

# Bulletin

## SIMLESA Highlights

January-March 2012

A bi-annual publication of Sustainable Intensification of Maize-Legume based Cropping Systems for Food Security in Eastern and Southern Africa (SIMLESA) program

### Drought tolerance, conservation agriculture, and double-cropping: A recipe for success in Mozambique



“Increasing Sustainable Agricultural Production in Mozambique through Drought Tolerant Maize and Conservation Agriculture” is a USAID-supported initiative bringing together two key components of CIMMYT’s work: Breeding for drought tolerance and sustainable land management to mitigate the effects of climate change. Demonstrations in rural farming communities of Mozambique are currently exhibiting four varieties, which were selected for drought tolerance in Harare, Zimbabwe,

and are currently being multiplied by two seed companies in Mozambique: Lozane Seed and Dengo Commercial. Farmers are also being shown several different cropping systems for these new varieties: conventional (burning residues and significant soil movement), conservation agriculture (CA) with seeding into previously dug planting basins, and CA seeded with a pointed stick or jab planter and retaining of crop residues. Farmers are showing significant interest in these new methods, favoring the jab planter and dibble stick as the fastest way of sowing.

During 16-24 February 2012, CIMMYT scientists, partners from the University of Tennessee, and USAID representatives travelled to project sites in the Manica and Sofala Provinces, to monitor project progress and evaluate the quality of implementation. The demonstrations also feature growing maize in full rotation with cowpeas, a technique previously unused.

“We never thought of growing cowpeas as a sole crop in rotation with maize and are amazed about the good crop stand and the yield we will get. We will try this on our own fields in the coming season,” said Raimundo Luis, a farmer from Sussundenga, Manica Province.



Maize is the staple food crop for farmers in Mozambique, with most growing just one crop, during the rainy season from November to April. Average yields are generally low, often less than one ton/hectare. However, with the advent of new varieties, such as the CIMMYT-developed short season open pollinated variety (OPV), ZM309, farmers can harvest their early seeded maize crops in February, a time when many grain stores are diminished. CA systems with residue cover enable greater conservation of soil moisture, and therefore allow farmers to plant a second maize or legume crop, for harvesting in June or July.

Double cropping will assure food security for farmers in Mozambique, and by planting protein-rich legumes as the second crop, nutrition of farm families can also be increased. The use of these methods will also reduce the risk of crop failure and increase productivity of the land.



**ACIAR**

Research that works for developing countries and Australia

[aciarc.gov.au](http://aciarc.gov.au)



**CIMMYT**<sup>MR</sup>

International Maize and Wheat Improvement Center



ETHIOPIA

KENYA

MALAWI

MOZAMBIQUE

TANZANIA

AUSTRALIA



ICRISAT  
Science with a human face



SASARECA  
Transforming Agriculture for Improved Livelihoods



THE UNIVERSITY OF QUEENSLAND AUSTRALIA



QAAFI  
Queensland Applied Agriculture and Food Innovation



ARC • LNR



MURDOCH UNIVERSITY

## South Africa commits to building capacity

During 20-25 February 2012, 16 scientists from partners of the Sustainable Intensification of Maize- Legume Cropping Systems for Food Security in Eastern and Southern Africa (SIMLESA) project and national agricultural research systems from Kenya, Tanzania, Malawi, and Mozambique, met at the Agricultural Research Council (ARC) of South Africa headquarters in Pretoria, South Africa, for a capacity building workshop.

The workshop was the first of its kind conducted under the SIMLESA project, which is supported by the Australian Centre for International Agricultural Research (ACIAR) and coordinated by CIMMYT. The week-long training



covered biometry, principles of conservation agriculture and soil science, and executing the concept of innovation platforms. Practical examples, working groups, and a visit to the Institute of Soils, Climate and Water made the training interactive and interesting. Participants also developed country action plans for implementing innovation platform activities.

The CEO and President of ARC, Shadrack Moephuli, addressed the participants and reaffirmed ARC's commitment to contributing to improved food security through initiatives such as SIMLESA. He expressed his gratitude to both ACIAR and CIMMYT, and acknowledged the collaborative research activities being undertaken. Yolisa Pakela-Jezile, Senior Manager, ARC Training services, described the forthcoming country trainings and the opportunities for post-graduate studies in South African universities for scientists from SIMLESA and national agricultural research systems.

Finally, SIMLESA Program Coordinator, Mulugetta Mekuria acknowledged ARC's support for the capacity building objective of SIMLESA. He also briefed the ARC CEO and the Executive Directors of Research, Development, and Technology Transfer on SIMLESA's progress to date, and extended an invitation to the 2<sup>nd</sup> SIMLESA Annual Review and Planning meeting in March.

## The best climate risk management strategy is good agronomic practice

"The best climate risk management strategy is good agronomic practice. And producing a flyer in the local language - that includes best local agronomic practices - and discussing it with the Mandela farmers would be the best strategy to reduce the impacts of climate variability and increase farmers' resilience." This was the key conclusion from a Master Class on Climate Risk Management run by the Queensland Alliance for Agriculture and Food Innovation (QAAFI), Agri-Science Queensland, in collaboration with Cape Town University and Department of Research and Development, Ministry of Agriculture, & Food, Tanzania (SARI). It was funded by the Crawford Fund

The training attracted more than 20 small holder farmers from the Mandela Village, in Morogoro, Tanzania and 20 extension officers, agronomists and meteorological officers from the National Agricultural Services of Ethiopia, Tanzania, Kenya, Malawi, Mozambique, Botswana and Sudan. The objectives of the training were:

- Train the trainers i.e. NARs researchers and extension officers, on participatory approaches to improve farmer's preparedness and responses to below and above average rainfall seasons.
- Increase farmers' and extension officers' understanding on how year-to-year climate variability impacts agriculture production and decision making, and how existing sources of climate information could be used to help farmers make better informed decisions and reduce climate associated uncertainties.

