of FEG members in FRG field days), but also through technology markets. A technology market held in a FEG village consisted in the demonstration by FRG members (facilitated by researchers and extension) of all the technologies developed in the FRG and on-station for subsequent assessment in the FEGs. Farmers visiting this market would then select the technology they would like to test.

Source: DRD, 2003

4 Monitoring and guiding the change process

4.1 Introduction

The change from a more traditional research institution to a client-oriented one is not something that happens overnight. Chapter 3 highlighted quite a number of potential changes in all five management dimensions. It requires research and extension staff to learn new skills, research tools and insights. Roles and responsibilities change and attitudes as well may need to evolve. Even administrative support staff, drivers and all others involved in the research process, be it directly or indirectly, will have to adapt themselves to the new situation.

How to ensure that this, rather complex, process moves forward as planned, to identify which events move things along, which problems are hampering implementation and how these may be solved? How to ensure that the changes made, have the desired impact on service delivery and beneficiary well-being (the objective of going through the change process in the first place). A monitoring system needs to be set up. Such a system facilitates a regular collection and analysis of data and qualitative information and hence provides the research manager (as well as his/her staff) with the information needed to take appropriate management decisions, adjust interventions if necessary and guide along the change process.

This chapter discusses what should be monitored and when, how the monitoring should be done and who should do it (research station staff, clients, stakeholders, etc.). It also explains the links between the five management areas, how progress in one area will influence progress in one or more of the others and the implications thereof for the monitoring system.

Obviously each ARC has its own starting point, work plan and overall context that form the basis for monitoring and guiding the change process. The monitoring mechanisms and instruments and various types of indicators presented in this Chapter are generally valid an applicable to all these different situations, at least in principle. However, timeframes, variables and indicators are not. They have to be formulated and adapted to each specific situation The annexes to this chapter provide examples of monitoring schedules, sheets and of indicators. Filling in the details and specificities remains the work of each ARC, its stakeholders and clients[1].

One word of caution: monitoring is an essential management tool that will help the change process along. However, monitoring should not become an end in itself and overburden staff (and stakeholders) with unnecessary data collection and reporting.

[1] If, as recommended in Chapters 2.4 and 3, a logical framework for the change process has been elaborated, this will provide the required indicators. See also Annexes 4.1-4.5.

4.2 General observations on indicators and timeframes in process monitoring

4.2.1 INDICATORS

Indicators exist in many forms and types and different definitions may be used. In this manual two major groups of indicators are dealt with: quantitative and qualitative ones. In addition to this the following characterisation is used:

- *Input indicators* measure how much time, human resource capacity, equipment and funds are being used;
- *Activity indicators* measure/ count which activities are being carried out (for example on-farm trials, training courses, number of farmers involved, changes in accounting system);
- *Output indicators* indicate the result/ output of these changes such as increased human resource capacity, increased stakeholder satisfaction, appropriate technologies for various target groups;
- *Impact indicators* attempt to measure the changes in among others, beneficiary well being, increased stakeholder participation.

The monitoring systems most commonly used in agricultural research and extension organisations deal with activities, inputs and outputs that can relatively easily be measured and quantified. Examples of such *quantitative indicators* are: number of on-farm trials planned, planted and harvested, number of male and female farmers involved, number of farmer research and extension groups.

Although some changes introduced through CORMA may be measured quantitatively (Annexes 4.1 – 4.5), the nature of these changes and more specifically, their impact on the quality of the ultimate service delivery and the well being of smallholders, needs to be measured. Measuring impact also requires *qualitative indicators* rather than only quantitative ones. Unfortunately, such indicators are not easily specified.
Firstly, they usually take the form of opinions about and descriptions of issues that have changed and how they have changed. In some cases, these descriptions may be pre-set and those involved in the monitoring process will have the opportunity to indicate that description that best fits their own opinion. In this way some kind of quantification may be achieved (See section 4.4.2). Secondly, whereas quantitative indicators may be applicable in a range of different situations, qualitative ones often depends on cultural norms that vary from one situation to the other. Obviously they need to be developed jointly with the main stakeholders.

4.2.2 TIMEFRAMES

The change from traditional to COR management requires those involved to learn new skills and adapt their work processes. This sometimes means that all staff needs to be trained or certain financial management changes need to have been implemented before the process can move into a next stage. There will be a sequence of changes in which certain changes will have to precede others, or in other words, achieving one change is conditional to beginning a next one. Sequences are difficult to put in a fixed timeframe with specific dates by which an activity should have been completed[2].

A progressive, or milestone-based planning in which sequences are indicated as logically related steps will better suit ARC needs. Monitoring then tries to determine the relations between various events. What are the possible reasons for succeeding or not succeeding to implement a certain change? What can we learn from it? Obviously, this makes change process monitoring an interactive activity. Lessons learned during the monitoring of a process are fed back into that same process.

[2] It should be kept in mind that this does not exclude the need to start change processes in all five management areas at the same time (see the Mali "diamond" experience), (IER, 1999).

4.3 Who should do the monitoring?

Process monitoring is by definition a participatory activity. It assesses whether those involved in or subjected to the changes, feel that changes have had an effect, either in a positive or in a negative sense. This implies that ARC staff as well as stakeholders will need to be involved. Chapter 2 indicates that one of the issues to be discussed during the stakeholders' workshop that starts off the change process is the establishment of a monitoring group that includes stakeholders, clients and ARC staff. To be effective such a group should be kept small.

This monitoring group (that may logistically be supported by an ARC monitoring specialist) should set up a monitoring system that includes:

- a timeframe for data collection;
- variables and indicators (input, progress/ activity, output and impact);
- sources of information for the various data to be collected (questionnaires, surveys, field trip reports, financial, progress and technical reports);
- mechanisms for joint monitoring;
- responsibilities;
- analysis;
- reporting frequency; and,
- mailing list for monitoring reports.

4.4 What should be monitored and how should it be done?

As indicated in Chapter 1, the overall aim of CORMA is to lead to a research institution, which is more client-oriented and hence provides adequate services and products requested by the client. Such a client demand driven output is expected to contribute substantially to sustainable and equitable rural development as it provides appropriate agricultural development technology.

Therefore the following questions should be asked at regular intervals:

- Is progress as planned?
- Are there any deviations from the original plan, in what way, why was it done and were these deviations effective?
- Are planned changes implemented more rapidly because of it?
- Do the changes made have the intended effect?
- Is the impact of these changes more profound than initially expected?
- What is the opinion of the ARC clients about the changes introduced? Have they noticed any changes? Did these changes have a positive or negative impact on clients' needs and well-being?
- Were elements in ARC research management identified that need to be adapted as well, but that were overlooked initially?
- Or did the implemented changes perhaps lead to a deterioration of ARC's client orientation?
- Were any contextual changes observed that might have had influences outside the change process?

These questions lead to a monitoring system that looks at:

- the actual management changes and related activities that are expected to lead to this client orientation (progress indicators, efficiency),
- the degree to which these changes are contributing to improved client-orientation of agricultural research (output indicators, effectiveness),
- the degree to which this strengthened client-orientation is leading to a more appropriate research output (impact),
- the degree to which smallholders' well being has improved due to improved research output (impact).

In addition, process monitoring needs to consider contextual changes (assumptions and conditions). As mentioned at the beginning of this Chapter, the change to an effective client-oriented ARC takes time. One may not expect that during this period, the institu-

tional, economic and social environment in which the ARC operates will remain static. Contextual variations may influence the ARC's operational space, bring new clients and new demands and thus it will influence ARC's change process.

4.4.1 MONITORING INSTITUTIONAL CHANGES AND RELATED ACTIVITIES

This first level of monitoring mainly uses straightforward input and activity/ output indicators. How much money and other resources were used and which (and how many) activities were carried out, changes implemented, etc.

As COR management involves five areas, activities will have been planned for each of these areas, and monitoring obviously will be carried out concerning each of them. The main issues at stake have been outlined in the various sections of Chapter 3 and provide the overall basis for this part of the monitoring system. Possible indicators related to these main issues are presented in the Annexes 4.1 to 4.5. The work plan made during the stakeholders' workshop following the initial assessment (Chapter 2), will guide ARC staff and stakeholders in identifying those variables and indicators that apply for their specific situation. Likewise, results from the internal assessment may be used as benchmark indicators.

