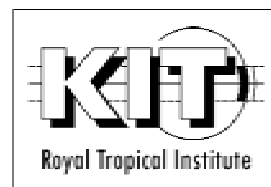
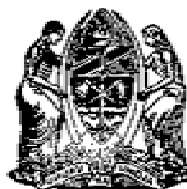


Managing Research for Agricultural Development

Proceedings of the
National Workshop on Client Oriented Research
27-28 May 2003, Moshi, Tanzania

Edited by Ninatubu M. Lema, Chira Schouten and Ted Schrader

United Republic of Tanzania
Ministry of Agriculture and Food Security
Division of Research and Development
Client Oriented Research Programme



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Abbreviations

AKIS	Agricultural Knowledge and Information System
ARDI	Agricultural Research and Development Institute
ARI	Agricultural Research Institute
ASDP	Agricultural Sector Development Programme
ASDS	Agricultural Sector Development Strategy
ASUC	Assistant Service Unit Co-ordinator
CBO	Community Based Organisation
CBRD	Community Based Rural Development
CDD	Community Driven Development
COR	Client Oriented Research
CORMA	Client Oriented Research Management Approach
CV	Curriculum Vitae
DALDO	District Agriculture and Livestock Development Officer
DADP	District Agricultural Development Plan
DC	District Commissioner
DED	District Executive Director
DEO	District Extension Officer
DESC	District Extension Steering Committee
DLO	District Liaison Officer
DRD	Division of Research and Development
DRDP	District Rural Development Programme
DSA	Daily Subsistence Allowance
EIARD	European Initiative for Agricultural Research and Development
FEG	Farmer Extension Group
FF	Farmer First
FFS	Farmer Field School
FN	Field Note
FRG	Farmer Research Group
FSA	Farming Systems Approach
FSR	Farming Systems Research
FSR-E	Farming Systems Research and Extension
GoT	Government of Tanzania
HoP	Head of Programme
ICT	Information and Communication Technology
IFMAS	Integrated Financial Management and Accounting System
IICD	International Institute for Communication and Development

ILO	Information Liaison Officer
IMC	Information Management Committee
IMF	International Monetary Fund
INASP	International Network for the Availability of Scientific Publications
INFORM	Information for Research Management database
IPR	Internal Programme Review
ITK	Information Technology Knowledge
ISFM	Integrated Soil Fertility Management
LAN	Local Area Network
LGA	Local Government Authority
LO	Liaison Officer
LZ	Lake Zone
LZARDI	Lake Zone Agricultural Research and Development Institute
MAC	Ministry of Agriculture and Co-operatives
MAFS	Ministry of Agriculture and Food Security
M&E	Monitoring and Evaluation
MIS	Management of Information System
MoU	Memorandum of Understanding
MRALG	Ministry of Regional Administration and Local Governance
MT	Management Team
MTP	Medium Term Plan
MWLD	Ministry of Water and Livestock Development
NALRM	National Agricultural and Livestock Research Masterplan
NARS	National Agricultural Research System
NGO	Non-Governmental Organisation
NPRS	National Poverty Reduction Strategy
NRM	Natural Resource Management
NZ	Northern Zone
NZARDI	Northern Zone Agricultural Research and Development Institute
NZARF	Northern Zone Agricultural Research Fund
NZARF-MC	Northern Zone Agricultural Research Fund-Management Committee
PCA	Product Chain Approach
PERI	Programme for the Enhancement of Research Information
PI	Principal Investigator
PR	Public Relations
PRA	Participatory Rural Appraisal
PRC	Poverty Reduction Credit
PRSP	Poverty Reduction Strategy Paper
PV	Payment Voucher
RAAWU	Research Academic and Allied Workers Union

RALDO	Regional Agriculture and Livestock Development Office
RAS	Regional Administrative Secretary
RC	Regional Commissioner
RELO	Regional Extension Liaison Officer
RDS	Rural Development Strategy
RNE	Royal Netherlands Embassy
SAP	Structural Adjustment Programme
SHF	Self-Help Fund
SUA	Sokoine University of Agriculture
SUC	Service Unit Co-ordinator
SWOT	Strengths, Weakness, Opportunities and Threats analysis
TACRI	Tanzania Coffee Research Institute
TAFIRI	Tanzania Fisheries Research Institute
TAFORI	Tanzania Forestry Research Institute
TAGREF	Tanzania Agricultural Research Endowment Fund
TARD	Tanzania Agricultural Research Database
TARO	Tanzania Agricultural Research Organisation
TARPII	Tanzania Agriculture Research Plan (Phase II)
TEEAL	The Essential Electronic Agricultural Library
TDT	Technology Development and Transfer
TDV	Tanzania Development Vision
ToR	Terms of Reference
TPRI	Tanzania Pesticides Research Institute
TRB	Technology Reference Book
TRIT	Tea Research Institute of Tanzania
URT	United Republic of Tanzania
VFM	Value For Money audit
WB	World Bank
ZARDI	Zonal Agricultural Research and Development Institute
ZARF	Zonal Agricultural Research Fund
ZARF-MC	ZARF-Management Committee
ZCC	Zonal Communication Centre
ZDRD	Zonal Director for Research and Development
ZEC	Zonal Executive Committee
ZIMO	Zonal Information Management Officer
ZRC	Zonal Research Co-ordinator
ZRELO	Zonal Research Extension Liaison Officer
ZTC	Zonal Technical Committee

Acknowledgements

On 27 and 28 May 2003 more than 110 people from public and private research institutes, extension agencies, NGOs, sponsors and other stakeholders, met for the National COR Workshop in Moshi. The workshop aimed to share experiences with the Client Oriented Research Management Approach that were gained in the Lake and Northern Zones of Tanzania in the past five years, and to analyse constraints and opportunities to sustain and institutionalise CORMA in the National Agricultural Research System (NARS). We would like to thank many people who, in various ways, made this workshop a success.

This book contains papers presented during the workshop, as well as discussions and recommendations from the workshop. After the foreword by Dr. J.M. Haki and the opening speech by the Acting Permanent Secretary of MAFS follows the introductory paper. This paper describes the roots of the CORMA and its conceptual framework. After that the book presents 12 papers. These 12 papers address specific management capacities, review experiences, suggest "best practices", analyse conditions for success, share lessons learned and suggest challenges and priorities for the way ahead. The book concludes with a paper on the management of the CORMA change process, followed by the workshop discussion and recommendations.

The Client Oriented Research Programme, the National COR Workshop and this book have been made possible by the support of the Netherlands Government through the Royal Netherlands Embassy in Dar es Salaam, Tanzania, and the Tanzanian Government through the Tanzania Agricultural Research Project Phase II. We would like to thank Dr. J.M. Haki, Director for Research and Development, Mr. T.N. Kirway, Assistant Director FSR/SE and Dr. G. Sempeho, Project Manager TARP II, for their support, guidance and facilitation. We are also very grateful to Dr. Z.M. Semgalawe who is now the country co-ordinator for the FAO Links Project for her input in the initial development of the CORMA and her involvement in assessing zonal levels of client orientation.

Our review and editorial work has benefited enormously from many helpful comments and much needed encouragement from our friends and colleagues. We would especially like to thank Robert Kileo and Barnabas Kapange for their intensive participation in the thorough review of the papers that were submitted. We would also like to thank all the contributors to the papers in this book for their patience and tolerance during the review and editing process.

Ninatubu M. Lema, Chira Schouten and Ted Schrader
Dar es Salaam
June 2003

Foreword

Agriculture and livestock production, processing and marketing are the major economic activities of millions of Tanzanians. Any initiative that seeks to solve the problem of rural poverty has to address the agricultural sector. This sector therefore prominently features in the National Poverty Reduction Strategy paper. In addition to ensuring food security for all citizens, the Agricultural Sector Development Strategy (ASDS) stresses that the agricultural sector has to become more competitive. The Agricultural Sector Development Programme (ASDP) will therefore also explicitly focus on the modernisation and commercialisation of the agricultural sector, without jeopardising the natural resource basis or creating social disruption. These ambitions are a major challenge for our National Agricultural Research System.

In the last decade factors such as the rationalisation of government expenditure have weakened the position of public agricultural research. Others, such as information and communication technologies, provide opportunities. Decentralisation and democratisation give more autonomy and power to local authorities and communities. Increasingly clients of research and end-users of agricultural technologies ask appropriate research results and value for their investments. The donor community shifts attention from the supply side to the demand side of research. In the near future, service providers will increasingly access funds through contractual arrangements. More and more agricultural research organisations need to adapt themselves to rapidly changing economic and political conditions, and involve and satisfy clients of agricultural research services.

In 1998 the Division of Research and Development (DRD) of the Ministry of Agriculture and Food Security (MAFS) piloted the Client Oriented Research (COR) Programme in the Lake and Northern Zones, funded by the Netherlands Government. The project, which is part of the second phase of the Tanzania Agricultural Research Project (TARP II) focuses on research management. Using the experiences from the two pilot zones as well as comparable initiatives inside and outside the country a comprehensive approach evolved: the Client Oriented Research Management Approach (CORMA). In June 2001 the DRD organised the first National CORMA Workshop in Dar es Salaam. Workshop participants discussed and adopted the CORMA conceptual framework. To enable scaling up of the CORMA to other zones, the DRD appointed national facilitators and allocated GoT/TARPII funds.

On 27 and 28 May 2003 the DRD organised the second National CORMA Workshop at the Lutheran Uhuru Hostel in Moshi, one month before the Netherlands funded COR programme ends. The main objective of the workshop was to share experiences with the Client Oriented Research Management Approach gained in the two pilot zones since 1998. The workshop also aimed to analyse constraints and opportunities to sustain and institutionalise CORMA in the National Agricultural Research System (NARS). More than 110 participants from public and private research institutes, extension agencies, NGOs, districts, agricultural research funds, sponsors and other stakeholders attended this meeting.

The fourteen papers presented in the workshop, discussed subjects related to the management of research, resources, networks and outputs. The first paper is an introductory paper that clarifies the roots of CORMA and its relation to approaches like the Farming Systems Approach (FSA) and the Product-Chain Approach (PCA). This paper also clarifies the CORMA conceptual framework that is composed of four levels: goal, purposes (or management areas), outputs (or management capacities) and activities.

The twelve papers that follow address specific management capacities. Each paper reviews experiences from the Lake and Northern Zones, describes "best practices", analyses conditions for

success, shares lessons learned and lists challenges and priorities for the way forward. Suggestions for improvement target research managers and research teams at both the national and zonal level.

The last paper outlines how the changes inherent to the CORMA can be managed in three phases: recognising the need for change, planning for change, implementing and achieving change. The last implementation phase is divided in three stages: getting prepared for COR, developing an institutional policy, and implementation and quality control. The COR Programme developed tools for these phases and stages.

In the discussions that followed the paper presentations, participants completely agreed to the need for change. They were concerned however that the approach could not be fully implemented in case of insufficient funding. I would like to stress here that most activities of the CORMA basket of options are not expensive. Many activities concern management practices that zonal institutes can implement themselves and that do not require high recurrent costs. Activities explicitly focus on cost reduction, income generation and the improvement of efficiency and effectiveness of our work. Donor support may be needed for capacity building and investments. Participants also raised concerns about the existing gap between research and extension and suggested that both research and extension have to be client-oriented and should join hands in the fight against rural poverty. I am convinced that the current sector-wide approach for the development of agriculture in Tanzania will bring research, extension and training closely together.

One of the principles of the CORMA is that all research institutes are client oriented to a certain extent. We do not need to start from zero. Practical experiences presented in this book prove that the gradual implementation of CORMA activities can transform research institutes into organisations that are accountable and perform better.

Research and extension in Tanzania are at a turning point. We should seriously consider the institutionalisation of "best practices" summarised in this book to increase the level of client orientation of our NARS and to improve the management and organisation of our research. The COR management approach provides a logical framework that can assist us in planning the future. Changing our organisation is possible and can have a positive impact. This will benefit research staff, stakeholders and ultimately the end-users of agricultural technologies, the farmers of Tanzania.

Dar es Salaam, June 2003

Dr. J.M. Haki
Director Research and Development
Ministry of Agriculture and Food Security

Opening address

Mr. Chairman,
Representatives of Stakeholders,
Development Partners,
Ladies and Gentlemen,

It is a great honour and privilege for me to be accorded this opportunity to officiate the opening of this workshop on the Client-Oriented Research Management Approach (CORMA) which is being held here at the Lutheran Uhuru Centre. On behalf of the Ministry of Agriculture and Food Security and on my own behalf, I wish to welcome you all and thank you for accepting our invitation and setting aside your time to participate in this important workshop.

Mr. Chairman, agricultural research in this country began during the colonial era. Agricultural research institutes were established for the purpose of developing cash oriented (industrial) crops with a few limited food crops. After Tanzania's independence in 1961, agricultural research expanded with establishment of new research centres. These new research centres had the mandate of developing improved crop varieties and improved livestock breeds. Various technologies were developed and disseminated to farmers with the purpose of improving productivity in a sustainable manner. The main purpose was to improve food security, increase income and improve living standards of farmers in Tanzania.

Mr. Chairman, the process of expanding research centres and activities has gone along with associated changes in the way research is planned and implemented. These changes have also been associated with the way researchable problems are identified as well as the way technologies are developed and disseminated. Adoption of technologies by clients heavily depends on how researchable problems are identified, planned, implemented and disseminated. Clients are now increasingly involved in the entire spectrum of technology development and transfer (TDT). The number of farmers or end-users adopting research technologies is a good indicator of the success of research initiatives. To ensure increased adoption of these technologies, there has to be a continuous effort in polishing our ways and means of meeting our goals. The target is to have sustainable mechanisms to increase adoption of improved technologies, in order to improve farm productivity and incomes.

Mr. Chairman, as you are aware, in August 2001 the Government of the United Republic of Tanzania approved and directed the Lead Ministries in the agricultural sector to implement the country's Agricultural Sector Development Strategy (ASDS). The ASDS which is one of the major components of the Rural Development Strategy (RDS) itself, stems from the 1997 Agricultural and Livestock Policy as well as the Co-operative Development Strategy, also of 1997, and the Tanzania Development Vision (TDV) 2025.

Mr. Chairman, one of the critical issues necessary for the development of the agricultural sector as identified in the Agricultural Sector Development Strategy is clarifying public and private roles in improving support services, including agricultural research, extension, training, regulation, information and technical services and finance. The private sector is expected to increase its role in providing a wide range of demand-driven support services to smallholder farmers. The public sector, on the other hand, will gradually, but increasingly, limit its role to financing the provision of collective goods and services that the private sector is unwilling to provide, and the targeted financing of goods and services to eventually overcome rural poverty.

Mr. Chairman, the Department of Research and Development (DRD) as part of the Ministry of Agriculture and Food Security sees itself as a catalyst for agricultural development and therefore aspires to be:

- client and development oriented;
- professionally staffed and managed;
- dynamic, innovative and efficient and
- a provider of services that are demand-driven, cost-effective, environmentally friendly and gender and age-balanced.

In order to provide efficient and effective services to the agricultural sector, the DRD will:

- collaborate with Local Government Authorities (LGA'S), the private sector and other service providers to promote, undertake and deliver client-oriented and demand-driven technologies to farmers.
- collaborate with other national and international institutions working in agricultural services.
- co-ordinate agricultural research.

Mr. Chairman, the DRD research strategy is embedded within the overall Agricultural Sector Development Strategy (ASDS) of 2001 which again is a component of Rural Development Strategy (RDS) and the Poverty Reduction Strategy Paper (PRSP). The main features of the ASDS include:

- Promotion of farm level methods for technology development and dissemination.
- Promotion of capacity building for National institutions which collaborate in technology development and dissemination.
- Strengthening formal training and retraining in emerging methods for participatory approaches and also in new emerging sciences.
- Establishment of sustainable sources of research funding as a complementary source of research funding, - create an Endowment Fund.
- Involving the private sector and other stakeholders in the funding and management of research.

The main objectives of the DRD are to

- contribute to poverty reduction through improved production technologies.
- to contribute to the advancement of knowledge, science and technology.
- conduct innovative and applied research whose results will have direct impact on farmers.

Mr. Chairman, the Medium-Term Plan for research for the period 2004-2010 is currently under preparation, and is expected to be completed by June 2003. It is expected that this Medium-Term Plan will take into consideration the outcome of this workshop.

Mr. Chairman, since the Client-Oriented Research Management Approach (CORMA) is an approach that helps agricultural research institutes to improve their level of client orientation and hence the efficiency and quality of agricultural research, this workshop is timely in sharing with the stakeholders the experiences of the approach in the Lake and Northern pilot zones, through the generous support of the Netherlands Government. I have come to learn that CORMA focuses on five strategic areas, namely: human resource management, financial management, linkages and collaboration research and output production, information management and dissemination.

Mr. Chairman, during this workshop I hope the participants will increase their awareness of how the five strategic areas of CORMA mentioned above are incorporated in the change process to this approach as experienced by the two pilot zones. Furthermore, the participants are expected to exchange experiences with respect to client orientation and research management.

Mr. Chairman, at the end of the workshop I hope the participants will have identified the “best practices” for improved client orientation and management of research within our National

Agricultural Research System. The identified practices can then be used for operationalisation of public and private sector partnerships as stipulated in the Agricultural Sector Development Strategy.

Mr. Chairman, let me now accord once again the appreciation of the Tanzanian Government to all our Development Partners for support they have given us since our independence to overcome the twin problems of poverty, illiteracy and diseases in this country. The support received from the Netherlands Government in the agricultural sector since 1997 in the Lake Zone is a clear example of how our Development Partners are kin in supporting us. The challenge for us is how to scale up and sustain the good experiences on CORMA received from the Lake and Northern Zone.

Mr. Chairman, I hope you will have a fruitful two-day workshop that will come up with a common understanding among the participants on how best to make our agricultural research client oriented and efficient. With these few remarks now it is my pleasure to declare this workshop open.

Moshi, 27 May 2003

Mr. Mohammed S. Kiboko
Acting Permanent Secretary
Ministry of Agriculture and Food Security

Speech on behalf of the Netherlands Ambassador

Honourable Permanent Secretary, Ministry of Agriculture and Food Security, Mr. Wilfred Ngirwa,
Honourable Permanent Secretaries and Government Officials,
Honourable Political Leaders,
Honourable Director for Research and Development, Dr J. M. Haki
Honourable Researchers, academicians, policy makers, members of the farming community,
Distinguished Guests,
Ladies and Gentlemen,

Mr. Chairman, first, let me begin by thanking the organisers for inviting the Royal Netherlands Embassy to this important National Client Oriented Research Workshop on Managing Research for Agricultural Development. The Netherlands Embassy would like to convey its support to this workshop. Both the Netherlands Ambassador to Tanzania, His Excellency Dr. Bernard Berendsen and the Head of Development Co-operation, Mr. Gertjan Tempelman, wished but could not attend this important workshop in person. Both are out of the country.

Mr Chairman, Ladies and Gentlemen, allow me to go back to history. The Client Oriented Research (COR) Programme is a follow-up programme of previous Netherlands funded projects in the Lake and Northern Zones, namely the National Farming Systems Research (FSR), the National Soil Service and the Plant Nutrition projects. The COR Programme however was executed within the context of the nation-wide Tanzania Agricultural Research Programme (TARP II).

Mr. Chairman,
The main objective of the Netherlands Government support to TARP II in the form of the COR programme was to contribute to the attainment of sustainable food security in selected agro-ecological areas of Tanzania through increased agricultural productivity by mainstreaming client orientation in all agricultural research using a participatory Farming Systems Approach (FSA).

Mr. Chairman, CORMA is one of the main approaches developed out of the COR Programme support. To be more specific CORMA was one recommendation of the COR Programme exit strategy backstopping mission of 2001. The mission, among others, recommended focus on facilitation and (institutional and financial) sustainability of the COR Management Approach (CORMA). It also emphasised diversification of research funding through strengthening of Zonal Agricultural Research Funds. This is what we can recall of the CORMA initiation. CORMA has gone through different steps. You are in a better position to assess the achievements and constraints of the COR Management Approach. Nevertheless, we believe that Client Oriented Research fits perfectly in a pro-poor approach embedded in the current Poverty Reduction Strategy of Tanzania.

Mr. Chairman, allow me to start that as long as the Agricultural sector will remain crucial for any Poverty Reduction strategy in Tanzania, so will CORMA remain important for the Tanzanian National Agricultural Research System. The aim of CORMA is to increase the level of client orientation of agricultural research institutes through improved management and organisation. In so doing it aims at sustainability of these institutes. CORMA has identified five specific areas. They are all important. But allow me to stress three areas:

- Human Resources Management aiming to ensure the availability of qualified staff through improved human resources management within agricultural research institutes;
- Financial Management aiming at enhanced efficiency, transparency and accountability of agricultural research institutes through improved (financial) management, and
- Output production, dissemination and information management directed at increasing the impact of agricultural research on rural development through increased output production and dissemination of information.

How far have we come with the implementation of CORMA areas? This reminds me of the Lake Zone self-assessment in December 2001. By then, the Lake Zone ARDI (Ukiriguru and Maruku) carried out a self-assessment of the level of client orientation on the five CORMA areas. Analysis revealed that the LZARDI overall level of client orientation was 66%. The best score was obtained for research planning, monitoring and evaluation. The lowest scores were obtained for areas of internal management: human resources management and financial management.¹

In conclusion, Mr. Chairman, Ladies and Gentlemen, Tanzanian agriculture, being in a socio-economic transition phase cannot afford not to stress the above areas. The Netherlands considers areas of output production, dissemination and information management together with human resources and financial management to be crucial for agricultural research in the future. Fortunately it is noted that the same areas are also addressed in the Agricultural Sector Development Strategy of 2001. And, going through the objectives and framework of this workshop, I note that during the course of this workshop you will - among others - give attention to these important issues.

Mr. Chairman, on behalf of The Netherlands Government I would like, once again, to assure you of The Netherlands support to this stimulating Workshop and we look forward to be informed on the outcome.

Moshi, 27 May 2003

¹ COR Work plan 2002 - 2003

Introductory paper

The Client Oriented Research Management Approach: background and introduction to the conceptual framework

Ninatubu M. Lema, Robert O. Kileo, Chira Schouten and Ted Schrader

Summary

For decades the government has dominated the Tanzanian agricultural sector. However, since the 1990's the environment for public agricultural service providers has changed tremendously. A combination of many different factors has weakened the position of public agricultural research. There is less direct funding from the government and donors are shifting their attention to the demand side of research. These changes push research organisations to find more efficient ways of organising and managing their work. The Client-Oriented Research Management Approach (CORMA) can help research organisations adapt themselves to new situations, which today are characterised by an emphasis on flexibility, efficiency, performance, quality service delivery and accountability. This paper retraces the background of the COR Management Approach in Tanzania and introduces the conceptual framework that was developed on the basis of pilot projects in the Lake and Northern Zone.

1. Agricultural research in a changing environment

In the past decade many factors have radically changed the environment of public agricultural research organisations. We will review some of the factors that are most frequently mentioned (Carney, 1998; Huntington Hobbs, 1999; KIT/DRD, 2000; DRD, 2001a; KIT/DRD/IER, 2002; MAFS, 2003; Beintema *et al.*, 2003).

Review of factors that have changed the environment of agricultural research:

Fiscal crisis, structural adjustment and declining support to the agricultural sector

Under pressure of the international donor community, spearheaded by the International Monetary Fund (IMF) and the World Bank (WB), many African governments are reducing their size and expenditure. In the early nineties of the last century, the introduction of Structural Adjustment Programmes (SAPs) became a pre-requisite for donor support. Although public sector deficits reduced since then, this also caused a drop in expenditures for public services. Funding for agricultural support services such as rural credit, agricultural research and extension and agricultural produce marketing declined. On top of that, government subsidies for inputs such as fertiliser and agricultural machinery were removed, making these unaffordable for resource-poor farmers.

Structural Adjustment Programmes and associated economic reform programmes led to down-sizing operations, retrenchment and a freeze on government recruitment. The number of DRD institutes was reduced from 50 to 20. Although MAFS-DRD for the first time in ten years is now recruiting new research staff, the average staff age in agricultural research institutes has increased considerably. Low salaries and unattractive incentive packages cause low staff morale and commitment, and push qualified staff to look for greener pastures.

Increased privatisation

In addition to the rationalisation of government expenditure, market liberalisation and privatisation is the second pillar of international donor policies. In 15 years, Tanzania transformed from a socialist centrally led country into an open market economy. The private sector is developing rapidly. The number and diversity of products and services that are offered increased greatly. Many private consultancy firms have established themselves and increasingly compete with government services. It is argued that the private sector can take over at least some of the government tasks.

Democratisation and decentralisation

Throughout the world, governments and their organisations, such as national agricultural research organisations, face pressure to become more accountable to citizens. This requires greater transparency in management of organisations. In Tanzania, a multi-party system is firmly established. Local government reforms have been implemented. Resources, power and responsibilities have been transferred to local authorities, which are accountable to their constituencies. Local government reforms aim to improve bottom-up planning and to involve communities in planning, implementation and management of development programmes.

Liberalisation of international trade

Trade liberalisation leads to increased international competition. It may make imported agricultural products cheaper, to the potential benefit of urban consumers, but has severe consequences on the domestic market, as local farmers may not be able to compete with cheap imported food. Trade liberalisation partially explains why prices of some of the most important Tanzanian cash crops are historically low. However, the global dominance of the economic paradigm of free trade also created opportunities for the revival of certain cash crops.

More emphasis on commercialisation and competition

Open borders and increased competition force countries to put more emphasis on profitable and commercial agriculture. The ASDS and ASDP reflect this trend. For agricultural research this implies that, in addition to production aspects, more attention must be given to post-harvest operations, value-adding processing, marketing and trade.

New research and communication technologies

New technologies such as biotechnology change the nature of research and the results that can be achieved. Equally important, new technologies have repercussions in terms of property rights, scale of investment, speed of innovation, and equity in accessibility. New Information and Communication Technologies (ICT), including E-mail and Internet, are increasing access to and dissemination of information. The worldwide scientific community is increasingly better connected and ICT changed the way researchers collaborate.

Globalisation

Research is rapidly becoming more global in nature. Research organisations must seek to establish more cross border alliances and become members of international networks.

Increasing environmental concerns

Agricultural research is facing increasing pressure to look into issues of sustainable agriculture. Public health and bio-safety issues are increasingly important, as is the case for subjects like soil fertility management and better land husbandry practices.

Renewed focus on food security and poverty alleviation

Food security continues to be elusive in Sub-Sahara Africa, and if current trends continue, the number of malnourished people is expected to increase in the next decade. Poverty remains important particularly in rural areas, and soil fertility decline and natural resource degradation seriously threaten the resource base of millions of farmers. Recently African 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 donor support. Donor emphasis has shifted from project and programme approaches to sector-wide approaches, which reflects the attempt to link macro, meso and micro levels more closely. Policy formulation, institutional strengthening, organisation and management, public-private partnerships and stakeholder involvement are now among the top priorities.

Support for the demand side and client empowerment

Although donors show a renewed interest in addressing rural poverty and in supporting the delivery of basic services, it is unlikely that donors will massively support governmental organisations. The focus is on stakeholder involvement, both from the public and private sector. 'Community-driven Development', (CDD), 'Community-based Rural Development' (CBRD) and 'Poverty Reduction Credits (PRCs) are new terms that indicate a trend towards the empowerment of the intended beneficiaries of development initiatives. Funds are increasingly channelled to the demand side and modalities are developed whereby beneficiaries control and monitor development activities. The need for client empowerment is often mentioned in this context. Especially community-based organisations need to be trained to enable them to have the information, knowledge and skills to request services and to monitor and assess the quality of service delivery.

New roles for service providers

In the near future service providers will increasingly get access to funds through contractual arrangements. A formal contract defines what a service provider has to accomplish and the fees that will be paid for it.

Changing roles for government

Government changes its role from funder and provider of services to partial financier (often through 'matching funds'), legislator, regulator, co-ordinator, and facilitator of a supportive development environment.

The need for new management practices

In Tanzania, central government contributions have been under increasing pressure because of the SAP. Donor contributions are being redirected to social sectors such as health and education or to new sectors such as local government and private sector development. Research institutes increasingly compete in an open market to acquire research funds. It appears that direct support to research organisations will gradually decrease. Funds available for research are more likely to be allocated to local governments, NGO's, farmer organisations, international institutes and competitive funds. Examples of this are initiatives such as the Zonal Agricultural Research Fund (a competitive research grant fund) and contract research that is commissioned by local governments. Producers and agribusinesses increasingly fund research on cash crops through taxation and export levies. Examples are research on tea, cashew, tobacco, cotton and coffee. This reallocation of funds will influence the type of research done. In general, stakeholders in agricultural development prefer investments in research that yield results that can be applied immediately. It may become more difficult to acquire funds for the early stages of technology development, i.e. basic research.

Globalisation, trade liberalisation and new communication technologies push organisations to find more efficient ways of organising and managing their work. Emphasis on the demand side, on performance and on service delivery requires flexible, less hierarchical organisational structures, more delegation of responsibilities, more decision-making power for staff and greater reliance on teamwork. All these factors show that agricultural research in Tanzania takes place in the context of a rapidly changing political and economic environment, which requires new approaches to the management of research for agricultural development.

2. The roots and evolution of client oriented research in Tanzania

The roots of CORMA: FSR-E

CORMA finds its roots in the Farming Systems Research and Extension approach (FSR-E). The adoption of FSR-E led to the inclusion of farmers and extension staff in the identification, implementation and assessment of research. This resulted in research institutes taking important steps towards demand-driven research. FSR-E also influenced the organisational culture of research institutes and changed attitudes of scientists.

The principles of FSR-E remain valid for agricultural research in Tanzania and CORMA fully embraces FSR-E and other participatory technology development approaches. There is a complementary relationship between FSR-E and CORMA. Whereas FSR-E focuses primarily on the research project cycle, CORMA focuses on the management of research institutes and the facilitation of quality research. CORMA gives additional emphasis to management and organisation issues with the objective to create an enabling environment for farmer-oriented and sustainable research. It also addresses critical areas of the organisation of agricultural research that FSR-E did not take into account. Examples are stakeholder involvement, participatory planning, monitoring and evaluation, networking, liaison activities, production of attractive and client-friendly output, information management and the management of human, financial and physical resources.

Zonal institutes

In 1989-1990 seven Zonal Agricultural Research and Development Institutes (ZARDI's) were established. These institutes got autonomy in the definition of research priorities, revenue generation, resource allocation, planning and management. Experience showed that a greater impact of agricultural research in Tanzania could not be achieved by decentralisation alone. Decentralisation has to be accompanied by managerial and organisational capacity building in the zones.

In 1994 and 1995 two meetings were organised on the subject of client-oriented research (Morogoro 1994 and Dar es Salaam 1995). 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 process, but without forsaking the researchers' own responsibility: farmer/client participation requires effective interaction with research" (KIT/DRD/IER 2002: 10).

CORMA in the context of TARP II

At the beginning of TARP II, the DRD management expected that by 2003 the agricultural research system in Tanzania would have the following key characteristics in 2003 (KIT/DRD/IER 2002: 9):

- *Demand driven research:* Stakeholders set the research agenda and influence the selection of research projects and resource allocation.
- *Diversification of research supply:* More suppliers of technology play a role and compete for funds: zonal and national institutes, universities and others through agricultural research funds.
- *Diversification of demands:* Not only public extension, but also farmer groups, producer organisations, the private sector, agro-industry and NGOs express research and information needs.
- *Focus on adaptive research:* The Zonal Research Institutes concentrate on adaptive research and produce appropriate technologies that address stakeholder priorities.
- *Sustainability:* Research institutes are increasingly financially sustainable because they can look for other than government sources for research.

These objectives reflected the commitment to evolve towards demand-driven research and higher levels of efficiency and sustainability. Experiments with client involvement in research in the Lake Zone, especially in Kagera region, appeared promising. In this context, the Division of Research and Development decided in 1998 to launch client oriented research programmes in the Lake Zone and the

Northern Zone (another client-oriented research and extension project was later initiated in the Eastern Zone).

Management of research became the focus of project interventions and gradually a comprehensive approach (CORMA) emerged from the pilot zones and comparable initiatives in Tanzania and abroad. The first National Workshop on the Client Oriented Research Management Approach was held in Dar es Salaam in June 2001 (DRD, 2001b). The CORMA conceptual framework was discussed and adopted. In 2001, the DRD decided to scale up CORMA experiences from the Lake and Northern Zones. DRD appointed national facilitators and allocated GoT/TARPII funds.

3. The COR Management Approach: definition, philosophy and objectives

Definition of CORMA

The Client Oriented Research Management Approach (CORMA) is an approach that helps agricultural research institutes to improve their level of client orientation and hence the efficiency and quality of research. The COR Management Approach facilitates a comprehensive process of organisational change, which focuses on critical areas of the organisation of agricultural research. This process affects research managers, scientists and support staff, as well as the partners of agricultural research institutes (local government, NGOs, farmer organisations, international research institutes, and donors).

CORMA philosophy

Two important principles inspire the COR management approach. The first principle is that any change process should build on previous achievements and existing capacities: every research institute is client oriented to a certain degree. The second is the principle of gradual but continuous change. Management capacities need to be constantly improved and adapted to a rapidly changing and competitive environment. For this adaptation process to succeed, CORMA assumes that it is more realistic “to change a little every day” (Huntington Hobbs 1999: 29) than to strive for a radical change in a short time.

Goal and purposes of CORMA

The overall goal (i.e. general objective) of the CORMA is to increase the level of client orientation of agricultural research institutes through improved management and organisation. For the achievement of its goal the COR management approach has five purposes (i.e. specific objectives):

1. To ensure the availability of qualified staff through improved human resource management within agricultural research institutes.
2. To enhance efficiency, transparency and accountability of agricultural research institutes through improved financial management.
3. To ensure the long term viability of agricultural research institutes through improved external relations, collaboration and demand-driven research.
4. To guarantee implementation of quality research projects through improved research planning, co-ordination, monitoring and evaluation.
5. To increase the impact of agricultural research on rural development through increased output production and dissemination of information.

The first two objectives focus on the internal organisation of research institutes. Objectives 3, 4, and 5 focus on the relationship between research institutes and other actors in the agricultural sector: national government policies, donors, clients, partners and farmers, who are the end-users of the proposed technologies and recommendations.

4. The conceptual framework of the COR Management Approach

The CORMA conceptual framework is a logical framework with four levels: the goal, purposes, outputs and activities. This framework is illustrated in Figure 1.

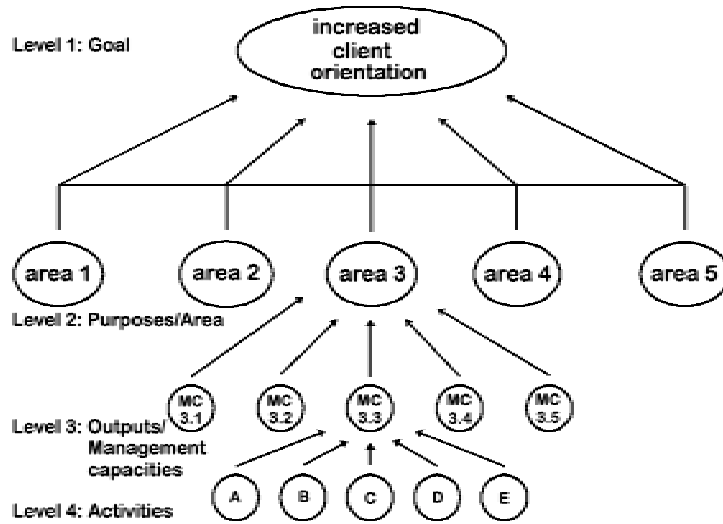


Figure 1 CORMA conceptual framework

Purposes: CORMA management areas

The CORMA framework that is presented in this paper is based on experiences from the Client Oriented Research programmes in the Lake and Northern Zone. Based on the CORMA goal and purposes, the framework defines five CORMA areas. These are areas of management and organisation of agricultural research that need to be addressed to improve the level of client orientation of an agricultural research institute (Table 1).

Table 1 Five CORMA management areas

<p><i>Internal organisation of research institutes</i></p> <ol style="list-style-type: none"> 1. Human resource management 2. Financial management 	<p><i>Relations with stakeholders</i></p> <ol style="list-style-type: none"> 3. Linkages and collaboration 4. Research planning, monitoring and evaluation 5. Output production, dissemination and information management
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Outputs/Management capacities

Each CORMA area encompasses specific management capacities that are essential to achieve the objectives for each CORMA area (Table 2). Management capacities are the abilities that are required to achieve the objective that is defined for each CORMA area.

Activities

The management capacities can be improved through a set of carefully selected activities to address a specific management capacity. All activities that the two zones are familiar with so far have been listed and grouped within the five areas according to management capacities. The list can serve as a basket of options for research institutes to choose from, but is not exhaustive (see Annex: CORMA basket of options). At the moment, there is an average of five activities per management capacity and

thus about 125 activities (five areas, times an average of five management capacities per area, times an average of 5 activities per management capacity; $5 \times 5 \times 5 = 125$).

Table 2 CORMA areas and related management capacities

<i>COR-MA areas</i>	<i>Management capacities</i>
1. Human resource management	1.1 Constantly adapt staff competence to stakeholder needs 1.2 Organise a flexible workforce 1.3 Increase staff motivation 1.4 Enable effective teamwork and communication amongst staff 1.5 Provide clear direction and responsive leadership
2. Financial management	2.1 Cover recurrent overhead costs 2.2 Sustain well-functioning support services 2.3 Efficiently procure goods and services 2.4 Maintain assets and equipment 2.5 Prepare and monitor activity based budgets 2.6 Organise efficient and transparent financial reporting
3. Linkage and collaboration	3.1 Maintain effective public relations 3.2 Organise active stakeholder involvement 3.3 Acquire research assignments and diversify sources of funding 3.4 Actively develop (inter-)national networks
4. Research planning, monitoring and evaluation	4.1 Initiate assessment of research needs 4.2 Target research 4.3 Plan research programme and write professional proposals 4.4 Conduct farmer focused research 4.5 Effectively monitor and evaluate research projects 4.6 Organise an efficient progress reporting system
5. Output production, dissemination and information management	5.1 Produce scientific output 5.2 Produce user-friendly output 5.3 Effectively disseminate research results and recommendations 5.4 Organise information management

5. Objectives of the COR National Workshop

This two-day workshop aims to inform participants on experiences with the Client Oriented Research Management Approach in Tanzania and future opportunities for CORMA in the National Agricultural Research System. The long-term objective of the workshop is to increase the level of client orientation of the NARS through the institutionalisation of "best practices" for improved research management and organisation. In the short term the workshop aims to:

- Contribute to the analysis of experiences in the five CORMA areas (Human Resource Management; Financial Management; Linkages and Collaboration; Research Planning, Implementation and M&E; Output production, Dissemination and Information Management) during the period 1998-2003;
- Increase awareness of all elements of the CORMA change process;
- Facilitate the exchange of experiences between the zones with respect to improving the client orientation and management of research;
- Identify constraints to and opportunities for sustaining CORMA in the national agricultural research system;
- Define opportunities for institutionalisation of the COR management approach.

6. The papers

We will present thirteen papers. Twelve papers focus on management capacities (see Table 3 and 4) and describe the activities implemented and the results obtained. Each paper describes best practices

that may improve the efficiency and management of agricultural research institutes. The authors analyse conditions for success and highlight practical lessons learned. The concluding paragraph of each paper lists the challenges ahead of us and makes suggestions on how to move forward. The last paper focuses on the management and facilitation of the CORMA change process.

Table 3 Overview of workshop papers and corresponding management capacities

Papers	Management capacities
1. Researchers and clients: getting to know each other (better)	3.1 - 3.2
2. Targeting and needs assessment	4.1 - 4.2
3. Training co-ordination: towards a learning organisation	1.1
4. Managing staff to enhance flexibility, communication and motivation	1.2 - 1.5
5. Information management: from old habits to new technologies	5.4
6. Accountability: transparent use of financial and physical resources	2.2 - 2.6
7. Sustainable functioning of the institute and internal service delivery	2.1 - 2.4
8. Networking and diversification of agricultural research funds	3.3 - 3.4
9. Proposal writing in partnership	4.3
10. Stakeholder participation and close monitoring for quality research	4.4 - 4.6
11. Output production: making research results accessible and available	5.1 - 5.2
12. Dissemination of agricultural technology: narrowing the gap between research, extension and farmers	5.3

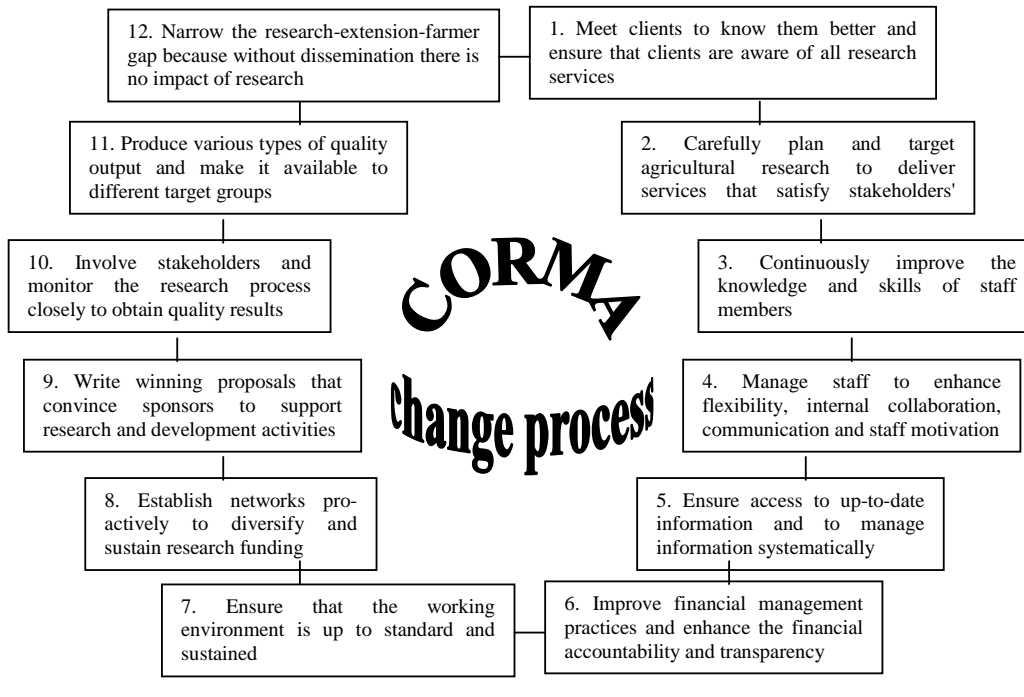
Table 4 CORMA management capacities in the different workshop papers

CORMA areas	Management capacities	Papers
Human resource management	▪ Constantly adapt staff competence to stakeholder needs	<i>Paper 3</i>
	▪ Organise a flexible workforce	<i>Paper 4</i>
	▪ Increase staff motivation	
	▪ Enable effective teamwork and communication amongst staff	
Financial management	▪ Provide clear direction and responsive leadership	
	▪ Cover recurrent overhead costs	<i>Paper 7</i>
	▪ Sustain well-functioning support services	<i>Paper 6/7</i>
	▪ Efficiently procure goods and services	
Linkage and collaboration	▪ Maintain assets and equipment	
	▪ Prepare and monitor activity based budgets	<i>Paper 6</i>
Research planning, monitoring and evaluation	▪ Organise efficient and transparent financial reporting	
	▪ Maintain effective public relations	<i>Paper 1</i>
	▪ Organise active stakeholder involvement	<i>Paper 8</i>
	▪ Acquire research assignments and diversify sources of funding	
Output production, dissemination & information management	▪ Actively develop (inter-)national networks	
	▪ Initiate assessment of research needs	<i>Paper 2</i>
	▪ Target research	<i>Paper 9</i>
	▪ Plan research programme and write professional proposals	
Output production, dissemination & information management	▪ Conduct farmer focused research	<i>Paper 10</i>
	▪ Effectively monitor and evaluate research projects	
	▪ Organise an efficient progress reporting system	
Output production, dissemination & information management	▪ Produce scientific output	<i>Paper 11</i>
	▪ Produce user-friendly output	<i>Paper 12</i>
	▪ Effectively disseminate research results and recommendations	
	▪ Organise information management	<i>Paper 5</i>

7. Guiding principles

All papers start with a guiding principle. This guides the subject discussed in the paper. The twelve guiding principles summarise the essence of the COR Management Approach and the CORMA change process that we propose if research institutes want to adapt to a rapidly changing environment (Figure 2).

Figure 2 Guiding principles of the CORMA change process



Researchers and clients: getting to know each other (better)

Mgenzi S.R. Byabachwezi, Hussein Mansoor, Barnabas W. Kapange and Ted Schrader

Guiding principle

‘Meet your clients to know them better and ensure clients are aware of your services’

Summary

The COR programme introduced a phenomenon of supply and demand, with research on the supply side and clients on the demand side. On the one hand, client oriented research is based on stakeholders who know what agricultural research services are available. For them to know these requires active promotion of the institute and the services available. On the other hand, research institutes must know stakeholders in the agricultural sector that may request research services. These stakeholders include governmental and non-governmental organisations, the private sector, community-based and religious organisations. This paper reviews tools that can be used to promote the services of research institutes and discusses modalities to involve stakeholders in the research process, with the objective to make research more demand-driven and to focus research on stakeholder needs. Although the experiences gained in the Lake and Northern Zones are recent, the practical lessons learned are useful for other zones that wish to know their clients better and want to ensure that their clients know the services research can provide.

1.1 Introduction

The history of public agricultural research in Tanzania shows that research has been guided by colonial powers (1900-1960), the central government (1960-1980), the central government and donors (1980-1995) and - more recently - by zonal priorities (since 1995). Two decades ago, the donors called upon the international community to involve farmers and extension staff in the identification, execution and assessment of research. Farming Systems Research gained momentum in Tanzania and knowledge of farmers’ needs, and farmers’ involvement gradually improved. Participatory Rural Appraisals and diagnostic surveys were conducted. However, researchers often dominated these exercises. Scientists often dominate committees that review research proposals on their relevance. International institutes and networks often only fund proposals that reflect researchers’ priorities, which are not necessarily in line with the priorities of local stakeholders. Although many important steps towards demand-driven research have been taken, farmers and other stakeholders still have little control over the nature and quality of research being conducted.

In the past two decades, fiscal problems forced governments to reduce direct funding for public agricultural research services. As of recent, the international donor community has started diverting funds to new priority areas like health, education, good governance and private sector development. The challenge of establishing demand-driven research is therefore set in a more difficult financial context. Stakeholders are often sceptical about the practical relevance and impact of agricultural research. Considering this external pressure on National Agricultural Research Systems (NARS), real client orientation is a major challenge to produce good research results and outputs that have field impact. These results, outputs and impact are also an important condition for sustaining agricultural research funding in the future.

Box 1.1 A short history of public agricultural research in Tanzania

Agricultural research in Tanzania (then Tanganyika) was initiated as early as the late nineteenth century. German colonial powers at that time established laboratory facilities and trial farms to study crop plants and husbandry. In the 1920's, under British rule, agricultural R&D was virtually abandoned, but in the next few decades research stations were established. Especially after World War II, the colonial administration sought a more active role in science and technology. Specialised institutes were established to support cash-crop production, such as cotton, tea, sisal, cashew, coffee and tobacco.

With independence in 1961, the Ministry of Agriculture inherited relatively well-developed research infrastructure, but research activities still depended largely on British researchers. Gradually, post-colonial agricultural research was oriented towards food production because national self-sufficiency was a major priority of the post-independence governments. In 1980, the Ministry of Agriculture was divided into the Ministry of Agriculture and the Ministry of Livestock Development. At the same time, agricultural research was reorganised into four parastatal organisations, the Tanzania Agricultural Research Organisation (TARO), the Tanzania Agricultural Livestock Research Organisation (TALIRO), the Tropical Pesticides Research Institute (TPRI) and the Uyole Agricultural Centre (UAC)-established in 1976. In 1984, the Agriculture and Livestock ministries were reconsolidated into the Ministry of Agriculture and Livestock Development (MALD) and a new Directorate of Research and Training (DRT) was created. TARO, TALIRO, TPRI and UAC remained semi-autonomous. In the 1980s, following the declining ability of the government to finance collective services, research became more donor-dependent. National research in Tanzania became more donor-driven instead of central government driven, following the conditions and priorities of international institutions and bilateral donors.

In 1989, MALD was restructured and renamed the Ministry of Agriculture and Co-operatives (MAC), and TARO and TALIRO were merged with DRT. The restructuring of agricultural research was accompanied by several planning activities resulting in the National Agricultural and Livestock Research Masterplan (NALRM). In 1989, the World Bank and other donors recommended that the department needed greater efficiency and client focus, resulting in decentralisation and the reduction of the number of facilities from over 50 institutes, stations, centres and substations to just 22. In the first half of the 1990's seven zonal agricultural research and development institutes were established in the country. Following the NALRM, several planning sessions were organised: planning and priority setting workshop (Arusha 1993), Planning, monitoring and evaluation workshop (Morogoro 1995) and two meetings on ways to strengthen client-oriented research (Morogoro 1994 and Dar es Salaam 1995). These activities noted the need to have stronger links between agricultural research and stakeholders. These activities, reinforced by the participatory research methods propagated under Farming Systems projects, led to improved farmer involvement in research. The zonal institutes conducted ZOPP research planning workshops between 1996 and 1998. The results of these workshops were summarised in the Project implementation plan (PIP) of the second phase of the Tanzania Agricultural Research Project (TARPII).

In 1997, DRT was renamed the Department of Research and Development (DRD) and its training component was transferred to the newly created Department of Training Institutes. In October 2000, MAC was renamed the Ministry of Agriculture and Food Security (MAFS). In February 2001, the government of Tanzania was restructured and DRD's livestock research institutes were relocated under the newly established Ministry of Water and Livestock Development. However, livestock research at field level remained under DRD responsibility largely because it is part of the TARPII project. (Source: Beintema *et al.*, 2003)

In 1998, specific client oriented research (COR) programmes were set up in the Lake and Northern Zones. The COR programmes addressed among others, the challenges of demand-driven research, the responsive provision of good quality services and sustaining research funding. These challenges need mutual understanding between the supply side (agricultural research service providers) and the demand side (the users of agricultural research services and products). The COR Management Approach (CORMA) stresses the importance of two-way communication. The supply side has to know the demand side and *vice versa*. One of the CORMA guidelines is that we shouldn't assume that clients know us and that we have to continuously ask ourselves if we know our clients well enough. This paper therefore addresses the important topic of 'getting to know each other', i.e. the establishment of communication and feedback between research and its clients. After defining some important concepts, we will review:

- what institutes can do to promote their services and products to clients;
- what institutes can do to interact with stakeholders and know them better.

1.2 Clients and stakeholders: some definitions

The term 'client' and 'stakeholder' appear in many documents addressing agricultural research and development and are sometimes defined - or understood - in different ways. This paragraph defines the term 'client' and 'stakeholder' as they are used in the CORMA.

The term client is normally associated with commerce and business rather than research. The word 'client' reflects the wish to respond to a demand and the delivery of a product or service at an acceptable price. A client is not a passive recipient of products and services, but is an actor who is able to express wishes and interests and to assess the quality of the products/services that are delivered. In order to be successful, the provider of products or services has to take the desires and needs of clients into account. As such, the client concept is suitable for agricultural research institutes that have to build on expressed needs. For agricultural research and development institutes, *a client is defined as a person or organisation that requests, funds, assesses, receives and/or utilises research services.*

The term 'client' should not be confused with the term 'stakeholder'. A stakeholder is any person or organisation involved in the agricultural sector. It is important to note that all stakeholders are potential clients, but that not all stakeholders are clients. Not each stakeholder necessarily requests, funds, assesses, receives or uses agricultural research services. The term 'stakeholder' is therefore a more general concept. Sometimes stakeholders are divided in two sub-groups: those involved in the agricultural sector but not directly benefiting from it (government officials, academics, statisticians, donor organisations and others) and those involved in the agricultural sector and directly affected by the performance of the sector (farmer organisations, agro-processors, marketers, transporters, consumers and others). Sometimes the term 'actor' is used for the first sub-group.

The number of persons and organisations that - directly or indirectly - have 'a stake' in the agricultural sector is large. NGOs, government extension organisations and agencies, educational organisations (universities, schools), local governments, the private commercial sector, chambers of commerce, community based organisations, commodity boards, religious organisations and others are all stakeholders. Private sector organisations, institutions and individuals providing goods and services to farming communities include individual traders, stockists, trading companies, seed and livestock suppliers, agrochemical and veterinary goods suppliers, banks, transporters, tractor and oxen rental suppliers, providers of artificial insemination and bull schemes, millers, milk processors, local vets, etc. Community based organisations (CBOs) include women groups, youth groups, saving and credit groups, dip committees, water committees, farmer co-operatives, farmer field schools, farmer research groups, farmer extension groups, etc. All these persons and organisations are potential clients: they may have research needs, may contribute financial resources, are able or can be enabled to monitor and evaluate research results, disseminate or adopt agricultural technologies.

The group of potential clients for agricultural research is therefore extensive. Clients for research organisations can be found at both the local and the international level. Also, the modalities of collaboration between research and clients can differ:

- A sponsor is a person or organisation providing funds to deliver a service to a client. Sometimes the words 'donor' or 'development partner' are used synonymously to 'sponsor'.
- A partner is a person or organisation that participates actively in delivering a requested service to a client. A partner may also be called a 'collaborator'.
- A beneficiary is a person or organisation benefiting from the use of a technology.
- An end-user is a person or organisation applying a technology without necessarily having participated directly in its generation.

Sponsors, partners, beneficiaries and end-users are therefore specific sub-groups of the clients of agricultural research.

It is important to use this terminology carefully. District extension services or NGOs are considered partners of research institutes when they are actively involved in on-farm testing of new technologies. However, the same organisation can be a beneficiary only when disseminating results from another trial. In some cases, the district extension service is a partner, while the local government (District Council) is the sponsor of research. An international network is a partner when it provides new technology and tests it in collaboration with an ARDI. However, the same network is a sponsor when it limits itself to the provision of funds to facilitate an ARDI to test a new technology and deliver the results.

1.3 Options for promoting a research institute and its services

Good public relations are a pre-requisite for client orientation. Stakeholders in the agricultural sector should know the institute, what it can offer, where they can find it and how a request for research will be processed. Moreover, an institute must have a reputation of reliability, efficiency and capability. The reputation of an institute is often over-estimated by its own staff, while in practice, stakeholders may not be fully aware of the available services and conditions (see Box 1.2).

Box 1.2 Knowledge of stakeholders: the case of Selian ARDI in 1998

In 1998, staff from Selian ARI visited various stakeholders in the agricultural sector and interviewed them concerning their experience with- and knowledge of the institute. Based on a sample of 40 stakeholders the following conclusions were drawn:

- 40% of stakeholders had never heard of 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 were 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 had 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.

Therefore, clients may not sufficiently know the research institutes and may not be aware of all available services. Potential clients often have subjective, incomplete or incorrect perceptions of the research institutes. How can such potential clients request what they need without being informed and convinced by what they will get?

Public Relations (PR)

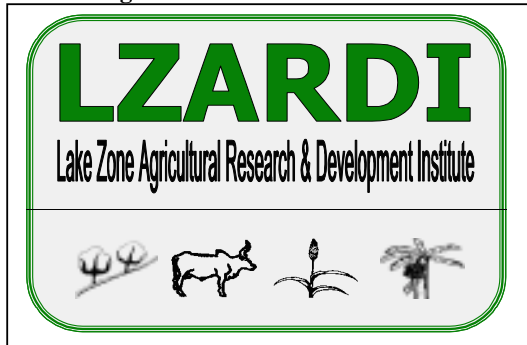
Public relations are about relations between an organisation – be it a business enterprise, a political party or an NGO – and the public. Such relations exist, whether we want them or not. It is therefore wise to consider what image you wish the public to have of your organisation and to work consciously on the promotion of that image. The CORMA attaches importance to the way institutes present themselves. The objective of public relations is to create a well-informed clientele that knows what is available in terms of agricultural research services and the modalities for procurement of these services. The following tools were developed or used for promotion purposes: logo, slogan, business cards, promotion flyers, promotion visits, newsletters, extension materials, field days, open days, agricultural shows, seasonal greetings, calendars and other promotion materials.

Logo

A logo is a graphic mark that identifies an institute. We can differentiate a logo from a logotype: a logo is pictorial in nature; a logotype is the name of the institute in a stylised lettering. An institute may use one of these styles or combine them. A logo introduces an institute to clients and builds a 'corporate image' that helps to recognise the organisation. For example, if someone sees the LZARDI

logo on a car in Mwanza, he/she immediately knows that that car is from Ukiriguru. The use of logos creates a professional image. Logos make official letters, business cards, reports and other output more attractive.

Box 1.3 Logos of the Lake and Northern Zone



Slogan

A slogan summarises the professional attitude and/or the mission of an organisation. A slogan can be used in combination with a logo, but both may exist independently from each other. Slogans such as 'your partner in agricultural development', 'we are there to help you', 'committed to work with you for agricultural development' can be put on promotion flyers, seasonal greetings and other documents. Both the Northern and Lake Zone use their slogan as footer on letters. The Lake Zone put its slogan in the conference hall. A good slogan creates goodwill, encourages clients to contact the research institute and gives them a feeling that they are valued and considered.

Business cards

Staff members who regularly meet stakeholders and visitors should have with business cards. A business card ensures that clients know where to find research in case of need. The target group for business cards is mainly authorities within client organisations (e.g. directors, managers and coordinators). Cards should not have more information than necessary: the name of the institute, logo, name and qualification of staff, mailing address, telephone, fax, e-mail address and – if appropriate – the website. The publication units of the Lake and Northern Zone produced business cards for all staff members. They have a uniform format and can be printed at low cost (approximately TSh.50 per card). Previously, researchers wrote their names, contact address and phone numbers on loose papers that could easily be misplaced. Today, researchers present themselves confidently and professionally. Business cards are not limited to local use; attaching a business card to a research proposal or letter gives a good impression.

Promotion flyer

A promotion flyer is a one page, double-sided printed and folded handout with 'catching' and essential information about the institute. The objective is to increase awareness of the institute and what it has to offer among a wide range of potential clients. The target group involves people of various administrative levels. Flyers should have an attractive layout, especially the front page, but should not be too expensive to multiply because they should be widely distributed. Information to be included: background and objectives, approaches, (some) achievements, summary of available services and invitation to consult or visit the institute. Like the business card, a flyer gives contact details and creates a positive, professional image. Previously, information about an institute had to be obtained from the ministerial headquarters and at times even employees within an institute could not provide details. A flyer is a low-cost solution to provide clients with basic information about the institute. Both Selian ARI and Maruku ARDI distributed their first flyers in 1998. Since then flyers have been improved and were produced for the zone as a whole. The above flyers are all in English. Maruku

ARDI also prepared a flyer in Kiswahili. Flyers have been greatly appreciated and are often the first written information a visitor of the institute receives.

Promotion visits

Physical visits to potential clients are needed when good relationships have not yet been established or when there are problems that need personal attention. The objective of the visits is to personally promote the institute and answer specific questions or solve problems of (past) collaboration. The target group consists of decision-makers who may be sceptical about the research institute. The researcher who visits this type of client should be senior and have a higher administrative function, but must have social skills to listen and react adequately to the client's suggestions and needs. An invitation for a counter-visit to the institute can further develop the relationship and convince the client. These visits allow for a level of personal attention that is generally not given in workshops and meetings. Promotion visits were used a lot in the Northern Zone when client oriented research started (e.g. the promotion team).

Newsletters

A newsletter describes research activities and output, highlights results and impact and invites stakeholders to make use of services. A newsletter is a tool to keep stakeholders informed about progress and can be instrumental in improving the institute's reputation among clients. The target group varies from decision-makers to field staff, such as DALDO's and DEO's. Newsletters contain articles contributed by staff members and stakeholders in the zones. The Northern Zone produced seven issues of the '*Northern Link*' newsletter in 4 years. LZARDI produced two zonal newsletters so far. Southern Zone too, has irregularly been producing its newsletter. Experience shows that although contributors are proud of the result, it is very difficult to get regular contributions. Articles are often not submitted in time. The production of newsletters needs co-ordination by an editorial board that is strongly supported by the zonal director. In the current situation, incentives are needed to get timely contributions. Although the respective publication units produced the newsletters, the cost of a newsletter is relatively high (e.g. TSh.5,500 in the Northern Zone). Newsletters are distributed widely (in the Northern Zone to 160 stakeholders) for free. Costs have to be reduced, for example by producing newsletters in black and white. Possibly costs can be recovered through subscription fees.

Display outputs

Institutes in both zones display research outputs in the institute buildings, so that visitors will directly see what has been done. Well-presented annual reports and field notes are good promotion material for potential international collaborators and sponsors. At Selian ARI the latest reports are displayed in the entrance hall. This may trigger client demand. Other output such as leaflets or posters can also easily be displayed at low cost. In the Northern Zone, photo frames were placed in the office corridors containing photos of each farming system zone. Maruku ARDI made a display board in the entrance hall that shows photos of staff members.

Media broadcasts

Radio and television broadcasts are not yet fully explored as a means of promoting the institute and research outputs. They cover a wider audience and can therefore reach those who are often not easily reached with other tools. Radio programmes may be expensive in absolute terms but the relative cost per recipient may drop below those of leaflets or posters. Since last year, NZARDI uses a weekly 15 minutes radio programme to promote technologies and to inform farmers. Indirectly, this will also promote the NZARDI. Because of the content of the programme the broadcasting station agreed to reduce the cost to TSh.25,000.

Calendars and seasonal greetings

Seasonal greetings and calendars are used to maintain good relationships with clients. These materials are often quite expensive and target higher authorities who deal with financial issues. Calendars can

contain messages. For example, the NZ calendars contain crop and livestock recommendations for specific months.

Service catalogue

A service catalogue facilitates effective interaction with clients and financiers. It presents an overview of available research services. Researchers often think that their disciplinary research is the only contribution they can make to solve problems. Clients however often do not only need adaptive research but also access to information from past research, instant advice, relevant extension material, training, soil/plant and pathology analysis, access to quality seed and planting material, etc. The availability, quality and cost of services have to be reviewed internally before the information is shared with clients (see Box 1.4).

Box 1.4 Northern Zone service catalogue

Clients frequently need a range of services. Whenever feasible, these services should be actively promoted among potential clients. Moreover, a list of costs and fees for these services as well as payment modalities should be established to standardise charges for individuals and groups. Available services and their costs can be assessed in a general staff meeting. Services to be included in the service list have to be reviewed to avoid that the institute promotes services which cannot be offered satisfactorily. This could be the case if for example a service can only be offered by one individual (and not by a department or section). If that person is not around, the service cannot be provided. Other services can often only be provided in close collaboration with partner institutes. In 1999, NZARDI compiled a list of services that it could provide. The list includes services ranging from breeding and testing varieties, selection of appropriate fodder crops, diagnostic surveys, marketing and feasibility assessments, and soil and water conservation, to services such as cartography, training, soil and plant analysis, testing of agro-chemicals, identification of diseases and insects, design of extension material, and hiring farm machinery. Fees were proposed for each service, discussed with stakeholders, approved by the management and published in the zonal policy paper.

Participation in development forum

Researchers often have the opportunity to participate in development forums. It is important for researchers to attend such forums and to use this opportunity to present the institute. In the Lake Zone, the Mara Diocese organises the Mara Development Forum on a quarterly basis. Participants come from various departments e.g. natural resources, health, local governments, land use planning, water-health development etc. This is a chance to make the institute better known.

Box 1.4 Field days and agricultural shows in the Lake Zone

Every year, LZARDI participates in field days and agricultural shows at different locations. In 2000 Maruku organised its first field day in Karagwe district, followed by Biharamulo the next year. In 2001-02, Ukiriguru conducted two field days at Bukangilija and Iteja respectively: 400 farmers participated. The districts meet costs for transport of farmers to and from the site and food for participants. The technology market and field visits are highly appreciated, among others by the Karagwe District Commissioner. Ukiriguru participated in the Buhemba agricultural show (Mara region). The exhibition pavilion had leaflets, brochures, video cassettes, information on crop pests and diseases, samples of botanicals, pasture seed, rice, maize, sorghum, millet, sweet potato, cassava and cotton varieties, agricultural tools like ox-planter, and post-harvest activities for roots, tubers and fiber crops. Ukiriguru was awarded the first prize for the quality of its presentation. In 2002-2003 LZARDI organises more field days in Mwanza and Kagera region. The COR project contributes TSh.0.6 million per field day. This is only granted if a field day is organised on the basis of co-funding by both GO and NGOs, and when extension organisations fully participate in the organisation.

Open day, field days and agricultural shows

Field days as they are defined in the Lake Zone are events at district or village level where scientists, districts, NGOs, CBOs, and farmers, exhibit technologies. An open day is when an institute opens its doors to the public with the objective to show what is available and what is going on in the institute. Agricultural shows are generally held at district, zonal and national level and bring different organisations together on exposition grounds. If well prepared, all these are likely to bring good

publicity to a research institute. Costs for open days, field days and agricultural shows can be high. Since 2000 the Lake Zone organises field days on the basis of co-funding (Box 1.4).

And there are even more ways for promoting an institute.....

