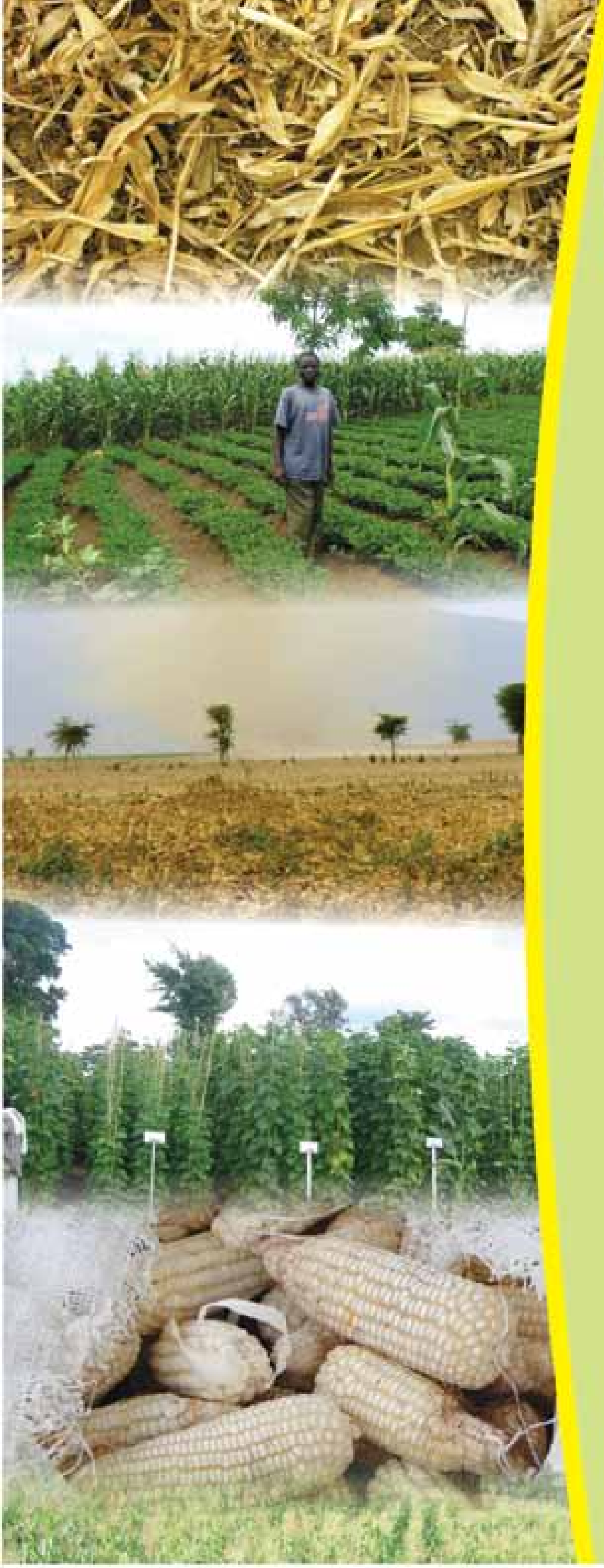


ASARECA
Transforming Agriculture for Improved Livelihoods

Agricultural knowledge and technology transfer and spillovers:

Study to inform SIMLESA

Volume 2

CIMMYT
ACIAR Research that works for developing countries and Australia aciar.gov.au
ICRISAT Science with a human face

Facilitating scaling out and spillovers of agricultural technologies and knowledge: Study to inform SIMLESA

Volume 2: Annexes

Association for Strengthening Agricultural Research in
Eastern and Central Africa
2014

Correct citation
Percy R, Kimenye, L, Pound B, Phiri A and Mills A. 2013. *Facilitating scaling out and spillovers of agricultural technologies and knowledge: Study to inform SIMLESA. Volume 2: Annexes.* ASARECA (Association for Strengthening Agricultural Research in Eastern and Central Africa), Entebbe.

Fair use policy

Association for Strengthening Agricultural Research in Eastern and Central Africa
(ASARECA)
Plot 5, Mpigi Road
PO Box 765
Entebbe, Uganda
tel: +256 414 320212/320556/321885
fax: +256 414 321126/322593
email: asareca@asareca.org
website: www.asareca.org

Editor: Anne Marie Nyamu, Editorial and Publishing Consultant, Nairobi, Kenya
Designer: Timothy Maleche, ImageMate, Nairobi, Kenya

ISBN 978-92-95070-98-1 (Print)





Contents

Foreword

Agricultural productivity and growth is without question widely acknowledged as the cornerstone to any meaningful reduction of hunger and poverty, as well as the means to attain economic growth for countries in sub-Saharan African. In most countries in sub-Saharan Africa, about 70% of the population and nearly 90% of the poor work in agriculture where they depend on increased agricultural productivity for food security and to lift them out of poverty.

Despite this, agricultural productivity in sub-Saharan Africa has lagged behind that of other regions of the world both in terms of total and per capita food production. For example, in the last decade Africa's share of world food production was only 3.9% while the shares for Asia, North America and Europe were 47.7%, 14.8% and 12.2% respectively. Coupled with the high population growth, the low productivity has contributed to increased food insecurity in the region. The recent rise in food prices witnessed around 2008–2009 caused much suffering to the millions of food insecure households in the region.

In efforts to redress this problem, various initiatives were started over the past several decades, some by national governments. Others were started by regional and international agricultural research and development (ARD) organisations with considerable support from various development partners. At the continental level, the Comprehensive Africa Agriculture Development Programme (CAADP) prepared by the African Union/New Partnership for Africa's Development (AU/NEPAD) in 2003 is one example of a broad strategy designed to promote interventions that best respond to this challenge. Other regional interventions by national governments include the Eastern Africa Agricultural Productivity Programme (EAAPP) and the West African Agricultural Productivity Programme (WAAPP) designed around commodity-based regional centres of excellence with support from World Bank funding.

In 2010 the International Maize and Wheat Improvement Center (CIMMYT) with support from the Australian Centre for International Agricultural Research (ACIAR) started a programme on sustainable intensification of maize–legume cropping systems (SIMLESA) covering five countries in Eastern and Southern Africa. The aim was to increase household and regional food security and incomes. SIMLESA is a regional collaborative programme implemented by national agricultural research systems (NARS) in Ethiopia, Kenya, Malawi Mozambique and Tanzania in collaboration with international and regional institutions. The Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) is among the regional collaborating institutions. Other partners include, University of Queensland through the Queensland Alliance for Agriculture and Food Innovation, the Queensland Department of Employment, Economic Development and Innovation (QDEEDI) and Murdoch University in Australia; and CIMMYT, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and Agricultural Research Council (ARC), South Africa. The role of ASARECA in SIMLESA is to provide technical backstopping to NARS in monitoring and evaluation (M&E) frameworks and gender mainstreaming, and in technology and knowledge transfers and spillovers. The study that culminated in this publication was part of ASARECA technical backstopping inputs to SIMLESA.

About ASARECA

ASARECA is a not-for-profit sub-regional organisation comprising 11 countries: Burundi, the Democratic Republic of Congo (DRC), Eritrea, Ethiopia, Kenya, Madagascar, Rwanda, South Sudan, Sudan, Tanzania and Uganda. Its mission is: To enhance regional collective action in agricultural research for development, extension and agricultural training and education to promote economic growth, fight poverty, eradicate hunger and enhance sustainable use of resources in Eastern and Central Africa.

ASARECA brings together scientists and other partners to generate, share and promote knowledge and innovations to solve common problems in agriculture in member countries and contribute to productivity and growth of the sector. Its partners include farmers, national, regional and international research, extension, and training organisations, public and private sector actors, non-governmental organisations (NGOs) and development agencies.

Dr Fina Opio
Executive Director, ASARECA

Preface

The Sustainable Intensification of Maize–Legume cropping systems for food security in Eastern and Southern Africa (SIMLESA) programme aims to increase farm-level food security and productivity through developing more resilient, profitable and sustainable farming systems. It is a multi-stakeholder collaborative programme covering five countries—Ethiopia, Kenya, Malawi, Mozambique and Tanzania. The programme focuses on validation and delivery of technological and institutional innovations that can significantly change the livelihoods of millions of smallholder farmers in Eastern and Southern Africa (ESA).

The SIMLESA strategy emphasises leveraging science and technology by using existing scientific evidence to enhance evaluation, adaptation and delivery of profitable options to smallholders. However, for SIMLESA to achieve its overall objective of spreading the impacts of its outputs widely within the five participating countries and beyond, integration of mechanisms that facilitate effective knowledge and technology transfers or 'spillovers' is critical.

It is against this background that the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), as a regional collaborator responsible for providing technical backstopping in knowledge transfers and spillovers, commissioned this study in 2012. The study sought to establish possible strategies to effectively transfer information and knowledge to end users, and to facilitate scaling out and spillovers of SIMLESA technologies. It also sought to generate an inventory of available maize and legume technologies and conservation agriculture practices that could be scaled out to communities within participating countries and to facilitate spillover across relevant countries. Furthermore, the study sought to identify extension approaches and knowledge products currently being used in SIMLESA. Using geographic information systems (GIS), the study sought to establish current areas of spread of the SIMLESA technologies and practices and to determine potential areas where the technologies can be further spread within the ESA sub-region.

The output of the study is presented in two volumes. Volume 1 is the main report. It comprises an executive summary, and three parts. Part 1 describes the various methodologies used by the study team to generate the findings; and Part 2 reports the results of the inventory of SIMLESA technologies, knowledge products and extension approaches used in the five countries. The locations that reported use of SIMLESA technologies were determined using outputs generated with GIS. Part 3 reports the findings relating to conditions for facilitating scaling out and spillovers of SIMLESA technologies and includes the conclusions and recommendations. Part 3 includes a short section that provides additional thoughts on the application of GIS in this type of work. Volume 2 contains all the annexes referred to in Volume 1.

I thank the study team: Rachel Percy (from the IDL group), Team Leader/Research Uptake Specialist; Barry Pound, Agronomist/Research–Extension Linkages Specialist; Alan Mills, GIS Specialist; Alexander Phiri, Agro-economist/Farming Systems Specialist; and support staff—Daria Dubovitskaya (Dasha) and Alastair Stewart—who worked under the auspices of Triple Line from the UK for conducting the study. I express my gratitude to the many stakeholders who directly and indirectly contributed to the output that led to this publication.

Lydia Kimenye, PhD
Programme Manager, Knowledge Management & Upscaling, ASARECA

Annex 1: Glossary of terms

Adaptation: Adoption of research outputs usually includes an element of adaptation by the target institution and/or the beneficiaries. It refers to testing, trying out and fitting it into the target institution/ beneficiary situation.

Adoption: Beneficiaries choosing to put a particular output or cluster of outputs into practice, e.g. following a technical recommendation or use of a new technology after the same output has been taken up and disseminated by a target institution.

Baseline: Information collected before or at the start of a project, policy or programme that provides a basis for planning and assessing subsequent progress or impact. Ideally, information should be collected from a comparable group (the control group) outside the project to make comparisons and assess the impact of the project. The baseline data are collected in a baseline survey or study.

Beneficiaries: People who stand to gain social, economic or environmental benefits from the output(s). A beneficiary may vary depending on the nature of the output—maybe a smallholder farmer in the case of, e.g. a new crop variety or policy maker in the case of policy outputs. A beneficiary will invariably be a primary stakeholder.

Best practice: A technique, method, process, activity, incentive or reward that is more effective at delivering a particular outcome than any other technique, method, process etc. So, the description of best practice should contain some reference to the 'below average' or normal situation, and why the proposed action or practice is better. The notion of best practice does not commit anyone to one inflexible, unchanging practice. Instead, best practice is an approach based around continuous learning and improvement.

Climate change: Any change in climate over time, whether due to natural variability or as a result of human activity.

Climate variability: Variations in the mean state and other characteristics (e.g. standard deviation or occurrence of extreme events) of climate on all temporal and spatial scales beyond that of individual events.

Cost–benefit analysis: A form of economic appraisal that assesses a project's worth by comparing its costs against the benefits it provides, including social costs and benefits. The techniques adopted include those used in financial appraisal, but in addition, a valuation in money terms is placed on social costs and benefits.

Dissemination: The process of spreading widely new information and knowledge.

End users: These are usually the beneficiaries but may sometimes be an institution.

Empowerment: The process whereby people gain more power over the factors governing their social and economic progress. This may be achieved through: increasing the incomes and assets of the poor, interventions that aim to enhance confidence and self-respect by developing collective organisation, decision-making and reforming political institutions to make them more inclusive. Empowerment is one aim of setting up participatory processes.

Environmental impact assessment: Analysis of the environmental consequences of a project, policy or programme.

Evaluation: A systematic assessment of the design, implementation, output and impact of an ongoing or completed project, programme or policy. This is a wider and more comprehensive activity than impact assessment and is generally multi-disciplinary. The aim is to identify the relevance and fulfilment of objectives, development efficiency, effectiveness, impact and sustainability.

Gender responsiveness: Creating an environment that reflects an understanding of the realities of the lives of men and women and seeks to address the issues of participation in any interventions. Gender responsiveness is designed to provide equal opportunities by responding to the needs, interests and aspirations of both men and women in given projects and interventions.

Impact: Beneficial or adverse changes experienced by end-users as a result of a research project activities and/or the application of research outputs. These changes may be direct or indirect, intended or unintended.

Innovation: The use of research (indigenous and exogenous) knowledge in a place or by people in a way it has not been used before. This is distinctly different from 'invention', which is seen as the creation of new knowledge.

Innovation platform: A network of partners working on a common theme and using research knowledge in ways it has not been used before to generate goods/services for the benefit of the poor.

Knowledge products: Outputs (in myriad forms of presentation) conveying the results of evaluation, research or other analysis.

Natural resource management: Responsible and broad based management of the land, water, forest and biological resources, including genes needed to sustain agricultural productivity and avert degradation of potential productivity.

Outcome: In this context, an outcome is seen as a generic term for the change that results from the implementation/application of research output. This change maybe measured in a variety of ways—this could be production orientated, such as increased yields; financial returns; or change in behaviour or actions.

Output: The end product/service of an individual piece of research or from a cluster of research activities. The output maybe in various forms: a technology, a practice, a process, a methodology, a decision support tool, a policy option etc.

Promotion: A proactive form of dissemination where an approach is pushed by a variety of interventions.

Risk: Understanding of the likelihood of events occurring, for example, on the basis of past experience. This concept contrasts with that of uncertainty, in which the likelihood is unknown. An individual or household may assess that the likelihood of a bad event, such as drought occurring is high enough to alter the mix of species cultivated. Including more drought-resistant crops spreads risk. This is known as risk diversification.

Scaling up: The process whereby more quality benefits are availed to more people, over a wider geographical area, more quickly, more equitably and more sustainably. In general, it involves engaging with more and/ or higher level institutions.