As mentioned in Chapter 4.2 some activities or changes are conditional to others and *implementation milestones* may be used in the monitoring schedule. These milestones indicate that a specific, crucial activity has been completed or a specific change has been noticed. The challenge is to identify these interacting and sequential milestones not only within each of the five COR management dimensions but also in the sequence of activities/ changes (see example in Table 4.1)

Table 4-1
Interacting and sequential milestones within and between the five management dimensions

Month	A: Human resource management	B: Financial resource management	C: Management stakeholder participation	D: Research planning, monitoring, evaluation	E: Output and dissemination management
1	Change A-1. conditional for change A-2	Change B-1 conditional for Change C-1			
2	Change A-2 conditional for change B-2				
3			Change C-1	Change D-1 conditional for changes C-2 and D-2	
4		Change B-2	Change C-2	Change D-2 conditional for change A-3	Change E-1
5	Change A-3 conditional for change E-2				Change E-2

Source: Elaborated for this guide

4.4.2 MONITORING THE CHANGES IN CLIENT-ORIENTATION

When monitoring changes in client orientation one may focus on various issues such as:

i. quantifiable changes in stakeholder involvement;
ii. qualitative changes in stakeholder involvement (improvement/ deterioration);
iii. changes in inputs of financial and other resources used to increase stakeholder involvement; and,

iv. qualitative changes in ARD vision, in ARC autonomy, and/or in targeting research activities.

Quantifiable changes
Changes in stakeholder involvement in relation to the research process may be measured by recording the number of meetings and number of participants during these meetings, meeting locations etc. Possible indicators are presented in Annex 4.3

Qualitative changes
Changes in the type and quality of stakeholder involvement may be monitored through matrix assessment. Table 4.2 presents a scoring matrix that answers the following questions:

- who participated in which research phase?
- what was the capacity in which they participated? and,
- what was the frequency of their involvement?

To monitor changes over time, this matrix should be used at regular interval by ARC staff and stakeholders alike. Rather than merely ticking the appropriate box, some descriptive statements could be made about the actual involvement that explain whether the respondent thinks his or her involvement in that particular phase was worthwhile or left a lot to be desired.

Table 4-2
Matrix of Scope and Nature of Stakeholder Involvement in Research

Stakeholder type/ name	.....			
	Scope and nature of stakeholder involvement			
Research Phase	**Informative**	**Consultancy**	**Partnership**	**Control**
Identification				
Planning				
Implementation				
Dissemination				
M&E				

Source: Adapted from Engel et al, 1997, and Lawrence et al, 1999.

Changes in client orientation in ARD vision and/or in ARC autonomy, may also be identified by means of the questionnaire used in the initial assessment (Chapter 2). The results of that assessment provide the base-line scores, the benchmarks, for the variables to be monitored. Annex 4.6 presents an adapted version of this questionnaire that may be administered at regular intervals to identify changes over time.[3] Where deemed necessary, questions may be added. ARC staff likewise could fill out this questionnaire. Results of the stakeholder and self-assessments could be jointly analysed to identify differences in perception. Using this or similar questionnaires in which opinions about each statement are presented as scores, facilitates the quantification of qualitative variables.

It may be important to identify whether improved client orientation is the direct result of changes in research approach and management. The client group itself may have become more active in approaching the ARC, having learned to better voice their concerns and information needs (although this may have been an indirect effect of changes in the ARC approach). The questionnaire in Annex 4.6 provides the opportunity to make such a general assessment of this increased client assertiveness (questions marked*).

Another possibility is to present a series of related statements that represent subtle differences between which stakeholders may choose. Table 4.3 gives an example of such a

[3] It may seem obvious that those elements that received the highest score of 5 do not need to be monitored as further improvement is not necessary or even possible. However, stakeholders may also feel that the situation deteriorated, in spite of all of the ARC's good intentions! Negative changes in one of the elements may also have negative effects on others. Therefore, to maintain equilibrium and register negative impacts, all elements should be scored.

questionnaire used to measure the quality of stakeholder participation, as used by FAO's "People Participation Programme" (Uphoff,1999).

Table 4-3
Example of participation indicators

1	Few members participate actively in meetings, few feel free to speak up and play an active role
2	Some members participate actively in meetings, some feel free to speak up and play an active role
3	Most members participate actively in meetings, most feel free to speak up and play an active role
4	All members participate actively in meetings, all feel free to speak up and play an active role

Source: Uphoff, 1999.

4.4.3 ENHANCING AND MAINTAINING EQUITY

When monitoring changes in client orientation it is essential to determine whether all groups (minority as well as majority groups) are included as target groups although they may be involved in different research activities, with different objectives. Equity must be maintained even though one may be tempted to leave out considerable part of the rural population due to fiscal decentralisation and the drive towards financial sustainability.

To monitor whether equity is being maintained, firstly requires the identification of target groups (see also Chapter 3). Once they have been listed, they should be briefly described for instance in terms of the percentage of the population they represent and gender and age composition.

The frequency of monitoring equity preferably is related to the research planning cycle. It is essential to make an ex-ante assessment of the research programme before it is being implemented to ensure that all target groups have been considered in the programme. When monitoring equity would take place only in the execution phase, it may be too late to implement programme changes.

Monitoring equity may involve activity, financial and researcher time assessments. Ultimately only when considered jointly, will the three instruments demonstrated in this section provide useful information on the equity issue.

1. Activity assessment of equity
In the activity assessment, the research manager should, annually or seasonally, analyse research plans and indicate which target groups are involved in which activity (Table 4.4). Changes from one year to the other thus may be identified and when needed, corrective action can be taken to ensure that the COR change process remains on track.

Within a research activity, sub-activities such as FRG meetings may be assessed as well. Table 4.4 may be adapted accordingly (i.e. made more specific) once target groups have been identified and described.

Table 4-4
Monitoring changes in equity: Percentage of target group involvement

Research season	..... /.....					
Target group / **Activity**	A	B	C	D	E	F
Activity 1	60%	40%				
Activity 2	10%	30%	60%			
Activity 3				30%	40%	30%
Activity 4	10%	10%	10%	10%	30%	30%
Activity 5		25%	25%	50%		
Total number of activities in which respective target group is involved	3	4	4	3	2	2

Source: Based on experiences of various "KIT' projects.

In addition to assessing research plans, actual implementation should be monitored as well, as deviations from the original plans may (and usually do) occur!

Because of different interests and needs, not all target groups have to be involved in all activities; they should however, whenever possible, receive similar attention in terms of time and/ or funds spent.

2. Financial Assessment of Equity
The tool of *Financial Ratios* may be applied for a financial monitoring of the equity issue (Tabor et al, 1998). This involves calculating the percentage of funds spent on the various target groups. As each activity is likely to have its specific budget, the percentages identified by means of Table 4.4 may be used to subsequently calculate the total amount of funds used per target group. The example in Table 4.5 shows that Target Groups B and D receive considerably more attention (in terms of funds) than the others, in particular E and F. Only when more is known about the composition and size of the target group will it be possible to determine whether groups B and D are getting their fair share or that less funds and attention should be spent on them (and for instance more on E and F).

3. Time assessment of equity
If records are kept for researcher/ research assistant time spent on each activity (see also Chapter 3.2), these may be used to assess research time spent on each target group. Such records may also used to refine the financial ratio.

Table 4-5
Financial monitoring of equity

Research season	...../.....											
	% involvement per target group per activity					Funds used (in $) per target group per activity					Funds used	
	1	2	3	4	5	1	2	3	4	5	$	%
All target groups	**100**	**100**	**100**	**100**	**100**	**1500**	**550**	**850**	**1200**	**2400**	**6600**	**100**
Target group A	60	10		10		900	55		120		1075	16
Target group B	40	30		10	25	600	165		120	600	1485	23
Target group C		60		10	25		330		120	600	1050	16
Target group D			30	20	50			255	240	1200	1675	25
Target group E			40	30				340	360		700	11
Target group F			30	30				255	360		615	9

Adapted from Tabor et al, 1998

4.4.4 MONITORING THE CHANGE IN APPROPRIATENESS OF RESEARCH OUTPUT

Various instruments may be used to identify whether research output has become more adapted to farmers' conditions, and stakeholders' wishes and demands.

- A continuous or regular analysis of the logical framework for the COR change process to be carried out with all stakeholders or with the monitoring group charged with this task (see Section 4.3.). In this way specific activities may be monitored on their merit. It also provides the opportunity to adapt or reformulate activities, adapt the time frame for implementation (for instance in response to contextual changes), include new or drop less relevant activities, etc. Examples of indicators are given in Annexes 4.3, 4.4 and 4.5.
- A general assessment of improved services by using the initial stakeholder assessment form. In this way changes in opinion about the ARC's general performances as well as changes in impact may be measured (Annex 4.6)
- An assessment of target group differentiation through participatory monitoring sessions with target groups or through a (gender/ generation sensitive) questionnaire survey. Attention should also be given to the ratio of time spent with the various target groups (and costs thereof) and the appropriateness of research results for each of these monitored groups. For this part of the assessment, use could me made of staff time sheets, progress and trial plans and reports (see also Section 4.4.3).

4.4.5 MONITORING THE IMPACT ON BENEFICIARIES' WELL-BEING

So far we mainly talked about changes in research activities and results (trials, technological improvements, organisational changes to benefit from economies of scale etc.). However, the change of traditional to client-oriented research management is designed to ultimately benefit the ARC's clients. Therefore we should monitor the impact of this change on beneficiaries' well being.