In addition to the above-mentioned options to promote an agricultural research institute, we should also mention the distribution of user-friendly output. Good reports, leaflets and posters are the best promotion (see also paper 11). Another option is the production of attractive annual reports. Lake Zone ARDI is currently finalising an attractive annual report that is less boring than a compilation of annual progress reports. It is written in a journalistic yet analytical style that highlights major activities and achievements. Another option that is potentially very cost-effective is the use of a website. Currently, both the Lake and Northern Zone are building their websites (see also paper 5).

The following helps you to choose the best options for promoting your institute:

<i>If you.....</i>	<i>Then use:</i>
Have never met the client,	Business cards, flyers and samples of available extension materials
Are dealing with a sceptical client,	Promotion visit by a senior staff member and all available PR materials
Have an established relationship with your client which needs improvements,	Promotion visits, workshops (on co-funding basis), extension materials and newsletters
Don't know your ('amorphous') clients,	Radio programmes, field days, agricultural shows, website and advertisements
Have little resources,	Samples of extension materials, home-made business cards and flyers, sponsored newsletters
Want to raise funds from an international sponsor,	Seasonal greetings, calendars, annual reports, website and field notes
Want to raise funds from a local client,	Seasonal greetings, calendars and promotion visits
<i>to promote your institute!</i>	

All PR materials and options have advantages and disadvantages and should be used according to the situation, specific clients and resource availability. Many promotion activities are affordable and institutes can produce many promotion materials themselves. From the experience in the Lake and Northern Zone we can conclude that the single most important condition for success is staff motivation and efforts to make the institute better known.

1.4 Linkage mechanisms and modalities to interact with stakeholders

In the old days researchers hardly knew organisations outside the research institute (agricultural extension being an exception). The scientific community set its own agenda and researchers would have experiments on-station or researcher managed trials on-farm. The gap between scientists and end-users was enormous and scientifically formulated research recommendations hardly reached the end-users. Those days are gone. With the farming systems approach, the involvement of farmers improved considerably. However, for different reasons, researchers are often still the ones who make an inventory of clients' research needs. And all too often, farmers and other stakeholders are 'cosmetic' members in formal research meetings. Linkage mechanisms need further improvement. Fundamental questions are:

- How to establish effective linkages (defined as ways to connect, join or unite stakeholders, including research, with the purpose of exchanging information and experiences)
- How to arrive at real dialogue between research and stakeholders, i.e. a more equal relationship and discussion that addresses agricultural development issues more profoundly. How can we find ways to encourage and empower stakeholders to formulate their research and information needs?

The following overview lists options to enhance stakeholder involvement and to improve the quality of interaction.

Stakeholder inventories

The elaboration of a stakeholder inventory is a systematic attempt to identify who is involved in the agricultural sector of the mandate area of an institute (for the inventory of international stakeholders and sponsors see paper 8). In the Northern Zone the original list of stakeholders was provided by the RALDO's office in the two regions in 1998. Community Development Offices from the regions and district staff helped to correct and expand the list. The COR promotion team in the NZ then visited 100 stakeholders, distributed formal interview forms and discussed collaboration in an informal manner. The use of PR material as described in the previous paragraph proved very helpful. In the Lake Zone research staff provided the first list of stakeholders in 1999. Stakeholders on the initial list received a short questionnaire and were asked to identify local stakeholders that they collaborated with. Using this information a more complete list was drawn up. This exercise was initially co-ordinated by the liaison team and linkage committee. Later on the ZRELO office (of which liaison team members are part) co-ordinated the exercise.

Stakeholder inventories focus on who local stakeholders are: mission and objectives, mandate area, target groups, role in agricultural development, main activities, staff capacity, source of funds, previous experience with research, and research and information needs. Information about stakeholders is collected in stakeholder tours and visits, stakeholder meetings, other field visits and whenever a visitor comes to the institute. Thus visits do not have to be budgeted for separately.

The information from the inventories is compiled in a stakeholder directory (e.g. Massawe *et al.*, 1999). Both the Lake and Northern Zone distributed these stakeholder directories to all stakeholders. Inventories have to be updated continuously while the directory is updated on an annual basis. It is interesting to see that not only researchers have used the inventory, but that it has also increased collaboration among stakeholders.

Although the collection of information needs input from all staff, it is important that the compilation of the inventory is under the responsibility of an individual or a small group. Another lesson learned is that the inventories only gradually become more exhaustive overviews. The first inventories had a bias towards government institutions and NGOs. Less conventional stakeholders from the private sector and CBOs were not adequately included.

Stakeholder meetings

Stakeholder meetings can be organised at institute level (stakeholders coming to research) or more decentralised levels (research going to stakeholders). The second option indicates a clear commitment of research to know stakeholders better. Whatever the venue, stakeholder meetings are important and allow stakeholders to present their programme, constraints and needs and researchers present progress reports and research results. Experience shows that:

- The participation of decision-makers (RC, RAS, DC, DED, Council Chairpersons) is important if the objective is to arrive at planning (and budgeting) of activities. Subject-matter specialists are often not in a position to make commitments and often do not give sufficient follow-up within their organisation.
- It is useful to ask stakeholders to prepare short presentations on agricultural development problems and challenges in their intervention area. This improves the quality of their contributions. The explicit incorporation of stakeholder presentations in the agenda of the meeting ensures that their views are put forward.
- It is important to conclude the meeting with resolutions and recommendations, to appoint task forces and/or to plan follow-up action for certain issues.

Often, local stakeholders cannot pay for research themselves. In such cases, research institutes can be instrumental in establishing vertical linkages between stakeholders and sponsors, e.g. joint proposal writing for a collaborative project (see paper 9).

Box 1.5 Stakeholder meetings in the Lake Zone

In February and March 2001, stakeholder meetings were organised at regional level (Kagera, Mwanza, Shinyanga and Mara). On average, 82 participants attended each meeting. The participation of stakeholders was very encouraging. LZARDI paid for the organisation costs and provided tea and lunch. Transport and Daily Subsistence Allowance (DSA) had to be provided by the organisations attending the meetings. LZARDI had the opportunity to explain its new policies to stakeholders, who clearly indicated that the focus on demand-driven research was highly appreciated. The stakeholders formulated many problems for agricultural development. Most needs were requests for information, some problems needed adaptive research. LZARDI therefore examined for what problems research could make a contribution. Stakeholder meetings in Mara led to the initiative to multiply seeds and planting materials. This initiative involved collaboration between LZARDI, the districts, MaraFIP, Mara Diocese and VI agroforestry. The stakeholder meetings in 2001 resulted in twelve proposals for contract and collaborative research.

Stakeholder visits and tours

Maruku ARDI started using annual stakeholder tours in 2000. Researchers with different backgrounds go as a small team of 'institute ambassadors' and meet policy makers, administrators, experts, technicians, NGOs, GOs, CBOs and other actors in agriculture. The team explains what services can be provided such as adoption trials, training of extension staff and farmers, study tours, field days, PRA, Farmers' Field Schools (FFS), etc. The team also briefs stakeholders on research progress and achievements in the previous year, and monitors on-going activities. This is facilitated by the use of a summary table that lists all research activities, their location and their progress. The tours also aim to acquire new projects. In general, the focus is to match demand and supply. When an appropriate subject or activity is identified, the process of proposal writing and (after securing funds) fieldwork starts. Visiting clients helps to see if clients are satisfied with the services provided and, if not, corrective action can be made. During the visits/tours, the research team also presents new information that might be useful in the visited area. After the tour, safari reports are written and sent to the stakeholders visited. Results of the tour(s) are discussed at the institute to define follow-up action.

FRG/FFS meetings and visits

Farmer Research Groups and FFS are important when testing and disseminating technologies. These groups give an opportunity to exchange views with farmers who are participating in all stages of the research process. Since researchers and extension staff facilitate the group activities, they often meet at village level. FRGs and FFS are therefore excellent occasions to learn about farmers' priorities and constraints. In the Lake Zone, FRG evaluation and planning meetings are organised on an annual basis. Among others, new activities and trials are identified during these meetings. Proposed activities are prioritised, sometimes on the basis of ranking exercises with different sub-groups, e.g. old and young men and women. This becomes input for the new season.

Analysis of stakeholder satisfaction

It is important to get regular feedback from stakeholders and to find out to what extent they are satisfied with the services provided. This helps to improve performance and to identify needs for (new) services and products. It is important to distinguish different categories of stakeholders, smallholders and large farmers, male- and female-headed households, traders, input suppliers, processors, NGOs *etc.* In 2002, NZARDI conducted a survey to analyse stakeholder satisfaction about the services provided, the effectiveness of communication and dissemination strategies and their implication in research forums. The survey showed that stakeholders have become more aware of and satisfied with the services of the institute.

Empowerment of stakeholders

Stakeholders often look up to scientists and do not feel competent and confident enough to share their analysis and to express their needs. The Lake and Northern Zones have trained some stakeholders (FRG members, ZTC members, ZEC members, ZARF MC members), especially on the subjects of research planning, research proposal screening and the monitoring of research projects. The Eastern Zone has gained important experiences with the empowerment of district staff. A challenge for the future is to further enable stakeholders to effectively participate in meetings, to influence the research agenda and to control resources. There are three major reasons why strong clients are not a nuisance but an asset for research:

1. Critical clients ask for good results, which will improve the quality of research results.
2. Commitment of well-organised clients to the research process increases the likelihood of successful dissemination of technologies.
3. An extensive local network of well-organised partners and clients is one of the most valuable assets of a research institute. Such a network enhances credibility of research institutions and opens the way for joint research-extension activities. Donor institutions that need indications that investments in research will pay off, are eager to see such research-extension-farmer partnerships and collaboration flourishing.

Other possibilities

There are many other possibilities for interaction with stakeholders. The IPR can be a joint instead of an internal programme review. For instance, almost all districts and some NGOs attended the Lake Zone IPR in April 2002. This significantly improved the quality of discussions. Also ZTC, ZEC and commodity board meetings, open days, agricultural shows, farmer field days and other events are opportunities to know stakeholder views better. Institutes should grab every opportunity to discuss agricultural development issues with stakeholders and should discuss stakeholder views in all internal meetings. This may gradually transform traditionally closed academic institutions into open, development-oriented organisations.

1.5 Organising promotion activities and stakeholder involvement

The Northern and Lake Zone have different experiences with the organisation of promotion activities and stakeholder involvement. In 1998, the Northern Zone appointed a 'COR promotion team'. The promotion team aimed to improve linkages between scientists and stakeholders in the Northern Zone and consisted of ten graduate and support staff. The team prepared a farming systems map, developed a flyer and newsletter to promote the institute, compiled a stakeholder inventory and identified stakeholder needs. The Northern Zone promotion team accomplished a lot in a short time. Gradually however it became clear that improved external relations alone would not suffice to increase the level of client orientation. Internal management issues were to be addressed as well and these affected all departments in the institute. In addition staff members who were not part of the promotion team felt excluded. In 1999 promotion and liaison tasks were taken over by the ZIMO and ZRELO offices, the publication unit and liaison officers. Other tasks were taken on by the institute management.

In the Lake Zone the Linkage Committee and Information Management Committee were responsible for promotion and liaison activities. Once the ZIMO and ZRELO offices were created in 1998 and 2000, responsibilities were given to these respective offices. The establishment of these offices is an important organisational milestone. It shows that the DRD aims to improve communication and collaboration with stakeholders. The profile of the ZIMO office is information management and output production. This office was therefore made responsible for the production of promotion materials. The profile of the ZRELO office is 'linkage and collaboration'. This office was made responsible for information sharing and liaison activities (see Box 1.6.).

Box 1.6 Responsibilities of ZIMO and ZRELO office for promotion and liaison activities

ZIMO tasks related to production of public relations materials:

- Production of attractive business cards and distribution to scientists
- Production and design of flyers
- Production of other promotional materials: calendars, seasonal greetings, signboards, etc.
- Development of layout of Institute's official correspondence (letter heads, invoice formats)

ZRELO tasks related to information sharing:

- Establish and update of mailing list (in collaboration with other departments)
- Distribution of ordered publications to clients
- Editing of articles in newspapers
- Production of zonal newsletter
- Production of radio programmes, slide shows, videocassettes

ZRELO liaison tasks

- Elaboration of stakeholder inventories and annual update
- Assessment of research needs of stakeholders
- Active collection of requests for research services and channelling these to research programmes through ZRC office
- Organisation of annual stakeholder meetings
- Regular visits of research-extension liaison officers to clients and partners (stakeholder tours and visits)
- Participation in meetings at district and regional level (Subject matter specialist meetings, Mara Development Forum, ...)
- Organisation and/or supervision of extension seminars

ZRELO offices are in place in all zones in Tanzania. Both Lake and Northern Zone took the initiative to give more 'body' to this office. One ZRELO cannot maintain relations with all stakeholders in all zones. For that reason, it was decided that the ZRELO would get assistance from Regional Extension Liaison Officers (RELOs). ARDI Maruku's mandate area corresponds with Kagera region. Internally, Maruku distributed the responsibility of stakeholder involvement and liaison activities to district co-ordinators. In the Lake Zone the task of co-ordinating contacts with Farmer Research Groups was given to FRG co-ordinators.

1.6 Challenges and the way forward

'Getting to know each other' is indispensable for client-oriented research. If well managed, promotion and liaison activities can have considerable impact in a short period of time. Both the Lake and Northern Zone Institutes are more widely known in their respective mandate areas (stakeholders' knowledge of Selian ARDI rose from 10 to 80% between 1998 and 2002) and stakeholders know better what services can be delivered. Different liaison mechanisms are in place, which enable research and clients to communicate and to give feedback. An increasing number of research requests confirms that clients know the institutes better. The number of demand-driven research activities, funded through collaborative arrangements, contracts or ZARF has grown over the years. In addition, stakeholders have requested a wide range of less conventional services: seed multiplication, laboratory services, training, conference and catering services, monitoring and evaluation of extension programmes. Collaboration between research and clients has intensified and the promotion and liaison activities are paying off. For the near future, we see the following challenges:

Funding and sustainability of promotion and liaison activities

The initial cost of public relations materials, promotion activities, stakeholder meetings and tours is high and needs resources. Promotion and liaison activities are overhead costs and it is impossible to link these costs directly to research activities. Instead costs will have to be covered from general institutional overheads. On the other hand costs of some PR materials can be reduced. Liaison activities can be more efficient when decision-makers are better involved. Memoranda of

Understanding could better specify the responsibilities of different actors and could include arrangements about cost sharing.

Extension of networks

Less conventional stakeholders, for example those from the private sector, are not yet sufficiently involved in research planning, funding and monitoring. Larger coalitions have to be established, preferably under the co-ordination of regional administration and local governments.

Improved outward-orientation

Relying on a promotion team, ZIMO or ZRELO offices bear the risk that promotion and liaison activities are considered the responsibility of some staff. Instead we should build an organisational structure and culture where all staff (and the ZEC) consider themselves *ambassadors* of the institute.

Institutional advantages

Maruku ARDI, a relatively small institute with a limited mandate area, has been quite successful in promoting its services, establishing linkages and getting assignments. This needs further investigation to find out why this has been the case.

Joint projects with stakeholders and establishment of vertical links

Even when closer relationships have been established, scientists still write proposals in isolation. However, joint collaborative projects that focus on research, training and dissemination seem to have a promising future. Research institutes should establish vertical links between the field level (where problems exist) and the national or international level (where the funds are located).

Immediate feedback

Many stakeholder needs are information needs. Some problems mentioned by stakeholders need field verification. It is important to conduct these field visits or to satisfy information needs as soon as possible. This creates goodwill and trust.

Stakeholder empowerment

Strong clients are the building blocks for successful partnerships. Training of stakeholders can raise the capacity to formulate needs, to participate in proposal writing, to screen proposals, to monitor field visits and to defend research interests to decision-makers.

Ownership

Clients should see the research institutes as 'their' service provider and the best way to reach this situation is when they are (at least partially) involved in the financing of the research programme or when they actively participate in research projects. Clients will only get involved in research funding when they are confident and assured of quality output.

Co-ordination and harmonisation of approaches

Promotion and liaison activities should be well co-ordinated. It is important to avoid that every zone struggles alone and different kinds of promotion materials are elaborated. National co-ordination of promotion activities could not only facilitate the work of the zones, it also leads to efficiency improvement and a more coherent 'corporate identity'. National co-ordination of liaison activities can clarify tasks within the zonal institutes as well as define the responsibilities of research and its stakeholders.

Agricultural research targeting and needs assessment

Ninatubu M. Lema and Robert O. Kileo

Guiding principle

‘Agricultural research institutes have to deliver services that satisfy stakeholder needs’

The objective of research institutes is to provide services to all areas and relevant stakeholders. However, research institutes in Tanzania have very large mandate areas and limited resources. Scientists must therefore make efforts to work as efficiently as possible. Targeting is a procedure that helps to focus research on relatively homogeneous areas and to be sensitive to socio-economic differences between and within farmer households. It is widely acknowledged that client needs have to guide the research agenda. Research and information needs assessment is important to set research priorities. The results of targeting and needs assessment can be used to elaborate strategic plans. This paper reviews and gives examples of experiences in the Lake and Northern Zone with targeting, needs assessment and strategic planning. The authors highlight conditions for success and lessons learned. The paper concludes with suggestions for institutionalisation of some of the best practices and to further improve the application of tools to better plan and target research activities.

2.1 Introduction

Historical background

The objective of the National Agricultural Research System (NARS) and its institutes is to provide services to all stakeholders at all levels using the most efficient approach. However, zonal research institutes have very large mandate areas and limited resources. Without clear policy direction and appropriate priority setting, the efficient use of government and donor funds for agricultural development purposes is hard to ensure. Until the 1980s, the respective colonial and post-independence governments defined the policies while researchers set priorities as to what subjects to do research on. At the beginning of the 1990s the systematic identification of research needs was given more priority. The National Agriculture and Livestock Research Masterplan (1991) ranked national commodity research programmes, and allocated resources accordingly. These priorities were further refined in zonal prioritisation exercises in 1993-1994. This was followed by the development of zonal farming systems research strategies and two meetings to identify ways to strengthen client-oriented research (1994-1996). These strategies stressed the need for improved client orientation and demand drivenness, cost effectiveness and sustainability of research institutes (Heemskerk, 1996). Although these developments were a major step forward, only very few stakeholders were directly involved.

In the 1990s, the Lake Zone Farming Systems Research Project started to involve farmers in Farmer Research Groups. This was a first effort and significant step to bring farmers, researchers and extension together. Over time, the FRG experience created the need of bringing other stakeholders in the process. Problems emerging from the FRGs like marketing and adding value to agricultural products increased the momentum for researchers to take appropriate action to involve more stakeholders in the research agenda. Furthermore, researchers noted that through the process of working with FRGs farmers were empowered to express their research and information needs.

Box 2.1 Overview of research planning in Tanzania (Kabissa and Heemskerk, 1999)

1920s-1940s	Commodity focus
1940s-1960s	Cropping and livestock system focus
1960s-1970s	Integrated farm management studies, e.g. Collinson studies for the Lake Zone
1970s-1980s	Centrally planned production focus. Few cash crops, emphasis on village food self sufficiency, negligence of free marketing, communal villages, no investment in infrastructure, supply driven research
1980s-1990s	Adoption of FSA, creation of critical mass of researchers in separate programmes, FS focus development, many diagnostic studies
1990s-	Zonal prioritisation, participatory research planning, client-oriented and demand driven research, privatisation of research, collaborative and contract research, livelihood system focus and market orientation

From there on, the DRD has continuously sought ways and means of involving stakeholders in the technology development and dissemination process. There has always been a need and struggle to improve the situation in identifying client/stakeholder research needs and information, which can be used for participatory strategic planning with a focused targeting. While zonal research institutes were struggling to satisfy stakeholder needs for research and information, the policy framework for agricultural development gradually improved. In October 2001, MAFS completed its Agricultural Sector Development Strategy (ASDS). This became the basis for public and private sector action in support of agricultural growth and rural poverty reduction in Tanzania. At the moment the Agricultural Sector Development Programme is in preparation to put the ASDS into effect at sub-sector level.

Targeting research

Due to the large mandate area and limited resources of the zones, it is necessary to look for scientific ways of dividing areas into representative 'sub-zones' and dividing the farmer population into 'sub-groups'. This process helps to address fundamental questions such as 'where to conduct on-farm research' and 'for which group of farmers' we choose to increase the efficiency of research. *Agricultural research targeting* is a procedure to identify and select areas and farmer categories on which research should focus. Targeting is not a goal in itself, but it is a tool/procedure that is used to make research more efficient.

Targeting is done to divide heterogeneous agro-ecological conditions and farming populations into relatively homogeneous areas and subgroups on the basis of factors that determine the farming systems or livelihood systems. It is important to note that 'homogeneity' must always be determined relative to the purpose of the intervention. Box 2.2 shows how the concept of targeting farmers is used at different stages in the research process.

Box 2.2 Targeting throughout the research process

Research stage	Purpose of targeting
<i>Diagnosis of farmer circumstances</i>	Define research areas or target groups with similar circumstances
<i>Identification of constraints and priority problems</i>	Specify which geographical zones or farmer groups have the same production constraints
<i>Selection and testing of possible solutions</i>	Identify possible solutions appropriate for specific farmer groups and test them in the field with groups concerned
<i>Development and recommendation of recommendations</i>	Define and disseminate flexible recommendations to address needs and circumstances of different farmer groups

An institute that wants to know its mandate area better, can implement several activities: zonation, social stratification analysis and intra-household diversity analysis (including gender analysis). In order to promote demand-driven research it is vital to improve targeting by identifying major farming and production systems in each zone. In each of these farming systems one has to characterise the

different producer groups. These groups will definitely show differences in their research and information needs.

Assessment of information and research needs

As opposed to targeting which allows an institute to know its research mandate area better and to prepare for the efficient organisation of work, the basic objective of information and research needs assessment is to develop a research programme, which is driven by stakeholders who are the clients of research outputs. When the institute has assessed its stakeholders (see also paper 1), the next logical step is to assess their research and information needs. An institute cannot plan its research programmes if it does not know the major problems and opportunities in its mandate area. The assessment has to be conducted carefully so as to identify client problems and constraints, which hinder sustainable and equitable agricultural development. Stakeholders should suggest the constraints and problems that research should work on. In this regard stakeholders have to be empowered to be able to come up with issues, which can be taken up by researchers to develop technologies or to provide information.

Strategic planning

An analysis that precedes the formation of a strategic planning consists of three steps: analysis of the current situation, analysis of the desired future and analysis of the gaps between the current and desired situation. Strategic planning reflects the will of a client oriented research institute to adapt itself to stakeholder needs.

In the next paragraphs this paper will subsequently discuss targeting of agricultural research, information and research needs assessment and strategic planning.

2.2 Targeting

Agricultural research can increase its efficiency and impact when targeted at well-defined farming systems and target groups. A zonation and description of the farming systems in a given geographical area facilitates decision making of where to allocate scarce resources. Moreover, the relevance of research results is highlighted because each farming system can be considered as a recommendation domain. In principle, research conducted within a farming system is relevant to all households in that farming system. However, socio-economic differences exist between households. The access to means of production and knowledge and the power of decision-making is not the same for all households. And even within the same households the position of different age and sex groups is not the same. These differences determine to a large extent whether households and individuals can adopt innovations or not and must be taken into account during the technology development process.

Targeting can therefore be done at different scales of analysis or levels of aggregation. We distinguish geographical zonation, social stratification analysis and intra-household diversity analysis.

Geographical zonation

The Farming Systems Approach has put much emphasis on the identification of recommendation domains. In practice this has often led to agro-ecological zonation. The definition of agro-ecological zones is a useful step towards farming system zonation. Agro-ecological zones are the biophysical basis of farming system zones and are time and development neutral. The former needs less information than the latter and can often be elaborated by using secondary data. Farming systems cannot be defined without field visits and (in-)formal interviews with farmers and other stakeholders.

The methodology of how to define farming systems includes: 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 (DRD/KIT 2000: 39). Both the Lake and Northern Zone have

zonation maps that are used for targeting research. Box 2.3 gives more details about the production and use of the Northern Zone farming systems zonation.

Box 2.3 The Northern Zone farming system zonation

One of the first COR activities in the Northern Zone was the elaboration of a farming systems map. Use was made of already available, but outdated maps that lacked precision. All relevant information was compiled before field visits were conducted. A list of parameters was discussed and compiled. Field visits were conducted during which the team interviewed farmers and other stakeholders, checked the parameters and defined boundaries of the farming systems by using a GPS. Preliminary results were presented in a stakeholder workshop. Participants noted several errors, which were corrected. Data were processed in close collaboration with ISS and 100 maps at a scale of 1:1,000,000 were printed and distributed among stakeholders. In total seventeen farming systems were distinguished in the Northern Zone, each with their specific conditions and constraints. Now, all scientists refer in their research proposals and research results to the target farming systems and indicate, for example, the relevant area covered or potential adoption by rural households. The zonal research policy paper has made extensive use of the farming system zonation. The policy does not target at farming systems in the absolute sense, but applies relative criteria that indicate which farming systems should be targeted at. For example, if the objective is to improve food security, then research should target at the handhoe (H1 and H2) or pastoralist systems (Pa1, Pa2 and Pa3). Source: Mansoor and de Steenhuisen Piters, 1999

Planning criteria can be applied to compare the major farming (or agro-ecological) systems and assess their importance. These criteria are often difficult to quantify, and should be considered as indicators only. Planning criteria may include: area covered, total human and livestock populations, economic importance and market opportunities, standard of living, presence of partners and clients, accessibility. In this context it is interesting to mention that the Lake Zone also produced thematic maps in collaboration with Mlingano ARDI. These thematic maps respectively show population density, livestock density and major cropping partners.

Prioritisation and targeting of farming systems is a matter of policy. There are no objective criteria for assessment of the importance of the systems. This implies that a zonal research policy is needed to obtain 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 policy, and, as a consequence, at which farming systems development efforts should be targeted. The farming system zonation map will then become more than a colourful decoration on the wall through its daily use as a planning tool for research and extension (DRD/KIT 2000: 40). Both the Lake and Northern Zone have been using their zonation maps, but the zonation exercise has not yet been fully linked to policy decisions.

Social stratification analysis

Rural societies are not homogeneous. They are composed of different household categories with specific constraints and contrasting interests. Social stratification analysis is a tool to identify groups of households with similar socio-economic and cultural features with the objective to develop appropriate and specific recommendations. In principle, research carried out with one household category is relevant to all households belonging to that category.

Social stratification or household diversity analysis enables the institute to:

- Assess 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 the requirements of the target category during the identification of options;
- Provide a picture on the degree of adoption likelihood of the technology to be tested;
- Select farmers belonging to relevant target categories for participation in on-farm research;

- Evaluate whether a target group adopted a technology or how the target group adapted an innovation to its specific conditions.

Both the Lake and Northern Zone have experiences with the methodology to identify social strata or household categories (Box 2.4).

Box 2.4 Farmer categorisation in the Lake Zone

In the Lake Zone the main farmer categories in each zone were identified based on resources such as land and cattle ownership as well as sex of the head of the household (Ndege and Steenhuijsen Piters, 1996; Kingma and Mafuru, 1996). A rough summary reads as follows:

Cotton-based farming system zones (Kingma and Mafuru, 1996):

- (1) Lower stratum/poor farmers
No cattle, but some small ruminants, little or no ownership of land, limited access to animals benefits and fertile soils, small household size, sale of labour. Many Female headed households (FHH).
- (2) 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
- (3) Upper stratum/rich farmers
Large number of cattle and oxen, cultivate large areas of fertile land, large household size, use hired labour

Banana – based farming, system zones (Ndege and Steenhuijsen Piters, 1996):

- (1) Absentee landlords
No client for research
- (2) Surplus producing households
Households larger, HH older, enough resources, banana and coffee surplus. Hire labour and are involved in trade. Need inputs
- (3) Self-sufficient households
Moderate access to means of production. Low social status. Decline of production
- (4) Marginal households
Resource poor, young HH, part-time farmers, food shortage. Many female headed households.
- (5) Caretaker households
Landless, only interested in annual crops
- (6) Migrant farmers
Not permanently in the village, hire themselves for labour.

As was the case with geographical zonation, this form of targeting also has to be related to zonal policies. In the Lake Zone, for example, full-time small-scale farmers are the target group of the institute. This implies that absentee landlords in Kagera region (land-owners who do not live on their land but other people take care of their land) are not considered a target group for Lake Zone research.

Intra-household diversity analysis (including gender analysis)

Within a household individuals have different positions based on gender, age and inter-generational relations, which are reflected in e.g. patterns of authority, division and control of labour, and access to and control over resources and benefits. Household members have shared, as well as different (and sometimes opposing) interests. The roles of household members other than the male head of the household are frequently ignored. Adult women, junior men and women, and children bring specific skills, resources and priorities to farm production. To ignore them is to ignore more than half of the farming population. There are ample examples that illustrate this point: training male heads of households in oxen-weeding whereas normally the work is done by young men (age criterion); improving varieties of crops grown by women without involving them in the assessment of preferred characteristics of the varieties (gender). See also Box 2.5 for an example in the case of agro-forestry.

Box 2.5 Effect of gender differentials on afforestation in Shinyanga Region

Whereas almost all respondents (96%), whether men or women, were engaged mainly in crop farming, and in herding as a secondary activity there were major differences in ownership of land and type of animal herded. In the case of male respondents, land holdings range from 0.5 to 250 hectares, with an average of 12 hectares. Only 8% of respondents possess the maximum land holding; most men owned between 0.5 and 8 hectares. In contrast, some 70% of female respondents had no land of their own; they depended entirely on their husbands and relatives. Even those with land of their own possessed only between 0.5 and 5 hectares. This land was acquired through inheritance, either from late husbands or from relatives. Men own land according to Sukuma culture, women depend entirely on their husband's relatives. However, an unmarried woman can have a plot allocated to her by the village government or hire one for a period of 2 years. Women in general cannot therefore make any decision that involves the development of land. This affects the extent to which they can employ conservation and forestation technologies, such as planting trees for fuel-wood and other products. Source: Otsyina and Rosenberg, 1999

Gender analysis is an organised approach that uses both quantitative and qualitative data to understand how women and men, female and male household members, relate to each other 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, especially for the weakest groups in the farming communities. Gender analysis is relevant in all phases of agricultural research and development, be it planning, experimentation, evaluation, dissemination, or adoption/impact assessment (Schouten, 2000). The Harvard Analytical Framework and the Gender Analysis Matrix are important tools to analyse the gender roles and relations. Both in the Lake and Northern Zone commodity scientists have been trained in the use of gender analysis. Gender is also an important element in the screening of research proposals (cf. paper 9).

2.3 Information and research needs assessment

Researchers have a lot of shelved information, which is potentially appropriate and useful, but is not easily accessible. Right from the beginning a scientist should be aware of the risk that his/her results are not used and be focused on stakeholder needs. Experience shows that many research and information needs of farmers and other stakeholders can easily be tackled by simply providing available information.

The different targeting exercises described in the preceding paragraph are very important for needs assessment. When assessing needs we should ask ourselves where needs come from: from which area, from which socio-economic group? Knowing the mandate area through targeting is indeed crucial for appropriate needs assessment. Research and information needs assessment should also differentiate between different kinds of (non-farmer) stakeholders. A stakeholder analysis helps to characterise stakeholders in terms of their main functions and expectations. Research and information needs should be identified for different stakeholder categories.

There are different opportunities to assess research and information needs: surveys and general studies, commodity/thematic workshops, stakeholder meetings, specific research requests and immediate follow-up of stakeholder requests.

Surveys and general studies

In the Lake and Northern Zone, several survey and general studies were done, for instance during the FSR programme. Farmers and other stakeholders needs were analysed and appropriate solutions to their production constraints were researched in a participatory manner. Diagnostic surveys were done in many districts, e.g. Meatu, Maswa, Kwimba, Biharamulo, Bukoba, Karagwe, Arumeru, Babati, Hai etc. Participatory research in the Lake Zone became operational in 1989 when the FSR programme

was initiated. Since then there have been improvements through use of additional and newly introduced PRA tools. Research planning is based on stakeholders needs identified during these surveys and other formal and informal meetings. Similar meetings are used as a platform to discuss the modalities of implementation of research activities and reduce the risk that would have arisen if researchers plan and implement research alone. Box 2.6 gives an example from Biharamulo.

Box 2.6 Participatory technology development in Biharamulo district of Kagera region

Diagnostic surveys were conducted in the eastern zone of Biharamulo district of Kagera region (Wella *et al.*, 1995). Farmers, district subject-matter specialists (agricultural extension, community development, natural resources and others), and researchers participated in the survey. A district stakeholder planning meeting was organised whereby the research results and recommendations were discussed. Approved research agenda included both research and development issues: integrated soil fertility management, pest management, promotion of labour saving technologies, testing of better adopted crop varieties, improvement of animal health, crop marketing systems and improvement of post harvest technologies. During implementation, research formed a farmer research group (FRG) in one village to test the proposed technical solutions (fertiliser use, variety testing and use of ox-drawn farm implements). At the same time district extension staff established farmer extension groups (FEG) in two villages to implement issues that were in their mandate. Monitoring took place through regular stakeholder meetings, by then called district extension steering committee (DESC) meetings.

Commodity or thematic workshops

About a decade ago, institutes in the Lake Zone started organising commodity and thematic workshops e.g. on maize, sweet potato, beans, coffee or soil fertility. Extension staff, NGO representatives, farmers and researchers were invited to discuss constraints and to suggest recommendations for future improvement of the production of the commodity in question. Though this enabled different stakeholders to meet and discuss together, it was not very efficient as farmers had more production constraints than the few that could be addressed in the workshop. Farmers' constraints needed to be addressed in a farming systems perspective. In recent years more emphasis has been put on further analysis of research and information needs to make research efforts more effective and accessible to stakeholders.

Box 2.7 Commodity and thematic workshop in the Lake Zone

In the Lake Zone in Tanzania researchers, change agents (public and private) and farmers systematically analysed recommendations for different commodities (e.g. maize, coffee) and factors (e.g. soil fertility management). The recommendation gap analysis workshops focused on the state-of-the-art in relation to formal (research) and farmer knowledge. If possible farmer knowledge was used: use of local names, farmers assessment and selection criteria, and farmer priorities for development. The workshops aimed to:

1. Analyse the technology gap between research, extension and farmer practices for each relevant farming system;
2. Develop a basis for reorientation and priority setting of research programmes;
3. Provide a basis for a comprehensive loose-leafed updateable extension manual for different agro-ecological zones

Stakeholder meetings and stakeholder tours

Every year the Lake Zone organises a tour to meet stakeholders to initiate planning of researchable issues for the coming season (see also paper 1). An inventory of information needs and researchable issues is developed and presented in annual stakeholder meetings for further discussion on relevance and modalities of implementation. Tengeru organised a stakeholder meeting very recently which involved more than 70 stakeholders from the Northern Zone. The meeting specifically identified research needs for different stakeholder categories and also discussed how these needs for research could be addressed.

Specific research requests

Stakeholders may come directly to the institute to explain their problems or do so when researchers visit them in the field. This may lead to research contracts whereby researchers are paid. This

approach has resulted in better quality services while at the same time improving institute funds. However, research needs can come from a few stakeholders only. It is often necessary to screen priorities to ensure equitable consideration of all beneficiaries. Experience has shown that although farmers and other stakeholders may face many problems and may even have a strong interest in research this will not automatically induce them to request research services. In order to stimulate farmers and other stakeholder to effectively demand services, participatory research approaches such as working with FRGs, FFSs and FEGs have been established. Both the Lake and Northern zones have also established stakeholder inventories and overviews describing available research recommendations. It has been suggested that the list should include possible costs that may be tied to these technologies or research requests (DRD, 2000).

Immediate follow-up of stakeholder needs

Information and knowledge on agricultural research findings is a key change agent in agricultural development and transformation. Thus dissemination of research results and facilitating its access to stakeholders is crucial. In order to achieve this, the LZARDI started an activity of making immediate follow-up to stakeholder needs. An example of this was follow-up on the outbreak of cassava mosaic disease (CMD) and rice yellow mottle disease (YMD) in Kagera and Mara regions respectively. A team of scientists visited the infested areas and made contacts with farmers, potential stakeholders and donors. The intention was to collaborate in combating the problems. As a result research activities were jointly identified, planned and implemented.

2.4 Strategic planning

Strategic planning basically means that an institute prepares itself to adapt its services to the needs and priorities of stakeholders in the mandate area. In order to have a clear image of its strengths and weaknesses and the services it can offer, LZARDI is currently developing a zonal strategic plan. The exercise started by training all scientists on principles of making a strategic plan. Researchers used their newly acquired skills to develop the document for the zone and programme levels. The process included a SWOT and stakeholder analysis, vision and mission statements of the institute. Priority strategic issues, goal, purpose and expected institute output were also analysed (Box 2.8).

Box 2. 8 Strategic planning exercise in the Lake Zone

LZARDI Vision:

To make LZARDI a sustainable research institute focusing on quality outputs and services that will contribute to poverty alleviation through improvement of agricultural productivity.

LZARDI Mission:

To improve agricultural productivity by demand driven research in the Lake Zone of Tanzania, through participatory planning and implementation, staff motivation, development of quality technologies and provision of services.

Strategic issues:

Based on the LZARDI SWOT analysis, Vision, Mission and Values the following are the key issues that need to be addressed by LZARDI in the strategic plan

- Generation and development of appropriate technologies, services and information
- Development of tools for dissemination of technologies
- Development and maintenance of staff
- Development of mechanism for sustainable research funding
- Develop and strengthen monitoring, evaluation and feedback mechanisms
- Marketing information mechanisms including prices, supply and demand of agricultural products
- Strengthen linkage and collaboration internally and externally

Similar procedures were followed for strategic plans at programme level (crops, livestock, special and social economics) and commodity level. Outlines were made for the different strategic plans and teams were appointed to prepare the draft strategic plans.

In a situation where research institutes want to respond to stakeholders' needs, these stakeholders should know the services (and associated costs) and have the confidence that the services are of good quality. As such research stations have to develop an inventory of available services. Once this is done and well advertised, requests from the demand side are expected to increase over time if quality is maintained.

2.5 Conditions for success and lessons learned

Finding the right balance

FRGs have provided a platform to deal with different farmer categories. The risk of an emphasis on contract research is that some clients may be left out e.g. the poorest of the poor. The same applies to the approach where research requests are established through indirect contacts, e.g. through NGOs or District Councils. These intermediate organisations may not have carefully assessed farmers' needs. At the same time, research institutes may be leaning too much on answering/responding to stakeholder needs with little attention to other important priorities. How do we balance all this?

Existence of a research interdisciplinary team

A client oriented research programme dealing with client issues requires the collaboration between various disciplines. Interdisciplinary teams have to be available at the research station to tackle issues in an interdisciplinary manner. Team members have to be able to apply FSA principles and concepts.

A clear understanding of the stakeholders i.e. knowing your stakeholders

It is a prerequisite that one should first clearly understand stakeholders in terms of their main functions and their understanding of their role in research. A stakeholder analysis may help to strengthen this understanding. Once this is clear, research and information needs can be assessed.

Definition of a research and development policy and objectives

Zonal research priorities have to be merged with national policies so as to be able to function appropriately with stakeholders. This is an important step towards working together for similar goals, which will have a positive impact. Policy statements should complement targeting exercises like geographical zonation and stratification analysis.

Formulation of programmes that address important problems and opportunities

The organisational structure of a research station has to be flexible enough to address client research needs efficiently and effectively. The current zonal structure (crops, livestock, special and SE programmes supported by the research-extension liaison and information management officers) appears to suffice in dealing with client research and information needs. However, that structure has to be dynamic enough to adapt itself to changing needs.

Specification of the outputs to be expected and the delivery time

Stakeholders/clients are quite sensitive on the type of outputs and the time researchers will use to deliver. Research stations have to develop an inventory of their outputs and resources required to produce. If it is clear enough stakeholders will get more confidence in dealing with the research station. In this context the MAFS client service charter is an important breakthrough.

2.6 Challenges and the way forward

Immediate follow-up

Quick responses on information needs and prompt action on research needs are required to avoid disappointed stakeholders. Satisfaction can only be achieved by providing good quality services. Traditionally, researchers are not much acquainted to a service-providing role. There is a need to improve research standards and ways of reporting.

Setting priorities: Whose priorities?

If we work with representatives of target groups only, we have to ask ourselves how representative these representatives are. Do DALDOs really give the needs of farmers? There is a continued need for assessing specific target group needs, e.g. marginal households.

From research requests to research proposals

Research is expensive. However, the most important but also under-utilised asset of a research institute is its stakeholder network. In establishing linkages with international networks this may prove crucial. Researchers through their contacts with local stakeholders and international networks have access to funds which local stakeholders may be unable to provide or access.

Covering the mandate areas

Zonal research centres have large research mandate areas, which may involve up to four administrative regions and more than twenty districts. Major stakeholders in these zones are the districts and they all demand research, training and information services. Most zonal centres are limited in terms of resources to reach each district; this is therefore one of the major challenges.

Continuously adapt research programmes

Farming systems are dynamic with changing social, political and economic environment. In such a scenario client needs become dynamic and may change in short periods. Of importance to note is the current need for adding value to products to improve product marketability. In such situations research institutes have to adapt themselves to meet changing client needs.

Building stakeholder capacity and empowerment

The process of involving stakeholders in all stages of research creates awareness and may eventually empower them. However, there is still limited stakeholder capacity to formulate research and information needs. Stakeholders and farmers raise broad issues ranging from production to development problems, which are often beyond the researchers ability to deal with. A research institute needs strong clients to develop and maintain a demand-driven agenda. Capacitating farmers through farmer organisations and farmer training is a main element in the CORMA approach which returns in each phase of the technology development process, whether planning, implementation or M&E. Increasingly, farmers and their organisations are empowered by assigning them the control over resources. This is achieved either by stakeholders having a majority vote in executive boards of research institutes or in the management committees of agricultural research funds, or by delegating control over funds allocated for research to farmer organisations or District Development Offices. Indicators need to be developed for the following dimensions of effective stakeholder participation:

- Quality and extent of stakeholder involvement
- Costs and benefits of stakeholder involvement
- Impact of stakeholder involvement
- Equity, diversity and gender aspects.

Training co-ordination: towards a learning organisation

Hilda Ngazi, Ted Schrader and Chira Schouten

Guiding principle

‘Staff members are the human capital of a research organisation;
their knowledge and skills have to be continuously improved’

Summary

In the COR management approach it is essential that research institutes are service oriented. This means that staff members have to adapt to changing stakeholder needs and new research approaches, and staff skills need to be improved regularly. This paper describes experiences from the Lake and Northern Zone concerning training co-ordination and staff training aimed at developing a more systematic approach towards learning, training and skill improvement. Constraints and lessons learned clarify how training co-ordination can be further improved within the pilot zones and what conditions would need to be met in the future. We suggest national and zonal levels intensively communicate and exchange views with respect to training. This may require the institutionalisation or at least the recognition of the importance of training co-ordination offices within the zone.

3.1 Introduction

The basic principle of CORMA is that research institutes are service oriented and that the needs of farming communities and intermediate organisations are the starting point for research, training and information services. This implies that agricultural research and development staff has to continuously adapt to needs and problems that arise in the field. Apart from this, scientists have to adapt to a changing research environment in order to improve their service delivery capacities. New research approaches, methods and techniques arise, new agricultural technologies are developed within and outside the country, terminology changes, and relations with extension and farmers are regularly reviewed (see Box 3.1). In addition, the quality of internal management practices has to be continuously improved. This raises the question how scientific and support staff competence can be adapted to stakeholder needs and donor requirements. What strategies can a research institute use to develop human resources and improve skills?

Box 3.1 Innovative issues of the past decade

Subjects that got attention in the past 10 years are: biotechnology, mother-baby trials, integrated soil fertility management, zero and conservation tillage, better land husbandry, farmer-led innovations, farmer field schools, participatory technology development and dissemination, writing winning proposals, client-friendly output production, farmer empowerment, gender, poverty alleviation, product-chain approaches, processing and marketing of agricultural products, public-private partnerships, diversification, niche-crops, scaling up of technologies, monitoring and evaluation, impact assessment, competitive research funds, information and communication technologies, information management, integrated financial management. This list is far from exhaustive and new subjects emerge all the time.

This paper intends to share experiences with training co-ordination in Tanzania and to present examples of training co-ordination that were piloted in the Lake and Northern Zone. These experiences suggest best practices that may guide us towards gradual transformation of our research institutes into ‘learning organisations’.

Learning organisation

A learning organisation is an organisation that adapts to a changing environment and encourages staff learning. It is open to new information and strives to adopt new insights and skills to improve the performance of the organisation. It promotes exchange of knowledge and information between employees thus creating a well-informed workforce. This results in a flexible organisation where people accept changes and adapt to new ideas through a shared vision.

The Chinese philosopher Confucius first stressed the importance of learning. He believed that everyone should benefit from learning and that learning never ends:

*"Without learning, the wise become foolish; by learning, the foolish become wise."
" Learn as if you could never have enough of learning, as if you might miss something."*

One of the reasons for the recent emphasis on organisational learning is the increased pace of change. An organisation that is able to learn and change working practices will perform better. However, the changeover to a learning organisation does not take place overnight. It is a gradual process whereby management encourages its staff to learn, and tries to find a balance between change and stability.

Box 3.2 Why a learning organisation?

In most cases, an organisation that needs to improve its performance is easily recognisable. Can you spot the signs?

- Do your employees seem *unmotivated or uninterested* in their work?
- Does your workforce *lack the skill and knowledge* to adjust to new jobs?
- Do *new ideas* come from the outside or from the top?
- Does your workforce simply *follow orders*?
- Do your teams *argue* constantly and *lack real productivity*?
- Or *lack communication* between each other?
- And when the boss or the "guru" is off, do things get put on hold?
- Are you always the last to hear about *internal problems* and the first to hear about *customer complaints*?
- And do the *same problems* occur over and over?

If any of these points sound familiar the answer for you could be a learning organisation.

(Adapted from: www.see.ed.ac.uk/~gerard/MENG/MEAB/learning_organisation)

An analysis of the situation that prevails within DRD suggests that there is a need to improve the way staff learning is addressed:

- Until recently, there is no clear CV format and CV databases did not exist. Individual staff developed their own CVs and submitted these whenever required.
- Staff capacity and careers are not analysed systematically and training needs are not assessed adequately. As a result training programmes are designed without taking trainee needs into consideration. Trainees will then feel distant from the learning process and the training is unlikely to be effective.
- Training largely depends on donor and central government funding. Zonal research and development institutes do not develop and implement a training strategy themselves. They generally react passively to opportunities, resulting in scattered training.
- Most training in the zones is co-ordinated from the ministerial headquarters, which bears the risk that a training programme does not reflect the needs of the institutes, its employees and stakeholders.
- In the zones, individuals often aim to get sponsorship for long-term training. Funding opportunities and personal efforts determine who is trained. This also leads to a situation where training topics are not necessarily in line with zonal or national priorities.
- Training of research staff gets more attention than support staff training.
- Often, external resource persons facilitate training workshops or short courses. Sometimes this option cannot be avoided, but it is expensive and foregoes local expertise.

- Knowledge and skills that trainees acquire are insufficiently shared and used.

COR self-assessments in the Northern and Lake Zone (NZARDI, 2002; LZARDI, 2001) indicate that staff members agree that the institute has the skills to respond to stakeholder requests but that staff training has to be better targeted and adapted to stakeholder needs. Most respondents feel that staff is not equally considered for training and decisions that are taken to send people for training are not transparent. This may be caused by the fact that staff training needs are not clear and that training attended by staff is not properly recorded. Staff indicates that selection for training should be based on staff competence and that the institute should actively search for training opportunities.

The fundamental issue to be addressed is to develop a more systematic approach towards learning, training and skill improvement. Therefore, the objectives of training co-ordination at zonal research institutes are to:

- Improve the co-ordination of training.
- Plan training programmes according to staff, stakeholders and institute needs in a transparent manner.
- Diversify the sources of funding for training.
- Use locally available expertise for training sessions whenever this is available.
- Stress group learning and create platforms for sharing information.
- Link training activities directly to research needs and activities to be carried out after the training.
- Balance training programmes between technical and support staff in order to increase work efficiency of the entire institute.
- Increase combined training opportunities for research staff and stakeholders.

3.2 Review of CORMA activities and their achievements

This paragraph describes initiatives from the Lake and Northern Zone and limits itself to training. Other initiatives related to human resource management, which are also important for the creation of a learning organisation, are presented in the papers on staff and information management.

Nomination of training co-ordinators

In 2001 and 2002, LZARDI and NZARDI informally nominated training co-ordinators at institute level (Ukiriguru, Maruku, Selian and Tengeru). The training co-ordinator has the following tasks:

- To communicate with DRD/MAFS training office;
- To collect and compile information about study opportunities in Tanzania and abroad and to inform staff about training sponsorships and fellowships;
- To establish a staff CV database and to update this on a regular basis;
- To make a training needs assessment and to compare client demand to staff capacities;
- To plan training according to staff, stakeholder and institute needs;
- To identify opportunities to satisfy identified training needs and to solicit funds for the training of staff members;
- To ensure that training is carried out successfully;
- To record training attendance, i.e. monitor who attended which training, when and where.
- To evaluate the impact of training sessions (quality of trainers, practical use of acquired skills).
- To organise monthly seminars to share knowledge and skills, and exchange experiences.

CV database and staff profiles

In the Lake Zone, a standard CV format was developed in 2000. A database was established in 2001 and updated in 2002 and 2003. Gradually the database was expanded to include all scientists, field officers and senior support staff. CVs are used whenever required (e.g. state house requests, research proposals). The NZARDI developed a similar CV format in 2002 and the CV database was set up in

2003. Both the Lake and Northern Zone summarised standard CVs into short staff profiles. Among others, these short profiles with passport size photographs, will be used on the web-sites of LZARDI and NZARDI. An example of staff profiles is shown in Box 3.3.

Box 3.3 Examples of staff profiles

Mr. J. Nkuba (MSc): Socio-economist, Officer in Charge. Joined ARDI Maruku in 1990. Specialises in marketing and sector studies, adoptability and adoption studies, food security issues and farmer assessments. He also co-ordinates and monitors Farmer Research Groups.

Ms. M.N. William (BSc): Agronomist. Joined ARDI Maruku in 1998. Specialisation: agronomy of grain legumes and potato variety evaluation. In addition she is the chairperson of the information management committee that supervises the timely production and quality of institute publications.

Ms. M. Shiyyo (Diploma): Zonal accountant. Joined ARDI Ukiriguru in 1999. She is a specialist in Integrated Financial Management and Accounting Systems and internal financial management issues.

Dr. R.N. Mero (PhD): Principal livestock researcher who joined NZARDI in 1994. Before that he worked as livestock researcher at LPRI Mpwapwa since 1981. He is specialised in animal nutrition and management, with particular focus on pastures and forages.

Training needs assessment

A training needs assessment systematically identifies performance gaps: the difference between the expected performance level and the actual performance level. For planning of an adapted training programme, assessment is essential. Performance gaps can be related to three basic domains of learning: Knowledge, Skills and Attitudes (KSA). Knowledge is retained information concerning facts, concepts and relationships. Skills are the abilities to do things effectively, to apply knowledge in work situations. Attitudes consist of feelings for or against certain issues; they reflect how individuals perceive their jobs, and other people, and they are reflected in people's behaviour, for example in terms of responsiveness to apply acquired knowledge and skills. A training needs assessment can help to see whether a certain performance gap can be solved by training. TNA is therefore part of a planning process focusing on identifying and solving performance problems (Swist, 2001). Previously formal training needs assessments were not done. In 2002 the department of training in MAFS carried out a training needs assessment. Zonal staff was requested to list training needs. TNA results allowed for the development of a training strategy and planning of short courses.

In the Northern Zone, training needs were assessed in 1998 (see Box 3.4) and again in 2002. The TNA resulted in a series of seminars. Training needs were related to broad stakeholder needs but not to individual performance assessments. Training needs were also assessed in relation to the establishment of service units.

Box 3.4 Staff training needs assessment in the Northern Zone in 1998

In 1998 the TNA in the Northern Zone (Mushi and Steenhuijsen Piters, 1998) aimed to review skills and training needs of staff of (then) 3 research institutes in relation to the implementation of client oriented research in the zone. The survey uses a structured questionnaire. Survey results indicate that:

- More than 75% of NZARDI staff works in the Crops Programme even if ARI Lyamungu and HORTI Tengeru are excluded from the sample. The survey concluded that staff qualifications are not in line with the comprehensive research mandate in the zone.
- Staff spends 63% of its time on research. The remainder is used for management and production. Very little time is allocated to dissemination of research results (4%). To increase the effectiveness of research the survey recommends that staff allocates more time to the translation of research results into user-friendly materials.
- The survey suggests ten training topics which could increase skills required for client oriented research. Staff ranked on-farm experimentation and appropriate statistical analysis for on-farm trials highest. Very low priority was given to gender analysis and linkages with stakeholders.

In the Lake Zone, training needs were assessed in relation to specific tasks, such as the establishment of service units, integrated financial management, library and registry management, proposal writing and strategic planning. Recently, a questionnaire for a more systematic TNA has been distributed. Results from formal and informal assessments in both the Lake Zone and Northern Zone also resulted in the development of new training modules for the national Farming System Approaches training. Newly developed modules include statistical analysis for on-farm trials, gender analysis, stakeholder analysis, technology dissemination, and production of user-friendly outputs.

Long-term studies

To effectively execute research programmes, it is essential for the Tanzanian NARS to have a well-balanced workforce in terms of relative numbers of scientists, technical and support staff, an appropriate distribution of disciplines and qualifications, and appropriate distribution of age and gender. Within DRD there is the following imbalance (URT/MAFS 2003: 32-33):

- Sub-optimal staff ratio: in 2000 DRD had 3.2 support staff per scientist, of which 1.3 technician, 0.6 administrative and 1.3 other support (labourers, guards, drivers) (Beintema *et al.*, 2003);
- imbalance between scientists addressing production oriented research problems and those addressing post-harvest, marketing and general socio-economic aspects in technology development and dissemination;
- imbalances in age and gender: in 2000 20% of scientists within DRD is female, however most hold lower degree qualifications than the Tanzanian average (Beintema *et al.*, 2003).

Box 3.5 Staff position and long term training in the Lake Zone (1989-2003)

From 1989 to 1993, the ratio of academic staff at ARDI Ukiriguru was 1:10:5 (One PhD, 10 MSc and 5 BSc). In this period, 3 scientists worked with the FSR project, other staff worked in commodity programmes. From 1994-98 staff increased and qualifications improved. The ratio became 4:18:5. The FSR team increased to 11 and commodity researchers were 15. Several staff members came back from training, which was funded by either TARP II or FSR. The situation changed again in the period 1999-2003, when the staff ratio became 1:19:9. Several PhD holders left the Institute, but some undergraduates joined the institute from SUA. Figure 3.1 illustrates staff position at ARDI Ukiriguru from 1989 to 2003.

In the Lake Zone, the FSR and COR projects provided scholarships that enabled staff to be trained to MSc and PhD level (Fig.3.2). In total, 14 scientists from Ukiriguru and Maruku were trained between 1991-2003 (11 MSc, 3 PhD and 2 BSc). Disciplines supported were agricultural economics (2 PhD in USA), soil science (1 PhD in the Netherlands), 6 MSc in agronomy, pest management and agricultural economics. Several other scientists had MSc training sponsored by NALRP and TARPII. At the moment 2 scientists are on study leave pursuing their PhD studies at SUA (EU funding) and in South Africa. An Italian NGO supporting female scientists provides this last sponsorship.

Figure 3.1 Staff position ARDI Ukiriguru (1989-2003)

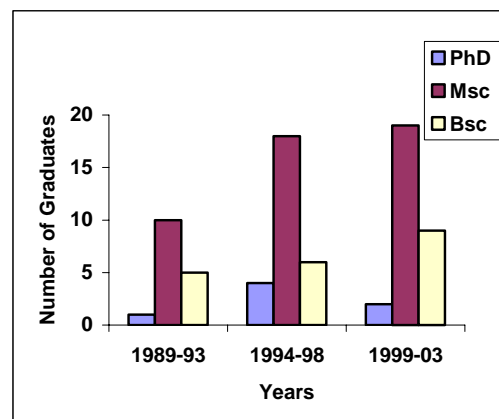
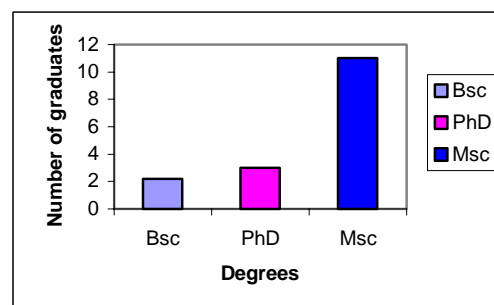


Figure 3.2 Scholarships supported by FSR and COR-Programme in the Lake Zone (1991-2003)



Box 3.5 illustrates how this problem was addressed in the Lake Zone. Long-term training increased the availability of MSc and BSc staff. After one decade, the number of PhD is still too low. This is mainly due to the fact that several PhD holders were appointed other functions at national and international level. One PhD candidate never reported back to DRD. Also at MSc level, greener pastures attract scientists. Secondments are a frequent phenomenon. In the past few years, scientists, who are pursuing long-term studies, have given lectures to their colleagues. Subjects of these lectures were new methodologies or their subject for fieldwork. These meetings were highly appreciated.

Short courses

Short courses are facilitated learning experiences that do not last more than 6 months. These courses may take place outside or within the institute.

Short courses outside the institute

Both the Lake and Northern Zones stressed practical training and identified training needs for support staff as well. The following overview illustrates short courses that were conducted outside the institute in recent years.

Short courses outside the institute (LZ and NZ)

- National FSA course (different venues)
- Training national gene bank (Arusha)
- Transport management control system (Arusha)-transport officers
- Car mechanics and handling (Mwanza)
- Registry management and filing of information (Dar)
- Bookkeeping, accounting, statistics and business administration (Mwanza)-operator
- Financial management in public sector (zonal accountant)
- Training librarian (Moshi)
- Training secretary (Tabora)
- Computer maintenance and repair (Arusha and Dar)

Most research staff has participated in the FSA course not only because they get a better knowledge of farming systems and related methodologies, but also because they gain a better understanding of rural livelihoods and are therefore, better equipped for client-oriented research (Kileo and Schrader, 2001). The institutes organised many short courses for support staff. Subjects for training were directly linked to job descriptions and planned activities. Most short courses outside the institute have improved trainees' skills and knowledge. The use of the acquired information has improved work quality and efficiency. Trainees shared their training experiences with colleagues during monthly seminars. National institutions and/or resource persons facilitated many of these short courses.

Short courses within the institute

The major characteristic of short courses is that the trainer comes to the trainees. Within the institutes many different short courses were conducted (see overview below). A major advantage of short courses organised at institute level is that a far larger number of participants can attend. In most cases, all members of the target group of the short courses attended the courses. This is in contrast with short courses outside the institute for which generally only few individuals are selected.

Short courses within the institute (LZ and NZ)

- Training of socio-economists (economic statistical analysis)
- Socio-economic training for commodity scientists (every year)
- Proposal screening and report writing
- Writing winning proposals
- Strategic planning
- Gender analysis
- Statistical analysis
- Adaptability and adoption analysis
- ZTC, ZEC and NZARF-MC: proposal screening, project monitoring, ex-post project evaluation
- Stakeholder training: developing ToR, screening proposals
- E-by-Epicor integrated financial management and accounting system
- Basic computer training
- Advanced computer training
- Desk-top publishing
- Leaflet and poster production
- Training module production
- Video production
- Service units: business skills, developing business plans, marketing, budgeting, bookkeeping

An important advantage of short courses at institute level is that because of the larger number of participants there are significant signs of improvement of knowledge and skills. An example is the computer training in the Lake Zone (see Box 3.6). The NZARDI has similar experiences. Staff was sent for specialised computer training and trained institute staff after that. TARP II also trained computer managers for maintenance and repair. In both the Lake Zone and Northern Zone staff could use their skills when provided with a repair kit.

Box 3.6 Computer training

Two staff of LZARDI were trained in computer trouble shooting (hardware and software), system administration and computer maintenance and repair at Mwanza Computer Solutions. The fact that computer attendants can maintain and repair computers on-station increased efficiency and saved costs. Back at the institute these specialists trained other staff in: Word, Excel, PowerPoint, Desktop publishing, Internet Explorer, Outlook Express. Trainees of these courses were tested by Mwanza Computer Solutions/VETA and awarded certificates for the exams they passed. The examination on desktop publishing was a presentation of work-related output (for instance a service unit flyer) to other staff members who then commented on it. More than 75% of the participants of in-house computer training use their computer skills. The workload of secretaries has been reduced because most staff can write their reports on the computer. In addition to increased work efficiency, the quality of reports has improved. Most staff members can search the Internet and communicate electronically with other stakeholders within and outside the country. This has important implications for the quality of research proposals and may eventually contribute to the diversification of funding sources.

Some courses (socio-economic analysis for commodity researchers, leaflet and poster production and training module production) are conducted every year. The leaflet, poster and training module production weeks are very practical. Participants not only learn how to produce these outputs but by the end of the training session they also produce a leaflet, poster or training module.

The Lake Zone training sessions for proposal writing and strategic planning were held immediately before related activities and involved all staff. This contributed to team building and created a positive attitude to the training sessions. These sessions were cost-effective joint experiences for the institute. Training sessions can also be extended to include other participants than institute staff. One example is the training on proposal screening organised by NZARDI that also includes ZTC, NZARF MC members and stakeholders. Another example is the proposal writing workshop that also included stakeholders and has led to the submission of joint proposals. The latter are more likely to be funded.

Another important element of short courses within the institute is the output related examination or assignment. Certificates for successful completion of training are only awarded pending the presentation of output related to the training (e.g. procurement data entered in Excel by the stores officer, an adoptability assessment for a research project) or a successful pass score for an examination.

On-the-job training ('learning by doing')

On-the-job training (OJT) is a training method that is planned, organised and conducted at the employee's work site. It is particularly appropriate for developing practical job skills that are relatively easy to learn and require locally owned equipment and facilities. There are basically two 'learning by doing' situations:

1. Senior or more knowledgeable staff coaches junior or less experienced staff;
2. Staff members learn from each other in interdisciplinary research settings.

In the Lake and Northern Zone, senior staff members and technical advisers guided and facilitated diagnostic studies, participatory rural appraisals, gender analysis, report writing and proposal development sessions. This enables staff to learn on the spot. Other examples are on-the-job training for support staff in monitoring service units and financial administration. In November 2000, ARDI Ukiriguru and Maruku recruited two young socio-economists who had just graduated from Makerere University. Senior staff and TA involved them in different studies (vegetable marketing study in Mara, adoption studies and sector studies). At present, the junior SE scientists are full-fledged team members who have elaborated winning proposals and are now in charge of research projects.

Between 1999 and 2002, Mlingano, Ukiriguru, Selian and Maruku ARDI conducted joint research activities for Integrated Soil Fertility Management (ISFM). Staff members from these institutes formed interdisciplinary teams and experiments were conducted in Arusha, Mwanza, Shinyanga and Bukoba districts. Researchers had an opportunity to learn from each other and were exposed to different working environments.

Exchange visits and study tours

Exchange visits and study tours aim to apply lessons learned from other organisations or other field conditions, in the home organisation and mandate area. In the past years, small interdisciplinary teams from Ukiriguru, Maruku, Selian and Tengeru conducted several visits. For every tour detailed Terms of Reference were elaborated. The ZDRD had to approve the ToR before the tour could be organised. Study tours were organised in relation to the following subjects:

- LZ and NZ exchange visits to share information about experiences with CORMA activities.
- Visit to TPRI gene bank to establish collaboration.
- Study tour to Morogoro and Tanga to learn about upland rice (Katrin ARDI) and spices (Tanga) aimed at preparing crop diversification activities in the Lake Zone.
- Gender study tour to KARI.
- FRG study tour from Maruku to Uganda.
- Study tour of LZARDI to NZARDI to learn more about the publication unit.
- Study tour NZ ZRELO and ZILO to the Lake Zone.
- Study tour NZ research co-ordinators, service unit co-ordinators and transport manager to Maruku

Researchers who had an opportunity to participate in exchange visits learned from experiences elsewhere and gained new ideas. Some of them share the lessons learned with their colleagues in monthly seminars. For all visits and tours safari reports were produced.

Conferences and seminars

Invitations for conferences and seminars generally include the costs of participation but exclude travel costs. Efforts were made to assist staff to go to the venue of the event, on the condition that all other costs would be borne by the organisers or other organisations.

Monthly seminars

Monthly seminars provide a forum for scientists, field officers and support staff to come together and discuss research findings and other issues. Ukiriguru and Maruku try to organise seminars every last Friday of the month. In these seminars two topics are discussed. The resource persons present their subjects with newly acquired Powerpoint projectors, which also trains them in the use of modern presentation techniques. Examples of subjects presented so far: participatory monitoring and evaluation, comparison of technology development methods, training needs assessment, preventive computer maintenance, use and handling of payment vouchers. Future seminar topics are: elaboration of staff profiles, information and research needs assessment and follow-up, research proposal format and criteria for research proposal screening, new modalities for the organisation of pre-IPR, importance of scenario writing for the production of radio plus video programmes. Seminars cover a wide array of subjects and involve different offices. Although the institutes have not been able to organise seminars on a monthly basis, the experiences so far are quite positive. The meetings do not exceed two hours and are generally well appreciated.

3.3 Conditions for success and lessons learned

For all training activities discussed, the conditions for success and lessons learned are summarised in the overview below.

