

THE SIMLESA Bulletin

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SUSTAINABLE INTENSIFICATION OF MAIZE-LEGUME CROPPING SYSTEMS FOR FOOD SECURITY IN EASTERN AND SOUTHERN AFRICA

 **CIMMYT**^{MR}
International Maize and Wheat Improvement Center



Australian Government

Australian Centre for
International Agricultural Research

Agriculture Ministers Support Policies to Achieve Africa's Growth Potential

Johnson Siamachira



Eastern and southern African countries need to formulate and implement appropriate policies to help smallholder farmers access technologies that will enable them to increase farm yields and improve crop resilience and nutrition to address poverty, food security, and economic growth, renowned Zimbabwean agricultural economist and academic Mandivamba Rukuni told a high-level policy forum.

Delivering the keynote address at the SIMLESA policy forum co-organized by CIMMYT and the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) in Entebbe, Uganda, on 27–28 October, Rukuni said this can only be achieved through a dramatic shift to help smallholder farmers produce sufficient food for themselves, plus generate income. “Such technologies include improved seed varieties and fertilizers, and better infrastructure such as roads and small-scale irrigation,” said Rukuni. SIMLESA is funded by the Australian Centre for International Agricultural Research (ACIAR) and implemented by CIMMYT.

The forum, whose theme was “Mobilizing policy action to scale up best agricultural practices,” was attended by the ministers of agriculture of Kenya (represented by Jacinta Ngwiri), Mozambique (Feliciano Mazuze), Rwanda (Charles Murekezi), Tanzania (Hussein Mansoor), and Uganda (Ambrose Agona).

Five challenges that stand in the way of wide-scale adoption of sustainable intensification and policy options were the subject of discussion: sustainable intensification of maize and legume production and livestock integration; building on social capital for collective action; facilitating access to key farm inputs; removing barriers to border trade; and containing maize lethal necrosis: current knowledge

Representatives of the agriculture ministers after signing the communique. From left to right: Charles Murekezi, representing the Minister of Agriculture and Animal Resources, Rwanda; Ambrose Agona representing the Minister for Agriculture, Animal Industry and Fisheries, Uganda; Jacinta Ngwiri, representing the Minister for Agriculture, Livestock and Fisheries, Kenya; Hussein Mansoor, representing the Minister of Agriculture, Food Security and Cooperatives, Tanzania; and Feliciano Mazuze, representing the Minister for Agriculture and Food Security, Mozambique. In attendance is Mulugetta Mekuria (in khaki shirt), CIMMYT - SIMLESA project leader and Francis Wachira ASARECA Interim Executive Secretary. Photo by Johnson Siamachira / CIMMYT

Fifty people participated, including researchers from CIMMYT, national agricultural research systems (NARS), ACIAR, international and regional non-governmental organizations, farmer associations, and private companies. The ministers pledged to support sustainable agricultural intensification and concurred that enhancing access to markets, extension services, and inputs is a fundamental policy issue that must be urgently addressed so farmers can reap more benefits from agriculture.

High on the agenda was formulating policies that would shape an agricultural market estimated to be worth billions of dollars. At the end of the two-day forum, the ministers acknowledged in a joint communiqué that the market faces many operational challenges. They also pledged to influence their governments to establish sound policies backed by evidence from agricultural research. ■ [To page 3](#)



ETHIOPIA



KENYA



MALAWI



MOZAMBIQUE



TANZANIA



AUSTRALIA



THE UNIVERSITY OF QUEENSLAND AUSTRALIA



QAAFI Queensland Alliance for Agriculture and Food Innovation



CIAT



ASARECA Transforming Agriculture for Improved Livelihoods



ARC LNR



ILRI



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This means empowering the smallholder farmers by giving them access to finance, better seeds and fertile soil, effective extension services, reliable markets, and supportive policies. Policymakers, the communiqué continued, can boost Eastern and Southern Africa's agricultural development by removing hurdles that limit the productivity of women farmers relative to men. The five ministers pledged to support the establishment and implementation of effective, research-backed policies.

The representatives of the agriculture ministers expressed a continued commitment to the region's smallholder farmers including pushing for further progress under the African Union (AU)'s Comprehensive Africa Agriculture Development Programme. Launched 11 years ago by the AU in Maputo, Mozambique, and approved by African governments, the program calls on these governments to commit at least 10% of their annual national budgets to agriculture and reach 6% annual agricultural growth by 2015.

According to B.M. Prasanna, Director of the CGIAR Research Program MAIZE and CIMMYT's Global Maize Program, gone are the days when agricultural production in developing countries depended on multinational organizations. "Agriculture in Eastern and Southern Africa continues to underperform because it is not giving farmers enough yield to feed themselves and get more to take to market," he told a media briefing parallel to the forum.

In Eastern and Southern Africa, only 5% of land is under irrigation, while 60% of Asia's agricultural land is irrigated. Improved seed varieties are not widely used in the region and thus only 40% of its overall yield potential is realized, according to the Food and Agriculture Organization of the United Nations (FAO).

Prasanna added that another threat to the region's development is maize lethal necrosis (MLN), a disease that cannot be ignored. "Effective policies and practices are needed to curb the spread and impact of MLN in Africa," he observed. "We need to focus on finding practical solutions to tackle this complex challenge, including strengthening MLN diagnostic and surveillance capacity while we continue inter-institutional efforts to develop and deploy improved maize varieties that incorporate MLN resistance."

By producing and delivering healthy, MLN-free seed to farmers, the commercial seed sector also plays a key role. However, without agricultural transformation policies that endorse such basic technologies for smallholder farmers, the region's agriculture will continue to underperform.

However, there has been some progress. A few countries such as Ethiopia and Rwanda, for example, have managed to expand their agricultural sectors. They have witnessed a huge decrease in poverty, with Ethiopia reducing poverty rates by 49%. Ethiopia is investing more than 10% of its national budget in agriculture, in line with the Maputo Declaration of 2003.

SIMLESA project leader Mulugetta Mekuria urged researchers and socioeconomists to provide policymakers with factual information to facilitate the establishment of sound policies. By forging strategic, well-formulated partnerships, the region's smallholder farms stand to succeed as businesses connected to lucrative local, regional, and global markets.