Various methods of Beneficiary Assessment have been successfully used to provide information on the appropriateness of implemented changes from the point of view of the final users (World Bank 2002, see also Annex 4.8). The objectives of a Beneficiary Assessment include:

1. determining the level of beneficiary satisfaction[4];
2. understanding the degree and manner in which community members have participated in various phases of research programme planning and programme implementation (See also section 4.4.2); and,
3. learning how stakeholders feel research station performance could be improved.

As such a Beneficiary Assessment guides the change process towards CORMA as it informs management about ways of improving research orientation and performance.

4.4.6 MONITORING CONTEXTUAL CHANGES

Contextual changes deal with changes in assumptions and issues that cannot be influenced by the research station itself. In the project logical framework (project planning matrix) assumptions may already have been formulated. Examples are an improvement of public research and extension funding, staffing and staff training, the continued presence of development programmes that are in a position to pay for the services of an ARC, the willingness of other stakeholders to collaborate, etc.

These assumptions are essential to the success of failure of a programme, thus of the change process. Therefore it is essential to identify whether these assumptions have held up or unfortunately, were not met. In the former case, causes for not achieving certain outputs may have to be found elsewhere (ambitious planning, lack of motivation). In the latter, objectives were not achieved not through fault of those implementing the change process but through external causes.

In either case, planning may need to be adapted to be more in line with what can or cannot be done.

Monitoring contextual changes is relatively easy; it involves:

1. accepting that the assumptions formulated in the logical framework constitute the base line;
2. for each assumption setting a realistic time frame (for instance a change in national policy towards staff salaries may not be resolved within a period of two months);
3. at regular intervals, assumptions should be compared with the actual situation of that moment and recorded;
4. information should be fed into the reiterative planning process and used to adapt planning if necessary; and,
5. assumptions can be added and removed over time at different levels. Some will become activities.

[4] An elaborated example of a questionnaire that facilitates the monitoring of client satisfaction is presented in Annex 9.

4.5 Monitoring mechanism

A properly elaborated monitoring mechanism includes indicators, monitoring tools, information sources, a timeframe, a reporting schedule and a list of those who should be informed about the monitoring results. It also identifies those responsible for implementing the monitoring activity, e.g. producer organisations. Such a mechanism may be easily represented in the form of a matrix that summarises all information (Annex 4.10). A chronogram will facilitate a timely implementation.

In some cases, research and extension funding may have been made available on the condition of enhanced client orientation. This could help the change process along. Monitoring, in particular milestone monitoring, may then be used to determine whether sufficient progress has been made to justify the release of subsequent disbursement of funds. In such a case, the logical framework that guides the implementation of the change process would have to be made part of a Change Contract, between the Research ARC and its financiers.
Overall, a properly elaborated logical framework for the implementation of the change process will provide the basis for an effective monitoring schedule that will assure the relevance, effectiveness, efficiency, impact and sustainability of any research programme.

5 Conclusions and perspectives

5.1 CORMA change process

In the CORMA change process three important phases can be distinguished: (1) recognizing the need for change, (2) deciding what to do and (3) implementing and achieving change. For the third phase three different stages can be distinguished; (a) getting prepared for COR, (b) defining an institutional policy and (c) implementation and quality control (Lema et al., 2003).

Although signs for change can be obvious for outsiders (clients and other stakeholders), this does not imply that researchers are aware of the need for organisational change. In many Sub Sahara Africa countries researchers recognize the need for change in terms of internal resources (declining budgets, loss of qualified staff and poor research facilities and poor incentive structures), while clients and stakeholders note the external signs (poor quality output, low adoption rates, poor reputation etc.). Both research and political leaders need to be aware of the internal and external signs as an expression of the need for change before a CORMA action plan can be made.

An action plan requires strong involvement and a common understanding of all stakeholders. An action plan for organisational change that only involves (some) researchers is likely to fail, since many of the management areas have wider institutional components (i.e. linkage management, participatory project management and output orientation and dissemination).

The actual start of the CORMA change process requires the fulfilment of three conditions. Firstly, (National and sub-national) leadership and funding agencies (Treasury, Donors etc.) need to fully agree to the aims and objectives of organisational change and commit themselves in terms of for example resource allocation, target adjustments and time allocated. Secondly, key decisions have to be made about the level of deconcentration (decentralisation) of the research system and its relation with key stakeholders: farmers and producer organisations as well as funding agencies (National or decentralised to local government). It is generally agreed that some form of deconcentration (decentralised administration) is required to enable active and efficient participation in all stages of the research process, in reaction to previous central (research) planning models. However, it is important to ensure that capacity is build to effectively take up the management areas that will be decentralised and at the same time during the change process the transaction costs do ‘not rise too high. Thirdly meaningful participatory planning requires some level of ARC autonomy and enhanced multi-stakeholder resource control, and consequently increased (fiscal) decentralisation is required if stakeholders are to influence over resource allocation and indeed if the ARC is to have an incentive to proactively look for research demand which can lead to contracts with clients. Most Sub Sahara Africa countries have a reasonable level of administrative decentralisation to allow the development of participatory planning, monitoring and evaluation (although there are still exceptions to this overall picture). Few however have developed arrangements with the Ministry of Finance for revenue retention, which allows for reinvestment of revenues from research contracts.

For an even stronger form of decentralisation of authority (e.g. local research boards, decentralised human resource management, research marketing etc.), transfer of knowledge to the local level and hence capacity building of stakeholders and ARC staff at the decentralised level will be required. Only when this is accomplished public research institutes can become fully accountable to their clients and stakeholders and can be judged based on their output and performance.

5.2 Some lessons

The CORMA change process in Tanzania and Mali continues to evolve, while Ethiopia and Benin have indicated a strong interest in the approach. Preliminary lessons with this change process show that five conditions have to be met before the process can successfully start, while joint capacity building has to take place simultaneously.
Control over financial resources remains essential (not only the control, also the transparency). Two elements have to be worked out before the CORMA change process can start. Firstly sub-national Agricultural Research Centres need to have the legal authority to sign contracts with clients, while being allowed to retain the revenue for reinvestment in the organisation (all subject to auditing). In addition the treasury and secondly public authorities (Finance, National research, etc.) have to accept that control over the allocation of public resources is partly transferred to the non-public sector (producer organisations, NGOs, private sector etc.).
Leadership is a crucial element in the organisational change process, not only in terms of continuity, but also in terms of having a change champion, emphasizing action for change. Leadership should be CORMA advocate, stimulating their staff to adhere to the CORMA principles and to improve client-orientation.
Another critical issue is the continued need for capacity building. Many believe the Farming Systems approach to Research (FSR) is widely adopted, through not institutionalised, hence the need for CORMA. The question however remains whether FSR is so widely adopted. Possibly this is the case in terms of diagnostics, but much less in terms of participatory planning, implementation, monitoring and evaluation, ex-ante and ex-post assessments and economic and gender analysis. Shortcomings in FSR capacity building lead to important lessons for a successful introduction of CORMA. One of the major lessons is the need for involvement of all research staff and stakeholders in capacity building. It is not sufficient to only train a Farming Systems Research team; other researchers and definitely stakeholders and clients have to be trained as well. Farmer organisations and other clients of research need to be empowered to effectively participate in research planning, monitoring and evaluation. FSR capacity has also been lost due to the high turnover in research staff as a result of poor research incentives, few career opportunities and the HIV/AIDS pandemic. Some of these causes of the high loss of qualified staff need to be addressed in the CORMA organisational change process.
A third major issue is the separation of functions such as the implementation, funding and planning, monitoring and evaluation of research. Special attention will be required for the establishment of sustainable financing mechanisms and strong producer organisations that can monitor the technology development process on behalf of the technology users and beneficiaries. Organisational change in research organisations will not bear fruit without organisational change in the two other main players in decentralised technology development: Funding agencies and client organisations and advocacy groups. Research funding will increasingly come from the demand-side through fiscal decentralisation to local governments or through independent technology development funds. At the same time a stronger role of client organisations in research planning, monitoring and evaluation will be required to form the essential triangle of separated functions in public-private partnerships: implementation, funding and fiscalisation (auditing, monitoring and evaluation).

Some level of decentralisation, mostly deconcentration, of the National Agricultural Research Organisation will have to take place to enable stakeholders to influence the management structure and organisational setting of the Agricultural Research Centres. At the same time a balance has to be found between this deconcentration of NAROs and the need to be part of a strong well-coordinated national research system, which is part of a wider regional and global research network.
A final critical issue is the need for strong and independent monitoring and evaluation of the CORMA change process. Researchers have the tendency to assume that collaboration with stakeholder committees and farmer research groups is sufficient. Stakeholders however can only assess progress on the basis of observed improvements in addressing client demand. Also, researchers tend to develop relationships with clients that are not always representative for all farmers.