Training co-ordination office

- a) There is a need for a senior scientist who is motivated for the task at hand and has (or gets) time to do the job. Clear Terms of Reference are indispensable.
- b) The role of the training co-ordinator has to be clearly communicated to all staff. After creation of the position, training related subjects have to be delegated to and supervised by the TC.

CV database and staff profiles

- a) The establishment of a CV database is a time-consuming task and cannot be done by one or two persons. It requires collaboration of all staff.
- b) The exercise will be most efficient if the preparation of the CV format has been extensively discussed. Otherwise, CV preparation has to be 'pushed' all the time.
- c) Some staff members prove to be reluctant to include all information in their CVs: they think information may be used to assess who can go for future training.
- d) CVs have to be updated regularly, preferably annually before the IPR, as CVs have to be attached to research proposals.

Training needs assessment

- a) Staff responsible for conducting a TNA needs to be trained. In addition, TNA needs sufficient time and resources for interviews and data analysis.
- b) Collaboration of staff is crucial. Explanation of the objectives and process and management support are needed before embarking on the interviews.

Long-term training

- a) Careful selection of candidates is necessary. Disciplines and study subjects should be in line with established priorities. It seems advisable to establish contractual arrangements before staff members go for further studies, in order to enhance the probability that staff will be available after completing their studies.
- b) The relation between staff on LT training and the institute should be maintained. Students have to consult the Institute when writing their proposal for fieldwork and may give lectures on their studies.

- c) Long-term training depends on donor funding; there are opportunities to secure sponsorships from other sponsors than GoT/TARPII.
- d) With low government salaries, graduates are attracted to greener pastures.
- e) The return on training investment is low, especially when compared to other training forms. In addition, it concerns individuals. For these reasons, it appears not to be the most efficient form of organisational skill improvement.

Short courses outside the Institute

- a) Short courses outside the institute are expensive (transport and living expenses) and largely depend on donor funding. Because of the incentives related to short courses, staff is generally highly motivated.
- b) Short courses at national and international level create awareness on new topics, methodologies and technologies.
- c) Careful selection of candidates is necessary. One should analyse first if acquired knowledge and skills can be put into practice. This is not always the case because of individual experience.
- d) Facilities at the institute should enable trainees to use their skills. Such facilities or equipment may need to be part of the training budget.

Short courses within the Institute

- a) Because of the group learning approach, short courses within the institute can be efficient and effective forms of training, especially when the training is directly linked to a planned activity. The importance of the shared experience and direct output production (for example client friendly output, research proposals, strategic plan) cannot be over-emphasised.
- b) However, the time allocated for short courses within the institute is often too limited. Appropriate time management is an important condition for success.
- c) Another factor that should not be overlooked is that trainees often lack motivation during training events that are organised at the station. Training at the institute is also less popular, because there are fewer incentives attached to it. Another problem is that 'normal duties' interfere with the training, leading to partial participation. It is therefore important to ensure that candidates are fully available and to improve the 'motivation package'. The provision of lunch and payment of overtime allowances are possibilities that can be considered.
- d) An additional incentive is to plan for performance based rewards for successful candidates. This can be an output-related incentive or a certificate. However, not all trainees are ready to be examined, especially in the case of partial participation.
- e) There are opportunities to select trainers locally. However, the level and experience of training facilitators should be critically checked before the start of the course. Trainers must be competent in the subjects they teach and if possible senior trainers are preferred.
- f) Groups of trainees should be more or less homogeneous according to level of education and seniority.

On-the-job training

- a) On-the-job training is very practical. Learning through experience generally has a high and sustained impact. At the institute level, there are ample opportunities for learning by doing. These possibilities have to be identified and carefully planned. This applies for interdisciplinary teams as well as for senior staff members coaching junior staff members.

Exchange visits and study tours

- a) This form of training is relatively expensive and generally only concerns a small number of staff. The advantage of visits and tours is that it works through the 'seeing is believing' principle of learning. It should focus on innovative activities, which the institute plans to implement in its mandate area.
- b) Participants should elaborate Terms of Reference before each visit. Once back, they should write a safari report and present experiences to colleagues.

Conferences and seminars

- a) Every year, there are many invitations to attend conferences and seminars and therefore there are many requests for support. A cost-effective option is to try to partially support conferences

costs (travel) while organisers cover other costs (especially when papers are written). This induces researchers to plan ahead and to communicate.

Monthly seminars

- a) Internal seminars are much appreciated. The level of attendance is satisfactory, both for researchers and support staff. It helps to improve internal communication and contributes to team building.
- b) Monthly seminars have to be well organised. It is important to prepare an annual overview of seminars, which allows resource persons to prepare their presentations.
- c) There is a need to motivate those who give seminar presentations.

3.4 Challenges and the way forward

The preceding paragraphs show that efforts can be made to ensure that training is more effective. Establishment of group learning experiences, sharing of knowledge and demonstration of skills to others can lead to significant capacity improvement and immediate practical impact.

An important challenge is to use different staff training possibilities in an appropriate manner: each training modality has its strengths and weaknesses. A major challenge is to conduct training sessions locally whenever this is appropriate and to use scarce resources for short courses for groups instead of using these funds for long courses for individuals. Under all circumstances training efforts should be directly linked to the implementation of planned activities and cover the needs of both scientific and support staff.

During the last two or three budget years, the number and quality of training sessions organised by the MAFS/DRD training office has significantly improved. The 'winning proposal writing' training that was organised in all zones is a good example. A very important challenge is to arrive at a more systematic annual planning of training events, whereby the national and zonal levels intensively communicate and exchange views. This may require the institutionalisation or at least the recognition of the importance of training co-ordination offices. This requires a clear definition of the role and ToR of training co-ordinators. The national training budget should be composed of a coherent set of national and zonal training programmes and budgets. More systematic planning also requires training needs assessments, which is the first step in the performance improvement process. It has to be underlined that a 'need' is not a want or desire. Another challenge is therefore to fit training efforts better to stakeholder needs. Training needs as expressed by individuals often originate from personal career ambitions and may not necessarily lead to improved service delivery of the research institutes.

For both long and short-term training, a more active search for additional training funds should be considered. Development partners (the new Netherlands sponsorship programme is a case in point) now consider institutional support that goes well beyond individual sponsorships. This also requires systematic institutional planning and justification of training activities.

And last but not least, one should realise that training is not the solution to all problems. Some problems, especially those related to staff motivation and access to information have to be addressed in other ways. These subjects are dealt with in the next paper.

Managing staff to enhance flexibility, communication and motivation

Jackson M. Nkuba, Peter Kapingu and Ted Schrader

Guiding principle

‘Teamwork, staff flexibility and performance-based rewards increase productivity’

Summary

Public agricultural research and development institutes in Tanzania face many challenges. Insufficient organisational flexibility, weak internal communication mechanisms and especially low staff morale are among the most important problems that have to be addressed. The goals of client-oriented research and delivery of appropriate research services cannot be attained without proper staff management. This paper argues that zonal management can do a lot to improve the situation, even in the prevailing unfavourable circumstances. Experiences in the Lake and Northern Zone suggest that several options for improving internal organisation and communication are available and that the problem of staff shortages can at least be partially solved. Job descriptions are an important tool to orient staff towards the achievement of tangible results and are also a precondition for a successful staff motivation scheme. Both zones made efforts to address the problem of low staff motivation and gained experiences with different kinds of incentives: contract research, institutional fees, reporting fees, service unit incentives, improved working conditions, social incentives and awards. These experiences can be used to formulate DRD staff management policies to enhance flexibility, communication and motivation.

4.1 Introduction

People are the single most important asset of any organisation, be it in the public or the private sector. Staff costs also represent a large share of expenditures. DRD's recurrent salary expenditures have been fairly constant between 1996 and 2000 and oscillated around TSh. 1.6 billion per year. In 2000, salary costs were more or less equivalent to the operational costs; both represented around 25% of the DRD's total expenditure (Beintema *et al.* 2003: 4). Therefore, it is important to manage human resources carefully and to ensure that staff responds efficiently to client needs and delivers the expected output.

In many African countries including Tanzania, low public salary levels for researchers are among the most serious problems affecting the productivity of agricultural research institutes and the delivery of quality research services. Salaries for staff with comparable qualifications are often much higher in non-governmental agencies. The salary of a junior research assistant at SUA or TPRI, for example, is about three times the salary of a DRD counterpart and includes superior incentive packages. Understandably, DRD has been unsuccessful in competing for and holding on to qualified staff (Beintema *et al.* 2003: 5). This especially applies to staff with high qualifications (PhDs) and of certain disciplinary backgrounds (e.g. economists). It is therefore difficult to acquire the right human resource mix of graduate and non-graduate staff, to have all disciplines and skills that are needed, to balance staff composition in terms of age and gender and to avoid staff turnover.

This situation was confirmed by results of the CORMA self-assessments, which were done in six zones. In all these zones the score for 'increase staff motivation' was generally the lowest of all 25 management capacities that were assessed. The same subject raised long discussions during SWOT analysis. It is clear that this subject touches staff profoundly and that any plan envisaging the improvement of staff performance must fundamentally address this issue.

As we saw in the box on the history of public agricultural research (paper 1), the Tanzanian agricultural research system had a semi-autonomous status between 1980 and 1989 (TARO). After this rather exceptional decade, most of the agricultural research institutes were brought back under the Ministry of Agriculture. However, the problem of staff salary and motivation has recently re-opened discussions about the status of agricultural research. In the context of the preparation of the Medium Term Plan (MTP) for 2004-2010, several options, including the return to a semi-autonomous parastatal status, have been presented. Under the public sector reform several government departments have been converted to semi-autonomous executive agencies and adopted a superior scheme of service. Furthermore, all universities, which are critical members of the NARS, operate as parastatals (URT/MAFS 2003: 48-49).

The related problems of low staff morale and insufficient salaries and incentives definitely justify a thorough review of all institutional and legal options. However, we do not further elaborate on this because it is beyond the scope of our paper that intends to discuss what can be done at zonal level. We will argue that even in the actual situation much can be done to address staff management and motivation issues. Box 4.1 presents some views of staff members on subjects related to human resource management. Many of the shortcomings mentioned can be solved at Institute level.

Box 4.1 Human resource management: some results of CORMA self-assessments

Organise a flexible workforce

Most staff members are of the opinion that they work sufficiently in interdisciplinary teams. Consensus is not high on this topic though, indicating that a significant number of staff still works rather isolated. If competence within the institute is not available, additional expertise is not often sought. Job descriptions are said to be outdated or not available.

Increase staff motivation

Staff, especially field officers and support staff, is of the opinion that they are not adequately rewarded for the work they do and the outputs they produce. As a result staff motivation is low.

Teamwork and communication among staff

Staff observes that the quality of technical and management meetings has to improve and that management decisions are not adequately communicated. The monitoring of the correct implementation of resolutions should be improved as well.

Provide clear direction and responsive leadership

In general technical and administrative leadership was positively assessed. Many staff members claim they do not know the contents of the zonal policy paper (case of the NZ) or do not know the responsibilities of the ZEC. Staff commented that the ZEC decisions are not sufficiently communicated to staff.

In the next paragraphs we will review Lake and Northern Zone experiences with enhancing staff flexibility and improving zonal management, organisation and internal communication. After that we will discuss the importance of job descriptions and review different options for performance-based staff incentives. Some initiatives had good results. The objective of this paper is to share the lessons learned and to give suggestions for the way forward.

4.2 Staff organisation: enhancing flexibility

The DRD research programme structure

Following the restructuring of agricultural research in 1989, seven Zonal Agricultural Research and Development Institutes (ZARDI) were established. Both at national and zonal level, the scientific staff

was grouped in four major research programmes: Crops, Livestock, Special (natural resources) and Socio-economics. Two thirds of the DRD researchers are involved in crop research. Rice, maize, coconut, cassava, tea and coffee accounted for 6-9 percent each, while the remaining crop researchers (60%) focus on a wide variety of other crops (Beintema *et al.* 2003: 6).

The crops and livestock programmes undertake adaptive research¹ with the objective to improve agricultural and animal production. Research focuses on the development of appropriate technologies², which are technically correct, environmentally sound, socially acceptable and economically beneficial. In principle, the crops programme works on all priority crops grown in Tanzania. An interdisciplinary perspective is important to grasp all aspects of crop production and consumption. The same is true for the livestock programme. Both the socio-economic and NRM/special programme have important roles that guide and support the technology development and dissemination process (Box 4.2).

Box 4.2. More information on Crops, Livestock, Special and Socio-economic Programmes

<p><i>Aspects of crop research and development</i></p> <ul style="list-style-type: none"> ▪ Genetic improvement and bio-diversity ▪ Seed production and input supply ▪ Agronomy ▪ Integrated pest management ▪ Labour saving technologies ▪ Post-harvest technologies ▪ Marketing strategies 	<p><i>Aspects of livestock research and development</i></p> <ul style="list-style-type: none"> ▪ Genetic improvement and bio-diversity ▪ Pastures and animal nutrition ▪ Animal health and pest management ▪ Processing and marketing of animals and dairy products
<p><i>Major roles of socio-economic programme</i></p> <ul style="list-style-type: none"> ▪ Description and analysis of socio-economic context (e.g. databases, diagnostic surveys, household stratification, gender analysis, income and expenditure analysis, adoption, market and sector studies) ▪ Identification of appropriate strategies to improve socio-economic conditions and to make the environment more 'enabling' (farmer organisation and empowerment, credit and savings, training and dissemination, communication tools) ▪ Assessment of social and economic impact of interventions and technologies 	<p><i>Major roles of special programme</i></p> <ul style="list-style-type: none"> ▪ Description and analysis of agro-ecological context (e.g. soil analysis, land mapping and surveys, and suitability analysis) ▪ Identification of appropriate strategies to improve agro-ecological conditions for production (integrated soil fertility management, water management, erosion control, agro-forestry, agro-engineering). ▪ Assessment of environmental impact of interventions and technologies

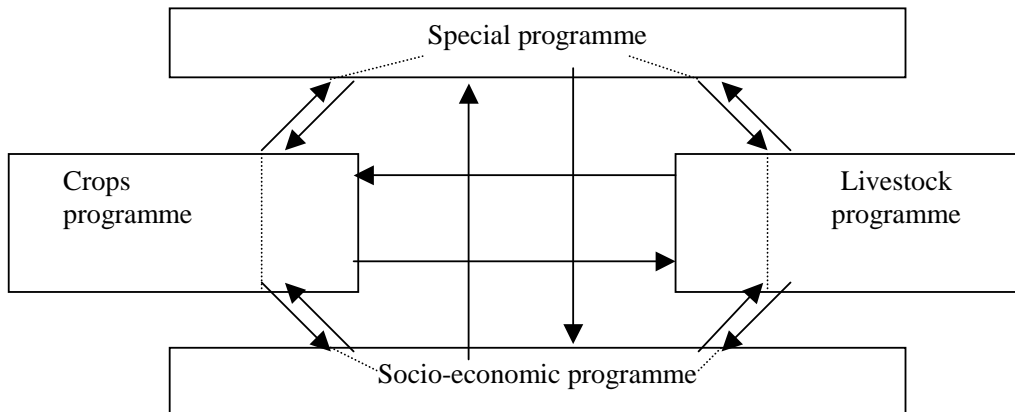
The research team as a whole needs an interdisciplinary perspective. In the context of soil fertility management or agro-engineering, the special programme should for example have attention for agriculture-livestock interactions. The socio-economic programme has responsibilities for several 'cross-cutting' subjects: access to labour, capital (credit) and markets, monitoring and evaluation. It is particularly important that this programme transfers practical socio-economic tools to commodity scientists (gender analysis, economic analysis, ranking tools and other tools).

The organisational structure of the ARDI's can be related to the dynamics of agricultural production systems and the realities of rural farming communities. In principle, the roles of the different research programmes, and relationships between them, can be clearly described. On that basis, complementary roles and fruitful collaboration between scientists could be established. The relationship between the DRD research programmes is interrelated, as shown in the following diagram:

¹ Adaptive research is defined as research designed to adjust new technology to a specific set of conditions in the (social and physical) environment.

² A technology is any one or combination of tools, equipment, planting material, farming practices and the knowledge and skills needed to use them. (DFID/NARO 2001: 3).

Figure 4.1 Relations between DRD research programmes



Insufficient collaboration

However, interdisciplinary collaboration does not regularly occur. In most institutes, staff is organised according to commodities (e.g. maize or rice) or subjects (e.g. agro-forestry). This is not a problem if the scientists concerned have a farming systems and product-chain perspective. A scientist with a farming systems perspective looks at 'his/her' commodity as part of more encompassing production system. A scientist with a 'product-chain perspective' (from breeding to post-harvest) perceives 'his/her' discipline as one out of many relevant disciplines that are needed. Unfortunately this is not the case yet. Most scientists are still glued to their commodity, theme or discipline. This is especially the case within the large Crop Programme.

The commodity-based organisation is based on the unrealistic assumption that a 'sub-programme' could have a balanced disciplinary staff mix. This is not possible with limited staff numbers. And even with additional staff recruitment it will not be possible to have all necessary disciplines for a commodity. In practice, certain 'sub-programmes' sometimes only have one scientist or field officer or lack staff altogether. Nevertheless, many researchers continue to limit themselves to one commodity or subject. This leads to several deficiencies and imbalances: some commodity sub-programmes are better staffed than others, some scientists are overloaded while others are idling. There is limited flexibility to adapt staff to client needs and insufficient communication at programme level.

Mainstreaming FSR

Between 1989 and 1996 the Lake Zone FSR team operated as a more or less separate entity within the Institute. It was as if an invisible wall separated commodity researchers from the farming systems research team. Since 1996, the farming systems research team was progressively dissolved and FSA was treated as an approach to participatory technology development that is valid to all research work. Several training activities were geared to that objective (see paper 3).

Reorganising staff according to disciplinary background

Considering the limited number of staff, management has to ensure that the available expertise is used as effectively and efficiently as possible in order to accomplish the mission of a research institute and to adequately address client research requests. For that reason LZARDI decided to organise its staff according to disciplinary background (Box 4.3). This arrangement has several advantages.

The first advantage is that it encourages scientists with a particular disciplinary background to cover different commodities. This is one way of reducing the bottleneck of staff shortages. Scientists are no longer confined to one crop; they address different commodities. A 'cotton breeder', for example, was assigned breeding for sorghum and millets. Researchers who were idle or under-used got opportunities for research in other commodities. Researchers who were overloaded got assistance from colleagues.

The second advantage is that the new set-up leads to a more flexible and appropriate response to client demands. This is particularly important from the client-oriented research management point of view. The tendency to conceive research subjects from the sub-programme (e.g. a rice scientist always coming up with rice subjects) has been reduced. Attitudes are gradually evolving into the perspective that staff has to match client demands and not the other way round. At Maruku ARDI, for example, the need to be flexible as a team came to the fore whenever there were 'non-conventional' client demands (upland rice cultivation, introduction of vanilla and spices, processing and marketing of fruits and horticultural crops, post-harvest activities etc.).

The third advantage is the improvement of the quality of work. With the broadening of the scope of work, interaction among researchers has intensified, which has widened their perspective on agricultural development problems. Certain commodities for which only breeding or pathology work was done are now dealt with in a more comprehensive way.

The new set-up makes better use of scarce human resources, increases efficiency and productivity, enhances the outward-orientation of the institute and improves service delivery. The ultimate goal is that researchers work according to projects and assignments that are based on client demands.

Box 4.3 Organisation of staff according to disciplinary background at Ukiriguru ARDI

The situation at Ukiriguru ARDI was that some (Crop) sub-programmes could have a breeder, and not a pathologist or agronomist, whereas other sub-programmes only had an agronomist or pathologist and lacked expertise in plant breeding. In 2001-2002, Ukiriguru ARDI organised several staff meetings during which this problem was discussed. The fundamental question was why a breeder should be confined to a certain crop and an agronomist to another? The outcome of the discussions was that everybody agreed that this indeed leads to a rigid organisation that is insufficiently able to respond to client demands. It was therefore decided to group researchers with similar disciplinary backgrounds together. After all, scientists are trained in disciplines, not in crops. At the end of 2002, all researchers were reallocated to new offices according to their disciplinary background (breeding, agronomy, plant protection, livestock, natural resource management and socio-economics). At the same time it was agreed that all Heads of Programme would share offices in the front research building. This would enhance communication across programmes and would enable the Institute to receive visitors better.

Temporary employment

The organisation of staff according to disciplinary background does not solve all staff shortage problems. Sometimes additional expertise is needed to fill gaps. Management could consider hiring expertise on a temporary basis. In order to avoid putting an unrealistic burden on the self-help fund, an institute should first make a financial analysis to see whether the salary can be paid and costs will be recovered through additional income generation activities. Both Lake and Northern Zone have experiences with recruiting temporary (scientific and support) staff (Box 4.4).

Box 4.4 Temporary staff recruitment

In November 2000, the Lake Zone employed two young agricultural economists who had just graduated from Makerere University. One was based at Ukiriguru and the second at Maruku ARDI. The objective of their presence was to fill gaps that existed, to acquire additional research contracts and to improve the quality of research. The first year was an on-the-job training experience. Since last year, the two economists have become confident team members and have succeeded to get research assignments. The self-help fund has been able to pay their salaries.

Lake Zone transport service units employed nine drivers on temporary contracts (six at Ukiriguru and three at Maruku). The Ukiriguru publication unit has two staff on temporary contract. The catering units of both Ukiriguru and Maruku have hired canteen and hostel attendants. Their salaries are paid from the money generated by the respective service units. Northern Zone service units also employ several people, who are paid from unit revenues. At Selian ARI the publication unit pays three staff, while the transport unit employs 4 drivers. This has reduced the burden on the Self-Help Fund.

Partnerships

Partnerships offer another opportunity to access expertise that is lacking or in short supply. Certain interdisciplinary research projects require expertise an ARDI does not have and for which temporary recruitment is not an option. Examples are public health, cartography, animal health, food processing, engineering, irrigation and others. For these subjects, collaboration with partners is required. For different research projects, Lake Zone gained experience collaborating with TANESA (Aids and food security) and VIC (Newcastle disease vaccine). It is suggested to pay more attention to these kind of alliances in the future. For fieldwork activities effective collaboration can be established with district authorities and NGO's. An example is presented in the use of paraprofessionals in Same District to implement and monitor a project on soil salinity in the Ruvu Basin (see paper 9). This not only reduces costs but also increases stakeholder involvement and ownership of research activities.

Thematic interdisciplinary working groups

For certain research priorities thematic working groups may be appropriate. This is especially the case if subjects cut across disciplines. In the past years, the Lake and Northern Zone established the following working groups: gender, integrated pest management, bio-diversity and integrated soil fertility management. The number of team members ranged from 5 to 9 persons and included researchers and stakeholders. Experience shows that thematic interdisciplinary working groups can function well if they have a clear mandate and job to accomplish. Terms of Reference for the group as a whole and individual team members are indispensable. Demand-driven contractual assignments that indicate when the job must be completed are the best guarantee for success. Research-driven groups that are not based on clear assignments are likely to face many problems: endless unproductive meetings, lack of co-ordination of tasks and domination of some members, unfinished data processing and analysis, lack of output, loss of direction etc. It has also been observed that interdisciplinary working groups have a tendency to become an end in itself. Institutionalisation of working groups seems justifiable only when a constant flow of client requests and assignments is anticipated.

4.3 Zonal management and organisation

Zonal Executive Committee (ZEC)

The Zonal Executive Committee functions like the Board of Directors of zonal ARDIs. The ZEC is responsible for general oversight of zonal agricultural research and development activities. The ZEC is the apex executive body and as such it is responsible for approving zonal research programmes and budgets. The ZEC has to meet at least once or twice per year. Since 1999, the Lake Zone ZEC has met on average three times per year. The main subjects of the ZEC meetings were the review of progress reports, the analysis of work plans and budgets, the allocation of research awards, the organisation and results of stakeholder meetings and the analysis of LZARDI financial sustainability initiatives. The membership of ZEC in the Lake Zone is as follows: RAS (chairperson), ZDRD (secretary), Livestock and Crop advisor Mwanza, CARE International, Nyanza Co-operative Union, two farmers, ZRC and two heads of programme/section (on rotating basis). The composition of the ZEC has been brought in line with the PIP instructions that stipulate that non-researchers should constitute 75% of the membership of ZEC. This rearrangement also helped to improve the gender balance and the representation of the four Lake Zone regions in the ZEC.

Relations between ZRELO, ZRC and ZIMO

In 1998 and 2000 respectively, the Ministry of Agriculture and Food Security created two new offices within the Zonal Agricultural Research and Development Institutes: the Zonal Information Management Office (ZIMO) and the Zonal Research Extension Liaison Office (ZRELO). The establishment of these offices indicates the importance that is attached to stakeholder involvement, information management and the production of attractive and user-friendly output. The ZIMO and ZRELO offices complement the office of the Zonal Research Co-ordinator in many important ways

and all are focused on the provision of quality research services. ZRC, ZIMO and ZRELO activities are very closely linked, as indicated in Figure 4.2.

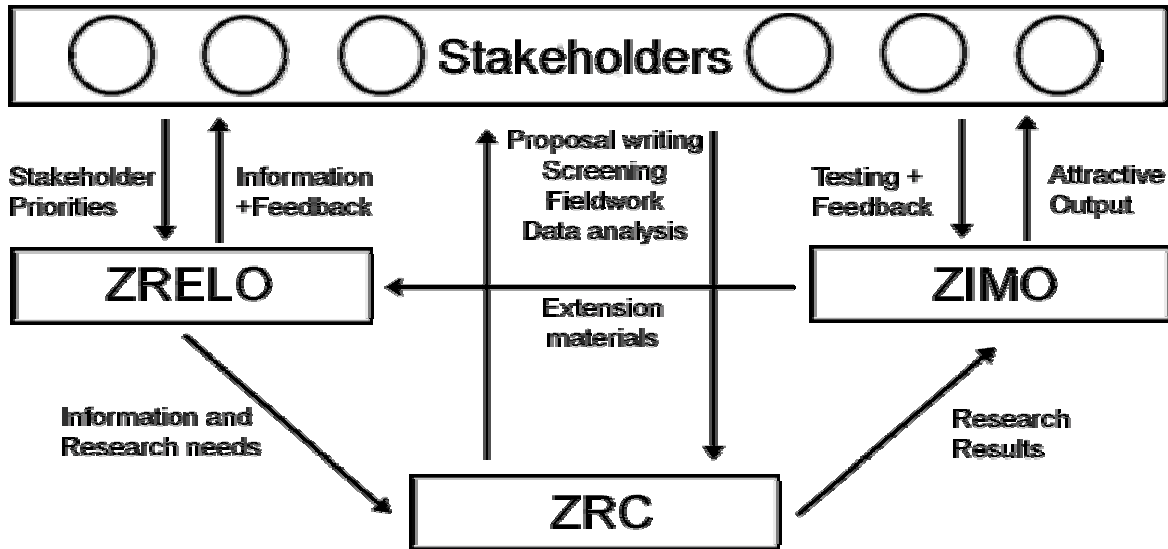


Figure 4.2 Relations between ZRELO, ZRC and ZIMO

At LZARDI, the Terms of References of ZIMO and ZRELO were reviewed and some overlap between the two was discovered. Changes were suggested whereby all activities related to information management became the responsibility of ZIMO while all those related to linkages would fall under ZRELO. These modifications were sent to DRD for approval and thus adopted for use in the Lake Zone (see this paper and paper 11 to find some more details on the job descriptions of ZRELO and ZIMO respectively). The ZRC, ZRELO and ZIMO functions, which are related to zonal positions, are also operational at Maruku ARDI. The Zone took the initiative to give some scientists these roles. For internal communication within the zone, these persons are informally called the 'Assistant ZRC', 'Assistant ZIMO' and 'Assistant ZRELO'. They often communicate with their zonal counterparts based at Ukiriguru ARDI.

Management Team (MT)

Larger organisations need Management Teams. A Management Team is composed of the major Assistant Managers (Heads of Programmes and sections) who report to the general manager (the Zonal Director). The level of Assistant Managers is crucial for proper two-way communication within an institute. They are responsible to bring issues from the work floor to the attention of the management and to inform their collaborators about management decisions that were taken. The Management Team of Ukiriguru was established in September 2002 with the objective to monitor and plan institute activities and to discuss general staff welfare issues. The members of the Management Team include all major functions: ZDRD, ZRC, Heads of Programmes (4), ZRELO, ZIMO, training co-ordinator, Head of Accounts, office supervisor, service unit co-ordinator, farm manager, transport officer and the Research Academic and Allied Workers Union (RAAWU) representative. The Zonal Director is the MT chairperson and the team elected the secretary among its members.

4.4 Internal communication

In any organisation, the issue of internal communication also needs sufficient attention. In this paragraph we will discuss different kinds of meetings as other methods of internal communication.

General staff meetings

A staff meeting is defined as a gathering of all staff or workers that belong to an organisation located in a certain place (Government Standing Order 1994). In this context, staff refers to every person at a place of work irrespective of the terms of the employment (permanent, temporary or contract). A staff meeting provides an opportunity to discuss issues of interest for all workers and allows management to share information on new developments and to get feedback. Staff meetings need preparation and must give room for participants to air their views. Prior to 1998, Ukiriguru staff meetings were held twice per year. Communication between management and staff was poor leading to many rumours in the office. To alleviate this problem, zonal management, in collaboration with the local RAAWU branch, planned quarterly staff meetings, chaired by the RAAWU chairperson. Main points on the agenda are issues of relevance to staff welfare, feedback from management team meetings, information on new developments affecting the institute as well as directives from higher authorities.

Monthly meetings

The monthly MT meetings at Ukiriguru review progress reports of every represented programme and section and discuss staff welfare issues. The secretary is responsible for editing the action-oriented minutes of the meeting. The summary of discussions is printed in normal font, whereas resolutions, tasks and action points are printed in italic. This facilitates subsequent monitoring of implementation. Resolutions that were adopted in the MT meeting are communicated to other staff during section and programme meetings, general staff meetings, quarterly meetings and displayed on notice boards. Ukiriguru has not been able to hold meetings every month. In practice there have been six meetings per year. Monitoring of the implementation of resolutions still needs more attention.

Quarterly meetings and reports

In the Lake Zone, the venue of quarterly meeting alternates between Maruku (July and January) and Ukiriguru (October). This system has had a positive impact on the communication between the two institutes. In April, there is no quarterly meeting because of the IPR, which is held at Ukiriguru. The quarterly meetings bring the management teams of Ukiriguru and Maruku together. Some days before the meeting, all delegates submit their specific reports to the ZRC, who then compiles the draft quarterly report that is discussed during the meeting. In addition to the monitoring of activities, quarterly meetings are zonal MT meetings during which zonal policies are discussed and adopted.

The format for the quarterly progress that is presented in Box 4.5 was adopted in September 2002. In line with the contents of every chapter, responsibilities have been given to specific officers. In this way, compiling the quarterly report is a team effort and a shared burden. For most chapters, the responsible officer has to get basic data from colleagues within his/her office. For that reason, it is important that programme or section meetings take place before monthly and quarterly meetings.

Starting in September 2002 HORTI Tengeru organises quarterly staff meetings. These meetings were initially started to discuss progress related to CORMA activities that were identified in the annual workplan for Tengeru 2002-2003. Meetings are chaired by the assistant ZRC, a position that was created in July 2002. Gradually these meetings have expanded to include other staff issues. They can be expanded further to cover progress in research projects as well. These meetings have greatly enhanced internal staff communication.

Box 4.5 General outline of Lake Zone quarterly report

	Responsibility
<i>Part I : Monitoring implementation of work plan</i>	
1. Staff and human resource development	Training co-ordinator
2. Assets, equipment and support services	Service unit co-ordinator
3. Financial management	Head of accounts
4. Linkages and collaboration	ZRELO
5. Research planning, monitoring and evaluation	ZRC
6. Research output	ZIMO
7. Dissemination and research-extension-farmer linkages	ZRELO
<i>Part II : Research progress reports</i>	
8. Crop research programme: cash crops	Senior scientist
9. Crop research programme: staple crops	Senior scientist
10. Crop research programme: roots and tubers	Senior scientist
11. Crop research programme: other crops	Senior scientist
12. Livestock research programme	HoP Livestock
13. Special research programme	HoP Special
14. Socio-economic research programme	Hop SE
<i>Part III : Conclusions and priorities next quarter</i>	
15. Conclusions and priorities next quarter	ZDRD

Weekly meetings

Maruku ARDI starts every week with a short (one hour) meeting on Monday morning that involves most staff. The meetings evolved from meetings that used to be organised by the FSR team in the institute. The group evaluates results of the previous week and plans the activities for the coming week. The Maruku research co-ordinator makes short minutes that are the basis for monitoring the implementation of activities. This system, which is feasible for smaller institutes only, has enhanced team spirit and has improved the implementation of activities. In addition, it enables an institute to react promptly on stakeholder needs and to correct errors.

Specific committees

In both the Lake and Northern Zone specific committees have been established that are responsible for certain tasks: research committee, review committee, financial committee, investment committee, rehabilitation committee, social committee, information management committee and linkage committee. To facilitate reporting and feedback at least one MT member is always represented in these committees. Our experience is that small committees can make an institute more responsive to client and staff needs and are efficient to get specific jobs done.

Other internal communication tools

Other important tools for enhancing internal communication are:

- *Effective use of notice boards:* Ukiriguru has three, Maruku two, Selian two and Tengeru one notice board. These are used for all information that is useful to staff (announcement of visitors, meetings, internal seminars or training sessions, reminders to submit reports or contributions, information about books, websites, seminars, sponsorships, call for papers, administrative information like health insurance and social information like the rehabilitation of the primary school or weddings). All notice boards are regularly updated.
- *Use of internal memos.* Important information is circulated through internal memo's. Examples are handing-over notes and instructions from headquarters. For important meetings targeted participants are personally approached and have to indicate whether they will participate in the meeting or not. Important documents are circulated as well.
- *Safari reports.* Writing a safari report is not only a requirement to settle imprests, it is also a tool to share information within an organisation. Safari reports are copied to most MT members.
- *Meetings at programme, discipline and section levels.* Information has to circulate between staff, from top to bottom and from the bottom to the top of an organisation. Meetings at the

intermediate level are important for that reason. And of course these meetings are important for detailed planning and monitoring of activities.

4.5 Job descriptions

A job is a collection of major duties that comprises the responsibilities of a staff position. A duty is a segment of the work performed in a job, usually comprising several tasks. A task is a distinct identifiable work activity that forms a logical and necessary step in the performance of a duty (ISNAR 1997: 89). A job description therefore indicates the duties/responsibilities of a staff member. A detailed job description may include tasks, but this is not generally the case. Tasks are more likely to be defined and updated during staff meetings. Job descriptions need to be reviewed annually or whenever deemed necessary. Job descriptions are important for both staff and supervisors. It helps staff to plan their activities and it cultivates a sense of responsibility and recognition. Job descriptions help managers to monitor and evaluate the performance of their staff. Job descriptions are also indispensable for the establishment of transparent staff motivation policies. Such policies require a clear and verifiable description of expected performance and outputs, which can then be linked to rewards and incentives.

Officially all government employees have at least some kind of job description. However, self-assessment exercises revealed that not all DRD staff was aware of their job description. Many staff members observed that the description of their duties was vague, outdated and/or no longer in line with actual duties. Many support staff do not have job descriptions. In the Lake Zone, job descriptions were established or reviewed according to the needs of the institute. Among others, job descriptions were adapted/elaborated for ZIMO, ZRELO, service unit managers, the accounts office and other support staff (see Box 4.6 for some examples). Also, Terms of Reference were established for several committees. The Northern Zone prepared job descriptions for the training officer, ZIMO, computer manager, Webmaster, service unit managers and started preparing Terms of Reference for accounts staff.

Many research staff members have more responsibilities than research duties alone, e.g. ZRC, ZIMO or Head of Programme. In the case of the Lake and Northern Zone, many staff members have additional responsibilities that are the result of the CORMA change process: service unit co-ordinator or manager (see paper 7), computer/network manager (see paper 5), training co-ordinator (see paper 3) or liaison officer (see paper 1). In addition some staff are member of committees like the information management committee (see paper 11). It is important that these duties are explicitly acknowledged in the job description and that time allocation is estimated.

Recently, the government adopted the performance based contract system as defined in the Public Service Reform. At DRD and in all zones the description of duties and tasks of scientific staff and Heads of Programme was updated. Unfortunately, the exercise was only shortly explained and the time allocated was rather limited. As a result, some staff filled out the form quickly, describing their duties in broad terms and submitted them. These difficulties notwithstanding, the staff performance assessment that will probably take place in July 2003 on the basis of job descriptions and planned output, is an important step. At the same time, new duties and outputs will be defined for the 2003-2004 budget year. The performance-based staff monitoring and evaluation system deserves close attention from all staff. It may result in improved planning of activities, lead to a gradual change of the organisational culture gearing it towards performance, output and impact.

Box 4.6 Examples of job descriptions (Lake Zone ARDI)

<p>Publication supervisor</p> <ul style="list-style-type: none"> ▪ Supervise photocopying activities ▪ Make sure that bills are prepared at least three days after the service rendered ▪ Acquire and keep all necessary materials in safe custody and use them as necessary (e.g. printing papers) ▪ Make sure that all payments are made for the services rendered ▪ Hand over the money collected to the accountant and receive the receipt. Cross check/reconcile with the accountant for income and expenditures in the unit ▪ Keep records for all activities carried out, show the materials used (even the wasted papers should be recorded) ▪ Responsible on arrangement of routine services of photocopiers and other equipment allocated in the publication section ▪ Assist the SUC in the monthly financial analysis ▪ Answerable to the SUC and to the Officer in charge of the station <p>Transport Officer</p> <ul style="list-style-type: none"> ▪ Responsible for all transport requests at the institute ▪ Responsible for assigning vehicles to customers ▪ Prepare the bills at least three days after the service rendered ▪ Make follow-up for payments ▪ When payments is by cash, give the money to the accountant and get the receipts ▪ Assist the SUC in the monthly financial analysis ▪ Answerable to the SUC and to the Officer in charge of the station 	<p>Zonal Research Extension Liaison Officer (ZRELO)</p> <ul style="list-style-type: none"> ▪ Meet on a regular basis with regional and district authorities, NGO's and other stakeholders in the zone, to identify gaps in zone-specific technologies and give feedback to research. ▪ Organise, in collaboration with relevant authorities, stakeholder workshops and seminars at zonal, regional and district level, targeting specific issues related to agricultural development in the zone. ▪ Be a member (ex-officio) of the Zonal Executive Committee (ZEC). ▪ Identify and organise the participation of resource persons in training sessions relative to district training calendars. ▪ Organise participatory field visits involving researchers, districts, NGO's, farmer organisations and other stakeholders to identify farmers needs and researchable problems. ▪ Advise DALDO and DEO's on the organisation of field days, exhibitions and agricultural shows in the districts and zone. ▪ Collaborate with the Zonal Economic Unit and other sections at the Zonal Head Office in matters related to stakeholder involvement and liaison activities. ▪ Prepare Zonal Quarterly and Annual reports for the Zonal Research Director with copies to PS-MAFS ▪ Prepare budgets and work plans for zonal liaison activities. ▪ Visit and liaise with zonal sub-stations on matters relating to linkages and collaboration. ▪ Perform any other relevant duties as may be assigned by ZDRD, in consultation with AD for Extension.
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4.6 Staff motivation

Science is a vocation, but also an income generating activity. As we wrote in the introduction of this paper, the remuneration of agricultural research staff is very low and promotion opportunities are limited. Although the year 2002 had some improvements (promotions, start of more transparent and performance-based assessment system), the scheme of service does not allow scientists to solely rely on the income derived from research activities. It is not surprising that most researchers have other sources of income besides their salary. This distracts them from their actual research duties and leads to absenteeism. Staff searches for other job opportunities and many have left for greener pastures. Realising the importance of staff rewards, the Lake and Northern Zone ARDIs have taken many initiatives to improve the situation.

Contract research and institutional fees

In 1995 contract research was initiated in the Lake Zone, and in 1998 in the Northern Zone. Since then, many stakeholders in the respective mandate areas have requested and funded research projects (district councils, DRDP's, NGO's, regional projects like KAEMP and MarafIP etc). The institutes charge an institutional fee (IF) of 50 USD per scientist per working day, of which 60% is for the

researcher and 40% for the Self-Help Fund. Travelling time, data analysis and report writing are not included (outputs are separately rewarded). In the Northern Zone, liaison officers or other staff who acquire new assignments are awarded 10% of the institutional fees, which leaves 30% for the SHF. The LZ and NZ institutes have been quite successful in acquiring contracts, especially Maruku ARDI where contracts represent 30-40% of the research budget. This has significantly contributed to staff income and motivation.

At first, the payment of institutional fees was only possible with research contracts. In 1999 this was extended to ZARF-funded projects. In 2001, the Lake Zone extended the institutional fee payment policy to TARPII/COR funded research projects, for which contracts were established between the Zonal Director and the PI concerned. There are now more possibilities for scientists to get additional incentives for their work. For these three funding modalities, the IF is included in the research budget, which ensures the sustainability of this incentive system. However, for most collaborative projects and for Cess-funded projects, the payment of IF is still not adopted. As a result scientists may give more priority to research projects for which rewards are foreseen.

Reporting fees

In the Lake Zone the former FSR project paid incentives for both scientific and user-friendly materials. The fees aimed to motivate staff to analyse data and write reports. Gradually these fees evolved to institutional reporting fees. The Northern Zone introduced reporting fees in 1998 and included them in the zonal policy. In both zones, the rewarding system now focuses on the production of research outputs and their dissemination. Fees were set for scientific reports and papers, but also for posters, leaflets and training modules. The reporting fees have resulted in a sharp rise in the number of reports that are produced (see paper 11). Reporting fees can be included in research budgets and funded by clients.

Service unit incentives

Both the Lake and Northern Zone have established service units (see paper 7 for more details). Each unit has a business plan and is managed by a unit manager, often assisted by other staff. The units manage their services in a business-like manner. In the Lake Zone, a part of the sales is transferred to the Self Help Fund from which incentives are paid. In the Northern Zone, each unit is allowed to retain 20% of the quarterly profit as staff incentive on the condition that this does not exceed US\$ 50 per person per month. For both zones the system is sustainable because staff incentives are part of the cost price of the services provided.

Working conditions

Good working conditions motivate staff. Both zones have tried to work on the following work-related subjects: availability and quality of office space, furniture, computers, telephone, fax, e-mail and internet, improvement of station roads, electricity and water, regular team meetings, performance reviews, security at the institute, transparent accounting and leadership, training sessions, study tours and other work-related conditions. Also staff has been allowed to use Institute farm land for private cultivation.

Social incentives

The Self-Help Fund and donor funding contributed to the availability of recreational and educational facilities like canteen, community centre, games, satellite dish, television set, rehabilitation of nursery and primary school premises. In addition, the self-help fund contributed to the organisation of get together parties (New Year, Workers Day) and facilitates transport to town in case of emergencies.

Awards

Previously, LZARDI had annual awards for the best scientist, the best research project, good publications, successful interdisciplinary teams etc. For 2002-03 this award system (which rewards good performance after tasks have been completed) was changed into an incentive system whereby

rewards are announced in advance. This may have the advantage to improve the performance and output orientation of staff. For both modalities the sustainability of funding is a weak point.

Staff motivation: conditions for success

The following four factors need careful attention when conceiving a staff motivation strategy:

1. *Participatory definition of goals and indicators.* The clear definition of goals and the availability of objectively verifiable indicators are crucial for the successful implementation of any incentive package. The goals set by management should be challenging but reachable. Implementers should consider them to be fair and reasonable. The goal-setting process (and the control of output and results) should therefore be a transparent and participatory process.
2. *Sustainability.* It is easy to find the means to reward people when funds are abundant. But what if funding stops? Institutes should therefore develop sustainable incentive action plans that are based on funding modalities that can be maintained. The experiences with institutional fees, publication fees and service unit incentives are encouraging in this respect. They can be included in activity budgets and sponsors are generally willing to accept the payment of fees if indeed they get value for money.
3. *Rewards and sanctions.* People tend to look at rights (rewards) and forget about duties (tasks to perform). There is a risk that staff considers incentives to be a legal right and expect to get the incentive irrespective of the quality of work done. Non-performance should not be rewarded but sanctioned. Any staff incentive scheme therefore also needs to consider sanctions and should be very clear about conditions that have to be met before a reward can be given.
4. *Biases.* It is easier to conceive incentives for certain staff categories than for others. Special attention is needed for managers and support staff. Incentives for management tasks and support staff tend to be extra complex as they are difficult to relate to specific activities and budgets.

Research institutes can achieve high levels of staff motivation if they go through the following steps:

- Set and agree on the goals of the Institute, programme, section and job;
- Design jobs that give people a sense of responsibility;
- Ensure that appropriate financial means are available for performance-related incentives and rewards;
- Announce clearly and beforehand that certain behaviour and output will be rewarded when people succeed but will be sanctioned if they fail;
- Create effective feedback mechanisms on the performance of staff.

4.8 Challenges and the way forward

Although the dominance of the commodity approach is gradually diminishing, staff members still often limit themselves to their traditional fields of inquiry. Some organisational rearrangements are necessary to create a more flexible workforce. The review of staff positions and responsibilities and the organisation of staff according to disciplinary background has several advantages. It can help to face the problem of staff shortages and to bring staff availability in line with client demands (and not the other way round). The challenge is to define flexible organisational settings that motivate researchers to work according to projects and assignments that are based on client demands. This organisational change is also needed to improve communication and interdisciplinary collaboration among staff.

Agricultural research institutes need management teams that are composed of the zonal director and his assistant managers. Depending on the size and the specific operational structure of an institute, a management team of 8 to 12 persons can cover all aspects of the organisation. This is important for delegation of tasks and for the planning, implementation and monitoring of all activities. It is

important to check whether the organisation chart and the composition of the management team match.

There are many opportunities to improve internal communication. Depending on its size and communication needs, every institute can define an appropriate system of weekly, monthly and quarterly meetings. The objectives of any system of regular meetings are transparent decision-making, close monitoring of activities, internal communication and teamwork. It would be useful if DRD could harmonise the table of contents for quarterly progress reports. Lake Zone experiences could be used as a starting point.

Job descriptions should be available for all staff positions and should include all actual tasks. Job descriptions are a necessary condition for establishing a performance-based staff assessment system. The implementation of the performance-based assessment system that was recently adopted by the government merits more attention.

Scientists should be in a position to complement their low government salaries with additional rewards that are based on successful fulfilment of duties. A well-balanced staff motivation system that combines different kinds of incentives might motivate staff to go into the direction the organisation has intended. The Lake and Northern Zone experiences show that performance-based and output-oriented incentives definitely help to improve the implementation of activities and to enhance the production of final output: people are motivated to do something if they know they will be rewarded for it. These incentives can also substantially improve researchers' income that may help to maintain staff within the research system.

Four factors are crucial when conceiving a staff motivation action plan: the participatory definition of goals and indicators, the sustainability of incentives, a balance between rights and duties and between rewards and sanctions and finally the inclusion of all staff categories. Motivation packages should be reviewed at both zonal and ministry level. This should lead to a harmonisation of staff motivation policies within DRD. These possibilities should subsequently be communicated to all stakeholders, because incentives should as much as possible be incorporated in activity budgets.

Staff management is the responsibility of every manager in an organisation. Within DRD, there is a need to improve human resource management capacities. Senior scientists are not necessarily good managers (and good managers are not necessarily good scientists). This not only asks for leadership and management training, it also requires harmonisation of staff management modalities so as to clarify what is expected to be done. Delegation of authority and tasks, organisation of meetings, follow-up and monitoring of action points are some important subjects that need attention. Management theory and practice suggest that managers should not occupy their positions too long or too short; the optimum period for a management position is said to be somewhere between 2 and 8 years (Huntington Hobbs, 1999).

Up to now, zonal institutes have partial autonomy regarding staff management and have limited 'hiring and firing' opportunities. This paper has shown that even within that context zones can do a lot to enhance staff flexibility, internal communication and staff motivation. However, no staff transfers are allowed above TGS 2, which limits the establishment of well-balanced teams in the zones. The recruitment of new staff is at ministerial level, which bears the risk that zonal staff requirements are not sufficiently targeted. Moreover, zonal research institutes only have a limited mandate to sanction staff that fail to accomplish assigned tasks. Further decentralisation and more zonal autonomy are therefore a challenge that should also be gradually addressed and implemented.

Information management: From old habits to new technologies

Barnabas W. Kapange, Peter Xavery and Ted Schrader

Guiding Principle

‘Professional scientific organisations must have access to modern information and communication technologies and manage their information systematically’

Summary

Until very recently, information management was largely based on hardcopies and manually compiled data. Scientists still have insufficient access to up-to-date information, which seriously affects the quality of their work. Management information is often incomplete and does not come in time, which affects the quality of decision-making. The ICT revolution is rapidly changing this situation. This paper describes how scientists access to information is gradually improving, how investments in information and communication technologies are leading to better working environments and what issues are being addressed to improve the management of information within the DRD system. Although much has been achieved, a lot remains to be done to improve the situation. This paper identifies conditions for success and formulates major challenges for the near future. It is argued that DRD management should fully support the change from traditional paper-based systems into digitised information management systems.

5.1 Introduction

Agricultural research is the art of collecting evidence about certain phenomena to produce practical knowledge for specific target groups. Information is a crucial asset for researchers: without access to up-to-date information they cannot properly do their job. Systematic information management is essential for research institutes to operate efficiently and effectively: institutes are part of wider research networks and have to communicate with their clients, not only with sponsors and partners, but also with beneficiaries and end-users of technologies. Access to up-to-date information and systematic management thereof are crucial assets for scientific organisations.

The third millennium is a world based on increasingly fast communication. We now live in the era of information. The last decade of the 20th century witnessed an unprecedented revolution in information and communication technologies, making information and knowledge factors *sui generis* in societal and economic development. Modern Information and Communication Technologies (ICTs) provide remarkably powerful and cheap means of managing information. Considering the ease of processing, storage and wide dissemination of information, scientific institutions have many reasons to treat information as an important resource and its management as a key task.

The situation prior to 1998

Up to only a few years ago, the zonal information management systems in place were not much developed. This was a result of the poor resource base (human, physical and financial), which was inadequate to accommodate the build-up of an effective information system. DRD and zonal management focused on conventional paper-based information management methods and did not

give high priority to investing in new information technologies. Also, little was done to record and preserve research outputs. Poor communication facilities hampered the exchange of information within the country and abroad. Scientists only had access to old-fashioned libraries with outdated books and journals. Even when more recent literature was acquired, there was a lack of sufficiently trained staff to manage that precious information. Scientists did not have access to the vast information available on the Internet.

Since then, the Department of Research and Development (DRD) of the Ministry of Agriculture and Food Security (MAFS), through the Tanzania Agricultural Research Project Phase II (TARP II) of which the Client-Oriented Research Programme is a component, has invested time and money to revamp and strengthen information management in the DRD system. Zonal management has also made efforts to do the same. This paper reviews these combined efforts that have changed the general outlook of the zones in terms of information management. We will review and discuss the following:

- Sources of information (5.2);
- Information and communication technologies (5.3);
- Management of information within DRD (5.4).

For every subject achievements and lessons learned are highlighted. The concluding paragraph presents some of the major challenges for the near future.

5.2 Sources of information

Good access to different sources of information is crucial for research organisations to operate successfully. Scientists need access to information in their office. In addition, it is increasingly important that scientists know how to access information that is located outside the institute. Scientists need to consult handbooks and scientific journals, they need reliable statistical data, information from resource persons within professional networks and they need to browse the Internet.

Handbooks

Handbooks are indispensable in any professional library. DRD has supplied some. More books will be sent later to the zones and stations. More internal co-ordination and communication with the zones might be useful. CTA, the publisher of *Spore* Newsletter, has devised a system whereby subscribers can earn points that allow them to select books. In this way, the Lake Zone, for example, got free access to dozens of very interesting books.

International journals

Access to professional journals and literature searches are indispensable for any agricultural scientist. If a researcher is deprived of this, he/she will be isolated and work more slowly, less effectively than one with access to information. The DRD is arranging acquisition of journals that scientists themselves indicated interest for. There are several other possibilities to get access to journals.

International databases and abstract series

International development partners such as CABI, CTA, FAO and KIT provide abstracts, full-text articles or bibliographic overviews on CD. These organisations have generously provided the DRD and zonal institutes with databases or abstract series, e.g. CAB, AGRICOLA, AGRIS, TROPAG/RURAL. Tanzania is part of the European Initiative for Agricultural Research and Development (EIARD) Information System as a pilot state. EIARD Infosys is an instrument to promote partnerships between European stakeholders and developing countries. The DRD head office could make additional effort to get access to comparable services. Zonal institutes could be more proactive acquiring them.

TEAAL

The Essential Electronic Agricultural Library (TEEAL) or 'library in a box' is a full-text database of renowned scientific journals. TEEAL is a result of co-operation between Cornell University's Mann Library (one of the largest agricultural libraries in the world), the Rockefeller Foundation, and leading scientific publishers. The TEAAL library includes articles that were published in more than 130 scientific journals since 1993. The set of 172 CDs contains 730,000 full-text pages, which means that even diagrams, figures and photos are available. The price is USD 10,000. This seems a lot until you consider the cost of the printed journal versions that equals USD 370,000. The range of topics that is covered is very broad: rural development, sustainable agriculture, natural resources, environment, food processing, veterinary medicine, range management, agricultural engineering, crop development, animal management, pest control, economics, soil science, nutrition, forestry etc. Having access to TEEAL equates to having a modern agricultural and related sciences library. Instead of a large library you only need a small room. Researchers of institutes located in a remote area can use it, provided there is electricity and a computer with a CD-ROM drive. The CD-ROMS are updated annually. For more information see Murdy and Sultan (2001) or www.teeal.cornell.edu. The DRD provided TEAAL to four zones including the Northern Zone. The remaining three zones will receive TEAAL by mid-2003. In every zone staff was instructed on how to use TEAAL. In the Northern Zone rather than keeping the CD-ROMs in the library, and in the absence of a ZIMO who could normally be responsible, these can be borrowed from the Publication and Communication Unit. The unit keeps a register. Unfortunately so far very few researchers use the CD-ROMs.

The INASP-PERI and other initiatives

Most African research cannot get access to up-to-date research in their subject. University libraries cannot afford the journals, neither can they publish research easily and African journals do not circulate widely. This is true, to a lesser extent, in other developing regions. The International Network for the Availability of Scientific Publications (INASP) is radically changing this picture. Over the next five years, all researchers with internet connections in up to 40 countries will get online access to over 6,000 journals and abstracts from another 20,000 titles - from African Development Review to the Veterinary Journal. Publishers have agreed countrywide access licences at heavily reduced rates. This is a very good reason for all institutes to get on-line. At the same time, INASP is helping journals published in developing countries to go online and provides opportunity for a range of 'Internet' training to help ensure that the information available is utilised to its fullest potential. DFID supports the 'Programme for the Enhancement of Research Information' (PERI) to complement existing funding from the Danish and Swedish governments. Ghana, Kenya, Malawi, Mozambique, Tanzania, Uganda and Zambia were among the first countries to have licences. More details are available at www.inasp.info/peri/index.html. Accounts from Kenyan and Ghanaian academics of its impact so far are in INASP's newsletter of February 2002.

The Humanity Libraries Project, a Belgium-based private organisation, produces CD-ROMs that contain the full text of hundreds of books on development. The Humanity Development Library is a single CD-ROM containing 1230 publications (160,000 pages) all in a very easy-to-use format. The original publications would weigh 340 kg and cost \$20,000. The CD-ROM and its protective envelope weigh just 25g and costs only € 6.00 (More info at: www.humanitycdrom.org).

Free journals and ToC announcement services

Many organisations that edit journals provide free subscriptions to persons and organisations from developing countries. These journals often provide practical information in an attractive style and include book reviews, seminar and conference announcements and information about scholarships. DRD and the zonal institutes are not fully exploiting this opportunity and should be encouraged to subscribe to these journals. A list is available for some 50 journals. Table 5.1 gives some examples. For other journals, institutes could subscribe themselves to ToC services, i.e. the announcement of Table of Contents. If the title of an article sounds promising, then an e-copy or hardcopy can be requested.

Table 5.1 Example of two free journals

Name of journal	Cost	Periodicity	Address	E-mail	Description
SPORE	Free	Bi-monthly	CTA Postbus 380 6700 AJ Wageningen The Netherlands	cta@cta.nl for readers' letters: spore@cta.nl Website: www.cta.nl	Bi-monthly publication of CTA providing information on agricultural development for ACP countries
LEISA	Free of charge on request	quarterly	ILEIA P.O. box 64 Kastanjelaan 5 3830AB Leusden The Netherlands	ileia@ileia.nl for subscriptions: subscriptions@ileia.nl Website: www.ileia.org	Magazine on low external input and sustainable agriculture

Databases and statistical data

Besides international databases, there are also nationally managed databases that are of importance. These include: CARIS, SPAAR InfoSys, TARD, FAO statistical database, MUSADOC, Management of Agricultural Research by ISNAR and others. All zones participate in the updating of CARIS that is eventually sent to FAO for incorporation in the global database.

The statistical unit of MAFS prepares a wide range of statistics that includes information on production areas and yields of food and cash crops, climate and rainfall, irrigation, agricultural inputs, plant health services, agro-processing. This information is available in booklets that provide basic data on the Tanzanian agricultural sector. The information is also accessible at the MAFS web-site (<http://www.kilimo.go.tz>). Database updating is not as frequent as it should be.

The CORMA encourages networking with other stakeholders in the zones. In the Lake Zone, research and stakeholders agreed that the quantity and quality of statistical data was deteriorating fast after the collapse of data collection by local governments. At first (1994-1999), LZARDI tried to establish and maintain its own database but this proved unfeasible. It was agreed to change the approach and to involve other stakeholders and specialists in the database establishment exercise. Several partners reacted enthusiastically and some promising meetings were held. However, the facilitator, the International Institute for Communication and Development (IICD) pulled out, most likely because the regional statistical bureau did not properly co-ordinate the exercise. Unfortunately, practical results have never come out. Not only in the Lake Zone is the lack of reliable statistical data one of the major information shortages scientists face.

Networks

The DRD is part of regional and global information networks. It is the focal point for information exchange with the CGIAR International Agricultural Research Centres (IARCs) and other organisations like FAO (CARIS database), CABI, DFID, CTA. DRD is also member of regional information networks such as Regional Agricultural Information Network (RAIN) of ASARECA, Southern African Agricultural Regional Information Network (SAAINET) of SACCAR and many others. These networks enhance the access to information and may lead to regional collaboration.

Searching the Internet

In a very short time, the Internet has probably become the most important source of information for agricultural scientists. In one way or another, most scientists have become acquainted with the World Wide Web (WWW), very often on their own initiative and effort. They have created their personal e-mail accounts and use them for communication with colleagues in Tanzania and abroad. Although an increasing number of scientists search the Internet for literature and background information, this has not yet become a habit for many of them. One of the major reasons is that investments in ICT lag behind the international developments and staff has not been sufficiently trained.

5.3 Information and communication technologies

Information and communication technologies include all technical options to get access to information and to communicate with others. Although conventional techniques are part of ICT, this term generally refers to electronic and computer-based technologies.

Communication

Considering government policies and costs, institutes still need conventional landline telephone connections. However, most scientists have and use mobile phones, which are often more reliable than TTCL landlines. With mobile phones you are personally reachable even on safari and in the field. Internal communication between scientists and institutes has definitely improved since the widespread use of mobile phones. The importance of radio and fax is getting less important. In the Lake Zone for example, the COR programme has made efforts to establish an Intercom system to ease communication within the institute. This is particularly important for larger institutes.

Computer management

A scientist without a computer is like a carpenter without a hammer. We can't do without computers anymore; we need them for proposal and report writing, for statistical analysis, for sending e-mails and for browsing the Internet. The COR Programme has facilitated the acquisition of hard- and software and the training of staff (see also paper 3). The programme put major emphasis on sound management practices and insisted that computer management is more than just installing a computer. It requires surge protection, voltage regulation, back-up power supply (UPS, generator, solar energy), virus protection, regular maintenance. Institutes therefore, need competent computer managers and attendants for maintenance and trouble-shooting. Both LZARDI and NZARDI staff (computer room managers and attendants and publication unit manager) received computer repair toolkits. They can address (and help avoid) the most common problems. Moreover, proper computer management needs internal policies especially in relation to sustainable funding of computer use (repairs, Internet provider, replacement of cartridges, *etc.*). The COR management approach explicitly acknowledges that, in this ICT era, sound computer management is an important function within an institute and a precondition for access to information (CD-ROMs, Internet) and proper management of information.

Local Area Network (LAN)

A Local Area Network (LAN) links computers of an institute together through a server. This enables communication, file sharing and sharing of equipment (e.g. printers can be shared). It can also reduce the cost of printing substantially. Rather than giving a colleague a hard copy of a proposal the file can be shared on the LAN. A LAN also helps to get access to Internet or to send and receive e-mail from your desk. And finally, it can lead to the systematic back-up of information. The COR programme facilitated the establishment of LANs at Tengeru, Selian, Maruku and Ukiriguru. The installation of the LAN at Ukiriguru was not without problems. The first attempt to install the LAN failed as the appointed company had insufficient experience, cables and hubs were of bad quality and computer managers were insufficiently trained. This prompted re-installation, this time with another company. This example shows that investments in assets and equipment are not just a matter of installing devices for the system to work perfectly. The DRD also installed LANs for Uyole and Tumbi stations. However, in all stations staff needs practical training on how to use a LAN to its full extent.

Internet and e-mail connectivity

The DRD intends to connect all major institutes to the Internet before the end of 2003. DRD has connected Tumbi and Uyole ARDI to full Internet access. COR did the same in the Lake and Northern Zones.

The Northern Zone got a dial-up e-mail connection at Selian ARI in 1996, and Internet connection in 1997. In 2001, the COR Programme together with the USAID funded *AfricaLink* project of ASARECA (Association for Strengthening Agricultural Research in Eastern and Central Africa)

supported connectivity to the Internet. Equipment and LAN were installed; first subscription fees paid and would-be Internet users trained. Currently, there are 17 computers connected that have full Internet access, hence reducing the use of fax and telephone. Each user pays a monthly subscription fee of about USD 22 to the Publication and Communication Unit. The fee that users pay includes a small maintenance contribution for the computer manager to be able to maintain the LAN. The zonal administration has been very supportive to the initiative and scientists can no longer do without the connectivity. At Tengeru, COR has facilitated establishment of the LAN, provided a Very Small Aperture Terminal (VSAT), 2 computers and a 3 months subscription fee.

There was no Internet connectivity for Ukiriguru and Maruku before the COR programme. In 1999 Maruku installed a radio-connection for e-mail (Bushlink), in the same year, Ukiriguru was connected to AfricaOnline (dial-up). Costs were borne by COR programme. The radio and dial-up connections did not work very well. In 2003, VSATs were installed at Maruku and Ukiriguru.

The investment costs and monthly subscription fees for Internet and email are high. Most research institutes are far from town and cannot have a wireless TTCL connection. The VSAT solution is technically sound but zones incur high recurrent costs. Maruku has a bandwidth of 48 kbps (16 up and 32 down) which costs USD 600 per month. Ukiriguru starts with a bandwidth of 16 kbps, which costs USD 336 per month. This calls for strategies to sustain these payments after the TARP II and COR projects phase out. The strategy of Ukiriguru is the establishment of an Internet café (see figure 5.1). Users will have to pay for the Internet service (TSh 1,000 per hour). Scientists will be encouraged to put Internet connectivity on their research budgets (direct costing method; see paper 6 and 7).

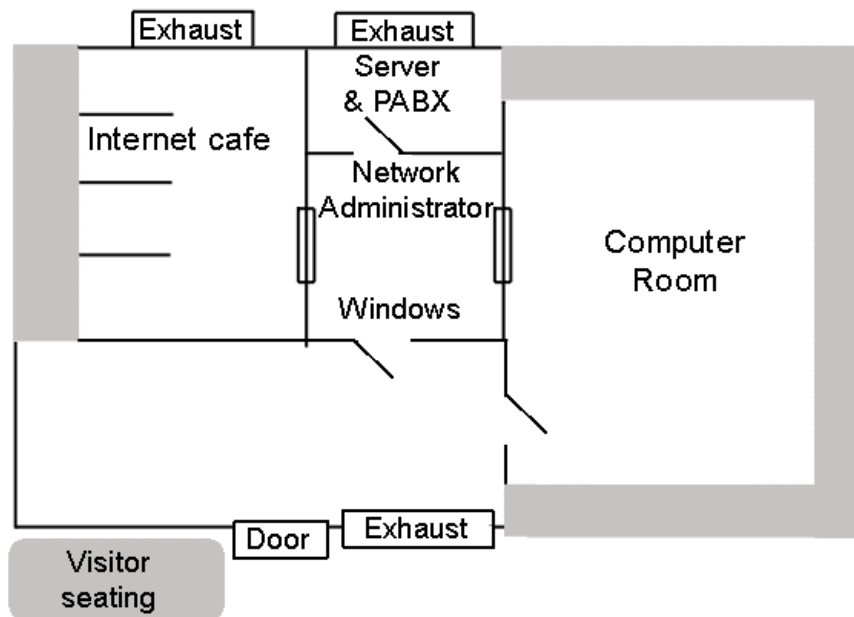


Figure 5.1 Internet café at Ukiriguru

5.4 Information management within DRD

DRD Information and Documentation Unit

DRD edits in-house publications related to the DRD system; these include *The Tanzania Agricultural Research & Training Newsletter*, biannual *Tanzania Journal of Agricultural Sciences (TAJAS)* - jointly published by the DRD and SUA. The DRD Information and Documentation Unit holds handbooks, proceedings, reports, policies, theses/dissertations, maps, directories, newspapers, and

since recently, all *Bunge* reports at the DRD library. Important documents are sent to zones and stations. Also, the DRD is providing the stations with the TEEAL CD-ROM library. The Information and Documentation unit will install the Tanzania Agricultural Research Database (TARD) at all stations, and is updating the CARIS database.