Stakeholders: Any person, organisation or institution with some direct or indirect role to play in the up-scaling of a particular output. Stakeholders may be defined as:

- Primary stakeholders: Those who are directly affected by the research outputs.
- Secondary stakeholders: Those who may not be directly affected by the research outputs but they have an interest in the project.
- Tertiary stakeholders: Those with high influence in the research and they can affect outputs but their interests are not the target of the research.

Target institution: These are institutions that are able to apply the research outputs with the aim of resolving the problem or exploiting the opportunity addressed.

Technology: Any one or combinations of tools, equipment, genetic material and breeds, farming and herding practices, gathering practices, laboratory techniques, models etc. and the knowledge and skills needed to use them.

Technology 'made available': Refers to where (1) the research on the technology has proven benefits; (2) the technology has been approved by the appropriate institutions for authorising its use; (3) technical extension services are capable of providing extension services pertaining to the new technology (where capable here means having a complete enough understanding of the technical requirements of the technology to be able to impart that knowledge, not the resources required to disseminate the technology; and (4) any policy(ies) authorising the use of the new technology has been adopted by the government in the realm of agriculture, the measure therefore includes those technologies released by research organisations for uptake by extension services and by extension services for uptake by farmers.

Technology transfer: The whole process by which technology from research is eventually integrated into production systems (includes dissemination, promotion, uptake and adoption).
Uptake: The acceptance and promotion of research outputs by institutions along an uptake pathway and their eventual adoption by end users. This is the key stage in the conversion of research outputs into impacts on the livelihoods of poor people.

Uptake pathway: The institutions and/or processes by which research outputs reach end users including organisations (civil society groups, government extension services, traders etc.) and activities (planting material multiplication, training).

User groups: A group of people who share a common task or asset, such as a water resource.

Validation: Evidence that the output(s) have been proven to be effective or offer(s) efficiencies by beneficiaries, other researchers, advisory providers and policy networks.

Annex 2: Desk review

2.1 Introduction

The desk review of literature is critical for the preliminary gathering of information about available proven technologies and knowledge products, reviewing secondary information on past experiences and conditions that have enabled knowledge, technology transfer and spillover within the region and elsewhere. The review will identify relevant technologies (Section 2.1) and the methods by which these technologies are promoted and disseminated (Section 2.2). The literature, with the use of case studies, will then be reviewed to identify the bottlenecks, enabling policy, institutional, biophysical and socio-economic conditions for smooth exchange and spillover of technologies (Section 3).

The findings from the desk review will be used to inform the survey tool used in the field work stage and aid analysis of the findings from the fieldwork. This analysis of past experiences, successes and bottlenecks on technology and knowledge transfer within and across countries will contribute to the formulation of a strategy for effective knowledge and technology transfer and the development of regional and local innovation systems.

Definitions

Technology is one or any combination of tools, equipment, genetic material and breeds, farming and herding practices, gathering practices, laboratory techniques, models, etc., and the knowledge and skills needed to use them.

Innovation systems or platforms are networks of partners working on a common theme and using research knowledge in ways it has not been used before to generate goods/services for the benefit of the poor.

Scaling-up is expansion higher up the ladder. It is institutional in nature and involves other sectors/stakeholder groups—from grassroots organisations to policymakers, donors, development institutions and international investors (Gündel et al. 2001).

Scaling-out is the geographical spread and expansion to more people and communities within the same sector or stakeholder groups. This is also known as horizontal scaling-up (Gündel et al. 2001).

Scaling-down is another form of geographical spread and involves increasing participation through decentralisation of accountabilities and responsibilities by breaking down large programmes into smaller programmes and projects (Gündel et al. 2001).

Spillover describes the act of scaling-up, scaling-out and scaling-down across country borders. Internal spillover will be used to describe technology and knowledge transfer across the five participating countries of Ethiopia, Kenya, Malawi, Mozambique and Tanzania. External spillover will be used to describe technology and knowledge transfer beyond the five participating countries.

Geographic information systems

Legg (2006), in his study on targeting agricultural research for development in Tanzania, writes:

> ...GIS techniques, combined with an assessment of the biophysical suitability of individual crops, can target agricultural development assistance to the areas of a country where this can have the greatest impact. Introduction of new crops and improved varieties in favourable agricultural zones within reach of local markets is a cost–effective approach with the greatest possibility of improving the food security and livelihoods of smallholder farmers in the medium term.

GIS will be used as part of this project to understand the geographic area of the current extent of maize/legume cropping technologies and to identify the potential areas where the available maize/legume cropping system technologies and practices could be up-scaled. A review of literature has found examples of studies that have used GIS for analysing geographical conditions of agricultural potential, transport networks, land use patterns and market access (Gonzalez 2002, Schmit and Rounsevell 2006, Staal et al. 2002). However, there is little evidence of similar studies related specifically to maize/legume cropping systems and such studies also tend to focus on nearby adoption rather than international spillover.

2.2 Approaches to technology and knowledge transfer

2.2.1 Classification of technologies

Conservation agriculture (CA) is a system of sustainable agricultural intensification that relies on the simultaneous application of the three basic principles: minimum soil disturbance, permanent organic matter soil cover and diversified crop rotations or associations (Thiombiana et al. 2009). A non-tillage approach involves directly planting of seeds using mulch from previous crops, with as little soil disturbance as possible. Covering the soil with mulch protects it from the effects of rain and wind erosion and provides a habitat for insects and bacteria which decompose the mulch and incorporate it into the soil (Friedrich et al. 2008). Diversified crop rotation is important for encouraging biodiversity, building up a diverse nutrient base in the soil and for pest management. Firstly, the rotation of crops with different root lengths will mobilise the existing nutrients and the selection of high biomass legumes will fix nitrogen from the atmosphere and enhance the range of nutrients in the soil (Friedrich et al. 2008). Secondly, by changing the available host plants, crop rotations disrupt the life cycle of some major pests and diseases that could be encouraged by the permanent soil cover. These principles are aimed at enhancing natural biological processes above and below the ground so that the soil becomes potentially self-sustainable (Kassam et al. 2009).

Legume–cereal intercropping is common throughout Eastern and Southern Africa and farmers commonly intercrop to secure food production by averting risk and to maximise utilisation of land and labour. Intercropping can result in better yields, better soil cover and leads to reduced erosion and nutrient leaching. Because legumes can rely on atmospheric nitrogen, they are less likely to compete for nitrogen with the cereal crop (Mucheru-Muna et al. 2010).

Improved seed varieties are a major contributing factor to the rise in agricultural output during the last half of the 20th century. Seed varieties can be bred to suit specific agro-ecological conditions and to be more responsive to fertiliser application. Hybrid seed is generally not recycled from year to year; it is purchased for each planting and is more expensive than normal seed.

Push–pull technology (PPT) is a strategy for management of cereal stem borers and striga weed in Eastern Africa. PPT uses an intercrop of a fodder legume Desmodium spp. with maize and a perimeter of Napier grass planted around the plot. Stem borer moths are effectively repelled away from the maize crop (push) by *Desmodium* spp., and are subsequently attracted to and trapped by the Napier grass (pull). *Desmodium* spp. roots produce several polyphenolic compounds, some of which stimulate striga germination while others inhibit haustorial development and growth thereby suppressing and eliminating Striga. Additionally, *Desmodium* spp. increases soil fertility through nitrogen fixing and soil organic matter enhancement (Amudavi et al. 2009).

Response farming techniques use early rainfall events to decide on the amounts of fertiliser to apply in a given season. The key to the system is flexibility in fertiliser application, with low initial doses applied when early rainfall is inadequate and higher doses applied when early rainfall is promising (Snapp et al. 2003).

2.2.2 Classification of approaches to technology and knowledge transfer

Demonstration plots are a participatory approach where farmers can learn by doing and adapt new technologies to their own needs and circumstances. Demonstration plots also reduce the risks faced by farmers as they are able to practice new technologies on a shared plot before implementing on their own land (Debelo 2012).

Farmer field schools are an effective way of disseminating information as farmers learn best when they are encouraged to experiment and researchers learn best when they work in a participatory way with farmers (Foresight 2011).

Field days are used to create awareness of technologies and practices and to facilitate local and district level cross-visits of farmer groups and farmer field schools. They can also be targeted at policy makers, extension workers, researchers and the private sector (Amudavi et al. 2009).

Food marketing boards can be used to buffer smallholders from downside price risk and support technology uptake. In much of Eastern and Southern Africa during the 1970s and 1980s, food marketing boards were successfully used to buffer smallholders from downside price risk and support their uptake of fertiliser and hybrid seed (Jayne et al. 2010).

ICT—mobile phones significantly reduce communication and information costs for the rural poor in developing countries, providing new opportunities for rural farmers to obtain access to information on agricultural technologies (Aker 2010) and up-to-date market prices for crops.

ICT—radio programmes can be targeted at illiterate farmers and provide them with information relating to all aspects of agricultural production in a language they understand. This does not mean simply reading technical information over the airwaves in local languages, but understanding the way farmers themselves discuss their problems in the community and providing relevant information in the local agro-ecological and cultural context (Chapman et al. 2003).

Input subsidy schemes aimed at smallholder farmers can include voucher schemes entitling farmers to input packages such as improved seed and fertiliser at subsidised rates. The sustainability of such input schemes is often questioned, but it is argued that they increase affordability and access to inputs that would otherwise be unobtainable (Sanchez et al. 2009).

Lead farmer approaches involves identifying and training farmers who implement the new technology and then pass on their knowledge to other farmers in their village or farmer organisation (Frankea et al. 2006).

Mother and baby trial design links a central 'mother trial' managed by researchers to numerous farmer-managed 'baby trials'. The central mother trial tests a large number of best bet technologies or varieties and is replicated within a site, whereas the baby trials are each a partial replicate and test a smaller subset of technologies. This facilitates a rigorous cross-check of biological performance with farmer assessment. Communication among researchers, extension staff and farmers is facilitated, ideally permitting researchers to better understand farmer decision making (Snapp et al. 2003).

Public–private sector partnerships aim to build the capacity of agricultural enterprises such as input suppliers and post-production processors to bolster agricultural advisory services to smallholder farmers (Debelo 2012).

Value chain approaches provide potential benefits for rural producers and urban consumers. Value chains describe the process from provision of inputs to production, transportation, processing, marketing, trading and retailing to final consumption. The value chain approach encourages looking at the production process from the consumer's end (Hoffler et al. 2005).

2.3 Conditions affecting technology and knowledge transfer

This section investigates the specific conditions affecting technology and knowledge transfer. It concentrates on political, institutional, ecological and biophysical, social and human, and economic and market conditions.

2.3.1 Political conditions

Agricultural investment

The reduction in donor assistance for African agriculture during the 1990s has been attributed to factors of frustration about the poor performance of donor-financed agricultural programmes, the perception that state interventions in agricultural markets were serving the interests of the ruling elite, the low priority afforded to agriculture by African governments (Jayne et al. 2010) and the impact of structural adjustment programmes. Recently, African governments have committed to increasing public investment in agriculture to a minimum of 10% of their national budgets through the Comprehensive Africa Agriculture Development Programme (CAADP). To date, however, few have honoured this commitment and the share of public expenditure on agriculture is declining (Jayne et al. 2010). By 2008, Burkina Faso, Ethiopia, Ghana, Guinea, Malawi, Mali, Niger and Senegal had exceeded this target. CAADP also has an agricultural growth target of 6%, which 9 of the 10 listed countries have exceeded (Angola, Eritrea, Ethiopia, Burkina Faso, Republic of the Congo, The Gambia, Guinea-Bissau, Nigeria, Senegal and Tanzania) (NEPAD 2010). Another issue facing agricultural research and extension is that any benefits of increased investment are likely to accrue in the long term which contradicts many governments' need for short-term impacts.

Seed policies and harmonisation

The high costs of meeting the different standards and regulations for each country in the ASARECA region and the relatively low effective demand for improved seed varieties make it difficult for local and international seed companies to invest in providing the quantity, quality and variety of seed needed to support an expanding agricultural base (Minde et al. 2006). Seed trade, agricultural products trade, germplasm exchange and technology transfer in many forms are hampered by the different seed laws and regulations of ECA member countries. Harmonisation of seed policies between Kenya, Tanzania and Uganda, now being adopted by other countries, is expected to accelerate trade not only in the ASARECA countries, but also throughout the Common Market for Eastern and Southern Africa (COMESA) region (Kirkby et al. 2011). The spread of seed varieties across national boundaries is impeded by national seed regulations and procedures for testing, phytosanitary regulations that are not based on scientific evidence, various tariffs and a lack of intellectual property protection for plant varieties (Minde et al. 2006). Harmonising policies and regulations will encourage the flow of seed across national boundaries, leading to increased availability of seeds to farmers.

Policy decisions made by governments can have a high impact on agricultural productivity. In Kenya, the passing of the Biosafety Bill has contributed towards getting an enabling environment for transgenics to be introduced in the country (Brooks et al. 2009). Ethiopia's 'Plan for accelerated and sustained development to end poverty' and Malawi's Farm Input Subsidy Programme have led to increased access for smallholder farmers to improved seeds, fertilisers, small-scale water harvesting systems, market liberalisation and export promotion (Sanchez et al. 2009).

Political will

The Sasakawa Global 2000 high input maize technologies project in Ethiopia and Mozambique was more successful in Ethiopia for several reasons, one of which was due to the country's President taking a personal interest in the high profile scheme leading to the formation of a new extension programme. Political will also plays a part in mainstreaming approaches to technology transfer across government departments, which is necessary for successful uptake of technologies. In 2010 the Zimbabwean Government allocated a budget for three years specifically for conservation agriculture (CA); the technology has been included in the annual National Crop and Livestock Assessment; a module on CA has been launched at colleges delivering the Diploma in Agriculture, and the government's extension department (AGRITEX) has set up CA demonstrations across the country. The implementation of CA within the mainstream agriculture development and extension services will have important positive consequences for up-scaling of CA practices (Thiombiana 2009).

Case study: Farmer training centres and demonstration farms in Ethiopia

The Ethiopian government has already established the largest agricultural extension system in sub-Saharan Africa, also ranked third largest agricultural extension system in the world after China and India. Currently Ethiopia has about 45,000 development agents and the government plans to increase this number to over 60,000 field extension workers. Ethiopia is pursuing a very innovative extension model of "cost-sharing" with local farmers. First, to establish a farmer training centre (FTC) at the local government (kebele) level. The local farmers have to agree to donate 1–2.5 hectares of community land near the kebele headquarters to establish the FTC, including a demonstration farm. The national government will then help finance and develop the FTC, including a small classroom-office building, simple housing for the DA staff (currently there are three development agents assigned to each FTC) and other capital improvements such as livestock buildings. Again, the farmers jointly finance these building costs by donating their labour, free of cost, to construct these FTC buildings. The current strategy being pursued by some innovative development agents is to develop their demonstration farm not only as demonstration units but also as revenue-generating units to help cover the operational costs of each FTC.