5.3 Final remarks

Rural service delivery, such as agricultural research and extension in the public domain will come under increasing pressure due to the rapid urbanisation in the third world. As in the rest of the world, public and private agricultural research no longer has a direct benefit for the major part of the population. Central governments will become reluctant to fully finance public agricultural research, when this mainly benefits the rural productive sector. Consumer prices are increasingly influenced by world market prices rather than by local production in open market economies.
Organisational and institutional change in this environment is extremely urgent for agricultural research to survive. This CORMA guide can contribute to strengthening the client orientation of rural service delivery, such as agricultural research. However, the whole sector should be involved in change. This implies changing roles and responsibilities, yet with respect for local priorities, culture and history.

Agricultural research in the public domain will have to invest in strong partnerships with the private sector and privately funded research. Modalities for public-private partnerships in rural service delivery need to be further developed. Responsibilities for research on goods with a private good nature (cash crops, inputs, hybrid seeds, animal breeds, etc.) and those for public good research (food crops, health safety and environmental issues etc.) have to be clarified.
The voice of the rural people, and in particular the producers, needs to become louder. The role of producer organisations needs to be empowered to demand rural service delivery. This requires a focus on capacity building and equity, but also on the removal of institutional constraints, such as the enhanced control over public resources by civil society. Modalities for the management and administration of public financial resources need to be developed. Agricultural research funding is no longer strongly controlled by different research levels (national programmes, national institutes etc.) only, but will be (partly) controlled by the demand. Does this capacity exist with producer organisations and does the local government (Districts or other local government structures) have this capacity?
In many countries the three main partners in agricultural technology development need organisational change and capacity building at the same time: rural service delivery (deconcentrated research and extension), funding (Districts or Local Government Development funds, Competitive Technology Development Funds, Public-Private Partnerships, etc.) and planning, monitoring, evaluation and control (local producer organisations).
The many experiences (in different countries and different sectors) in Sub Sahara Africa with public-private partnerships, agricultural and rural development financing and strengthening of producer organisations in rural service delivery need to be analysed for scaling-up of best practices.
The present CORMA reference guide will be complemented with future guides based on the best practices with the CORMA organisational change process in other countries in order to be to be scaled up nationally, internationally and intersectorally. Change is a continuous process of adaptation and optimisation, and so is the CORMA approach.

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Annexes of chapter 1

Annex 1.1 Definitions

Stakeholders in the agricultural knowledge and information system

Agricultural Research Centre (ARC)	All research centres and/or sub-stations at sub-national level (in some countries regions in others zones.
Beneficiary	A person or organisation benefiting from the use of the technology (i.e. farmers, agro-processors and their organisations)
Client	The term client normally evokes more association to commerce and business than research, the term client is relatively new to science. The meaning of the term client reflects, however, the wish to respond to a demand and the acceptance that quality services at a reasonable price should be delivered. A client is not a passive recipient of products and services, he/she/ is an empowered actor who is able to express his or her wishes, interests and satisfaction, to reward valuable output but if necessary take remedial actions. A producer or provider of products and services has to take into account the desires and needs of its client in order to be successful. As such, the client concept is therefore suitable for ARCs as well. *In CORMA, a client is defined as a person or organisation requesting, partially or completely funding, utilising, monitoring and evaluating, and ultimately receiving a product from a research service.* After having defined these terms, it is not difficult to envisage a picture of a nearly infinite number of clients in African rural space and in the peri-urban centres. Potential clients of agricultural research are NGOs, public and private enterprises, government extension institutions, public administration at local level, producer associations, farmer co-operatives, women groups, individual farmers, water user groups, schools, mosques, churches, universities, chambers of commerce, commodity boards and so on. All these people and organisations may have demands for research, can contribute financial resources, are able or can be enabled to monitor and evaluate research results and adopt new technology. Because in the end, they also need to make a decision to apply the research results and/or communicate them to the end-users they represent, clients are the key to adoption and diffusion of research products and ultimately impact.
End-user	A person or organisation applying a technology without necessarily having participated directly in its generation.
Partner	An active participant in delivering a requested service to a client.
Research staff	All ARC staff: Management, scientists, technicians/field officers and support staff (accounts, supplies/ stores, transport, farm etc.)
Sponsor	A person or organisation providing funds to deliver a service to a client
Stakeholder in AKIS	A person or organisation involved in the (agricultural) sector The term client should not be confused with the term stakeholder, which is a person or organisation more broadly involved in the agricultural knowledge and information system

Cost structure

Overhead costs	Costs involved in maintaining the assets and facilitation of proper functioning of the ARC and its support staff.
Direct costs	Costs that can be directly attributed to a special research activity (transport costs, per diem, daily salary costs etc.)
Indirect costs	Costs, that can not be related to a specific research activity (part of overhead costs)
Operational costs	All costs (direct or indirect) that are needed to allow the researcher to operate.

Hierarchy of Agricultural Research Systems (from global to local)

Hierarchy of research systems	Characteristics	Scope	Challenges
International or Regional level research institutions and systems	Instrument for tackling broader cross-border and global problems utilising complementarity and synergy effects	Comparative advantages at the technical level and due to economies of scale	Exploration of viable options for regional collaboration and technology borrowing Development of north-south partnerships Establishment of donor coordination
National level research institutions (NARIs), Organisations (NAROs) and Systems (NARSs)	Instrument for achieving the national sector goals of sustainable food security, additional income opportunities and sustainable natural resource management in rural areas	National Agricultural Research links ARCs to the global system, assists local research on problems where it has comparative advantage and supports national agricultural research policy formulation	Support of links between different parts of the NARS Facilitate inclusive discussion of research priorities Support involvement of national level stakeholders and farmer organisations
Sub-national level or agro-ecological zone research institutions or ARCs	Agricultural research primarily fulfils a service function to farmers, farmer groups and extension services and other local clients such as in agribusiness and NGOs	Strengthen ability of individuals and institutions to assess needs and problems of the farm and household systems and translate them into research that is relevant and capable of achieving solutions	Support local level priority setting with stakeholders Explore options for research funds Help develop the demand side for research

Source: Adapted from Carney (1998), Ritter et al (1995)

The **agricultural research continuum** from basic research to farmer experimentation

Type of research	Definition	Level
Basic or fundamental research	To generate new understanding of systems and processes	Regional and international level. Institutions for higher learning. In laboratory or field managed by researchers
Strategic research	To solve problems of strategic importance resulting in application over a broad range of situations	NARS. Mostly on-station and researcher-managed
Applied research	To create new technologies or systems applying knowledge generated through basic research	NARI. Mostly on-station and researcher- managed trials
Adaptive research	To adapt to a specific environment results of applied or strategic research	Local agricultural research centres. On-farm or on-station and mostly farmer-implemented
Farmer experimentation	Technology verification and further adaptation	In villages, On-farm without research/extension management

Source: Tabor et al, 1998.

Public and private goods in agricultural technology development

Type of information and technology goods	Characteristics	Source of finance
Public good	Low subtractability and excludability (Husbandry, farm management information)	Central Government (Research), local government (extension), bilateral and multilateral donors
Toll goods	High excludability and low subtractability (client-specific information)	Clients (lager farmers, processors, traders, exporters etc.)
Common-pool goods	Low excludability and high subtractability (Seeds, inputs)	NGOs, CBOs, private extension, produce boards
Private goods	High excludability and high subtractability (All goods with IPRs etc.)	Private commercial sector (seed companies, input supply companies

Adapted from Sulaiman and Sadamate, 2000, Umali and Schwartz, 1994 and Beynon et al, 1998.

The logical framework (LF) and its terminology

A plan results in a time-bound implementation schedule i.e. when, how and above all by whom, research and related activities will be carried out, what the inputs required are (funds, personnel and facilities) and when they will be needed. A plan should have goals, objectives contributing to the goal, outputs meeting the objectives and activities contributing to the output. All activity levels will need to have quantifiable indicators, which will allow effective monitoring (at activity and output level), and evaluation (at objective level).

The common planning tool used to guide performance monitoring is the "logical framework" which specifies:

- why the project is carried out;
- what the project is expected to achieve;
- how the project is going to achieve the results;
- which external factors are crucial for the success of the project;
- how the success of the project can be assessed ("key impact indicators");
- where the data required to assess the success of the project can be found;
- what the project will cost; and,
- who is expected to benefit from the project.

The project LF is used for describing the research goal, objectives, outputs, activities, indicators, means of verification and assumptions. The key performance indicators provide the basis to assess the degree to which research activities have made progress in the desired direction (i.e. in achieving objectives and outputs). A key task in LF formulation is therefore the identification of meaningful indicators (i.e. measurable performance/achievement evidence). To attain client orientation and demand-driven research, the identification of indictors should be participatory, incorporating the expectations and goals of the different stakeholders involved.

The indicators need to be both qualitative and quantitative; they also need to be feasible and verifiable, including by stakeholders. There is a need to distinguish:

Input indicators (i.e. resource indicators); e.g. concerning funding (by whom and at what levels and times), human resources (which staff, what time allocation, etc.) and infrastructure (which laboratory, office and for how much time).
Process indicators (i.e. activity indicators).
Output indicators concerning stakeholder perceptions of services provided, numbers of people involved and behaviour changes intended (e.g. with regard to capacity building and empowerment).
Outcome indicators (impact indicators); these focus on effectiveness and efficiency (measurable changes based on the project objectives).