But there are many obstacles along the way. For example, half of the region's population lives in extreme poverty, and more than 60% lives in remote rural areas where agriculture is the main economic activity. This is unlikely to change any time soon, strengthening the case for effective policies that will improve their lives.

Moreover, the projection is that between 2012 and 2050, the population in most sub-Saharan Africa will more than double, to 11.3 times its 1950 level. Research by FAO shows that growth in sub-Saharan Africa's agricultural sector reduces poverty 11 times more effectively than growth in other sectors.

Mekuria said food production was being hampered by climate change and called for agricultural technologies to help farmers adapt and cope with climate change impacts such as frequent droughts. At the media briefing, Mekuria explained that research results and tools aside, what was lacking was the political will and commitment to transform and make agriculture more productive and more resilient to climate change, thereby increasing food security.



Message from the project leader

Welcome to all readers of this quarterly bulletin of the International Maize and Wheat Improvement Center (CIMMYT)'s Sustainable Intensification of Maize-Legume Cropping Systems for Food Security in Eastern and Southern Africa (SIMLESA) project.

Improving the production of maize and legumes to ensure food security is the main goal of the SIMLESA project. Started in 2010, the project is funded by the Australian Centre for International Agricultural Research (ACIAR) and managed by CIMMYT. It is implemented by national agricultural research systems in five partner countries – Ethiopia, Kenya, Malawi, Mozambique, and Tanzania. Lessons from these five core countries are also implemented in other spillover countries: Botswana, Rwanda, and Uganda. The project collaborates with technical partners as sub grantees: QAAFI (Australia), ILRI, CIAT, ASARECA and ARC-South Africa.



Mulugetta Mekuria,

CIMMYT - SIMLESA project leader

I am happy to share with you this issue of the SIMLESA Bulletin which contains information on what we are collectively achieving, as well as articles and photographs that capture the essence of our field and capacity-building initiatives. During the reporting period, we organized various capacity-building activities, including workshops on gender mainstreaming. We have strengthened local innovation platforms and conducted monitoring and evaluation tours, including field days.

I am also particularly excited that we are releasing this issue after the SIMLESA Mid-Term Review (MTR) held on 16-31 October 2015. Emphasizing the scaling out of SIMLESA technologies in Phase II of the project, the MTR underscored the need for SIMLESA to consolidate its activities during Phase II. Overall, the on-farm exploratory and on-station research trials implemented during the first phase (2010-2014) resulted in the development of appropriate practices and recommended useful technologies that were adopted by farmers.

Our experiences in phase I revealed that the concerted efforts of research institutions and the continued training of government extension workers are critical for SIMLESA's long-term impact in the second phase (2014-2018). For the technical recommendations to have an impact and the expected outcome, it is indispensable to institutionalize a strong monitoring and evaluation framework, gender mainstreaming activities across the different objectives and development of outreach and communication materials for our target audience.

In this bulletin, you will read about SIMLESA-ASARECA's recent high-level policy forum held in Entebbe, Uganda, on 27-28 October. At this forum, agriculture ministers of SIMLESA partner countries supported policies to achieve Africa's growth potential. Through a joint communiqué, the ministers pledged to influence their governments to establish sound policies to support and champion sustainable intensification approaches that are backed by evidence from agricultural research.

Through various SIMLESA initiatives, sustainable intensification approaches are being promoted which could potentially improve food security and incomes of communities where SIMLESA is operational. Smallholder farmers have given their testimonies on the benefits of sustainable intensification practices they are adopting, as reported elsewhere in this issue.

On behalf of SIMLESA, I would like to thank all participating countries that have allowed our agricultural scientists to work with farmers and other agricultural organizations in the region. I would also like to express my gratitude to the larger SIMLESA family.

We acknowledge the ACIAR organized MTR team for providing us insights and useful set of recommendations that would help us to streamline our activities between 2016-2018 seasons for greater impact.

I am grateful to the SIMLESA Project Steering Committee (PSC), Project Management Committee, ACIAR and CIMMYT, who gave SIMLESA the financial and technical support as well as other resources to carry out its work.

On a lighter note, I want to end by sharing what the MTR wrote about SIMLESA:

“SIMLESA (I and II) is complex program with many partner countries, agencies, science disciplines, and objectives. Despite that complexity, the MTR found the program on the whole to be well managed by CIMMYT, and the NARS partners had a strong sense of ownership of the program. It was very evident that the whole SIMLESA team is determined to meet the objectives of the program, to contribute and to work as a team. The MTR was particularly impressed with the energy and commitment of the program’s coordination team, the leadership of the various objectives and the national teams. The input during the MTR of those members of the PSC who were present was very valuable. They too demonstrated their commitment and understanding of the program’s many dimensions and the need to deliver outcomes and impact” pp4

*Mid-Term Review Report (Draft): Sustainable intensification of maize-legume cropping systems for food security in eastern and southern Africa Phase II (SIMLESA-2)
CSE/2009/024 (variation 3) December 2015*

Thank you for being part of the SIMLESA family.
We value you and your support!
Wishing you a happy holiday season and best wishes for 2016.

Mulugetta Mekuria

Ethiopia’s Research Centers and On-farm Trials Visited & Evaluated

Sebastian Gavera



From 21-23 September 2015, SIMLESA undertook a week-long visit to assess its projects in Ethiopia.

The SIMLESA project started in 2010 in partnership with the Ethiopian Institute of Agricultural Research (EIAR) and eight of its federal and regional research centers, covering 17 districts in different agroecological environments.

SIMLESA undertook this assessment in preparation for the Mid-Term Review which was scheduled for October 2015. The monitoring and evaluation team comprising of Stuart Irvine-Brown (Soil Scientist, Queensland Alliance for Agriculture and Food Innovation), Dr. Bedru Beshir (SIMLESA-Ethiopia Country Coordinator), Elias Damtew (International Livestock Research Institute Livestock Scientist), and Sebastian Gavera (SIMLESA M&E Specialist) visited all the SIMLESA districts in western Ethiopia.