Source: Swanson et al. (2010).

Land tenure

Farmers without ownership rights to the land they are using, lack the incentive to invest in the long-term productivity of their land. Land and soil conservation techniques used in CA require permanent practice and deliver long-term benefits (Thiombiana 2009) and mulching only tends to be viable when property rights over residual crop biomass are observed and tenure is secure (Erenstein 2003). Such technologies may not appeal to smallholder farmers who are uncertain of using the same land in the future, so new technologies need to provide instant results if they are to be successfully scaled-out to landless farmers.

2.3.2 Institutional conditions

Extension services

Effective communication of new technologies depends on the quality of agricultural extension services. Farmers have different information needs depending on the stage of technology introduction, which can range from weather forecasts, pest attacks, inputs, improved cultivation practices, pest and disease management and prices (Aker 2010). Negatu et al. (1999) found that recommendations from extension agencies are often inconsistent with farmers' objectives and decision criteria, leading to slow or non adoption. Extension services therefore need to identify the information needs and preferences of the target farmers before attempting to promote new practices.

Effectiveness of extension services are also dependent on the extension staff, with much of the related literature citing problems in motivation, accountability and a need to control the mix of signals sent to frontline extension staff. Farrington et al. (2002) write, "Coherent policies explicitly placing extension within the poverty reduction agenda are the best basis for demonstrating to extension agents, that pro-poor efforts will be recognised and rewarded within their institutions and not seen to be 'deviations' from modernisation efforts." The remote locations of field staff also contributes to problems in extension effectiveness due to high costs of transport to rural areas, limited geographical scale and issues in verifying performance indicators such as number of training courses and attendees (Aker 2010). Precise verification of indicators is necessary as the lack of reliable evidence on the impact of agricultural extension exacerbates problems related to funding (Aker 2010).

As well as face-to-face extension, technology transfer can be facilitated through the use of information communication technologies (ICT). Radio programmes addressing agricultural topics are an effective way of targeting a large area and are accessible for illiterate farmers; mobile phones can also be used for the exchange of information. In 2009, mobile cellular penetration in all developing countries reached 57% of inhabitants, up from 23% in 2005.

Extension services have evolved over recent decades from the linear 'scientist to extension worker to farmer' model, through participatory 'bottom up' approaches, approaches that support teaching-learning processes among farming men and women (Swanson et al. 2010), and public-private partnerships in extension delivery. Extension approaches vary according to a nation's development goal, whether it be achieving national food security, improving rural livelihoods or improving natural resource management.

According to Swanson et al. (2010:11):

> During the second half of the twentieth century the primary agricultural development goal of most developing countries was food security. Due in large part to the Green Revolution and public extension's focus on technology transfer, many nations actually achieved national food security by the end of the twentieth century. As a result government support for both agricultural research and extension institutions began to decline, with a direct long-term impact on agricultural productivity growth.

There is a contemporary emphasis by governments and donors alike on innovative, market-driven extension approaches. These are consistent with the agricultural innovation systems framework, which is the basis of this study's analytical framework (see Figure 25 in Volume 1). Under this extension approach it is the growing market for (usually high-value) products that controls specific innovations that can be successfully taken up by different farming households.

In relation to this, many donor agencies (such as the UK Department for International Development, the International Fund for Agricultural Development) and non-governmental organisations (NGOs) (such as the Dutch Agency SNV and indeed the SIMLESA project itself) seek to establish innovation platforms. These platforms bring together the key players from across a particular value chain.

Whereas in the past there was a strong focus on public sector extension provision, these days extension provision is far more pluralistic, with various combinations of government, NGO and private sector provision. Many governments and donors have a strong interest in supporting such pluralistic provision and exploring the various ways in which public-private partnerships can be established for effective extension and agricultural innovation.

Uganda's National Agricultural Advisory Development Services (NAADS) exemplifies an attempt, at a national level, to shift to private sector provision of extension services, funded largely by public (government/donor) sources. Although NAADS has departed somewhat from its original vision, evaluations of the first phase of its operation indicated that the NAADS programme had substantial positive impacts on the availability and quality of advisory services provided to farmers (IFPRI 2007; IFAD 2008).

Case study: ICTs for increased access to agricultural information

ShujaazFM is one example of the use of information and communication technology (ICT) to generate interest and access to agricultural messages. The project, developed by Nairobi-based communications company, Well Told Story, targets young farmers in Kenya through a nationally distributed free monthly comic book, daily FM radio and television programmes and interactive short message service (SMS). Investment in June 2010 has led to circulation growing to 600,000 copies per month with an anticipated readership of 12 million (RIU 2011). Each edition contains agricultural stories that are seasonal and relevant around the country with examples of previous topics including vaccination of chickens, new and improved maize varieties, seed priming and conservation tillage.

Source: RIU (2011).

Farmer organisation and interaction

Good social networks generate collective action. It is important facilitate to collective action among farmers who have common interests and this way help to bridge social capital with markets and businesses, and to link social capital with multi-level institutions (Foresight 2011). Participation in farmer groups brings advantages for group members including development of linkages with input suppliers, improving their competitiveness in the marketplace with buyers and reducing production and marketing costs (Legg 2006). Visiting farmer groups is easier for extension workers than visiting individuals spread over a large area, and participation in local groups provides opportunities for interactive learning about new innovations and technologies. Smith et al. (2001), commented that the success of such groups "has been characterised by experience, education and links gained outside of the community context...benefiting from government, donor and NGO infrastructural investment." However until farmers are organised into producer groups, many extension personnel will continue to work with high-resource farmers. As Farrington et al. (2002) wrote:

> Despite hopes that producers' organisations will contribute to poverty alleviation, little has been done to draw poorer farmers into cooperative arrangements from which they can benefit through greater economies of scale, bargaining power and a stronger voice.

Case study: Farmer field schools for conservation agriculture in Tanzania

The Conservation Agriculture for Sustainable Agriculture and Rural Development (CA SARD) project was implemented in northern Tanzania by FAO, GTZ and the Selian Agricultural Research Institute (SARI) in 2004. The project provided training on CA concepts and farmer field school methodology to extension workers who became farmer field school facilitators. The project provided training to farmers on how to apply CA technologies/practices and assisted with CA equipment, including subsoilers, rippers, jab planters, direct planters and zam-wipes. The farmer field school groups also received 10 kg of maize seed, 8 kg of lablab and a 1 litre bottle of round up (glyphosate). Each group tested several farming techniques on a shared one acre plot of land including CA practices and farmers' normal practice; ploughing twice and then planting maize intercropped with pigeon pea, beans and pumpkins. The plots were monitored by FFS members and farmers used their own experience and observations to make decisions on how to manage the crop. Records of the type of work done, number of people per operation, time taken per operation, type of inputs, quantities/rates and costs were kept and farmers held a field day before harvesting to show other farmers in the community what had been achieved. Key elements that led to the success of the intervention included proper group formation leading to sustainable and stable groups, in-depth problem analysis by farmers themselves, and a participatory learning process resulting in farmer-led facilitators who were proactive in spreading CA technology to other farmers.

Source: Owenya et al. (2011).

Multi-stakeholder approach

Public–private partnerships are attracting attention because as the agricultural sector develops, technology transfer and advisory services tend to become increasingly privatised (Swanson et al. 2010). In central Malawi, extension staff have worked with NGOs and private companies to review paprika varieties and develop better crop advice for farmers. Such public-private partnerships allowed extensive training of smallholders in techniques to produce high quality paprika and reduced risks for smallholders entering new markets (Snapp et al. 2003).

A multi-stakeholder approach being taken by SIMLESA is the establishment of innovation platforms. Innovation platforms were earlier introduced by the International Fund for Agricultural Development, the UK Department for International Development and other agencies. Commonly, innovation platforms involve bringing together all value chain stakeholders at national or local levels. The purpose is to identify weaknesses or barriers in the value chain and address these to the benefit of all stakeholders. These weaknesses or barriers may relate to supply of technologies and knowledge or demand for these. Innovation platforms recognise that bringing about agricultural innovation and development is a complex and multi-stakeholder activity, rather than a linear approach involving research via extension to farmers.

2.3.3 Ecological and biophysical conditions

Agro-ecological zones

The map of Köppen-Geiger climate types for Africa (Köppen-Geiger climate type map of Africa) shows that out of the five main climate types, three are present in Africa, of which the dominant climate type by land area is arid (57.2%), followed by tropical (31%) and temperate (11.8%) (Peel et al. 2007). The high diversity of agro-ecological zones across Africa requires adaptive testing and substantial modification of promising varieties, which can be a factor in limiting technology diffusion and returns to research and development (Lybbert et al. 2012; Brooks et al. 2009). Farmers are often experimental when it comes to adapting technologies to local agro-ecological conditions (Frankea et al. 2006).

Case study: Private sector involvement in scaling-out chilli production in Kenya

Mace Foods is a private limited company (Kenyan-Italian-German joint venture) started in 2002 with its headquarters in Eldoret, Kenya. In addition, Mace Foods Europe Ltd., located in Wuppertal, Germany, handles all sales and marketing activities. Given this European Union (EU) connection, Mace Foods has rapidly increased its production, processing and export of chilli powder and other dried horticultural products to Germany, Italy and other European countries. To expand its exports, it has steadily increased its production base. Prior to scaling-up, Mace Foods had only two extension agents who were providing advisory services to a small group of farmers. In order to expand their production, Mace needed an additional 1000 farmers who could produce chillies to EU standards.

The USAID-funded Kenya Horticulture Development Programme (KHDP), provided a full-time extension specialist and agreed to cost-share the salaries of 20 additional agricultural technicians who, starting in 2004, were trained in the recommended production techniques. This specialist worked closely with each technician for one year and KHDP paid 50% of each technician's salary. At the end of this "training" phase, Mace Foods assumed the full cost of these technicians. During the one-year start-up phase, 1000 selected farmers were organised into producer groups, and were subsequently trained and integrated into the Mace supplier programme. By 2008, a total of 5000 Kenyan farmers were producing chillies and other dried horticultural export products for EU markets. KHDP also worked closely with Kenya Seed Company to develop a sustainable source of hybrid seed for the chilli variety required by Mace Foods Europe. Kenya Seed is now the commercial supplier of this seed to Mace Foods.

Source: Swanson et al. (2010).

Land and soil degradation

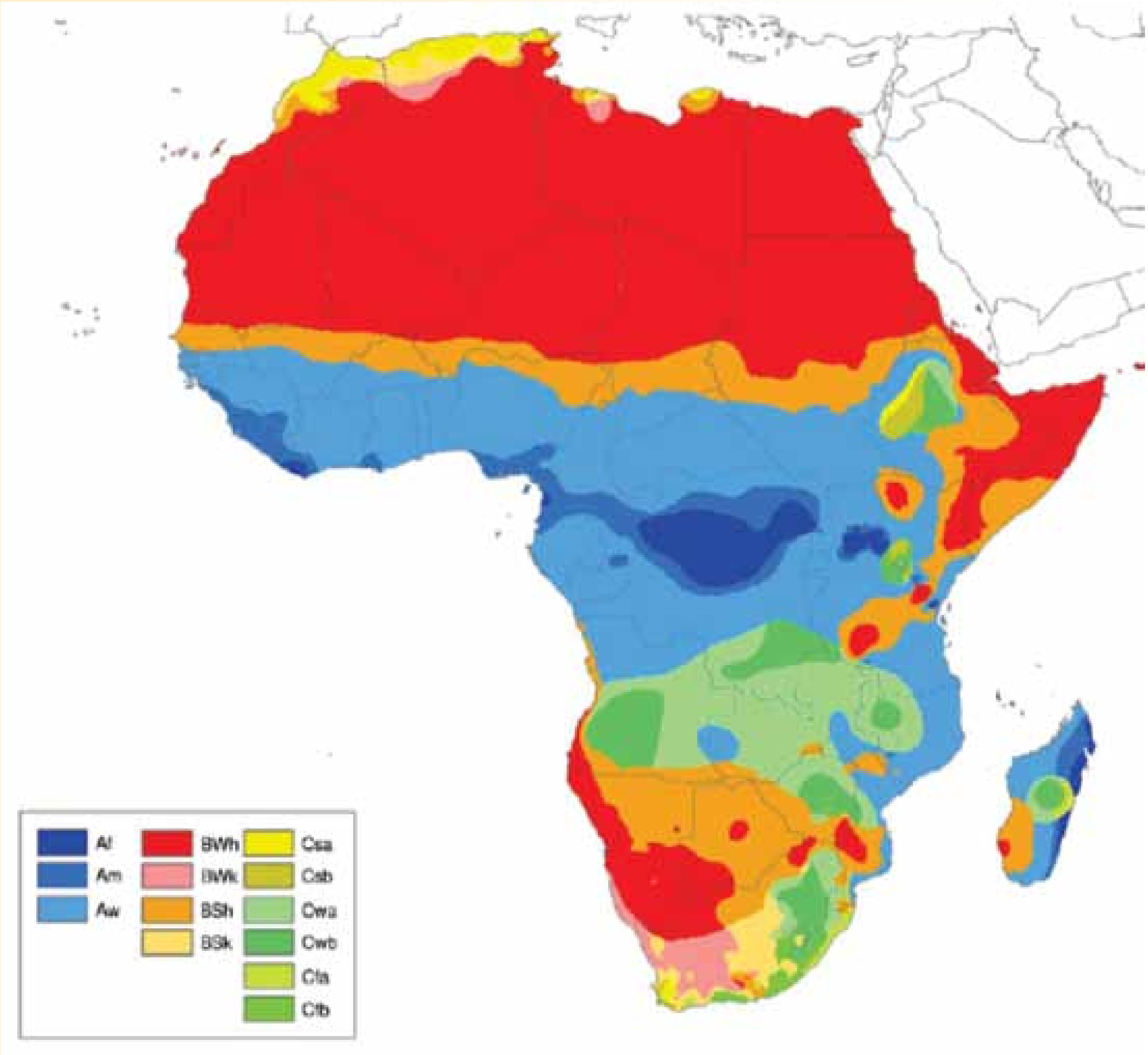
Visible soil degradation and related declining yields can act as a catalyst for farmers to invest in appropriate technologies. Fowler et al. (2001) found that adoption of conservation agriculture was more successful, where farmers could see the effects of erosion and the likelihood of short-term economic gain, whereas Erenstein (2003) saw increased adoption in areas with poor soil fertility, a long potential growing season, low biomass weathering rates and substantial crop residue production. However, implementation of technologies that fail to address problems of soil degradation can result in wasting financial and labour resources of smallholder farmers who may have invested in inputs such as fertiliser, the benefits of which are lost through continued erosion.