Libraries

Users of the DRD library can borrow books and journals. Reading services are open to different users who are free to browse the library materials. Book lending and circulation is available to DRD personnel only. The loan period lasts 2 weeks and three items can be borrowed at a time. To cope with modern ICT and increased customer demand, the DRD library system is due for computerisation.

Most zonal libraries are in poor condition. They are badly equipped and poorly managed and therefore not frequently used. An average zonal library has piles of (old) books and bundles of papers: all dusty and termite-ridden. Catalogues do not exist or are no longer maintained. The libraries generally do not even provide up-to-date information. Scientists do not have access to journals that contain the latest findings and do not have books that describe standard techniques. Scientists may therefore be using outdated information and methodologies, repeating experiments that have already been done elsewhere. This is like working blindfolded: it is the scientific equivalent of solitary confinement (Mundy and Sultan, 2001: 219). Establishing a state-of-the-art library is expensive. It would have to subscribe to dozens of journals and buy hundreds - if not thousands - of books. However, it seems that the digital technology is coming to the rescue. So what can be done?

1. The first step is the (low-cost) rehabilitation and upgrading of long neglected libraries. At Ukiriguru, some rehabilitation was undertaken to store the existing collection better, to make a more comfortable reading corner and to present current journals better. The library was provided with a list of more than 50 free journals. The library attendants, supervised by the Information Management Committee, are currently subscribing the Institutes to these journals. At Maruku, the existing collection was reclassified and better presented. This first step encouraged scientists to visit the library more often. Both institutes acquired some modern handbooks. More scientists are now borrowing books and most books are returned because monitoring has improved. Library users are allowed to take books and journals to the publication unit to make photocopies.
2. The second step consists of preparing the libraries to become information centres, using books, journals, computers, databases and the Internet. In the Lake Zone, the COR programme provided a computer to the library for the use of the TEAAL CD-ROMs.
3. The third element of library management is training. Libraries not only need new facilities, librarians also need new skills: they should become information specialists. In line with that, the library attendant of Ukiriguru was sent for an in-country training course including computer use in libraries, anticipating computerisation of the library in the future. At Maruku, Tanzania Library Services provided on-the-job training for the staff. Selian plans to contract a professional librarian to rearrange, classify, and catalogue documents in the library. If possible, professional librarians should be trained, rather than partially utilising field officers as library staff.

The DRD is in the process of distributing books to the zones and will distribute more books and journals that have been ordered through an appointed agent.

Management Information Systems

Managers need reliable information to guide an organisation towards better performance and service delivery. New information can result in an Institute offering new products and services, to reshape jobs, and perhaps to profoundly change the way they conduct research. A Management Information System (MIS) is not just the storage of information in a computer. A MIS is a system that uses formalised procedures to provide management at different levels of an organisation with appropriate information, so as to enable them to make timely and effective decisions for planning, directing, and

controlling activities for which they are responsible. The information a MIS may contain and provide depends on the expressed needs of the management. The set-up of valid management information systems requires an understanding of the organisation, the management and the Information Technology shaping the system (see figure 5.2). Management information systems help to find adequate responses to challenges posed by the environment. Only when managers have articulated their information needs can IT experts conceive a MIS (it shouldn't be the other way round). When considering what information should be included in a MIS, a practical rule of thumb is that a MIS should hold only the minimum data that are required for the purpose. Information overkill should be avoided.



Figure 5.2 MIS: combination of the organisational reality, information needs of the management and the potential of information technology

DRD has adopted the Information for Research Managers (INFORM) database as its management information system. ISNAR conceived and tested INFORM for national agricultural research systems. The objective is to inform research managers about human, physical and financial resources, as well as about past and on-going research projects. Unfortunately, the initial training of INFORM practitioners was not accompanied by the provision of software and on-site monitoring. This situation has been corrected, but the question remains with sustainable regular updating of information. This requires management commitment and motivation of staff working with INFORM.

Box 5.2 INFORM management information system

Research managers are increasingly faced with the challenge of raising the efficiency of agricultural research and produce client-friendly output that advises about appropriate technologies for farmers. Among others, they must have good information about research inputs, e.g. human, financial and physical resources. Such information must be well organised, accurate, up-to-date and easy accessible. It should be available in various forms so that it can be used to serve different needs. INFORM can answer the following questions:

- What proportion of the research budget is allocated to different commodities or: what proportion is allocated to different zones and stations?
- What proportion of scientists' time is spent on research, management or extension?
- How many researchers have BSc., MSc., and PhD degrees?
- What is the gender balance of staff?
- What proportion of the research budget comes from GoT and donors?
- How much is assigned to scientist salaries, labour costs or transport?

Personnel files and CV database

Research management includes the management of staff. Data on research staff in a MIS should be limited to information that is of direct interest for the management of research programmes. Any additional data can be better located in a separate Personnel System. In more advanced systems the two databases could be linked. In such cases, all personnel data could then be kept in the Personnel System and retrieved when necessary for MIS outputs. Both the Lake and Northern Zones have made great efforts to establish staff CV databases (see paper 3).

Registry

Up to now, institute registries are not managed professionally. However, the correct classification, storage and dispatch of official documents is of great importance for any organisation. Failure to retrieve documents not only causes internal frustration, it also gives a bad impression to the outside world. The COR programmes have given some support to the registries: book shelves, file cabinets, and stationery. At Ukiriguru, a registry assistant was sent for a 3-month clerical training course in Dar es Salaam. Considering the advanced levels of ICT, it seems appropriate for DRD to consider having electronic registry files containing personnel and other information.

Financial data

Accurate and timely information about income and expenditure is crucial for adequate management decisions. A transfer to computerised and integrated financial management and accounting systems is now possible (see paper 6).

Local knowledge systems

The need for establishing and recognising farmers' knowledge about a terminology for natural resource classification (soils, vegetation, and land use types) cannot be overemphasised. When collaborating with farmers in on-farm experiments, it is equally important to know what kinds of local weights, volumes and measurements are used and to relate these to scientific methods of quantification.

Agricultural knowledge and information systems (AKIS) and information sharing

Scientists work together with subject matter specialists, extension workers, government institutions, NGOs, private sector, farmer and community-based organisation, farmers, *etc.* (see list of stakeholders in paper 1). Together, these actors or stakeholders form an Agricultural Knowledge and Information System (AKIS). Bridging communication gaps and sharing of information within the AKIS is a major challenge. New information and communication technologies can be used to provide information to audiences, to help audiences find information and to facilitate dialogue (Mundy and Sultan, 2001: 3).

The Lake and Northern Zone have produced client-friendly outputs, made publication lists, established publication archives and defined modalities for the distribution of research outputs to stakeholders (see paper 11). They are also producing a technology reference book, which provides an overview of the technologies generated in each zone. As regards publishing activities, COR has injected capital for the establishment of publications units. As a result, there is now a larger flow of publications and other research outputs that reach farmers and other stakeholders.

Websites

The DRD has its own website (<http://www.drd.mafs.go.tz/>) that went up on the web three years ago. More and more documents, for instance the *Research & Training Newsletter*, and policy documents are now available online. The DRD has been actively involved in the planning and implementation of the World Bank-funded Tanzania Development Gateway, which is a one-stop Internet portal for all development related information for Tanzania. A prototype is now available at <http://www.tanzaniagateway.org>

The Lake and Northern Zones are currently building their own websites (see Box 5.3).

Box 5.3 Proposed contents of homepage LZARDI and NZARDI websites	
<p><i>About us</i> <i>LZARDI / NZARDI strategy and policy</i> <i>Ukiriguru ARDI / Selian ARDI</i> <i>Maruku ARDI / Horti Tengeru</i> <i>Staff directory and expertise</i> <i>Research programmes</i> <i>Publications</i> <i>Training</i> <i>Services</i> <i>Partners</i> <i>Events</i> <i>Links</i> <i>FAQ</i> <i>Contact us</i></p>	<p>The preparations for the websites for the Northern and Lake Zone have just started. The homepage will present a short profile of the Institute (concise vision and mission statement) and of course the Institute logo and some informative pictures. The right hand side of the homepage could present a kind of notice board announcing upcoming events. The left side of the homepage presents buttons linking to the main 'chapters' of the webpage (from 'about us' to 'contact us').</p> <p>For all these chapters the contents have been defined in collaboration with staff members who showed a lot of interest. The challenge is now to get quality information written and edited. That job should not be underestimated, because it is more work than writing a book. To facilitate the process it is proposed to organise web page writing days. Some staff members will be trained in web design and maintenance.</p>

5.5 Challenges and the way forward

In the past decade the world has changed, with the ICT revolution dramatically transforming the way in which knowledge is generated, communicated and assimilated. Information and Communication Technologies have become so compelling to most organisations that they realise that they run the risk of being isolated. The fundamental challenge in the domain of information management is therefore the change from traditional paper-based systems into digitised information management systems. This transformation needs strong management support.

Adoption of modern ICT within DRD

The way information management is handled influences every part of a research organisation: human and financial resource management, the institute's public image, relationships with stakeholders, the quality of research work and the capacity to avail research outputs to the intended clientele (to mention but a few). The DRD has therefore every reason for adopting modern ICTs in facilitating researchers' access to resources of information and technologies world-wide. DRD should ensure that all Institutes get Internet and e-mail connectivity in the nearest future and look for possibilities to link DRD institutes, privatised research institutes, SUA and other non-DRD agriculture related research institutes such as TAFORI, TAFIRI, in one NARS network.

Computer and network management and sustainable use

Installing computers and VSATs is relatively easy. Continuous and sustainable use of these assets however requires sound computer management: cost recovery policies, updating of hardware/software, network management and trouble-shooting. This requires competent IT staff, thus compelling the DRD to add human-ware to hard- and software. Computer and Internet users need additional training in order to make full use of the potential. Scientists should be sensitised to include communication costs (including Internet) in their research proposals and budgets.

Improved access to information

Tanzanian researchers are often like 'professional prisoners' locked up in traditional paper-based working conditions. The ICT revolution can radically change this situation in a cost-effective manner. Whole modern libraries are available on CDs and the Internet provides opportunities we only dreamt about ten years ago. These possibilities should be further explored, extended and made available to the zones. Scientists should be trained to use facilities effectively and quality standards for research proposals and research outputs should be raised.

Improved library services

The quality of library services can be improved in three phases, so that libraries become 'information centres'. Libraries can acquire more up-to-date publications and journals at low cost (or for free). Computerisation of library services can be foreseen, at least at DRD level. Librarians need to be trained to prepare them for their new role as 'information specialist'. Improved library services will entice increased use of reference services such as TEEAL and others.

Institutionalisation of MIS

Although INFORM has been adopted, the successful establishment and maintenance of this management information system still needs attention. It might call for further sensitisation of research managers and directors on the importance of the system and training on how to use it.

Institutionalisation of information management

Information management can improve if activities related to it are better co-ordinated. Information management has many dimensions: library, computer management, databases, registry, output production etc. In the Lake Zone for example, the information management committee of the ZIMO office co-ordinates all information management related activities. This has largely contributed to some of the successes. This example and organisational set-up might be considered by other zones

Accountability: transparent use of financial and physical resources

Magdalena Shiyyo and Ted Schrader

Guiding principle

‘Supervisors, clients and the general public have the right to assess that research institutes use funds efficiently and effectively’

Financial administration and control are a key management task in any organisation. A professional accounting system gives credibility to an institute and builds trust among staff. National governments and international development partners attach increasing importance to accountability and transparency. Higher accounting standards and internal control mechanisms will be required to maintain and secure funding for agricultural research. The COR management approach considers financial management one of the priority areas for improvement. This paper presents experiences with computerised integrated financial management, internal control mechanisms, direct and variable costing methods, procurement, and asset management. The lessons learned may guide future policies that envisage more requirements for accountability and transparency. The authors suggest that the account office could gradually develop into a financial management department.

6.1 Introduction

Financial management issues are delicate. Increasingly, the subjects of accountability and transparency raise attention, both at the level of national governments and international development partners. People often ask about the meaning of these concepts. Box 6.1 gives definitions that address the sound administration and use of financial and physical resources.

Box 6.1 Some definitions

An *accountant* is a professional keeper and inspector of accounts, who administers all transactions and compares income with expenditure.

Accounting is the art of keeping and verifying accounts.

Accountability is the capacity (or ability) "to demonstrate in a transparent fashion that mandated goals and objectives have been achieved through the efficient and legal use of resources" (Eponou, 1998: 260).

Transparent: transmitting rays of light without diffusion so that bodies behind can be distinctly seen.

Transparency: situation that is easily understood, free from disguise, frank.

Having defined the concepts, the next question is of course why these concepts are important for agricultural research institutes. There are three major reasons why financial management, accounting, accountability and transparency are of utmost importance for research institutes:

1. *The decentralisation process.* In the 1990's the Tanzanian NARS underwent several structural changes. One of the most important changes is the decentralisation of research planning and implementation to the zonal level. Increased authority at the zonal level, in order to manage agricultural research according to client needs, requires the strengthening of zonal management

capacities. Further empowerment of the technical structures at the zonal level requires strengthening of the administrative and financial infrastructure (including that of the banking system) if decentralisation is to be effective (Elliot, 1998: 123). This is one of the reasons why CORMA paid much attention to financial management capacities.

2. *External accountability.* The second justification is linked to the diversification of funding sources. It is now generally agreed that public agricultural research systems can become sustainable and more effective by being allowed to tap into different sources of funding. Although government funding may remain the most important single source of money, other funding sources are gaining importance. Resource mobilisation strategies thus become a key element in the management of agricultural research (see also paper 8). Having more sources of money means that more requirements have to be met and more financial reports have to be produced. This is the second reason why financial management is an area that deserves more consideration than it has been given in the past, especially since investors are becoming more and more demanding. While stakeholders and farmers (and their organisations) have previously been quite passive, they are now beginning to exert pressure on research organisations. Increased accountability may even become their primary condition for contributing funds to agricultural research (Eponou, 1998: 260-61).
3. *Internal transparency.* The performance of agricultural research institutes is affected by recurrent operating cost problems. The first step in addressing this issue is to identify the cause and extent of the problem and to bring this to the attention of the zonal management, headquarters and main financiers so that appropriate solutions can be jointly identified. This requires appropriate financial analysis and reporting and internal discussions (see also paper 7). Within DRD, zonal institutes can tap additional sources of funds and explore new and less conventional income-generating activities. The income thus derived benefits zonal Self-Help Funds. However, these initiatives require more complicated internal financial procedures and transactions. Scientists and support staff who contribute to income-generating efforts will ask for financial information. If the financial management system can deliver correct and timely information, staff commitment and trust can be maintained. Sharing of financial information and internal transparency are therefore crucial.

The challenge of accounting and accountability is to use resources efficiently and effectively for the intended purpose and to handle funds according to national and international standards of financial management (i.e. the Tanzania Statement of Accounting practice and the International Accounting Standards). Organisations that develop and maintain high accounting standards do not only gain trust of clients, stakeholders, farmers and the general public, but also gain confidence from their employees.

Accountability and transparency issues are strongly related to other challenges of research management: stakeholder involvement, networking and diversification of funding, acquisition of contracts, progress reporting, sustainable service delivery, and human resource management. Insufficiencies in the financial management system can compromise the functioning of an entire institute.

Within DRD, many scientists perceive an account office as an office that should handle claims and put figures together when needed. Most zonal accounts are operated manually and are not managed in the most efficient manner. Moreover, the account office is often in the margin of the organisation and not highly considered by research staff (see Box 6.2).

Considering the above, the following goals were formulated and became important objectives for the research institutes in the Lake and Northern Zone:

- Computerisation of the accounting system for the entire institute (integrated financial management and accounting system);
- Improvement of efficiency of account office and clear task description for all accountant staff;
- Use of direct variable costing method for budget preparation;

- Improved handling of claims and transparency of decision making;
- Set-up of comprehensive asset and equipment management system;
- Timely production of financial reports;
- Involvement of account office in management team and management committees.

Box 6.2 Working conditions and functioning of the Lake Zone account office in 1998-99

- Limited office space and no telephone extension in the account office
- Many different forms and manual registers, leading to duplication of work
- All kinds of people submit claims and enter in account section
- Most of the account section work is done as routine work, based on practical experience
- Difficulties to retrieve past records
- Accountant staff computer illiterate; reports for Government and most donors manually prepared
- No inventory of assets and equipment for the institute as a whole
- Imprests issued from different sources of funds, leading to duplication and control problems
- Account office not represented in Management Committee

6.2 Integrated financial management and accounting system

This paragraph describes practical experiences from the Lake Zone in establishing an Integrated Financial Management and Accounting System (IFMAS). The goal was to create an efficient financial management system for the entire institute that would enable the LZARDI to adhere better to Government regulations and requirements. Specific objectives were to establish strong computerised internal controls that would reduce the risk of errors and omissions, to improve recording and storage of financial information and to produce comprehensive and reliable financial reports in a timely manner for DRD, sponsors, stakeholders, the zonal management and staff.

The process started in 2000. At that time, the choice for an appropriate software package proved difficult. DRD/TARPII had adopted the FINPRO system while the Ministry of Finance had adopted the Platinum system (Platinum was later renamed 'E by Epicor' or 'Epicor'). Although donors largely supported efforts for good governance and improved accounting, there was an obvious lack of donor co-ordination and harmonisation of approaches. LZARDI therefore faced a dilemma. The FINPRO financial software was never used in the Lake Zone, because one of the two trained accountants died and the other accountant did not feel capable enough to put the system into practice. After several consultations with DRD, it was decided that LZARDI would adopt the Epicor IFMAS, because the Government of Tanzania had adopted it as the standard computerised financial management and accounting system. It was envisaged that all Ministries, sub-treasuries and districts would use this system. It was therefore considered useful to get experience with this system in the Lake Zone, in anticipation of later expansion to other zones. Box 6.3 describes the introduction of the Epicor IFMAS in detail. It shows that the transition towards an integrated automated system is very demanding indeed.

Initial reactions of LZARDI staff were negative and sometimes even hostile. The payment process was slow in the beginning and the account section was blamed for that. The IFMAS issue was a recurrent point on the agenda of staff and management meetings. With the improvement of the handling of the system and especially when financial reports were produced in time, the complaints became less. At present, most users, both within and outside the account section are satisfied.

When setting up the integrated financial management system, the account section elaborated new job descriptions. These stress the complementary role of the zonal director, HoPs and the account office, as well as the separation of tasks within the account office to ensure transparent decision-making and system security (see also Box 6.3). Apart from general supervision and co-ordination of the accounting procedures and integrated management system, the zonal accountant was also made responsible for support missions to Maruku ARDI.

Box 6.3 Introduction of the integrated financial management system in the Lake Zone

Preparation. LZARDI approached Soft-Tech Consultants in Dar es Salaam for training and introduction of the Epicor System. The preparations started in January 2001 with the conceptualisation of the framework of the financial management system. This included the editing of a new manual, adapted to a computerised situation.

Training. A condition for successful Epicor training was to have basic computer knowledge. A computer-training institute was contracted to train the account section staff, supplies officers and transport officers. After the computer training, a one-month IFMAS training, attended by the account staff and supplies officers from Ukiruguru and Maruku, took place in May-June 2001. This training covered the following modules: general ledger, cash management, account payable, account receivable, system management, multi-currency manager, asset management and tools for the generation of financial reports.

System security and separation of tasks. The Epicor system distinguishes three types of user groups: the system administrator, managers and operators. The system administrator has the overall responsibility and allows access to users. The system administrator never enters or approves transactions in the system, because this would violate internal accounting control mechanisms. The managers are the certifying officers who have to approve transactions in the system. They are responsible for ensuring that transactions are in compliance with Government financial regulations and with instructions contained in the Epicor manual. Operators are account staff who are responsible for entering transactions promptly and accurately in the system. System operators have to ensure that all data are entered on a daily basis in order to avoid the build-up of backlogs. The system does not allow operators to approve transactions.

Chart of accounts and coding system. Epicor uses the GoT chart of accounts. This helps to design and accumulate financial data according to assets, liabilities, revenues, expenses or capital items respectively. In addition, the codes have three segments. Segment 1 indicates the Zone, institute or service unit. Segment 2 indicates the source of funds, the objective and activity. Segment 3 indicates the sequence number. This coding system helps to keep information about specific sources of funds, research projects and other activities. This is very helpful for the production of customised financial reports.

Getting started. The Epicor system became operational in July 2001, after LZARDI synchronised all budget years with the GoT budget year (July-June). For that reason, the IPR was organised in April. At the beginning, the processing of claims was slow and several technical problems were encountered. After some time, most accountant staff got more conversant and confident with the system.

New forms. After one quarter, the manual system was abolished and simple claim forms were conceived. This reduced the amount of work considerably. The new form replaced the previous Government and COR forms. They clearly show the claim process, from claim submission to the delivery of the cheque. Since Epicor is the official Government system, auditors and the sub-treasury have accepted and commended the forms.

Bank account system

At the start of the 2001-02 budget year, LZARDI decided to rationalise the number and type of bank accounts and to create one bank account structure for the Institute. All COR project accounts were abolished. Clients (including donors) transfer money to the (local and forex) income accounts of the Institutes. These accounts are with the same bank. For the monitoring of receivables it is important to have a bank that gives clear details on the source of funds. According to the activities supported by the sponsor and/or the service to be provided to the client, money from these accounts is transferred to one of the four expenditure accounts: research account, self-help account and two service unit accounts (see Figure 6.1.). The research account is for the operational costs of all research projects. The Self-Help account is for all expenditures that cannot be attributed to research activities. For the service units two bank accounts were established: one for operational costs and one for capital expenditures.

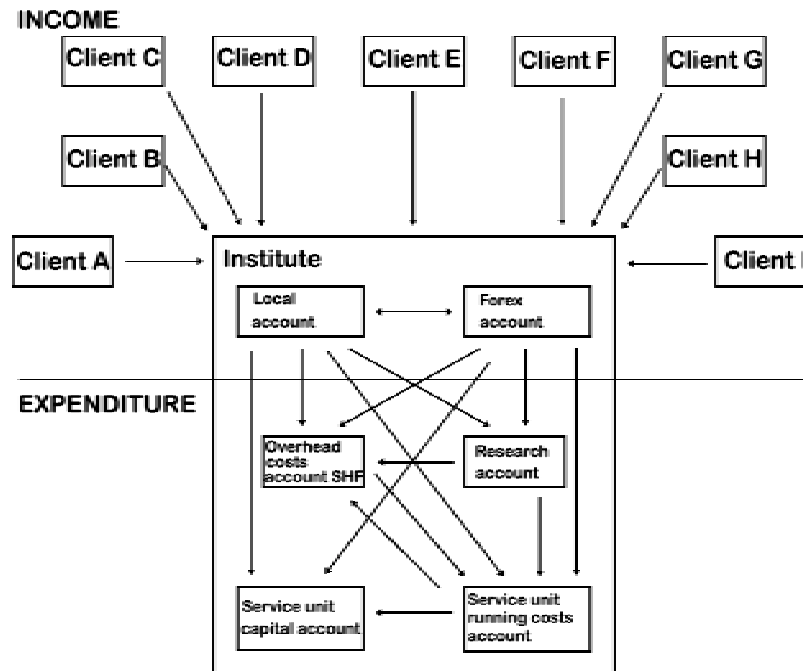


Figure 6.1 Client-oriented bank account structure LZARDI

6.3 Direct costing, improved budgeting, claim handling and imprest management

CORMA supports the improvement of budgeting capacities of all staff and the transparent handling of claims and imprests. This paragraph presents experiences from the Lake and Northern Zone.

Direct costing method

In the Lake and Northern Zone expenditures for different costs used to be handled as lump sums. Realistic costs for transport use, stationary, telephone and email use, photocopying, reviewing, ploughing and other services were not itemised in research budgets. To cope with the problem of insufficient recurrent operational funds, the institutes decided to attribute costs as much as possible to specific activities, or - in other words - to make indirect costs direct. For this, costs had to be made variable (per unit of service delivered, for instance one kilometre of transport, one photocopy) so that users could buy services. With the establishment of service units, cost prices were determined and these costs were to be included in research and other budgets (see paper 7 for more details).

Improved budgeting of research activities

An important implication of the direct variable costing method is that staff has to be very attentive when planning activities and elaborating activity budgets. All expenditure must be foreseen or implementation will be affected. Both zones set up a proposal format where the activities given in the detailed work plan are directly linked to the detailed budget. For example, if a detailed project work plan has three sub-activities, e.g. (1) preparation of training modules, (2) farmer selection, (3) training, then the detailed budget has three budget lines. Each sub-activity has a budget that is itemised. In this manner it is relatively easy to make realistic quarterly budgets (rather than quarterly budgets that are one fourth of the total budget) and monitor and control expenditure.

Research budgets have become more detailed. More costs are included and submitted to sponsors for funding. This helps the institutes to realistically recover recurrent research expenditure. At a glance it looks as if research activities have become twice as expensive. This is not correct. Rather the initial

costing system did not make all costs visible. In the Lake Zone even administrative units now have to budget for operational costs such as e.g. mileage, photocopies or stationary.

Although this system requires budgeting capacity from staff, our experience has been that staff learns the 'art' of budgeting very quickly. Once a budget has been approved and funds are secured, the activity gets a budget code and funds are labelled. This gives the responsible officer the security that budget has been explicitly allocated to his/her activity and that it will be available for that purpose only. Because principal investigators are responsible and pay for the services provided for their projects, they regularly request balances. Staff members are more involved in the financial monitoring of their activities and the account office gets requests to provide financial information. This financial planning resulted in more transparency, more secure budget allocation and better implementation.

Service units and consequences for the accountant office

The establishment of service units has had important consequences for the account office. Budgeting and cost allocation became more detailed. In both the Lake and Northern Zone the account section handles all financial transactions related to internal service provision. This significantly increased the number of transactions. Since the service units have the responsibility for service unit income and expenditure, they require monthly overview reports. With appropriate coding, this service can be delivered. If necessary, the account section can provide up-to-date information on a daily basis. In the Lake Zone the provision of information is greatly facilitated by the use of the IFMAS system. Even though most accounts in the Northern Zone are kept manually, the service unit account has been computerised and cost and expenditure for each unit have been coded. Due to limited staff in the account office the provision of information to unit heads does not go smoothly yet.

Improved handling of claims and transparency of decision-making process

As a response to problems that were encountered in the first year of operation of the IFMAS, LZARDI adopted a new claim form and procedure. During a management team meeting, it was agreed that the handling of a claim would take two working days. Claims can be submitted on Monday and Wednesday only. These claims will then be answered on Wednesday and Friday respectively (i.e. the Mon-Wed-Fri system). The claim handling procedure consists of a logical sequence of steps and is based on the explicit separation of roles and responsibilities, one of the most fundamental principals of internal control (see Box 6.4). To the satisfaction of all parties involved, this system is quite closely adhered to. However, urgent issues sometimes need an accelerated procedure, which requires close collaboration between the claimant, his/her HoP, the zonal director and the account section. Compared to previous years, the number of pending claims in the account office has been significantly reduced and the transparency of claim handling and decision-making has improved considerably.

Box 6.4 The steps of the Mon-Wed-Fri system in the Lake Zone

The procedure of the Monday-Wednesday-Friday claim handling system is as follows:

1. Claimants prepare their claims and submit them to their Head of Department (HoP's, ZRC, ZIMO, ZRELO, SUC, TC).
2. The Head of Department screens if the activity is in line with the approved work plan and budget. On that basis, he/she rejects or approves the claim. Approved claims are entered in the Department's dispatch book.
3. On Monday or Wednesday around 10 am, the account office messenger collects the claims from all departments, gives a claim sequence number and signs the dispatch books of the departments. The claim sequence number can be entered in the dispatch book of the Departments, which facilitates monitoring and follow-up.
4. The claims received are entered in the account office claim entry book, specifying the Department concerned and the claim sequence number.
5. The account office Epicor system managers control the commitment, i.e. they check if there is available budget for the activity. On that basis, they reject or approve the claim. In both cases, the available budget has to be noted down on the claim.
6. The Zonal Director then checks the claims, which have already been signed by both Head of Department and Head of Accounts. He rejects or approves these claims. He also has a look at the claims, which do not have

- (enough) budget. For these, he rejects payment or he proposes a budget reallocation.
7. The Epicor system operators (who are different from the system managers!) then process the approved claims and produce the payment voucher.
 8. The cashier prepares the cheque or the direct payment.
 9. The outcome of the process is communicated to the claimant, specifying the claim sequence number and the Department concerned. In case of approval, the claimant collects the check. Refused claims are sent back to the claimant with explanation of the reason why. Such claims may eventually be re-submitted after appropriate corrections have been made. In that case they will get a new claim sequence number.

Imprest management

Imprests are advance payments to staff to facilitate them to implement an activity. An imprest is therefore an internal loan and not (yet) an expenditure. In the Lake Zone imprests are handled as follows. Names and account codes for all staff members are entered in the system ('Account receivable' module). The credit control function in the IFMAS does not allow a person to have more than one imprest at the same time (irrespective of the source of funds). Imprests are settled in the system by credit memo whereby the expense account is debited and the staff account is credited. For imprests that go beyond the allowed period, the system can create an invoice for the person concerned. This method has improved imprest management and has reduced the amount of outstanding imprest in the Lake Zone. It has even improved the production of output and safari reports because these are requirements for the settlement of imprests. In the Northern Zone imprests within the service units, NZARF and COR account are computerised in DacEasy. The accounts are however not linked and thus staff can have more than one imprest at the same time. To solve this problem an imprest ledger was set up in 2002. The ledger registers all imprests within the institute. Unfortunately entering imprests manually in the ledger leads to increased work as imprests have to be recorded twice. Management support is indispensable to ensure that agreed rules and regulations for imprest management are respected.

6.4 Financial reporting and auditing

Financial reporting

In the first year of operation of the new IFMAS system, the Lake Zone institutes had many problems producing financial reports. Although the support of the consultancy firm was irregular, most problems were solved in July 2002. For this budget year financial reports have been produced more regularly. Reports are produced for external partners and sponsors as well as for internal monitoring purposes (research projects, service units, self-help fund). However, the account office still has problems to produce tailor-made reports for all activities in a timely manner. The use of the FRX function of Epicor (a tool to define customised reports) requires a sound knowledge of accounting principles and a high level of computer literacy. In the Northern Zone financial reports are regularly prepared for the computerised accounts. Other accounts require manual reporting.

Auditing

Traditionally auditors assess if an organisation respects financial instructions, in our case Government regulations. Every year, the zones get several audit missions (CAG, TARPII audit, COR audit and others). These audit missions are not linked. The establishment of an integrated financial management system in the Lake Zone has not (yet) resulted in an integrated audit of the Institute's accounts that could satisfy all sponsors. Different audit missions in the zone assessed the transition towards the computerised IFMAS very positively. Despite this, auditors formulated many recommendations, which mainly addressed the improvement of internal control mechanisms, data storage and retrieval and the respect of procurement procedures.

For 2001-2002 the Lake and Northern Zone COR Programmes subjected themselves to a so-called 'Value For Money' (VFM) audit. This is a new and more comprehensive form of auditing that goes well beyond the scope of traditional audits. VFM audits not only look at the respect for financial rules

and regulations, but also investigate the efficiency and effectiveness of the use of funds. VFM auditors ask the following questions: "Could certain activities have been done in a more economic manner? Has the output (that was promised in the work plan) been produced and were indicated results obtained?" Auditors even check the output produced. Table 6.1 shows the logic of the VFM verification system for two activities.

Table 6.1 Example of Value for Money audit verification system

Code	Description	Budget	Expenditure	% of budget used	Expected output and/or results as per workplan	Objectively verifiable indicators	Observations auditor	% of output produced
56021	Leaflets Ukiriguru (100,000 per leaflet)	4,500,000	4,740,000	105%	Production of 45 new leaflets	Leaflets produced and displayed at different places		
53037	On-farm testing of new chickpea varieties	3,230,000	2,740,000	85%	RMFI trials in 3 districts Farmer assessment of five varieties Final report Release of most promising varieties	Progress reports Field note		

VFM audits require clear annual work plans and an explicit output-orientation of an institute. A VFM audit is more demanding and more 'kali' than traditional audits. However, the credibility of an institute is greatly enhanced when an external auditor certifies that funds have been used in a cost-effective and cost-efficient manner and that the promised output has been produced. Although at this moment auditing firms do not have much experience with this form of auditing, it is anticipated that it will gain momentum in the near future.

6.5 Procurement and asset management

Tender procedures and procurement

The procurement of goods and services in an institute should be transparent and effective. The Lake Zone ARDI organised tender procedures for infrastructure works and rehabilitation projects. A good example is the rehabilitation of roofs of all (old) office buildings at Ukiriguru (Box 6.5).

Box 6.5 Ukiriguru roof rehabilitation tender procedure

The first preparation was to establish a very detailed description of the work involved and an estimation of costs. An independent engineer prepared a tender document and made his calculations. The tender procedure was publicly announced. Many constructors reacted and bought the tender document. Eleven firms submitted their proposals before the deadline. The same day, envelopes were officially opened and winners publicly announced. All constructors attended this meeting. Next the Ukiriguru management shortlisted four companies for in-depth interviews during which the track record of the companies was screened. This included a visit to projects implemented by the companies in and around Mwanza. The outcome of this process was that a small company ranked first in price comparison and the most experienced grade 1 constructor ranked third. The last stage consisted of a negotiation process whereby the institute requested the grade 1 contractor to revise his price calculations. This led to a price reduction of more than 25% and a calculation that was very close to the one of the contracted engineer. With the technical designs and detailed price calculations as an attachment, a contract was established between the institute and the contractor. The rehabilitation work was spread over two budget years. Now all roofs have been rehabilitated and the interior and exterior of the buildings have been painted. This led to a completely different outlook of the Institute and - even more important - roofs are not leaking anymore!

The Lake Zone experience shows that a zonal institute can handle large procurement and rehabilitation projects. Both the Lake and Northern Zone used similar approaches for the hiring of consultancy services, for example in the selection of a local consultant who could guide the establishment of service units. In the Lake Zone however, in contrast to the contractor for roof rehabilitation, the

performance of the selected consultant was disappointing. Careful selection does not guarantee success.

Procurement

The Lake Zone institutes tried to organise the procurement of equipment and consumables better. Staff is supposed to timely submit their requirements to the procurement officer. This would enable him to work efficiently and for example reduce ad hoc trips to town. This approach has not yet been very successful and regulations are not always fully adhered to. To improve procurement, audit recommendations need follow-up and internal control mechanisms and transparency have to be improved. A positive development is that the direct costing method has brought more direct costs to research budgets. This has given more responsibility to individual staff and staff teams. Principal investigators have become more cost conscious and ask value for 'their' money. This can be seen as an internal pressure for change towards better management and more transparency.

Inventory and management of assets and equipment

An updated list of assets and equipment is important in making management decisions. An inventory enables an institute to assess the condition of its capital goods and the need for replacement. A computerised inventory can provide an institute with this information very quickly. If such an inventory is linked to an integrated financial management system any procurement will automatically be included in the asset register. In 2000, the LZARDI institutes started setting up a comprehensive list of all assets and equipment, irrespective of the funding source. This list specifies the type of item, procurement date, procurement price, source of funds, depreciation period, actual location and users. At Ukiriguru to be able to do this systematically, the farm manager and supplies officer numbered every office block, individual office and item. Government inventory forms were filled out for every room, signed by the supplies officer and staff member concerned, and attached to the office door. A similar inventory was set up in the Northern Zone institutes in 2002. This computerised list also specifies the present condition of the equipment. The numbering of items (asset tags) in both zones proved complicated. The numbering system in use is not consistent. There is a need for a systematic DRD asset and equipment numbering system. A code that indicates the actual location of an item should be included or added. These suggestions are based on the experience that items are sometimes very hard to find, which bears the risk that valuable goods are lost.

In the Lake Zone in November 2002, accounting staff and supplies officers were trained in the Epicor asset management module. Since then, the computer processes all purchase orders. In this manner the asset and equipment inventory is always up-to-date. Integration of asset management in the IFMAS makes it possible to value and to depreciate assets and equipment automatically. This will bring the institute closer to the establishment of annual financial reports that include capital goods. In the absence of an IFMAS in the Northern Zone the assets register will need to be updated annually to be able to provide the institute with the required information.

6.6 Conditions for success and lessons learned

The preceding paragraphs show that institutes have a number of options to enhance transparency and accountability. Both the Lake and Northern Zone can share practical lessons that are summarised below.

The introduction of an integrated financial management system profoundly affects an institute. While the majority of staff may not notice changes in research approaches in field trials, all staff will notice changes in accounting procedures. Whereas functioning problems within a research programme may not directly affect others, problems in the account section affect all staff. The importance of frequent and open communication between the account office and research staff cannot be underestimated. Conflicts that are the result of misunderstandings are just around the corner.

The transition from a loosely integrated manual system to an integrated computerised system is very demanding and takes at least one year. It can only succeed if qualified staff is available and management supports the transition (see Box 6.6). Computer literacy is a condition for success. Not all staff may prove to be trainable in this respect. Experience shows that the management needs to test the willingness of accountant staff to study and implement an integrated computerised system. After IFMAS training, continued technical backstopping is needed to support the correct use of acquired skills.

Box 6.6 Why Northern Zone did not adopt the Epicor system

Like many zonal research institutes, the Northern Zone has different accounting procedures for different sources of funds. Most transactions are manually entered. TARPII vouchers are entered in the FINPRO system in Dar es Salaam. Collaborative activities and transactions of the Self-Help Fund are manually kept. COR, service units and NZARF financial reports are made with DacEasy software. In 2001 it was anticipated that the Northern Zone would also pilot the Epicor Integrated Management and Accounting System that was adopted by the Ministry of Finance. After several discussions this was cancelled, one of the major reasons being the limited accountant staff capacity in the two zonal institutes: only two from six staff in the two institutes are computer literate and the zone has not had a zonal accountant since 2000. This was insufficient to handle such a demanding transition.

Compliance with Government accounting standards requires clear guidelines, forms and procedures. This is valid for imprests, claims and asset management. Internal financial procedures have to be officially announced and explained, preferably by the ZDRD.

Strict adherence to accounting guidelines does not necessarily create goodwill for the account section, especially when this causes the rejection of claims or delays approval. Clear explanations and support from the zonal director's office are very important. The management should clearly show that it is serious about accountability and transparency. If not, the account section may become isolated in the institute. Timely delivery of services though (payments and financial reports) creates goodwill for the account section.

Clear job descriptions and the separation of tasks are important conditions for professional accounting. Job descriptions should include support tasks (managers supporting operators and the zonal accountant supporting stations). In addition, the account section needs computer facilities and sufficient office space for its staff and the filing of PVs. Unlimited access of non-authorized staff to the account office is not compatible with professional working standards.

Accountability and transparency have a price! The administrative office should ensure that the account section is properly facilitated. These costs are part of the institute's overhead costs. International donors require high standards of accounting, transparency and accountability and ask for accurate and timely financial reports. For the LZARDI for example it was encouraging when PriceWaterhouse Coopers recently observed that the institute could now qualify for USAID funds. This indicates that professional financial reporting can help to qualify for donor support. In this manner, successful institutes can compensate accounting costs.

A financial management change process leads to different perceptions of the account section. This can be negative and positive. If the zonal management carefully guides the change and good results are obtained, the initial resistance to change towards more accountability and transparency gradually turns into support and staff progressively recognises that the account section is indispensable in the organisational structure. This will lead to more attention for financial management issues. In the Lake Zone, the zonal accountant is part of the management team. Financial reports for research, service units and the self-help fund are discussed in monthly and quarterly meetings. This has enhanced internal transparency. Management Team members were informed about the financial situation and about some problems. As a result, they constructively sought for means to address these problems and several modalities to reduce costs or to enhance efficiency were identified.

6.7 Challenges and the way forward

Most zones have three major funding sources: GoT/TARPII, commodity levies and collaborative research projects. These funds are often administered separately and in many cases the account section cannot give a full overview of the financial situation of an institute. The use of FINPRO is generally limited to TARPII funds. For information on the use of other funds the respective co-ordinators or principal investigators have to be approached (see also CORMA assessment reports for the zones). The number and level of accountant staff is generally insufficient and zonal financial management systems are not integrated nor computerised. The establishment of integrated, computerised and transparent financial management systems is therefore a major challenge. Although the MTP report (first draft) only dedicated one page to financial resource management, it advised the following important actions: (i) full computerisation of the zonal financial management systems, (ii) additional recruitment of accountant staff to fill vacant positions and (iii) conducting short-term computer courses for the existing accountant staff.

Another fundamental challenge is to reconsider the role of the account section. These offices should not limit themselves to the mere handling of claims, but should play a more important role in budget preparation, control and financial reporting. To meet this challenge more and higher qualified accountant staff is required.

If the first two challenges are met, account sections could gradually evolve into financial management departments that will be the 'guardians' of financial credibility of research institutes and advisors for financial issues to the management. In this context it is good to note that the head of the financial department is often one of the most important advisors to the director of an organisation and that financial data often feature prominently in annual reports.

Improved financial management and higher levels of accountability and transparency require substantial investments (staff recruitment and training, new roles and tasks, office space and operational budget) and explicit management support. It requires strong leadership at zonal and national level that is based on the recognition that accountability and transparency are essential to enhance the credibility and sustained funding of our institutes. It also needs confidence that such a demanding transition process is possible and will ultimately pay off.

Development partners supporting agricultural research need professional and timely financial reports, and the quality required will be more and more demanding. Non-compliance to requirements will not only delay disbursements, but may also put next project phases into danger of discontinuation. At the same time, it is clear that research funds are progressively channelled to the demand side of research. We should therefore also have the capacity to make customised reports for clients. However, financial reports are not only meant for sponsors and stakeholders. Farmers and the general public have the right to know how funds are used and what results are obtained. An important challenge is therefore to introduce the concept of value-for-money at all levels within the organisation.

Recent training sessions for accountant staff indicate that DRD is ready to take up these challenges. This paper indicated that zones can embark on a change process that leads to higher levels of accountability and transparency, but that several conditions have to be met. Even then, the process is not easily implemented. The major challenge remains that top management recognises the need for change and leads the process. The good thing is that there are a large number of lessons that can be built upon.

The recurrent cost problem: sustaining the institute and internal services

Charles J. Lyamchai, Frank J. Mwakanyamale and Chira Schouten

Guiding principle

‘Institutes need to maintain and sustain their working environment’

Summary

Public funding for recurrent costs of the agricultural research institutes has been dwindling for some years. As a result research institutes have not been able to pay their recurrent costs (electricity, labour, telephone, maintenance). Nevertheless, zonal institutes can address these problems. They can reduce expenditure, are endowed with both human resources and assets that can be used for income generation and improve the efficient use of resources. Strong and viable institutional strategies have to be in place to ensure that the working environment is up to standard and maintained. This paper analyses resources and conditions that need to be in place for research institutes to continue providing the intended services and goods. Experiences that have benefited the Lake and Northern zones are highlighted.

7.1 Introduction

Agricultural research faces a major challenge in a period of waning public sector support for agriculture and for agricultural research and development. The government has little room to increase public expenditure. Donor interest in agricultural research is waning. Many would argue that the lack of resources results in poor performance and lack of financial sustainability. Despite these developments, agricultural research in Tanzania, until recently mostly a public sector funded activity, has to meet an increasing demand for services and has to have enough operating resources to do so. This paper addresses the lack of sufficient resources to operate and maintain public sector research institutes, and describes how CORMA has tried to address these problems in the Lake and Northern Zone. This paper only discusses how a research institute can address the problem of recurrent operating costs (or overhead costs) (see Box 7.1). The issue of increasing funds for research will be addressed in paper 8.

Box 7.1 Definitions

Recurrent operating costs are those costs that remain when we deduct salaries, benefits and capital investment from the total cost of research. They include: office and laboratory supplies, spare parts, transport, communication, water, electricity, rent, library materials, publications, training and repairs.

Direct costs are costs that can be directly attributed to any research activity e.g. transport, per diem, stationary.

Indirect costs are costs that cannot be attributed directly to a specific research activity e.g. training, watchmen, electricity, road maintenance.

If funds are not allocated and a national agricultural research system is not maintained, the research system and its institutes will inevitably deteriorate (Tabor, 1998). Many research institutes in Tanzania show some or all of the following symptoms of not being able to cover their recurrent operating costs:

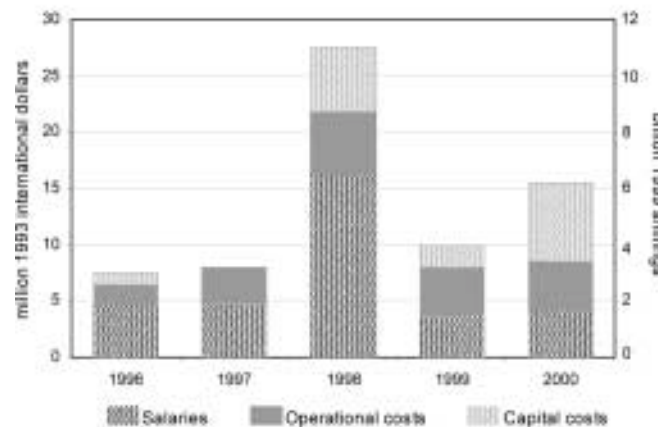
- Essential services are disconnected, such as electricity, telephone, water.

- Salaries for casual labourers accumulate. For example salaries for watchmen or cleaners.
- Maintenance and repair of equipment and facilities accumulates: vehicles are parked with no funds for major repairs, laboratory equipment is stored with no budget to buy chemicals.
- Absenteeism rises as research staff seeks other ways to gain additional income, e.g. researchers attending to their dala dala, shop or cattle.
- Well-trained researchers become frustrated and leave the system, in some cases abandoning research altogether.

If we wish to address the above problems we need to understand what those problems can be caused by. Reasons can be many:

1. *Investments have been too high:* A research system can invest heavily in expansion of facilities and staff. When institute revenues stagnate facilities and staff cannot be sustained. Staff is laid off and buildings may be abandoned.
2. *Investments are badly designed:* In other cases research investments are expensive to operate, maintain and repair. For example, an institute may have been provided state-of-the-art equipment under a donor-assisted project while the cost of repairing and replacing equipment is not included in the project (Tabor, 1998: 49-52).
3. *Public expenditure is erratic:* In Tanzania government contributions for research are determined by the parliament and, to a small degree, by local districts. One of DRD's problems has been the inconsistency between budget allocation and actual disbursement. Funds are released irregularly, and arrears may accumulate (Beintema *et al.*, 2003: 5).
4. *Research is politically neglected:* Research may suffer from inadequate overhead cost financing even when governments have resources to adequately fund research. Leaders may not see a meaningful role for agricultural research in technological change. They may believe there is already a well-stocked technology shelf and that this only needs to be communicated to farmers. Hence an increasing focus on extension.
5. *Poor management:* Often the problem is not a problem of inadequate resources but of poor management of existing resources. Waste and poor planning can lead to a situation where despite sufficient resources there is still a shortage of funds for priority operating costs.

In the 1990's DRD was reorganised to reduce general operational costs and to increase efficiency. Research on coffee, tea and tobacco was privatised and staff was laid off. Still the salary share of total DRD spending remained fairly high in 1996-1998, but started to decrease recently. DRD spending is now shifting slightly toward investment, equipment, and training. In 2000, total salaries and operational costs each accounted for about a quarter of DRDs total spending (Figure 7.1).



Source: Compiled by authors from ASTI survey data (IFPRI-ISNAR-ASARECA 2001-02).

Figure 7.1 Cost-category shares in DRD's expenditures, 1996-2000 (Beintema *et al.*, 2003)

Problems of lack of resources to cover overhead costs can however be addressed at the zonal level as well. Research institutes have many options. The CORMA explicitly addresses this problem as it is essential in the improved functioning of research institutes and thus its responsiveness to stakeholder demands. Here we would like to address recurrent cost problems in four different steps. These steps have been described here as a flow from one to the other (see Figure 7.2, adapted from Tabor, 1998: 53-62). This paper describes the experience that the Lake and Northern Zone have. These experiences did not necessarily follow the chronological flow as described below. However, the authors of this paper feel that in the case of extending these experiences to other zones in Tanzania, these steps facilitate the implementation of changes.

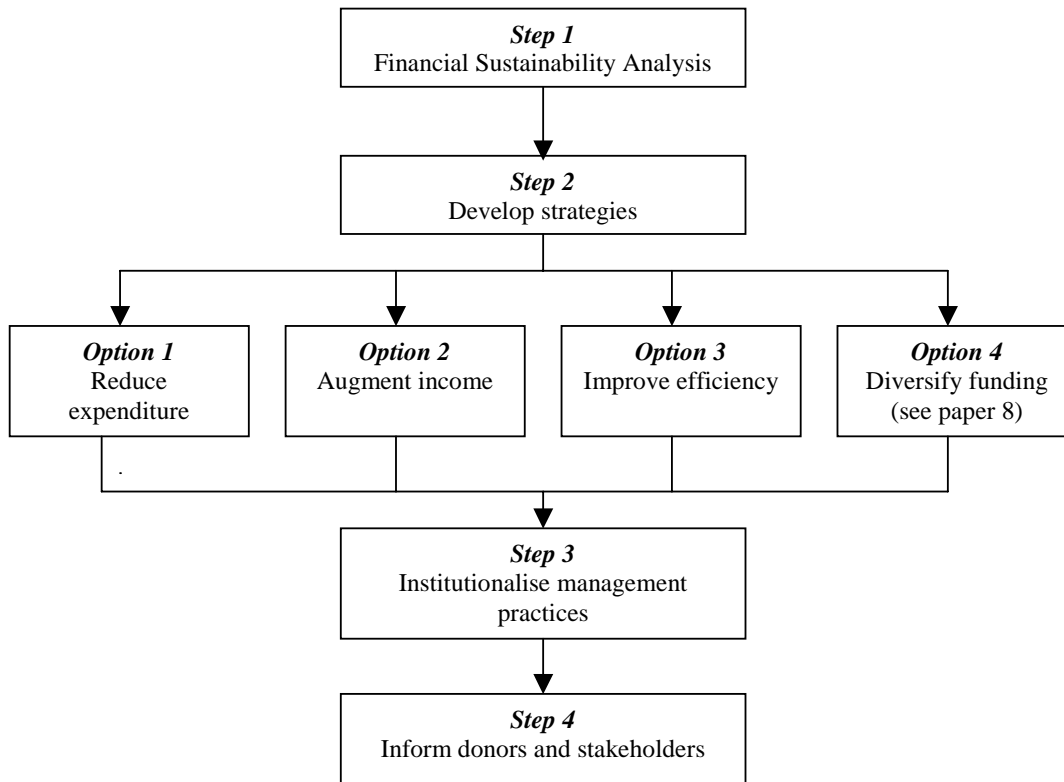


Figure 7.2 Options for addressing recurrent operating costs.

Option 4 refers to the fact that not only can existing funding sources be used more effectively, but the extent of government funding can be reduced in areas where the private sector may be willing to participate or beneficiaries are willing to pay (Beynon, 1996). This is dealt with in paper 8, which focuses specifically on the diversification of funding.

7.2 Financial sustainability analysis

It is essential that a research institute analyses its financial sustainability and the extent of the recurrent operating cost problem. Documenting the extent of a problem is often the first step towards its solution. In the CORMA the institute management first assesses what funds come in and what is spent. Costs are categorised in direct and indirect costs.

In both the Lake and Northern Zone the institutes were confronted with problems of shortage of funds for recurrent operating costs such as electricity, telephone, casual labourers wages etc. Not to mention the lack of funding for maintenance and repair of equipment and facilities, and a problem of very low staff morale due to low government salaries and a lack of incentives. In February 2003 arrears in

Ukiriguru ARDI had amounted to TSh. 155 million, of which 80% for water and 20% for wages. Figure 7.3 shows that arrears accumulated due to an increase in expenditure and reduced income from 1999 to July 2001. In the Northern Zone in 2001 arrears were high as well, e.g. 16 million for electricity alone.

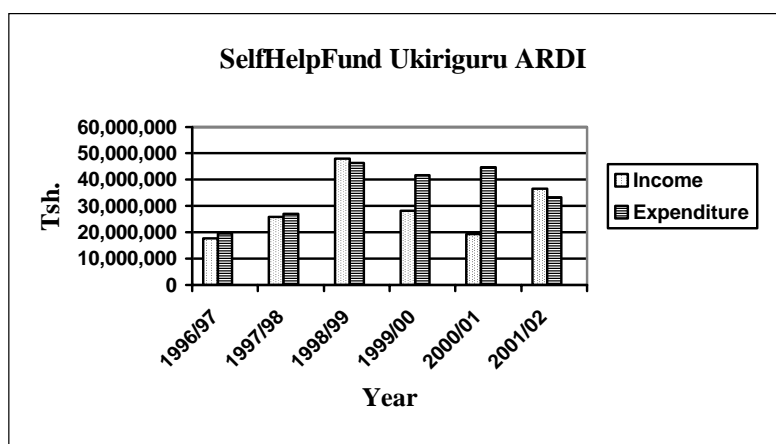


Figure 7.3 Annual SHF income and expenditure from 1996-2002

To start addressing these problems the Lake Zone in 2000 made a first attempt at estimating total income, total institutional operating costs and institutional overhead cost (LZARDI, 2000). In 2003 the exercise was improved and in anticipation of the institute not being able to bear costs itself, possible funding sources were identified. Table 7.1 gives an overview of anticipated overheads in the Lake Zone (both Ukiriguru and Maruku) as estimated in 2003 (LZARDI, 2003).

Table 7.1 Estimate of recurrent operating costs in the Lake Zone (2003)

Main category	Includes	Estimated annual cost [TShs.]	Source
Buildings and land	Maintenance of buildings, furniture, security, roads, fire extinguisher services	115,411,000	Donor, Government, SHF
Human resources	Training, staff motivation, library	108,500,000	Donor
Consultants, temporary personnel	Audit, local consultants, temporary personnel	35,600,000	Donor, Research, SHF, Service Units
Transport	Procurement and maintenance of cars, lorries, tractors, machinery, motorcycles, workshop tools and implements	236,800,000	Donor, Service Units
Scientific equipment	Laboratory, ginnery, agro-meteorology, computers, printers, software, projectors, camera's	42,350,000	Donor, Service Units
Functioning costs	Telephone, fax, email, internet, electricity, generator, water and sewage, postage, courier, bank charges, stationary, photocopies	44,900,000	SHF, Donor
Management costs	Bi-weekly meetings, quarterly meetings, IPR, ZTC, ZEC, hospitality, functioning ZDRD, ZRC, HoPs	31,865,000	SHF, Government
Public relations	Flyers, business cards, newsletter, website	3,715,000	Government
Liaison activities	District meetings, stakeholder directory, stakeholder meetings, extension seminars, agricultural show, field days, functioning costs ZRELO and liaison officers	45,790,000	Government, Donor
Functioning costs support personnel	Accounts, registry, procurement officer, farm management	14,450,000	SHF
Livestock	Drugs, fencing	2,238,920	SHF
Total		681,619,920	

From the total recurrent operating costs given in Table 7.1, the LZARDI estimates that TSh. 102 million needs to be borne by the SHF of which 75% for Ukiriguru and 25% for Maruku. The financial report for the SHF from Ukiriguru ARDI shows that for the period July 2002-February 2003 SHF income was TSh. 20 million, an average of TSh. 3 million per month or TSh. 36 million per year. This is far short of the required TSh. 75 million. Data from Selian ARI for the past five years suggest a SHF income of about TSh. 15 to 20 million per year. However at Selian overhead costs are paid from a number of accounts which makes the estimation of total expenditure for recurrent operating costs very difficult. In the Lake Zone the SHF has been transformed into an overhead cost account.

7.3 Reduce costs

After the financial sustainability analysis and the assessment of the gap between income for recurrent operating costs and expenditure, the COR project supported institutes in both the Northern and Lake Zone to develop strategies to try and reduce this financial gap. One of these strategies is to develop a plan to reduce costs that are borne by the SHF (or any other account that would normally pay overhead costs). Costs can be reduced as presented below.

Introduce direct costing

In general, research projects have a tendency to underestimate realistic costs in their budgets. The following can be done:

- Indirect costs such as telephone, internet, labourers, vehicle use, can be budgeted for (see also paper 6). In both the Lake and Northern Zone researchers were asked to include as many itemised costs as can realistically be estimated. This increased research budgets but also ensures that internal services are sustained and equipment maintained.
- Budgeting procedures were improved, e.g. by linking detailed budgets to detailed workplans (see paper 9).
- Budgets are increasingly screened before they are submitted to sponsors. In both zones though this has been greatly facilitated by the formulation of internal policies that were approved by DRD, e.g. the Northern Zone Agricultural Policy was approved in 1999. Internal financial policies ensure that all research projects are treated in the same manner.

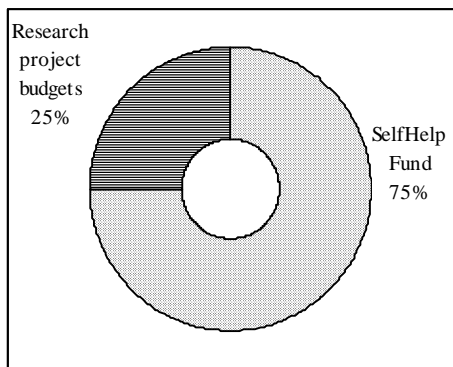
Transfer and decentralise expenditure posts

In most research institutes the payment of overhead is centralised and the sole responsibility of the ZDRD. In both the Lake and Northern Zone a number of costs that were borne by the SHF have been transferred to service units. This means that responsibilities have been delegated to the heads of different units, and has also increased the efficiency of the use of funds as unit heads are directly responsible for income and expenditure in their respective unit. For example:

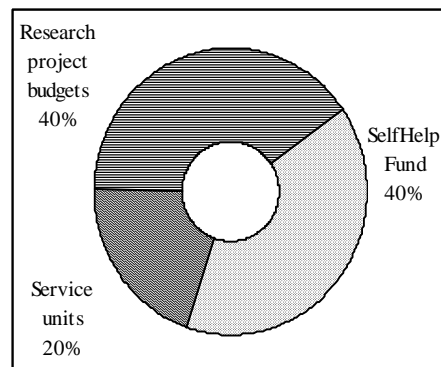
- Salaries for casual labourers: in the Northern Zone the publication unit pays monthly salaries for three workers in the unit who were previously paid from the SHF, while the transport unit pays salaries for four drivers.
- Vehicle maintenance: Costs for vehicle services, repair, insurance and tyres are borne by the transport unit. It is in the interest of the transport unit to keep its vehicles in good condition to ensure that income increases. However, it is also in the direct interest of this unit to service vehicles as economic as possible as reduced costs increase profit margins.

The below figure shows how overhead costs in the Lake and Northern Zone are being borne. Situation A illustrates the old situation where most overhead costs are covered by the SHF. Situation B illustrates how at present responsibilities for covering overhead costs are increasingly shared by research budgets and the service units.

Overhead cost sharing (assuming total overhead costs are constant)



Situation A: Old



Situation B: New

Search for economies

Institutes can reduce overhead costs further by ensuring that the lowest realistic cost is paid for consumables and new equipment while still maintaining the quality. Under general GoT regulations any procurement needs to be accompanied by three genuine pro-forma invoices. These are screened carefully, not only in terms of quality that is provided but also in price. In the Lake Zone for example the fact that stationary is centrally procured (stationary shop) and sold as a service within the institute, has made researchers aware not only of costs but also of quality. Costs have also been reduced by ensuring that new equipment can be maintained locally and that future maintenance costs can be borne by the institute. This is possible only when a zonal institute co-ordinates procurement required for research and station upkeep very strongly, or, in case of centrally co-ordinated procurement by the DRD, is extensively consulted for equipment specifications. If however, researchers procure their own stationary and equipment such economies are very difficult to achieve.

7.4 Increase income

The second strategy that can contribute to cover recurrent operating costs is to increase income. Institutes may have under-utilised facilities (land, buildings), staff and equipment. Commercialisation and cost recovery such as the introduction of user charges (e.g. analytical services) and contracting of public sector research by commercial organisations can augment income. In many countries this is hindered by the fact that proceeds from such activities revert to general revenues of the treasury. In 1994, the Tanzanian government addressed this issue by permitting research institutes to retain revenues from activities at the institutes as "Self-Help Funds" (SHF). Until then revenues collected from income of farm produce, animals and fees were sent to the government treasury and subsequently reallocated to mostly other sectors. This provided very little incentive for revenue generation within the zones. The SHF however can be used for station maintenance and upkeep, as well as for research programmes, and allows research institutes to pursue initiatives to augment income. We will discuss two initiatives that were supported by the COR programme in the Lake and Northern Zone that aimed to increase institute income. The first is the streamlining of contributions by sponsors to overhead costs, the second is the establishment of service units.

Streamline donor contributions

Research project funds contribute to institutional overhead costs. In the absence of clear guidelines within the institute, funding modalities tend to be determined by the negotiating skills of an individual scientist and the willingness of a potential sponsor. A clear description of a limited number of funding modalities increases transparency and credibility of research institutes, facilitates negotiations with potential investors, and helps to streamline budgeting procedures within an institute. Last but not least it helps an institute to recover overhead costs by clearly identifying which funding agency contributes

what. In the Lake and Northern Zone five different research funding modalities are distinguished. These modalities differ with respect to the source of funds, and the financial means of clients. Clients who request research must contribute but contributions can include funds, land and labour input, staff time, facilities, vehicles etc. For example, a commercial farmer can request research services on contract basis and cover all costs. International networks provide more than just funds for which they need to be acknowledged in the terms for collaboration. The following gives an overview of funding modalities and their contribution to overhead costs as formalised in both zones.

Modality	Clients	Financial contributions to overhead costs
Modality 1: GoT	Farmer associations, GoT institutions, NGOs	None
Modality 2: Cess	Farmer associations, GoT institutions, NGOs	None
Modality 3: Collaborative	NGOs, agribusiness, (inter)national networks	Contribution of 10% of the recurrent budget as overhead fee to the Institute. The value of donations and contributions in kind is to be deducted from this amount. Contributions by partners are specified in a MoU.
Modality 4: Contract	All clients	Institutional fee of USD 50: LZ: 60% researcher incentive, 40% SHF NZ: 60% researcher incentive, 10% acquisition, 10% reviewing, 20% SHF
Modality 5: ZARF	Farmer associations, GoT institutions, NGOs	Institutional fee of USD 50: LZ: 60% researcher incentive, 40% SHF NZ: 60% researcher incentive, 10% acquisition, 10% reviewing, 20% SHF

Modality 4, i.e. contract research was introduced in the Lake Zone in 1995 and in the Northern Zone in 1999. The introduction of this modality aimed to contribute to the diversification of research funds and was accompanied by clear guidelines (see Box 7.2). The use of an Institutional Fee within the DRD system at that time was new and initially confused staff as well as outsiders.

Box 7.2 Contract policy in the Northern Zone

The following regulations for contracted services are applicable:

1. NZARF and clients pay an institutional fee (IF) plus DSA in case of contract research. DSA is considered a cost and is paid according to GoT rates and regulations.
2. IF is only paid for research staff with qualifications of BSc and higher. A flat rate is charged of USD 50 per day, which is not negotiable.
3. IF is charged for actual field days and does not include transport time. Report writing is excluded, but is remunerated by a publication fee.
4. The publication fee depends on the type of report required by the client. Publication fees are (in USD):

progress report	\$ 100	leaflet	\$ 150
field note	\$ 200	poster	\$ 150
working paper	\$ 500	verbal presentation	\$ 50
5. IF and publication fees are paid to the accountant of the Institute, who is responsible for re-allocation.
6. IF is distributed as follows:
 - 60% to the scientist.
 - 10% to the person who provided the contract (acquisition fee).
 - 10% to the reviewers of the output.
 - 20% to the Institute's self-help fund (contribution to overhead costs).
7. Terms of payment:
 - 1/3 of IF is paid on signing the contract.
 - 1/3 of IF is paid on completion of the field work.
 - 1/3 of IF is paid after presentation or submission of a draft report.

The publication fee is paid after acceptance of the final output. The client advances all expenditures; the principal scientist settles advances on actual cost-and receipt basis.

8. All contracts are signed between institutions. IF is paid to the institutional accountant who transfers the amount to the SHF account. Re-distribution of the IF to beneficiaries can only take place after registration and transfer to the account.

Source: NZARDI, 1999: 13-14.

7.5 Semi-autonomous service units

Service units are commercial support units within an institute that offer services and goods on a cost recovery basis and generate revenues that are partly contributed to the SHF. The units take responsibility for some institutional overhead costs and aim to provide sustainable support services for research. Service units however do not only generate income. Service units can contribute to more management efficiency through delegation of responsibilities. Service units are thus to be assessed in three terms:

- a. How much do the service units contribute to the SHF.
- b. Are the necessary quality support services available at realistic costs for research whenever required.
- c. Are assets and equipment that have been allocated to the units being maintained.