The team was meant to facilitate assessment of several SIMLESA components (checking for soil fertility tests, progress in crop and livestock integration as a strategic component of SIMLESA Phase II, and project performance in general).

Belay Ebisa, the Kebele Development Agent, Ethiopia. He is taking care of the permanent conservation agriculture demonstration plot in Ilu - Gelan District.

Ethiopia's Research Centers and On-farm Trials Visited and Evaluated

Continued

The capacities of Farmer Training Centers (FTC) were also assessed by checking what farmers were learning from the center and implementing in their individual farm plots, particularly the five SIMLESA treatments: continuous sole maize, continuous sole bean, continuous maize + bean intercropping, maize rotated with bean, and bean rotated with maize, compared to the conventional farmers' practice.

Overall, the plots were well-managed, with the farmers adopting good agricultural practices from the FTCs and expecting harvests beyond their home consumption needs. Farmers were encouraged to utilize the Innovation Platforms as a way of creating linkages with viable markets. Farmers were also encouraged to keep records and view farming as a family business.

There was satisfactory evidence that the region of Ethiopia that was visited had made tremendous strides in developing and testing SIMLESA technologies on station as well as scaling up and out for wider benefit of its smallholder farmers. The FTC platform has proved to be taking these best bet technologies and providing farmers with the technical capacity to sustainably intensify conservation agriculture.

Also, it was noted that the Bako Agriculture Research Centre (BARC) was doing very well in seed maintenance, seed production, and varietal assessment of legumes ranging from climbing bean, runner bean, soybean, pigeon pea, and cowpea.

SIMLESA Review Finds Many Successes and Major Challenges



SIMLESA Project Steering Committee co-chairperson, Eric Craswell addressing participants at the project's mid-term review meeting in Addis Ababa, Ethiopia. To the right is SIMLESA project leader, Mulugetta Mekuria. Photo by Johnson Siamachira / CIMMYT

On 16-31 October 2015, the Sustainable Intensification of Maize and Legume Systems for Food Security in Eastern and Southern Africa (SIMLESA) project undertook a two-week long Mid-Term Review (MTR) of its agricultural research and development activities on station and on farm. SIMLESA undertook this review to assess project performance and recommend actions to refine activities. The last MTR was carried out in 2012.

To wrap up the review, a two-day meeting was held with the participation of 40 people, including representatives from the Australian Centre for International Agricultural Research (ACIAR), Queensland Alliance for Agriculture and Food Innovation, the International Center for Tropical Agriculture (CIAT), the International Livestock Research Institute (ILRI), the national agricultural research systems (NARS) of Ethiopia, Malawi, Mozambique, Kenya, and Tanzania, and CIMMYT scientists from Ethiopia, Kenya, and Zimbabwe.

The primary objective of the SIMLESA project is to improve food security for 650,000 small farming households by increasing food production and household incomes of vulnerable but commercially viable farmers by 2023.

A five-member team from ACIAR, SIMLESA's funding institution, assessed the different maize-legume and forage/fodder production

systems in the project's core countries of Ethiopia, Kenya, Malawi, and Tanzania, and one spillover country, Uganda. The team also analyzed reports and presentations from Mozambique, and SIMLESA spillover countries of Botswana and Rwanda.

At the meeting held in Addis Ababa, Ethiopia, on 31 October, the entire MTR team acknowledged that CA-based maize-legume cropping systems are a highly relevant intervention to reduce small-holder farmers' vulnerability and food insecurity.

MTR team leader Bruce Pengelly said SIMLESA's second phase would enable the project to better support regional activities, and would place it more strategically among government, non-government, and development partners. His advice to SIMLESA participants: "It may not be in your best interest to embark on new, demanding work now...this is the consolidation phase where you are expected to enhance planned activities."

SIMLESA Project Steering Committee co-chair Eric Craswell said, "Showcasing our program of work remains a significant challenge. This can be overcome through programs that demonstrate the values of agricultural research and development through the use of maize-legume cropping systems, and help us share lessons learned and experiences gained."

"It may not be in your best interest to embark on new, demanding work now...this is the consolidation phase where you are expected to enhance planned activities."

Project leader Mulugetta Mekuria stressed that "While taking stock and celebrating our many successes, we are aware that there are still major challenges to be overcome. We will achieve our targets if relevant stakeholders work together for a common goal."

Overall, the on-farm exploratory and on-station research trials implemented during the first phase (2010-2014) demonstrated useful technologies that were adopted by farmers. However, the concerted efforts of research institutions and the continued training of government extension workers are critical for SIMLESA's long-term impact in its second phase (2014-2018). Another challenge is building a strong monitoring and evaluation framework, development outreach and communications, and mainstreaming gender into the way NARS plan and think.

According to adoption monitoring studies, over 46,000 farmers across SIMLESA sites adopted CA and improved maize-legume technologies in 2013. As a result of on-farm exploratory trials, by 2014, over 68% of host farmers were using two or more of these technologies in Mozambique. Across the six SIMLESA districts in Malawi, use of CA technologies increased from an average of 4% during the baseline year to 38% in 2013. This year, the project reached out to a total of 173,533 farmers, compared to the target of 143,607, accounting for a 21% increase in the number of farmers.

SIMLESA envisaged a 30% risk reduction by 2023. Using SIMLESA data from Malawi, the project found that the chances of producing extremely low yields were actually higher than had been assumed in many studies. This indicates that crop diversification and minimum tillage are strategies that can reduce the risks implicit in maize production.

Addressing participants at the MTR meeting, SIMLESA cropping systems agronomist Isaiah Nyagumbo said that during the first five years, the project focused on establishing on-farm and on-station trials to develop and test productive, resilient, and sustainable maize-legume systems that are well adapted to each country's socioeconomic, agroecological, and cultural environment.

A total of 268 maize and 378 legume varieties underwent on-farm participatory selection. "From these, the best performing maize and legume varieties that met farmers' preferences were selected and scaled up by partner companies," said Peter Setimela, SIMLESA seed systems specialist. The best varieties yielded 30-40% more under drought and 20-25% more under optimum conditions compared to commercial checks.