2.3.4 Social and human conditions

Gender

Researchers, policy makers and academics often cite the importance of focussing agricultural development strategies in Africa on female smallholder farmers. However, no evidence exists showing that extension is specifically targeted to women and in fact, they are ignored by many external agencies and under-represented in research and governance systems (Foresight 2011). Research must ensure that dissemination materials and inputs are suitable for women as well as men (Adolf et al. 2010) and that extension services place importance on using female extension workers to communicate messages to female smallholder farmers (Swanson 2008).

Female smallholder farmers involved in CA farmer field schools in northern Tanzania were keen to implement CA on their land once they had access to jab-planters which enabled them to perform three tasks in one. The process of digging a hole, planting the seed (perhaps applying fertiliser) and covering the hole was reduced to one movement with the aid of the jab planter. This reduced the time needed for planting, a task that is traditionally left to women, leading to increased adoption among women smallholder farmers who owned plots of land that were too small to utilise animal drawn direct-seeders.



Code	Agro-ecological zone	Code	Agro-ecological zone
Af	Tropical rainforest	Csa	Temperate – dry/hot summer
Am	Tropical monsoon	Csb	Temperate – dry/warm summer
Aw	Tropical savannah	Cwa	Temperate – dry winter, hot summer
BWh	Arid desert, hot	Cwb	Temperate – dry winter/warm summer
BWk	Arid desert, cold	Cta	Temperate – without dry season, hot summer
BSh	Arid steppe, hot	Cfb	Temperate – without dry season, warm summer
BSk	Arid steppe, cold		

Figure 2.1: Köppen-Geiger's map of climate types for Africa.

Labour

Two major factors leading to labour constraints in subsistence farming are the impact of HIV and migration. HIV/AIDS contributes to a diminished workforce through the inability of sick farmers to work and by diverting farmers' time as they care for the sick and their children. When time is a scarce resource, less important activities are abandoned, including tasks related to soil fertility management, as Misiko (2008) writes: "HIV/AIDS is a significant and complex threat to the already deficient soil fertility practices among smallholders." Low productivity and returns of smallholder agriculture also lead to many able bodied men leaving farms in search of more lucrative off-farm opportunities, contributing to labour shortages in the smallholder farming sector. New technologies, therefore, need to take into consideration the time constraints and labour shortages faced by many farmers. Onerous activities are unlikely to facilitate widespread adoption and any increased demands on labour should be duly justified through visible, beneficial and quick results.

Education

Research into the effectiveness of field days for dissemination of PPT found a negative correlation between farmer education and efficiency in their PPT uptake, which suggests that more educated farmers have more choices relating to income-generating strategies and therefore have less incentive to practice PPT (Amudavi et al. 2008). The same research also found that younger farmers were more efficient in their uptake of PPT due to progressive attitudes. This suggests that less educated farmers may be easier to target for agricultural technology transfer; however, educated farmers should not be ignored as the success of an agricultural technology may well be marked by its adoption among those who are able to implement the technology out of careful consideration rather than desperation.

Case study: Field days for push-pull technology in Kenya

Field day participants included push–pull technology (PPT) practicing farmers, non-PPT practicing farmers, local leaders, researchers, district and division agriculture/livestock extension workers, NGOs, community based organisations and farmer groups of diverse backgrounds. The participants were asked to compare and evaluate PPT and check plots during their participation in the event. At each field day30–35 farmers with no previous exposure to PPT were randomly selected to take part in a research study with a final total sample of 1492 participants from 45 field days. 90% of respondents agreed that the FDs assisted them to acquire knowledge and skills related to PPT components. In particular, the field days enabled them to learn about biology and damage caused by stem borers (91.6%), biology and damage caused by striga(89.6%), concept of PPT and how it works to control both stem borer and striga(92.3%) and considerations in planting cereals using PPT (89.7%). On the overall effectiveness of field days, 97% of the respondents noted that the field days enabled farmers to gain new agricultural information, 90% indicated that farmers' expectations were achieved, 98% felt that they would attend subsequent field days, and 96% recommended that field days were an appropriate method of disseminating new technologies. 75% of respondents indicated they had a high level of confidence in implementing PPT, suggesting that field days were effective at demonstrating the potential of PPT and how to implement the technology on the farm.

Source: Amudavi et al. (2009).

2.3.5 Economic and market conditions

Market access and development

Access to markets is essential if subsistence farmers are to be convinced to increase production to the levels required for transition to commercial farming, which can create positive change in the socio-economic circumstances of smallholder farmers in sub-Saharan Africa (AATF 2010).For this to be achieved, market infrastructure must be developed to reduce the high transport costs incurred in areas with poor quality roads (Howard et al. 2003) and improve interest from farmers in selling cash crops (Negatu et al. 1999). In addition to difficulties in physical access to markets, there are barriers to financial access related to the cost of entry into agricultural markets. Cadot et al. (2006) estimated the cost of entering markets for smallholder farmers in Madagascar as being 124–153% of subsistence farmers' annual production, highlighting the importance in increasing production, improving rural transport services and infrastructure and providing access to credit for smallholder farmers. Insufficient financial services for smallholder farmers are seen as a major barrier to purchasing and accessing equipment, seeds, fertiliser and pesticides. Jayne et al. (2010) write:

> There appears to be a vicious cycle in which low surplus production constrains the development of markets, which in turn constrains smallholders' ability to use productive farm technologies in a sustainable manner, reinforcing semi-subsistence agriculture. Crop production expansion is difficult to sustain in the face of highly inelastic product demand, which causes precipitous price plunges when local markets are unable to absorb surplus output. Such price drops are believed to be a major cause of subsequent farm dis-adoption of improved technology.

Price risk is also identified by Snapp et al. (2003) as a barrier to scaling-out technologies as farmers are often unable to recoup costs when selling surplus crops immediately after harvesting when the price drops due to increased availability on the market. Farmers' perceptions are important in adoption and these perceptions are influenced by the farmer's resource endowment and risk estimation (Negatu et al. 1999).

Input availability and affordability

Provision of inputs tied to promotion of new technologies can have a decisive impact on the success of out-scaling. However, this comes at a high cost for the stakeholder providing the inputs and raises questions of sustainability of the technology. The Sasakawa Global 2000 high input maize technology project in Ethiopia provided inputs including hybrid seeds and fertiliser, with 25% of costs paid up front by the farmer and the remaining 75% paid at harvest. This scenario worked well in Ethiopia but in Mozambique where a similar project was implemented, repayment terms on credit were unclear and led to farmers defaulting (Howard et al. 2003).

Case study: High input maize technologies in Ethiopia and Mozambique

Sasakawa-Global 2000 (SG) introduced programmes to promote high input maize technologies to smallholder farmers in the 1990s. These programmes provided credit, inputs and extension assistance to participants willing to establish half-hectare demonstration plots on their own land. In Ethiopia, farmers received close extension supervision and made a 25–50% down payment on the input package at planting time, with the remainder due at harvest. In Mozambique, expectations about repayment were unclear and follow-up collection was inconsistent, hence repayment rates for the Mozambique programmes were low. The SG technology was much more successful in Ethiopia than in Mozambique. As maize varieties were so fertiliser-responsive in central-southwest Ethiopia, farmers could repay their inputs and earn a profit even with relatively mediocre yields. In Mozambique, farmers who get average yields risk losing money, and profits for those who get excellent yields may not be significantly higher than profits from well-managed low-input plots. These high-input technologies can be successfully introduced through well-funded high-profile programmes, but there is no conclusive evidence that such programmes can be scaled-up and sustained.

Source: Howard et al. (2003).

2.4 Conclusion

The review of literature indicates that several conditions are necessary for creating an enabling environment for scaling-out and spillover. A summary of these conditions can be found in Table 2.1; the conditions are split into political, institutional, ecological, social and economic conditions and highlights if the condition is an enabling factor or a bottleneck to widespread technology diffusion and adoption.

Case study: Legume seed supply system in Malawi

Problems of access to seed of legume crops at planting times has contributed to very low productivity in the grain–legume subsector; therefore, increased productivity can be achieved if farmers can access sufficient quantities of seed of desirable improved varieties. The role of Research Into Use (RIU) in this initiative was to: (1) facilitate the bringing together of all stakeholders in the legumes subsector value chain, allowing for development of synergies that build communication and business practices; (2) coordinate the unblocking of identified bottlenecks; and (3) empower farmer groups through training, enabling them to become an effective partner of the legumes platform. Part of this training included seed production techniques of beans, soya beans and groundnuts. This arrangement enhanced the communication and direct interaction between researchers with farmers. There is now increased interest from private sector companies as platform issues are in line with the business interests of seed multiplication. The project expects 28 tonnes of legume seed of new released varieties to be produced benefiting around 7000 farmers by 2011.

Source: Moyo (2010).

Table 2.1: Conditions that enable or act as bottlenecks to scaling-out and spillover of agricultural technologies

	Enabling factors, conditions, requirements and mechanisms	Bottlenecks, barriers and unfavourable conditions
Political conditions	• Investment from governments or donors • Regional harmonisation of seed policies • Policies for technologies mainstreamed across government departments • Interest shown from political figures • Security of land tenure	• Reduction of donor assistance • National seed regulation and testing procedures • National phytosanitary regulations • Lack of political will • Lack of land rights • Conflict in the region
Institutional conditions	• Timeliness of information provided to farmers • Policies placing extension within the poverty reduction agenda • Improved monitoring of agricultural extension impacts • Access to information through mobile phones and radios • Involvement in farmer groups	• Recommendations from extension agencies inconsistent with farmers' objectives • Conflicting advice given to farmers • Low motivation and accountability of extension staff • Networks not encouraged • Exclusion of the private sector
Ecological and biophysical conditions	• Adaptive testing and substantial modification of promising varieties to differing agro-ecological zones • Farmers adapting technologies themselves • Awareness of soil degradation • Adoption best in areas of high potential	• 'One size fits all' or ''magic bullet'' approach to technology diffusion
Social and human conditions	• Use of female extension workers to target women farmers • Dissemination materials and inputs suitable for women • Time saving agricultural technologies	• Women under-represented in research and governance systems • Women ignored by external agencies • HIV/AIDS affecting labour requirements • Migration depleting farm workforce
Economic and market conditions	• Improved interest from farmers in selling cash crops • Access to credit and financial services • Input provision alongside advice and technical support	• High transport costs due to poor rural roads • Price plunges when local markets are unable to absorb surplus output • Shortage or inaccessibility of seeds

2.4.1 Conditions specific to spillover

The factors in Table 2.1 can be applied to scaling-out and spillover. However, although all of these factors are important for scaling-out, only some of them influence spillover across countries. Specific conditions drawn from Table 2.1 that influence spillover can be seen in Box 2.1.

Box 2.1: Conditions that specifically enable or act as bottlenecks to spillover of agricultural technologies

Main enabling factors for spillover of agricultural technologies across national borders:

- Investment from governments or donors
- Improved monitoring of agricultural extension impacts
- Regional harmonisation of seed policies
- Adaptive testing and substantial modification of promising varieties to differing agro-ecological zones

Main bottlenecks disrupting spillover of agricultural technologies across national borders:

- Reduction of donor assistance
- National seed regulation and testing procedures
- Shortage or inaccessibility of seeds
- Exclusion of the private sector
- ‘One size fits all’ or ‘magic bullet’ approach to technology diffusion
- Women under-represented in research and governance systems

These enabling factors and bottlenecks can be categorised into six areas:

- Agricultural investment
- Increasing role of regional bodies and organisations
- Monitoring and evaluation of technology and knowledge transfer
- Seed policies and distribution
- Private sector involvement
- Gender targeting

Investment in agriculture

Increased and sustained agricultural investment from governments will help ensure political focus on the importance of building a productive agriculture sector in African countries. Cross-national agencies developing cross-national approaches and policies will help to ensure regional harmonisation and improve the flow of technologies across borders.

Increasing role of regional bodies and organisations

Increased and sustained agricultural investment from governments will help ensure political focus on the importance of building a productive agriculture sector in African countries. With this taking place in the context of the continent-wide CAADP, the opportunities for exchange of experiences and lesson learning between countries are enhanced.

Monitoring and evaluation of technology and knowledge transfer

Through improved monitoring of the impacts of approaches to technology and knowledge transfer, future design of strategies for out-scaling and spillover will be able to draw on previous successes and failures. Being aware of the strategies that work well in particular areas will help target approaches in specific agro-ecological conditions or with particular groups of farmers. Monitoring and evaluation (M&E) and impact assessments should therefore be built into all projects, with thought given to this at the early stages of project formation to ensure adequate baseline data for comparison. Results from impact assessments should be made available on a regional scale to facilitate planning of projects that enable spillover.

Seed policies and distribution

Conditions concerning seeds include regional harmonisation of seed policies, regulation and testing procedures, adaptive testing and substantial modification of promising varieties to differing agro-ecological zones, and improved access and availability of seeds. Governments should maintain sovereignty of their regulations and should not be collared into adapting policies under pressure from corporations with interests in seed distribution. However, improved regional harmonisation of seed policies will increase the flow of seeds across borders, and improve availability and uptake of improved seed varieties.

Private sector involvement

Involvement of the private sector in agricultural technology schemes has demonstrated success stories in increasing demand for products, facilitating uptake of technologies, raising market awareness of smallholder farmers and meeting the financial constraints of agricultural programmes. Public–private partnerships are an opportunity to combine expertise and knowledge from two sectors and an approach to cost-sharing. Future design of cross-country programmes therefore should not exclude the private sector.

The private sector is seen as an important part of the innovation platform and research of private sector involvement in SIMLESA identifies roles in input provision, technology dissemination and crop insurance. A key area of involvement for the private sector is in the production, multiplication, marketing and distribution of seeds. Availability of seed depends on numerous factors with research showing that demand and profit are important incentives for private sector involvement.

Gender targeting

Under-representation of women in research and governance systems at both national and international levels can lead to lack of focus on extension and agricultural programmes targeted at women. Policy makers are well aware of the need to target agricultural technologies specifically for women, but the literature points to a lack of success in this regard. Increased gender mainstreaming and female presence in national and regional organisations will result in a shift in focus towards providing approaches to technology and knowledge transfer that appeal to and are viable for women smallholder farmers.

This desk review does not claim to have covered all the aspects of the conditions that influence scaling-out and spillover of agricultural technologies and practices. However, it is designed to provide an informative round-up of the literature identified before the field research phase to inform the project team and wider readers on the context of the current situation.

2.5 References

Adolf B, Pound B, Sheikh A, Veaux J-L, Ewell P, Masambu H, Belgrave D, Munyani P, Ahmed M, Briand D, Nathan B, Dejene T, Okuny M, Centenary H, Mutesi E. 2010.ASARECA Joint Mission of Developing Partners 3–22 May 2010. ASARECA, Entebbe.

AATF [African Agricultural Technology Foundation]. 2010. A study on the relevance of Chinese agricultural technologies to smallholder farmers in Africa. Nairobi, Kenya.

Aker JC. 2010. Dial “A” for agriculture: Using information and communication technologies for agricultural extension in developing countries. Tufts University, Medford, Massachusetts, USA.