It is essential that the various indicators are developed jointly with farmers and discussed in FRGs through planning and restitution meetings.

Annex 1.2 Programme planning matrix for establishing and implementing demand driven research agenda at local (sub-national) level (adaptive) research institutions

Narrative summary		Indicators	Means of verification	Assumptions
CORMA Mission: To accelerate impact of agricultural research on improving livelihoods of rural people by improving effectiveness and efficiency of research through use of demand driven research agenda		Adoption rates and impact improved of technology disseminated	Adoption studies (comparing intervention and non-intervention areas), baseline studies, impact studies	
CORMA purpose: To strengthen the level of client-orientation of agricultural research centres (ARCs) through strengthening of five management areas: human resource management, financial resource management, stakeholder linkage management, planning, monitoring and evaluation, as well as management of output orientation and dissemination.		Indicators that allow the measuring of the progress in client-orientation in the five management areas and largely based on assessment by stakeholders.	Contracts, MoU's. Minutes of meetings Research and development workplans and minutes of approval meetings Stakeholder assessment reports	Opportunities for upscaling experiences sanctioned by NARS Research capacity in place to address demand driven agenda
Narrative summary		**Indicators (of management capacities)**	**Means of verification**	**Assumptions**
Main output	Human resource management of ARC is efficient and effective in relation to clients needs	Staff competence to stakeholder needs Flexible workforce organised Staff motivation increased Effective teamwork and communication among staff in place Clear direction and responsive leadership	Annual workplans	Authority for HRM (partly) decentralised Support for staff development
	Financial management is efficient and effective and leads to sustainable ARC	Well-functioning support services Efficient procurement of goods and services Assets and equipment maintained Activity based budgets prepared and monitored Efficient and transparent financial management in place	Planning reports	Local level revenue retention allowed Confidence by private entities Good governance
	Linkages and collaboration are established and maintained with relevant stakeholders and clients	Effective public relations maintained Active stakeholder involvement Research assignments acquired (Inter)national networks developed	Minutes, stakeholder analysis reports	Balance struck between institutional sustainability and equity Private-public sector reciprocal trust
	Planning, monitoring and evaluation of research is client demand driven and sustainable	Research needs assessment Research targeted Research program planned and proposals written Farmer focused research conducted Research projects effectively monitored and evaluated	Plans and M&E reports	Acceptance of role of clients in ARD resource control
	Technological output production and access to technology information by clients improved	Efficient progress reporting system organised Scientific output produced User-friendly output produced Research results and recommendations effectively disseminated Information management organised	Physical output (reports, leaflets, radio broadcasts etc.	Information channels open to ARD Target groups reached
	Activities: Management activities to be defined between all stakeholders in the AKIS in order to strengthen different management capacities	To be defined by stakeholders in the AKIS through action plan development in a joint workshop	M&E meetings and reports	All stakeholders are involved in preparation of action plans

Annexes of chapter 2

Annex 2.1 ARC self-assessment questionnaire

Instructions:
Please take your time and read the statement carefully. In case of doubt or questions do not hesitate to contact one of the facilitators who will help you with understanding the statement. Discuss the statement well among all group members and make sure that everybody has given his or her views. Give each statement a **group consensus score** between 0 and 5 by circling the number. A score of 0 indicates that you entirely disagree with the statement. A score of 5 indicates that you fully agree with the statement.

Please indicate the number of participants in your group			**1**	**2**	**3**	**4**	**5**
Is your group composed of research staff, technicians or support staff or is it 'mixed'?	Scientist	Technician	Support				

No	Serial	Statement	Score					
1	1.1.1	Our staff members have adequate skills to respond to all stakeholder needs	0	1	2	3	4	5
2	1.1.2	Staff training is planned according to stakeholder needs	0	1	2	3	4	5
3	1.1.3	All staff members are equally considered for training, once need is established	0	1	2	3	4	5
4	1.2.1	Our staff members work sufficiently in interdisciplinary teams	0	1	2	3	4	5
5	1.2.2	Our ARC can easily engage an outsider on short-term basis to complement the ARC staff	0	1	2	3	4	5
6	1.3.1	All staff members regularly receive incentives for performance or output	0	1	2	3	4	5
7	1.4.1	There are sufficient technical meetings	0	1	2	3	4	5
8	1.4.2	There are sufficient management meetings	0	1	2	3	4	5
9	1.4.3	Decisions agreed upon in meetings are well communicated to all staff	0	1	2	3	4	5
10	1.4.4	There is adequate follow-up on agreed decisions in meetings	0	1	2	3	4	5
11	1.4.5	There are adequate facilities for informal interactions between all staff members	0	1	2	3	4	5
12	1.5.1	There is a well-defined research strategy paper for the thematic or geographic mandate area	0	1	2	3	4	5
13	1.5.2	The ARC Board guides Agricultural Research Centre (Institute or organisation) research organisation/management effectively	0	1	2	3	4	5
14	1.5.3	There is good/ effective ARC administrative leadership	0	1	2	3	4	5
14a	1.5.4	There is good/ effective ARC technical leadership	0	1	2	3	4	5
15	2.1.1	Our ARC actively tries to generate sufficient revenue/funds ('Self Help' funds) to maintain its facilities	0	1	2	3	4	5
16	2.1.2	Our ARC consistently charges overhead costs (indirect costs) for services delivered	0	1	2	3	4	5
17	2.1.3	The ARC has sufficient funds to cover costs for its electricity, labourer wages, watchmen etc.	0	1	2	3	4	5
18	2.2.1	All support services (transport, soil lab's, computer lab, etc.) are available when needed	0	1	2	3	4	5
19	2.3.1	ARC Stores are well managed	0	1	2	3	4	5
20	2.3.2	Procurement procedures are transparent and effective	0	1	2	3	4	5
21	2.4.1	Our ARC allocates funds to ensure regular maintenance of its facilities	0	1	2	3	4	5
22	2.5.1	Every year, our ARC reviews and plans its annual revenues and expenditures	0	1	2	3	4	5
23	2.5.2	All research costs (direct and indirect) are included in research activity budgets	0	1	2	3	4	5
24	2.6.1	The accounting system is efficient and transparent	0	1	2	3	4	5
25	2.6.2	Researchers obtain their research advances (batches) when needed	0	1	2	3	4	5
26	3.1.1	Our ARC knows its stakeholders	0	1	2	3	4	5
27	3.1.2	The stakeholders know the ARC and the services it can provide	0	1	2	3	4	5
28	3.1.3	The stakeholders are satisfied with the services that our ARC provides	0	1	2	3	4	5
29	3.1.4	Our ARC actively promotes its services with public relations materials	0	1	2	3	4	5
30	3.1.5	Our ARC responds adequately to stakeholder requests for services	0	1	2	3	4	5