Below we describe the experiences with the establishment of service units in the Lake and Northern Zone that were supported by COR/TARP II.

Preparing the units

In August 2000 the institute management at ARI Selian set up service units on a trial basis. In early 2001 this was followed in both the Northern and Lake Zone by:

- An assessment of the types of services and goods that could be offered by the four institutes on a commercial basis. Related services were clustered together to form a unit.
- The management of the institutes appointed unit managers and assistants for each unit. Unit heads monitor cash-flows, manage staff in the unit, market services, and plan essential capital investments to sustain facilities from the unit.
- The institutes appointed a Service Unit Co-ordinator (and Assistant Service Unit Co-ordinators at Tengeru and Maruku) responsible for overall guidance of the units, financial monitoring and relations between the institute management and unit heads.
- After a thorough selection procedure (i.e. a local tender) both the Northern Zone and Lake Zone recruited local consultants (FAIDA-BDS Ltd. and Prestige International Ltd respectively). These consultants assessed the feasibility for planned service units and trained unit managers and assistants on how to plan business enterprises, how to identify competitors, how to study markets, how to identify possible clients, how to develop a business plan, and how to manage a commercial enterprise.
- Each unit developed a detailed business plan. These plans include a market and competitors assessment, services that will be offered, staffing, fees, and a monthly, annual and 5-year cash flow prediction. The plans also include a section on capital investments required. Consultants assessed all plans for viability, financial feasibility and profitability. As a result nine different service units were identified in both zones (see Table 7.2).

Table 7.2 Service units in the Lake and Northern Zone

Service units	Selian ARI	HORTI Tengeru	Ukiriguru ARDI	Maruku ARDI
Transport and workshop	X	X	X	X
Farm	X	X	X	X
Publication	X	X	X	X
Stationary and input	-	-	X	X
Catering and conference	-	-	X	X
Laboratory	X	-	-	-
Seed production	-	X	-	-
Plant propagation	-	X	-	-
Mushroom	-	X	-	-

Getting services started

In all zonal institutes the generation of revenue is hampered by the bad condition of equipment and facilities: laboratory equipment has broken down, vehicles are old, a photocopy machine needs maintenance. A new business enterprise would normally start with new equipment e.g. using a bank loan. Revenues generated would cover depreciation of equipment and facilities and would be used to pay back the loan. In the Lake and Northern Zone existing equipment was allocated to the units. As a result, depreciation costs can only be accumulated for a short period before the assets are to be replaced. For this reason the Lake Zone decided to inject seed money into the units. Seed money equals depreciation that would normally accumulate in the years since the assets were procured. This seed money was to be transferred to the capital account of the service units and to be reserved for replacement of assets. For example seed money for the Transport Unit at Ukiriguru was estimated at TSh.72 million, for Maruku TSh.32 million. In the Northern Zone budget was limited and seed money could not be allocated. In a situation where it is very likely that assets and equipment will continue to be provided by donors (as e.g. vehicles in the Lake Zone) depreciation may not need to be included in service unit budgets.

Every service unit needs to estimate capital investments and working capital required to start services. Capital investments include major repairs to equipment that are required to start the service, e.g. tractor overhaul. Working capital is the money required to cover operating costs in the first three months. The revolving fund is a fund that can be used to cover unexpected costs that are not normally part of the cash flow. Units can borrow money from the revolving fund on conditions (one of them being interest paid). Table 7.5 gives details of investments made in both zones. Overall injections in the Northern Zone were far short of what was required and major repairs on e.g. laboratory equipment could not be funded.

Table 7.3 Service unit investment in the Lake and Northern Zone

	Seed money	Investment capital	Working capital	Revolving fund
Ukiriguru	78,000,000	15,65,000	10,335,000	-
Maruku	33,500,000	10,800,000	3,840,000	-
Selian	-	10,500,000	5,852,000	2,000,000
Horti Tengeru	-	5,000,000	4,000,000	1,500,000

Operating the units

First and foremost a service unit provides services to research staff. Unit managers, however, are free to explore opportunities for revenue generation. For example, the new head of the transport and workshop unit at Selian, decided to repair a trailer that had been in disrepair for five years, at a minimum cost. The trailer has been hired out regularly ever since. Table 7.4 gives a short overview of sources of revenue for the units, and lists major costs that these units cover. The service units provide services for cash payment only: "No pay, no cure". Clients of services pay the account section directly, which administers all transactions. In both zones separate accounts were set up. In the Lake Zone two accounts were set up, one for operational costs and one for capital costs. In the Northern Zone this is

one account. In all cases the SUC or ASUC is a signatory for the accounts. In the Lake Zone financial transactions of the service units are part of the IFMAS (see paper 6). In the Northern Zone the accountant (together with the SUC and the heads of units) set up a coding system in DacEasy so that transactions could be computerised. Heads of service units need regular updates on their cash flow position. In both zones the account section agreed to give such updates on a monthly basis, although the computerisation even allows for daily transaction and balance reports. In the Northern Zone this system does not work smoothly. This is mainly the result of the fact that both at Selian ARI and Horti Tengeru only one accountant is computer literate. At Selian this has now been partly resolved by appointing a secretary for voucher entry.

Table 7.4 Service unit revenues and expenditure

Service units	Sources of revenue	Expenditure
Transport and workshop	Vehicle hiring, vehicle maintenance, workshop facilities, driving lessons, secure parking	Fuel, spare parts, driver salary, tractor operators, insurance,
Farm	Crop production, production of certified seed, land rent, ploughing, harrowing	Drivers, tractor maintenance, fuel
Publication	Desktop publishing, scanning, photocopy and binding, leaflet production, secretarial service, telephone, internet, computer maintenance, and audio-visuals	Stationary, salaries office attendants, maintenance of equipment
Stationary and input	Stationary, fertiliser and chemicals	Stationary, fertiliser and chemicals
Catering and conference	Canteen, hostel	Salary manager hostel, consumables
Laboratory	Soil, plant, water and manure analysis, advisory services	Chemicals, support staff allowances, 2 casual labourers
Seed production	Foundation and common grade vegetable seed	Casual labourers, land preparation, seed cleaning, field guards
Plant propagation	Fruit tree seedlings, rooted cuttings, banana suckers, crop produce (oranges, banana, lychees), ornamentals	Casual labourers
Mushroom	Mushroom spawn, fresh mushrooms, training	Laboratory attendants

Revenues are used to cover regular operating costs, maintenance of equipment, and staff salaries. Revenues also contribute to the SHF. In the Lake Zone each unit contributes a fixed amount to the SHF monthly. In the Northern Zone unit profits are calculated at the end of each quarter. 40% Of the unit profit is transferred to the SHF, 20% of the profit can be used for staff incentives. The higher the profit, the higher staff incentives. So far units have contributed significant amounts to the institute recurrent operating costs (see Table 7.5).

Table 7.5 Service unit contributions to recurrent operating costs (monthly averages)

Institute	Maintenance, salaries	Contribution to SHF	Depreciation
Ukiriguru	1,675,000	1,192,000	-
Selian	2,107,475	743,667	338,416
Tengeru	110,000	106,000	97,500

7.6 Improve the efficient use of financial resources

The last option for an institute to address the problem of recurrent operating costs, is to increase the efficient use of financial resources. Better resource management may be a solution to making more effective use of limited recurrent cost resources (Tabor, 1998: 61).

The first step is usually to assess how resources are used but often records are not available or may not give a correct picture of what has really happened. In Tanzania, the government circular that allowed

the establishment of SHFs also indicated that Financial Advisory Committees would be established at every institute. These committees would consist of insiders (institute staff) and outsiders (stakeholders) and would monitor the use of SHFs and advise on improvement. So far these committees are not active, as SHFs can still not afford to pay committee members allowances.

Secondly, researchers can share equipment and field sites. This can only be achieved if research co-ordination within an institute is very strong and staff members are committed to reduce costs. Field sites can be shared if staff members are aware what other staff members do and where projects are located. At Maruku for example, staff meetings are held every Monday morning and allow researchers to share information. This can lead to sharing of transport or even the sharing of staff. In the Lake Zone, quarterly research meetings significantly contribute to increased collaboration between programmes and individual researchers.

Thirdly, researchers need to be given increased confidence in the ability of the research institute to cover recurrent costs. Key measures are increased transparency in financial reporting (see the paper on accountability) and easier access to budgetary information. Sharing budget information with staff is the best way to restore their confidence in the institute. The watchword here is transparency, transparency in the discussion and dissemination of financial information within an institute (Tabor, 1998: 62). When staff members actively contribute to increased institute income through collaborative or contract research or service units, it is only logical that they will remain motivated to do so in the future only if they are aware of what the income is used for. If, for example, increased staff contributions to the SHF have not solved symptoms such as disconnection of electricity or telephone, or transport fees for accountants, then those staff will likely be very disillusioned. In the absence of a Financial Advisory Committee for the SHF such information can be discussed in a management meeting. This is the case for example in the Lake Zone where financial reports for all accounts are discussed in monthly management meetings. The accountant is a member of the management team. In the Northern Zone this is not yet the case. In the absence of regular management meetings, institutes in the NZ set up financial committees in January 2003. The committees at Selian and Tengeru consist of the accountant, the SUC or ASUC, one programme head and one other staff. Their activities need strong management support.

Finally, in the modalities that are described in 7.4, stakeholders collaborate in research or contract research. They contribute funds to cover overhead cost through either institutional fees or 10% of the recurrent research budget. Increasingly stakeholders demand transparency for the funds they have contributed. In the Lake Zone this is addressed by increasingly incorporating financial reports in annual reports. Short summaries of for example income sources and expenditure for the SHF are incorporated in the annual reports, which are distributed to stakeholders. In Maruku, short SHF statements are also part and parcel of annual stakeholder meetings.

7.6 Lessons learned

Financial sustainability of an institute can be assessed but needs input from all staff at a research institute. It requires budgeting capacity not only for researchers but also for support staff such as accountants, procurement officers, and heads of service units.

The transformation of recurrent operating costs into direct costs leads to research budgets that appear to be higher than before. Costs related to transport, stationary, soil analysis etc. are directly allocated to research and allow for more recovery of overhead costs. In many cases this will have to be accompanied by institutional policies that clarify what funds are used for and how various clients will be charged. In the absence of clear internal guidelines, the outcome of negotiations will be determined by the researcher ability to explain increase costs.

The delegation of management responsibilities to the service unit managers enhances management efficiency. It also ensures that equipment is being used optimally and maintained (e.g. a vehicle, tractor or photocopy machine) (see Box 7.3), and that support staff salaries are timely paid. In the case of Selian for example, ploughing in 2003 was done by the Transport and Workshop Unit and resulted in all land being ploughed three weeks before the onset of rains. In 2002 ploughing had to be contracted out to other tractor owners and plots were planted only after rains had started.

Box 7.2 Quotations from Institute Directors in the NZ

“Although the units have not yet transferred money to the SHF awaiting confirmation of profit calculations from FAIDA-BDS, I am very happy that they have not asked any money from me for e.g. repairing vehicles or buying tires. They are maintaining vehicles in the unit and that is a big relief to me. Before the start of the units I used to pay quite a big bill for vehicle maintenance” says the Director Horti-Tengeru.

“Salaries for about 10 casual labourers are being paid by the units and they are also repairing their own assets thus removing quite a big load from my shoulders. This is a big plus for the service units” says the ZDRD (N)

However, the internal reorganisation also meets 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 objected as they feel equipment is provided by the government and should thus be freely accessible (e.g. by buying fuel for a vehicle instead of paying a mileage fee to the unit).
- Secondly, when service units started up in the Northern Zone they could not create a profit instantly. As a result they were unable to transfer money to the SHF thus leaving the station management with no resources to pay for services themselves. In the Lake Zone this problem did not occur as contributions to the SHF are part of monthly costs, not profits.

Service units increasingly use farm land, animals, farm machinery and implements, buildings and laboratories to increase station revenues. Initial revenue generation however can be seriously hindered by e.g. old machinery, electricity cut-offs and weak staff morale. The establishment of service units needs to be accompanied by financial injections. Equipment needs to be repaired or bought. The inclusion of depreciation costs in costing may not be realistic if donors are willing to continue making capital investments. In that case however, units should not be excluded from the allocation of new equipment, e.g. printers, computers, photocopy machines or vehicles.

The augmentation of funding for recurrent operating costs ensures that income for the SHF will be more stable in the future. Reliance on one funding source only brings sustainability issues in question. The below figure (Figure 7.4) shows how a number of funding sources contributed to the SHF at Ukiriguru. Funding sources will be further dealt with in paper 8.

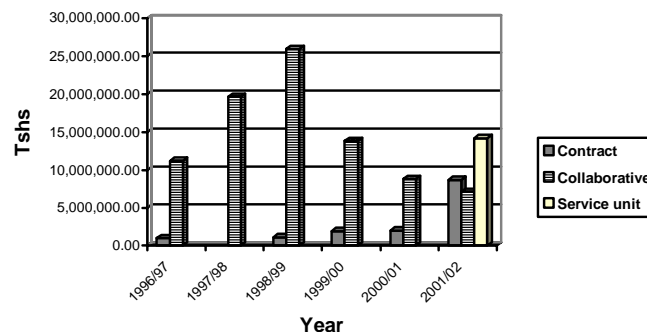


Figure 7.4 Contribution of contracts, collaborative research and service units to SHF at Ukiriguru

Institute staff lack skills to run business-like enterprises with the objective of generating revenue. In both the Lake and Northern Zone unit managers attended a two-week short course on business management. Such training is essential for service units to be successful. Staff are not used to deal with matters in a business like manner.

The establishment of service units increases financial transactions in the account section. Computerisation of transactions helps to reduce this additional workload. However it is essential then for staff to be computer literate. Poor co-ordination in the accounts section leads to poor reporting for service units. It also makes it very difficult to access financial data on research projects, and their contribution to overhead costs. A financial sustainability analysis can only be made in collaboration with all account staff and with strong support from the management.

Business plans are essential for service units to operate. It gives unit managers a sense of ownership and guides activities. Business plans allow for monitoring and assessing results. Business plans however should be flexible. Changes can occur which require amendment. Such changes should always be discussed in consultation with the heads of units, the SUC and the institute management. Unilateral instructions to service units will not contribute to staff motivation. Box 7.3 gives an example of changes within the Transport Unit at Ukiriguru.

Box 7.3 The Lake Zone transport unit: process, problems, adaptation and stakeholder reactions

In the period 2001-2003, the LZARDI paid a lot of attention to the issue of sustainable provision of services, of which transport is one of the most important. Management extensively discussed transport issues in monthly, quarterly and special meetings. Although time consuming, these discussions ensured that all programmes and sub-programmes support the new policies.

On the basis of feasibility studies and the elaboration of a first 'business plan', the internal delivery of transport services on a cost-recovery basis started in July 2001. The units at Ukiriguru and Maruku ARDI started with ten and five cars respectively. In the first year, staff cost consciousness significantly improved and transport costs were incorporated in activity-based budgets. Due to coding deficiencies, the account office handled financial transactions manually; transport income and expenditure was not entered in the computerised financial management system. Revenues were used to maintain the vehicles and to cater for operational costs. However, the income did not suffice and external support was still needed. Problems were mostly related to the situation that, initially, Ukiriguru and Maruku ARDI had two different transport management modalities. For cars that were acquired through the TARP/II/COR project, the transport units charged 450 TSh per kilometre. This included all costs: fuel, other operational costs, depreciation and overhead costs. For cars from other sources (CDF, NRI, LEWS, DFID, EU), staff members were only contributing for the fuel costs (approximately 100 Tsh per kilometre) and some repairs.

For several reasons, it was decided to review this 'double standard' and to adopt a system that would include all vehicles. First of all, transport facilities are the responsibility of zonal management. When cars are provided, agreements are made between the Institute and the sponsor, not between the sponsor and the sub-programme or the individual scientist conducting the activity. Secondly, the recovery of fuel costs only is insufficient, because it doesn't include variable costs: driver salaries, tyres and tubes, routine and major services, electricity and insurance and overhead costs. And thirdly, continuity of transport is not assured when sub-programmes have to rely on their 'own' car. A good example was the breakdown of a pick-up provided by NRI for Root and Tuber research activities. Field activities would not have been possible without the car hiring facility.

In February 2003, transport officers of Maruku and Ukiriguru each calculated that the total variable costs per kilometre is TSh.240. This did not include depreciation and overhead costs. At current prices and currency rates, the depreciation is around TSh.200 per kilometre. However, the LZARDI decided not to include the depreciation in the cost price: (1) the price of transport may restrict clients, (2) experience shows that the international donor community facilitates the acquisition of transport facilities (LZARDI received several new cars in 2002-03 and more cars are expected). It was therefore proposed to charge TSh.300 per kilometre: 80% for the transport unit to maintain cars and pay direct costs, and 20% for the self-help fund to cover overhead costs.

In the past two years, LZARDI asked stakeholders and development partners what they thought of the transport unit system. The reactions are generally positive. However, district authorities and some NGO's pointed out that they cannot afford the full cost price of then TSh.450. In case of many field trips, transport costs inhibit users

(one of the reasons to recover variable costs only). Reactions by the Minister and the PS of MAFS, DRD, TARP II supervision missions, controllers of CAG and the sister institute MATIU (Ukiriguru training department) have all been positive. Reactions of sponsors have generally been positive as well. Development partners mostly remark that they are happy that the car they provide will be taken care of. Instead of being grounded because of a lack of operational funds, they will be on the road and in a safe condition. One of our partners explicitly mentioned that “this is the way it should be done” and another one asked: “why didn’t you do this before?” Yet another sponsor signed a contract and agreed on a budget that indicated 50 Dollar cents per kilometre.

The challenge is now to institutionalise the transport management modalities and to inform all stakeholders accordingly. All scientists will continue to include the variable transport costs in their budgets. And, with a sustainable management system in place, the Institute expects that it will be easier to convince partners to facilitate the acquisition of transport.

7.7 Challenges and the way forward

In 7.1 we described the process for addressing problems of recurrent operating costs. The flow figure clearly shows a third and fourth step. In both the Lake and Northern Zone these steps have not been adequately addressed yet. In step 3 management practices related to the options that are explored are institutionalised. This refers to formal approval of the strategies that are implemented by DRD and MAFS, internal management practices such as internal financial reporting including the SHF, formal approval of fees, and the harmonisation of fees within an institute and between institutes. In phase 4 donors and stakeholders should be informed.

Quality services provided by the units have increased the demand from customers outside the institutes. For instance the use of halls and catering services, the production of event cards and the demand for improved planting material. Institutes will need to ensure that the demand for services by outsiders does not result in services not being available for research staff.

The importance of transparency issues cannot be stressed enough. In the starting situation in the two zones only the ZDRD or station director was responsible for general expenditures from SHFs. Now the heads of service units are partly responsible for payment of overhead costs allocated to their unit (e.g. salaries and maintenance). Researchers contribute directly through research projects and direct costing methods. The use of funds that the staff members create should be transparent as this will instil a sense of ownership and will continue to motivate staff to contribute. Frequent reporting on how the SHF has contributed to the institute welfare, and incorporation of staff suggestions on how to improve the welfare of the institute further would lead to staff being motivated to contribute to the institutional welfare.

Networking and diversification of agricultural research funds

Margaret N. Kingamkono, Jackson M. Nkuba and Chira Schouten

Guiding principle

‘Institutes are part of large networks:
a pro-active attitude towards sponsors leads to more sustainable research funding’

Summary

The Division of Research and Development (DRD) vision of research through the TARP II has been to make research more user-oriented and demand-driven. One of the main features has been the decentralisation of research activities with main responsibilities vested in the zones, sourcing for sustainable funding opportunities, promotion of private sector involvement and enhancement of collaborative research arrangements within and outside the country. This paper argues that there is a lot that zonal institutes can do to increase funds for research in the zone.

8.1 Introduction

Agricultural research is expensive. Trials often take a long time and are unpredictable. At independence Tanzania inherited a relatively well-developed research infrastructure but activities depended heavily on British researchers and favoured mostly export crops. After independence government investment grew, new stations were set up, staff expanded and research started looking at food crops. In the late 1970s however, government funding stagnated and later started declining. Staff kept growing and as a consequence expenditure per researcher declined. Agricultural research was increasingly dependent on donor contributions. In the 1990s government funding declined to about 25% of requirements while donor contributions covered 75% (Herz, 1996).

At the moment agricultural research funding in Tanzania is characterised by the following three problems:

1. *Low research intensity*: Total public spending as a percentage of agricultural output is a commonly used research investment indicator that enables us to compare agricultural research and development spending in an international context. In 2000, Tanzania invested USD 0.38 for every USD 100 of agricultural output - less than half the average of USD 0.85 for Africa as a whole in 1995 (Beintema *et al.*, 2003) (see Figure 8.1). Even though in the period 1996-2000, DRD spending doubled, this increase was mostly due to World Bank loans. Spending per scientist almost doubled from USD 25,000 in 1995 to USD 48,000 in 2000 but was still very low compared to spending in surrounding countries (Beintema *et al.*, 2003).

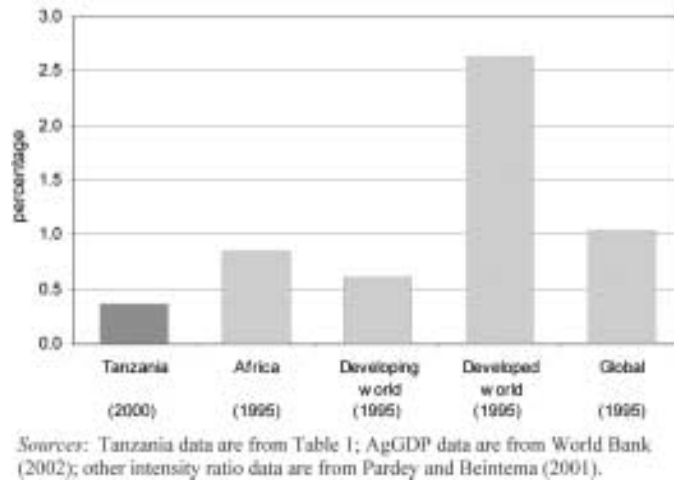


Figure 8.1 Tanzania's public agricultural research intensity compared regionally and globally (Beintema *et al.*, 2003)

2. *Erratic funding:* Government and donor funding to DRD between 1996 and 2000 fluctuated (see Figure 8.2). One of DRD's problems for example has been the inconsistency between budget allocations and actual disbursements. About two-thirds of total government funding is destined as recurrent budget. 90% of this is earmarked for salaries and benefits. The development budget is drawn almost entirely from World Bank contributions, which are given in a form of loans and are therefore treated as part of the total government allocation.

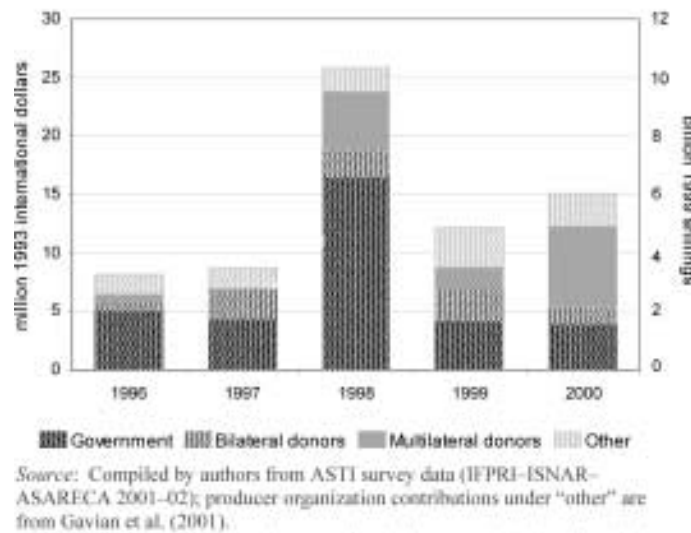


Figure 8.2 DRDs funding sources, 1996-2000 (Beintema *et al.*, 2003)

3. *High donor dependency:* DRD has become increasingly dependent on donor funding. More than half of total 2000 revenue came from the World Bank and other donors (Beintema *et al.*, 2003). Of TARP-II's total USD 25 million funding, about USD 20 million came from the World Bank, African Development Bank and various bilateral donors such as the governments of the Netherlands, Germany, and the United Kingdom. The national government's contribution to the

project was USD 5 million. The major donor is the World Bank. In the case of the Lake Zone there is a high dependency on the Netherlands Government.

Funding modalities

To improve funding levels as well the sustainability of funding flows DRD and zonal institutes increasingly explore other sources of funds. The following is an overview of some of the funding options that are in use in DRD:

1. *Central government allocations:* Tanzania faced financial constraints for many years and could not fund agricultural research and extension adequately. Government budget support has remained far below the expected levels. It is likely that these levels will not increase dramatically in the future.
2. *Donor subventions:* Research in DRD largely depends on donor funds. Support however has been declining and could decline further due to changes in policies and new mechanisms such as basket funding (URT/MAFS, 2003).
3. *Commodity levies:* Research funding through commodity levies is relatively high in Tanzania as compared to other African countries. Local taxes are collected as cess. In 1996-2000, these sources accounted for 12 percent of total DRD funding. More than half this amount was created from cashew (Beintema *et al.*, 2003: 5), others are created from cotton, tea, coffee, sugarcane and tobacco. Commodity levies tend to be affected by reforms in agricultural trade, and commodity prices. When commodity prices are high, revenues increase, when prices are low, they fall. This makes revenues volatile and makes their contribution to sustain research activities erratic.
4. *Collaborative research:* Nationally, DRD collaborates closely with a large number of government and non-profit organisations such as TAFORI, COSTECH, TPRI, SUA, TACRI and TRIT. International linkages include collaboration with ASARECA and other regional networks, as well as many of the international centres. Collaboration is mostly in bilateral agreements at the national level.
5. *Contract research:* This is carried out in limited areas in Tanzania. Contract research started in 1995 in the Lake Zone and has increased ever since. Some zones are involved in contract research and for a station like e.g. ARDI Maruku contract research contributes substantially to research project funding. Income varies from year to year and depends on opportunities in each zone and how well the institute competes with other service providers.
6. *NARF and ZARF:* Many developing countries have set up competitive grant programmes. These can create competition within the research system between research suppliers and can be an important tool for controlling the quality of research. The first competitive fund for agricultural research was set up in 1991 and became operational in 1994. The fund, the National Agricultural Research Fund, intended to support research activities under the National Masterplan. The fund also aimed to improve linkages among agricultural research agencies in Tanzania, between the public and private sectors, and with agencies outside Tanzania. As of June 30, 2002, USD 750,000 had been allocated to NARF, and half this amount has been disbursed (Beintema *et al.*, 2003: 6). In 1997, the Zonal ARF was established to address what was perceived as inherent problems with NARF, specifically that it is operated in isolation of farm-level clients. ZARF is decentralised, involves local stakeholders and research institutes, and receives contributions from district councils, non-governmental organisations, the governments of Sweden and the Netherlands and other donors. These contributions are matched equally by the World Bank through TARP-II. Most District Councils made pledges varying from TSh. 1 to 5 million.

These funding options have resulted in very different situations in the zones. Table 8.1 compares the funding situation in Southern Zone and Central Zone (CORMA assessment, 2002). The total funding level is very different and sources of funds are specific to the zone. Southern Zone depends mostly on funds provided by the cess on cashew. As a result funding is determined by the cashew price. In the Central Zone funding sources are more varied but the zone relies heavily on TARP-II funding.

Table 8.1 Funding sources in Central and Southern Zone in 2000/2001

Source of funds	Central Zone [million TSh]	Southern Zone [million TSh]
GoT salaries	65	84
TARP-II research	48.9	37.4
TARP-II other activities	18.7	
NAEP	11	12.5
Cashew levy	0	332
Collaborative	74.3	47.5
ZARF	5.7	0
SHF	21.3	18.2
Total	244.9	531.6

Possible options

Considering the above problems what can an institute do? The COR Management Approach offers a range of options that will contribute to an improved funding situation and increased funding diversity. Several of those have already been described in previous papers. Others will be described here. Summarised we distinguish the following:

1. Get to be known as an institute and implement activities that will ensure that you get to know the stakeholders in the mandate area (paper 1);
2. Know what the problems in mandate area are (paper 2), prioritise them and develop a strategic plan;
3. Adapt the institute staff and the organisation to stakeholder needs (paper 3 and 4);
4. Ensure that researchers have access to information and to communication facilities (paper 5);
5. Ensure sound financial management practices within the institute and ensure the availability of internal services (paper 6 and 7);
6. Define the services that the institute can offer and the relevant fees (this paper);
7. Know your funders (local, national and international) (this paper);
8. Establish and maintain partnerships (this paper);
9. Write winning proposals (paper 9);
10. Conduct quality research and produce quality outputs (paper 10-12).

8.2 Define services and fees

Develop a service catalogue

Researchers often believe that their disciplinary research is the only contribution they can make to solve problems perceived by farmers. Experience from the Northern Zone and Lake Zone shows that clients frequently need a range of services. These may include requests for results of current adaptive research, but also access to information from past research, instant advice and recommendations for urgent problems, relevant extension material, training, soil/plant- and pathology analysis, access to quality seed or planting material, etc. Where feasible, these services should be made available and actively promoted among potential ARC clients. Moreover, a list of costs and fees for these services plus payment modalities should be established to standardise charges for individual client(s) or group(s).

In the Northern Zone available services and their costs were assessed in a general research staff meeting. Services to be included in the service list have to be reviewed first to avoid that the institute promotes services that cannot be offered satisfactorily. This could be the case if for example a service can only be offered by one individual and not a department or section. If the person is not available the service cannot be provided. Other services (e.g. soil fertility analysis) can often only be provided in close collaboration with (a) partner institute(s). These services should be mentioned specifically, because the institute is not solely responsible for providing them. All conditions that may limit

immediate access to the services (e.g. availability of chemicals for soil analysis), should be included in the information regarding available services. Fees for all services were proposed, discussed with stakeholders, approved by the Ministry of Agriculture, and published in the zonal policy paper. The policy paper hence served to guide all services the institute provides. Table 8.2 gives an overview of services that the NZARDI can provide.

Table 8.2 Overview of NZARDI services in 1999.

<p>Crops Programme</p> <ul style="list-style-type: none"> ▪ 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) ▪ Post-harvest processing (P) 	<p>Livestock Programme</p> <ul style="list-style-type: none"> ▪ 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 and marketing of animal products (P) ▪ Assessment of public health risks (P)
<p>Special Programme</p> <ul style="list-style-type: none"> ▪ 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) 	<p>Socio-economics Programme</p> <ul style="list-style-type: none"> ▪ 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)
<p>Laboratory services</p> <ul style="list-style-type: none"> ▪ Soil analysis (all macro nutrients, various micro nutrients, CEC, organic matter, texture) (P) ▪ Nutrient analysis with stable isotopes ▪ Plant pathology analysis ▪ Nematode analysis 	<p>Other services</p> <ul style="list-style-type: none"> ▪ Documentation and information ▪ Training courses and training facilities ▪ Demonstrations ▪ Quality seed production ▪ Grafting of fruit trees ▪ Testing of agro-chemicals ▪ In-vitro services

(P) refers to services that can be delivered with additional support by a partner

Streamline fees

An overview of services should be accompanied by the institute making an effort to streamline fees that are charged. If the institute aims to be credible to funders, it should make sure that charges are transparent and, for example, have been published in an institute fee list or policy paper. Use of these charges should be monitored and periodically reviewed. In the Lake Zone fees for research modalities were streamlined in 1995-1996, while the Northern Zone started in 1998. Basically the institutes distinguish five funding modalities, i.e. government, cess, collaborative, contract and ZARF. Charges for each modality were set and discussed with stakeholders. In the Lake Zone for example, stakeholders and donors participated actively in the elaboration of the contract research modality. This ensures that stakeholders fully support the streamlining efforts and will be willing to pay relevant charges. Similarly fees were streamlined for services that are provided by the service units (see paper 7). These have been listed in flyers for each respective unit.

Develop budget guidelines

An institute has to prepare budget guidelines, to ensure that all proposals going out follow the same pattern and make the same budget assumptions. For instance, when you have not discussed budgets with respective donors yet you cannot charge one donor more for mileage than another. However it is

important to note here that different funding organisations have different conditions and guidelines that are to be followed. It is then important to leave room for flexibility and negotiations.

8.3 Know your funders

Donor inventory

To increase chances of securing funds research institutes need to establish good relations with financiers and donors. These may be private organisations or donors using public sector funds, i.e. bilateral or multilateral donors (Mugah and Temu, 2001):

- **Bilateral donors:** The word bilateral indicates aid (usually in the form of money) that flows from one country to another. Funds for bilateral donors are mobilised from tax revenues in the donor country and political leaders in the donor country decide how such funds should be used. Examples are DANIDA, DfID, CIDA, SIDA, USAID.
- **Multilateral donors:** Funds of multilateral donors come from a number of member donor countries. Their primary source of such funds is also tax revenues. Recently funds for these organisations started to decline and they are less and less able to finance research. Examples are FAO, UNDP but also AfDB, IFAD, EU and World Bank.
- **Private sponsors or foundations:** The most common type of organisation with private sources of funds are foundations. Their primary sources of funding are wealthy individuals or profitable commercial companies. Foundations have large sums of money that they have invested. On the interest that they earn from their investments they fund research or other projects. Examples are Ford Foundation, Rockefeller Foundation, McArthur Foundation, Winrock, Cargill.

Where to look

Researchers can find written information from a range of sources such as standard publications, databases, newspapers and the internet (Foundation Centre: www.fdncenter.org; European Foundation Centre: www.efc.be or www.fundersonline.org; www.grantselect.com; www.europa.eu.int). In addition personal contacts with donor representatives are very helpful.

What to look for

Donors routinely receive numerous requests for funds. Competition is stiff. Donors will only fund a research project if it is of interest to them. There is no point sending a proposal on maize in East Africa to the Asian Development Bank. You need to know as much as possible about possible donors. What is its purpose, its interests, its politics, its budgets? This is what is called "donor intelligence". It includes information on (Killen, 2003): funders mission; type of foundation or funder; funding pattern; what type of organisations and what type of projects were previously funded; what is the proposal application procedure and are there deadlines for submission?

Northern and Lake Zones have lists of external funding opportunities that has been developed and often updated, and directories of stakeholders. The funding list has been compiled in a compendium and is used as a guide for searching more details about the funding organisations.

Know the networks of scientists

Prior to 1998, there were many national and international donors who were funding research programmes, but they were not co-ordinated. A donor funding a certain programme or project may not be known to other researchers within the same institute. As a result the institutes did not have proper strategies for maintaining them. In 1998, the Northern Zone circulated a form to staff to request them to fill in their networks. This resulted in a long list with international, national and zonal institutions. The Lake Zone also tried to assess researcher networks but so far has not been able to finalise the list.

8.5 Establish and maintain partnerships

Agricultural research is not a secluded undertaking. It involves many disciplines, expertise and different types of resources. It touches on community development and livelihoods of the people, the main reason as to why it requires a holistic approach. A holistic approach in agricultural research and development requires strong partnerships and networking among the partners at all levels and research stages. Partnership is crucial to bring about a more demand driven and client oriented research and extension and to create a leeway to democratisation and decentralisation of farmer organisations and other partners (Collion and Rondot, 1998). In the research funding context partnership is of vital importance between the funding agencies, research partners and the clients. Research institutes have been taking deliberate moves to ensure strong partnership and networking is sustained. This enables the pooling of resources and sharing of knowledge and expertise. Partnership in the research cycle, development of proposals, implementation of projects, dissemination of research outputs and project evaluation make agriculture a more sustainable venture. Where the partnership is strong and networking is promoted, research results have been productive.

Individual initiatives and institutional partnerships

Partnerships can be established at different levels within an organisation, from individual to programme to centre. As an institute cannot normally fulfil all requests for collaboration there are a number of issues that can be considered when selecting partners:

Partnership(s) should:

- have a shared vision of the needs being addressed and how these may be addressed;
- be on a participatory basis, with joint sharing of responsibilities and accountability;
- be based on mutual respect between the parties;
- have complementarity of skills between partners;
- involve interdependence in that neither partner would be able to complete the tasks alone;
- contribute to the institute goals by being related to research and research- related activities, strategic in nature, and within its resources;
- be within priority areas of partner(s) and meet the criteria set by them;
- result in institute skills and knowledge benefiting partners' activities which are aimed at a shared goal;
- result in better use of scarce resources, quicker gains from priority research, stronger research networking, and synergy gains.

Box 8.1 Responsibilities for partnerships

Individual scientists are responsible for:

- Working in groups, with technical partners and beneficiaries, to design research projects that (a) fit within the plans and programs of the NARS, (b) are of value to the beneficiaries, (c) are cost-effective, and (d) can attract donor interest and funding
- Writing up their project ideas in appropriate formats for submission to external donors
- Contributing to the NARS Donor Intelligence Unit
- Contributing to the maintenance of good donor relations
- Helping with NARS public awareness efforts
- Revising concept notes and proposals to accommodate the views of donors
- Attending the reviews of their colleagues' concept notes and proposals, and providing constructive criticism
- Helping to track their proposals with donors
- Monitoring funded projects, and preparing good progress reports to donors
- Preparing follow-on proposals in a timely manner to ensure seamless funding for research activities

NARS management and administrative staff are responsible for:

- Creating and maintaining a Donor Intelligence Unit
- Creating and maintaining a NARS public awareness effort
- Preparing strategic plans and research programs, including a strategic fund-raising plan

- Preparing project development and budget guidelines
- Reviewing concept notes and proposals in open reviews
- Coordinating the tracking of donor proposals
- Reviewing project reports before submission to donors
- Maintaining a steady flow of proposals from various departments within the NARS

Source: ISNAR

Maintaining relationships

Good relationships are based on mutual understanding; mutual understanding depends on good communication. Everyone in an institute has a role to play in the donor relations effort. It is always important that these efforts of individuals are co-ordinated. The objective of the donor relations effort is to present the institute and its work in the most favourable light—to create a good impression of the institute in the mind of the donor. This can include materials specially written for donors, a series of presentations, meetings, and other face-to-face encounters with donor agencies and staff such as seminars, farmer field days, open days etc. Information about the outputs and impact of the institute should not be underestimated. These can be research highlights, annual reports, a website, use of email and internet, frequent pieces of news, publication lists. Many of these have been developed in the Lake and Northern Zone and have been described in paper 1. Staff also needs information on donors that can be maintained in a 'donor library' containing brochures/proposals/requirements/formats.

Follow announcements and calls for proposals

Sometimes donors know what they want to fund. They may, for instance, want to fund a project to provide poor farmers in Tanzania with an alternative to subsistence farming in the form of producing new, high-value, export crops, such as vegetables and flowers. The agency does not, however, want to implement this project itself. Instead, it wants to find a good organisation to implement it. To this end it issues a *Request for Proposals*. Other donors like to pick and choose from different proposals. So they set up *competitive grant programmes*. These are far less specific than RFPs. The donor may only specify a given topic, such as “natural resource development” or “crop improvement” or a given geographic area. The donor will also usually give guidelines about the size of the grant that is available, or the preferred duration of the project. This may be known as the *Call for Proposals*. There is nearly always an annual deadline for submitting a proposal. If you miss that deadline, you have to wait till the following year.

8.5 Diversification of funding in the Lake and Northern Zone

Relying on a single funding agency or sticking to the traditional funding organisations, whether the government, private sector or external funder is risky. This is in terms of organisational sustainability and the possibility of unbalanced policy pressure as it sometimes happens with external funding or in cases of produce board financing which may result in an exclusive cash crop orientation (CORMA 2002). It is therefore important to look into appropriate and cost effective means to increase the leverage of clients and other stakeholders, over research priorities and to achieve a more client driven research agenda

GoT/TARP II

Core funds provided by the GoT/IDA (TARP II) are available for the period 1998-2003, and have now been extended to 2004. The funds are labelled and targeted at priority crops in the both the zones. TARP-II funds are mainly used for research requested by GoT extension services and few NGOs to improve small-scale crop- and livestock production. Requests for research will come through mostly districts or FRGs in the case of the Lake Zone. Funding in the Lake Zone is provided entirely through the COR programme and will end in 2003. Recently the LZARDI introduced Institutional Fees for this modality as well. Researchers sign a contract with the ZDRD. Reporting and service unit fees are included in all budgets and motivate staff to write and submit proposals. Due to the programme nature only short term projects (i.e. up to 3 years) were funded. Project proposals are screened according to

procedures as described in paper 9. In the Northern Zone the use of TARP-II funds has not been popular due to initial disbursement problems. In addition TARP-II in the Northern Zone does offer opportunities for the inclusion of fees but in the case of limited fund allocation researchers do not feel it will be useful to do so. Due to extensive networks that researchers have many of them actively pursue other funding opportunities.

Cess

Due to the unreliability of cess funds researchers have increasingly submitted proposals for crops such as cotton, tea and coffee, to other funding agencies. Cotton cess in the Lake Zone has proven an unreliable source. Coffee and tea research have been privatised. Cess offers an opportunity for longer term research.

Collaborative

Collaborative research is one of the most important channels for current research funding in the Northern Zone and Lake Zone. Partnership with regional and international research centres offers opportunities for improving the funding levels of research institutes in terms of increased capacity building through training, development of collaborative projects and technical back up. This however requires a proactive and strong liaison with international and regional research institutions and organisations and calls for partnership and networking to be able to identify areas of common interests and modalities of co-operation. In both the Lake and Northern Zone researchers use their networks to pro-actively search for funding opportunities. Collaborative research does not provide researchers incentives like e.g. contract research and ZARF but does often allow for incentives such as training, conferences or international DSA. Agreements tend to be signed for longer term projects and give the researcher security. The Northern Zone has long experience in maintaining such collaborative efforts through CIMMYT, ASARECA networks, FAO etc. In case of collaborative research, all contributions by the partners are specified in a memorandum of understanding. The partner of the Institute is requested to pay 10% of the recurrent research budget, or its value in kind, as overhead costs to the Institute. Memoranda of understanding however are signed at the national level and often do not allow for the inclusion of specific zonal requirements.

Contract

All clients can apply for support through a contract. The contract must stipulate all contributions by the stakeholders involved and the modalities. Contracts are always signed between the highest authorities on behalf of the client/s and the Institute. Both the Northern and Lake Zone have at least 5 years experience with this funding modality. The extent to which contract research can contribute to research funding in the zone is determined by the acquisition capacity of research staff, and more importantly the satisfaction of clients. Both zones have experience with clients not coming back after they felt that outputs were not delivered in time or were not of sufficient quality. Institutes in both zones tend to have several contracts a year and a client who is satisfied with services that have been provided will come back. Contracts tend to have a short term perspective and contribute to short term funding diversification. Contracts are very difficult to predict but offer incentives to researchers which may not be offered in other cases. Contract research has many advantages but also many disadvantages. Table 8.3 below gives an overview of these based on experiences in the Lake and Northern Zone.

Table 8.3 Advantages and disadvantages of contract research

Advantages of contract research	Disadvantages of contract research
<ul style="list-style-type: none"> ▪ Research done is generally of good quality because the client has the opportunity to evaluate progress and the results at any stage. Lack of quality can have repercussions on the payment of the institutional fee. ▪ Contract research is action oriented. Clients are in most cases interested in quick results. 	<ul style="list-style-type: none"> ▪ Most research done on contract basis is of short-term nature. Local sponsors are not ready to fund long-term strategic research. ▪ The institute may become too commercial and tend to sell itself to resource-rich clients only. Resource-poor clients may be less considered,

<ul style="list-style-type: none"> ▪ Contract research becomes more efficient as the ToR are clear. Individual researchers become more responsible for respecting the budget as the sponsor supervises the allocation of funds. ▪ Contract research helps to set research priorities. In the past clients tended to make research requests without thorough evaluation of their needs and the costs involved. Because research has become a cost to the client, he/she will evaluate its importance before releasing the funds needed. ▪ With contract research the research institute becomes a regional centre as it has to answer research requests from all over its mandate area, using funds from local sponsors. It becomes more flexible in choosing its partners which avoids domination of one foreign donor. Also the institute can become financially self-supporting and can pay for its day to day running costs. 	<p>although their research requests are as valid.</p> <ul style="list-style-type: none"> ▪ Some clients are not able to formulate ToR themselves. Moreover they may not be able to evaluate the quality of the work performed. This is not a sound basis for partnership and training must be provided to empower clients. ▪ A conflict occurs when a researcher has to report to his or her higher authorities and to the client. Sometimes a client receives reports which are too scientific and inaccessible. ▪ In the Lake and Northern Zone contracted scientists often received late payments of funds by local sponsors which hampered timely execution of activities.
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Source: DRD/KIT 2000

ZARF

ZARFs are complementary to TARP II, but are more flexible and accessible to a wider range of clients in the zone. Research funded by the ZARF addresses well-defined needs by, mainly, resource-poor clients, such as GoT extension services, NGOs and farmers' associations. ZARF have well defined objectives that need to be addressed in a proposal if it wants to qualify for funding. In the Lake and Northern Zone ZARFs were set up in 1999. The modalities are the same as those stipulated for contract-research, including institutional fees to be paid to the Institute (see for example, Constitution of the NZARF). The major difference however, is that ZARF is a competitive grant, i.e. only those proposals that are good are being funded. When ZARFs started in the Lake and Northern Zone donors were mostly bilateral donors, while funds were doubled by TARP II. Stakeholder meetings were organised in 2001 and 2002 and District Councils pledged to contribute. So far these funds have come only slowly. In the Lake Zone efforts to increase the independence of ZARF and improve stakeholder ownership have resulted in the fund moving its' offices from the LZARDI to Mwanza.

Box 8.2 shows ZARF in the Northern Zone. ZARFs are an indication that if more attention is given to strengthen such modalities, agricultural research funding, contributed and controlled by the stakeholders for client oriented research can be sustained.

Box 8.2 Experience in Northern Zone with Agricultural Research Fund

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 the 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. 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 the ZARF priorities. Committee members rejected 32 proposals and accepted 22 proposals for funding. The number of proposals can be an indicator for empowerment of stakeholders in the ZARF –MC.

Overall results of funding diversification

In the Lake Zone GoT, Cotton Cess, and one single donor (Netherlands Government) used to provide 95% of all research funds. Now funding sources have significantly diversified (see Figure 8.3) but differences between the two institutes are very clear. Ukiriguru relies on cess and collaborative research, while Maruku has been successful in acquiring contracts and ZARF.

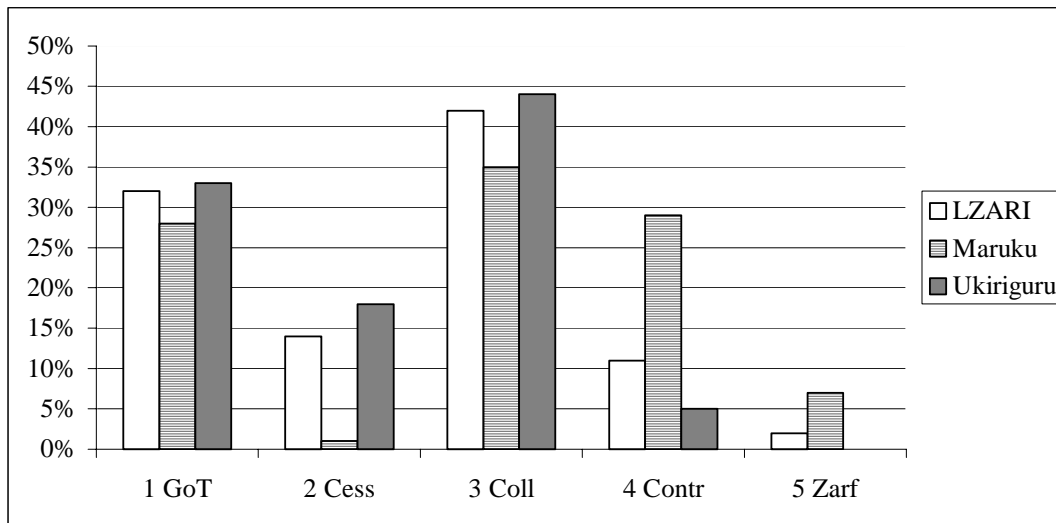


Figure 8.3 Funding sources LZARDI in 2000-2001 (total funding TSh. 410 million)

8.6 Conditions for success and lessons learned

Individual contacts and institutional partnerships

Funding organisations fund people, individuals that represent the institutions. It is therefore obvious that individuals should maintain good relations with the funding organisations. It has been observed that getting funding from a funder for the first time could be difficult, but thereafter it becomes easier due to the partnership that develops. Individual contacts however should be developed into institutional partnerships.

Maintaining the relationship

It is relatively easy to get and to lose a client or sponsor. In that context quality research is crucial. Donors are not really donors anymore but investors. Investors who would like to support agricultural research in developing countries. An investor by definition expects to see a return on the investment, and thus outputs.

Transparency

The main requirement for success with alternative funding schemes is a good accounting system and agreement by the government (treasury and MAFS) on development of these alternative funding sources. How will the extra funds affect the government budget and will treasury funds not be affected by it. Transparency in research management and high output standards of a research institute win the trust of donors.

Skills and expertise

Individual scientists would do well to sharpen their skills and expertise, and be ready to work for different clients on different aspects of agricultural research. Few people are likely to spend a lifetime working in a single discipline on a single crop. All professional people are going to have to learn to live with continual change in their working lives. Knowing how to sell project ideas is a useful skill for the changing times ahead.

Proposals as a contract of agreement

By writing a proposal a researcher commits him or herself to deliver outputs and results as described in the proposal. At the same time the donor agrees to provide the funds. Funds have to be provided

timely and as agreed in the proposal for the researcher to be able to deliver. If the funding agency does not provide funds as agreed partners and beneficiaries will lose confidence in the research institute.

Donor co-ordination within the institute

Co-ordination within an institute is essential. If not, people will approach organisations individually without even knowing that other researchers from the same institute already have contacts. A small unit or office could house all donor information. The staff in this unit co-ordinates the flow of information, collects news from staff and provides information on demand. The unit will have a library of materials on donor agencies and a database of names, contact points and other information. The library will contain information such as donor proposal formats and guidelines, donor proposal review cycles and deadlines, lists of donor projects, and other material you will need when preparing proposals.

Motivation

Researchers will be more enthusiastic and proactive if they are also motivated, i.e. having a good salary and other benefits (Paper 4). Client satisfaction strategies should go hand in hand with researcher satisfaction strategies.

8.7 Challenges

Local networks

The biggest strength of a zonal agricultural research institute is its local stakeholder network. Increasingly funding agencies ask for partnerships between public and private sector organisations. Research institutes should use their knowledge of local networks to attract more funding.

Strategic fund-raising plan

Both at the national level, DRD, and the zonal level, institutes will need to prepare a strategic fund-raising plan which sets out the amounts of funds expected over the coming years from various sources. The plan could cover five years, and be reviewed and revised annually. The plan should include future estimates from a wide mix of donors, starting from national treasury sources, and including other national, regional and international sources. The plan should take into account the time lags involved in receiving funds. For instance, funding from an international donor will, on average, take 12–18 months from project idea to receipt of funding. The plan must ensure that all programmes or departments within the system or institute receive funding they need in good time. Finally, the plan should define the roles and responsibilities of various groups and individuals within the system or institute with respect to project development and fund raising. It is also suggested that financial resources have to be increasingly controlled and provided by clients.

ZARF

ZARF could be developed further as a competitive fund that is owned by stakeholders and independent from research. The ZARF should maintain neutrality or else it will lose its credibility with funders such as the District Councils. The biggest threat to ZARF however is its sustainability. An independent ZARF has a price as it requires a management that has both scientific and financial skills and is able to screen and select projects and manage grants. Funds have to be allocated through the agreed procedure. If however research institutes have more easy access to other funding sources, research institutes may not see the need to compete and quality standards cannot be enforced. Some researchers may feel that ZARF unnecessarily complicates access to research funds.

ZARFs tend to rely very heavily on pledges made by District Councils. These however depend very much on collection of cess and levies, sources that are already overtaxed. Reforms in the Districts may lead to drastic reduction in the number and percentages of taxes on agricultural products, and hence the tax collection and thus pledges to ZARF.

TAGREF

Endowments are another way to fund agricultural research and are being thoroughly explored by the DRD for future use. A sizeable sum of money is set aside as a financial investment and research expenses are paid with the net returns (i.e. after taking into account inflation and fund management costs). Since an endowment provides an annual return independent of public budgets and spending, it is usually considered a more stable source of revenue. A number of issues have to be given careful consideration when establishing the fund:

- Financial independence and accountability are essential. This can be achieved by having the right mix of people on the board that sets policy and formulates strategy.
- Management of the investments depends on high-quality financial staff.
- An endowment fund protects research from changes and thus allows research to pursue long-term objectives. However, by giving this kind of protection an endowment fund may end up confirming research that is no longer relevant. Again it will mainly be the management structure of the fund that determines its responsiveness (Janssen, 1998: 156).

Institutional capacity

Institutional capacity in terms of facilities and expertise remains a challenge to raise funding from non-traditional sources. Researchers have been leaving in search of better jobs and payments especially after acquired good skills through job-training and/or long term training. Research institutes are used as a learning place and then move for better jobs. This is a trend that needs to be checked. Lack of reliable funds to cover institute overhead costs, could lead to failure in acquisition and maintenance of research facilities and reduce the institute credibility. It is important that the government and the institutions take a deliberate initiative to make sure that institutions are well equipped to be able to qualify for funding.

National and zonal priorities

The inflow of alternative funding sources may enhance research on priority activities. However, there is also a risk of projects being developed for the sake of a donor. Projects that do not bear any relation to the research institute mission. Another danger may be that fund raising becomes more important than research.

National and zonal policies

The DRD and zonal institutes need to develop clear policies and procedures for managing project or donor funds. Zonal policies need to be streamlined and if agreed should be implemented for every project that is undertaken.

Use of public funds

Those removed from markets, subsistence farmers in particular, will remain reliant on public research services. Public funds should be concentrated on public goods aspects of research and development. The government may have to withdraw from much applied and adaptive research of a mechanical or chemical nature, and of hybrid seeds and animal breeding. The focus of public sector research should be on more strategic research, on applied research into open-pollinated seed varieties and research of an agronomic nature, on products such as staple foods, and on health, safety and environmental issues that are unlikely to interest the commercial sector.

Proposal writing in partnership

Leonis J. Ndege, Margaret N. Kingamkono and Ninatubu M. Lema

Guiding principle

‘Write winning proposals that convince sponsors to support research and development activities’

Summary

Funding from traditional sources such as the government has been dwindling for years. Increasingly, funding is to be solicited from non-traditional donors. This requires presentation of good quality proposals that can compete. Experiences from the Lake and Northern Zones, show that regardless of research funding modes the focus should be preparation of quality proposals for seeking research funds. This paper discusses key tips to give the proposal a competitive and winning edge, including writing in partnership, screening the proposals and packaging for submission. Based on experiences gained, the paper concludes that the best option of soliciting research funds on competitive basis is to develop grant-winning proposals that may attract funding from a number of funding agencies that have the will, but require proposals that effectively solve farmer problems. Research institutions through researchers and partners should create an effective environment and projects that are convincing for donors to invest their money in. Finally, the paper stresses the need to have high quality proposals by facilitating the process of proposal writing and having strong and effective review and screening teams at zonal level.

9.1 Introduction

Direct contributions to agricultural research from the Tanzanian government and the donor community have decreased and are expected to decrease further (DRD, 2001). Funds available for research will more likely be allocated to local governments, NGO's, farmer organisations, international institutes and competitive funds. This trend is not only true for Tanzania. Internationally, trends of declining research funds observed the following:

- Declining research funds from governments or other conventional sources e.g. crop boards in Tanzania
- Increased competition for funding in all priority sectors.
- Funds devolve to beneficiaries directly who request research

The idea of seeking research grants other than core funds from the Government and local sources results from the fact that currently, funds received are not sufficient and not sustainable. For example, for the past 5 years, ARDI Maruku in Kagera Region depended greatly on COR/TARP II, District Councils and local NGOs for funding research. Of late, donors funding local governments are shifting their priorities away from funding agricultural research to health, education, good governance, *etc.* Consequently there is a drop in research funds, as well as funds for station upkeep. Challenged by this reality, research centres are forced to seek for alternative means of financing research. On the other hand, there are many donors who are willing and able to fund research, provided they are approached and convinced to do so (Killen, 2002). As applicants for such funds are many and screening criteria very strict, the only way to get these funds is through writing high quality winning proposals.

Why is a research proposal important? A proposal is a marketing document that sells a request for an investment and partnership. It aims at convincing and demonstrating to a potential funding individual or organisation that the proposed project is useful to beneficiaries and genuinely needs funding. A proposal focuses on portraying the relevance of the proposed activity with respect to achieving the donor's mission, and a proof that given the funds, the team submitting the proposal will achieve the stated goals or expected outputs. A proposal should answer questions for its justification/rationale, objectives, methodology, and the planned activities. It also mentions the implementers and their qualifications, time frame, the budget, and impact indicators. In summary, a research proposal is a description of a research project that is justifiable for funding by a donor or a sponsor, answers the demands of clients and is implementable by a research team.

Any researcher developing and submitting a proposal should aim at winning funding. Only then can professional and organisational goals of the research institute and those of stakeholders in the mandate area be achieved. Quality proposals raise the credibility and reputation of an institute and researchers in a funding agency. Furthermore, the institute and researchers gain attention and respect within an area of expertise or topic. Ill-conceived projects, written in isolation, hastily designed and prepared, unprofessionally produced and packaged proposals, do not stand any chance for winning funding (Killen, 2002). Worse, submitting a bad proposal portrays a bad image of both the institute and individual researchers. Research institutes therefore, need to strive for and maintain high standards of research proposals for increased and sustainable funding.

Proposal development for agricultural research in Tanzania can be divided into three historical phases: prior to FSA³, during FSA⁴, and during COR⁵. This last phase is applicable for the Northern and Lake Zones, which are pilot areas for Client Oriented Research (COR).

Proposal writing during commodity research

In the 1970's and early 80's agricultural research in Tanzania was organised along commodity lines. The Ministry of Agriculture disbursed funds to commodity co-ordinators (banana, maize, coffee, beans *etc.*) who were research managers countrywide. They had a mandate to organise annual co-ordination meetings, which, among others, were responsible for screening research proposals and approving funding. These meetings were similar to the current Internal Programme Reviews (IPRs), except that they were commodity based. Weaknesses with commodity-oriented proposals included the fact that proposals were single line proposals. They had a low level of inter-disciplinarity, system or farmer-orientation, and were mostly researcher-driven. Researchers wrote proposals in isolation with little or no partnerships and therefore proposal quality was determined by staff rather than the institute. Research proposals were funded mainly because there was little competition, as research funds were readily available. Although proposals were reviewed by peers, there was a lack of common screening guidelines. This reduced chances of getting quality proposals. Activities planned were not realistic as most proposals were determined by the budget that was available.

Proposal writing during FSA

In the end of the 1980's the Farming Systems Research (FSR) programme started with diagnostic surveys for describing farming systems, and identifying and specifying constraints and opportunities for improvement by zones and target groups. Focus of research was mainly on participatory technology development using short term on-farm trials. Through innovations such as inclusion of a systems perspective, zonation, household categorisation and genotype x environment trials, time for technology testing was shortened. Many technologies were developed and disseminated to farmers. Although the budget allocated for these activities was small, leading to low returns to the institute and scientists, returns at farm household level (technology development) were quite high.

³ Phase before the integration of the Farming Systems Approach (FSA) in NARS; when research was purely commodity oriented

⁴ Phase when FSA had already been integrated in the NARS

⁵ Phase when CORMA was been piloted in the Northern and Lake Zones

In this period proposal writing was improved. Researchers wrote proposals in interdisciplinary teams including for example an agronomist, a soil scientist and a socio-economist, using standard guidelines. Research proposals were screened before funds were allocated. Screening criteria included farmer priorities, priority farming systems zone, inclusion of gender or adoptability and marketing issues. Researchers increased their efforts to write relevant and realistic proposals, with respect to addressing the identified farmer needs. Quality was ensured through mostly internal peer review, the zonal internal programme review and screening committees such as the ZTC.

Gradually researchers and the institutes found that what qualified as a high quality proposal by FSR standards, did not necessarily concur with standards and requirements of competitive funds. Increasingly grants are set up at national level, such as NARF and ZARF, or international level. Increasingly researchers have to compete for funds and prove that their research is worth an investment. In line with marketing principles this means that:

- First you need to develop your ideas and assess who would likely "buy" your proposal. Which funding agency would be interested in what you can offer them.
- Secondly, you will have to convince a possible donor that your proposal is the best possible means for them to achieve their objective. Your proposal is your marketing document and you need to develop it very carefully.
- Thirdly, you will only be able to stand a chance if your proposal is of high quality before it leaves the institute. Tough reviews are the best means of achieving this.

Recognising the fact that this is the only way ahead, this paper describes how both the Lake and Northern Zone tried to prepare research staff.

9.2 Getting started

Stakeholder research requests

Stakeholders who request research services do not necessarily have the means to pay for research. Research has an important role to play in providing the link between local stakeholders on the one hand and donors on the other. To be able to fulfil this role research has to know what stakeholder research requests are on the one hand and what donor interests are on the other. Paper 1 described how institutes in both the Northern Zone and Lake Zone improved their relations with stakeholders. Increasingly this has led to requests for research of information services. Requests come in stakeholder meetings, stakeholder tours, annual planning meetings, liaison team visits or through specific project activities. Requests for information and materials can often be answered straight away. However, when requests involve some extent of contracting, collaboration or sponsorship such requests have to be made to the ZDRD.

In the Northern Zone the institute developed a standardised request form which can be used as reference and proof of client demand for the funding agency. The 2-page request form not only includes information about the constraint to be solved but also specifies its geographical and economic relevance, and the contribution of resources by the client. These forms have to be signed by the highest authority in the client organisation before the institute can act on them. Forms are collected by liaison officers or are delivered at the institute. The institute assesses if the request is a genuine request for research or can be solved instantly if for example recommendations are already available. If research is required, a researcher or team of researchers is appointed to draft a concept note. This concept note is discussed with the client before a proposal is developed. So far, only very few potential clients provide comments on concept notes. This requires attention in the future. In addition researchers do not yet assess the wide range of funders for potential submission and mostly focus on direct contracts or submission to ZARF.

Strategic plan

Strategic planning basically means that we adapt the services that the institute can offer to the needs and priorities of stakeholders in the mandate area. Research contributes to zonal and national development goals. To this end researchers have to be aware of national policies and development goals. An institute should have a strategic plan that spells out her mission, vision and her implementation strategy in contributing to these national goals for a fairly long time, usually 5-10 years. This strategic plan in turn guides researchers on areas to focus their efforts in research proposal writing (see paper 2). Any research project within the institute should contribute to the achievement of these goals and objectives. The Lake Zone ARDI developed its first strategic plan in 2003. In both zones the institutes ensured that copies of all relevant national policies are available at the institute. In both zones researchers have access to the internet and researchers were informed of online versions of national policies (see Box 9.1).

Box 9.1 National goals and policies online

The following website provides online versions of a range of national policies. All of these documents can be downloaded as PDF files: www.tzonline.org/policies.htm

Examples of policies on the site:

- Tanzania Development Vision 2025
- National Poverty Eradication Strategy
- Agricultural Sector Development Strategy
- Food and Nutrition Policy
- National Environmental Policy
- Community Development Policy

Donor interests

Having the ideas and requests for research projects, the next step is to assess which donors are interested in the topic. Paper 8 already described the first step to assess donors, i.e. who are the donors (donor inventory). Knowing who donors are is followed by an assessment of what they are interested in. It is no use submitting a proposal to a funding agency that is not interested in the topic. The donor inventory will provide answers on donor requirements, give uniqueness and creativity to the proposal and increase the chances of it being accepted.

There are very few donors that provide funds purely for altruistic reasons. Donors have their own policies and preferences. Some donors refuse to invest in specific countries, often there are complex procurement rules, and there will be programmatic restrictions. Researchers who write a proposal have to know what donors like and do not like and write around it. The following are examples of requirements that increasingly need to be met in research proposals:

- Emphasis on research and development projects whereby research and her partners implement a project that starts with adaptive research and gives attention to input requirements, marketing, processing, dissemination and upscaling.
- Emphasis on interdisciplinary approaches and inter-institutional teams
- Emphasis on equity including various producer groups at the grass-root level i.e. gender issues, children and households.
- Intellectual property rights for the various actors in technology development and transfer e.g. indigenous technical knowledge.
- Evaluating procedures e.g. impact transparency, significance and equity.
- Emphasis on institutional accountability and compliance and ethics.
- Sustainability issues of the research work itself including funding.

There will always be strings attached to the money, some will be more uncomfortable than others. As a recipient the institute always has the choice. If you cannot accept the restrictions you need not accept the money. The scarcity of well-designed projects is usually greater than the scarcity of donor money (Fuchs-Carsch 1998: 193).

9.3 Facilitating proposal development

Partnerships in proposal development

Increasingly donor interest is geared to funding research and development projects, rather than research projects per se. Firstly this requires an integrated approach to research and interdisciplinary teamwork throughout. Secondly it requires a slightly different approach for proposal development. Rather than a research institute developing proposals on its own based on stakeholder requests, proposals need to be developed in partnership with local stakeholders (see also paper 8).