Amudavi DM, Khan ZR, Wanyama JM, Midega CAO, Pittchar J, Nyangau IM, Hassanali A, Pickett JA. 2008. Assessment of technical efficiency of farmer teachers in the uptake and dissemination of push-pull technology in Western Kenya. Crop Protection 28:987–996.

Amudavi DM, Zeyour RK, Wanyama JM, Midega CAO, Pittchar J, Hassanali A, Pickett JA. 2009. Evaluation of farmers' field days as a dissemination tool for push-pull technology in Western Kenya. Crop Protection 28:225–235.

Brooks S, Thompson J, Odame H, Kibaara B, Nderitu S, Karin F, Millstone E. 2009. Environmental change and maize innovation in Kenya: exploring pathways in and out of maize. STEPS Working Paper 36. STEPS Centre, Brighton, UK.

Cadot O, Dutoit L, Olarreaga M. 2006.How costly is it for poor farmers to lift themselves out of subsistence? World Bank Policy Research Working Paper 3881. The World Bank, Washington, DC.

Chapman R, Blench R, Kranjac-Berisavljevic G, Zakariah ABT. 2003. Rural radio in agricultural extension: the example of vernacular radio programmes on soil and water conservation in northern Ghana. Agricultural Extension & Research Network Paper 127.Overseas Development Institute, London, UK.

Debelo A. 2012.SG 2000–Ethiopia history. Available athttp://www.saa-safe.org/www/ethiopia.html.

Erenstein O. 2003.Smallholder conservation farming in the tropics and sub-tropics: a guide to the development and dissemination of mulching with crop residue and cover crops. *Agriculture, Ecosystems and Environment* 100:17–37.

Farrington J, Christoplos I, Kidd AD, Beckman M. 2002.Can extension contribute to rural poverty reduction? Synthesis of a six-country study. Agricultural Research & Extension Network Paper 123. Overseas Development Institute, London, UK.

Foresight Project on Global Food and Farming Futures. 2011. Synthesis Report C9: *Sustainable intensification in African agriculture: analysis of cases and common lessons.* The Government Office for Science, London, UK. Available at (http://www.bis.gov.uk/Foresight).

Fowler R, Rockstrom J. 2001.Conservation tillage for sustainable agriculture: an agrarian revolution gathers momentum in Africa. Soil and Tillage Research 61:93–107.

Frankea A, Ellis-Jones J, Tarawalia G, Schulza S, Hussainic M, Kurehc I, White R, Chikoyea D, Douthwaite B, Oyewolea B, lanrewaju A. 2006. Evaluating and scaling-up integrated Striga hermonthica control technologies among farmers in northern Nigeria. Crop Protection 25:868–878.

Friedrich T, Kassam A, Shaxson F. 2008. *Conservation Agriculture (CA). Agricultural Technologies for Developing Countries,* Annex 2. European Technology Assessment Group, Food and Agriculture Organization of the United Nations (FAO), Rome.

Gonzalez RM. 2002.Joint learning with GIS: multi-actor resource management. *Agricultural Systems* 73:99–111.

Gündel S, Hancock J, Anderson S. 2001.Scaling-up strategies for research in natural resources management: a comparative review. Natural Resources Institute, Chatham, UK.

Hoffler H, Maingi G. 2005.Rural-urban linkages in practice: Promoting agricultural value chains. Promotion of Private Sector Development in Agriculture (PSDA), German Technical Cooperation (GTZ), Nairobi, Kenya.

Howard J, Crawford E, Kelly V, Demeke M, Jeje J. 2003. Promoting high-input maize technologies in Africa: the Sasakawa-Global 2000 experience in Ethiopia and Mozambique. *Food Policy* 28:335–348.

IFPRI [International Food Policy Research Institute]. 2007. Assessing the impact of the National Agricultural Advisory Services (NAADS) in the Uganda Rural Livelihoods. Development Strategy and Governance Division and Environment and Production Technology Division. IFPRI Discussion Paper 00724. International Policy Research Institute, Washington, DC, USA.

IFAD [International Fund for Agricultural Development]. 2008. Performance Evaluation of National Agricultural Advisory Services (NAADS). Final report. Ministry of Agriculture, Animal Industries and Fisheries, Government of Uganda, Kampala.

Jayne TS, Mather D, Mghenyi E. 2010. Principal challenges confronting smallholder agriculture in sub-Saharan Africa. *World Development* 38(10):1384–1398

Kassam A, Friedrich T, Shaxson F, Pretty J. 2009.The spread of conservation agriculture: justification, sustainability and uptake. *International Journal of Agricultural Sustainability* 7(4):292–320.

Kirkby R, Eugene Terry E, Tilahun Zeweldu. 2011. Evaluation of USAID/East Africa support to the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA). Submitted by DAI in Association with Michigan State University to the United States Agency for International Development (USAID).

Legg C. 2006. Targeting agricultural research for development in Tanzania: an example of the use of GIS for ex ante impact assessment at IITA. In: Alene AD, Manyong VM, Abnele S, Sanogo D, eds., Proceedings of the 26th Conference of the International Association of Agricultural Economists, 12–18 August 2006, Brisbane, Australia.

Lybbert TJ, Sumner DA. 2012. Agricultural technologies for climate change in developing countries: policy options for innovation and technology diffusion. Food Policy 37:114–123.

Minde I, Waithaka M. 2006.Rationalization and harmonization of seed policies and regulations in Eastern and Central Africa: effecting policy change through private public partnerships. Poster paper prepared for presentation at the International Association of Agricultural Economists Conference, Gold Coast, Australia, 12–18 August 2006.

Misiko M. 2008.An ethnographic exploration of the impacts of HIV/AIDS on soil fertility management among smallholders in Butula, Western Kenya. *NJAS Wageningen Journal of Life Sciences* 56(3):167–177.

Moyo N. 2010.Establishing a functional legumes seed supply system in Malawi.In: RIU Malawi. *RIU Annual report 2009–2010.* Research Into Use Malawi.

Mucheru-Muna M, Pypers P, Mugendi D, Kung'u J, Mugwe J, Merkxx R, Vanlauwe B. 2010. A staggered maize–legume intercrop arrangement robustly increases crop yields and economic returns in the highlands of Central Kenya. Field Crops Research 115:132–139.

Negatu W, Parikh A. 1999.The impact of perception and other factors on the adoption of agricultural technology in the Moret and Jiru Woreda (district) of Ethiopia. *Agricultural Economics* 21:205–16.

NEPAD [New Partnership for Africa's Development]. 2010. Comprehensive Africa Agriculture Development Programme (CAADP). Available at http://www.nepad.org/foodsecurity/agriculture/about

Owenya MZ, Mariki Wl, Kienzle J, Friedrich T, Kassam A. 2011.Conservation agriculture in Tanzania: the case of the Mwangaza B CA farmer field school, Rhotia village, Karatu District, Arusha. *International Journal of Agricultural Sustainability* 9(1):245–152.

Peel MC, Finlayson BL, McMahon TA. 2007.Updated world map of the Köppen-Geiger climate classification. *Hydrology and Earth System Sciences*11:1633–1644.

RIU [Research Into Use]. 2011. ShujazzFM. Available at http://www.researchintouse.com/bestbets/bb37shujaaz.html.

Sanchez PA, Denning GL, Nziguheba G. 2009. The African Green Revolution moves forward. *Food Security* 1:37–44.

Schmit C, Rounsevell MDA. 2006.Are agricultural land use patterns influenced by farmer imitation? *Agriculture, Ecosystems and Environment* 115:113–127.

Smith D, Gordon A, Meadows K, Zwick K. 2001. Livelihood diversification in Uganda: patterns and determinants of change across two rural districts. *Food Policy* 26:421–435.

Snapp SS, Blackie MJ, Donovan C. 2003.Realigning research and extension to focus on farmers' constraints and opportunities. Food Policy 28:349–363.

Staal SJ, Baltenweck I, Waithaka MM, deWolff T, Njoroge L. 2002.Location and uptake: integrated household and GIS analysis of technology adoption and land use, with application to smallholder dairy farms in Kenya. *Agricultural Economics* 27:295–315.

Swanson BE. 2008. Global review of good agricultural extension and advisory service practices. Research and Extension Division, Natural Resources Management and Environment Department and Policy Assistance and Resources Mobilisation Division, Technical Cooperation Department, FAO. Food and Agriculture Organization of the United Nations, Rome, Italy.

Swanson BE, Rajalahti R. 2010.Strengthening agricultural extension and advisory systems: procedures for assessing, transforming and evaluating extension systems. Agriculture and Rural Development Discussion Paper 45.The World Bank, Washington, DC, USA.

Thiombiana L, Meshack M, eds. 2009.*Scaling-up conservation agriculture in Africa: strategy and approaches.* FAO subregional office for East Africa, Addis Ababa, Ethiopia.

Annex 3: Schedules for field visits

3.1 Kenya schedule

Organisation/ company/project	Name	Role	Day
KARI Nairobi	Charles Nkonge	SIMLESA Country Coordinator in Kenya	13 February 2012
Freshco Kenya	Captain Karanja	General Manager	13 February 2012
CIMMYT	Fred Kanampiu	SIMLESA Objective 2 Leader	14 February 2012
Drought Tolerant Maize Initiative	Dan Makumbi	Scientist/Maize Breeder	14 February 2012
CIMMYT	Menale Kassie	SIMLESA Objective 1 Leader	14 February 2012
Africa Conservation Tillage Network	Hamisi Dulla Peter Kuria	Knowledge and Information Manager Programme Officer	14 February 2012
Wakala Africa	George Otieno	Product Development Manager	14 February 2012
KARI Embu	Presentations by James Ouma, Alfred Micheni, Ezekial Ngoroi	KARI Embu Objective Leaders 1, 2 and 3	15 February 2012
KARI Embu	Ezekial Ngoroi	KARI Embu Objective Leader 3b (legumes)	15 February 2012
KARI Embu	James Ouma	KARI Embu Objective Leader 1	15 February 2012
KARI Embu	Alfred Micheni	Eastern Kenya SIMLESA Project Coordinator; KARI Embu Objective Leader 2	15 February 2012
Field visit to Embu East	Lucy Ngatho, Genesio Murithi	District Horticulture Officer & District Crops Officer	16 February 2012
Field visit to Embu East	Kyeni innovation platform	Chairlady, SIMLESA trial farmers, neighbouring farmers, district extension officer, Kilimo Salama crop insurance representative	16 February 2012
Farm Inputs Promotion Systems	Paul Seward	Managing Director	17 February 2012
Ministry of Agriculture	Mary Karanja	Programme Coordinator, Traditional High-Value Crops Programme	17 February 2012
KARI Kakamega	John Achieng	KARI Kakamega Objective 2 Leader	18 February 2012
Kenya Seed Company	Joseph Kamau	Managing Director	18 February 2012
KARI Nairobi	Charles Nkonge (de-briefing)	SIMLESA Country Coordinator in Kenya	18 February 2012

3.2 Ethiopia schedule

Organisation/company/project	Name	Role	Day
Arrived in Ethiopia on 27 February and drove direct to Melkassa ARC same day			
SIMLESA, Melkassa Agricultural Research Station	Sime Mekonnen	SIMLESA Ethiopia Coordinator	27 February 2012
SIMLESA, Melkassa Agricultural Research Station	Kassaye Negash	SIMLESA Legume Plant Breeder (Objective 3)	27 February 2012
SIMLESA, Melkassa Agricultural Research Station	Lealem Tilahun	SIMLESA Maize Breeder (Objective 3)	27 February 2012
SIMLESA, Melkassa Agricultural Research Station	Getachew Ayana	Centre Director	27 February2012
SIMLESA, Melkassa Agricultural Research Station	Asheber Tegegn	Forage Researcher	28 February 2012
SIMLESA, Melkassa Agricultural Research Station	Sime Mekonnen	SIMLESA Ethiopia Coordinator	28 February 2012
SIMLESA, Melkassa Agricultural Research Station	Adam Bekele	SIMLESA Economist (Objective 1)	29 February 2012
SIMLESA, Melkassa Agricultural Research Station	Lealem Tilahun	SIMLESA Maize Breeder (Objective 3)	29 February 2012
Writing up and setting up appointments		Adama town	1 March 2012
Travel to Awassa	Awassa ARC staff Woreda agricultural staff Farmers Sime Mekonnen	Awassa	2 March 2012
Travel to Adama	Sime Mekonnen	Adama town	3 March 2012
Travel to Addis Ababa. Entering data into database		Addis Ababa	4 March 2012
EIAR Headquarters, Addis Ababa	Abebe Kirub	Director Information and Communications	5 March 2012
SSG2000, Addis Ababa	Aberra Debelo	Ethiopia Director	5 March 2012
Oromia Seed Enterprises	Ato Kedir Nefo	Director	6 March 2012
Ministry of Agriculture, Extension Directorate	Kenu Abate	Extension Agronomist	6 March 2012
Return to UK			7 March 2012

3.3 Tanzania schedule

Organisation/company/ project	Name	Role	Day
Arrived in Arusha on 27 February at 2.30 am due to flight delays in Nairobi			
SARI	Lucas Mugendi	SIMLESA Tanzania Coordinator	27 February2012
SARI	Richard Ndondi	Maize Breeder for SATEC and SIMLESA Objective 3 Stakeholder	27 February2012
RECODA	Domnick E Ringo	Executive Director and Objective 2 and 3 stakeholder	28 February2012
WADEC	Helen Bradbum and Theresia Joel Mollel	Centre Director and Community Development respectively, SIMLESA stakeholders Objective 2 and 3	28 February2012
World Vision Tanzania	Mr Njiro	SIMLESA Stakeholder on Objective 2 and 3	28 February2012 (unavailable in the office)
ASA	Paul Nandila	SIMLESA stakeholder Objective 3	28 February2012
29 February, Depart for Mbulu District from Arusha at 8.30 am and arrive 1.15 pm			
Mbulu District	Julita Bulali and Francis Msuya	District Agriculture and Livestock Development Officer (DALDO) and District Crops Officer	29 February2012
Mbulu District	John Qawuwe	Host Farmer in Bargish-uwa Village Bargish Ward	29 February2012
Mbulu District	Joseph Pisa	Host Farmer in Bargish-uwa Village Bargish Ward	29 February2012
Mbulu District	David Umbe	Village Extension Worker Bargish Ward	29 February2012
Depart for Arusha via Karatu District and arrive in Arusha at 10 pm			
SARI	John Sariah	Researcher at SARI and Objective 2 Leader	1 March 2012
SARI	Francis Mmbando	Socio-Economist and Objective 1 Leader	2 March2012
SARI	Lucas Mugendi	SIMLESA Tanzania Coordinator debriefing meeting. He was busy with a line of people at his office waiting office waiting	2 March2012
Return to Malawi			3 March2012