By October of this year, 56 agricultural innovation platforms had been established and were operating at 31 sites, according to Michael Misiko, the person responsible for scaling up project activities.

Through the project, 22 doctoral students enrolled at different universities in South Africa, Australia, Ethiopia, and Kenya. A further 42 students were pursuing Master of Science degrees at national universities in SIMLESA partner countries. Three out of 64 SIMLESA-supported NARS staff members graduated (two Ph.Ds. from Tanzania and Kenya, and one M.Sc. from Rwanda). Two more M.Sc. candidates from Mozambique studying at the University of the Free State in South Africa submitted drafts of their theses and are expected to graduate this year.

"We are encouraged by the progress made so far and expect to have a measurable impact in the years ahead. New areas of research, crop livestock integration, market link mechanisms, agricultural innovation platforms, specific climate-smart agricultural practices, and capacity building are the fresh challenges the project faces in the coming years," said Mekuria.

Drought-tolerant Maize to the Rescue as Hunger Threatens 1.5 Million in Zimbabwe



According to the World Food Programme (WFP) of the United Nations, nearly 1.5 million (16%) of Zimbabwe's 14 million people are feared to go hungry at the height of the 2015-16 lean season, a 164% increase over the previous year. This is due to a dramatic decrease in maize production. The lean season is the period after harvest when food stocks run low.

Maize is Zimbabwe's staple. At 742,000 tonnes, production has dropped by 53% compared to the 2014-15 season, according to the Southern African Development Community, of which Zimbabwe is a member.

"The situation in Zimbabwe is more extreme than in most countries in the region but it is not unique," WFP spokesperson David Orr told the Thomson Reuters Foundation. An estimated 27 million people in the region are food-insecure as a result of drought and inappropriate farming practices.

Children in a drought-stricken maize field in Gwanda District, southeast of Bulawayo, Zimbabwe's second largest city. Drought is the most frequently occurring natural hazard in Zimbabwe, made worse by the clear trend, since 1980, of decline in rainfall that the country has received each year.

Photo: Desmond Kwande/Practical Action.

Drought-tolerant Maize to the Rescue as Hunger Threatens 1.5 Million in Zimbabwe Continued

Mary Gunge, 45, and her family of six live in drought-prone Chivi District, Masvingo Province. For the past five years, life has been difficult for Gunge and other smallholder farmers in this harsh, semi-arid environment. “There are no good rains to talk about anymore,” Gunge told visiting journalists recently. The rains in her area were too little, too late. Smallholders need urgent food aid to carry them to the next harvest in May and June of next year.

Parts of Zimbabwe are experiencing unpredictable weather. Zimbabwe’s Meteorological Service says the country is experiencing more hot days and fewer cold days.

“We’re no longer sure when to start preparing the land for planting or when to start planting. It’s pretty much gambling with nature,” says Gunge.

Climate change will have a significant impact on southern Africa’s fragile food security, environmental experts have warned. It already costs southern Africa 5 to 10% of its gross domestic product. This implies a loss of between US\$ 10 and 21 billion annually in a region

where nearly half the population is living on less than one dollar a day.

To address this all-too-familiar situation, the International Maize and Wheat Improvement Center (CIMMYT)’s southern Africa Regional Office (CIMMYT-SARO) and its partners are working to increase the productivity of maize-based farming systems to ensure food and nutritional security, increase household incomes, and reduce poverty.

“Using conventional breeding, CIMMYT and partners have produced new varieties which yield 20 to 30% more than currently available local varieties under drought and low soil nitrogen,” says Mulugetta Mekuria, CIMMYT-SARO Representative. New maize varieties now account for 26% of maize hybrids grown in Zimbabwe.

By the end of this year, CIMMYT will establish a modern quarantine facility to safely import maize breeding materials to southern Africa, and to enable local institutions to proactively breed for resistance against Maize Lethal Necrosis (MLN) disease.



Showcasing various maize varieties. CIMMYT-SARO maize breeder Thokozile Ndhlela at this year’s CIMMYT field day. Partners, including the Government of Zimbabwe, witnessed CIMMYT’s work in its efforts to reduce hunger and malnutrition in southern Africa. Photo: Johnson Siamachira/CIMMYT.

More efficient use of the limited resources that smallholder farmers have is crucial for increasing food security. CIMMYT’s project on Sustainable Intensification of Maize–Legume Based Cropping Systems for Food Security in Eastern and Southern Africa (SIMLESA) focuses on increasing food production from existing farmland while minimizing pressure on the environment.

SIMLESA has successfully used the principles of conservation agriculture in Malawi and Mozambique.

“Making use of the combined benefits of minimum soil disturbance, crop residue retention, and crop rotation, conservation agriculture yields better when compared to conventional agricultural practices after two to five cropping seasons,” said Mekuria, who is also SIMLESA Project Leader.

Trials in farmers’ fields in Malawi increased yields by 20 to 60%. By using animal traction and conservation agriculture, yields in Zambia and Zimbabwe increased by almost 60%.

Peter Setimela, CIMMYT-SARO Senior Seed System Specialist, says, “Developing drought-tolerant maize will increasingly become more critical especially now when most countries in the region continue to be affected by drought.”

In the past two years, 28 varieties have been released in southern Africa that have greater tolerance to the region’s main stresses. These new varieties are expected to benefit almost 12 million people by helping to enhance food security, improve livelihoods, and reduce poverty.

Empowering Women in Agriculture through SIMLESA



Participants at the gender training workshop in Pretoria, South Africa.

CIMMYT's Sustainable Intensification of Maize-Legume-based Cropping Systems for Eastern and Southern Africa (SIMLESA) project and the Agricultural Research Council (ARC) of South Africa hosted a five-day gender training workshop on 24-29 August in Pretoria, South Africa.

Called "Situating Gender in SIMLESA", the workshop aimed at increasing awareness of gender issues in agricultural research and development, and identifying practical solutions to integrate gender into SIMLESA. It brought together a core team comprised of SIMLESA's project leader, project manager, gender focal points, monitoring and evaluation specialist, communications specialist, and country coordinators. In his opening remarks, Litha Magingxa, ARC Group Chief Executive (Agri-Economics and Capacity Development), commended SIMLESA for the gender training.