Writing as a team within the institute

Proposal writing within the institute starts by discussing the proposal topic (idea) with interested researchers. Open meetings within the institute can contribute to improvement of initial ideas and development of the approach. A team is then appointed to develop a concept note. Draft concept notes have to be discussed so that others can contribute to the identification of partners, the size of the project, its budget and which donor might be interested. Still too often discussions remain at the individual or programme level. Amongst investigators one becomes a principal investigator, whose initial task is to develop a skeleton for the proposal, indicating content of each chapter in line with the proposal guidelines.

Writing with partners

Partners (or collaborators) are those that are involved in developing and implementing the proposal jointly with research. Clients are those that request the research, contribute resources, monitor and evaluate its results, disseminate and/or adopt agricultural technologies. In the writing stage clients formulate a request and develop the Terms of Reference. They review concept notes and proposals. In most cases experience from the Lake and Northern Zone shows that this needs active follow up by research. Clients often find it difficult to formulate requests or a ToR. Liaison officers play an important role as they try to elicit problems without being directly involved in the project (unlike a potential principal investigator). The Northern Zone trained stakeholders to improve their capacity for writing ToR and monitor and evaluate projects. Efforts have been very limited due to resources required. The Eastern Zone stressed capacity development of district staff. Lessons learned should be used for other zones. Partners are active participants in the development of proposals. Even though the experience is very recent, the Northern Zone trained potential partners and researchers in proposal development. So far this has resulted in the development of 7 joint proposals that will be submitted to external donors. Box 9.2 gives an example of joint proposal development in Same District.

Box 9.2 Development of proposal for addressing salinity in Same District

In October 2001 a NGO in Same District personally requested a researcher from ARI Selian to write a proposal to solve the problem of soil salinity in the Ruvu Basin. Unfortunately the organisation had no funds and could not contract research. The request was not followed up. In December 2001 the DED of the district requested PAMOJA to financially support the project and requested Selian ARI to implement the activity. Half a year later the institute received a formal research request through the liaison officer. A researcher was assigned to develop a proposal. The proposal included laboratory testing and field testing of treatments such as the use of manure and gypsum, and would be co-ordinated by the researcher. As the researcher and liaison officer thought PAMOJA would fund the project, negotiations started with PAMOJA. PAMOJA indicated it could only facilitate proposal development. A stakeholder workshop was organised in February 2003. Representatives from all stakeholders in the Ruvu Basin participated. The workshop appointed a stakeholder taskforce, which would elaborate the proposal, the approaches and its budget. The proposal now addresses salinity in a broader sense, including the assessment of crop tolerance. Treatments have been reduced and the project is co-ordinated by the taskforce, not the researcher. As Selian ARI is far from the district, the project uses para-professionals from NGOs in the area. These para-professionals will be trained by researchers. Project costs are shared by stakeholders in the district and the project will start in July 2003. Even though it has taken long for the project to take off, all parties feel that stakeholder awareness of the problem and stakeholder commitment to the project have increased, research results are more likely to be adopted, and financial transparency of how funds are used has improved.

Training

Proposals are written to persuade and convince donors to fund a research activity that is in their area of interest. Objectives of such funding are many (Gill and Carney, 1999) but it is important to note that such funds increase the diversity in terms of sources, and geographical and thematic coverage of research. Other comparative advantages are:

- They encourage improvement of quality proposals
- They call for high standards of staff performance

Researcher skills with respect to writing quality proposals are limited. Most researchers have very little experience in writing proposals that compete for funds. In the Lake and Northern Zone, as in other zones, DRD organised proposal writing training sessions in 2002 and 2003. In the Northern Zone this was followed by a training that involved researchers and partners, and used concept notes that participants submitted. The latter training aimed to develop proposals for submission after the training, and was funded by COR and ICRAF. The training resulted in 7 project proposals so far. Trainees have also been assigned tasks to write unconventional project proposals such as a proposal for horticultural training of extension staff in the Northern Zone, and a proposal for network expansion and computers.

Proposal preparation grants (PPGs)

Even if a proposal is of good quality and relevant, it has to be more convincing than other proposals from scientists who compete for the same funds. Writing winning proposals requires good preparation. Moreover chances of funding increase when proposals for demand-driven and output-oriented research are elaborated together with stakeholders and farmers. The Lake Zone introduced PPGs in 2000. Eight PPGs were the result so far. The investment will hopefully pay back in terms of increased grant funding. Proposal preparation grants can also be applied for from international funding agencies and foundations (see list of websites in paper 8).

Box 9.3 Proposal preparation grants (PPGs) in the Lake Zone

The quality and relevance of research proposals increasingly determines whether one gets access to research funds or not. And even if a proposal is of good quality and relevant, it has to be more convincing than other proposals from other scientists who strive for the same funds. Writing winning proposals requires very good preparation. In the paragraphs on background, justification and methodology, a scientist must prove that he/she has the most up-to-date information. This is not yet enough: chances of funding increase when proposals for demand-driven and output-oriented research are elaborated together with stakeholders and farmers. These are the major reasons why the Lake Zone initiated a new type of research support, which acknowledges the importance of proposal writing: the project preparation grant (PPG). This grant aims to contribute to a change in the culture of proposal writing. Many scientists still write their proposals alone in their office. Generally they only work on it for a couple of days. The IPR often strongly criticises the quality of these proposals (and we may guess what national or international screening committees think).

The PPG aims to assist researchers to seriously prepare research and/or extension/dissemination proposals. It enables applicants to carry out preliminary work (basic data collection, problem analysis, stakeholder meetings or workshops), and to formulate research or action plans with partners (farmer groups or organisations, NGO's, districts). The key objective is to ensure that activities have genuine farmer collaboration and there is collaborative participation by all project implementers.

The PPG funding limit was set at one million TSh. A scientist can use the budget to go through a participatory research proposal development process that may require transport, allowances and the facilitation of meetings. Lake Zone scientists had to justify their PPG application by indicating the problem they want to work on, with whom and how they would use PPG support to develop a mature research proposal. A condition for funding is that a full proposal has to be completed before the next IPR and that the source of funding must be other than GoT/TARPII or Cess. All proposals must demonstrate that suggested solutions for problems and work plans have been developed with farmers and other local stakeholders and that the proposed work will be implemented, monitored and evaluated with these partners.

Information

Researchers need a lot of information to be able to elaborate good proposals. As mentioned earlier both the Lake and Northern Zone ensured that staff had access to all relevant policy papers. In addition staff need access to donor information (see paper 8), literature, proposal formats and guidelines. Much of this information is available online. In both zones this information is now easily accessible as computers are linked internally and internet access has been secured.

Improved budgeting

The proposal budget is one of the most important sections of a proposal. Many readers will only look at the summary, the objectives, and the budget. Proposal and budget guidelines need to be prepared for each institute, to ensure that all proposals going out follow the same pattern and make the same budget assumptions. For instance, you cannot charge one donor more for a day of your time than another. You also want everyone in your institute to use a similar format, typeface, etc. This is part of “branding” your institute. The institute should use a consistent budget format in all proposals, except for those where donors have their own. Budget guidelines list standard costs within the institute and should ensure that all staff use the same financial assumptions. The most important part is to use accurate and current unit costs. Funding agencies want to see budgets that are inclusive, accurate and transparent.

Both the Lake and Northern Zone streamlined their services and fees (see paper 8). Both zones also use a budgeting format as given in Box 9.4 and linked budgets to activities in the workplan. This greatly enhances the transparency of a budget. Both zones introduced direct costing (see paper 6) where all costs inherent in the project are made visible. It initially took researchers time to adjust to the guidelines. Many researchers complained that it is not possible to estimate costs for agricultural research, as can be done for e.g. development projects because research takes place in an environment that cannot be predicted. This is correct, however it does not justify requesting lumpsum budgets from a donor. A donor is an investor and would like to see how the money is used and what results come out in return. If circumstances or costs change drastically budgets can be renegotiated provided justifications are given.

Box 9.4 Budget format in NZ and LZ

A project budget follows the activities listed in the work plan:

Activity no.	Item	Quantity	Unit price [Tsh]	Total cost [Tsh.]
1	Allowances VEO	3 days	2,000	6,000
	DSA RO and FO	2 nights	20,000	80,000
	DSA driver	2 nights	15,000	30,000
	Transport Tengeru-Arumeru-Tengeru	300 km	350	105,000
	Notebooks	4	550	2,200
	Pencils	10	100	1,000
	Photocopies	100	50	5,000
	Total activity 1			229,200
2				
3				
Total :				

Remarks:

- Use one line per activity.
- Include all expenditure items for the activity concerned.
- Remember to include: photocopy costs, reporting costs, dissemination costs (leaflet or poster production costs and leaflet/poster awards), administration or overhead costs, report review fees, debriefing meetings with collaborators and target group, e-mail subscription costs etc.

Packaging a proposal

Commercial enterprises know that it is the way you pack your product that sells it. Researchers can package their activities as well (see Box 9.5) but have generally very little experience in doing so.

Box 9.5 Packaging a proposal

Imagine a project that seeks external funding to increase the productivity of fruit trees in a given country. Here are some of the ways that research and its impact can be packaged for different readers:

- For a donor interested in the environment, stress that the trees, if introduced in the upper reaches of a watershed, will help prevent erosion and aid soil fertility.
- For a donor interested in economic growth, explain how the trees will provide long-term income for relatively low labour inputs, freeing up family labour for other possibly higher-income activities.
- For a donor interested in nutrition, show how fruit is an ideal source of vitamins in a high-starch, low-protein diet.
- For a donor with social interests, explain how tending fruit trees is an occupation that allows women and children to participate in the economic life of the family.
- For a donor interested in capacity building, show how support for the project will help to build the horticultural research capacity of the NARS

Source: Fuchs-Carsch, 1998.

9.4 Proposal screening

The reputation of an institute and its researchers is determined by the quality of proposals that are submitted. A poor proposal may result in proposals from a specific research institute not being considered in the future. In many cases rejection of a proposal could have been avoided in an early stage. To reduce the chance for proposals to be rejected a thorough review and screening procedure at the institute is essential. The Lake and Northern Zone screening procedures have become increasingly strict to ensure that sub-quality proposals will not leave the institute.

Internal screening procedures

Internal screening in the Lake and Northern Zone goes through a number of stages. Each of these stages is essential in ensuring a quality proposal is developed.

1. *Screening by the principal investigator:* Researchers were sensitised on the need to develop quality proposals. Principal investigators have the overall responsibility in developing proposals. They should use critical self-assessment before submitting the proposal.
2. *The principal investigator, the associated research staff and collaborating organisations:* It is important the proposal is based on a joint understanding of the subject and is the result of a genuine common effort of conceptualisation and writing. Under all circumstances, it should be avoided that associated research staff and collaborators are insufficiently (or not even) informed.
3. *The sub-programme or programme level:* In the Lake Zone, programmes review proposals at programme/subprogramme level. Experience shows that the proposals of those programmes are more balanced and contain less mistakes or omissions.
4. *The zonal programme review process:* Zonal review starts with the zonal IPR, which is a forum composed of stakeholders and researchers where researchers present progress of on-going work and propose new research activities. In the Lake Zone efforts to sensitise stakeholders to attend the meeting have been very fruitful. In 2002, out of 26 districts, 20 attended the IPR at their own cost. It is a very interactive forum but experience indicates that the forum does not get enough time to review the reports thoroughly. In all zones comments from this forum are taken to the Zonal Technical Committee (ZTC) for further review. Finally recommendations from the ZTC are discussed in the Zonal Executive Committee for funding approval.

Although this process appears thorough, a number of stakeholders in the LZ were not satisfied with the ultimate outcome. Screening was improved by establishing a committee. The committee consists of eight people, four from the institute and one stakeholder from each region. Stakeholders are selected

from participants in the IPR. At the end of the IPR members of the committee discuss the review guidelines and procedures. They all receive the full proposals and scoring forms. This process is described below:

- a. *Individual appraisal*: Every member appraises the proposals individually (2 or 3 days). Firstly to verify if the research proposal format is respected. Secondly, the reviewer quickly appraises the quality using a checklist with 20 questions (see Box 9.6). If the proposal format is respected and the first impressions are satisfactory, the reviewer proceeds with detailed scoring.

Box 9.6 Checklist of 20 questions for quick assessment of proposal quality	
1.	Is the proposal complete (proposal summary, 10 chapters, detailed budget and CVs of principal and associated scientists)?
2.	Does the proposal address a significant constraint to rural development?
3.	Is the proposed activity not an old topic, routine work or not necessary because already done elsewhere?
4.	Is there clear evidence of client-demand? Is it explained how the request for the research activity was made? Is there evidence that key stakeholders were involved in preparing the proposal?
5.	Is there no confusion between client, target group and funding agency?
6.	Is title of research project clear and to the point?
7.	Are the objectives realistic and measurable and are they compared to the <i>ex-ante</i> situation?
8.	Is there a strong indication that clear and user-friendly output will be produced?
9.	Does the proposal indicate how the results of the research activity will be reported and made available to extension and farmers (leaflets, posters, training,)? In other words, are dissemination activities clearly described?
10.	Is the research activity likely to have an impact on resource-poor farmers? How?
11.	Does the proposal (background/justification) clearly state the problem and the affected geographical areas and socio-economic groups?
12.	For ongoing activities: are the results so far obtained sufficiently described are these results promising?
13.	Does the background and justification contain up-to-date and complete information?
14.	Is relevant literature cited and is this mentioned in the literature list (and <i>vice versa</i>)?
15.	Does the methodology take technical, socio-economic and institutional issues into account?
16.	Are research methodologies and tools clearly indicated? Does it answer questions that start with: how, what, when, where, who, why? Would another scientist be able to conduct the activity when he is guided by the methodology and the work plan?
17.	Is the use of personnel realistic and not overdone?
18.	Is the work plan presented in chronological order with one line for each activity?
19.	Is there evidence of strong institutional collaboration with other organisations (other research institutes, districts, NGOs)?
20.	Is the budget in line with the proposed activities and is it realistic?

- b. *Scoring forms*: Committee members score each proposal that is complete and gave a good first impression. Box 9.7 presents the outline of the scoring form. For every element of the research proposal, a detailed list of criteria is available, as well as scoring instructions.

Box 9.7 Proposal scoring form

Principal investigator:		Proposal no:	
Title of research project :			
Subjects	Maximum score	Score	Remarks
0. Project summary	3		
1. Background and justification	15		
2. Objectives	7		
3. Materials and methods	10		
4. Personnel	7		
5. Work plan	15		
6. Expected output and impact	15		
7. Monitoring and evaluation	7		
8. Detailed budget and budget summary	11		
9. Collaboration / Other sources of funds	7		
10. Literature	3		
TOTAL SCORE :	100		
General remarks :			

- c. *Ranking*: The total scores given for the proposals are entered in Excel and the proposals are ranked quantitatively (based on the average of 8 scores). The scoring and ranking overview is given to the team members on the day of the plenary meeting.
- d. *Committee meeting, final ranking and minutes*: During the meeting, the team discusses the quantitative scores. Experience has shown that it is not uncommon that the ranking order of the proposals changes after the team discussion. The minutes of the Committee meeting highlight the decisions made. In some cases, the committee has the mandate to give researchers the opportunity to modify the proposals for re-submission. The Committee also has the mandate to redefine modalities of the proposal (work plan, time frame, budget).

In 2000 for example the meeting 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. In 2001 and 2002 the Northern Zone ZTC used a similar approach. ZTC members read all proposals, but proposals were distributed over the members. Ranking was discussed and results were communicated to PIs for their follow up. Results of the scoring exercise were submitted to the ZEC for approval.

External screening procedures

Screening by Northern Zone Agricultural Research Fund (NZARF)

The whole proposal screening procedure begins with a call for proposals. Once the proposals are submitted a secretariat does a preliminary screening using the following criteria: 1) Adherence to the NZARF proposal format, 2) Presence of evidence of client demand, 3) Assessment of scientific quality, and 4) Whether the proposal has already received funds from elsewhere. After the preliminary assessment, the proposals meeting the criteria are each reviewed by a panel of scientific reviewers who use a review form to score a list of 29 criteria. These criteria are divided into four broad groups that include: relevance, quality of the proposal, quality of proposed methodologies and activities; and the quality of expected results. These are forwarded to the ZARF management committee for assessment. The NZARF-MC screens proposals as described in Box 9.8. In 2000 this screening resulted in the NZARF-MC rejecting 32 proposals and accepting 22 for funding.

Box 9.8 NZARF-MC assessment of proposals

1. All proposals submitted have been scientifically reviewed. Proposals with scores higher than 61% will be reviewed by the MC, which may decide how high the benchmark should be for qualification. Proposals with scores lower than 61% are not accepted for further assessment.
2. Proposals with no evidence at all of client demand are not accepted for further assessment.
3. Proposals accepted for funding by any other sponsor (e.g. TARP-II) will not apply for assessment by the MC.
4. All other proposals are assessed and scored by the MC on the following criteria:
 - Convincing evidence of client demand
 - Contributions by requesting client and partners
 - Adoptability of the expected output (i.e. likeliness of the target farmers to adopt the recommendations proposed after the study)
 - Budget: correctness and total requested amount for sponsorship
 - Quality of the log-frame
 - Qualifications of the principal investigator/s and collaborators for the proposed activitiesAll six criteria are equally important and scored from 1-5 (1 = very poor/absent, 2 = poor, 3 = moderate, 4 = good, 5 = excellent). The cumulative score is divided by 30 to obtain the ZARF scoring percentage of the proposal.
5. All proposals assessed and scored are ranked according to their scoring percentage. After compilation of the list, the MC will apply four (absolute) policy criteria:
 - Avoid duplication with previous or proposed research
 - Concentrate research in priority farming systems (to be defined)
 - Availability of human resources of the institute/department/program in relation to other commitments
 - Timing and urgency of funds needed for conducting the activities
6. The MC will allocate funds according to availability of funds, cumulative scoring and application of policy criteria.

Screening by other funding agencies

In many cases it will be a disappointment if a proposal is rejected. Researchers have spent time and resources in the development of the proposal. In many cases rejection of a proposal could have been avoided. Box 9.9 gives a number of reasons why proposals failed.

Box 9.9 Reasons why funding agencies reject proposals

The following reasons on why proposals fail were taken from funder “De-briefings” on rejected proposals compiled over 15 years. They are listed in order of importance (Stephen Hawking in Killen, 2002):

1. Deadline for proposal submission was not met.
2. Guidelines for proposal content, format and length were not followed exactly: “Overall, the most striking reason for low-marked proposals was the consistent failure of universities to be fully responsive to what was asked for in the RFP”.
3. Proposals are not organised such that their distinct sections can easily be matched up against the RFP evaluation criteria.
4. Proposed research question, research design, and/or research methods were completely traditional. The proposed project offered nothing unusual, intriguing, or clever and/or lacked significance.
5. Study or project was not a priority topic to the funder or the sponsoring agency.
6. Proposal was not absolutely clear in describing one or more elements or the proposal was not complete. For example, the proposal did not describe how the project would be managed, how activities would be monitored and results evaluated and reported.
7. In the literature review section or background section, the proposal writer showed he or she simply did not know the area of his or her subject matter. For example, sources cited were out-of-date, or the proposal writer overlooked important reference materials or previous studies and projects.
8. Proposed project appeared beyond the capacity of the individual or institution to carry out.
9. Method for conducting the research or carrying out the project was not explained or seemed unsuited to the project.
10. Budget was too high or too low.
11. Beneficiaries of project had no role in identifying problems and solutions, in designing project or in carrying out the activities. It seems unlikely that benefits will be sustained.

9.4 Successes and lessons learned

There is a range of success stories and experiences at varying degrees in the zones where the COR programme has been implemented. However, the general success is that the research institutions have recorded an improvement in the quality of the proposals that are being presented during IPR meetings for TARP II funding and those submitted for contract research. The range of subjects being covered in the proposals has been diverse, demand driven and increasingly respect the guidelines.

In the Northern Zone, there is a review committee set up to review all the proposals that are to be submitted for funding elsewhere and there is a general improvement in the screening. Training however has been instrumental.

A major contributing factor to the success is the creation of a favourable environment in the research institute. CORMA addresses all five management areas. Investments in human resources, effective communication at the institutes, between partners in R&D with funding organisations has been one of the major driving forces to the achievements recorded so far. Researchers use e-mails to communicate and share information and exchange proposal drafts, to communicate with funding agencies. Use of the Internet has enhanced search for literature and funding opportunities, and therefore entices development of more proposals.

Proposals developed under contract research need faster reviews and in most cases, stakeholders cannot wait for the annual zonal IPR. Under such a situation, flexibility is needed. Contract research reviews are organised by the ZRC appointing three senior staff for every proposal. This provides a fast mechanism to satisfy stakeholders.

Partners need to be increasingly involved in training. Proposals need to be developed jointly and implemented jointly. This requires capacity development for partners but also requires an open, team-oriented attitude from researchers. There is less and less room for single discipline oriented proposals.

Thorough screening within the institute contributes greatly to the quality of proposals. Many mistakes in proposals could very easily have been avoided in an early stage within the institute. Researchers however need to develop the trust that screening is done objectively on the basis of the proposal. It is not the person who is screened. Instead a review assesses the way in which you tried to put your thoughts on paper and tries to help a researcher to improve this.

Key lessons further include:

- Grant winning proposal writing is the only way forward.
- No donor will invest in a non-collaborative project. There is a need to pool resources and expertise between partners. Partnership should be encouraged.
- Institutional standards should be set higher in terms of the personnel, facilities and quality of research outputs. Proposals from institutes with high capacities are more appealing to funding organisations.
- Support to researchers in developing proposals is the best investment for quality and winning proposals. Proposal development grants should be encouraged.
- Motivation of researchers is crucial. It is one of the most influential strategies to provide them with moral support towards greater achievements. Projects should have packages for motivation.

Contract research is a means to implement Client Oriented research, and ARDI Maruku has been very successful. Financially, the Institute had more than 30% of its research budget from contracts, mostly paid by the District councils through District Rural Development Programmes (DRDP). To win research contracts over other competitors such as ETC Kenya and Sokoine University of Agriculture, and to maintain the contractual relationship with the districts required that researchers improve greatly the quality of research proposals and research outputs. The fact that gradually ARDI Maruku won most of the research contracts in the region is a proof that Maruku researchers have been successful in implementing the basic ideas of CORMA. The high success rate can be largely attributed to internal and external partnerships.

9.5 Future challenges

Client orientation in research and development has generated a number of positive results in Northern and Lake Zones in Tanzania. These are lessons that can be scaled up to other zones and even countries. However, it is important to note here that, there is still more to be done.

Despite improvements in securing resources for funding research, actual funding is still inadequate. Many proposals focus on traditional donors and usually aim at small grants.

Not all researchers and partners have the skills to develop winning proposals and are capable of searching for relevant donors. Seeking funds through writing grant winning proposals is basic to ensuring institutional financial sustainability. Efforts started through COR approaches in soliciting funds need to be sustained. Institutes should build their staff capacities in developing winning proposals and seeking funds from non-traditional donors. They should polish their strategic plans that explicitly spell out missions, visions and implementation strategies in contributing to the national goals. Improved communications such as reliable Internet services if not used effectively will be a waste of money. The future should focus on having zonal teams responsible for seeking research funds beyond the traditional donors.

Generally, there are no funds for proposal development. It is therefore difficult to get all the information, make all the necessary communications and contact partners for shaping up a proposal. The example of PPG could be linked to one of the major challenges, e.g. to significantly improve the quality of proposals. Among others this requires a more serious preparation (time and some facilitation).

It is said, “Chance favours the prepared mind”. Agricultural research institutions are increasingly facing shortages of research funding at the time when demand for technologies from clients is growing. The best option out of the situation is to develop grant-winning proposals to attract funding from different donors. Fortunately, both COR and the Government have laid strong foundations in the institutes to achieve this. It remains for the institutes to make sure that researchers prepare and submit quality proposals to the donors by following guidelines and writing in partnership, having a strong and effective review and screening teams. Research institutions should brace for creating effective environments and projects that can convince donors to invest their money. They should ensure that for each acquired activity, quality output is produced, so as to ‘keep the donors smiling’ and perpetuate the possibility of winning other grants.

Stakeholder participation and close monitoring for quality research

Patrick N. Ngwediagi, Mshaghuley M. Ishika, Robert Kileo and Ted Schrader

Guiding principle

‘Stakeholder participation, close monitoring and evaluation improve the quality of research, which enhances the likelihood that recommendations will be adopted’

Summary

Stakeholder participation in all stages of research is essential to ensure that their needs are addressed adequately. CORMA is a management approach that facilitates demand-driven research that is professionally conducted. As such, it is compatible with and complements farming systems and product-chain approaches. It encourages the use of a wide array of participatory research development methods that are available. This paper describes the process that takes place after a research proposal has been approved and the generation of research results. It discusses some experiences of doing research with farmers and stresses the importance of close monitoring and evaluation. The paper concludes with some initiatives that were taken in relation to adoptability research, farmer assessment and debriefing. The major challenges that face DRD, are the improved implementation of FSA-PCA approaches and participatory methodologies, the sustainable funding of on-farm research and the improvement of research coordination, monitoring and evaluation at national, zonal and programme level.

10.1 Introduction

The emergence of participatory approaches

Until recently, research in Tanzania - as in many other developing countries - was mostly carried out on research stations and experimental farms. Scientists planned in isolation and fully controlled research conditions. They were the ones selecting research topics and methodologies. Unfortunately this type of research did not lead to recommendations that were adapted to agro-ecological and social economic field and farmer conditions. If research is to develop technologies that resource-poor farmers can adopt, then it should be designed and implemented based on farmers’ needs and realities at farm level.

For some time now efforts have been made to improve the impact of agricultural research. Many new approaches were developed, among others: Farming Systems Approach, Participatory Technology Development and Dissemination Approach, Gender and Development Approach and Livelihood Approach. These efforts were fuelled by a growing awareness that the socio-economic and agro-ecological conditions of resource-poor farmers are complex, diverse and risk-prone (Farrington, 1998). These efforts focused mostly on increasing the involvement of farmers in technology development and transfer (see Table 10.1).

Since the 1980s, development practitioners increasingly perceive farmers as partners in research and extension and as key players in technology development and transfer. An enormous variety of participatory methodologies, generally put in the Participatory Rural Appraisal (PRA) framework,

were developed and thousands of professionals adopted more flexible and open-ended approaches and methodologies. As a result, it became clear that farmers can be partners in the development of technologies. It was also realised that farmers have the capacity to diffuse new technologies among themselves (farmer-to-farmer approaches). These insights culminated in what is now known as the *Farmer First approach* (FF; Chambers *et al.*, 1989). In contrast to technology-driven agriculture, with its standardised technology packages (blanket recommendations), the Farmer First approach proposes baskets of options (flexible recommendations) to enable farmers to vary and diversify their farming systems. It stresses the abilities of the resource-poor farmers to experiment, adapt and innovate.

Table 10.1 Evolution of participatory approaches in response to low levels of adoption and impact

Period	Reason given for non-adoption	Solution	Role of research
1950/60	Ignorance	Extension	Develop technology
1970/80	Farm-level constraints	Remove constraints	Understand farming systems
1990-95	Technology does not fit	Participatory technology development	Understand rural livelihoods
1995-	Technology does not fit and farmers do not have access to goods and services.	Networking among organisations and empowerment of farmers	Understand rural livelihoods, policy context and communication networks

FSA, PCA and CORMA: complementary relationships

The Farming System Approach (FSA) was introduced in Tanzania in the 1980s. It is problem-oriented and stresses farmer involvement. Its principles are based on targeting research, farmer participation, innovative and participatory research methods, on-farm research, multi and inter-disciplinary collaboration. The introduction of FSA in Tanzania has led to the inclusion of farmers and extension staff in identification, implementation and assessment of research activities. In this way there has been a shift of emphasis from purely Researcher Managed and Researcher Implemented (RMRI) to Farmer Managed and Farmer Implemented (FMFI) on-farm trials. Many scientists who worked in isolation and confined themselves to specific commodities or disciplines have been encouraged to work together with colleagues and farmers. This made our research more demand-driven, client oriented and relevant.

Of recent there has been an emphasis on the product-chain approach (PCA), which stresses that the whole commodity production, marketing and consumption chain has to be addressed. Whereas the FS approach stresses the complexity of farmer conditions and the integration of farming activities within a farming system ('horizontal linkages'), the PC approach stresses the incorporation of farming systems in the wider economy ('vertical linkages'). Most agricultural research is focussed on the production side and tries to solve production constraints. The Product-Chain Approach helps to widen the perspectives of scientists to include processing, storage, marketing and consumption. These two approaches therefore complement each other very well.

FSA and PCA are approaches that give guidelines how to orient and conduct research. The Client-Oriented Research Management Approach (CORMA) gives guidelines how to manage research institutes. Above all it is a management approach. As such, it not only includes research management (see paper 2, 9 and this paper), but also the management of resources (see paper 3-7), networks (see paper 1, 8 and 12) and outputs (see paper 11 and 12).

CORMA fully supports the principles of FSA, PCA and other participatory research and extension approaches. Every year the COR Programme has contributed to the successful organisation of the national FSA course (see Table 10.2.). Nineteen modules will be printed this year and distributed to all DRD scientists and field officers.

Table 10.2 FSA modules phase 1 and phase 2

First phase: Introduction and diagnosis		Phase 2: Planning, experimentation, analysis and dissemination	
<i>Modules</i>		<i>Modules</i>	
1	Introduction to FSA	9	Planning and prioritisation
2	Interdisciplinary collaboration	10	Adoptability
3	Stakeholder involvement and needs assessment	11	Research proposal writing
4	Targeting research to respond to stakeholder needs	12	On-farm experimentation
5	Research with farmers	13	Farmer assessments
6	Participatory technology dissemination	14	Statistical analysis
7	Participatory research tools and techniques	15	Economic analysis
8	PRA fieldwork, analysis and reporting	16	Scientific reporting
		17	User-friendly outputs
		18	Adoption and impact assessment
		19	Effective research in Tanzania

CORMA builds upon the achievements of the Farming Systems Approach. We may even state that FSA cleared the way for the introduction of the CORMA because FSA facilitated research institutes to gradually evolve towards demand-driven research. The FSA also influenced the organisational culture of research institutes and changed attitudes of scientists. The COR management approach evolved from the FSA, but expanded to include issues like staff, information and financial management that are also crucial for success.

CORMA aims to attain higher levels of client involvement and in the case of practical agricultural research fieldwork, the involvement of farmers in particular. In addition, CORMA stresses monitoring and evaluation and research quality control. In the following paragraphs we present activities that contribute to the achievement of the following objectives:

- More explicit focus on stakeholder needs and stakeholder involvement in the research process;
- Systematic use of adoptability analysis, farmer assessment and debriefing to improve the communication between research, farmers and extension, and the provision of feedback;
- Improvement of the monitoring and evaluation system of research institutes;
- Timely and accurate reporting of research progress.

10.2 Doing research with stakeholders

CORMA believes in a participatory technology development and transfer process. Such a process enables researchers, farmers and other actors to collaborate with the objective to identify and develop appropriate technologies. Demand-driven and client-oriented research induces more ownership, which encourages clients to adopt recommended technologies. Participatory techniques encourage listening to farmers and partners. It is through this process that farmers' Indigenous Technical Knowledge (ITK) and the views of extension staff can be incorporated in the research process. Farmer Research Groups (FRG), Farmer Extension Groups (FEG) and Farmer Field schools (FFS) can promote effective participation between research, extension and farmers.

Two projects, e.g. soil fertility management in Lushoto district and improvement of local goats in Kagera region, can be taken as good examples of demand-driven and participatory research projects that led to good results (Box 10.1).

Box 10.1 Two examples of demand-driven research projects that delivered services to clients

Soil fertility management in Lushoto district

In Kwalei village, Lushoto district, farmers were involved in identifying solutions to solve soil fertility problems through the use of natural plants in combination with industrial fertilisers. A PRA that was conducted in 1998 revealed that low soil fertility was one of their priority problems. It was further discovered that a shrub locally known as *tugutu* (*Vernonia subligera*) was traditionally used to improve soil fertility. After laboratory testing, the shrub was tested on farm with farmers, which resulted in the recommendation that a combination of *tugutu* and rock phosphate gives good field results and is affordable for Kwalei farmers.

Improvement of local goats in Kagera region

During an annual research planning meeting in Kagera region, farmers expressed interest in keeping crossbreed goats for manure, milk, and meat production. Manure was a priority as it could be used to improve soil fertility, generate cash and improve household nutrition. In response to this request a survey on small ruminants was conducted. Results revealed that farmers prefer breeds with large body size and good milk and meat production abilities. After the survey a research project was initiated in the target area. Buck introduction was accompanied with training on management practices. 15 bucks were introduced to Kiilima and Kabirizi villages in Bukoba district and Bisheshe village in Karagwe district. Farmers were responsible for the management of the goats while farmers, extension workers and researchers jointly monitored project performance. Farmers collected data on date of serve, parturition and kid birth-weight. The programme was well received and an adoption and impact assessment is planned to analyse the successes so far.

Stakeholder involvement in research not only refers to the involvement of farmers, but also of farmer and community-based organisations, NGOs and the private sector. In Kagera region, Maruku implemented a tea sector analysis in 1998-1999 and included not only tea growers in villages in Kagera but also the tea factory, Tanzania Tea Authority, Tanzania Tea Research Institute (TRIT), CMU, Tanzania Tea Blenders (TTB), and Tanzania Tea Packers (TATEPA). Smaller studies were done e.g. for banana processing and cassava processing and marketing. In the Northern Zone NZARF funded a project that assessed milk consumption, milk marketing and public health issues.

Many client driven research activities have been and are being implemented in the Lake and Northern Zone. They all have in common that farmers or rural development organisations (through farmer research groups, District extension staff, NGOs and GOs) identified the researchable problems. These research needs were communicated to the research institutes through liaison officers (in the Northern Zone) or visiting liaison teams (Lake Zone). The set-up and implementation of research activities were participatory. After the identification of research topics, short planning and training sessions were conducted on-farm to identify the action plan and responsibilities of each actor in the research process. Researchers, extension staff and farmers joined these sessions.

Farmers and other stakeholders are fully involved in the assessment of technologies. Farmer assessment tools such as adoption likelihood analysis (also called adoptability analysis), different forms of ranking techniques (matrix and pair wise, wealth) and gender analysis are used. Mainstreaming of socio-economic and gender analysis received much emphasis during the implementation of the CORMA programme. At first, external consultants and later local staff of the SE Programme trained commodity scientists. Gender, socio-economic analysis, appropriate targeting and the inclusion of farmer assessment tools became important criteria while screening proposals. Some improvements have been observed on these subjects, but implementation problems have been encountered, as the review process is not always critical enough and scientists still confine themselves to their traditional areas of work.

Adoptability screening, adoptability analysis and ex-post adoption analysis address all more or less the same topics. According to Mafuru and Van de Meerendonk, the evaluation of the level of adoption has to cover the so-called four A's: accessibility, affordability, acceptability and attractiveness. Acceptability refers to the technical characteristics of a recommendation. Accessibility refers to

awareness about the innovation and the availability of necessary inputs. Affordability and attractiveness refer respectively to investments, recurrent costs and rates of return (Van de Meerendonk, 2000). These are the economic parameters determining whether a farmer will start and continue the activity. Several PRA tools (e.g. ranking tools) and semi-structured interviews can address these different aspects of adoption analysis (see Table 10.2).

Table 10.3 The four A's

ACCEPTABILITY	Acceptability refers to the technical characteristics of the recommended technology that answers positively the following questions: does it really deliver what it promised during the trial? Is a variety in practice indeed as high yielding or drought-resistant as found during the trial? In other words, how does the innovation perform compared to existing alternatives? <i>Possible analytical tool: Rapid Technology Assessment</i>
ACCESSIBILITY	Accessibility refers to the availability of the recommended technology. Availability can be in terms of information, knowledge. This is related to the level of training of the farmers and efforts of extension sector to diffuse innovations and to train farmers. Important questions to be answered include: Do farmers know (about) the innovation? Has there been any contact with extension agents? <i>Possible tool: Information dissemination mapping.</i> Can the target group avail of the technology? Are seeds, planting materials or necessary inputs locally available? Is a maintenance system in place? <i>Possible tool: Rapid Availability Assessment</i>
AFFORDABILITY	Affordability refers to the economic characteristics of the recommended technology: can the target group within the recommendation domain afford the costs involved in acquiring and maintaining the recommended technology? Are the investments not prohibitive? Are recurrent costs not in a period of farmer liquidity problems? <i>Possible tool: Household income and expenditure survey</i>
ATTRACTIVENESS	This refers to the competitive position of the recommended technology in comparison with existing practices. Does the farmer get a substantial extra revenue if (s)he decides to innovate? <i>Possible tools: partial budget analysis, marginal rate of return, minimum rate of return</i>

10.3 Monitoring and evaluation of the research process

Monitoring of the research process is of utmost importance to ensure quality research services. Monitoring can be defined as the continuous assessment of a research activity during implementation to ensure that operations are implemented efficiently according to plan and can warn against deviations from the intended outcome. It ensures that input deliveries, work schedules and targeted outputs proceed according to the work plan. The definition of monitoring indicates that it is based on performance indicators. These must be defined during the planning phase. The Lake Zone and Northern Zone have got experience with the use of research proposal summary sheets. The sheets, which are based on the logical framework format, clearly indicate the work plan and the expected output of a research activity. These kinds of sheets are indispensable for monitoring.

The Lake and Northern Zone have used several modalities to ensure that the research process is closely monitored.

Farmer Research Groups

Zonal research institutes have large mandate areas that include many different agro-ecological and socio-economic environments. In order to have a fair coverage and a farmer-focused research system, Farmer Research Groups (FRGs) were formed to represent different zones in the target area. Having a relatively limited number of sites has helped the zones to implement, monitor and evaluate the on-farm research activities. FRGs, representing different agro-ecological zones, became partners in adaptive research. These groups became platforms that provided feedback from farmers to researchers and

other stakeholders in the zone. Since farmers and extension staff collect most data, this approach has contributed to efficiency and sharing of experiences among stakeholders. Participatory research monitoring and evaluation enhances the likelihood to develop acceptable technologies. Every season the institutes conduct annual meetings to evaluate research activities and to plan new ones. Apart from the PIs having trials in collaboration with FRGs, zonal and DRD M&E teams often visit the sites.

Participatory monitoring and evaluation: M&E tours

Stakeholder participation in monitoring and evaluation of agricultural research activities is very important to improve the client orientation of research. The Lake Zone involves different stakeholders in monitoring and evaluation missions. Several times a year, LZARDI composes four teams of three persons (an economist, a scientist with technical background and a research extension liaison officer) who each visit one of the four regions of the zone. Every group has a terms of reference, which indicates the sites and organisations to visit, the objectives, time schedule and a checklist with topics that need attention. In the Northern Zone, participatory research monitoring is mainly done through visits of the Liaison Officers and ZRELO to the field and to partner organisations. Feedback from these participatory monitoring activities is used to improve performance of the ongoing research projects as well as for planning of future activities. Box 10.2 gives an example of how participatory M&E within the ZARFs can be given shape and what possible results of such an exercise can be.

Box 10.2 Participatory M&E in NZARF

In 2000 the NZARF Management Committee agreed to monitor 22 projects that had started that year. The MC formed four teams. Each team was assigned a number of projects to be monitored and visited selected project sites. Monitoring was done in four steps:

1. A review of the progress report written by the PI answering questions if the project started on time, if the project is on schedule, if the project is implemented as agreed, if funds were used as budgeted, if farmers participated as agreed, if the client provided agreed resources, if results are convincing and if changes in the approach were required.
2. A preliminary decision on continuation, expansion, narrowing down, suspension or termination of the project.
3. Field visits where team members were accompanied by liaison officers, not the PI.
4. Final decision and recommendation for the project to be submitted to the NZARF MC.

At the end of these monitoring visits teams submitted their reports to the NZARF MC. The committee terminated two projects and narrowed down the activities of two others. In January 2002 the NZARF MC used an ex-post monitoring and evaluation to assess what projects could be continued the following season. The committee used ZTC scores and a NZARF scoring form that consists of 14 questions, scored on a scale of 1 to 5. As a result of this screening eight projects were either considered complete or were terminated. Thirteen projects could continue to finalise activities or e.g. produce extension material in 2002. All PIs were formally informed of the NZARF MC decisions and received a summary of the evaluation report. This included: the ZTC score, the NZARF score, the percentage budget used, an explanation of the NZARF score (e.g. objectives not achieved, outputs not produced, budget not used as agreed, report quality), the NZARF recommendation for 2002, conditions for continuation, and follow up required by the PI (e.g. report to be rewritten, detailed work plan to be elaborated, detailed budget to be prepared).

Research progress report monitoring

Progress reporting is an administrative device for gathering timely and accurate information on research activities, inputs and outcomes. It allows managers to compare the progress of a research activity against planned targets and to identify significant deviations. Periodic reporting is most useful when it integrates the flow of information with decision making at different levels. Research progress reports in the Northern and Lake Zones are presented and reviewed at different occasions, i.e. weekly, monthly, quarterly and annual meetings.

Presentation of progress reports in weekly meetings

ARDI Maruku has a weekly evaluation and planning meeting. All researchers, field officers and most support staff (e.g. farm manager, office supervisor, stores and accountant) participate in these meetings. The results attained during the previous week are critically discussed and plans for the next week(s) are made. Suggestions for improved implementation of activities are given. Minutes are produced to enable follow-up on the action points agreed during the meetings.

Monthly research progress reports

Both at Ukiruguru and Maruku, principal investigators report progress of their research activities during monthly meetings at programme level. These results are reported in the Management Team meeting (see paper 4).

Quarterly research progress reports

A format, which was developed and approved by researchers, is used for production of quarterly research progress reports per trial (Table 10.4). The quarterly report is composed of three parts: project summary, financial monitoring and technical progress report. Although this format was found to be very useful and does not take long to prepare if a scientist knows his/her project well, it has not been widely used. PIs do not really feel the need to do so. Most donors do not (yet) require quarterly progress reports. Ways are being thought of in order to sensitise researchers on the importance of the reporting and formal record keeping of research outputs. It is anticipated that regular progress report writing will become more important in the near future.

Table 10.4. Format for quarterly research project progress report

A. Project summary

Title of research project	
Research Institute	
Project identification number	
Progress report number	
Client	
Objectives	
Expected output	
Commodity/product(s)	
Discipline(s)	
Type and stage of research	
Target farming system(s)	
Target group(s)	
Location(s)	
Name of principal investigator	
Name(s) of associated investigators	
Name(s) of field officers, extension agents and other persons actively implied in the activity	
Execution period	
Source of funding	
Total costs	
Annual budget	

B1 Financial monitoring (Disbursement / expenditure planning)

Quarters	Disbursements (Tsh.)	Expenditures (Tsh.)
July-September		
October-December		
January-March		
April-June		
Total annual budget		

B2 Financial monitoring (Funds received and actual expenditures)

Quarters	Disbursements received	Expenditures (Tsh)	% of annual budget
July - September			
October - December			
January - March			
April - June			
Total			

C. Quarterly progress reports (as compared to approved workplan)

Months	Activities	Remarks
July		
August		
September		

Quarterly progress reporting

In the Lake Zone, progress of research and other activities is discussed and reviewed during zonal quarterly meetings on the basis of a draft zonal progress report (see also paper 4). In this meeting the implementation and results of research activities are reviewed in relation the work plan. The quarterly meeting results in the final quarterly report, which is submitted to the DRD and other stakeholders. In the Northern zone, the Zonal Research Coordinator collects information from the departments and compiles the progress report, which is sent to the DRD office. Without the deadline of a meeting that discusses progress reports, such reports often tend to be submitted late. In addition information cannot be shared within the institute. At Tengeru for example, staff awareness on progress of activities within the institute has significantly improved since the institute started organising regular progress meetings for all staff.

Presentation of annual progress reports

In all zones, PIs have to present all progress reports and technical proposals to the annual IPR. Over the years, the IPR has become less 'Internal'. More and more stakeholders (especially district extension staff, farmers and representatives from other zones) participate (IPR may be called Programme Review or PR now). In the Lake Zone IPR of 2002, most districts were represented. An important improvement is that in certain zones annual progress reports are reviewed at programme level, prior to the IPR. These pre-IPR reviews considerably improve the quality of presentations in the IPR. There is a standard format for presenting and writing both proposals and progress reports.

Adoption studies

Adoptability analysis is a strong tool used during a trial to foster the maximum likelihood of adoption of recommended technologies. Recommended technologies are disseminated to farmers within their domain and hence it is important to study the diffusion after one year since it was introduced. The level of adoption has to be analysed with farmers to identify constraints in the diffusion process. In the Lake Zone several adoption studies have been conducted. Most were conducted three years after project establishment to assess the adoption rate of the technology. The review of the methodology developed by Van de Meerendonk and Mafuru suggests that it is more efficient to focus adoption studies on a set of technologies than on one single technology (Van de Meerendonk, 2000). Both Lake and Northern Zone staff were trained in tools and techniques for adoptability and adoption analysis.

Debriefing to beneficiaries and clients

Debriefing is an effective way of giving feedback to clients. Debriefing can be done after field visits, in district and stakeholder meetings, and in formal and informal meetings with clients, e.g. DALDOs, NGOs and FRGs. Sending a draft report to clients for comments before a final report is produced is also used as a means of debriefing. Other forms of debriefing include announcing progress of an activity in a newsletter.

The empowerment of end-users (stakeholders) to exert effective demand for research results and other related services, is an important pillar of the philosophy that guides CORMA. Empowerment can only be attained through the participation of stakeholders in all stages of technology development and adoption. Empowering stakeholders ensures collaboration and complementary interaction, minimizes duplication of efforts, induces adoption and ensures demand for future contracts. In enhancing the capacity to effectively monitor and evaluate research projects, debriefing of stakeholders on research project results was one of the procedures to enhance stakeholder involvement in project monitoring and evaluation. An example from the Northern Zone is the debriefing of a research activity in Mwangi and Same districts, which gave very encouraging results (Box 10.2).

Box 10.2 Debriefing in Mwangi and Same Districts in the Northern Zone

A researcher who had a NZARF project on the effect of farmyard manure on maize and sorghum yields in Mwangi and Same conducted a debriefing of results of his trial after it was completed. The main purpose was to brief farmers and other stakeholders on project results and get feedback. Both those who did and who did not participate in the two year trial were involved. The debriefing was conducted in six villages where a total of 194 farmers participated. District extension staff, village government officials, and NGOs (e.g. MIFIPRO and SAIPRO) attended. In each village a copy of the report in Swahili was given to two selected farmers on the condition that they would allow other farmers to read them as well. The district extension office and the two NGOs promised to assist in making more copies of the report and distribute it to those who would be interested. In every village a discussion followed after the presentation of the results. Most questions concerned the best ways to store and apply manure. Many questions related to the use of inorganic fertilisers. All these inquiries were given explanations that satisfied farmers. At the end of each debriefing session farmers showed a lot of enthusiasm towards use of manure in maize and sorghum in the seasons to come. The scientist was satisfied with the outcome of this debriefing exercise as it clearly showed likelihood of adoption of technology by not only farmers involved in the trial but also farmers who were not involved.

10.4 The way forward

Experiences in the Lake and Northern zones indicate that stakeholder participation in planning, implementation, monitoring and evaluation improves the performance of scientists and their collaborators, enhances the quality of research findings and augments the chances of technology transfer. However, monitoring of activities is expensive (transport, time, allowances). It is recommended that monitoring activities are carefully planned and budgeted for, both at research project and institute level.

Mechanisms should be put in place that allow the frequent review of progress. In particular, weekly, monthly and quarterly meetings and their related progress reports are important and can improve interaction among researchers. Improved quality control pays off in the form of improved performance and better results. It can also help to avoid duplication of research activities and to avoid making the same errors repeatedly.

Annual progress reports need to be further improved and targeted. Different stakeholders need different formats for them to understand what the results are and to be able to assess them. The institute has to make its results accessible for different users.

There are many possibilities to regularly debrief stakeholders. Debriefing shows respect to clients, enhances ownership of research results and increases the likelihood of technology transfer. There is a need to stress the importance of debriefing so that it becomes a habit of scientists.

Another challenge facing the public sector research and development institutes is the improvement of the quality of research co-ordination, monitoring and evaluation at national, zonal and programme level and the availability of funds to do so.

Although successes have been realised in the field, there are still major challenges that need to be addressed:

- Empowerment and capacity building of stakeholders to improve their ability to identify and voice their problems;
- Convincing donors (projects and NGOs) and district authorities to adopt farmers priorities;
- Training of research staff and stakeholders in monitoring and evaluation techniques;
- Strategies to raise funds/resources for close supervision during implementation and monitoring of activities.

Output production: Making research results accessible and available

Magdalena N.M. William, Appolinary A. Manyama and Chira Schouten

Guiding principle

‘Quality output is the most effective promotion for an institute’

Summary

Research outputs are compilations of research results that explain how specific technologies are applied and what their benefits are. They are normally produced after completion of a research project. Production of output is essential to make research findings available and accessible to clients. Outputs can contribute to the improvement of agricultural productivity. Unfortunately it is often given little priority. Research outputs are categorised into two groups: scientific and user-friendly (leaflets, brochures, posters and training manuals) outputs. Quality is maintained through reviews at various stages: monitoring the actual production progress, reviewing the outputs, testing the outputs and dissemination of outputs. This paper argues that research has a key role in the development of suitable information packages that will facilitate dissemination of technologies. The paper describes experiences with improved output production in the Lake and Northern Zone. The authors assess a number of future challenges, among them the need for adequate staffing of the ZIMO office and the need to institutionalise a thorough review system.

11.1 Introduction

The essence of agricultural research is that research findings are shared to enable others to use the results. Only in sharing these results is agricultural research able to contribute to agricultural development. Everyone will agree that for the past ten years funding agencies, partners and clients of research increasingly focus on research outputs as a means to assess its effectiveness. Investments in research have been substantial but still complaints are numerous that results are not available or not accessible. Visits to various DRD institutes (see CORMA assessment reports) show that many raw data are held in field-books and files, waiting to be analysed and reported to relevant users. Researchers produce progress reports for the IPR that often do not have sufficient information on the technologies. Comprehensive annual research reports are often not produced at all. When results are reported, there is a bias towards scientific reports, journal articles or workshop papers, which are not accessible to extension agents or other clients. Consequently, results are insufficiently communicated to potential users. Many observers argued that although reporting is crucial, it is generally one of the weakest links in technology development and dissemination. Reasons are multiple. Some scientists do not publish because they do not have the skills or do not know where to send manuscripts. Others feel they are not adequately facilitated in the process of writing and lack motivation. In other cases, the sponsor does not ask results and data collection leads to piles of raw data.

If we agree that research results have to be shared we need to know who we want to share results with, how results can be made accessible for each specific target audience, and how we can motivate researchers to do so. In general the target audiences for agricultural research findings are:

Farmers	men, women, youth
Extension staff	government, non-government, religious organisations, farmers associations, Farmer Training Centres
Government, parastatals	Coffee Board, Cotton Board, TPRI, Development Authorities, local administrators, national policy makers
Agri-business	Traders, stockists, seed companies, chemical companies, general suppliers, vets, millers, processors
Community Based Organisations	women groups, farmer groups, schools
Researchers	national and international research centres, universities, NGOs

Source: Scarr et. al. (1999)

Although research findings and the resulting recommendations may be appropriate they will not spread if not packaged for each of the above specific target groups. Important elements are the content, format and language used. This leads to two major types of outputs, i.e. scientific output and user-friendly output:

1. *Scientific output*: Researchers are professionals and their activities need review by colleagues. This can only be done if researchers publish. They have to publish research approaches and results to stimulate the exchange of information within national and international research networks. Scientific outputs include technical reports, journal contributions, book chapters, theses, conference papers and annual reports.
2. *User-friendly output*: Although farmers are mentioned as the main beneficiaries in almost every research proposal, outputs of the research process are not "farmer-friendly" and frequently do not reach farmers at all. Information from Tanzania suggests that the use of improved agricultural technology is not common practice. For example, in the agricultural census of 1994/1995 it appeared that out of every ten farmers only three use improved seed; two use chemical fertiliser; six receive advice from extension agents; eight own an axe and one owns a plough (Limbu, 1999; see also paper 12 for more details). One of the major reasons for non-adoption is that technologies remain on the shelves, simply because extension and farmers are unaware of their existence (Eponou, 1995). Too often researchers consider links with extension and farmers supplementary to their normal research workload. Quite a number of researchers still think that it is up to the extension agent and farmer to come to research, get the technology, transfer it to farmers, and provide feedback if they have any. However, research has a key role in the development of suitable information packages that will facilitate dissemination of technologies.

The manner in which research messages are packaged should encourage the adoption of improved practices. Researchers and clients have to agree on message formats and analyse options for effectiveness and efficiency. Media options are many but need to be used carefully, linking them to target group characteristics, characteristics of the message that needs to be conveyed, and resources that are available (Table 11.1).

Table 11.1 Media analysis

Media	Strength	Weakness
Leaflet/ brochure	Stores information, can be used repeatedly	Not accessible for illiterates
Poster	Reaches illiterates, good for raising awareness	Short-term access to information
Field day	Reaches illiterates	Only few people reached at any time, information cannot be stored
Radio	Reaches many people, raises awareness, changes attitudes	Expensive, one-time broadcasts, not suitable for skill development
Filmstrip/ slide series	Reaches illiterates, develops skills, can be shown in rural areas	Relatively cheap if processing lab is available
Video	Raises awareness, changes attitudes, develops skills	Expensive, limited access in rural areas
Drama/songs/ storytelling	Raises awareness, changes attitudes	One-time performances, not suitable for skill development, cannot last longer than half an hour

Source: adapted from Scarr et. al. (1999)

Before 1988 most scientists concentrated on writing technical reports (annual progress reports and scientific papers). Reports were sent to lead scientists at headquarters (e.g. coffee reports). In 1988 the Farming System Research (FSR) programme started. Farmers were involved in developing the research agenda and testing technologies. Increasingly attention was given to documenting and disseminating research findings. A number of field notes was produced and the FSR programme in the Lake Zone collaborated with e.g. the Integrated Pest Management (IPM) project in Shinyanga to develop brochures. The Farming Systems Research programme developed a publication series for the Lake Zone. The first publications in this series date back to 1989. The series included field notes, working papers, journal papers, and leaflets:

- Field note: Final technical report written by the Principal Investigator (PI) after completing a research project, containing recommendations that should be disseminated to clients.
- Working paper: Report produced after completion of a given research task that covers a wide range of information e.g. diagnostic survey.

Even though a number of reports were produced, this initially remained restricted to research activities undertaken by the FSR section. Gradually, from 1995 onwards, research activities from other programmes started publishing results in field notes and working papers as well. The following paragraphs aim to illustrate how the production of scientific and user-friendly outputs was organised in both the Lake Zone and Northern Zone.

11.2 Organising output production

In 1998 the DRD appointed a Zonal Information and Liaison Officer (ZILO) in all zones. The term ZILO changed into ZIMO (Zonal Information Management Officer) in 2001. The appointment aimed to improve communication with stakeholders. The Terms of Reference focused mostly (but not entirely) on information management (Letter Ministry of Agriculture and Co-operatives of 27/7/1998). The ToR however showed a number of overlaps with the Terms of Reference for ZRELOs who were appointed in 2000. In the Lake Zone both ToR were reviewed. Changes were suggested whereby all activities related to information management became the responsibility of the ZIMO while all those related to linkages remained with the ZRELO. These changes were submitted to DRD for approval and adopted for use in the Lake Zone. This contributed substantially to the successful implementation of changes with respect to the production of outputs as responsibilities within the institute were clearly spelled out.

Box 11.1 Revised ZIMO tasks

- Assist in collecting, compiling, processing and disseminating agricultural research information for users within and outside the zone.
- Answer information queries from different users and handle correspondence relating to agricultural information and documentation services in the zone.
- Conduct database searches according to inquiries from users.
- Assist with publishing of zonal and station documents including research reports, newsletters and leaflets.
- Prepare workplans and budgets for zonal information and documentation services.
- Collaborate with the Zonal Economic Unit and other sections at the Zonal Head Office in matters related to management of information systems.
- Liaise with and visit zonal sub-stations on matters related to information and documentation services.
- Liaise with the Information and Documentation Unit at the DRD Head Office for provision of information facilities including document delivery.
- Zonal correspondent for the DRD Newsletter and other national and international publications.
- Maintain links with local stakeholders within the zone, other zones, national, regional and international bodies for the benefit of information and documentation services in the zone.

In most zones, including the Northern Zone, the ZIMO office consists of one officer, who has to implement all tasks mentioned in the ToR. At Ukiriguru and Maruku ARDI, the ZIMO office is a team: the Information Management Committee (IMC). The ZIMO is in charge of this team. The IMC handles all activities related to output production and information management. At Ukiriguru the team consists of six staff including the computer manager, library attendant, and a previous ZCC officer. At Maruku the team consists of two staff. The activities of the Information Management Committee are grouped into six main categories i.e. public relation materials, scientific publications, extension material, computer and telecommunication, library, database maintenance and mapping (Box 11.2).

Box 11.2 Examples of IMC tasks

Tasks related to the production of scientific publications:

- Planning and monitoring of scientific publications within the institute
- Organisation of review of scientific publications
- Supervision of elaboration of fact sheets (to be included in field notes) which are the basis for the elaboration of training modules and extension materials
- Definition of format and style of publications and monitoring of respect of format and style
- Elaboration of up-to-date publication list at the end of each calendar year
- Set-up and maintenance of publications archive

Tasks related to the production of extension material:

- Promotion of client-oriented and user-friendly output
- Elaboration of up-to-date list of available extension materials at the end of each calendar year
- Production of Technology Reference Book
- Elaboration of order form for clients

In February 2002 officers from the Zonal Communication Centres were transferred to the zonal agricultural research and development institutes. In most zones these officers were attached to the ZRELOs office, not to the office of the ZIMO. At Ukiriguru, one of four ZCC officers was informally linked to ZIMO activities, e.g. production of client-friendly output. In view of the tasks and responsibilities of the ZRELO and ZIMO offices and considering the background of the ZCC staff, it seems logical and advisable to revisit the allocation of ZCC staff.

11.3 Production of scientific output

Researchers prepare quarterly and annual progress reports to monitor research projects within the research programme. Responsibility for these reports is firstly with the Heads of Programmes, thereafter with the ZRC. At the end of the research project, results have to be reported in a final technical report. This report must have an executive summary and a clear overview of conclusions and

recommendations. Both in the Lake Zone and Northern Zone guidelines for writing final technical reports have been developed and used. Use of the guidelines is monitored by the IMC in the Lake Zone and by the ZRC, ZTC and NZARF-MC in the Northern Zone. These guidelines aim to help researchers structure their reports and thus the quality and accessibility.

Publication series

Until recently scientific publications in the Lake and Northern Zone were rather scattered. Co-ordination was weak and programmes hardly monitored the production of reports or gave follow up to pending reports. Each PI produced reports in his/her manner and quality control was done within the programme. Field notes and Working Papers were produced if activities were related to the previous FSR programme or the COR project (less so in the Northern Zone where the programme started later). In the Lake Zone, collaborative and contract research reports and results of cotton research were initially hardly included in the 'FSR' series, which was considered a separate entity within the Institute. In 2002 the already existing Field Notes series was adopted as the institutional LZARDI publication series. The series includes all research documents published by the Lake Zone institutes. Documents published in the last 15 years have been reprinted and given an attractive cover. Original titles and series numbers were maintained. The Working Papers were abandoned. In the Northern Zone in the absence of direct project funding for research the series focuses primarily on activities implemented by the programme and contract reports. Other reports are scattered over the institute and will need to be included to ensure that information is accessible and not lost.

Field notes

'Field notes' is the term used in the Lake and Northern Zone for final technical reports for projects that have been completed. In both zones procedures were developed to review draft field notes. In the Lake Zone authors send their drafts to the IMC who organises the review of all institute reports. For every report, the IMC approaches three appropriate reviewers. The Northern Zone has a review team for the review of draft reports. In both cases the review aims to ensure that sub-quality reports are not released. In the Lake Zone scientists are paid a fee of TSh. 20,000 per review. Authors receive a reporting fee of TSh. 200,000 per field note, which has to include a fact sheet. These fees are paid only after the ZIMO or IMC has officially approved the report. In the Northern Zone field notes are paid the same fee. However up to 2002 researchers did not include fact sheets as they had not been trained yet on how to write these.

Prior to 1998 both the Lake and Northern Zone had a serious backlog in reporting. The IMC in the LZ made an inventory of pending technical reports and started systematic monitoring of which reports were due. At Maruku ARDI for example, the IMC monitored all research projects that were due to report results on a quarterly basis, irrespective of the donor or research modality. The IMC agreed with the authors on deadlines for submission and subsequently monitored progress. As a result the backlog of technical reports has ceased. In the Northern Zone in the absence of a co-ordinating office (ZIMO) up to 2002 this has not been solved yet.

Between 1990 and 2003, the Lake Zone produced 143 Field Notes, 33 Working Papers, 65 special reports and 6 stakeholder meeting reports. The total number of reports may be slightly higher since not all reports and papers have been reported to the ZIMO office and many documents have been lost or gone with the author. In the Northern Zone in the absence of the ZIMO, reports were published through the Publication Office. Reports that went through this office have been rather few. The actual number of scientific reports is much higher but in the absence of co-ordination, reports have not been centrally monitored. With the reporting being very dispersed the likelihood of reports getting lost or disappearing from the institute is very high.

Journal or conference papers

In both the Lake Zone and Northern Zone fees were set to motivate scientists to produce journal papers or contributions to conferences (TSh.100,000 per approved paper). In the past ten years

scientists in the Lake Zone produced 76 papers, an average of 8 papers per year. Due to limited funds the COR project in the Northern Zone could not motivate researchers in the same manner despite the fact that scientists indicated this to be a priority (see the results of the CORMA assessments in the Northern Zone, February 2002). However, in 2003 the Northern Zone ZRC prepared an inventory of appropriate scientific journals with their publication guidelines and requirements, to encourage staff to publish their research progress. A small budget was set aside to facilitate a limited number of articles.

Fact sheets

Fact sheets summarise research results and technical information on a selected topic, and are derived from and attached to technical reports (in the Lake Zone fact sheets are a mandatory part of a Field Note). The fact sheet enables reviewers to assess the reliability of results and recommendations. A fact sheet serves as a basis for developing extension material, be it a leaflet, brochure, poster, radio message, slide series or song (see Figure 11.1). Basic elements of a fact sheet are background, key findings and recommendations (see Box 11.3). All staff in the Northern Zone and Lake Zone was trained on how to make fact sheets. In the Northern Zone as in the Lake Zone user-friendly material cannot be produced without first submitting a fact sheet.

Box 11.3 Guidelines for making a fact sheet

Background:

- Presents the agro-ecological and socio-economic context.
- Quantifies and qualifies the problem or topic under study.
- Lists causes of the problem (e.g. production decline, higher incidences of pests, marketing problems).
- Lists advantages and disadvantages of conventional techniques that are actually applied.

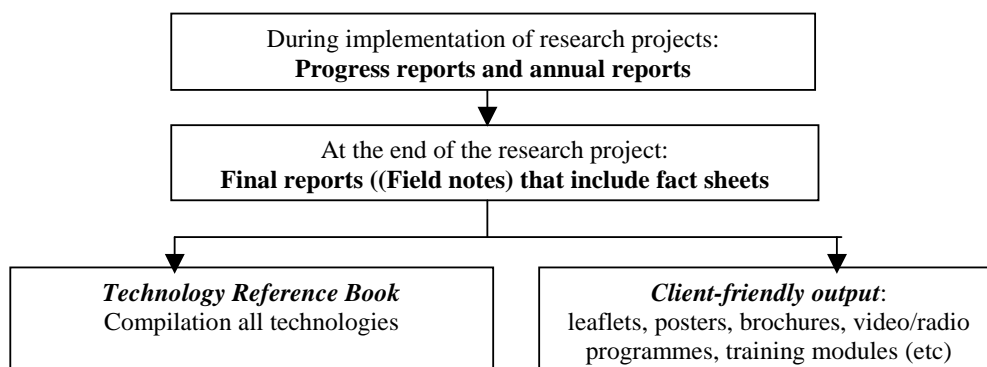
Key findings:

- Gives all necessary experimental data or survey results needed to assess whether the recommendations have enough scientific justification.
- Summarises all data that the target group may need in order to compare the new technique with the conventional one (e.g. quantification of yield increase, percentage insects killed, extra labour involved, extra costs, economic gains, possible constraints or conditions for adoption).
- Specifies who could likely benefit from the technique, who could use it.
- Encourage the target group to adopt the technique and preferably offer them multiple choices.

Recommendations:

- Should follow from the data presented in the key findings and should fit in the agro-ecological and socio-economic context described in the background.
- Should be simple, flexible and targeted (e.g. for AEZs, household categories, gender or growing season).
- Should be in chronological order.

Figure 11.1 The sequence of output production



11.4 Production of user-friendly output

User-friendly outputs are outputs in which research recommendations are written in a language that is targeted to end-users (in most cases extension staff and farmers). Most researchers however have very limited experience and capacity to develop extension material. In this case messages should be developed jointly with extension staff, and the researcher capacity needs to be strengthened.

Leaflets, brochures and posters

In both the Northern and Lake Zone the above has been achieved through one-week workshops. Up till now 6 workshops have been organised in both zones. The workshops bring together research staff, illustrators, translators, extension staff and staff from the ZCC office. All workshops are preceded by short seminars on how to produce fact sheets. Fact sheets are then used to develop a leaflet, a brochure or a poster. Morning sessions of training are followed by practical sessions of developing the material. By the end of each workshop an average of 10 to 15 outputs is ready to be field-tested.