3.4 Malawi schedule

Organisation/ company/project	Name	Role	Day
Chitedze Research Station	Cyprian Mwale	SIMLESA National Coordinator and Objective 3 Leader	6 March 2012
Land Resources Department, MoAIWD	Getrude Kambauwa	Chief Land Management Training Officer, CA Task Force Coordination	7 March 2012
Seed Testing Unit, Chitedze Research Station	Lucy Mtambo	Head of Seed Testing Unit, Stakeholder of SIMLESA	9 March 2012
Chitedze Research Station	D Kamlongo	Researcher and SIMLESA Objective 2 Leader	9 March 2012
ICRISAT	Oswin Madzonga	Scientific Officer and SIMLESA stakeholder	9 March 2012
IITA/SARRNET	Alene Arega	Country Representative, SIMLESA stakeholder	9 March 2012
Mitundu EPA, Chiwiri Section	Steve Kamwendo	AEDO and SIMLESA facilitator	10 March 2012
Host Farmer	Katalina Adoni	Host Farmer, Mitundu EPA	10 March 2012
Host Farmer	Christina Chalendewa	Host Farmer, Mitundu EPA	10 March 2012
Focus group discussion (females only)	Liveness Lonard Group Village Chisamba Jessy Levisoni, Alinafe Elisa and Alinesi Damiano	Farmers in Chisamba Senior Group Village	10 March 2012
Ministry of Agriculture, Irrigation and Water Development	G Ching'oma	Director of Crops Department	14 March 2012
Farm Input Subsidy Programme Coordination Unit	Osborne Tsoka	Chief Agriculture Officer	14 March 2012
Department of Agriculture Extension	Clodina Chowa	Deputy Director, Extension Methodologies	15 March 2012
Farmers' Union of Malawi	Mark Matabi	Institutional and Cooperatives Advisor	15 March 2012
Seed Traders Association of Malawi	Supply Chisi	Seed Business Development Officer	15 March 2012
Agriculture Research and Extension Trust	Violet Phiri	Senior Seed Officer	15 March 2012
Bunda College of Agriculture	H Mloza-Banda	Professor in Agronomy and CA Task Force member	16 March 2012
Total Land Care	Spence Ngoma	Project Manager and SIMLESA stakeholder	16 March 2012
Focus group discussion (men only)	Gift Wiston, L.K. Chipeni, Jentar Zuze, Isaac Davison, Medison Mkhuziwaduka	Host Farmers of CA project implemented by TLC since 2005/06. Mvera EPA, Dowa	17 March 2012

Annex 4: Survey tool

1. General section for use when relevant: Description of the project/programme under discussion

1.1 Timeline: when started, scope, main activities, objectives, how it has expanded.
1.2 Institutional linkages between the project and other stakeholders (stakeholder map);partnerships.
1.3 Policy and regulatory environment.
1.4 Any other information.

2. Description of the variety or conservation agriculture practice

2.1 Title of the variety or CA practice.
2.2 Problem it aims to address.
2.3 How the variety/CA practice works.
2.4 Brief description of how the variety/CA practice is used (if relevant).
2.5 Justification: why the variety/CA practice is appropriate for scaling-outor spillover
2.6 (NB 2.6 relevant for varieties more than for CA practices). Where in the country the seed variety has been tested or promoted.
  2.6.1 The geographical area: where possible, list districts/provinces/regions or even village/research stations.
  2.6.2 Temperature: establish what kind of temperature measure is important—minimum, average, maximum, number of days of growing season.
  2.6.3 Relative humidity: establish what measure is important—average, minimum, maximum, perhaps number of days at a certain RH (if available).
  2.6.4 Rainfall: establish what is important—average rainfall, average seasonal rainfall (what time of year), cumulative rainfall.
  2.6.5 Soil type: name of soil (FAO classification) and soil pH (if available).
  2.6.6 Altitude: minimum, maximum, range (m).
  2.6.7 Agro-ecological zone (FAO or national classification).
  2.6.8 Topography: description of terrain and slope types.
  2.6.9 Near or far from markets: name markets if possible.
  2.6.10 Access to inputs and credit.
2.7 Which other countries the variety/CA practice is already being used in (if relevant).
2.8 Similar agro-climatic areas/countries where it can potentially be applicable.
2.9 Type(s) of farmers for whom the technology/practice is suitable.
2.10 Who are the users of the variety/CA practice?
2.11 Benefits of the variety/CA practice for the farmer.
2.12 Drawbacks of the variety /CA practice for the farmer.
2.13 Enabling factors for scaling-out.
2.14 Enabling factors for spillover.
2.15 Constraining factors for scaling-out.
2.16 Constraining factors for spillover.
2.17 Resources needed to make it work, availability and access.

3. Approaches and knowledge products being used for scaling-out and, where relevant, spillover

3.1 Communication infrastructure available to the farmers: mobile phone networks, access to computers, landlines and postal service.

3.2 Technical assistance support: name of local extension office, any named NGO support, international donor project.
3.3 What **extension approaches** have been used? (For example, demos, field days, exchange visits, farmer field schools).
3.4 What **knowledge products** have been used to support the extension approach? (For example posters, radio broadcasts, documentaries, fliers, plays)
3.5 Is the approach demand-led, market-led, technology-led or institution-led?
3.6 Were the messages blanket or tailored to specific locations or circumstances?
3.7 Which of these approaches and methods were most effective and why?
3.8 Which were not effective and why?
3.9 Which institutions are involved? (For example, government, NGOs, community based organisations, private companies, projects, donors)?
3.10 What are the institutional linkages (For example, is there an 'innovation platform', a value chain or a central organisation that is promoting and coordinating the use of the technology?)
3.11 To what extent could the extension approaches and knowledge products be used in other countries?

4. Gender considerations

4.1 What gender implications were considered in the development and dissemination of the variety/CA practice? (Probe here on the extent to which gender concerns are addressed in technology innovation)
4.2 Gender issues/concerns that should be considered to scale-out/spill over adoption of the technology/practice.
4.3 Roles and responsibilities of men and women in use of the variety/CA practice (probe whether female and male farmers respond differently to the new varieties/CA practices).
4.4 Rights of men and women in relation to the variety/CA practice (probe here as to whether the variety/CA practice promotes gender equality).
4.5 Access to the variety/CA practice (including inputs) for women and men (do women and men have equal access?)
4.6 Appropriateness of the variety/CA practice for women and men.
4.7 Uptake by women and by men (probe whether men and women are participating equally in knowledge generation).

(The sex-disaggregated information cannot be exhaustive, as specific situations will undoubtedly vary according to country or region and over time. However, the information should help articulate gender differentiations/demands of users, promoting equal opportunities for female and male farmers as participants and beneficiaries of knowledge).

5. Economic considerations

5.1 What are the basic costs (local currency and equivalent US$) associated with application/utilisation of the technology/practice? (You may want to consider such costs as purchased inputs, labour [family and hired] construction or installation)
5.2 Estimated revenues.
5.3 Profit or loss (local currency and equivalent US$) calculated using gross margin analysis where applicable.
5.4 Cash required for purchase of inputs/infrastructure (one-off or ongoing).
5.5 Speed of return to investment.
5.6 Rate of return to investment.
5.7 Profit and loss sensitivities (inputs, labour, price, transport costs) from gross margin analysis.

5.8 Timely access to inputs/credit/grants and markets.
5.9 Need for good transport facilities (roads, rivers, ports, railways, trucks, boats, airplanes).
5.10 Risks of failure: pests (in field, post-harvest), diseases (in field, post-harvest), drought, floods, hail, other climatic risk, market failure, security/theft.

6. Private sector role

6.1 What are the opportunities for private sector involvement? (Use this section to pull together all findings concerning private sector)

7. Current situation and future scaling-up

7.1 What are the critical and essential factors (for example, social, environmental, institutional, policy and regulatory, market, infrastructure) for the scaling-up of the technology/practice within the country?
7.2 What are the factors for spillover to other countries?
7.3 What are the challenges (if any) encountered in respect of further dissemination and scaling-out of this technology/practice?
7.4 Recommendation for addressing the challenges.
7.5 What are the challenges for spillover?
7.6 Recommendation for addressing the challenges.

8. Case study or success stories

8.1 Provide at least one or two success stories regarding beneficiaries attesting to the ability of the variety or CA best practice to make a meaningful change (effects such as incomes, food security, livelihoods). Ensure that the profiles provided as case studies are written as success stories and contain appropriate quantifiable information and pictures. Include named locations where possible.

9. Contact details

9.1 Contact details of the interviewee.
9.2 Any other relevant contact details.

10. Additional information

10.1 Photographs in original JPEG format, maps, charts, dissemination or promotional materials and so on. This should be provided separately as annexes to the proforma.

Annex 5: Matrix of findings on conservation agriculture and varieties

5.1 Conservation agriculture practices

Conservation agriculture practice	Problem it aims to address	Where in sub-region it has been promoted	Similar agro-climatic zones or countries for possible application	Justification for scaling-out and spillover
No tillage or minimum soil disturbance.	• Soil erosion and moisture loss • The threat of climate change • *Striga asiatica* (witch weed)	Uganda, Mali, Cameroon, Ghana, Zimbabwe, Zambia, Guinea, Burkina Faso, Swaziland and all SIMLESA countries	Uganda, Rwanda, Burundi, Sudan, Mali, Cameroon, Ghana, Zimbabwe, Zambia, Guinea, Burkina Faso, Rwanda and Democratic Republic of Congo	Persistent drought and dry spells due to climate change. Striga is a widely found weed in the SIMLESA countries as well as in the whole Eastern and Southern sub-region. Reduces risk to soil erosion.
Weed management (use of herbicides).	• Control weeds	Uganda, Zambia, Zimbabwe and all SIMLESA countries	Uganda, Rwanda, Burundi, Sudan, Mali, Cameroon, Ghana, Zimbabwe, Zambia, Guinea, Burkina Faso and The Democratic Republic of Congo, Sudan	It is labour saving and suitable even for labour constrained households such as the elderly and frequently ill. It also addresses poverty through improvement in soil fertility, thereby reducing demand for inorganic fertilisers
Soil cover with crop residue.	• Soil fertility decline since most farmers are poor and cannot afford inorganic fertiliser • Fluctuating soil temperature • Low soil organisms. Decomposition of crop residue improves microorganism activity in the soil and leads to fertility improvement	Uganda, Zambia, Zimbabwe and all SIMLESA countries	Uganda, Rwanda, Burundi, Sudan, Mali, Cameroon, Ghana, Zimbabwe, Zambia, Guinea, Burkina Faso, Democratic Republic of Congo(DRC) and Sudan	Persistent drought and dry spells due to climate change. The practice conserves moisture even during relatively dry conditions. Additionally, soil fertility decline is a common phenomenon in sub-Saharan Africa.
Maize–legume intercropping.	• Soil fertility decline; • The sale of legumes (such as pigeon peas)contributes to household income (poverty)	Uganda, Zambia, Zimbabwe and all SIMLESA countries	Mozambique, Rwanda, Burundi, Uganda, Sudan, Cameroon and DRC	Land shortage is increasing due to population growth. The legume significantly contributes to household income, soil fertility and nutrition.

Conservation agriculture practice	Problem it aims to address	Where in sub-region it has been promoted	Similar agro-climatic zones or countries for possible application	Justification for scaling-out and spillover
Maize–legume rotations.	• Soil fertility decline • Legumes are a source of household income and a cheap source of protein	Zambia, Zimbabwe, Mozambique, Uganda, DRC and all SIMLESA countries	Zambia, Zimbabwe, Mozambique, Uganda and DRC	Land shortage is increasing due to population growth. The legume significantly contributes to household income, soil fertility and nutrition.
Pit planting.	Soil moisture loss (water harvesting measure)	Zambia, Zimbabwe and Malawi	Mozambique, Rwanda, Burundi, Uganda, Sudan, Cameroon and DRC	Moisture stress is becoming a regular phenomenon during the crop cycle. Pit planting conserves moisture for long periods and makes it available for crop growth.

5.2 Maize varieties

Country	Maize variety	Problems addressed	Agro-ecology	Source of material and other comments
Ethiopia	Hybrids			
	BH-660, BH-661, BH-543, BKH-1, BKH-5, BKH-8	Major biotic and abiotic stresses: ✓ Disease (leaf rust, leaf blight, grey leaf spot) Low yield	Subhumid mid-altitude (BH-540 Gibe-2, Gibe-1) Some promoted for transitional mid to highland areas (such as BH-660, BH-661). Annual rainfall: 1000–1500 mm Altitude: 1600–2200 m asl	
	MH-130 (recently released) MHQ-138 (recently released) SC-403 (recently released)	Major biotic and abiotic stresses ✓ Drought/low moisture stress ✓ Disease (leaf rust, leaf blight, grey leaf spot) Low yield	Some have been promoted (such as Melkassa 2, Melkassa-6Q) to Central Rift Valley of Ethiopia Annual rainfall: 600–800 mm Altitude: 1200–1700 m asl	MH-130 and MHQ-138 National programme and SC 403 Seed Co regional programme
	Open pollinated varieties			
	Melkassa-2 Melkassa-5 Melkassa-6Q	Major biotic and abiotic stresses ✓ Drought/low moisture stress ✓ Disease (leaf rust, leaf blight, grey leaf spot) Low yield	Some have been promoted (such as Melkassa 2, Melkassa-6Q) to Central Rift Valley of Ethiopia Annual rainfall: 600–800 mm Altitude: 1200–1700 m asl	National programme and CIMMYT
	Gibe-2 Gibe-1	Major biotic and abiotic stresses ✓ Disease (leaf rust, leaf blight, grey leaf spot) Low yield	Subhumid mid-altitude (BH-540 Gibe-2, Gibe-1) Some have been promoted for transitional mid to highland areas (such as BH-660, BH-661). Annual rainfall: 1000–1500 mm Altitude: 1600–2200 m asl	National programme

Country	Maize variety	Problems addressed	Agro-ecology	Source of material and other comments
Kenya	KH539E	High yielder Medium maturity Disease tolerance (grey leaf spot and maize streak virus—MSV) flint	Upper midland Altitude: 1300–1500m asl Annual rainfall: 500–800 mm, well distributed Optimum temp: 18–25°C	
	H520	High yield Medium maturity	Upper midland Altitude: 1300–1500 m asl Annual rainfall: 500–800 mm, well distributed Optimum temp: 18–25°C	
	KH500Q	Quality protein Medium maturity	Upper midland Altitude: 1300–1500 m asl Annual rainfall: 500–800 mm, well distributed Optimum temp: 18–25°C	
	KH533A	Early maturity	Upper midland Altitude: 1300–1500 m asl Annual rainfall: 500–800 mm, well distributed Optimum temp: 18–25°C	
	KH631Q	Striga tolerant	Lower midlands to medium midlands Altitude: 1200–1500 m asl Annual rainfall: 500–800 mm, well distributed Optimum temp: 18–25°C	
Malawi	MH 26	Low yield, drought, foliar diseases (rust & GLS) White seed, flint grain, good husk cover. Early – medium 130–140 days	Annual rainfall: 500–600mm Altitude: 200–760 m asl Temp: 25–35°C Soil types: alluvial, average pH 6.0	National Programme and CIMMYT
	MH 27	Low yield, drought, foliar diseases (GLS & leaf blights) White seed, flint grain, good husk cover Medium maturity: 130–145 days	Annual rainfall: 600–1000mm Altitude: 760–1300 m asl Temp: 15–30°C Soil types: loam, average pH 5.7–6.0	National Programme and CIMMYT
	E7010 (to be coded **MH** after release)	High yielding, drought tolerant, early maturity	Low altitude areas Annual rainfall: 500–600mm Altitude: 200–760 m asl Temp: 25–35°C Soil types: alluvial, average pH 6.0	National Programme
	MAO 7007 (to be coded **MH** after release)	High yielding, drought tolerant	Mid and low altitudes	National Programme