No	Serial	Statement	Score					
31	3.1.6	Our ARC collaborates sufficiently with national and sub-national partners	0	1	2	3	4	5
32	3.1.7	Our ARC collaborates sufficiently with international partners	0	1	2	3	4	5
33	3.2.1	Liaison officers (e.g. research extension officers) enhance linkages between our ARC and its stakeholders	0	1	2	3	4	5
34	3.2.2	Our ARC has an updated detailed stakeholder inventory/ directory	0	1	2	3	4	5
35	3.3.1	Our ARC acquires sufficient research assignments from local stakeholders/clients	0	1	2	3	4	5
36	3.3.2	Our ARC acquires sufficient research assignments from international organisations	0	1	2	3	4	5
37	3.4.1	Our ARC has frequent interactions with international research (in Africa and beyond) networks	0	1	2	3	4	5
38	3.4.2	Our ARC has frequent interactions with national and other sub-national agricultural research ARCs	0	1	2	3	4	5
39	3.4.3	Our researchers frequently participate in national research forums/conferences	0	1	2	3	4	5
40	3.4.4	Our researchers frequently participate in international research forums/conferences	0	1	2	3	4	5
41	4.1.1	Stakeholders are partners in the identification of research needs	0	1	2	3	4	5
42	4.1.2	Stakeholder involvement has resulted in more accurate information about research needs and priorities	0	1	2	3	4	5
43	4.2.1	There is an updated Farming System Zonation (Agro-ecological zones-based) map in the mandate area.	0	1	2	3	4	5
44	4.2.2	Within farming system zones, the ARC has identified farmer target groups for research	0	1	2	3	4	5
45	4.3.1	Our researchers interact with stakeholders/ clients during proposal development	0	1	2	3	4	5
46	4.3.2	All researchers use the same format for writing research proposals (including logframes, budgets)	0	1	2	3	4	5
47	4.3.3	All proposals are reviewed internally before submission to clients for approval	0	1	2	3	4	5
48	4.3.4	All technologies to be tested are subjected to ex-ante adoptability analysis (the likeliness of a technology to be adopted)	0	1	2	3	4	5
49	4.3.5	All research activity proposals specify relevant farming system zones and target groups	0	1	2	3	4	5
50	4.3.6	All research activity proposals specify who and how research results will be disseminated	0	1	2	3	4	5
51	4.3.7	All research activity proposals are critically reviewed by the ARC's internal review process	0	1	2	3	4	5
52	4.3.8	All research activity proposals are critically reviewed and approved by a stakeholder dominated committee	0	1	2	3	4	5
53	4.4.1	Farmers participate in conducting all research activities (on-farm and on-station)	0	1	2	3	4	5
54	4.4.2	Gender analysis is conducted in all research activities	0	1	2	3	4	5
55	4.4.3	All research activities include economic analysis	0	1	2	3	4	5
56	4.4.4	Farmers always assess the performance of technology tested	0	1	2	3	4	5
57	4.5.1	Various stakeholders/ clients are involved in research monitoring and evaluation (M&E)	0	1	2	3	4	5
58	4.5.2	Our ARC uses logical frameworks (log-frames) to monitor and evaluate research activities	0	1	2	3	4	5
59	4.5.3	Our researchers always have up-to-date information on their research activities expenditures and remaining funds	0	1	2	3	4	5
60	4.5.4	Our ARC regularly conducts adoption studies of released technologies	0	1	2	3	4	5
61	4.6.1	All progress of research activities is reported quarterly and annually	0	1	2	3	4	5
62	4.6.2	Progress of research activities is frequently discussed with various stakeholders	0	1	2	3	4	5
63	5.1.1	All research publications are reviewed by peers	0	1	2	3	4	5
64	5.1.2	Our ARC has an accessible publication series	0	1	2	3	4	5
65	5.2.1	Our ARC generates a variety of extension materials for all types of clients	0	1	2	3	4	5
66	5.2.2	Research and extension staff co-operate in the generation of extension materials	0	1	2	3	4	5
67	5.3.1	Our ARC organises farmer field days, demonstrations, training and agricultural shows to disseminate research results	0	1	2	3	4	5
68	5.3.2	Our ARC uses other multi-media (e.g. radio, TV, zonal newsletters, newspapers) to disseminate research results	0	1	2	3	4	5
69	5.3.3	Our ARC facilitates farmer exchange visits and farmer-to-farmer extension	0	1	2	3	4	5
70	5.4.1	Research staff members have sufficient access to scientific information	0	1	2	3	4	5
71	5.4.2	Our ARC library is well-organised and up-to-date	0	1	2	3	4	5
72	5.4.3	Our ARC has an up-dated database on research activities, results and agricultural data	0	1	2	3	4	5

For purposes of processing of the questionnaire: serial numbers refer to capacities and dimensions (e.g. questions 1.1.1 + 1.1.2 + 1.1.3 refer to management capacity 1 of management area 1).

Annex 2.2 Assessment of stakeholder satisfaction with ARC services.

Instructions:

- Individuals or groups of stakeholders can do this exercise with or without facilitation.
- The stakeholder should first of all consider whether he/she is in a position to score for the statement. If this is not the case the zero box (Not known) is ticked and no score is filled.
- For all statements scoring can be given on a scale from 1 to 5, 1 meaning you strongly disagree and 5 meaning you strongly agree.
- Comments and explanations can be given on the back of the sheets.

Please indicate the number of participants in your group	
Indicate the type of stakeholders in your group: public sector, private sector, farmers etc.	

Management areas, management capacities and the management activities (statements)			Score					
			0	1	2	3	4	5
1		**Human resource management**						
	1.1.1	Researchers have the knowledge to satisfy our needs						
	1.1.2	Researchers have the skills to satisfy our needs						
	1.1.3	Researchers have the attitude to satisfy our needs						
	1.2.1	Research staff is flexible enough to address our concerns						
	1.2.3	Researchers address problems in interdisciplinary teams						
	1.2.3	The ARC involves others if need arises						
	1.3.1	Research staff shows commitment to their work						
	1.3.2	Researchers complete our assignments in time						
	1.3.3	Researchers can be seen as our advocates						
	1.4.1	We have regular meetings with researchers (technical seminars etc.) exist						
	1.4.2	There are adequate opportunities for informal meetings with research staff						
	1.4.3	We know whom to contact within the ARC						
	1.5.1	We have frequent contact with research leadership						
	1.5.2	Research staff performance can be discussed with research leadership						
2		**Financial management**						
	2.1.1	Research fees are clear (and transparent)						
	2.1.2	Research fees are reasonable considering quality of results						
	2.1.3	Research costs cover all research activity expenses						
	2.1.4	We are aware that research costs are also for ARC maintenance						
	2.2.1	Internal research services (transport, administration, laboratories etc.) do support researchers						
	2.3.1	Supply of research goods (equipment, trial inputs) is well organized						
		Research activity inputs are timely available						
	2.4.1	Research equipment, transport and buildings are in good condition						
	2.5.1	We are aware of the costs of a particular research activity						
	2.5.2	Research budgeting is realistic						
	2.5.3	We are actively involved in developing research budgets						
	2.5.4	We regularly monitor expenditure						
	2.5.5	We have influence over the research expenditure						
	2.6.1	We are satisfied with the ARC financial management						
	2.6.2	ARC financial procedures are clear						
	2.6.3	We receive comprehensive budgets of research programmes						
	2.6.4	We receive financial reports						
3		**Linkages and collaboration**						
	3.1.1	The ARC is known to us and our interests						
	3.1.2	We know the institute and the services it can provide						
	3.1.3	The services that are provided are appropriate						
	3.1.4	We regularly use the ARC services						
	3.1.5	We are satisfied with the services provided						
	3.1.6	The ARC has an active public relations section						

Management areas, management capacities and the management activities (statements)			Score					
			0	1	2	3	4	5
	3.1.7	The ARC responds quickly to our requests						
	3.1.8	The ARC has good relations with national partners						
	3.1.9	The ARC has good relations with international partners						
	3.2.1	We relate to the ARC through one contact person (liaison officer)						
	3.2.2	The liaison officer actively contacts us						
	3.2.3	The ARC has an up-to-date stakeholder inventory list						
	3.3.1	The ARC is our favourite technology supplier						
	3.3.2	The ARC has a positive reputation as a technology supplier with others						
	3.4.1	Researchers found a balance between networking (travelling) and attending local demand						
	3.4.2	Researchers are aware of new developments in science and technology						
4		**Planning, monitoring and evaluation**						
	4.1.1	We fully participate in problem analysis						
	4.1.2	We agree on general research priorities						
	4.1.3	Agreed research priorities originate from us						
	4.2.1	We agree on (priority) geographic areas						
	4.2.2	We agree on (priority) target groups						
	4.3.1	We are aware of the annual research planning cycle						
	4.3.2	Research proposals originate from farmers/producers						
	4.3.3	Research proposals are based on our formal requests/ToR						
	4.3.4	We are actively involved in preparation of research proposals						
	4.3.5	We are actively involved in screening and review of research proposals						
	4.3.6	Research proposals are adequately screened in the ARC						
	4.4.1	The number of on-farm and on-station research activities is well balanced						
	4.4.2	Farmers are actively involved in 0n-station research						
	4.4.3	Farmers actively participate in on-farm research						
	4.4.4	Rich and poor farmers are equally involved in research activities						
	4.4.5	Both men and women are equally involved in research activities						
	4.4.6	Participants in on-farm research are satisfied with implementation procedures of research activities						
	4.4.7	Participants in on-farm research always assess technology performance						
	4.4.8	Technologies tested in on-farm research are assessed economically						
	4.5.1	We are actively involved in developing progress indicators						
	4.5.2	We regularly participate in monitoring meetings						
	4.5.3	Research provides timely information (progress, financial etc.)						
	4.5.4	We have been involved in adoption and impact studies of research						
	4.6.1	We regularly receive progress reports						
	4.6.2	Progress reports are comprehensive (technical and financial)						
	4.6.3	Researchers regularly provide feedback on research results						
5		**Output production, dissemination and information management**						
	5.1.1	We have access to scientific reports and papers						
	5.1.2	Scientific reports and papers are of high quality						
	5.1.2	We regularly receive a list of publications						
	5.2.1	The ARC produces extension material in understandable language						
	5.2.2	Extension material produced by the ARC is of high quality						
	5.2.2	The ARC uses farmer's knowledge (e.g. local soil names) in the material						
	5.2.3	We participate in the development of these leaflets						
	5.2.4	We use the ARC extension material						
	5.3.1	We are exposed to research results (Radio, TV, papers etc.)						
	5.3.2	We are invited for field days, seminars, meetings						
	5.4.1	Researchers are familiar with farmer's knowledge						
	5.4.2	We are aware of the ARC library						
	5.4.3	Research information of previous years can easily be obtained						

Annex 2.3 Example of an institutional stakeholder interview form

Name of stakeholder:	Type of stakeholder::
ddress of stakeholder: P.O.Box	Place:
District:	Email:
Telephone:	Fax:
Name of interviewee:	Position of interviewee:
Name of interviewer:	Date of interview:

What we would like to know about you

What is your mandate?	
What is your mission?	
Who are your clients?	
Which services do you provide?	
What is your geographical coverage?	
What are your financial sources?	
How are you organised?	
What is your staff capacity?	
What are your preferred means of communication and	
how do you communicate with your clients?	