Working closely with ARC, CIMMYT gender specialist Vongai Kandiwa provided technical training to 14 participants on gender analysis tools, leadership skills, and competencies. Given the coordination role that SIMLESA gender specialists play within countries, it is essential that they have solid interpersonal and leadership skills, in addition to their gender expertise.

"This is a particularly exciting workshop because it demonstrates a strong commitment by CIMMYT and SIMLESA to actively invest in building skills and finding practical ways of integrating gender into ongoing activities," said Mulugetta Mekuria, SIMLESA Project Leader. "The workshop has highlighted some of the gender-based constraints that women and men face when they try to adopt, adapt, and benefit from sustainable intensification options. This is a critical first step to improving gender awareness and equality in the rural smallholder agriculture sector where SIMLESA operates."

Of the poor who depend on maize for their livelihoods and food security in East and Southern Africa, more than half are women and girls. Although women play a crucial role in farming and food production, they often face greater constraints in agricultural production than men. Rural women in East and Southern Africa are also less likely than men to own land or livestock, adopt new technologies, access credit and financial services, and receive education or extension advice, according to the Food and Agriculture Organization (FAO) of the United Nations.

Participants discussed challenges and opportunities to embed gender within the relevant SIMLESA work sub-objectives. They collectively identified gender entry points, specified monitoring and evaluation indicators, and agreed on an effective accountability framework. They also agreed on what should be done across all SIMLESA countries in diverse areas such as socioeconomic research, strategic gender research, seed systems, and participatory selection of alternative sustainable intensification options.



Some of the facilitators and participants at the gender training workshop in Pretoria, South Africa. Photo: Johnson Siamachira/ CIMMYT

Additionally, ASARECA documented in-depth case studies to improve SIMLESA's understanding of the best practices for gender analysis and development. SIMLESA II is poised to build on this foundation and integrate gender effectively.

As Kandiwa told the participants, "Careful integration of a gender perspective into the research process ensures that maize and legume research for development leads to positive and substantive outcomes."

The participants were expected to return to their respective workplaces and apply the knowledge and skills they gained at the workshop. Almost immediately, country coordinators will work closely with objective coordinators and gender specialists to ensure gender relevant activities are budgeted for during SIMLESA's annual planning meetings, effectively implemented, and accurately reported. The ARC undertook to develop a gender capacity building strategy for SIMLESA

In SIMLESA II (2014-2018), the aim of gender integration is to consolidate the gains made during SIMLESA I (2010-2014). Through the Association for Strengthening Agricultural Research in Eastern and Southern Africa (ASARECA), SIMLESA I strengthened the capacity of more than 1,000 individuals by providing gender-sensitive training at times and places that were convenient for both men and women, with the aim of ensuring equal access to the skills and knowledge needed to succeed in agriculture.

SIMLESA Field Days Nudge East African Farmers towards Sustainable Intensification



In Tanzania, one of the major highlights of the field day was the showcasing of conservation agriculture farm mechanization equipment, such as the ripper. Photo credit: Johnson Siamachira/CIMMYT

Smallholder farmers in East Africa can attain food security and move from subsistence to commercial farming by sustainably intensifying their maize-based farming systems. This was revealed during the annual field days recently held in Kenya and Tanzania, which were jointly organized by CIMMYT's Sustainable Intensification of Maize-Legume Cropping Systems for Food Security in Eastern and Southern Africa (SIMLESA) project and the two countries' national research systems.

The objective of the field days was to examine how the new experiments under SIMLESA Phase II were progressing and gather farmers' feedback on some of the sustainable intensification interventions. They also showcased SIMLESA's farmer-tested improved maize-legume technologies.

Smallholder farmers interacted with NGOs and private-sector partners who have shown great interest in SIMLESA's outscaling approach, which relies on lead farmers and uses demonstration sites as learning centers. Some of the sites promote smallholder agriculture development by linking farmers with buyers and agridealers, and helping them access credit and technical training.

In Tanzania, the field day was held on 16 July in Karatu District, with the participation of more than 300 people, including senior government officials. Highlighted during the field day were a newly released drought tolerant maize hybrid (TZH 538), a newly released bean variety (JESCA), appropriate maize and bean intercropping practices, and farm mechanization equipment, especially direct seeders, jab planters, and rippers.

In neighboring Kenya, during the field day held in Meru County on 21 July, SIMLESA's technologies were included in a mega-demonstration plot where SIMLESA partners in eastern Kenya promote conservation agriculture (CA) technologies at the smallholder farm level. All activities are carried out by members of the area's agricultural innovation platform (AIP) through which SIMLESA farmer groups, the Kenya Agriculture and Livestock Research Organization, and relevant stakeholders share agricultural information and knowledge. AIP in SIMLESA refers to a network of actors along a value chain with aligned objectives and activities to sustainably generate and share information and knowledge on agribusiness and other agricultural development work.

The field day in Boro, Siaya County, western Kenya, was organized by the Boro Agricultural Innovation Platform on 22 July. It presented

agricultural technologies such as maize-groundnut rotations and maize-pigeon pea systems being implemented by lead farmers and adopted by over 2,000 farmers. In this area, new maize and groundnut varieties have been introduced under SIMLESA Phase II, in addition to common bean varieties that were previously tested in core on-farm exploratory trials.

Speaking at the field day at Boro, SIMLESA Project Leader Mulugetta Mekuria said the debate on whether CA works or not was no longer an issue. "The bottom line is that smallholder farmers should move from subsistence to commercial farming. To achieve this, more work is needed to improve seed systems in Africa by encouraging local research institutes and locally owned African seed companies, and installing mechanisms to reach farmers with improved seeds." He also stressed the urgent need to work with smallholder farmers to maximize crop yields and improve their land through more efficient use of fertilizers and herbicides, and better post-harvest processing and storage facilities.

Helping family farmers diversify what they grow to ensure a nutritionally diverse diet and protect their farming income from the risks of climate change was another key message.