Country	Maize variety	Problems addressed	Agro-ecology	Source of material and other comments
	CZH 87 (to be coded by the responsible seed company)	High yielding and drought tolerant. Medium maturity: 130–145 days	Mid altitude Annual rainfall: 600–1000 mm Altitude: 760–1300 m asl Temp: 15–30°C Soil types: loam, average pH 5.7–6.0	National Programme
Mozambique	Open pollinated varieties			
	Tsangano	Yield and drought tolerance	Mid and high altitude:600–1500 m asl Annual rainfall: 600–1200 mm Temp: 25–30°C	CIMMYT-ZM621. Released
	ZM523	Yield and drought tolerance	Low to mid altitude: 0–600 m asl Annual rainfall: 400–800mm Temp: 25–30°C	CIMMYT. Released 2011
	ZM 309	Yield and drought tolerance		CIMMYT. To be released in 2012
	Dimba	Early maturity, flint	Lowland and marginal areas Annual rainfall: 400–800 mm Temp: 27–35°C	IIAM
	Maize hybrids			
	Hluvukane	Yield, flint, tolerance to post harvest insects	Low and mid altitude:400–800 mm Annual rainfall: 27–35°C)	IIAM
	Olipa	Yield, QPM, foliar disease tolerance (MSV, GLS, DMR)	All agro-ecologies Annual rainfall: 400–1200 mm Temp: 25–35°C)	IIAM
	Molocue	Yield, drought tolerance	Mid and high altitudes:600–1500 m asl Annual rainfall: 600–1200 mm Temp: 25–30°C	CIMMYT-CZH0511. Released 2011
	SP1	Yield, drought tolerance	Mid and high altitudes:600–1500 m asl Annual rainfall: 600–1200 mm Temp: 25–30°C	CIMMYT-CZH0524. To be released in 2012
	DC1	Yield, drought tolerance	Mid and high altitudes:600–1500 m asl Annual rainfall: 600–1200 mm Temp: 25–30°C	CIMMYT-CZH04008. To be released in 2012

Country	Maize variety	Problems addressed	Agro-ecology	Source of material and other comments
Tanzania	Selian H208	Diseases (tolerant of blight, GLS), drought (tolerant), maturity (early 135 days), yields (high 7–8 t/ha)	Altitude: 900–1800 m asl; Annual rainfall: 600–1100 mm per growing season Temp: 15–30°C	CIMMYT and National programme
Country	**Maize variety**	**Problems addressed**	**Agro-ecology**	**Source of material and other comments**
	Selian H308	Diseases (tolerant to blight, GLS), drought (tolerant), maturity (early 135 days), yields (high 8–9 t/ha).	Altitude: 900–1800 m asl Annual rainfall: 600–1100 mm per growing season Temp: 15–30°C	CIMMYT and National programme
	SAH 779	Drought (tolerant), Diseases (resistant to MSV, GLS and Tursicum blight), Maturity (early 150 days), yields (high 8-9 t/ha)	Altitude: 1200–1600 m asl Annual rainfall: 600–1600 mm per growing season Temp: 15–28°C Moisture: 600–1100 mm	Regional trials
	SAH 636	Drought (tolerant), Diseases (resistant to MSV, GLS and Tursicum blight), Maturity (early 150 days), yields (high 6–7 t/ha)	Altitude: 1200–1600 m asl Annual rainfall: 600–1600 mm per growing season Temp: 15–28°C Moisture: 600–1100 mm	Regional trials
	SAH 638	Drought (tolerant), Diseases (resistant to MSV, GLS and Tursicum blight), Maturity (early 150 days), yields (high 7–8 t/ha)	Altitude: 1200–1600 m asl Annual rainfall: 600–1600 mm per growing season Temp: 15–28°C Moisture: 600–1100 mm.	Regional trials

5.3 Legume varieties

Country	Legume variety	Problems addressed	Agro-ecology	Source of material and other comments
Ethiopia	**Bean varieties**			
	ECAB-0081 GLP-2 ECAB-0056 Nasir Awash-1 Deme Dinkinash Awash Melka	✓ Yield increase ✓ Tolerance of major diseases and pests ✓ Drought tolerance	Mid-altitude, low moisture areas	For the same areas within Ethiopia and same agro-ecologies in spillover countries.
	Soybeans			
	Belessa-95 New variety-1 New variety-2	✓ Yield increase ✓ Tolerance of major diseases and pests	Subhumid mid-altitude areas	For the same areas within Ethiopia and the same agro-ecologies in spillover countries.
Kenya	**Pigeon peas**			
	ICEAP 00040 (Mbaazi 2)	- High yield (1.3t/ha) compared to local varieties(500kg/ha) - Tolerance of diseases	Low midlands 4. Altitude: 900–1800m asl Annual rainfall:400–800mm well distributed in growing period Temp: 15–25°C	
ICEAP 00850	- High yield (1.3 t/ha) compared to local varieties(500kg/ha) - Tolerance of diseases	Low midlands 4Altitude: 900–1800m asl Annual rainfall:400–800mm well distributed in growing period Temp: 15–25°C		
	Beans			
	Kat X69	- Early maturing (65 days). - Good seed colour - Yield 1.4–2.0 t/ha - Tolerant of rust and common bean mosaic virus and angular leaf spot - Cooks fast	Upper midlands 3–4 Altitude:900–1600m asl Annual rainfall:200–400 mm well distributed Optimum temp: 15–27°C	

Country	Legume variety	Problems addressed	Agro-ecology	Source of material and other comments
	EMBEAN 14	- Early maturing (75 days) - High yield (2 t/ha) - Good cooking quality	Upper midlands 3–4 Altitude: 900–1600m asl Annual rainfall: 200–400mm well distributed Optimum temp: 15–27°C	
	KK15	- Tolerant of root rot	Upper midlands 3–4 Altitude: 1500–1800 m asl Annual rainfall: 250–450mm well distributed Optimum temp: 15–27°C	
	KK8	- Tolerant of root rot	Upper midlands 3–4 Altitude: 1500–1800 m asl Annual rainfall: 250–450 mm well distributed Optimum temp: 15–27°C	
	KK71	- Tolerant of root rot	Upper midlands 3–4 Altitude: 1500–1800 m asl Annual rainfall: 250–450 mm well distributed Optimum temp: 15–27°C	
Malawi	**Pigeon pea:** Mwaiwathu alimi (ICEAP00557)	Low yields and drought. Medium duration. Early maturing. Market preferred (white grain)	Annual rainfall: 500–600 mm Altitude: 200–760 m asl Temp: 25–35°C Soil types: Alluvial, average pH 6.0	- Maize/pigeon pea intercropping - CA. It can be grown across agro-ecologies.
	Ground nut: Chitala (ICGV-SM 99568)	Low yields, drought, Rosette disease. Early maturity, medium to large seeded	Annual rainfall: 500–600 mm Altitude: 200–760 m asl Temp: 25–35°C Soil types: Alluvial, average pH 6.0	Maize-groundnut rotation
	Soybean: Nasoko	Low yields and drought. Seed size and colour, medium duration	Annual rainfall: 600–1000 mm Altitude: 760–1300 m asl Temp: 15–30°C Soil types: loam, average pH 5.7–6.0	- Maize- soybean rotation - CA
	Other legume varieties on the Seed Road Map			
	ICEAP 01514/15 (ppea)	Medium duration, small seed size cream colour	Can be grown across agro-ecologies	
	Kachangu (ICEAP 00040)	Large seeded, cream	Can be grown across agro-ecologies	
	JL 24	Small–medium seed, taste, high yield	Can be grown in low altitudes	
	CG 7	Medium–large seed, high oil, high yield	Can be grown across agro-ecologies	

Country	Legume variety	Problems addressed	Agro-ecology	Source of material and other comments
	Nsinjiro (ICGV-SM 90704)	High yield, rosette resistance	Can be grown in both mid and low altitude	
	Chalimbana 2005	High yield, rosette resistance, market drive	Mid-altitude	
	Makwacha	Large seeded, high yield	Can be grown in both mid and low altitude	
	Tikolore (TGX	Small–medium seeded, high yield	Can be grown in both mid and low altitude	
Mozambique	**Soybean**			
	Ocepara-4	Yield, earliness and non-shattering, tolerance to virus	Mid–high altitude:600–1500 m asl Annual rainfall: 600–1200 mm Temp: 25–30°C	IITA. Released in 2011
	427/5/7	Yield, earliness and non shattering, tolerance to rust and virus	Mid–high altitude:600–1500 m asl Annual rainfall: 600–1200 mm Temp: 25–30°C	IITA. Released in 2011
	H7	Yield, earliness and non-shat tering, tolerance to rust and virus	Mid to high altitude:600–1500 m asl Annual rainfall: 600–1200 mm Temp: 25–30°C	McKnight. Released in 2011
	17	Yield, earliness and non-shattering, tolerance to rust and virus	High altitude and most suited to Angonia site Altitude:600–1500 m asl Annual rainfall: 600–1200 mm Temp: 25–30°C	McKnight. Released in 2011
	Cowpea: IT16 (TL-II), IT) 18)	Determinate, tolerance to rust and to ascochita	North and centre Altitude:600–1500 m asl Annual rainfall: 600–1200 mm Temp: 25–30°C	IITA. IT16 released in 2011

	Common bean: CAL 143,	Tolerant to bacterium wilt, drought tolerance and tolerant of low soil fertility	North and centre Altitude:600–1500 m asl Rainfall: 600–1200 mm Temp: 25–30 °C	McKnight. Released in 2011

Country	Legume variety	Problems addressed	Agro-ecology	Source of material and other comments
	Pigeon pea: ICEAP 00040	Long cycle (able to escape pest infestation), high yield	North and centre Altitude:600–1500 m asl Annual rainfall: 600–1200 mm Temp: 25–30°C	ICRISAT Released in 2011
Tanzania	ICEAP 00554 ICEAP 00557	Diseases (resistant to Fusarium wilt). Drought (tolerant), maturity (early maturity)	Altitude: 0–700 m asl Temp: 25–30°C	ICRISAT
	ICEAP 00040 (Mali)	Diseases (resistant to Fusarium wilt). Drought (tolerant), maturity (early 160–180 days). Low yields (high 3t/ha)	Altitude: 900–1500 m asl Temp: 15–25°C	ICRISAT

Annex 6: Materials gathered in field

6.1 Materials from Kenya visit

Title	Type	Who provided it
Up-scaling legume seeds	4-page summary document	Charles Nkonge
The importance of crop rotations	2-page brochure	Fred Kanampiu
Manual and animal traction seeding systems in conservation agriculture	2-page brochure	Fred Kanampiu
The role and importance of residues	2-page brochure	Fred Kanampiu
Implementing conservation agriculture on farmers' fields	2-page brochure	Fred Kanampiu
Managing conservation agriculture demonstration plots	2-page brochure	Fred Kanampiu
Calibration and operation of jab planters	2-page brochure	Fred Kanampiu
Kilimo salama	2-page brochure	Anastasia (field visit)
Kilimo salamaplus	2-page brochure	Anastasia (field visit)
SIMLESA farmers coordinates	1-page sheet	Alfred Micheni
SIMLESA farmers' field day	Newsletter	Alfred Micheni
The organic farmer	Collection of articles	Alfred Micheni
SIMLESA speaks…	SIMLESA publication, case studies	Alfred Micheni
ACIAR Annual Report 2010–11, Africa	Summary article	John Achieng
Africa Food Security Initiative (2010–2013) ACIAR SIMLESA project field day in West Kenya	Article from Nairobi Post	John Achieng
Famine proofing Africa: ABC Rural exploring food security in Kenya	Australian radio broadcast transcript	John Achieng
Kenyan farmers showcase their harvest	Australian Embassy website article	John Achieng
Precision nutrient management for improved efficiency, healthier and more productive soils under maize and wheat systems in India	CIMMYT Informa newsletter	John Achieng
KILIMO-KARI 5pm	Radio Mambo broadcast transcript (Swahili)	John Achieng
Eco-friendly weed killer to boost food security	The County Weekly article	John Achieng
Kenya promoting conservation farming to fight food insecurity	The East African (regional newspaper) article	John Achieng
GIS data	Green textbook photocopies	Alfred Micheni
SIMLESA Highlights July–December 2011	Bulletin	Fred Kanampiu
Conservation agriculture as practised in Ghana	Book	ACTN
Conservation agriculture as practised in Kenya	Book	ACTN
Conservation agriculture: a Uganda case study	Book	ACTN
Conservation agriculture as practised in Tanzania: three case studies	Book	ACTN
Quality protein maize KH631 Q	Poster	Captain Karanja
KDV-1 Freshco's quality drought tolerant maize variety	Poster	Captain Karanja
Freshco Seeds seed catalogue	Brochure	Captain Karanja

Title	Type	Who provided it
Drought tolerant crops	Leaflet	Captain Karanja
Hybrid maize Longe 10H	Leaflet	Captain Karanja
CA-ARD project summary by ACT	8-page summary article	ACTN
Characterisation of soil nutrient levels in smallholder farms in Eastern Kenya	3-page article	Fred Kanampiu
Initial results on the response of maize and pigeon peas to conservation agriculture at Karatu–Tanzania	4-page article	Fred Kanampiu
SIMLESA to promote conservation agriculture, Mirimir (Ethiopian Institute for Agricultural Research newsletter)	Short article in a 6-page newsletter	Fred Kanampiu
Kenya promoting conservation farming to tackle food insecurity	1-page article in The East African	Fred Kanampiu
DIST food security	Australian radio programme, 6:21	Fred Kanampiu
SIMLESA country posters	PDF file (SIMLESA posters 11 October 2011)	Fred Kanampiu
VoA (Voice of America) SIMLESA report	American radio programme on SIMLESA work (6:38)	Fred Kanampiu
The DTMA Project Platform Newsletter, May–July 2011	Newsletter	Dan Makumbi
E-news briefs	8 briefs on the role of the private sector, the benefits of drought-tolerant maize, scaling-out and partnerships	Dan Makumbi
Embu agronomy to report Triple line	PowerPoint presentation	Alfred Micheni
Embu Met data revised	Temperature, rainfall and evaporation data for Embu	Alfred Micheni
Embu report February 2012	PowerPoint presentation	Alfred Micheni
Ezekiel Objective 3b	PowerPoint presentation on legume varieties	Alfred Micheni
KARI RE CAPT 2	Field day video clip	Alfred Micheni
Kenyan farmers showcase their harvest	YouTube video clip	John Achieng
Posters used by village-based advisors to advise farmers	Photographs	Paul Seward
Empowering millions of smallholder farmers to put research into use to improve their food security in East Africa	Methodology brief	Paul Seward