In both zones researchers also prepare leaflets, brochures and posters individually in relation to research projects that they are finalising. All extension material is awarded a publication fee. In the Northern Zone this fee is TSh.150,000, which includes the cost for artists and designers, as well as review. The height of this fee is presently under review. In the Lake Zone the fee for leaflets and posters used to be TSh.150,000 but was reduced when researchers were obliged to make a fact sheet and include that in their technical reports (for which the fee was raised from 120,000 to 200,000 Tsh.). The fee for leaflets and posters presently is TSh.100,000 and is only paid once the material is reviewed (reviewers are paid TSh.10,000 per review), field tested and approved by the ZIMO or IMC. Reporting fees as well as review fees are included in research budgets both in the Lake Zone and Northern Zone.

Up to 1998, Ukiriguru produced 17 brochures. Since 2000, Ukiriguru has produced 98 leaflets, 2 brochures and 8 posters. Many more are under review. Since the first workshop in 2000 the Northern Zone has produced 34 leaflets, 4 brochures and 17 posters. At the moment 22 leaflets and 3 posters are still under review. When the ZCC joined the Northern Zone, their materials were also included in the publication list. This raised the number of leaflets to 70. In both zones leaflets are only produced in black and white, as colour copies are too expensive to multiply. Only in case a stakeholder requests production of colour material and agrees to take on costs for multiplication, is colour material produced. In the case of black and white extension material, single copies of new materials have been sent to stakeholders on an annual basis with an order form. Stakeholders pay for multiple copies or multiply their own.

Training modules

Since last year, the Lake Zone has started to develop training modules. Comparable to leaflet and poster production weeks, a training module production week was organised during which an experienced tutor of the Ukiriguru training wing (MATIU) provided background information and support. Ukiriguru produced 28 training modules on many different subjects. Client demand for training services is steadily growing. Researchers who prepare a module are paid a fee of TSh. 200,000 per module after the ZIMO or IMC approves the module. In this case reviewers are paid TSh. 20,000. As much as possible, training modules are tested in real training situations. Districts or other collaborators are approached and asked to host a training session.

Maps

In close collaboration with ARI Mlingano and the Integrated Plant Nutrition Management programme the Northern Zone ARDI produced an agro-ecological zonation map and a provisional farming systems zonation map. These maps were presented and discussed during a stakeholder meeting attended by 60 stakeholders and scientists. Participants suggested improvements for the map, which were incorporated after verification in the field. Once the maps were finalised they were sent to all

Northern Zone Districts and other stakeholders. A farming systems map of the Lake Zone was prepared in 1997. The map was largely based on soil and rainfall data and thus closer to an agro-ecological map. The FSR database was used to prepare more detailed maps for smaller areas, as well as thematic maps. LZARDI attempted to produce a more comprehensive map that would also include data on land use, dominant crops, livestock, population density and marketing of agricultural produce. This attempt failed because of poor quality of statistical data. At the moment the ZIMO office, in collaboration with the Special Programme, monitors the finalisation and printing of thematic maps. The IMC encourages the use of maps in reports and brochures.

Radio programmes

In the Northern Zone the ZIMO co-ordinates weekly radio broadcasts through Radio Sauti ya Ingili in Moshi. Even though reception of this radio station within the zone is limited it is relatively cheap (TSh.25,000). Programmes are broadcasted every Tuesday evening from 20.45 to 21.00 hrs. So far 14 programmes were aired which focused on for example services available at NZARDI, quality protein maize, dryland farming, mushroom production. As a result of the weekly radio broadcasts a number of stakeholders have visited both Selian ARI and HORTI Tengeru with requests for information and follow up. Maruku ARDI organised three radio programmes so far under the programme of '*Ana kwa ana, Tuambie and Mtaalam wetu*'.

Video episodes

Video production in the research institutes started only recently. Research staff in the Lake Zone was trained on writing a script, shooting and editing material, in a one-week practical training. The training resulted in 4 small video episodes. Other video episodes followed after the training. Until now the Lake Zone produced episodes on Cassava Mosaic Disease and chicken Newcastle Disease. Fieldwork for a promotion film on LZARDI is underway and scenarios for other subjects are being prepared. Now that ZCC staff has joined the zonal institutes professional video episodes can be prepared. In the Northern Zone ZCC staff brought in experience with 53 video episodes so far.

Materials for practical demonstration

Zonal institutes participate in agricultural shows, be they at the regional or district level. Every year, institutes tend to start preparations all over again. CORMA tried to facilitate the institutes to prepare exhibition material that can be used several times. In the Lake Zone this resulted in posters about the research institute background and approach, display boards, goat sheds, and solar dryers for banana and sweet potato. The materials greatly enhance the success of agricultural shows.

Zonal newsletter

In 1999 the Northern Zone institute started a zonal newsletter "Northern Link". The newsletter was entirely funded by the COR project and sent to 160 stakeholders. Every issue focused on a specific topic such as maize, soil fertility management, and horticulture. The newsletter was written in English and targeted stakeholders and extension staff in the zone. The newsletter produced 7 issues and was then stopped. The first issue of the Lake Zone newsletter "Our Link" was released in 2002. The second issue was published in May 2003. For both zonal newsletters major obstacles are sustainable funding (in the Northern Zone each issue cost TSh.5,500) and the reluctance of research staff to submit articles when requested to do so.

Technology reference book

A technology reference book is a book that compiles all research technologies that are released within the zone. It gives short presentations of all technologies, similar to the fact sheet, but targets a different audience, i.e. mostly extension staff. The technology reference book serves as a basis for extension staff to inform farmers in their mandate areas. In both the Lake Zone and the Northern Zone a compilation of this information started in 2002. The ZIMO first compiled all relevant technologies available within the research system. Thereafter a format was chosen to present the technologies. In the Northern Zone a format was followed that is similar to the fact sheet and the format of the Eastern

Zone Technology Book. The Lake Zone followed a format that included extra features such as dissemination and adoption. This latter section focuses on the actual status of dissemination and adoption, and conditions for success.

11.5 Publication list and archive

Publication list

Research outputs need to be documented, stored and easily retrievable when required. Both the LZARDI and NZARDI made publication lists. The LZARDI (with separate publication lists for Ukiriguru and Maruku) made a first list in 1995. This list was regularly updated and included field notes, working papers, journal papers, special reports and leaflets. The publications included primarily research projects implemented by the FSR project. This was expanded to include all institutional reports in 2002. The list now includes all publications produced in the past 15 years. In the Northern Zone similar publication lists were made in 2002 (both for Selian and Tengeru). As in the Lake Zone the list includes all technical reports, field notes, journal papers, leaflets, posters and video episodes. The publication lists have been distributed to stakeholders and researchers in the respective zones and have increased the accessibility of research results. The lists are used for quick searches on topics or past research results. Stakeholders' appreciation for these publication lists is very high. The publication lists are sold so that production costs are recovered. In the Northern Zone staff also uses a separate list of leaflets, brochures, posters and video episodes in Kiswahili. These lists are regularly sent out to stakeholders to inform them of new extension material. The list is sent together with an order form to encourage clients to order outputs.

Publication archive

A publication list is of no use if information that is in the list is not available. It would be very embarrassing to add titles to the publication list that cannot be photocopied or borrowed. Unfortunately publications tend to get misplaced, borrowed but not returned, etc. Hence it was agreed that the ZIMO office would at least keep one hard copy and one soft copy of all outputs produced by the institutes in both the Lake Zone and Northern Zone. Not only copies of technical reports for government funded activities but technical reports of all research projects implemented by the zone, as well as user-friendly materials. Compilation started in both zones but is far from complete yet.

11.6 Quality control

Reviews

Research institutes need to ensure that outputs from research projects implemented by staff from the institute are of high quality. A good quality report is the best promotion an institute can get. Equally a poor quality report is the worst promotion an institute can get and fires back on the entire institute, not only on the author of the report. Quality can be improved by setting up a thorough review system for all outputs that leave the institute, be these technical reports for DRD, a contract report, reports of collaborative assignments or leaflets.

In the Lake Zone the IMC set up a review system in 1999. This included different review forms for technical reports, leaflets and brochures, and training modules. All researchers were carefully instructed on how to use the forms. Procedures are outlined in a number of instructions that have been distributed to all staff. The review procedure basically consists of the following steps for all materials:

- The author submits the material to the IMC. The IMC organises a review of the output by three appropriate reviewers and sends copies to the reviewers together with a review form. Reviewers are appointed within 2 weeks after submission.
- Reviewers get 2 weeks to review the output and then submit the copy and the review form to the IMC.

- The IMC gives the review findings to the author. He or she processes the review comments and hands over the final output to the IMC.
- The IMC checks if the information of reviewers has been processed. In case of insufficient processing, the report is send back to the author.
- When the final output is accepted by the IMC, the ZIMO or IMC requests the institute management to release fees.

Outputs can be reviewed internally and externally. In the case of Maruku ARDI, one of three reviewers is a researcher from Ukiriguru, while in the case of review of extension material one of the reviewers is an extension agent or a ZCC officer, and in the case of a training module one of the reviewers is a trainer. Thorough reviews take time if done well. The institutes agreed to reward reviewers although fees depend on the material that is reviewed (for final technical reports and training modules the review fee is TSh.20,000, in the case of a leaflet or poster the review fee is TSh.10,000). These fees are paid only if the ZIMO office or IMC is satisfied by the quality of the review. If a review is not done properly or does not come in time, the IMC appoints another reviewer.

Testing of extension and training material

In the case of producing extension material the output has to be tested. Testing aims to:

- determine in how far the target group(s) understands the written text and the illustrations;
- identify users' opinions of the relevance of the message and its applicability;
- determine if the presentation and lay-out are attractive;
- assess if the message encourages adoption of the improved practices.

Testing is done after the draft output is reviewed internally and revised. Outputs are then taken for testing to the target group (see Box 11.4 for testing guidelines used). In the Lake Zone in the period from 2000 to 2002, researchers went to villages to test extension materials. As of recent a panel of farmers and extension staff - coming from different areas - is invited to the institute, where they critically discuss the material. This will not only enhance the thoroughness of testing, it will also greatly reduce costs. In the Northern Zone testing has only recently been included in the procedures for developing extension material. It has been agreed though that researchers cannot test their own material, as they would influence the outcome of the activity.

Box 11.4 Guidelines for testing leaflets, brochures and posters

1. What is according to you the message that is described here?
2. What questions did you ask yourself about this message before reading this? What questions do you think will be asked by others? Does this material answer these questions satisfactorily? If not, what should be added?
3. Does the leaflet add something new you did not know before? If so, what elements are new to you?
4. After reading this, are you convinced that the message as it is presented here is worth disseminating? If not, why not?
5. Is the message practical for you or others to use?
6. What group of farmers will be interested in this message (e.g. according to gender, level of education, resources, other)? Who will not be interested, why not?
7. Are there any words or technical terms in the text that are difficult to understand?
8. What do you observe in the drawings, what do you think is the information the images want to get across?
9. Are there any elements in the drawings that you are unfamiliar with in your situation (e.g. clothing, activities) or that you find difficult to understand?
10. Do you think the drawings are essential for understanding the leaflet?
11. Are the drawings presented in an attractive manner?
12. If we would charge for this leaflet, brochure or poster, how many people in this area would buy it? What price would be reasonable?
13. Other comments and suggestions for improving the material?

11.7 Lessons learned and the way forward

The production of quality output is a crucial step in technology development and dissemination. It needs more attention from the management, both at national and zonal level. Some of the major challenges for the future are summarised below:

The creation of a ZIMO office must imply the transfer of responsibilities to that office. The ZIMO has to be given responsibilities for activities and a budget to implement them. If not, business will continue as usual. When the Northern Zone ZIMO was transferred, the zone was without a ZIMO for two years, after which a ZIMO was appointed at zonal level. This would not have been the case if the transfer had affected the ZRC or ZRELO office. The position of ZIMO should get adequate priority at both zonal and national level. One person can hardly handle all tasks given to the ZIMO office. This office needs more staff (e.g. an information management committee) and adequate facilitation.

If staff is rewarded they definitely produce outputs, both scientific and user-friendly. However, a thorough review system is essential to ensure the quality of research outputs. To get quality reports/publications, scientists must accept criticism and be ready to produce a second draft of their reports, training and extension materials.

Output-related publication fees need to be harmonised and officially endorsed within DRD. Also review procedures and procedures for publishing research results have to be institutionalised and have to apply for all research projects irrespective of the funding agency. The type and the quality of outputs that researchers produce could be taken into account in annual staff evaluations and promotions.

Reporting fees such as those for field notes and leaflets or brochures can only be sustained if they are included in research budgets and if the institutional policy ensures that these fees are indeed a zonal policy for all research modalities. In the Northern Zone field notes and extension materials continue to be produced under NZARF and contract research. A number of collaborative projects also started including these fees but in most collaborative or government funded projects, reporting, reviewing and testing is not budgeted for. In the Lake Zone a large number of research projects was funded through the COR project which would hence ensure that fees could be budgeted. This ensured that staff became familiar with the advantages of such a system. The introduction of reporting fees has definitely increased the number of research outputs. However, the incentives have also created a situation where quality is not always given sufficient attention.

Equipment has to be in place such as computers with desktop publishing software, printers, a photocopy machine, a scanner, binding equipment, a good camera. The cost of maintaining this equipment has to be borne on a cost recovery basis to sustain the relevant services in the long run.

Publication lists are easy to compile using titles that staff provides. However in both the Lake and Northern Zone it was agreed that only those publications could be included in the list where hard copies were provided. The latter proves very difficult when research staff does not (or cannot) provide hard copies (leave alone soft copies). The problem is caused by some of the following:

- Individual researchers may not keep record of their own reports and do not file a hard or soft copy.
- Reports are not centrally filed. If individual researchers have copies they may not provide a copy to the institute. If a researcher is transferred the research results for a particular area disappear as well.
- If reports are centrally filed they may have disappeared, e.g. from the zonal library.
- Staff often contributes to papers or publications resulting from collaborative research projects (with networks or international institutes) but do not receive hard or soft copies.

The above can only be resolved with strong management support at the institutional level.

A continuous flow of scientific and client-friendly output needs the consolidation of funds from various sources (GOT, Donors, Individual projects). This requires writing good proposals that can win the market. Research institutes should consider writing more for policy development and administrators. This may increase funding and general support for research.

Locally generated technologies often require formal approval before messages can be disseminated. Procedures and regulations need to be reviewed before technologies are released. The analysis should focus on existing legislation (including by-laws), bio-safety regulations and rules within the Ministry of Agriculture and Food Security. While messages concerning agronomic practices, use of fertiliser and pesticides, are approved locally, the use of different inputs is normally approved at the national level. Even though it is important that DRD formally endorses messages, it is equally important to avoid blanket recommendations and accept the possibility of several different, overlapping messages for the same commodity or enterprise for different zones/regions and/or target groups.

Dissemination of agricultural technology: Narrowing the gap between research, extension and farmers

Ali M. Ngendello, S.R.B. Mgenzi and Ted Schrader

Guiding principle

‘Without dissemination there will be no impact of research at farm level’

No matter how perfect a technology is, it is useless if it is not disseminated and taken up by end users. Technology development and technology dissemination can therefore not be separated. Innovations should flow from innovation centres like agricultural research institutes to intermediate organisations that can spread it further to all segments of farmer communities. Unfortunately, the actual institutional context does not favour the uptake of technologies. Large gaps separate research, extension and farmers. This paper reviews experiences from the Lake and Northern Zone that have increased the chances of technology dissemination. The review indicates that there are many options to significantly improve communication, collaboration and information sharing between stakeholders. However, these efforts will only reduce gaps and do not necessarily lead to higher adoption rates. To bridge the gap, a more comprehensive approach is needed that incorporates research, training and extension. The authors suggest that we need an integrated client-oriented research and extension management approach (COREMA).

12.1 Introduction

Agricultural development: the most difficult task a nation can face

Already 35 years ago agricultural development has been called "the most difficult task a nation can face" (Freeman 1968: 46). Since then enormous efforts have been made. In the past three decades, agricultural production doubled but so did the world population. In Asia per capita food availability improved, in Africa it declined. Increases in productivity have largely been achieved through cultivating more land, extending irrigation, and introducing fertilisers and insecticides. These options generally did not reach remote areas and poorer social groups. Today, agricultural production factors (land, water, energy and fertiliser) are in a tighter supply and more expensive than ever before. Agricultural commodity prices are historically low and in the context of structural adjustment programmes most subsidies on inputs have been abolished. Furthermore, deforestation, soil mining, erosion and health crises undermine the stability and sustainability of many agricultural systems. Future increases in food production will have to be achieved by solving more complex technical, ecological, sociological and political problems. Freeman's statement is therefore even more valid today than it was one generation ago.

The challenge

In Tanzania, more than four million rural households are engaged in small-scale agriculture. These households produce about 75% of the national agricultural production. Around 60 percent of the rural population lives below the poverty line (Limbu, 1999). Considering the quantity and quality of natural resources as well as the available economic opportunities, it is evident that land and labour productivity are well below what they could be. Average yields per hectare are low and for most major

crops they could easily double. The increase of agricultural productivity and the use of labour saving technologies are therefore crucial components of the national poverty alleviation strategy.

Adoption of technologies

Many adequate and profitable technologies are available in Tanzania. Most of these technologies have been released on the basis of attributes like high yield, early maturity and taste, rather than economic benefit. Farmer assessments, economic viability analysis, gender analysis have only been very recently integrated in the process of agricultural technology development. Also the attention for farmer organisation, processing and marketing is recent. However, many technologies like improved varieties, the use of animal draught power for ploughing and weeding, the use botanicals for pest and disease control, dairy farming practices and many others, are (potentially) profitable. Lake Zone ARDI developed different sweet potato and cassava varieties that were released through TOSCA. One sweet potato variety (SPN/O) is now widely grown, not only in the Lake Zone but throughout Tanzania and East-Africa. Four orange-fleshed varieties are potentially very important because of their high vitamin A content. Certain resistant cassava varieties play a strategic role in controlling the CMD pandemic. A coalition that includes the cotton board, donors, MAFS, research and farmer groups organises the multiplication of UK 91, a cotton variety that may lead to higher productivity and better cotton quality. Similar success stories can be reported for other zones, for example for maize and bean varieties. Research also proposed livestock innovations that have reached the farmer level. We mention the crossbreeding of goats, the use of a local shrub (Tephrosia) for tick control, the thermostable vaccine for controlling chicken Newcastle disease. In the Northern Zone haymaking and baling is becoming popular.

These successes notwithstanding, many indicators suggest that four decades after independence the use of modern agricultural technology is not a common practice. For instance, quality seeds and planting materials are not widely available at farm level, soil fertility management practices are hardly applied, levels of mechanisation and irrigation are low, potentially profitable post-harvest techniques are not used, and livestock productivity is still very low (cf. Box 12.1 for more indicators).

Box 12.1 Adoption of agricultural innovations and technology (Source: Limbu 1999)

According to the 1994-95 National Sample Census of Agriculture (URT/MAC 1996), out of every ten households:

- Three use improved seeds and four use farm yard manure
- Two use chemical fertiliser (and this is mainly in seven regions) and three use pesticides, insecticides or herbicides
- Six receive advice of extension agents

The common farm implement owned by all holders is the hand hoe. Out of ten holders:

- Eight own an axe and a big knife machete
- Five a grinding stone
- One a plough

Out of thousand holders:

- Four own harrows and only one a tractor
- Five get agricultural credit
- Three carry out irrigation (mainly in three regions).

Tanzania has made little use of the rich livestock resources:

- Draught oxen represent 5% of the total cattle population, improved dairy cattle only 2.5%
- Animal traction is used on 20% of the cultivated land. Although weeds constitute one of most serious barriers to increased agricultural production, this is even less for weeding.
- Despite its large herd, Tanzania is a net importer of dairy products. Per capita milk production (20-28 litres) is well below the African average (35 litres) and Kenyan levels (44 litres).

Despite serious threats to the natural resource base, adoption rates of soil fertility management, water conservation and erosion control measures are still very low.

6.2 Research and extension: common goals, common problems and different worlds

Common goals

No matter how perfect a technology is, it is useless if it is not disseminated and adopted by end users (farmers). This means that research and extension have to work closely together, which calls for intensive communication, collaboration and information sharing. Extension is like the bridge that brings a technology from one side of the river to the other.

Problems in technology dissemination are generally the result of (a combination) the following:

- a. *Technology-fit problem*: the technology is not adapted to farmer conditions.
- b. *Information dissemination problem*: farmers are not aware of available technologies (they haven't heard about it and/or haven't seen it).
- c. *Training problem*: farmers may have heard about the innovation or have seen the technology, but do not know how to implement it.
- d. *Enabling environment problem*: even when farmers are aware of the technology and have been trained, they can't apply it because they cannot face the financial and/or labour requirements of the proposed options.

Although local level research organisations do not have an official mandate for extension, they nevertheless have an important role to play in supporting the dissemination of research results. Research can play an active role to (partially) overcome the problems mentioned above:

- a. *Appropriateness of technologies*: The first duty of research is to demonstrate that target groups can adopt research recommendations. Research should be participatory and include farmer assessment, adoptability analysis, socio-economic and gender analysis (cf. paper 10).
- b. *Information dissemination*: 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)
- c. *Training*: Research can contribute to capacity building, e.g. the training of extension staff, farmers and other organisations such as NGOs.
- d. *Policy advice*: In addition, research can undertake policy studies and formulate recommendations to improve the enabling environment.

Technology development and technology dissemination cannot be separated. Research is at the source of innovations. If research does not develop technologies that fit farmers' conditions, and if research does not inform and train stakeholders, then innovations do not have a big chance of reaching the target groups. It is therefore hard to understand why strategies to develop and disseminate user-friendly extension materials were only recently developed. Most probably this was due to the scientific orientation of research institutes and the absence of strong links between research, extension, farmers and other stakeholders involved in the agricultural sector.

It is now widely acknowledged that research institutes have to collaborate with extension organisations, whether public, private or NGOs, whether strong or weak, in order to play its complementary role and to get the necessary input and/or feedback from farmers and other clients. Research and extension have to reach out and join hands. In the current institutional set-up, this is not as easy and straightforward as it sounds. The uptake capacity of extension and stakeholders is weak and a large gap separates research and extension.

Weak uptake capacity

Many governments have found it difficult to make adequate resources available for agricultural extension. Structural adjustment programmes have exacerbated the situation. Financial pressures led to the reduction of staff, facilitation and training. Staff is ageing. The lack of incentives results in poor staff morale. Some observers even ask the question whether there is life after structural adjustment for public sector agricultural extension (Farrington, 1994). Within the extension service there is weak integration of livestock and crop specialists. Linkages with research organisations and the private

sector are weak and also the level of farmer involvement is insufficient. Village/farmer situations are not adequately analysed and there is a lack of proper prioritisation of problems. The supply-driven and top down Training and Visit extension approach has failed to respond adequately to the needs of different categories of farmers and livestock keepers (Ndege *et al.*, 2002).

Common problems

The characteristics of the public extension sector are remarkably similar to those reported for the agricultural research sub-sector. Low staff motivation, insufficient client orientation and targeting, lack of collaboration between different disciplines and insufficient linkages with stakeholders also characterise public research institutions. This suggests that the technology development and dissemination system should be seen from a holistic institutional viewpoint. Extension and research have problems in common and these problems should be addressed for both key players in the technology development and dissemination process.

Different worlds

Although everybody agrees that research and extension are like two sides of the same coin, there are three reasons why it is as if research and extension live in different worlds:

1. *Different cultures and languages:* Researchers and extension workers are not necessarily sharing the same values. Researchers look for scientific evidence and have their peer researchers as their reference group. Articles in international scientific publications are generally more valued than leaflets for farmers. Scientists may come up with technically sound recommendations, which are not sufficiently disseminated or which have not been demonstrated to be practically feasible, e.g. adapted to local situations. Extension workers often have their intervention zone as their area of reference. They may not grasp scientific language and often lack the latest information on agronomic practices, pest and disease control, post-harvest technologies, potential new crops and varieties, etc. Sometimes they are not even interested in what happens outside their area.
2. *Different ministries:* Agricultural research was under the Ministry of Agriculture and Co-operatives, which was split into MAFS, MWLD and MMCD in February 2001. Also extension is no longer under the Ministry of Agriculture. It was brought under the Ministry of Regional Administration and Local Governance (MRALG), as part of the ongoing decentralisation process (Local Government Act No. 6 of 1999). This has created a bigger distance between the search for agricultural innovation on the one hand and the implementation of agricultural innovations on the other hand. Experience shows that it is now more difficult to bring research and extension together. Often, the question "who pays what?" already distorts the contacts. Even at district level the agricultural departments are often poorly integrated and do not get much financial and policy support.
3. *Different budget years:* The budget year of MRALG is January-December; for all other Ministries, including MAFS, the budget year is July-June. This enormously complicates the planning, harmonisation and synchronisation of activities. In addition, research and extension are supported by two different WorldBank/IDA projects (TARPII and NAEPII) that have not succeeded to bring about closer linkages between the two.

These different worlds have to be brought together, but what can or should be done?

12.3 Narrowing the gap

The wide gap between research, extension and farmers is probably the single most important barrier towards transfer and adoption of agricultural technology. For most regions and districts in the country we actually do know the major problems farmers are facing. And for many - if not most - of these problems we also know potential solutions, at least partially. However, the agricultural development system (which besides research and extension includes seed and input suppliers, animal health centres

and other providers of agricultural services) has not been able to deliver the messages and/or did not succeed to facilitate farmers to implement available technologies.

The need for a sector-wide approach

More than ten years ago, it was already noted that 'despite the sizeable research network, Tanzania research services have not been able to fulfil their role in developing appropriate technological packages for farmers' (URT 1991: 13). The major problems are poor stakeholder involvement, weak research-extension linkages, inadequate funding, low staff motivation, insufficient output, insufficient adoptability analysis, poor technologies, poor co-ordination and backstopping, fragmentation and poor co-ordination of the research system.

Of course research cannot be held responsible for the situation of the entire agricultural sector. Many reasons for low adoption rates lie outside the domain of the national agricultural research system. According to Limbu (1999), the major factors hindering poverty alleviation through improved agricultural technologies are the limited scale of production, low producer prices, poor functioning and partial collapse of the seed multiplication system, high input prices, lack of credit facilities, weak extension services, and a lack of farmer aspirations. All these factors reinforce each other and have to be addressed together. Recent policy documents (Tanzania Vision 2025, Poverty Reduction Strategy, Public Sector Reform, Agricultural Sector Development Strategy and Programme, MAFS client service charter) indicate that the agricultural technology development and dissemination system is now subjected to serious examination and that sector-wide policies are being prepared for implementation. This may change the future outlook of extension and technology dissemination systems in Tanzania.

This paper will however turn to the situation of today. We will suggest some practical options for narrowing the gap between research and extension. Our main objective is to see how research and extension - which have common goals and problems but live in 'different worlds' - can be brought together in the present institutional context.

What research and extension could do to reach out and narrow the gap

In the next paragraphs we will shortly present activities that can be undertaken to reach out and narrow the gap between research and extension. All these activities have in common that it is about intensifying relations with extension. Tables 12.1, 12.2 and 12.3 suggest that scientists - for almost everything they do - should see how they can collaborate with extension and farmers to increase the impact of their activities.

Table 12.1 Options to intensify communication:

What research could do	What extension could do
Establish liaison teams (ZRELO, liaison officers) with eventual nomination of district liaison officers	Nominate of research-extension liaison officers
Elaborate Memoranda of understanding	Elaborate Memoranda of understanding
(Co-) organise stakeholder meetings and facilitate participation of research	(Co-) organise of stakeholder meetings and facilitation of participation of extension
Elaborate stakeholder inventory, analyse agricultural knowledge and information system (AKIS), identify and continuous update stakeholder research and information needs,	Provide information for stakeholder inventory, participate in AKIS analysis and explain research needs and other problems to research
Organise open day at station and ad hoc reception of stakeholder teams at research station	Facilitate extension officers and farmers to attend open day and specific visits to research stations
Active participation in farmer field days and agricultural shows, cost-sharing, preparation of exposition materials	Organise farmer field days and agricultural shows

Table 12.2 Options to intensify collaboration

What research could do	What extension could do
Elaborate strategic plans for commodities, themes or specific disciplines	Provide input for and give feedback on strategic plans
Develop farming system zonation map and distribute FSZ map to stakeholders	Provide input for and give feedback on FSZ map
Participate in development of statistical database	Organise data gathering system at village and farm level
Diagnostic surveys, social stratification and gender analysis	Participate in diagnostic surveys; Provide input for and give feedback on social stratification and gender analysis
Write joint research proposals (in collaboration with client) and look for funding opportunities	Participate in research proposal writing
Establish FRG-FEG or FFS system per district	Establish FRG-FEG or FFS system per district
Stakeholder tours and organisation of M&E of on-going field trials	Receive teams and participation in M&E tours
Participate in M&E of extension programmes	Organise M&E of extension programmes
Farmer assessments, socio-economic feasibility studies, adoptability and adoption studies	Participate in various assessment studies and react on results: facilitate adoption
Present draft research results, use of comments	Review draft reports

Table 12.3. Options to intensify information sharing between research and extension

What research could do	What extension could do
Set-up attractive publication series (field notes including fact sheets) and send at least one copy to stakeholders	Set-up district information centres and NGO office libraries where publications are displayed for consultation
Produce user-friendly output: leaflets, brochures, posters, radio and video programmes	Participate in review of leaflets, brochures and posters. Multiply and disseminate extension materials to farmers. Use of video in village meetings. Facilitate air time for radio programmes
Produce Technology Reference Book and overviews of suitable technologies per district	Consult reference books and select technologies for further dissemination
Organise extension seminars on specific themes	Participate in extension seminars
Participate in development forums	Organise development forums
Develop training modules and better integration of research and training	Participate in review of training modules and organise training sessions for district staff, VEO's and farmers; establish district training centres
Produce publication list and order forms. Use of up-to-date mailing list and systematic sharing of information	Consult publication list and order documents. Announce documents received to subject matter specialists and extension staff
Edit newsletter (quarterly, bi-annual)	Subscribe and contribute to newsletter
Accessible library and literature search facilities (internet)	Visit library and internet services. Use literature and latest information

There are therefore many opportunities to improve communication, collaboration and information sharing between stakeholders. These options can be found in different CORMA areas, e.g. linkage and collaboration, research planning, monitoring and evaluation, output production and information management. The Lake and Northern Zones gained some experience with these options. These will be reviewed with the objective to suggest best practices.

12.4 Experiences to improve communication, collaboration and information sharing

Liaison teams

The idea of institutionalising the liaison and linkage between research and extension was introduced in the early 1990s, initiated by the Farming System Research Project (FSRP) and later succeeded by the Client Oriented Research Programme (CORP). In the Lake Zone three scientists were assigned per

district. Their main activity was to link research and extension at district and village level through Farmer Research Groups (FRGs), which were established in the main farming system zones. In the late 1990s these liaison activities were institutionalised. In 2000 a ZRELO office was established in all zones. In the Lake and Northern Zones COR and GoT were the main sources of funding.

The liaison team is composed of many persons. In the Lake Zone the ZRELO is assisted by four Regional Extension and Liaison Officers (RELOs). There are two District Extension Liaison Officers (DILOs) for Shinyanga, Mara and Mwanza regions. Maruku ARDI appointed liaison officers per district (5). The main activities of the ZRELO office include: promotion of the institute, inform stakeholders on available services, distribution of user-friendly output, identification of research and information needs. The integration of ZRELO office within the zonal team, the appointment of RELOs and DILOs, good collaboration and division of tasks between the ZIMO and ZRELO offices have facilitated the dissemination process significantly. RELOs and DILOs are scientists and field officers from different programmes being responsible for linkage and liaison activities for Regions and Districts respectively. In the Northern Zone a promotion team of ten staff was set up in 1998. Their tasks included promotion, stakeholder linkages and identification of research and information needs. In 1999 the promotion team was dissolved and replaced by a liaison team that consisted of four scientists and field officers from Selian ARI. Each liaison officer was responsible for a number of districts in the zone. When the ZRELO was appointed in 2001, he took over the co-ordination of the liaison team. The liaison team was further reduced to three staff members in 2001 with the aim of reducing liaison cost, while one staff member from Selian ARI was replaced by a staff member from Horti Tengeru. In both zones the ZCC is also under the responsibility of the ZRELO office.

Memoranda of understanding

A Memorandum of Understanding (MoU) is a duly signed document that stipulates the responsibilities and obligations of the parties that enter into an agreement. In 1999, all zonal institutes established MoU with district authorities. The MoU gives an overview of past collaborative activities and defines the terms of collaboration, the research programme and commitments, both in terms of human resources and financial contributions. The client and the institute agree for example on the type of meetings that will be held and the modalities for distributing documents. The existing MoUs have to be updated and more MoUs could be established.

Stakeholder meetings

Regular stakeholder meetings and visits tend to narrow the gap between research and clients. In the Lake Zone such kind of meetings are organised per region and on an annual basis. In such meetings the institutes explain new technologies and distribute user-friendly extension material. Although this initially raised some discussion, stakeholders pay for their participation (travel and accommodation costs). The research institutes organise the meetings and pay for the participation of researchers.

Open day at the station

Open days give farmers and other stakeholders the opportunity to visit the institute and on-station activities. Technology dissemination is one of the objectives. Extension material for different technologies is displayed and distributed. In the Lake Zone both Maruku and Ukirguru ARDI have organised open days in 2001 and 2003 and hundreds of farmers and extension officers attended. Participants paid for their transport and allowances, the institutes took care of the organisation costs. In the Northern Zone both Selian and Tengeru organised similar days in 2002. For Tengeru this was the first day in many years and more than 200 people participated. During these days, a good number of field trials and post harvest activities are shown, and the functioning of service units and other supporting services is explained. After the field visits a general discussion takes place, which is an opportunity for scientists to get feedback from farmers and stakeholders at an early stage of technology development.

Agricultural shows

These events bring together stakeholders that have different experiences and messages for farmers. Researchers meet with farmers, extension staff of government and non-governmental organisations, traders and processors and other stakeholders that visit the exhibition area. In all regions of the country, the Nane Nane agricultural shows are organised annually and most DRD institutes participate every year. For three consecutive years, LZARDI participated in shows organised by the Mara Diocese at Mogabiri and Buhemba agricultural centres and won several awards. The shows are an opportunity to show technologies like high yielding and tolerant varieties of various crops, agricultural and post-harvest equipment, as well as livestock related technologies. Researchers explain the details of each technology to the audience and questions are asked for clarification. In so doing some of the farmers and clients requested a follow up on some of the activities. User-friendly materials are shown and sold and orders for field notes, leaflets, brochures are noted down. Ukiriguru recently started to show videos. This initiative was highly appreciated.

Farmer field days

As its name indicates, a farmer field day is organised at farm level. The common practice in the Lake Zone has been to collaborate with Farmer Research Groups. All research activities that are carried out in the host village are shown to other farmers, extension staff, scientists, NGOs and district authorities. The main goals are to share information, to monitor the on-farm trials, to do a quick farmer assessment and to get an impression of adoption indicators. In the Lake Zone, research institutes, districts and NGO's co-organise the farmer field days jointly (see also paper 1).

Technology markets

Technological options can also be disseminated in villages through technology markets, during which researchers present technological options (short talks, presentation of implements, posters and pictures). A technology market can be part of the farmer field day programme, as was the case in Karagwe District in 2001. At the market, farmers can choose from the options they think are relevant for them. Technology markets can therefore be instrumental in selecting farmers who are interested in testing a particular option. They can register themselves and appointments can be made for follow-up meetings to discuss the various experiments and options. This would be an improvement in comparison to earlier practices whereby farmers were not selected on the basis of interest but purely on the basis of their "representativeness". In the Lake Zone two FRGs were established based on that approach. The adoption of technologies at FRG-Iteja has been very fast while at FRG-Mwagala the adoption of technologies has been very gradual. The reasons for that difference are yet to be discovered.

Rural seed fairs

Seed fairs are a specific form of technology markets. They can be a potentially important tool to enhance the adoption of new seed varieties. The Southern Zone (Naliendele ARDI) has experiences with organising these in collaboration with District Councils (IBRB/ World Bank 2002). The main objective is the sharing of seeds, planting materials and knowledge between farmers. In the Lake Zone and also in other zones, some NGO's have experiences with organising seed markets. Zonal Institutes could liaise with these organisations.

Farmer Extension Groups

Farmer Extension Groups (FEG) are groups of farmers that are working with extension on the verification of recommended messages and options, which have been developed in the same or similar farming system zones by FRGs in partnership with research institutes. The number of FEGs is larger than the number of FRGs but smaller than the extension "contact groups", which are known from the Training and Visit system. FEGs remain in close contact with FRGs (facilitated by extension officers) in order to receive technology feedback. During field days in the FRGs, FEG members are invited to assess the various technological options for possible testing.

Farmer Field Schools

Farmer Field Schools (FFS) are commonly used in Asia, especially for Integrated Pest Management. This collaborative approach has been recently introduced in Tanzania. The FFS approach puts emphasis on stakeholder involvement, PRA techniques and tools and underscores the principles of the Farming Systems Approach. The Farmer Field School is not so much different from FRG; the only difference is that one field is used as a training site on the assumption that tested technologies will spread further. LZARDI has conducted training sessions for district extension staff in all regions, Mara, Shinyanga, Mwanza and Kagera. It is too early to judge its effect as a method for dissemination of technology.

Stakeholder tours and visits

The Lake Zone has regularly organised stakeholder tours and visits, during which different teams of scientists visit the regions. All districts are at least visited once per year. The main objectives are to monitor on-going field activities, to carry out stakeholder inventories, to identify research and information needs, to discuss information and services available at the institute and to analyse client satisfaction. Experience has shown that these tours are essential for distributing extension materials and explaining technologies. Feedback from extension staff and some NGOs reveals that the quality of most extension materials is satisfactory (stakeholder satisfaction survey).

Joint proposal writing

Donors are eager to support joint projects that address both adaptive research and dissemination activities (see paper 8). The DRD institutes have not yet sufficiently reacted on this challenge and opportunity.

Monitoring and evaluation

Both the Lake and Northern Zone are organising M&E activities in collaboration with stakeholders (see paper 10). In addition, Maruku ARDI got a contract from some districts to monitor the district extension programme. Ukiruguru also got a contract to evaluate a rural development project in Misungwi district. These examples show that research institutes could become more involved in the design, implementation, monitoring and evaluation of agricultural development programmes.

Technology reference book

Researchers in the Lake Zone and the Northern Zone are currently compiling a 'Technology Reference Book' (TRB) that targets extension services and other stakeholders. The Eastern Zone (EZ) already produced a TRB. Each technology consists of a short description, results, applications, advantages and limitations (Cf. paper 11). The assumption is that the availability of a TRB will facilitate dissemination of technologies through direct requests to research institutes.

Recommendations per district (District TRB)

An overview of recommendations per district is a tailor-made TRB for a particular district. This is important because realities differ. For instance, the recommended planting period for Shinyanga rural is November-December, whereas for Misungwi the best period is January-February. Within districts different agro-ecological zones and socio-economic groups can generally be identified. District TRB's should therefore take these difference into account. The challenge is to compile technologies suitable for a certain district and make them available. This will not only facilitate the selection of technologies and the development of district agricultural development plans, but also create a lot of goodwill for the institute. It may even lead to research and training assignments. For Kagera region, Maruku ARDI already compiled overviews for Biharamulo, Muleba and Karagwe.

Extension seminars for clients

Extension seminars are events that are purposively organised for extension. They generally cover a specific topic. During the past years, Lake Zone organised many of these seminars. Recent topics include: striga control, sweet potato production, seed multiplication, alternative cash crops, post

harvest technologies, participatory approaches to technology transfer, pests and disease control for various crops. Therefore, research institutes are always equipped with training materials for different groups, disciplines and commodities. The research institutes have training manuals, training modules, handouts, field notes, working papers and other extension materials ready for the training sessions whenever needs arises. Monthly seminars and quarterly workshops are alternatives approaches used to disseminate technologies. Extension seminars have also empowered stakeholders on demand driven extension.

Development forums

Development forums are meetings that bring stakeholders of a particular area together to discuss development issues. In the Lake Zone, Mara Diocese organised the Mara Development Forum on a quarterly basis. For the past two years LZARDI has been participating in this forum. Generally the research contribution consists of the presentation of recent technologies and findings. Some stakeholders invited the institute to give follow-up on certain subjects. Among others, a Mara seed multiplication project was initiated, which involves LZARDI, districts, NGOs and Mara Diocese.

Training sessions

Apart from adaptive research, research institutes can provide training services. Since 2001, LZARDI has prepared more than 30 training modules that cover many different technical subjects: natural resource management (agro-forestry, ISFM), post-harvest technologies for cassava and sweet potato, livestock supplementary feeding, ox-drawn weeding, pest and disease control for all major crops, multiplication of seeds and planting materials, crop diversification, as well as methodological subjects (farmer assessment, agricultural enterprise budgeting, simple experimentation and data collection). A training module is composed of handouts for trainees and a trainer's guide. The institute has conducted many training sessions at different levels (village, district, region, project and institute) and for different clients, both GO and NGO. Each training session carries a specific extension message. Most of the trainees are extension staff and sometimes farmers. Experience from the Lake Zone shows that there is a market for training services. Many clients, especially NGOs and districts, have approached the institute and are willing to pay.

Distribution of user friendly materials

Once extension material is published, it is added to the publication list and made known to potential users. The Northern Zone attaches an order form to the publication list that is sent to stakeholders. Informally the institutes have agreed with many stakeholders to send one or two copies of reports and extension material free of charge. To enhance distribution of extension materials, mailing and distribution lists have to regularly updated. Using different channels (mail, meetings, shows), both the Lake and Northern Zones have distributed a good number of extension materials to stakeholders and farmers. Between 2001 and 2003, LZARDI distributed copies of 96 different leaflets, 15 posters and 40 training modules. If more materials are required then clients can buy these at cost price. The current strategy of producing extension materials that can be easily photocopied seems to give good results. The current price of TSh. 100 per copy is affordable. A recent survey reveals that the number of extension materials available to the end users was higher than the limited number of copies that were distributed, because stakeholders photocopy the publications, especially the leaflets. Institutes may consider elaborating extension materials on the basis of client demand. For example, the DALDO offices of Geita and Sengerema districts showed interest to make a list of materials they need.

Use of mass media

Mass media (radio programmes, newspaper, magazine etc) are useful for large-scale dissemination of technologies. The Northern Zone has experience with the use of radio. The liaison and linkage office (ZRELO) collects topics of research outputs from scientists and simplifies the message to make it suitable for radio presentation. A local radio broadcasts the recorded information on a weekly basis. The airtime (15 minutes) costs about TSh. 25,000 per programme.

12.5 Challenges and the way forward

The preceding paragraph shows that research institutes have many possibilities to reach out to the 'other side' and to narrow the gap between research, extension and farmers. Some success can be attained when a combination of different options for dissemination of research outputs is used. However, research institutes could still make more efforts to diversify their services and to better promote the different services they offer. For almost all activities they undertake, scientists should ask themselves how they could collaborate (better) with extension and farmers to enhance the impact of their activities. More training in the management of linkages between research and technology users might be appropriate (ISNAR 1997).

Some stakeholders do not yet clearly see a role for research in technology transfer. This may be the result of the fact that research often can only play an indirect role in technology dissemination (there is only one agricultural scientist per 100,000 inhabitants). Researchers can only facilitate direct dissemination of research outputs to FRG, FEG and FFS, e.g. groups of farmers they work with in the context of on-farm activities. Research institutes should therefore formulate strategies that indicate how their results can reach farmers. This can only be done in close collaboration with all stakeholders. The role of research in technology dissemination can be further improved if the collaboration between ZRC, ZIMO and ZRELO offices is further intensified.

For the actual up-scaling of successful technologies to different categories of end-users, dissemination needs to relate to intermediary organisations such as NGOs and sometimes to national policy and decision-makers. Options to achieve this include many of the options that were reviewed in the previous paragraph (distribution of extension materials, use of mass-media, technology markets, seed fairs, farmer field days, farmer extension groups, farmer field schools).

The training of extension staff is an important service research institutes can provide, especially when subsequent training of trainers takes place and horizontal farmer-to-farmer dissemination strategies are used. Stakeholders' reactions to training services are very positive and the demand for it grows fast if the first experience has been positive.

The major challenge for agricultural technology dissemination is to bridge the research-extension gap and to create an environment that enables scientists to deliver appropriate knowledge, information and technologies, that enables extension to communicate effectively with all segments of the farming community and that enables farmers to adopt innovation and to invest in their enterprises. The specific challenge for agricultural research institutes is to position itself as innovation centres, providing research, training and information services to stakeholders.

In a relatively short time, there has been a radical rethinking of the role of farmers and professionals in agricultural research and extension. The focus of extension changes from teaching to learning, from top-down to participatory bottom-up approaches and from centralised to decentralised decision making. Successful application of participatory technology dissemination techniques requires a radical shift in the role perception, attitudes and working conditions of both scientists and extension staff. This change will of course take time, because most of the public extension service is still 'trapped' in the Training and Visit system.

Innovations have multiple sources. It is widely acknowledged that the majority of farmers get to know about new technologies from neighbours, friends, family members, community-based organisations and from the radio. In addition to the public extension service, NGO's, the private sector and religious organisations are increasingly important. The different objectives and working styles of these organisations complement each other and provide opportunities for improved collaboration. Research institute should pro-actively establish stakeholder networks and work closely together with all these

actors. The use of the RAAKS toolbox to analyse Agricultural Knowledge and Information Systems is recommendable (Engel 1997, Rees et al. 2000).

Recent policy documents (Vision 2025, Poverty reduction strategy, public sector reform, agricultural sector development strategy and plan, Client service charter of MAFS and many others) indicate that a serious rethinking of the Agricultural Technology Development and Dissemination System is now underway. Efforts are now made to bring research, training and extension closer together. At District level, Agricultural Development Plans (DADPs) have been elaborated for the first time this year. These plans may become important entry points for more widespread dissemination of technologies. At the level of MAFS, a client service charter was adopted in November 2002. These are encouraging developments. The improvement of the institutional set-up is more than necessary, because in the actual situation the gap between research, extension and farmers can only be narrowed, not bridged.

The different worlds of research and extension have to be brought together in an institutional set-up that will induce collaboration. Although this institutional challenge is beyond the scope of our paper, we would like to suggest that we do not only need a client-oriented research management approach but also a client-oriented extension management approach! We should therefore strive towards COREMA: Client Oriented Research and Extension Management Approach.

Managing the CORMA change process

Robert O. Kileo, Ninatubu M. Lema, Chira Schouten and Ted Schrader

Guiding principle

‘The implementation of CORMA needs inspiring leaders, flexible managers, appropriate tools and facilitation, as well as the institutionalisation of management practices’

Agricultural research and development institutes face many challenges, which need appropriate institutional and organisational responses. The client oriented research management approach (CORMA) is a comprehensive and practical approach that aims to improve the management of research, networks, resources and outputs. The guidance and implementation of a CORMA change process requires strong and inspiring leadership, as well as flexible and competent managers. This paper reviews tools that were used during the process of organisational change and presents a short overview of policy implications and major challenges for DRD and the zonal institutes.

13.1 Major challenges and the corresponding CORMA management areas

Agricultural research and extension in Tanzania are at a turning point. It is widely acknowledged that the quality of agricultural services has to improve. These services include the supply of inputs (fertilisers, chemicals, seeds and planting materials), rural credit, agricultural produce marketing and of course, agricultural research and extension.

The preceding twelve papers have clearly demonstrated that agricultural research institutes face many challenges - and have many opportunities - to improve the quality of their services. The overall picture that evolves from these contributions is that many things should change (and can change). Not only in the 'traditional' area of research planning, monitoring and evaluation, but also in less conventional areas like the management of human, financial and physical resources and information and communication. This paragraph summarises the major challenges for four areas: the management of research, networks, resources and outputs.

Research management

Agricultural research institutes aim to increase productivity of important crops, trees and livestock without jeopardising the natural resource base or creating more social inequality. The ultimate beneficiaries of research efforts are resource-poor farmers, who operate in a complex agro-ecological and socio-economic environment. Most smallholders and their families are under or just above the poverty line. They often have food security problems and cannot afford to take risks. In addition, prices of agricultural products are low and hardly justify investments. The infrastructure and the quality of agricultural services that are required for agricultural development (rural roads, input supply, extension, rural credit, veterinary services, farmer organisation, marketing) are generally poor. The weakness of the 'enabling environment' therefore complicates the situation. Developing appropriate options for farmers is not an easy job and cannot be accomplished by research alone.

In recognition of this complex situation, DRD adopted the Farming Systems and Participatory Technology Development approaches. In addition, much emphasis has recently been put on product-chain approaches and better land husbandry practices. The need for farmer involvement in the research

process and the delivery of quality research services is stressed in recent policy documents (ASDS, ASDP, MTP and Client service charter). The challenges of appropriate planning, implementation, monitoring and evaluation of a participatory research process is addressed with the fourth CORMA area of improvement (paper 2, 9 and 10).

Management of networks

Researchers cannot work in isolation. Links and partnerships have to be established between research, farmers, extension and other stakeholders to improve the efficiency and effectiveness of research and development activities. Building on the insights gained with FSA and PTD, the issue of networking received more attention in the 1990's. Collaborative work, liaison activities, coalitions and partnerships became 'buzzwords' and are expected to be high on the agenda in the next years to come. In addition, research institutes need sustainable funding. This can only be achieved through the diversification of funding modalities and sources, which requires a pro-active attitude of research institutes. The management of networks is therefore a major challenge for optimising research impact, efficiency and funding. This challenge is taken up in the third CORMA area of improvement (papers 1, 8 and 9).

Management of resources

In Africa - and Tanzania is not an exception - research institutes generally have limited means to carry out their mission. A lot of work has to be done with very few resources. Changes in international trade relations, low prices for basic commodities, structural adjustment programmes, privatisation and the decline of direct donor support have seriously affected the resource base of agricultural research organisations. Financial pressures led to the reduction of staff, less facilitation and training. Many governments are reducing the size and expenditures for agricultural research and extension. This has seriously affected staff morale and working conditions. More than other approaches, CORMA puts a lot of emphasis on human resource management, on good governance and accountability, on information management and on management practices that enhance sustainable access to financial and physical resources (first and second CORMA area; papers 3, 4, 5, 6 and 7).

Management of outputs

Quality output is not only the best promotion for research institutes, it is also a precondition for successful dissemination and uptake of technologies. Currently, national agricultural research organisations (including DRD) are increasingly demanded to show results, impact, favourable cost-benefit ratios and returns on investment. To ensure continued trust and funding of research, managers are likely to need evidence of the adoption of technologies that have had a positive impact on farmers' conditions. The preceding papers (11 and 12), which addressed the fifth CORMA area of improvement, indicated that research can develop different types of client-friendly output that can be more easily taken up by extension and farmers.

13.2 Why CORMA?

What is needed is a comprehensive framework that guides research managers, and that binds people together. An organisation needs a vision and mission that are formulated in operational terms, and a balanced set of options that might bring the organisation to the desired level of performance. Without a comprehensive framework certain activities will be insufficiently linked to others and only lead - at best - to incidental successes. In 2004, the second phase of the Tanzania Agricultural Research Project is coming to an end. Preparations for the planning and funding of the NARS activities for the period 2004-2009 have started (Medium Term Plan). Development partners have regularly indicated that they want to see better results and more impact. Some donors even shifted their attention to other development sectors.

Although CORMA certainly does not have an answer to all questions, the results so far suggest that this approach may help find adequate responses to the many challenges that face the NARS. CORMA addresses agricultural research management: it is basically an approach that focuses on institutional strengthening and organisational development. This refers to a continuous process of improvement of the whole organisation and its performance. CORMA is about 'the way things are done' and aims to enable scientists to do their work better. That's why it not only looks at the management of research but also at the management of networks, resources and outputs. The COR management approach has the following five basic characteristics: **Comprehensiveness**, **Realism**, **Output-** and **performance-orientation**, **Public service delivery** and **Sustainability** or 'CROPS' (cf. Box 13.1 for more details).

Box 13.1 CROPS: the basic characteristics of the COR management approach

Comprehensiveness CORMA addresses different broad management areas. As we saw in paragraph 13.1, these areas cover all challenges. A successful transformation of the research system needs to address all these management areas. Good research conducted by institutes without sound financial management will lose credibility. Without sustainable sources of funding a perfect financial management system does not really make sense. Without good examples of good research and useful output, it is hard to convince development partners to fund research, etc (the list can be extended). That's why CORMA is about stakeholder involvement, client empowerment, participatory technology development and dissemination, quality control mechanisms, the production of leaflets and other extension materials, sustainable funding of internal services, networking, contract research, integrated financial management, training co-ordination and staff motivation packages at the same time!

Realism CORMA is a very practical and flexible approach that asserts that there is no single recipe for change. CORMA works simultaneously on 25 management capacities and proposes a basket of more than 125 practical options ('activities') that could be implemented to improve client orientation. And what is important: it seeks to implement these activities in the context of existing agricultural research structures. CORMA envisages a gradual change process that is 'owned' and implemented by the people working in these organisational structures.

Output and performance orientation CORMA facilitates output-oriented planning and encourages performance-based reward systems. It acknowledges that public or semi-public research centres are accountable to clients and the general public. For this, CORMA is in line with the philosophy of the Public Sector Reform and the Client Service Charter of MAFS.

Public service delivery CORMA focuses on the interests of the Tanzanian population in general and the interests of resource-poor farmers in particular. Poverty reduction is the primary objective of an institutional change process guided by the COR management approach. CORMA explicitly starts with the involvement of stakeholders and their needs. It encourages and enables a research institute to work on rural development priorities. CORMA puts much emphasis on user-friendly output that is actively disseminated to extension services and end-users. This is in line with the major national development policies (Vision 2025, PRSP, ASDS).

Sustainability CORMA facilitates working modalities that can be sustained in the medium and long term. It prefers a gradual change process with small resources to short-term successes. Major emphasis is put on the institutionalisation of national and zonal policies, as well as on sustainable funding of the operational costs of research and support activities.

13.3 Teamwork, leadership and management

Teamwork

Although many opportunities and threats come from outside the NARS, CORMA is based on the assumption that a process of organisational change must take place within the organisation. Up to now, the COR management approach has identified 25 different capacities that need to be strengthened to improve the management of research, networks, resources and outputs. No single person can learn or handle these capacities at the same time. Some people excel in promotion and marketing, while others are more confident with participatory fieldwork or writing attractive output. And yet other persons are needed to guide internal processes related to the management of resources. Managing a CORMA change process therefore needs teamwork and the involvement of all staff.

Leadership

Moreover, research institutes need strong and inspiring leadership, as well as flexible and competent managers to adapt to a continuously changing environment and to satisfy the changing needs of stakeholders. The guiding principles of the twelve preceding papers summarise the mission and policies of research institutes that accept to embark on the road towards improved client-orientation and agricultural research service delivery. The challenges that lie ahead of us ask for leadership that believes that better performance is possible and is prepared to go off the 'beaten tracks' to achieve the goals.

The roots of the term leadership stress the importance of guiding people towards a certain destination. The original meaning of 'lead' is a path or a course of a ship at sea. A leader is a person with the appropriate knowledge and skills to guide a group of people to achieve an objective. The leadership style, the way of guiding people to fulfil their mission, depends on the personal qualities of the leader such as his or her self-knowledge, analytical and communication skills. Good leaders have a sense of direction and the ability to foster teamwork. Great leaders are often humble. They inspire other people and accept them (a good leader can delegate tasks). Being accepted by others is also important for a leader, because he/she must challenge existing routines, inspire a shared vision and encourage others to act accordingly.

Management

The terms 'management' and 'managers' are derived from the Latin word *manus*, meaning 'hand'. Managers have the responsibility to put adopted policies into practice. They focus on the planning, implementation and monitoring of activities that lead to outputs and results. They generally have a shorter time perspective than leaders. For that, they rely on administrative and technical skills and on performing specific tasks. Managers keep an institute going and make sure results are obtained.

Organisations need inspiring leaders as well as capable managers. A leader innovates; a manager puts innovation into practice. A leader asks what and why; a manager asks how and when. A leader does the right things and a manager does things right.

13.4 Phases of the CORMA change process

Three phases

The CORMA change process consists of three important phases: (1) recognising the need for change, (2) deciding what to do and (3) implementing and achieving change. For this third phase, three different stages may be distinguished: (a) getting prepared for COR, (b) defining an institutional policy and (c) implementation and quality control.

1. Recognise the need for change

A change process begins with awareness among management and staff that the research organisation may have to change. This can be the result of internal and external signs that change is necessary (Box 13.2.) and/or the adoption of new policies at higher levels. In this context, the adoption of national rural development and agricultural policies and the MAFS Client Service Charter in November 2002 may have a very high 'facilitating value'. They create urgency for change and implementation. Knowledge about what the different stakeholders expect from the organisation may also lead to the recognition that change is needed. Although internal and external stakeholders can press for change, this pressure alone doesn't make change happen. Leaders have to translate this pressure into an internal sense of urgency for change.

Box 13.2 Possible internal and external signs that change may be necessary

(adapted from Huntington Hobbs, 1999)

Internal signs for change:

- Declining budgets
- Loss of qualified staff
- Poor staff morale and low commitment to work
- Centralisation of human resource management decisions
- Up-country research stations with insufficient staff and facilities
- Poorly maintained facilities
- Poor record keeping
- Poorly maintained facilities
- Untimely changes in leadership
- Bias towards jobs that provide incentives like per diems and others

External signs:

- Low adoption of research recommendations
- Demands for better service delivery
- A poor or declining reputation
- Rise of competitors
- Decline of support to agricultural research and / or donors setting stringent conditions for their support

New circumstances that induce the need for change:

- Reduction of size of and expenditure of governments and increasing privatisation
- Trade liberalisation
- Globalisation of research
- New research and communication technologies

2. Plan for change: deciding what to do

After recognising the need for change the NARO or the agricultural research centre must decide what to do. What are the objectives and goals of the organisation or institute? Which management areas need (most) attention, which capacities have to be strengthened and which activities should be undertaken?

3. Implement and achieve change

To achieve change, organisational structures and cultures generally need to be adapted and fears and concerns of staff and stakeholders are to be anticipated. New policies and new responsibilities have to be prepared, discussed and adopted. During the implementation phase, situations of conflict and/or misunderstanding will arise and have to be addressed. To keep things going, good results have to be celebrated to indicate that the change process is continuing and important milestones are achieved. In this respect it is advised to follow a sequence in the implementation of a CORMA change process.

Get prepared for COR

An institute has to get ready for client-oriented research. A number of conditions must be met before a client oriented research policy can be successfully developed and implemented. These conditions include the subjects that were presented in the first three papers: getting to know each other, research information needs assessment, targeting, and adapting staff competence to stakeholder needs. These preparations provide information to the research policy makers and individual scientists for rational re-orientation, while future clients are sensitised about the new research policy (DRD/KIT 2000). Of course, promotion activities, stakeholder needs assessment, targeting and training are on-going activities. However, at least some preparations have to be done before other activities can be considered.

Develop an institutional policy

An institutional policy defines the objectives and mandate of the research institute, its approach, available services, modalities of collaboration and funding. These policy issues affect stakeholders and should therefore be discussed with them in order to define a policy that is acceptable to future clients (DRD/KIT 2000). In addition, an institutional policy defines internal management modalities, which generally address the management of resources (human, financial, physical and information). It is important to acknowledge that an institutional policy is never perfect at once. As experience grows new specific policies will be formulated and others will need to be adapted.

Implementation and quality control

During the implementation of institutional research policies, increasing attention is given to the actual improvement of the performance of the organisation by conducting activities from the CORMA basket of options. At this stage, writing winning proposals, diversification of funding, implementation of innovative research projects, production of different forms of output takes place. Results obtained will affect (positive or negative) how stakeholders perceive the institute. It will also affect the formulation of new requests and the opportunities to get funds. The evaluation of achievements and constraints will lead to the updating of policies.

CORMA facilitation tools

The COR Management Approach can be applied at different levels within a research system: national, zonal, sub-station and programme or department level. In the past five years, the Lake, Northern and Other Zones have undergone institutional changes that were facilitated by the CORMA approach. Table 13.2 illustrates these three phases of organisational change and some of the corresponding CORMA facilitation tools.

Table 13.2 Stages of organisational change and relation to CORMA facilitation tools

Stages	Some selected tools to facilitate the different stages
Recognising the need for change	<ul style="list-style-type: none"> ▪ Self-assessment of current degree of client orientation ▪ Stakeholder assessment
Planning for change: deciding what to do	<ul style="list-style-type: none"> ▪ Prioritisation of CORMA areas and selection of management capacities ▪ Development of COR action plan
Implementing and achieving change	<p>Get prepared for client oriented research</p> <ul style="list-style-type: none"> ▪ Analysis of available research services and public relations strategy ▪ Inventory of stakeholders and research and information needs assessment ▪ Analysis of AE and SE realities and targeting of research ▪ Training needs assessment <p>Develop an institutional policy</p> <ul style="list-style-type: none"> ▪ Financial sustainability analysis and preparation of sustainable funding initiatives ▪ Strategic research planning ▪ Institutional policy formulation ▪ Donor inventory and networking <p>Implementation and quality control</p> <ul style="list-style-type: none"> ▪ Adapting organisational structure and culture ▪ Quality control, monitoring and evaluation ▪ Evaluation of stakeholder satisfaction ▪ Staff evaluation, performance-based incentives and value for money audit

Preparing, implementing and readapting the CORMA change process is an on-going management task, as illustrated in Figure 13.2 below. Although the sequence of planning, implementation, monitoring and evaluation is presented in a logical cyclical order, this sequence can be slightly modified when necessary and not all tools need to be used. However, a systematic approach is preferred over partial application of tools and sequences. The same applies for the choice of management areas and capacities. Some institutes may embark on a fairly comprehensive journey towards client orientation that includes all major management areas, whereas others may start first by applying only a few tools and activities. The motivation and availability of staff as well as the availability of resources are of course important factors in this respect.

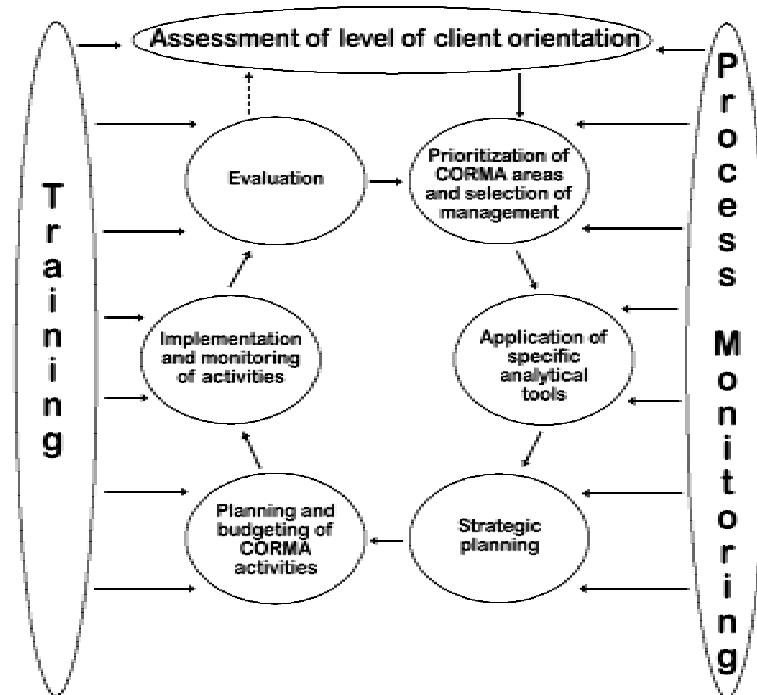


Figure 13.2 Recurrent steps to strengthen client oriented research management capacities

13.5 Assessment of level of client orientation

The COR management approach uses two tools for the assessment of the level of client orientation: an internal or self-assessment tool and an external stakeholder assessment.

Self -assessment of current level of client orientation

An internal assessment is a very useful tool to get the CORMA change process started. Apart from learning more about the COR management approach, the self-assessment has the following objectives:

- To get the views of staff on the current level of client orientation (scoring exercise);
- To make an inventory and to analyse available human, financial and physical resources;
- To assess the strengths and weaknesses of the institute, and opportunities and threats of the external environment (SWOT analysis).

Scoring exercise

COR facilitators guide the process of self-assessment. The first step is the scoring of the CORMA areas and management capacities. Research managers, scientists, field officers and support staff are asked to assess their own institute using a questionnaire with 72 questions which cover the five management areas and all specific management capacities. The COR facilitators process the data from the questionnaires, calculate the average score per management capacity (in %), record minimum and maximum scores and analyse scoring ranges and standard deviation. The facilitators then present the results and a plenary discussion follows to ensure that a common understanding is arrived at.

The scoring exercise does of course not provide an objective assessment of the level of client orientation of an institute. It just shows how an institute perceives itself. During the different CORMA self-assessments we observed that management and staff may not be sufficiently aware of the need for change or are comfortable doing what they have always done. Others never worked in an organisation where performance was better, and are unaware of any shortcomings. Some may not be aware that

their institute faces serious challenges, while others may be aware of the problems but are not in a position or do not know how to deal with them. Isolated institutes may therefore score themselves higher than institutes that are more exposed to innovations, even if the performance of the first institute is obviously less. A study tour to other institutes may be appropriate in such cases.