Other "take home" messages from the field days included:

- Strengthening national and local institutions
- Building the technical and knowledge infrastructure for sustainable farming
- Improving financial investment in agriculture
- Improving access for "innovative" private investors, such as microfinance

Trading Tedium for Technology to Increase Productivity, Incomes for Women Farmers



Thanks to the SIMLESA project, Angeline Odera and 2,000 other farmers in Boro Community in Siaya County, Western Kenya, received training in good agricultural practices focusing on the importance of using new technologies for weed-free crops and increased yields.

Technologies likely to make a difference in the daily lives of rural women farmers are those that address their specific needs based on the division of labor in developing countries.

For women, benefits would have to go beyond increased productivity and income. When their drudgery and tedium are reduced, women have more time and confidence to pursue different activities. This includes assuming leadership in their communities, which in turn can help ensure the benefits of improved agriculture are shared more equally among women and men.

A key commitment for SIMLESA is to empower rural women. One of the ways SIMLESA strives to do this is through time- and labor-saving technologies targeting women. Since women generally handle the bulk of the weeding on Africa's smallholder farms, using herbicides can be a major time-saver.

"I used to spend many hours doing exhausting hand-weeding in my fields, but my yields still decreased every farming season," said Angeline Odero, a smallholder farmer from Boro Community in Central Alego Ward, Siaya County, western Kenya. Farmers in eastern and southern Africa lose about 30% of their potential maize yield because of late weeding.

Thanks to the SIMLESA project, Angeline and 2,000 other farmers in her area received training in good agricultural practices focusing on the importance of using new technologies for weed-free crops and increased yields. Using farmer-hosted demonstration plots, SIMLESA introduced herbicide technology to help reduce drudgery for smallholder farmers, for whom labor shortage is a major constraint.

After seeing the excellent weed control on the demonstration plots and receiving training and technical assistance this season, farmers in Boro applied herbicides to their maize and legume crops.

Without herbicides, Angeline harvested two tonnes of maize per hectare; with the herbicide, she is now harvesting five tonnes of maize per hectare. The increase in yield translated into increased gross margins from less than US\$ 5,000 per hectare up to US\$ 6,500-8,000 per hectare. With the herbicide, she reduced the cost of weeding from US\$ 160 per hectare using hired labor and traditional weeding practices to less than US\$ 60 per hectare.

"I couldn't cope with hand weeding. Herbicides save us time, money, and energy," said Angeline.

SIMLESA-Mozambique Learns More about Conservation Agriculture Technologies in Brazil

Domingos Dias

Three agriculturalists from the Sustainable Intensification of Maize-Legume Cropping Systems for Food Security in Eastern and Southern Africa (SIMLESA)-Mozambique made a training visit to Brazil on 3-13 June 2015.

The objective of the visit was for the three researchers to acquire conservation agriculture (CA) skills, with a special focus on soil health and climate change. The training sessions were also expected to give participants the opportunity to share their knowledge and experience with their Brazilian counterparts at EMBRAPA sites.

According to team leader Domingos Dias, SIMLESA-Mozambique National Coordinator, "By visiting and interacting with farmers, observing trials, and having discussions with CA advisors, researchers, policy makers, and agriculture industry representatives, we gained new knowledge of CA technologies."

During the 11-day visit, participants were presented with real-life CA challenges so they could solve them interactively. Having learned the required theory and facts through demonstrations, question-and-answer sessions, and multimedia presentations, they are now expected to apply these technologies in their respective countries.

Smallholder farmers in Mozambique are affected by the poor farming methods they practice, such as late weeding and inefficient residue application; they also lack farm mechanization. The participants learned to use and maintain agro-machinery, such as direct seeders and rippers, as well as when to plant forage crops such as Brachiaria, which produces much biomass and whose deep root system plays a critical role in improving soil properties.

"We learned very useful practices and will test some of them under our conditions. The training in Brazil presented alternative uses of residues and rotations based on soil properties suitable for southern African countries," said SIMLESA-Mozambique participant Custodio Jorge.

Both farmers and extension staff who participated in the first phase of SIMLESA (2010-2014) lacked basic skills and knowledge of CA farming systems. The second phase of the project (2014-2018) is focused on filling this gap through training.

Mega Demonstration Hubs Empower Smallholder Farmers in Kenya



SIMLESA Kenya agronomist Alfred Micheni, showcasing the results of good agricultural practices at the Geeto Primary School mega demonstration plot in Kenya. Photo: Johnson Simachira/CIMMYT

Calmen Kaaria, from Meru County in eastern Kenya, is benefiting from the increased productivity of her maize and legume crops. Kaaria, a lead farmer in her area, is participating in a new model dubbed mega demonstration hubs, developed by SIMLESA in eastern Kenya.

These hubs are centers where agricultural technologies and innovations are promoted to smallholder farmers through demonstrations. The centers link farmers with researchers, agroinput suppliers, credit providers, and marketers within and beyond a given hub. The Geeto Mega Demonstration Hub was started in 2013 and has helped its members, mainly smallholder farmers from Meru County, to learn the importance of not tilling the land and not burning crop residues, but leave them on the soil surface. "In the long run, the retained crop residues help to improve soil fertility," said Kaaria.

The mega demonstration hub is implemented by SIMLESA partners in eastern Kenya with the aim of promoting feasible technologies at the smallholder farm level. The hub is a plot of more than one acre which a community member or a school provides on behalf of the community. Most of the activities in a given mega demonstration hub are carried out by members of the area's innovation platform (IP).

The main partners in a given mega demonstration hub are SIMLESA innovation platform members, particularly farmers who use their plots to grow the maize and legume varieties promoted by the project for demonstrations or seed production. The IP initiative is made up of farmer groups, agricultural research institutions such as the Kenya Agriculture and Livestock Research Organization, individual farmers, agricultural extension providers, local administrators, and other relevant stakeholders who test and promote SIMLESA technologies. Apart from being a focal point for scaling out new technologies, the mega demonstration hubs test new crop varieties and conservation agriculture practices, and also distribute seed to other farmers and institutions.

Extension workers provide technical assistance in lead farmers' fields, which serve as practical learning sites that teach other farmers the value of implementing good agricultural practices.