6.2 Materials from Ethiopia visit

Title	Type	Who provided it
SIMLESA Ethiopia highlights for Jan–Dec 2011	Printed handout	SIMLESA Country Coordinator
Commercial Bank of Ethiopia awaits 200 million birr loan fromthe enterprise	Newspaper article in The Reporter, Sat 25 June 2011	Internet
SIMLESA: CA-based technologies for sustain-able maize–legume cropping system in CRV and mid-altitude areas of Ethiopia	2-page handout	SIMLESA Country Coordinator
SIMLESA summary, Hawassa area	2-page handout	Country Coordinator
Objective 2 work at Awassa ARC. Presented at the Annual Review and Planning meeting 30–31 Dec2011	PowerPoint presentation	Salomon Admassu
Objective 3 work at Awassa ARC Presented at the Annual Review and Planning Meeting 30–31 Dec 2011.	PowerPoint presentation	Salomon Admassu

Title	Type	Who provided it
Pulse production regions: 2011	Paper mostly in Amharic (NB has map of pulse producing areas)	Kenu Abate, MoA
Map of pulse production regions	Single sheet map	Kenu Abate, MoA
Estimate of area, production and yield of crops for 2009/10 and 2010/11, Meher season	Table (NB from Ethiopia Central Statistics Agency)	Kenu Abate, MoA
Analysis of seed system in Oromia: opportunities for improvement (2011)	PowerPoint presentation (very good)	Kedir Nefo, Director Oromia Seed Enterprises
Feeding the Future Issue 27, Oct 2011	Magazine/newsletter	Dr Aberra Debelo, SSG2000

6.3 Materials from Tanzania visit

Title	Type	Who provided it
Rainfall time series data for Karatu, Mbulu, Kilosa and Mvomero districts	Excel file, soft copy	Mr Mmbando, Objective 1 Leader
No title: Key macro-economy information on Tanzania	Soft copy, 2 pages	Mr Mmbando, Objective 1 Leader
SIMLESA baseline report	Soft copy	Mr Mmbando, Objective 1 Leader
WADEC plan, M&E gaps	Hard copy,1 page	Director of WADEC
WADEC profile	Hard copy, 7 pages	WADEC Director
Constraints and proposed solutions to the livelihoods improvement for small-scale farmers in Tanzania	Hard copy, 23 pages	RECODA Director
ASA brochure	Hard copy	Deputy farm manager
Safari report for Malawi study tour (24 November to 3 December 2002)	Hard copy, 20 pages	RECODA Director
Poster—with CA photos in Swahili. Prepared by African Conservation Tillage Network	One big page, did not have a copy in English	WADEC Director
Brief organisational profile for RECODA (May 2011)	Hard copy, 12 pages	RECODA Director
Title	**Type**	**Who provided it**
Farmer book—only in Swahili—the Director explained what the book/manual was about	Hard copy	RECODA Director
Conservation agriculture for sustainable agriculture in rural development	Hard copy, 4 pages with photos on CA and light farm implements	WADEC Director
RECODA 2012 calendar	Hard copy	RECODA Director

6.4 Materials from Malawi visit

Title	Type	Who provided it
Improving the livelihoods of smallholder farming communities in Malawi, Mozambique, Tanzania and Zambia	Brochure, project brief, hard copy, 4 pages	Spencer Ng'oma,
Land-care practices in Malawi	Book/manual, 251 pages, hard copy	Spencer Ng'oma,
Agro-forestry tree propagation and out-planting	MAFE Booklet Series No. 1, hard copy, 71 pages	Spencer Ng'oma,
The voices of farmers	Brochure, hard copy	Mark Matabi

Title	Type	Who provided it
A production of Seed Trade Association of Malawi	Brief about STAM and its membership, hard copy, 38 pages	Supply Chisi
Za Achikumbi	Extension newsletter for farmers, hard copy	DAES (Division of Agricultural Extension Services)
Department of Agricultural Extension Services organogram and staff establishment	One page photocopy	Clodina Chowa
Guide to agricultural production and natural resources management	Summary guide, hard copy, 88 pages	G Ching'oma
Overcoming market challenges for smallholder farmers: the case of groundnuts in Malawi	Project brief, hard copy, 8 pages	O Chinzonga
A Malawi Seed Alliance newsletter. Securing the harvest: the Malawi Seed Industry Development Project	Hard copy, Issue 1, Volume 1	O Chinzonga
Soybean breeding	Brochure, IITA	Alene Arega
Soybean agronomy. A participatory approach to develop crop management recommendations for smallholder soybean producers in Malawi	Brochure, IITA	Alene Arega
Quantitative analysis of sustainable land and water management technologies in Malawi	Report, soft copy	Mloza-Banda
National investment framework for conservation agriculture in Malawi	Report, soft copy	Mloza-Banda
Review of the experiences in rainwater harvesting and small-scale water resources development	Report, soft copy	Mloza-Banda
Conservation agriculture programmes and projects in Malawi: impacts and lessons	Report, soft copy	Mloza-Banda
Conservation agriculture research study 2011	Report, soft copy	Mloza-Banda
Policies and institutional arrangements relevant to conservation agriculture in Malawi	Report, soft copy	Mloza-Banda
African Technology Policies Network (ATPS). ATPS Malawi chapter, Lilongwe, Malawi	Report, soft copy	Mloza-Banda
Case studies of successful land and water management systems in dryland of Malawi	Report, soft copy	Mloza-Banda
STAM position on 2011/12 Farm Input Subsidy Program	Position paper, soft copy	Supply Chisi
Environmental impact assessment of the Farm Input Subsidy Program	Inception report, soft copy	Christopher Mbukwa, MoAIWD
2011/12 FISP implementation guidelines	Guidelines, soft copy	Osborne Tsoka
Concept note for Malawi seed industry development	Concept note, soft copy	Supply Chisi
Grain legume market information system	Baseline report, soft copy	Supply Chisi
Adoption of conservation agriculture in Malawi	MSc thesis, soft copy	Supply Chisi

Annex 7: Workshop schedule

Workshop schedule: Stakeholder validation and dissemination workshop: SIMLESA scaling-out and spillover study findings and recommendations

Thursday 3 and Friday 4 May 2012, from 9 am to 5 pm, Nairobi Hilton Hotel

Participants: SIMLESA coordinators and objective leaders; NARS representatives from potential spillover countries; and CIMMYT and ASARECA personnel

Session	Time	Topic	Purpose of session
	8.30 am–9 am	Registration of participants	
1	9 am–9.30 am	Introductory session: • Welcome • Introductions • Participant expectations • Objectives • Outline of the workshop	To get to know each other and for all to understand and agree on purpose of the workshop
2	9.30 am–11 am	Findings on available conservation agriculture practices	To share, discuss and validate findings on Conservation Agriculture
3	11.30 am–1 pm	Findings on maize–legume varieties	To share, discuss and validate findings on maize–legume varieties
	2 pm–3.30 pm	Maize–legume varieties (continued)	To share, discuss and validate findings on maize–legume varieties
4	4 pm–5.30 pm	Findings on extension approaches and knowledge products	To share, discuss and validate findings on extension approaches and knowledge products
5	9 am–10.30 am 5 May	CA practices (picked up from session 2 above)	Participant validation
6	11 am–1 pm	Findings on barriers to and enabling factors for scaling-out and spillover	To share findings, discuss in plenary and carry out group exercises on 'killer' barriers and key drivers of change/enabling factors.
	2 pm–3 pm	Making the most of opportunities and turning barriers into opportunities	To analyse in depth each type of barrier/ opportunity (group work)
7	3.15 pm–4.30 pm	Enhancing spillover—strategy options	To identify SIMLESA and national strategy options for enhancing spillover
8	4.30 pm–5 pm	The GIS process and conclusion	To introduce the GIS process To conclude the workshop

Annex 8: Workshop participant list

Participants at the SIMLESA spillover validation workshop held at the Hilton, Nairobi, 3–4 May 2012

1	Dr Pedro Fato Maize Breeder Mozambique National Research Institute IIAM Av. DAS FPLM 2698 Mavalance Maputo MOZAMBIQUE CP 3658 MAPUTO Tel:+2588298189 Fax: +25821460074 Email: fatopedro@hotmail.com	2	Mr Cyprian Doka Mwale Research Scientist Department of Agricultural Research Services Chitedze Research Station PO Box 158 Lilongwe MALAWI Tel:+265999318544 +2651707 222041 Fax:+2651707041 Email: cyprianmwale@yahoo.com
3	Mr Donwell Kamalongo Maize Agronomist DARS Chiteoze Research Station PO Box 158 Lilongwe MALAWI Tel:+265991740679 Fax: +2651707041 Email: dkamalongo@yahoo.com	4	Dr John Sariah Breeder/Agronomist Selian Agricultural Research Institute PO Box 6024 Arusha TANZANIA Tel:+255777539699 Email: jsariah@yahoo.com
5	Mr Kheri M. Kitenge Maize Breeder Selian Agricultural Research Institute PO Box 6024 Arusha TANZANIA Tel:+255754855298 Email: kkitenge@yahoo.com	6	Mr John O Achieng Senior Research Officer Kenya Agricultural Research Institute PO Box169-50100 Kakamega KENYA Tel: +254 722 371 873 Email: joachieng2004@yahoo.com
7	Mr Solomon Jemal SIMLESA Objective Two Leader Ethiopian Institute of Agricultural Research (EIAR)/ NARC Melkassa Agricultural Research Centre PO Box 436 Nazareth ETHIOPIA Tel:+251911348182 Email: YESOL78@yahoo.com;YEMELK80@gmail.com	8	Mr Albert MZ Chamango Groundnut Breeding–Research Scientist Department of Agricultural Research Services Chitedze Research Station PO Box 158 Lilongwe MALAWI Tel:+265995945026 Fax: +2651-707-041 Email: achamango@gmail.com

9	Mr Domingos Dias Mozambique National Research Institute IIAM Av. DAS FPLM 2698 Maputo CP 42 Chimoio, Manica MOZAMBIQUE Tel:+258 25124422 +258 840622102 Fax: +25821460074 Email: djosedias@gmail.com	10	Dr Lydia Kimenye Programme Manager ASARECA PO Box 765 Entebbe UGANDA Tel:+256772798628 Email: l.kimenye@asareca.org
11	Mr Charles Mugo Rimui Senior Technical Assistant Kenya Agricultural Research Institute PO Box 27-60100 Embu KENYA Tel: +254710276357 Email: mugorimui@yahoo.com	12	Mr Robert Kabasi Accounts Assistant ASARECA PO Box 765 Entebbe UGANDA Tel:+256772367017 Email: r.kabasi@asareca.org
13	Dr Alexander Phiri Senior Lecturer in Agricultural Economics/Consultant Bunda College of Agriculture PO Box 219 Lilongwe MALAWI Tel: +265 999 283 718/888832056 Email: marphiri1996@yahoo.com	14	Ms Maureen Katafiire Programme Assistant ASARECA PO Box 765 Entebbe UGANDA Tel:+256778451134 or +256712812418 Email: m.katafiire@asareca.org or maureen.balinda@gmail.com
15	Mr Luka Atwok Ministry of Agriculture and Forestry Ministries Complex Airport Road Juba SOUTH SUDAN Tel:+211955614010 Email: lukatwok@yahoo.com	16	Dr Mulugetta Mekuria SIMLESA Programme Leader CIMMYT-Southern Africa Box MP 163, Mt. Pleasant Harare ZIMBABWE Tel:+263712604006 Email: m.mekuria@cgiar.org
17	Dr Fred Kanampiu Agronomist CIMMYT PO Box 1041-00621 Nairobi KENYA Tel: +254207224600 +254722154877 Fax: +25420722460 Email: f.kanampiu@cgiar.org	18	Dr Hezron Mogaka Programme Manager ASARECA PO Box 765 Entebbe UGANDA Tel:+254722325500 Email: h.mogaka@asareca.org

	Dr Michael Waithaka Programme Manager ASARECA PO Box 765 Entebbe UGANDA Tel:+256 414321780 +256782654085 Email: m.waithaka@asareca.org		Mr Gezahegn Bogale Gebre SIMLESA Objective Three Leader Ethiopian Institute of Agricultural Research (EIAR)/NARC Melkassa Agricultural Research Centre PO Box 436 Adama ETHIOPIA Tel:+251911362250 Email: gezahegnbogale2004@gmail.com
19	Mr Ezekiah Ngoroi Principal Research Officer Kenya Agricultural Research Institute PO Box 27-60100 Embu KENYA Tel: +254720852947 Email: ehngoroi@yahoo.com	20	Dr Drake N Mubiru Senior Research Officer National Agricultural Research Organisation (NARO) NARL-Kawanda PO Box 7065 Kampala UGANDA Tel:+256782415843 Fax: +256414567226 Email: dnmubiru@kari.go.ug or drakenmubiru@yahoo.com
21	Dr Nabahungu Nsharwasi Leon Senior Scientist–Natural Resource Management Rwanda Agricultural Board (RAB) PO Box 5016 Kigali RWANDA Tel:+250788422519 Email: nabahungu@yahoo.com or nabahungu@gmail.com	22	Mr Charles Nkonge Senior Principal Research Officer Kenya Agricultural Research Institute PO Box 57811-00200 Nairobi KENYA Tel: +254722327936 Email: cnkonge@kari.org
	Dr Rachel B Percy Senior Consultant Church & Court Barn Church Lane, Tickenham Bristol BS21 6SD UNITED KINGDOM www.theIDLgroup.com Tel: +44 (0)1275 811 345 Mob: +44 (0)7968 053 731 Fax: +44 (0) 1275 811 333 Email: rachel.percy@theIDLgroup.com Skype: rachelpercyatwork		

This document has been produced using funds provided to ASARECA by the Australian Centre for International Agricultural Research (ACIAR) through the International Maize and Wheat Improvement Center (CIMMYT). The contents of this document should in no way be taken to reflect the views of CIMMYT or ACIAR.

ASARECA
Transforming Agriculture for Improved Livelihoods

For further information:
The Executive Director, ASARECA
Plot 5, Mpigi Road
PO Box 765
Entebbe, Uganda
tel:+256 414 321126/320556/321885
fax: +256 414 321126/322593
www.asareca.org