Your experience with the ARC

Can you describe the mandate of the ARC?	
Can you describe the services and products available?	
Did you collaborate with the ARC (please specify when and how)?	
How was the collaboration established?	
With whom did you collaborate?	
What were the collaborative activities?	
Did you receive any other services and can you describe them?	
Do you collaborate with any other research organisation (please specify)?	

Your satisfaction with the ARC performance

	Score 0-5
The staff capacity of the ARC satisfies our needs for research services	
The ARC is responsive to our demands for services and products	
The attitude of ARC staff is collaborative, communicative and helpful	
The ARC is effective in solving our problems	
The ARC provides effective services and useful products	
The ARC communicates well with us and provides adequate feed-back	

Your impression of ARC strengths and weaknesses

What do you consider strengths of the ARC?	
What do you consider its weaknesses?	

At this point of the interview, the interviewer should probe the understanding of the stakeholder about the ARC. In case the stakeholder is not familiar with the ARC, then the interviewer should provide background information before proceeding to the next questions about 'needs for services'. This is recommended because stakeholders may refrain from voicing their demands because they think these may not be within the mandate of the ARC.

Before addressing the needs of the stakeholder, the interviewer should define what is meant by 'services' (support or assistance such as advice, information and training), products (outputs such as extension materials, improved seeds and breeds), and resources (any contribution that is needed for delivery of the service, such as funds, logistics, staff, networks and linkages, facilities).

What are your own strengths and weaknesses in relation to the ARC

Can you translate your problems in clear terms of reference for research to implement?	
Can you assess the quality of research (progress) reports?	
Can you evaluate the results of the ARC in terms of addressing your problems?	
Is your organisation well organised for dealing with research?	

What are the services and products you need from the ARC?

Which services and products do you need (list)?	
Can you prioritise your needs?	
What resources are you able and willing to provide?	
Which conditions have to be met by the ARC to address your needs?	

Annexes of chapter 3

Annex 3.1 Incentives in Mali (IER)

RULES FOR DELIVERY OF SERVICES

This document defines the conditions and the remuneration of researchers and other personnel of the Institute of Rural Economy (IER) for the delivery of services

Article 1: The following activities are considered as services: studies, consultancies, technical assistance, and training demanded and paid for by a client.

Article 2: The personnel of IER is not authorised to execute services in the areas of work of IER without the written permission of the competent authorities of IER. Disciplinary measures will be taken in case its personnel caries out contracts without the written permission of the direction.

Article 3: All agents that are asked to carry out an assignment for a client shall contact the Director of the Regional Research Centre (DRRC) of the Director General (DG) of IER.

Article 4: Once received the request, the DRRC or the DG shall ask the responsible services to develop a technical and financial proposal that shall be submitted to the clients within 10 days of the request. These activities should never jeopardize the ongoing research programmes.

Article 5: All services need to formalised in a contract between IER (DG or DRRC) and the clients.

Article 6: The scientific departments at the national and regional level are responsible for the quality of delivered services. They shall read the reports before they are send to the client. A copy of the final report shall be archived.

Article 7: The budgets are developed following the general formats and fees of the Institute. There are minimum fees and the marketing units are responsible to negotiate the best fee.

Article 8: After signing the contract the following departments should receive a copy of the contract.
Management board of IER: scientific director, director of financial resources, and the director of services.
DRRC : accounting division and the regional scientific committee.
The original contracts are classified by the Deputy Director General.

Article 9: After receiving the funds the accounting department adnd the management should follow these procedures :
calculate the amount to pay for salaries, indirect costs and pay them to the appropriate accounts;
divide the fee into a amount for the consultant and for IER. The consultant receives 60% of the fee and 40% for IER if the fee is F CFA 50,000 or less. For the amount of the fee higher than F CFA 50,000 the fee is split into 50/ 50.

Annex 3.2 COR Incentives for research staff in Tanzania

GUIDELINES FROM THE DEPARTMENT OF RESEARCH AND DEVELOPMENT MINISTRY OF AGRICULTURE AND FOOD SECURITY TANZANIA

The Department of Research and Development in the ministry of Agriculture and Food Security Tanzania implements a programme to reward out-standing researchers and support staff. This has been implemented at a **National** and **Zonal** levels as described below. All the awards are currently of a monetary nature.

National Research Awards
The Minister for Agriculture and Food Security presented awards to scientists and technicians who had excelled in technology development in 2002. In the National Agriculture Research System this was the first award forum of its kind with wide coverage in the media so as to publicize both appropriate research technologies developed and the research staff involved. Politicians, policy makers, scientists, NGOs, research institutions and district council representatives attended the forum.

Among several criteria used to select winning research teams (scientists, technical and support staff) include:

i) That the technology had been developed as a result of prioritizing client problems and short listing of researchable problems that had been identified.
ii) An assessment of the extent to which the research programme focused on solving identified problem with a list of core actors drawn up collaboratively.
iii) The impact of the technology on the farming community including agricultural productivity and production, income generation and environmental conservation..
iv) That the technology developed has a national impact on the farming community.

On the basis of the criteria itemized above, awards were given to twelve research teams. These teams were selected by a national committee, which comprised of the national Director for Research and Development as the Chairperson, Assistant Directors for Crop, Livestock and Special Programmes research and Senior researchers. The process began by asking Zonal Directors to propose research teams, which could qualify for the awards. Proposals from the zones where then evaluated by the national committee.

Funding for these awards was through a World Bank loan Research project (TARP II). Although the intention is have it annually, it may not be sustainable unless a special fund is created for this purpose.

This practice of awarding Researchers has given the Department of Research and Development a good national picture in Tanzania. It has raised awareness among Tanzanians of the importance of agricultural research in the national economy and also has given opportunity to the farming community to know some of the available technologies to improve their situations.

Zonal level Research awards - A case of Lake Zone Tanzania
The Department of Research and Development developed selection criteria and procedures to be used for Zonal Research awards. These criteria and procedures were sent to all seven zones for implementation. However not all zones could adopt the awarding scheme because of funding problems. In the Lake zone where the Netherlands government is providing support through a National Research project it was possible to implement. A research awards committee was formed with a task of identifying individuals and activities to be awarded for various categories during the year 2000. The committee is composed of members as follows:

- Zonal Research Co-ordinator (Chairperson)
- An NGO representative
- Two representatives from the regional administrative office. Each from one region.
- Zonal Information Liaison Officer
- Officer In charge of a Research Centre, which is part of the Zone but located in another region.

- Assistant Zonal Research Co-ordinator who is also from the research centre located in the other region.

On this basis awards were given to 12 lead scientists, 44 collaborating scientists and 51 technicians. Winners were given certificates as well as cash totaling US$ 1.7 million. Each winning team was awarded US$ 1,500 and divided within the team as follows: Lead scientists US$ 700, Collaborating scientists to share US$ 500 and involved technicians to share US$ 300.

Awards were given to teams, which developed the following technologies:

i) Maize: Variety UH615 that is resistant to Grey Leaf Spot (GLS).
ii) Maize: Varieties LISHE and SITUKA that have high protein and drought resistant, respectively.
iii) Maize: Medium altitude, early maturing series (Staha, kito, TMV1 & Kilima)
iv) Paddy/ Rice: Variety TXD-88 that is high yielding, non-lodging, early maturing and is aromatic.
v) Sorghum: Drought and disease resistant varieties Tegemeo, Pato & Macia.
vi) Wheat: Award given for tackling the pathology problem knows as 'Patch Stunting of wheat'. Proper agronomic practices is the key issue here
vii) Beans: Varieties Uyole-98, Selian-97, etc that are both high yielding and disease resistant. These varieties are equally popular beyond our borders.
viii) Pigeon peas: Variety 'Komboa' that is high yielding, early maturing, non-photoperiodic and multiple harvests.
ix) Cassava: Processing for good quality flour and easy preservation.
x) Cashew: Integrated Cashew management (ICM) where farmers have a basket of options from which to select an ideal technology for each situation.
xi) Agro-forestry: A sustainable system of tree planting that generates fuel-wood (needed for tobacco curing) using a very early maturing tree varieties

Source; DRD, 2003

The award committee prepares forms, which elaborate the various criteria for each category. Researchers are then asked to fill in these forms and give them a chance to assess themselves. After this stage the forms are verified by their heads of programme. These are then given to the award committee for final assessment. Each committee member gives a score to each criterion. These scores are then weighted and summed up. This gives a final result on who is to be awarded. At the Zonal level, these criteria and procedures were adopted but modified slightly to suit the zonal situation.