SIMLESA-Kenya is piloting this model and will establish at least 20 mega demonstration hubs around the country over the next two years. So far, 11 such demonstration plots have been established in eastern and western Kenya. This has encouraged the project and its partners to demonstrate technologies to more smallholder farmers. For example, Geeto Mega Demonstration hub is showcasing how different varieties of maize (KH500-33A, KDV6, Duma 43, and DK C9089), bean (Embean 14, KAT Bean 1, and Kakamega 15), climbing bean (MAC 13, MAC 34, and MAC 64) cowpea (M66), and pigeon pea (Kendi) perform under conservation agriculture practices. The hubs also offer input suppliers the opportunity to interact with smallholder producers during technology evaluation and field days.

Kaaria has been growing maize on her plot for more than two decades, but has had trouble selling her crops at a fair price over the last several years. "I had to diversify into other staple crops such as groundnuts," said Kaaria. To help farmers like Kaaria generate profit from maize farming, SIMLESA is providing technical training and market linkages. For example, for almost three years, Kaaria has been a member of Geeto SIMLESA Farmers' Group, whose members are trained to care for their individual farms.

Geeto Farmers' Group received US\$ 250 worth of inputs from the SIMLESA project in the 2013/2014 cropping season. By employing good agricultural practices such as soil and water conservation, weed control, crop nutrition, and better postharvest handling techniques, Kaaria's yields went from 150 kilograms of maize to 3 tonnes on a 0.5-hectare plot. "I now have renewed confidence in maize production. The project provides me with a guarantee that my crops will have a ready market," Kaaria noted.

So much potential in Malawi

Cyprian Mwale



Belita Maleko, of the Mwansambo extension planning area, Nkhotakota Zone, Central Malawi. Photo: T. Samson / CIMMYT.

As one of the strategic management activities, SIMLESA Regional Office personnel make routine visits to country teams to assess project performance and give support supervision to ensure smooth running of project activities at that level.

As part of this process of work, SIMLESA held a meeting was held in Malawi with the national coordinator and his team on 9 July.

Country objective coordinators presented objective progress updates, particularly activities conducted after the Annual Review and Planning Meeting (ARPM) held in Harare, on 16-19 March 2015. It was reported that the main achievements for Objective 1 during the reporting period were development of two draft policy briefs on adoption monitoring of SIMLESA technologies and the review of input and output value chains

The main activities for Objective II were: Planning and review meetings, development of protocols, distribution of inputs, field tour, pre-harvest training, exploratory data collection and participatory modelling workshops.

For Objective III, a number of meetings were held on potential drought tolerant maize and legume varieties with seed companies, ICRISAT, IITA and NGO partners. Hybrid maize MH30 was selected for planting under pit planting by Kachere Farmers Group in Lilongwe District. CADECOM was out scaling soybean seed multiplication, while Natural Resources College (agriculture college training students in agriculture and natural resources management) tested different maize varieties under conservation agriculture (CA) and conventional practice imparting knowledge about CA and varieties to students and other relevant stakeholders.

Scaling activities are being carried out by partners but seems to be no clear targets hence the group was urged to go through adoption pathways targets. The targets will be shared by Objective 1 project members. On capacity building, members were encouraged to focus more on on-the job training. It was mentioned that long term studies support, for example competitive grants for MSc and PhD were open for Malawians in Australia and South Africa.

Malawi has so much potential in addressing food security challenges through maize-legume cropping systems.

Cyprian Mwale is SIMLESA-Malawi National Coordinator



SIMLESA Soil Sampling Manual Production Process Kicks off

Stuart Irvine-Brown



*The CIMMYT Nitrogen by Residue Long-term experimental site at CIMMYT-Southern Africa Regional Office field area.
Photo by: Stuart Irvine-Brown/CIMMYT*

A SIMLESA soil sampling manual to assist partners to effectively provide consistent reporting on research activities is at an advanced production stage. This manual will be used as an easy access reference document for SIMLESA on-station and on-farm research site soil sampling and analysis.

As part of this process of work, the Queensland Alliance for Agriculture and Food Innovation (QAAFI), in conjunction with CIMMYT researchers, conducted soil sampling trainings in Malawi, Mozambique and Zimbabwe. QAAFI plans to conduct similar trainings in SIMLESA-eastern African countries in 2016.

This training helped national agricultural research systems (NARS) partners in developing a sampling strategy and taking soil samples to characterize the long-term sites most valuable to SIMLESA soil-based research outputs. The training and site assessment within each partner country selected long-term on-station research sites where the greatest potential research gains could be made from implementing rapid field-based soil analysis and characterizing the site soil for use of Mid Infra-Red (MIR) as a more cost effective, repeatable, and faster turn-around soil sample analysis process.

All relevant soil information, sampling and processing protocols along with equipment outlines, problem solving advice and sample preparation and delivery are currently being compiled to produce the SIMLESA soil sampling manual. Experience and feedback gained from the training and soil sampling conducted as part of this activity in southern Africa will contribute towards the soil sampling manual and enhance its applicability to SIMLESA sites and the partners who will be using the reference.

continued

Combined with training, the manual aims to build the capacity and understanding of SIMLESA NARS to know when, where and how to assess changes in those components of soil which most directly affect its fertility over various timeframes. Using the soil sampling manual accompanied by training that is applicable to the SIMLESA site situations, it is possible to provide consistency in reporting across the SIMLESA research activities. This is in regards to obtaining, comparing and sharing soil data relevant to implementation of conservation agriculture in mixed maize-legume cropping systems for sustainable intensification.

Training with NARS partners in Malawi and Mozambique, and CIMMYT researchers at the Southern Africa Regional Office in Zimbabwe has therefore provided preliminary testing of the equipment and methodologies, protocols and procedures that form fundamental parts of the SIMLESA soil sampling manual.

Different soil sampling strategies, sampling methods, and laboratories for soil analysis have been previously used across the SIMLESA country partners. For much of SIMLESA Phase I, there has been a lack of consistent soil data to determine research outcomes of soil fertility improvement and upon which basis observed changes to soil properties occur. By standardizing soil sampling methods, soil processing and laboratory analysis, robust comparisons of results across different sites become possible.