In practice, the scores for the level of client orientation proved to be somewhere between 15 and 95%, with most scores oscillating around 50%. The interpretation of these scores is roughly as follows:

10	20	30	40	50	60	70	80	90	100
<i>Low or very low score, disapproval with existing situation, clear perception of need for change</i>				<i>Intermediate level, need for change may not be perceived</i>				<i>Very high score; no clear reason for change</i>	

The scoring exercise does not give absolute indications that change is needed. The opinion and motivation of the people within the organisation are more important than the percentages.

In most zones staff scored the area of research planning, monitoring and evaluation the highest. Lowest scores were mostly given to areas of internal management: human resource management and financial management (see Table 13.3).

Table 13.3 Scores for level of client orientation per management area in six zones

CORMA area	Lake	Northern	Western	Southern	Central	S. Highlands
Human resource management	56	41	41	50	49	33
Financial management	55	39	47	63	50	43
Linkages and collaboration	72	54	49	62	56	54
Research	81	65	56	67	61	60
Output production	69	49	47	57	47	33

Inventory of human, financial and physical resources

During the self-assessment, the team of facilitators also collects secondary data on human and financial resources, facilities and other assets. The actual number of staff members available and the actual state of facilities and assets are reviewed to realistically assess their availability. The facilitators present this analysis of resources, facilities and assets during a plenary meeting for discussion with staff members. The institutes that participated in the self-assessment generally appreciated the effort to establish an overview of human resources and assets. Figure 13.4 gives an example of the gap between staff that is officially allocated to WZARDI and the number of staff that is actually available (the other staff members are pursuing further studies or are on secondment). Figure 13.5 gives an example of computers procured by funding agencies in the Southern Zone.

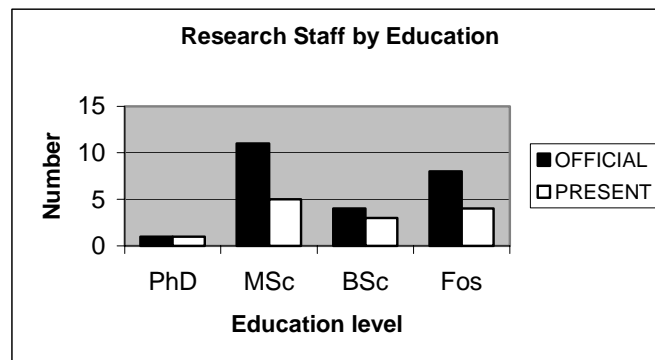


Figure 13.4 Actual and official research staff of Western Zone

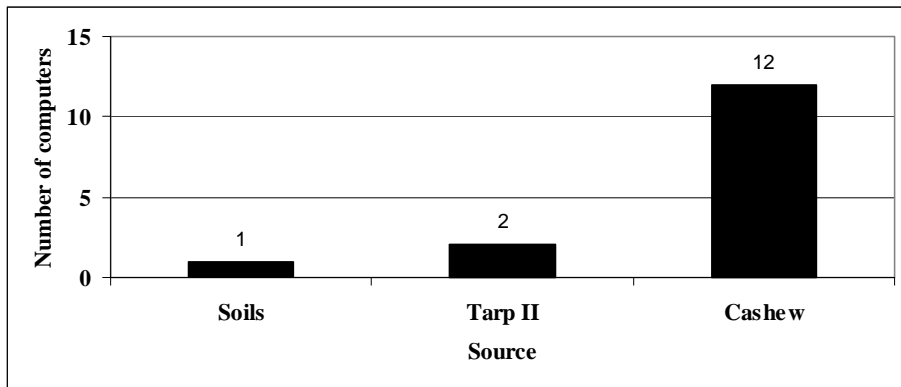


Figure 13.5 Number of computers at ARI-Naliendele by source

SWOT analysis

A SWOT analysis complements the scoring exercise and the assessment of available resources. Five sub-groups discuss the strengths and weaknesses of the institute with respect to a particular management area, as well as the opportunities and threats in the external environment. Every sub-group presents the results of her analysis in a plenary session. The SWOT is a more dynamic tool than the questionnaire. It allows for further discussion and guides participants towards the identification of priorities and potential improvements. It also helps facilitators to assess what aspects of CORMA are misunderstood.

Generally, the self-assessment exercise proved a very good starting point for the planning of a CORMA change process. It created understanding and an improved perception of the need for change. A studytour to other institutes could be a useful complementary tool that would improve the level of understanding and facilitate the identification of CORMA activities.

Stakeholder analysis

The objective of a stakeholder assessment is to get the perception of stakeholders on what needs to be improved. It is important that stakeholders are categorised in sub-groups, for instance smallholders and large farmers, districts, NGO's, traders, processors etc. To ensure that non-biased views are gathered, independent persons should preferably conduct interviews with stakeholders. Institute staff could also conduct the interviews but in that case appropriate instructions need to be provided (KIT/DRD/IER 2002: 23).

13.6 Planning for change

Prioritisation of areas and management capacities

The self-assessment and stakeholder assessment, provide a clear picture about the level of client orientation of the institute. The self-assessments conducted in six zones show that zonal research institutes have many characteristics in common but are never identical. Although all institutes are client-oriented to some degree, they have many opportunities to improve the situation. The combination of scores for the areas differs from one institute to another. As a result, the priority given to different areas, management capacities and activities differs as well.

The assessment of available resources and the SWOT analysis almost 'automatically' leads to actions that should be undertaken to improve different management areas. This leads to the identification of priority management capacities to work on. The first priorities that are generally identified are:

- Practical problems such as those related to infrastructure and equipment;

- Activities that are relatively easy to implement, e.g. production of business cards, flyers and extension materials
- Improvement of working modalities to solve certain obvious organisational problems.

The change of organisational structures and working methods usually gets less attention at this preliminary planning stage.

Developing CORMA action plans

In the past five years, both the Lake and Northern Zones gained experience with the elaboration of annual work plans. Since 2001, the work plans are structured according to the five CORMA areas. The work plans for 2002-2003 are good examples (NZARDI 2002, LZARDI 2002). For this budget year, the planning of activities was a participatory process, involving all departments and all staff. Every CORMA activity was elaborated on a planning sheet that presents a review of the preceding year, the justification, objectives and expected output of the activity. For every activity the responsible officer, the management area, the management capacity, the activity number and the budget code are indicated. The work plan and budget indicate the time frame for implementation and the detailed budget that includes all costs related to the activity (see Table 13.4 for an example).

In Table 13.4, activity 315 means the fifth activity of the first management capacity of area 3. The activity planning and detailed budget allows for close monitoring of activities. The indication of objectives and expected output are preconditions for staff performance and output-related incentives.

All activity proposals are reviewed in staff meetings. This can be considered an Internal COR Programme Review (ICPR). Experience has taught us that it takes time to arrive at good quality planning. Especially the elaboration of the justification, objectives and expected output of an activity needs training and experience. The elaboration of budgets gave less problems; the direct costing method was quickly understood. Explicit management support is needed to make the planning process a success.

Table 13.4 Example of activity planning sheet

Management Area: LINKAGES AND COLLABORATION		Management Capacity: Maintain effective public relations	Activity number: 315			
Research Institute: Ukiriguru and Maruku ARDI		Responsible Officer: ZIMO	Budget code: 5305			
Review 2001/02 and justification: Calendars and seasonal greetings were produced in the year 2001/02 and distributed to partners and stakeholders. The 12 page colour calendar and the greeting card signed by the Director were much appreciated. This season 2002/03, at least 250 calendars and new year greeting cards will be produced, with at least 75 copies for Maruku ARDI. The calendars and greeting cards will be sent together. This will reduce costs. Instead of 12 pages, a four-page calendar (one page per quarter) is planned.		Objectives: ▪ To improve public relations of the Institute.	Expected output: • A minimum of 250 calendars and seasonal greeting cards be produced and distributed before December 15 th 2002			
<i>Activity Planning</i>		<i>Budget</i>				
Month	No	Items	Quantity	Unit price	Tsh	
Oct	1	Designing of calendar and new year greeting card (in combination with editing newsletter)	Design fee Transport	2 120 km	15,000 450	30,000 54,000
Nov	2	Printing of calendar and new year's greeting card	Calendar & greeting card	250	2,000	500,000
Nov	3	Postage	Postage Envelopes	180 180	250 100	45,000 18,000

13.7 Implementing and achieving change: review and lessons learned

Getting prepared for COR

Both in the Lake and Northern Zone, client oriented research activities started in 1998. The evolution of the two sub-programmes was quite different.

In the Lake Zone, the COR programme succeeded the FSR project (1989-1997). Some CORMA principles were already applied in the FSR period, whereas some FSR project habits such as the strong focus on research activities continued for some time under COR. Gradually, the attention for the management of resources, networks and outputs increased. Existing responsibilities (such as ZIMO, ZRELO, accounts office and others) were used to develop activities in these management areas. Since the Dutch funded COR programme was responsible for all TARP-II support to the Lake Zone and funds are directly channelled to Mwanza, there were no practical limitations to facilitate a broad wide-ranging CORMA change process. Many activities in all management areas were implemented at the same time.

In this sense there was no specific stage of 'getting prepared for COR'. This may be regretted in the sense that the many activities, which were conducted at the same time, went beyond the implementation and monitoring capacity of the zone. The advantage of this approach was that most staff was somehow involved in the CORMA change process, if only in one or two of the management areas. The co-ordination of activities improved later when COR work plans were structured according to the five management areas and detailed activity sheets and budgets were in place.

In the Northern Zone, the COR Programme was new and started with a general introduction to NZARDI staff. The preparation phase for client oriented research in the Northern Zone was facilitated by a COR promotion team, which was composed of 10 graduate and support staff with various disciplinary backgrounds and chaired by the ZRC. A steering committee supervised the implementation of client-oriented activities, and paid special attention to sustainability of the activities in the institute. The steering committee was chaired by the ZDRD.

The promotion team focused on: development and dissemination of a farming systems zonation map, improvement of public relations with stakeholders, elaboration of stakeholder inventory and identification of the services needed, the establishment of an inventory of available information and recommendations and some training of research staff related to demand-driven research (DRD/KIT 2000: 15). The focus on a limited number of activities led to quick achievements. The five activities mentioned were completed in 1999. However, NZARDI staff initially perceived the COR facilitation programme as another research project. There were misunderstandings between those involved and those excluded. It took some time for all research staff to realise that COR is a management approach that concerns them all (DRD/KIT 2000: 16).

These two experiences show that there are different ways to get started. The Lake Zone approach covered most CORMA areas from the beginning. This approach included most staff but was probably too ambitious to be properly absorbed and had implementation and monitoring problems. The Northern Zone approach was based on a relatively small promotion team that focussed on fewer activities. This approach was more efficient but led to feelings of exclusion from staff.

The availability of funds largely explains why the two zones opted for different approaches. The Lake Zone had secure funding directly from the Netherlands for all TARP-I activities (training, investments, operational costs). The Northern Zone had a very limited budget that was largely for CORMA facilitation. However, money is not always the best advisor in issues of management and organisation, especially not when financial and institutional sustainability are not sufficiently taken into account. Analysing the Lake and Northern Zone cases, we may conclude that a combination of the two approaches is the best option. The COR promotion team can consist of key members of the zonal

management team. We suggest that the ZRC, ZIMO, ZRELO and the accountant are at least members of this team. Zonal management has to ensure that the different departments of the institute feel involved and are well informed about the process. The planning of the initial activities should be rational and realistic and lead to immediate success. A focus on a limited number of key issues is probably a wise decision. If different offices are represented in the COR promotion team, this means that several activities from different areas can be implemented simultaneously.

Developing institutional policies

After completing their first activities, the NZ COR promotion team organised a workshop with stakeholders to discuss and formulate an institutional research policy. This resulted in the NZ institutional policy, which was approved by ZEC and DRD. The policy indicates the objectives of research, targets systems, groups and clients, defines modalities to enhance stakeholder involvement, defines available services and fees and elaborates on quality control mechanisms. The policy paper is a coherent document that was also distributed to stakeholders. It was elaborated in a short time and concentrates on CORMA areas 3, 4 and 5. Internal management issues are not covered much yet.

The Lake Zone did not elaborate an official zonal policy paper. The Zone followed an approach whereby policies were progressively elaborated and discussed. For many subjects specific committees were appointed that would prepare discussion papers. Examples are the work on financial sustainability analysis, strategic planning, review forms and procedures and other subjects.

Also with the development of institutional policies we observe major differences between the two zones. The Northern Zone worked systematically and produced quick results. Paradoxically, the feeling of ownership and the actual application of the zonal policy is not yet optimal. The Lake Zone had many meetings and adopted certain policies that are separately discussed in ZEC and submitted to DRD. Again we think that the best practice may be a combination of both approaches. Although it is more time-consuming, policies need to be grounded and based on internal processes of discussion and decision-making. Policies that affect stakeholders should also be discussed with them. However, after some time it is essential to put the policies of the institute together in a zonal policy paper.

Implementation and quality control

Management structure and responsibilities of offices

Traditionally CORMA area 4 is best covered in the organisational structure. The Zonal Research Co-ordinator and four Heads of Programme co-ordinate research activities. Recently, other offices have been institutionalised. The Zonal Information Management Office (ZIMO) links very well to CORMA area 5, e.g. output production and information management. The Zonal Research Extension Liaison Officer (ZRELO) matches quite well with the area of Linkages and Collaboration (Area 3). Considering the importance of Human Resource Management (Area 1), both the Lake and Northern Zone institutes nominated Training Co-ordinators (TC). The account office under the guidance of the office of ZDRD/OiC addresses issues on financial management (Area 2). For the appropriate management of service units, the institutes also appointed Service Unit Co-ordinators (SUC).

Table 13.5 summarises the way the CORMA areas are linked to formal offices and to specific functions that were informally established in the Lake and Northern Zone. According to our experience, it is of utmost importance that the five management areas are reflected in the organisational structure. A major challenge is to further analyse the situation and to come up with a set-up whereby the conceptual framework and the organisational structure match better. Another challenge is to raise the status of certain support functions.

Table 13.5 Responsible offices in relation to CORMA areas of improvement

CORMA area of improvement	Responsible offices
1. Human Resource Management	Training Co-ordinator
2. Financial management	Accounts, SUC, supplies office
3. Linkage and Collaboration	ZRELO
4. Research planning, Monitoring and Evaluation	ZRC assisted by Head of Programmes (HOPs)
5. Output production and information management	ZIMO

Quality control, monitoring and evaluation

The COR management approach gives high priority to continuous quality improvement. Without quality research there will be no impact, nor many well-paid assignments. For many activities CORMA has developed quality control mechanisms (research proposal screening, pre-IPR, adoptability analysis, review of reports and extension materials, field testing, etc.). CORMA also gives a lot of attention to reporting and debriefing that can be seen as a form of 'customer care'. A major challenge is to arrive at more harmonisation of quality control and reporting practices within DRD.

Evaluation of stakeholder satisfaction

Ultimately, it is the satisfaction of stakeholders that counts most in the evaluation of the performance of research institutes. Client satisfaction will certainly become a more important factor than it has been in the past. Only the Northern Zone has some experience with explicitly evaluating stakeholder satisfaction. This subject needs more attention in the future.

Staff evaluation, performance-based incentives and value-for-money audit

Some papers elaborated on these subjects and the experiences obtained in the Zones. Here we just want to reiterate that output- and performance related evaluations are of crucial and growing importance.

13.8 Conditions for successful change

Experiences from many different countries suggest that guiding national agricultural research organisations through a process of change is complicated and needs careful and flexible management as well as strong and inspiring leadership. The following conditions for success apply:

- *Sufficient time:* Change takes time and has to go through a series of phases that build on each other. ISNAR has the experience that it generally takes one year to plan a fairly comprehensive change process. Another year is needed to begin making the changes and a third year to consolidate the changes and to begin to see improvements in performance. By the fourth year, there should be evident improvements in performance (Huntington Hobbs 1999: 2).
- *Commitment:* Change needs commitment from top and senior managers. If they do not explicitly and openly support the proposed changes, then the results are usually poor.
- *Internal communication:* Change can be disruptive and create tensions that have to be detected and addressed as soon as possible. Internal communication and rewarding success are important in this context.
- *Gradual process:* To avoid staffing and training problems, change should be "as much as necessary and as little as possible". A gradual process of change is preferred over a management revolution.
- *Continuity:* A process of change should not be disrupted after the diagnostic and planning phases, but should become a 'real' event. Only talking is not enough. The worst thing that can happen is the creation of awareness of the need for change that is not translated in practical activities. This not only brings the process to a halt, it will also frustrate new initiatives in the future, because staff loses confidence in the sincerity of their leaders.

- *Flexibility:* Change often has unintended consequences. Planning change may be the easiest part of the change process. Problems generally arise during the implementation phase when written intentions become reality and money is spent. Internal and external stakeholders can react in unexpected ways that will affect the final outcome of the change process (positively or negatively).

The experiences the COR Programme gained in five years are very much in line with and confirm these general guidelines for managing change. In combination with the different lessons learned presented in the 12 papers and the preceding paragraphs, the biggest challenge is the capacity of the DRD management to envisage and guide a comprehensive process of change that will bring agricultural research, training and dissemination towards new horizons, higher levels of performance and improved service delivery to stakeholders.

An oriental wisdom says:

"You cannot discover new oceans unless you have the courage to lose sight of the shore".

In our case, the new ocean is improved client orientation and research service delivery. The shore consists of the actual working methods and habits. However, before leaving the shore, it is essential that leaders foster a common understanding of what is expected from different actors. We hope that this seminar has given you a better understanding of the Client Oriented Research Management Approach and the challenges that lie ahead of us. We also hope that you are at least partially convinced that this approach provides a framework for guiding the future.

1. Introduction

The National Client-Oriented Research Workshop, held in Moshi from 27 May till 28 May 2003 was attended by 110 participants from all seven agricultural research zones of Tanzania. Participants were from the Zonal and National levels of the Department of Research and Development, as well as from private research (tea and coffee), agricultural extension, private sector, NGOs, farmer associations and donors.

Paper presentations were followed by a discussion of 20-25 minutes. In some cases the discussion for papers addressing the same CORMA management area was combined. Questions raised were recorded and passed on to the authors for a written answer. Participants were encouraged to record questions that could not be raised in the plenary due to time constraints, as well as main conclusions and recommendations for each paper (see Recommendations). To focus participants input, each recorded best practices in the paper presented, concerns or obstacles for implementation and recommendations. Facilitators noted major issues raised in the discussions for the final plenary session. Both at the start of the second day and the afternoon session on the second day, facilitators summarised participants' feedback. At the end of the workshop participants completed the workshop evaluation form.

The following paragraphs summarise the plenary discussions and participants' individual feedback according to the five CORMA management areas. The plenary session at the end of the workshop is summarised separately.

2. Human resource management

Training co-ordination: towards a learning organisation (Paper 3)

Managing staff to enhance flexibility, communication and motivation (Paper 4)

Best practices

Participants concluded that the concept of a learning organisation rather than individual learning is a sound one. Important elements in this approach are the appointment of a training co-ordinator in the ZARDIs, responsible for the elaboration of a training needs assessment of all staff (researchers, support staff and management) based on the strategic plan. Human resources are the main assets of a ZARDI and it is therefore good practice to have a proper database with CVs for all staff, job descriptions and regular seminars to exchange knowledge.

Discussion

Many of the observations focused on the need for proper and transparent training needs assessment at zonal level. There should be due attention for PhD/MSc/BSc ratio, as well as for post-graduate training and short courses for all staff categories. Communication between researchers is essential in order to become a learning organisation. This can be through monthly seminars and national disciplinary meetings, which are not taking place. Participants expressed a major concern in relation to training incentives (higher salary or other incentives after training) and co-ordination between national and zonal levels. Others argued that staff performance after having had training should be assessed and remunerated. Training programmes should be more transparent. At present they favour senior staff. On the other hand, there is no need for different salary scales for same quality staff. Performance-based incentive schemes are essential for staff motivation and lead to improved outputs of researchers (benefiting the client) and support staff (benefiting research). Incentives are important to retain staff, but concern exists in relation to the sustainability of incentive schemes.

3. Financial management

Accountability: transparent use of financial and physical resources (Paper 6)

Sustainable functioning of the institute and internal service delivery (Paper 7)

Best practices

Participants underlined the need for institutionalising an Integrated Financial Management and Accounting System (IFMAS) as implemented in the Lake Zone, in all zones. Many highlighted the establishment of sustainable service units within ZARDIs and more commercially oriented institutes. The drive for financial sustainability was widely supported.

Discussion

Participants supported the use of IFMAS, but expressed concern over the fact that different zones use different software packages for IFMAS (e.g. FINPRO/TAMPRO, EPICOR, DacEasy, Excel etc.). Different software packages however do the same trick and can be linked. Even Excel works but will not generate donor-specific reports and has a low level of security and internal control. A point of concern remains the absence of coherent government policies in relation to the use of software (and support). The Self-Help Fund (SHF) is the result of a balance between the GoTs responsibility for funding research and the ZARDIs own responsibility. In the discussion it was stressed that ZARDIs will never be able to rely on SHFs (i.e. subject to auditing by the CAG) and that some zones are even in a less favourable position. The challenge remains to sell research outputs for the generation of contributions to the SHF. Participants also expressed concern on the drive for fund acquisition, which may leave researchers with little time for addressing small-scale farmers problems. The efficiency improvement of the service units should not have negative consequences for service delivery to researchers, after all not all cost reduction leads to improved research efficiency (example of staff retrenchment provided).

4. Linkages and collaboration

Researchers and clients: Getting to know each other (better) (Paper 1)

Networking and funding diversification (Paper 8)

Best practices

A general consensus emerged on the importance of a public relation policy for the Zonal Agricultural Research and Development Institutes (ZARDIs). Participants particularly highlighted the importance of stakeholder inventories and meetings. The emphasis given to this in the Lake Zone (LZ) and Northern Zones (NZ) led to a better reputation, which was translated in an impressive number of research contracts and other forms of agreements with clients. The use of different financial funding modalities (core funding, Cess, contracts, collaborative, ZARF) will enhance the sustainability of the ZARDI.

Discussion

Misunderstandings on the scope of the workshop (organisational change rather than research impact) as well as focus (experiences from NZ and LZ as 'end-of-project' results rather than a national presentation) were ironed out. Interventions should focus on the need to create client 'ownership' over their ZARDIs, which will require a good deal of client capacity building. Researchers who are part-time RELOs (not to be confused with the Regional Agricultural Advisors, RAAs) and District and FRG co-ordinators assist the ZRELOs in the Lake and Northern Zone. Participants widely expressed their concern about the sustainability of the public relations campaign in LZ and NZ and would like to see a quantification of the effects of the PR policy. Others were not clear about the roles in this for research and extension: "*Is extension not mandated to link research with other stakeholders and clients?*". The public relations programme can become sustainable by adapting the options used to the

resources available in a creative manner. Although research has to open up to all clients (both commercial and subsistence farmers) the DRD mandate stipulates that public research should mainly focus on the needs of small-scale farmers. Client satisfaction assessments are recommended to be part of the PR programme.

The closer relation with clients in terms of research funding is considered impressive. All service unit costs are included in research budgets, but some capital investments by the Government are not included (e.g. national overhead, training, staff salaries, investment in buildings). The drive towards financial sustainability through research contracts (e.g. with Districts, seed companies, NGOs, large scale producers etc.) has not yet led to financial independence of LZ and NZ from GOT/TARP II funds. In a next phase, donors are expected to fund research through basket funding (sub-sector wide approach), this is also to compensate for the concern that donors tend to fund quick impact research and that basic research is left behind. Although some argue that ZARDIs need co-ordination units, it is generally accepted that it is up to the Zonal Director to decide what he/she requires in terms of internal support. Research priority setting through contract research could lead to the leaving out of some stakeholders (e.g. resource poor farmers) or some important themes (e.g. livestock management issues), although these are particularly addressed by the ZARF.

5. Research planning, monitoring and evaluation

Agricultural research targeting and needs assessment (Paper 2)

Proposal writing in partnership (Paper 9)

Stakeholder participation and close monitoring for quality research (Paper 10)

Best practices

Research targeting is essential in order to balance the limited resources with the vast zonal mandates (cf. Lake Zone with 4 regions and 1.5 million households in twenty districts). Targeting is also important for needs assessment of the main mandate target group: small-scale farmers. Proper targeting in relation to small-scale farmers is essential in order to allow for up scaling of the use of the technologies developed. Development of quality proposals on the basis of documented client requests and with stakeholder participation is the way forward. The enhancement of farmer ownership over research through participation as e.g. in the Lake Zone and as implemented by the tea research institute (“farmers can sack the researchers if they do not perform”) is encouraging.

Discussion

Participants expressed some reservations about research priorities set on the basis of a need assessment with farmers and their representatives (e.g. FRGs and District Councils). A danger exists that research priorities will be too production oriented and will not include market issues and basic research priorities will not emerge. Concern equally exists about the sustainability of the needs assessment if it is mainly done by research, while the role of extension is not clear. Targeting is confusing to some, as it appears to contradict client-orientation. Geographical targeting and client (farmer category) targeting is often difficult due to the lack of reliable statistical data. Although the first paper was mainly on how to make the research centre known by the clients and the second paper on how the research centre gets to know what clients want, there is some overlap. More attention is suggested for the development of a capacity with clients to approach research, rather than the other way around. Farmers have started approaching research (e.g. on soil fertility, improved varieties and agro-processing) either directly or through district councils. Some client requests have been received on support for programme development and proposal writing. Some argue that development of a good proposal also needs a good idea (based on client request), access to Internet to get the necessary background data as well as funds for proposal preparation.

Monitoring and evaluation of research programmes has continued to be the mandate of national lead scientists. This has not been implemented due to lack of funds. At the local level farmers have been involved in the whole technology development process (priorities, implementation, debriefing) as well as extension officer (supervising trials, taking data, liaising with FRG and FEG etc.) and the district (planning, contracts and M&E).

6. Output production, dissemination and information management

Information management: from old habits to new technologies (Paper 5)

Output production: making research results available and accessible (Paper 11)

Dissemination: narrowing the gap between research, extension and farmers (Paper 12)

Best practices

The different options presented in terms of access to information through a VSAT (Satellite Dish)-based Internet connection are considered a must for all zones. This and essential proposal writing skills will lead to timely quality proposals, which will attract funding. The variety of technology transfer mechanisms was appreciated, as well as the created supporting functions of Regional and District Liaison Officers.

Discussion

Internet access through the VSAT is expensive. Some argue this can be made sustainable through Internet café constructions, others argue that researchers should have free access. It is stressed that Information and Communication Technology (ICT) will contribute to the Agricultural Knowledge and Information System (AKIS), to which farmers knowledge is equally contributing. Output production of research is hampered by excessively rigid regulations for the release of extension messages. The procedures are also complicated due the fact that extension and research are in different worlds (culturally) and different ministries. Consequently it would not be a bad idea to merge research and extension to some extent and develop a Client-Oriented Research and Extension Management Approach (COREMA). The relation between research and extension through contracts with district councils could become problematic, if contract fees prove not to be sustainable nor the (part-time) functions of RELO and DLO. The gap also results in cumbersome impact assessments (tea research has merged research and extension and has one output to be assessed).

7. Managing the CORMA change process

As indicated in the Agricultural Sector Development Programme organisational change is required in the agricultural service sector due to globalisation (WTO, liberalisation etc.). CORMA offers a framework for change in all seven ZARDIs, although best practices have to be extracted from all the LZ and NZ experiences presented. In order to get this change process moving, participants the following conditions have to be met: political and financial commitment for change at all levels, by policy makers, DRD management and ZARDI management as well as researchers themselves, but also by the other stakeholders. A change process will require adequate resources (financial and human) for DRD, while research funds should also be made available to the District Councils. Only this two-way support will create the necessary enabling environment. Participants argue that change is to be facilitated by a neutral, external change manager at ZARDI level. A change agent (national or international) is to be employed by the ZARDIs (on own funds, ARF or donor supported) and should emphasise a gradual process in which all researchers and other stakeholders remain on board. The resources available for organisational change process will determine the speed of the process.

8. Summary of plenary discussion

Sustainability of CORMA

A process of organisational change aimed at greater sustainability of client-oriented research services of the ZARDIs requires resources. If well managed, the required external resources will decline over time. In the Lake Zone and Northern Zone the change process has not yet been completed. Total GoT/TARPII (including all donors) funding for research in the Lake and Northern Zones is not very different from other zones. What has been different is the disbursement (no time or quantity gap between allocation and disbursement) and the allocation (more for organisational change, less for research since paid by clients).

A lean form of the CORMA organisational change process with emphasis on efficiency, cost-recovery, diversification can always be implemented. Special attention is needed for research paid by clients and others ('there are thousands of donors out there'), and an emphasis on performance based assessment (as foreseen under the Civil Service Reform Programme). Research planning can be made much more cost-effective by tapping in on the mainstream planning system of the Local Government Reform Programme and by using information in existing Village and District Development Plans. Well-trained, pro-active (towards clients) and motivated staff remains a condition for such a process.

Marketing issues

The renewed emphasis in the ASDP on commercialisation and the product-chain approach (PCA) featured prominently in the discussion. However, the present research establishment is relatively short in qualified marketing and agro-processing staff. This can be solved by operating in multidisciplinary teams with NGOs, the private sector and the Local Government (several examples were provided), and by adaptation of research approaches. For example, researchers should pay more attention to value addition of produce, agro-processing and post-harvest technologies (e.g. cassava flour now in supermarkets) in close collaboration with clients (farmers and the private entrepreneurs). Special attention should be given to skill development for working with a Product Chain Approach (e.g. training and general implementation of cost benefit analysis, sensitivity analysis, consumption niches, input/output relations, profitability and feasibility studies, rapid market analysis, etc.). Extension should play a role in supporting marketing information systems and capacity building for producer organisations that can demand research services.

Output/impact

Many participants would have liked to see more information on the impact of research in the Lake and Northern Zones on rural poverty reduction. Although outputs of the organisational change process (main topic of the workshop) were presented, little (quantified) information was available on the client satisfaction of this process. A process, which led to increased information output of the respective ZARDIs (leaflets, posters, technology reference guides, etc.). Others argued that the impact can be measured only after some time and only after considering the whole technology development and dissemination chain (from basic research to village extension). The M&E information, collected in the LZ and NZ could be used for impact assessment at a later date. These observations led some to the conclusion that there is need for a concerted Client-Oriented Research and Extension Management Approach (COREMA), while others emphasised the need to bring research and extension closer (in one Ministry or even a merger). The general feeling was however that district extension would have to remain with local government, while a merger at higher level is an option but no guarantee for success ('there is no success formula for an adequate organisational structure'). Considering the importance of capacity building and the increasing demand for training services (also for the ZARDIs) it was even suggested that training should also be linked closer to research and extension, which would allow for the harmonisation of training services and its funding.

Other zones

Although the workshop focused on the experiences of the Lake and Northern Zones, since direct Netherlands Technical and Financial support is phasing out, some participants argued that other zones should have been given an opportunity to share experiences. Some ZARDIs and TRIT provided some insights in their change process during the discussions. At the end of the workshop some time was allocated for feedback from Central Zone ARDI and Eastern Zone ARDI.

9. Workshop evaluation

At the end of the workshop 76 participants completed and returned a workshop evaluation form. The analysis of the evaluation forms indicates that the workshop was quite successful:

1. Participants rated the workshop as excellent (20%), good (73%), and average (7%).
2. Participants indicated that the purpose of the workshop was fully achieved (46%) and partially achieved (54%).
3. Expected workshop outputs were rated as follows:
 - Sharing of experiences between the zones with respect to improving the client orientation and management of research: fully facilitated (51 %), partially facilitated (45%), and not facilitated (4 %).
 - Awareness of all elements of the CORMA change process as compared to existing misconceptions: fully increased (52 %), partially increased (44 %), and not increased (4 %).
 - Constraints to and opportunities for sustaining CORMA in the national research system: fully identified (40 %), partially identified (56 %), and not identified (4%).
 - Experiences in the five CORMA areas and opportunities for institutionalisation: fully analysed (53 %), partially analysed (46%), and not analysed (1 %).
4. Main features of the workshop:

Feature	Rating [%]			
	Very good	Good	Fair	Poor
Paper presentation	50	46	4	0
Discussions	21	68	11	0
Quality of papers	41	55	3	1
Quality of visual aids	53	39	8	0
Workshop organisation and management	49	48	3	0
Workshop facilitation	46	47	6	0

5. Workshop and session duration: long (9 %), adequate (75 %), and short (16 %).
6. Other general comments about the workshop by the participants included:
 - The workshop was very lively, informative, and interesting.
 - The workshop venue and the general atmosphere were very appropriate.
 - The session attendance by the participants was quite good.
 - The use of theatre art group was an excellent idea.
 - The workshop was very well organised, probably due to the adequate financial resources that were available to the organising team. There is a need to strive to have similar levels of workshop organisation within DRD.
 - Failure to introduce all the participants at the beginning of the workshop hindered effective interaction.
 - More extension agents should be included in future workshops.
 - Group discussions for the various areas could have come up with more constructive ideas.
 - The proceedings of the workshop should be published as soon as possible and distributed orderly.

7. The participants submitted large numbers of conclusions, recommendation and questions sheets. This is an indicator of strong participation in the workshop:

Papers	Question sheets	Recommendation sheets
1 and 2	12	64
3 and 4	5	27
5 and 6	7	18
7 and 8	11	33
9 and 10	10	40
11 and 12	2	34
Paper 13	7	25
Plenary	18	n.a.

Recommendations

The papers that were presented in the workshop recommend future actions at the level of the zonal institutes and the DRD or MAFS. These recommendations were reorganised according to the five CORMA management areas and presented in a plenary workshop session. Workshop participants added recommendations on the basis of discussions at the end of each presentation. These recommendations were recorded on individual sheets that were returned to the workshop facilitators. The following is a compilation of recommendations at activity, output and purpose level.

Human resource management (paper 3 and 4)

1. The DRD should develop strategies for Zonal Agricultural Research and Development Institutes (ZARDIs) to strengthen their role as knowledge (information and technology) centres stressing principles of a learning organisation. A learning organisation is an organisation that adapts to a changing environment and encourages staff learning. It is open to new information and strives to adopt new insights and skills to improve the performance of the organisation. It promotes exchange of knowledge and information between employees thus creating a better-informed workforce. This results in a flexible organisation where people accept changes and adapt to new ideas through a shared vision.
2. Appoint training co-ordinators at the zonal level with clear ToR. This would facilitate the development towards a learning organisation and contribute to better planning and co-ordination of training activities.
3. Both at national and zonal level staff training needs should be assessed regularly. This Training Needs Assessment (TNA) should explicitly include an analysis of stakeholder research needs to bring training efforts in line with stakeholder needs. This can contribute to a more systematic annual planning of training events. The national and zonal training offices should intensively communicate and exchange views. The national training budget should be composed of a coherent set of national and zonal training programmes and budgets.
4. Training and capacity building are expensive. Different options for staff training have to be combined. Training sessions should be conducted locally whenever this is appropriate. Scarce resources should be used for short courses for groups of staff instead of using these funds for long courses for individuals. For both long and short-term training a more active search for additional training funds should be considered. New opportunities such as donor support for institutional training programmes and the use of modern information and communication technologies should be explored.
5. Training should not be used to solve problems related to staff motivation. All training should be directly linked to the implementation of planned activities and cover the needs of both scientific and support staff.
6. Organisational change is required at the zonal level to create a more flexible workforce, which can promptly and efficiently react to client demands. This involves enhanced internal communication, interdisciplinary collaboration, the mainstreaming of the Farming Systems and Product-Chain approaches and a shift away from the commodity approach.
7. The organisation of staff according to disciplinary background could solve some of the problems related to staff shortages. Temporary recruitment of staff and partnerships with other organisations should also be considered.

8. A performance-based assessment system needs to be implemented with special attention for individual merit-based career development with performance indicators as used in the context of the Public Sector Reform. The elaboration and regular updating of job descriptions is crucial in this context. Job descriptions should include all tasks that are assigned to staff, including management tasks.
9. ZARDIs should have lean management teams consisting of heads of research programmes, the ZRC, ZRELO, and ZIMO, the service unit co-ordinator and the accountant, chaired by the institute manager. The management team should clearly reflect the organisational structure and meet on a regular basis.
10. Staff management requires more preparation, leadership training and specific skills and guidelines (delegation of tasks and authority, harmonisation with civil service reform, organisation of meetings, monitoring action points, etc.).
11. There is need for the establishment of a zonal staff council with special attention for the working conditions of all staff.
12. The national and zonal research management should develop incentive and motivation strategies, which are harmonised and compatible with existing legislation and procedures. The Lake and Northern Zone experiences show that a well-balanced set of performance-based and output-oriented incentives can be established. This motivation system could be a starting point for a DRD staff motivation action plan. Special attention is needed for the sustainability of the incentive system.
13. Research management areas such as research planning, linkage management and technology dissemination have all been decentralised to the zonal level. However, integrated management at zonal level cannot take place unless human resource management and financial management are more fully decentralised.

Financial management (paper 6 and 7)

1. All ZARDIs should have a mandatory, integrated, computerised and transparent financial management and accounting system (IFMAS). This requires investments and the availability of qualified and computer-literate account staff.
2. Zonal and national leadership has to recognise the importance of accountability and transparency of research to enhance the credibility and sustained funding of the institutes.
3. A transition phase from financing the supply side to financing the demand side has to be anticipated. This will fundamentally affect the functioning of the institutes (professional financial reporting, need for customised reports, compliance with donor regulations, more thorough external auditing, value for money concept).
4. Researchers need to be sensitised on the overriding importance of financial transparency and compliance with financial procedures. They should also accept the idea of financial sustainability, e.g. that internal service delivery (transport, stationary, canteen, laboratories) has a price.
5. Account sections should play a more important role in the annual budget cycle: planning, monitoring and evaluation of the annual budget. Account sections should progressively evolve into financial management departments.
6. All ZARDIs should undergo a financial sustainability analysis followed by the development of strategies to reduce expenditure, augment income, improve efficiency and attract and diversify funding. This should be monitored through annual zonal financial presentations that present an analysis of the last financial year and indicate the expected income and expenditure for the next financial year.
7. Sustainable semi-autonomous service units (as in LZ and NZ) need to be established along with the existing organisational structures in order to maintain organisational stability. Costs related to

transport, stationary, soil analysis and other variable costs should be directly allocated to research budgets, which allows for more recovery of overhead costs. The delegation of management responsibilities to service unit managers enhances management efficiency and ensures that equipment is optimally used and properly maintained. Establishing these units has to be accompanied by business plans, training of service unit staff, and strategies for obtaining seed money, allocation of staff and contributions to the Self-Help Fund.

8. The Self-Help Funds should be managed in a transparent manner. Frequent reporting on how the SHF has contributed to the institute welfare is necessary to instil a sense of ownership and to enhance the willingness of staff to contribute to income-generating activities for the institutes.
9. National and zonal research management should inform donors and all other stakeholders about the institutional financial management policies and practices and the resulting transparent direct costing of research and other activities.
10. Institutes need to ensure that the demand for services by outsiders does not result in services not being available for research staff. Service level agreements between service units and research programmes need to be established in relation to internal shopping and services that are provided to outsiders.

Linkages and collaboration (paper 1 and 8)

1. The national level should establish a proper institutional framework and elaborate guidelines for well co-ordinated promotion and liaison plans at zonal level. The experiences of the Lake and Northern Zones can be used to develop a national policy. National co-ordination of promotion activities could not only facilitate the work of the zones, it also leads to efficiency improvement and a more coherent 'corporate identity' of DRD. Special attention has to be given to the sustainable funding of promotion and liaison activities. Cost-sharing arrangements have to be further explored.
2. Zonal institutes should develop service catalogues that present an overview of services and their respective fees. Harmonisation of fees and national support is crucial.
3. ZARDIs should actively pursue strong links with all stakeholders in the technology development and dissemination chain (from FRGs to national levels, i.e. national programmes, other zones and institutes, universities) and international agricultural research (regional networks, eco-regional programmes, CGIAR, IARCs). This will improve the quality of research, which is the best PR.
4. All institute staff as well as for example ZEC members should become ambassadors of the ZARDIs. This requires capacity building and a change in attitude. Specific promotion or liaison teams bear the risk that these activities are perceived as the responsibility of some officers only. ZARDIs should have a public relations unit with a business plan and in charge of the co-ordination of activities related to promotion and liaison activities, as well as the marketing of research. It is important that quick feedback is given on needs expressed by stakeholders.
5. Cost-effective opportunities to assess research needs should be used (e.g. decentralised planning in Districts). District Councils should be sensitised on the need to support their ZARDI or ZARF.
6. ZARDIs should seek to empower stakeholders and to improve their capacities. Strong clients are the building blocks for successful partnerships. Training of stakeholders can raise the capacity to formulate needs, to participate in proposal writing, to screen proposals, to monitor field visits and to defend research interests to decision-makers.
7. ZARDIs should develop research marketing strategies and strategic fund raising plans with special attention for financial targets for different financial windows. ZARDIs, assisted by DRD should establish and regularly update a donor or sponsor database. The (pro)-active acquisition activities should give due attention for national and zonal priorities based on the assessment of stakeholder research and information needs, because the biggest strength of zonal agricultural research institutes is its local stakeholder network.

8. Clients of research should see the ZARDI as their credible service provider. This can be achieved by transparency, value for money, training and empowerment of client in terms of resource allocation. It can be assessed through client satisfaction studies.
9. ZARFs should be further developed as competitive funds that are 'owned' by the clients (Districts, NGOs and Producer Organisations). The ZARFs should be neutral and function independently from the research institutes. Much attention should be given to the professional management of the ZARFs (financial administration, screening capacities of MC members, functioning of executive secretariat).
10. The establishment of TAGREF deserves close attention, since it may ensure sustainable funding of research activities.
11. Public sector research should enter into partnerships with the private sector for research on goods with a private good nature (cash crops, inputs, hybrid seeds, animal breeds, etc.) while focusing on public good research (food crops, health safety and environmental issues etc.) with public funds (District contracts, core funding, etc.).
12. The DRD and zonal institutes need to develop clear policies and procedures for managing donor funds. Zonal policies should be streamlined and be implemented for every project that is undertaken. Transparent management of funds is a pre-requisite for maintaining partnerships with donor organisations.

Research planning, monitoring and evaluation (paper 2, 9 and 10)

1. ZARDIs should develop and implement zonal targeting strategies (agro-ecological or farming systems zones, farmer and gender categories, and other clients in the product chain with specific needs). To avoid bias, targeting and needs assessment should preferably be led by non-researchers or external persons with strong farmer and community involvement and by making use of farmer knowledge. While targeting, one should permanently assess the representativeness of stakeholder representatives. Specific attention has to be given to marginal households.
2. Considering their large mandate areas, ZARDIs should have a strategy of representative intervention areas/districts working with representative communities, which will allow both effective demand-driven technology development and up scaling in the mandate area.
3. ZARDIs should have the flexibility to address ever-changing needs of clients in their mandate area, due to rapidly changing socio-economic context. ZARDIs should become effective adaptive research teams, regularly updating strategic plans, targeting and priorities. The issues of storage, processing and marketing of agricultural products need special attention.
4. The only way that needs of clients (i.e. producers and processors) can be effectively addressed by research is through the empowerment of clients and their organisations with due attention for equity, resource control and farmers knowledge.
5. Clients are sensitive on the type of outputs they will receive, the time researchers use to deliver these, and the costs involved. Research stations should develop an inventory of their services and fees. This would enhance the confidence of stakeholders to deal with research stations. In this context, the MAFS client service charter is an important breakthrough.
6. An enhanced zonal planning procedure, which includes strategic plan development, targeting, needs assessment, priority setting, participatory planning, monitoring and evaluation is required. DRD should develop this on the basis of the experiences that were gained in different areas and subsequently build capacity in the zones.
7. The (adaptive) research cycle should always start with a proper documented client request, followed by preliminary screening on basis of soundness and strategic plan, concept note development, priority setting, and assessment of sponsor interest, before full proposal writing.

8. ZARDIs should fully support diversification of funding for research through development of quality grant-winning proposals for traditional and non-traditional financiers and supported by peer reviews. The elaboration of proposals in collaboration with stakeholders and the incorporation of donor requirements require more attention.
9. Proposals developed for contract research need faster reviews. In most cases, stakeholders and donors cannot wait for the annual zonal IPR. Flexibility is required. The ZRC could appoint three senior staff to review a contract research proposal.
10. The decentralisation of research (from national to zonal programmes) and main clients (from national demand to district and community demand) requires a change of culture in research. Researchers are accountable to clients rather than the national co-ordinators, who provide co-ordination and guidelines only. This change of culture can be further enhanced by client empowerment through capacity building at community and district levels with special attention for proposal formulation and participatory monitoring and evaluation.
11. Socio-economic and gender analysis, as well as farmer assessment and adoptability analysis should be mainstreamed and compulsory for all on-farm research.
12. Strategies for monitoring and evaluation need to be enhanced with attention for the supply side (facilitation national lead scientists, peer reviews etc.) and the demand side (client participation, local politicians, involvement in IPR, external assessment etc.). The quality of research co-ordination, monitoring and evaluation should be improved, both at national and zonal level. Research staff should be enabled in terms of resources as well as in skills and knowledge in order to develop and implement participatory monitoring and evaluation techniques. Resources needed for supervision and monitoring should as much as possible be included in research budgets.
13. Clients and donors will increasingly ask for regular reports that inform them about the progress made with specific research projects. Modalities should be defined to induce scientists to produce these reports.
14. Mechanisms should be put in place that allow the frequent review of progress. In particular, weekly, monthly and quarterly meetings and their related progress reports are important and can improve interaction among researchers. Harmonisation of the outline for quarterly and annual progress reports is needed. Improved quality control pays off in the form of improved performance and better results.

Output production, dissemination and information management (paper 5, 11 and 12)

1. DRD and ZARDIs should transform their traditional paper-based management information system into a digitised information system. This not only requires appropriate equipment but also the capacity to manage a computer-based working environment as well as the institutionalisation of INFORM-R. Management support, training and staff sensitisation are needed. ICT capacity can help to establish the essential link with national and international research organisations. Emphasis has to be put on a two-way communication system between zonal, national and international technology development systems as well as with zonal research clients and stakeholders.
2. Management of research institutes can be effectively improved with computer-based management information systems, but only if these are transparent, reliable and operational.
3. Explicit attention should be given to the establishment of modern library and database facilities and their appropriate use.
4. The creation of the ZIMO office must imply the transfer of responsibilities. The position of ZIMO should get adequate priority at both zonal and national level. One person can hardly handle all tasks given to the ZIMO office. This office needs more staff (e.g. an information management committee) and adequate facilitation.

5. Research output should be user focused with user specific formats. Different target groups require different ways of packaging information. More attention is needed for publications directed at policy makers, government administrators and potential financiers.
6. Assessment of timely production of quality scientific and user-friendly output should be part of a performance-based merit system.
7. Output-related publication fees need to be harmonised and officially endorsed within DRD. This also applies for review procedures and fees. Reporting fees such as those for field notes and leaflets can only be sustained if they are included in research budgets and if the institutional policy ensures that these fees are indeed a policy for all funding modalities. Research activity budgets in all financial windows need to include a budget line for output production and dissemination (e.g. incentives, computer hard and software, reproduction equipment etc.).
8. If staff is rewarded, they definitely produce more outputs. However, a thorough review system is essential to ensure the quality of research outputs, both scientific and user-friendly.
9. The move from blanket recommendations to flexible basket recommendations needs to be endorsed by procedures and regulations, with due attention for bio-safety regulations as well as specific recommendations for zones/regions and/or target groups.
10. ZARDIs should be at the interface between different knowledge and information systems (farmers, communities, extension, scientists, traders, radio etc.) and establish strong agricultural knowledge and information networks. ZARDIs should position themselves as innovation centres, providing research, training and information services to stakeholders.
11. For the actual up-scaling of successful technologies to different categories of end-users, dissemination needs to relate to intermediary organisations such as districts and NGOs. ZARDIs role in the dissemination of technology can be enhanced through the formulation of a technology dissemination strategy. This requires teamwork and collaboration between ZRC, ZIMO and ZRELO. The establishment of coalitions, research-extension partnerships and other up-scaling strategies need special attention
12. There are many opportunities to narrow the gap between research and extension. For any activity scientists should ask themselves how they can collaborate with extension and farmers to enhance the impact of their activities. Explicit attention should be given to the establishment of Memoranda of Understanding and cost-sharing arrangements.
13. Empowerment through capacity building of other stakeholders and clients is an important service of ZARDIs. The training of extension staff is an important service research institutes can provide, especially when subsequent training of trainers takes place and horizontal farmer-to-farmer dissemination strategies are used.
14. Decentralisation and integrated planning at district level (District Agricultural Development Plans; DADPs) based on village action plans, will lead to new roles for research and provides opportunities for new modalities of collaboration between research, extension and training. DRD and ZARDIs have to prepare themselves for this new emerging situation.
15. The different worlds of research and extension have to be brought together in an institutional set-up that will enhance collaboration instead of separation.
16. In order to enhance the drive towards demand-driven technology development and dissemination the need arises for a comprehensive Client-Oriented Research and Extension Management Approach (COREMA).

Closing remarks

Mr. Chairman,
Workshop facilitators,
Representatives of stakeholders,
Development partners,
Ladies and Gentlemen,

Mr. Chairman, on behalf of the workshop organising committee, the Ministries of Agriculture and Food Security and Water and Livestock Development, let me thank you all once again for your willingness to participate in this Workshop.

As we have all been made aware during this Workshop, the Client Oriented Research Management Approach (CORMA) helps agricultural research institutes to improve their level of client orientation and hence the efficiency and the quality of agricultural research. The main objective of this two-day workshop was to share with stakeholders the experiences gained in the Lake and Northern pilot zones. As we are now aware, CORMA focuses on five strategic areas: Human resource management; Financial management; Linkages and collaboration; Research planning, monitoring & evaluation; and Output production, dissemination and information management.

Mr. Chairman, during this workshop we have witnessed the presentation of 12 papers based on experiences with the implementation of CORMA in the two pilot zones. The papers focused on the crucial management capacities related to the five CORMA areas of improvement I just mentioned. Following the presentation of the papers, the participants among others raised the following general issues:

- Sustainability of CORMA
- Costs involved in implementation of research in the two pilot zones not being very different from the other zones but the identified differences were on fund disbursement and allocation.
- Emphasis on research efficiency, cost recovery and revenue diversification.
- Need for considering marketing issues in addition to production issues.
- Targeting of research should not only be limited to farmers but also to other stakeholders involved in the production-consumption chain.
- The need to use Local Government planning structure for needs assessment in addition to Farmer Research Groups, which are too limited.

Mr. Chairman, these general issues raised by the participants are crucial in improving the draft Medium Term Plan of agricultural research, which is in the final stage of preparation. I appreciate the presence of Dr. Robert Otsyina, the Team Leader of the Medium Term Research Planning Team and hope that he has taken note of the issues raised.

Mr. Chairman, in addition to the general issues raised, specific issues and recommendations related to each of the papers presented, were also discussed. These issues will be additional inputs required in making improvements of the presented papers.

Mr Chairman, as you may recall, the last paper on "Management of Change" focussed on the management and facilitation of the CORMA change process. As we have noted, the guidance and implementation of a CORMA change process requires strong and inspiring leadership, as well as flexible and competent managers. The paper also reviewed some tools that were used during the process of organisational change and presented a short overview of policy implications and major challenges for DRD and zonal institutions.

Mr. Chairman, I hope at the end of this two-day workshop the participants have been able to identify "best practices" for improved client orientation and management of research within our National Agricultural Research System. I hope that the identified practices can be used for the operationalisation of the public and private sector partnerships as stipulated in Tanzania's Agricultural Sector Development Strategy.

Mr. Chairman, let me thank again all our development partners for giving us hands in our efforts of strengthening the agricultural research system. I would particularly like to thank the Royal Netherlands Government for supporting our efforts to pilot CORMA in the Lake and Northern Zones, and funding this workshop.

I would also like to thank all authors who presented good quality papers at this workshop. Without their timely preparation of the papers it would not have been possible to hold this workshop.

Mr. Chairman, let me also record my appreciation for the excellent work done by both international and local facilitators in making this workshop a success. I hope they will continue to be good catalysts in making our NARS realise its dream of making research over 95% client oriented in the medium term.

Mr. Chairman, the contributions of participants throughout the workshop have been very good and useful and I would like to thank you all for this.

Mr. Chairman, we would have probably found the two-day workshop very tiresome had we not been entertained by the theatre group, led by Mr. Bambo. Let us thank the group for entertaining us so well.

Finally, let me sincerely thank our host, the management of the Lutheran Uhuru Hostel, for the good workshop facilities, including meals and refreshments they served us.

Let me now wish you all safe journeys to your work places and it is my great pleasure to declare this workshop officially closed.

Moshi, 28 May 2003

Mr. T.N. Kirway
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Annex 1: Workshop programme

Tuesday 27 May

08.30-09.00	Registration	
<u>Session 1</u>	Chairperson: Dr. J.M. Haki	
09.00-09.15	Opening address	Acting Permanent Secretary MAFS
09.15-09.30	The COR Programme (1998-2003)	Mr. A.S.M. Rwechungura, COR Programme Officer, RNE
09.30-10.30	Introduction to Client Oriented Research Management Approach (CORMA)	Mr. N.M. Lema
10.30-11.00	<i>Tea/coffee</i>	
<u>Session 2</u>	Chairperson: Facilitators	
11.00-13.00	1. Getting to know each other	Mr. S.R.B Mgenzi
	2. Research and information needs assessment	Mr. R.O. Kileo
13.00-14.00	<i>Lunch</i>	
<u>Session 3</u>	Chairperson: Facilitators	
14.00-16.00	3. Training co-ordination: towards a learning organization	Ms. H. Ngazi
	4. Staff management	Mr. J.M. Nkuba
	5. Information management	Mr. B.W. Kapange
16.00-16.30	<i>Tea/coffee</i>	
<u>Session 4</u>	Chairperson: Facilitators	
16.30-18.00	6. Accountability: transparent use of financial and physical resources	Ms. M.S. Shiyyo
	7. Sustainable functioning of the institute and internal service delivery	Mr. C.J. Lyamchai
<u>Evening programme</u>		
19.00-21.00	Dinner at Lutheran Uhuru Hostel	

Wednesday 28 May

<u>Session 5</u>	Chairperson: Facilitators	
08.30-10.30	8. Networking and funding diversification	Ms. M.N. Kingamkono
	9. Proposal writing in partnership	Mr. L. Ndege
10.30-11.00	<i>Tea/coffee</i>	
<u>Session 6</u>	Chairperson: Facilitators	
11.00-13.00	10. Our core activity: implementing and monitoring quality research	Mr. P.S.N. Ngwediagi
	11. Output production: making research results accessible and available	Ms. M.N.M. William
	12. Dissemination: bridging the gap between research, extension and farmers	Mr. A. Ngendello
13.00-14.00	<i>Lunch</i>	
<u>Session 7</u>	Chairperson: Facilitators	
14.00-15.00	13. Management of change	Mr. R.O. Kileo and Mr. N.M. Lema
15.00-16.00	Plenary discussion	
16.00-16.15	Workshop summary	
16.15-16.30	Closing	Dr. J.M. Haki
16.30-17.00	<i>Tea/coffee</i>	
<u>Evening programme</u>		
19.00-21.00	Closing party	

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Annex 3: CORMA basket of options

1. CORMA area: Human resource management

Management capacities	Activities
1.1 <i>Constantly adapt staff competence to stakeholder needs</i>	Appoint training co-ordinator
	Develop format for staff CV and establish staff database
	Make staff profiles
	Assess training needs of four categories of staff : research managers, scientists, field officers and support staff
	Establish contracts for long-term training and maintain relationship with trainees
	Search for opportunities to get training sponsorship
	Organise computer literacy programme
	Organise short courses
	Organise on-the-job training
	Organise exchange visits
	Organise study tours
	Facilitate participation of staff in conferences and seminars
Organise internal (monthly) seminars	
1.2 <i>Organise a flexible workforce</i>	Regroup scientists according to discipline to enhance flexibility
	Mainstream the farming systems approach
	Make an inventory of people available for short assignments
	Establish temporary contracts for disciplines that are insufficient or missing
	Organise interdisciplinary teams for particular assignments
Establish partnerships with other organisations	
1.3 <i>Increase staff motivation</i>	Develop performance-based sustainable incentive package
	Define incentives for four categories of staff: research managers, scientists, field officers and support staff
	Promote contract research and apply institutional fees for all funding modalities
	Establish sustainable system of reporting fees
	Develop incentive scheme for service unit managers
	Improve working conditions
Provide social incentives	
1.4 <i>Enable effective teamwork and communication among staff members</i>	Set up appropriate committees
	Organise general staff meetings
	Organise effective system of staff meetings (quarterly, monthly, weekly)
	Ensure availability of meeting minutes
	Provide follow-up on agreed action
	Establish community centre or canteen
Provide notice board announcements	

1.5 <i>Provide clear direction and responsive leadership</i>	Develop a zonal policy paper
	Develop procedures for ZEC involvement in policy development and monitoring of agricultural research and development
	Appoint an Institute management team
	Clarify relations between ZRC, ZIMO and ZRELO offices
	Develop procedures for transparent decision making
	Establish and regularly update job descriptions for all staff categories

2. CORMA area: Financial management

Management capacities	Activities
2.1 <i>Cover recurrent overhead costs</i>	Determine the recurrent overhead costs to be borne by the Institute
	Develop and implement strategy for decreasing structural overhead costs (direct variable costing method and establishment of service units)
	Develop and implement strategy for increasing funds for "self-help fund" (institutional fees, service units, additional sources of income)
	Determine contributions from institutional fee for overhead costs
	Facilitate incentives for research management
2.2 <i>Sustain well-functioning support services</i>	Establish service units and appoint service unit co-ordinator
	Organise sustainable access to transport
	Organise publication and photocopy service
	Ensure availability of stationary and inputs
	Organise optimal use of farm land
	Organise conference and catering facilities
	Ensure availability of laboratories and other scientific support services
	Sustain access to telephone and fax services
Acquire and organise sustainable access to computers and internet	
2.3 <i>Efficiently procure goods and services</i>	Set up comprehensive inventory system for entire institute, irrespective of funding source (preferably computerised)
	Determine procurement priorities in participatory manner
	Plan and evaluate annual procurement plan and monitor regularly
	Establish procurement procedures and techniques (preferably computerised)
	Follow tender procedure for large projects
2.4 <i>Maintain assets and equipment</i>	Appoint investment/rehabilitation planning & monitoring committee
	Establish maintenance contracts (outsourcing)
	Establish appropriate computer management and maintenance system
	Train own staff for certain regular maintenance activities

2.5 <i>Prepare and monitor activity-based budgets</i>	Determine annual institute income and expenditure and discuss with all staff
	Introduce direct costing method for research (and other) budgets
	Link budgets to output, activities and staff
	Introduce control ledgers
	Establish/improve communication lines between accounts office and other staff
	Elaborate activity plans for service units and specify internal accounting procedures
2.6 <i>Organise efficient and transparent financial reporting</i>	Introduce an Integrated Financial Management & Accounting System (IFMAS)
	Set up a comprehensive system of bank accounts for the Institute
	Improve handling of claims and ensure transparent decision-making process
	Improve imprest management
	Organise annual audit / value for money audit
	Elaborate procedures for internal cash flows
	Timely produce financial reports for all sponsors and for internal use
	Introduce financial reports for service units
	Monitor financial reporting procedures

3. CORMA area: Linkages and collaboration

Management capacities	Activities
3.1 <i>Maintain effective public relations</i>	Develop a logo
	Prepare a slogan
	Introduce business cards
	Develop promotion flyers
	Conduct promotion visits and distribute user-friendly output
	Introduce Zonal Newsletter
	Display outputs
	Contribute to newspaper articles
	Develop radio broadcasts
	Prepare a service catalogue
	Develop an institute profile or zonal research policy paper
	Develop and send calendars and seasonal greetings
	Develop website
	Participate in development forum, field days and agricultural shows
Organise open day at the station	

3.2 <i>Organise active stakeholder involvement</i>	Appoint liaison officers and set up a liaison team
	Produce stakeholder inventory
	Organise stakeholder meetings at different levels
	Organise stakeholder tours (visits of liaison officers to stakeholders)
	Organise FRG/FFS meetings
	Organise farmer field days and farmer exchange visits
	Organise Open Day at research station
	Participate in agricultural shows
	Monitor and evaluate contracts
	Monitor and analyse stakeholder satisfaction
	Train and empower stakeholders
	Invite stakeholders to IPR
3.3 <i>Acquire assignments and diversify sources of funding</i>	Develop a service catalogue, streamline fees and define guidelines for budgeting
	Make donor inventory and know their specific interests and characteristics
	Establish donor co-ordination unit within the institute
	Assess costs of raising funds
	Follow announcements and calls for proposals
	Promote independent and sustainable ZARF
	Develop strategic fund raising plan
3.4 <i>Actively develop international networks</i>	Know the networks of scientists and institutionalise contacts
	Organise liaison activities with international research institutes facilitated by DRD and national co-ordinators
	Establish and maintain partnerships with funding agencies

4. CORMA area: Research planning, monitoring and evaluation

Management capacities to:	Activities
4.1 <i>Initiate assessments of research needs</i>	Initiate surveys, baseline studies, sector studies, and marketing studies
	Organise commodity or thematic workshops
	Implement research needs assessment during stakeholder meetings and tours
	Give immediate follow-up on specific requests
	Build stakeholder capacity to express needs
4.2 <i>Plan and target research in a participatory manner</i>	Target zones: Farming System zonation and description
	Make thematic zonation maps (population, livestock, marketing,...)
	Make social stratification (target socio-economic groups)
	Conduct intra-household diversity analysis (including gender analysis)
	Elaborate strategic plans (zonal, programme commodities, disciplines, ...)

4.3 <i>Develop professional research proposals</i>	Inform scientists on criteria for screening proposals (from different organisations)
	Develop institutional format for research proposals and elaboration of budgets
	Ensure participatory proposal writing (with clients)
	Invest in quality proposal writing (Proposal preparation grants)
	Train scientists (grant-winning proposal writing and packaging of proposals)
	Define internal screening procedures at different levels (peers, sub-programme, programme, IPR, ZTC)
4.4 <i>Conduct farmer focussed research</i>	Train scientists in participatory technology development methodologies
	Define modalities to conduct on-farm research in collaboration with stakeholders, including Farmer Research Groups and Farmer Field Schools
	Train collaborators in on-farm research methods and approaches
	Systematically include adoptability analysis, farmer assessment and gender analysis
4.5 <i>Effectively monitor and evaluate research projects</i>	Develop format for research progress monitoring report (for PI)
	Set standards and develop procedures for monitoring research projects
	Develop procedures for stakeholder involvement in project monitoring, for instance M&E tours
	Ensure frequent trial visits and include costs of monitoring in research budgets
	Inform and debrief stakeholders before and after every field visits
	Implement adoption and impact assessment studies
4.6 <i>Organise an efficient progress reporting system</i>	Develop a reporting system based on monitoring reports of principal investigators
	Develop format for quarterly progress report for entire Institute and divide tasks of reporting among different departments
	Produce annual progress reports and inform stakeholders on results
	Produce attractive annual report
	Develop debriefing procedures for stakeholders
	Clearly indicate tasks and responsibilities of different institutes in the Zone

5. CORMA area: Output production and dissemination

Management capacities	Activities
5.1 <i>Produce scientific output</i>	Appoint information management committee (IMC)
	Set up an institutional publication series
	Define contents and quality standard of scientific report
	Ensure incorporation of fact sheets in scientific reports
	Make inventory of reports that are due and introduce monitoring of pending documents
	Produce publication list for entire Institute and establish publication archive
	Define review procedures for scientific output
	Define review and publication fees

5.2 <i>Produce user-friendly output</i>	Define format for leaflets, posters, brochures and training modules
	Organise leaflet/poster brochure production weeks
	Produce training modules that include hand-out for trainees and trainer's guide
	Organise training module writing weeks
	Develop radio programmes
	Define review procedures for client-friendly output
	Extensively test client-friendly output with different groups of stakeholders
	Produce video episodes
	Develop maps and have these available in case of stakeholder requests
	Develop materials for practical demonstrations
	Produce newsletters
	Compile and regularly update zonal Technology Reference Book (TRB)
	Compile District Technology Reference Book (TRB)
5.3 <i>Effectively disseminate research results and recommendations</i>	Appoint liaison officers and teams
	Initiate and update MoU with partners
	Define arrangements for co-funding
	Define procedures for distribution of reports and user-friendly output and TRB's
	Set up a mailing list with mailing instructions
	Use all opportunities to disseminate: stakeholder meetings, open days, agricultural shows, FEG's, stakeholders tours
	(Co)Organise farmer field days
	(Co)Organise technology markets
	(Co)Organise rural seed fairs
	Participate in development forums
	Organise extension seminars for stakeholders
	Organise training sessions for clients
	Use mass media
	Organise debriefing of clients and stakeholders
Participate in agricultural shows	
5.4 <i>Organise information management</i>	Prepare ICT policy and plan for sustainable access to computer/internet service
	Establish internet connection and LAN
	Develop and implement library policy
	Computerise library services (provide internet search opportunity)
	Use and update INFORM management information system
	Modernise registry
	Organise research filing system
	Analyse Agricultural Knowledge Information System (AKIS), including ITK
	Develop statistical database in collaboration with stakeholders
Develop and regularly update Institute website	