Six award-winning categories can be distinguished:

Research award Categories

1. *Best Zonal Research Award - Two awards - Best researcher gets US$ 1500 and the second best researcher gets US $ 1000*

The criteria used under this category is:

i) Number of international journal/ conference papers published
ii) Number of zonal research activities in the current season
iii) Number of zonal research activities completed in the current season
iv) Number of research activities with international institutes
v) Number of activities involving clients (farmers, NGO etc)
vi) Number of disseminated technologies to farmers, NGOs etc in the current season
vii) Extent to which farmers participate in the research process.

2. *Research Funding Sustainability Award - Ten awards at US $ 100*

This category is meant for awarding scientists who have attracted activities with funding from agents (clients) other than those who fund through the government. Award is only given if the final product is accepted by the funding agent. Apart from this other criteria include:

i) Extent to which activity was requested by the client as a contract
ii) Level at which a proposal was developed based on terms of reference (ToR)
iii) Frequency of follow up consultations made in the season
iv) Quality of progress report presented during the Zonal Internal Programme review
v) Level of acceptance of final report by clients?

3. Community Benefit Award - Two awards at US $ 500

This category is for awarding scientists with activities which have shown positive impact of the research technology released/ tested under farming situations:

i) % age yield (kg) increase at farm level
ii) Income net increase (Tsh) at farm level
iii) Ability of technologies released to elevate work-load
iv) Extent of adoption analysis of technology done
v) Level of community and extension participation in activities
vi) Whether/ quality of extension message developed
vii) Level of technologies influence to policy markers

4. Natural Resource Management - Two awards at US $ 500

This is for awarding scientists with activities, which are environmentally friendly and use naturally available resources.

The criteria used under this category is:

i) Extent to which Activities consider use of locally available resources
ii) Level at which an activity improves/ conserves natural resources

5. Farmer Research Groups - Two awards at US $ 500

This category is a group award for scientists leading Farmer Research Group (FRG)

The criteria used under this category is:

i) Number of Activities identified by the FRG
ii) % age of completed activities that farmers participated in
iii) % age of increased farmer membership
iv) Group is well organized (regular meetings, leadership, record keeping at FRG and office documentation etc.)
v) Number of FRG members adopting technologies developed
vi) Frequency of farmers meetings/ researcher visits.

6. Publication award

This monetary publication award is given to scientists who have published papers in International Scientific Journals or International Conference proceedings. The criteria used by journals should be submitted to the Zonal Management Team in order to to be available for referencing.

Value of awards for each publication under various categories:

i) Scientific journal paper/ conference proceeding (International) - US $ 150.
ii) Regional conference proceedings paper - US $ 100
iii) Chapters in books - US$ 100 for each chapter
iv) Newsletters publication - US $ 50 for each.
v) Posters and leaflets - US $ 50 for each

These awards have motivated scientists in such a way that competitiveness is easily built into the research system. The criteria used also ensure good output for the satisfaction of the clients.

Annex 3.3 Financial management: Contractual research regulations

Different modes of collaboration exist between clients, financiers and suppliers of research results, examples of these have been given. Each of the different modalities will have a specific type of contract e.g.

Traditional research programmes with Core funding by Government or bi-/ multilateral donors have at least agreed outputs and milestones and increasingly well established contracts with quantified targets and outputs.

In collaborative research contracts (often in the form of a Memorandum of Understanding or MoU) are between different technology suppliers, or partners in the research continuum. Special contracts here can also be contracts between research and farmer researchers of the farmer research groups. Roles, functions and inputs by different partners are clearly spelt out[1] (example 2).

In contract research contracts funds are provided for by the client of the research. These arrangements require a special contract format (see example 1).

[1] This type of contract between farmers and researchers should not be confused with the contractual mode in farmer participatory research, which refers to an arrangement whereby farmers provide labour and land for researcher managed and researcher implement experiments.

Example 1
Establishment of the contract modality of research funding

Objective

To enter in formal agreements between technology demand (Client stakeholders) and technology supply (research institutions) with the aim to strengthen the demand drivenness of the research agenda as well as to contribute to the financial sustainability of the research institution

What is contract research?

Contract research is a formal agreement between a sponsor of a research service and an executing institute. If the requesting client is also the sponsor, the agreement will be between two parties. However, often the client does not have the financial resources and requests a third party to sponsor the services.

A contract stipulates the research service to be rendered, the number of days and scientists involved, the budget and who contributes to which costs, monitoring and evaluation, availability of output, terms of payment and legislative conditions (see example of contract attached). Contracts are signed between the highest authorities on behalf of the sponsor and the institute. Contract research has many advantages, but also some disadvantages:

Some lessons learnt with contract research:

- *Talk to your client for research requests, talk to the sponsor or financial authority for funding.*
- *Know your limitations and do not sell services you cannot deliver.*
- *Empower your clients to sustain contract research in future.*
- *Evaluate the financial reliability of the sponsor to avoid late payment of funds.*
- *Diversify the sources of funds and look for specific sponsors of strategic research.*
- *Commercialise your services, not your objectives.*

Contract research examples

The manager of a seed company in Arusha came to Selian ARI to discuss a constraint in his farm. He explained to the zonal director that due to annual ploughing a hardpan had developed in his soil that hampers rooting by maize and beans. The client was referred to a scientist having experience with the problem. She suggested to incorporate a deep rooting crop in the rotation of the farm, such as pigeon peas or sorghum. The client expressed his interest in the latter and the scientist prepared a proposal for on-farm testing of three sorghum varieties. The client appreciated the proposal and requested a contract. A contract was prepared, but the client responded that the budget was too high. The principal investigator removed two scientists from the proposal and reduced the budget. Now, the client and zonal director signed the contract.

A DALDO in one of the districts of the Northern Zone made a request for testing new varieties of maize. The liaison officer for that district discussed the request with the zonal director and transferred it to a principal investigator. The latter wrote a proposal that was submitted to the DALDO. After few corrections, the final proposal was submitted with a contract to the DED and the adviser of the District Rural Development Programme (DRDP). Both of them approved the proposal and submitted the contract to the annual DC budgeting meeting, where it was approved for funding. However, the sponsor of the DRDP had serious reservations and rejected the contract for funding. The mistake made in the negotiations was that funding was discussed with the wrong party. The DALDO is an executor, not a financier. He or she can make requests as a client of research, but funds and allocation of other resources must be discussed with the right party, i.e. the DED, the adviser and the DRDP sponsor.

Example 2
Main elements of the collaborative agreement or Memorandum of Understanding in Mali for IER

Context of the agreement
The objective of this MOU is to specify the general conditions of collaboration

Contents of the agreement
The following areas of collaboration e.g.
- To conduct collaborative agricultural research ;
- Training and exchange of scientific personnel ;
- Exchange of scientific information and technologies.

Collaborative agricultural research
The two institutes shall identify areas of joint research programmes. For each joint research programme, the objectives, contributions, justification, modalities of publication, duration of the programme, personnel involved, work schedule, and a budget shall be specified. The responsible of each joint research programme, in collaboration with the research team, shall write a yearly technical and financial report.
The joint research programmers shall operate within the framework of the strategic research plans and programming of both institutes.

Training and exchange of scientific personnel
The need to improve the performance and quality of their personnel, therefore:
- Receive and exchange scientific personnel to implement collaborative research programmes;
- Invite researchers or technicians to participate in training courses, conferences or short term missions.

Exchange of scientific information and agricultural technologies
Commitment to:
- Organize and host conferences and workshops ;
- Publish results of collaborative research programmes ;
- Exchange agricultural technologies and information.

Financial and technical reporting
Monitoring and evaluation of joint research programmes shall be the responsibility of a taskforce that consists of members of the two institutes. They will meet at least once a year at a place and date to be determined by the two institutes.

Responsibility of the taskforce
Develop joint research programmes and identify the human and financial resources to implement them ;
Financial and technical backstopping of the joint research programmes, and write a yearly progress report.
Assure the well-functioning of joint research programmes.

Responsibilities of the institutes
Assures that joint research programmes shall be hosted by the organizational structures of IER;
Assures that it shall appoint its staff to joint research programmes. Jointly search for financial assistance to finance the joint research programmes.

Intellectual property
The intellectual property of all findings, reports and other documents and information pertaining to the collaboration rests with the collaborative partners
All information passed on and related to the collaborative research programmes and any other institutions co-operating within the framework of the project, shall be treated by both parties as strictly confidential. Without specific permission in writing by authorized officials of both institutes, the institutes shall refrain from publishing (or contributing to any publications on) such information.

Duration of the MOU
This agreement will be valid for a period of five years, starting form the date of signature, and may be extended by mutual agreement.

Final stipulation
Disputes shall be resolved by the General Directors of the two institutes or by a third party to be determined by the two institutes.

Source: IER, Mali