This process is an excellent opportunity for SIMLESA country partners to move from conventional soil analysis with high costs and large quantity per sample to new spectral analysis with low costs and minimal quantity per sample needed. For more information on SIMLESA Soil Manual and potential for participation, please email Stuart Irvine-Brown of QAAFI, based at CIMMYT Ethiopia. Email address: s.irvinebrown@uq.edu.au / s.irvine-brown@cgiar.org

Making headway in Mozambique through good agricultural practices

Casper Roxburgh



The SIMLESA-Mozambique team have used a combination of approaches, such as semi-structured interviews. Photo by Casper Roxburgh/ QAAFI.

Making headway in Mozambique through good agricultural practices

continued

Since late 2013, researchers from the Queensland Alliance for Agriculture and Food Innovation (QAAFI) in collaboration with Instituto de investigação Agrária de Moçambique (IIAM) have been working with SIMLESA farmers in the Macate District of Mozambique.

Led by PhD candidate Caspar Roxburgh, the team have used a combination of semi-structured interviews, crop systems modelling with APSIM and field experiments to identify and assess best farmer practices for maize production in the community. After initial work in 2013 which suggested better agronomy (i.e. planting times, plant populations) was a key reason for better productivity in the community, the team returned in 2014 to run more extensive interviews and field trials.

The outcomes from the 2014-15 season were presented to the Macate community during a workshop held on the 22nd of October 2015. The researchers (Caspar Roxburgh and Joseph Eyre from QAAFI, and Custódio José and Maria Da Luz from IIAM) presented farmers with three key decisions which could help to improve productivity:

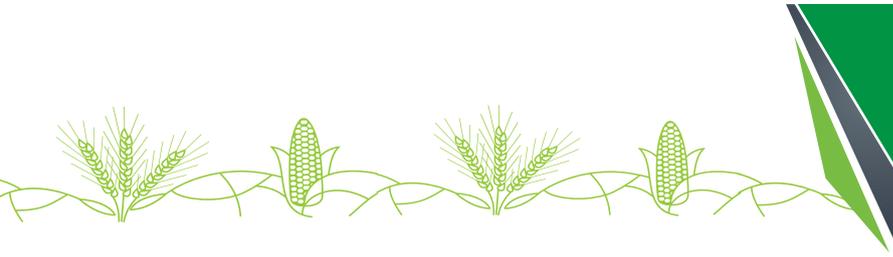
- later planting;
- lower plant populations; and
- earlier weeding.

Based on farmer experience, yields were found to be higher when avoiding the early sowing window in late September. Farmer experience and experimental results showed that lower plant populations (4.4pl./m² instead of common practice of 10 pl./m²) could achieve similar yields while improving grain quality. Finally, both reported farmer yields and experimental results showed maize yields could increase by 50% by weeding earlier (i.e. within the first three weeks).

Following the presentation, farmers were invited to give their impressions of the lessons learned from the project. Most agreed that the on-farm yields reported were accurate, and that the proposed changes to management were likely to improve their production. The main subject of discussion was around how to implement these changes into a seasonal plan which also involves working on non-maize crops and competing with off-farm activities. Farmers stressed that labor availability was a key constraint to making changes.

The final phase of the project for the 2015-16 season will include running the field experiments (hosted by partners at the Instituto Superior Politecnico de Manica) a second time. As a capacity building exercise, two local Mozambican students Nataniel Zango and Monteiro Baltazar, who worked with Roxburgh in the 2014-15 season, will be taking the reins from the QAAFI team and managing the trials directly.

In addition to these activities, QAAFI are also working closely with several case-study farmers in the Sussundenga District to evaluate the potential of cultural weed suppression with legume crops on labor demand and weed seed set.



About CIMMYT

CIMMYT - the International Maize and Wheat Improvement Center - is the global leader on public funded maize and research, and on farming systems that include these crops. Headquartered near Mexico City, CIMMYT works with hundreds of partners throughout the developing world to sustainably increase the productivity of maize and wheat cropping systems, thus improving global food security and reducing poverty. CIMMYT is a member of the CGIAR Consortium and leads the CGIAR Research Programs on MAIZE and WHEAT. The Center receives support from national governments, foundations, development banks and other public and private agencies.

SIMLESA Geographic Focus Map



About SIMLESA

The International Maize and Wheat Improvement Center's Sustainable Intensification of Maize–Legume Based Cropping Systems for Food Security in Eastern and Southern Africa (SIMLESA) project was launched in 2010. Funded by the Australian Centre for International Agricultural Research (ACIAR), SIMLESA aims to improve the livelihoods of small-holder farming communities in Africa through productive and sustainable maize–legume systems and risk management strategies that conserve natural resources. It is managed by CIMMYT and implemented by partners in Ethiopia, Kenya, Malawi, Mozambique and Tanzania. From gains and lessons learned in these project countries, there are benefits for three spillover countries — Botswana, Rwanda and Uganda.

Through participatory research and development with farmers, extension agencies, non-governmental organizations, universities and agribusinesses along the value chains, the project aims to improve maize and legume productivity by 30 percent, and to reduce the expected downside yield risk by 30 percent for an approximate additional 650,000 farms by 2023.

Contacts:

Dr Mulugetta Mekuria-Project Leader, email: m.mekuria@cgiar.org:

Address: CIMMYT, Sustainable Intensification of Maize–Legume Based Cropping Systems for Food Security in Eastern and Southern Africa, Regional Office for Southern Africa, P.O. Box MP 163, Mt Pleasant, 12.5 km Peg Mazowe Road, Harare, Zimbabwe. Tel: +263 772 469 211/2.

Website: www.simlesa.cimmyt.org



ETHIOPIA



KENYA



MALAWI



MOZAMBIQUE



TANZANIA



AUSTRALIA



THE UNIVERSITY OF QUEENSLAND AUSTRALIA



QAAFI Queensland Alliance for Agriculture and Food Innovation



CIAT International Center for Tropical Agriculture and Forestry



ZASARECA Transforming Agriculture for Smallholder Livelihoods



ILRI International Livestock Research Institute