- Improve NARs researchers, extension officers and farmers understanding of existing tools, sources of information and products (micro-insurance for smallholder farmers) already available in their region.
- Promote a trans-disciplinary dialog between agronomists, extension officers and meteorological officers.
- Promote the development science and extension networks across the seven participating countries.

The course covered topics such as:

- Climate information sources for southern and eastern Africa and theory, formulation, interpretation and communication of seasonal climate forecasts
- Engaging farmers in focal group discussion, individual questionnaires and resource allocation mapping on cropping systems, management and climate and yield variability
- Survey results analysis - data entry, comparative yield analysis (RUE) and formulation of management messages under variable rainfall patterns
- Farmer specific modelling applications – model outputs used with farmers in interpretation of yield outcomes under variable rainfall.

During this training we all learnt that the agronomic performance of Mandela farmers is highly variable and poor in general. Key constraints to rainfall use efficiency appear to be related to:

- the short window of opportunity between the start of the rainy season and the land preparation activities;
- sowings occurring outside the recommended sowing window;
- use of recycled seeds;
- no use of fertilisers and limited weeding;
- lack of understanding of the benefits of fertilisers and at least two in-crop weeding events;
- lack of cash to purchase fertilisers was also mentioned by several farmers.

The dependence of farmers on low and or highly variable rainfall across most south Sub-Saharan countries, compounded by depletion of soil fertility, makes efforts

of intensifying maize based production systems to lift farmers' livelihoods a rather daunting and complex task. In general, climate risk acts as a disincentive for farmers to invest in needed technologies and markets, reducing their chances of increasing yields and reducing risks. Across the region, lifting the productivity of crops, i.e. grains and biomass, is paramount to start building more sustainable and profitable cropping systems and achieving the Millennium Development Goals in Africa.

Across Africa, highly vulnerable risk-averse farmers tend to favour precautionary strategies that buffer against climatic extremes over activities that might be more profitable on average. One of these precautionary strategies is to grow staple crops (such as maize). Farmers' perception of risk and its consequences is paramount. How farmers' perceptions relate to the actual variability in yields driven by climate variability, and to what extent existing yield gaps driven by poor agronomic practice or lack of use of agricultural inputs are responsible for farmer's risk averse attitudes.

## SIMLESA holds another successful field day in western Kenya

On January 16, 2012, the western Kenya SIMLESA team held a very successful field day at Bumula, in Bungoma County. The field day, which was organized in collaboration with Kenya Agricultural Research Institute (KARI) and Ministries of Agriculture and Livestock Development attracted over 1,000 people. Farmers were impressed by a maize crop grown using Conservation Agriculture technology

Speaking at the event, Charles Nkonge, SIMLESA National Coordinator for Kenya stated that the technology increases crop yield while conserving the environment, adding that there are plans to upscale it to other sub-Saharan African countries to boost food security to end endemic hunger and poverty.

The technology requires farmers to kill weeds by applying environmentally friendly chemicals and leaving maize stalks and other plant residues to decompose on the land to increase nutrients and retain moisture in the soil.

According to John Achieng, an agronomist at KARI, Kakamega, farmers are able to save up to 50% of the costs as ploughing and hand weedings are eliminated from the production process. The new technology has widely been embraced in Australia, South America and the United States of America.

However, Nkonge noted that for the technology to yield good results, farmers should use high yielding seed varieties and reduce amount of fertilizer.

During the occasion, Mr. Mohammed Rashid, Provincial Commissioner, Western Province who was also the Guest of Honour, hailed the Australian Government for funding the project to increase food production and income among smallholder farmers in the country. He appealed to western Kenya farmers to diversify their farming methods instead of relying on sugarcane.

The Provincial Director of Agriculture, Mr. John Cheruiyot said the region was food deficit as it produced only 5.0 metric ton of maize while the region needed about 7.5 metric ton. He appealed to farmers to adopt the new technology to reduce the deficit.

"Soils in most parts of western Kenya have been degraded due to continuous cultivation without replenishment of plant nutrients. Striga weed has also contributed to low crop yield in the region. Farmers produce less than 5 bags of maize instead of over 20 bags from one acre. Conservation Agriculture improves soil fertility, increases infiltration of rain into the soil, reduces soil and water erosion, and suppresses weed growth resulting in higher crop yield" said Mr. Achieng.



## SIMLESA M&E Training: February 27-29, 2012

The third SIMLESA M&E training for NARS partners in preparation for the 2<sup>nd</sup> SIMLESA Annual Conference was held from 27<sup>th</sup> to the 29<sup>th</sup> of February in Nairobi with all the five SIMLESA implementing countries represented by their M&E focal persons. The meeting was facilitated by ASARECA, a SIMLESA partner. Nine SIMLESA NARS participants and two CIMMYT staff members attended the meeting to appraise each other on project progress based on agreed targets per indicator. The meeting necessitated target reviews on previous set indicators as

well as identified areas for capacity building in terms of M&E function. The workshop was also held to agree and finalise on the previous agreed indicators for specific country inputs. Country representatives gave honest individual presentations on progress across objectives. The workshop realised that much progress has been scored so far after the November training in Entebbe. The training combined individual and plenary sessions where participants interrogated some of the agreed targets vis-à-vis what came out of the recently completed baseline surveys.

## Strengthening Local Innovation platform in Melkassa and Hawassa, Ethiopia

SIMLESA held two Local Innovation Platform meetings with partners in Melkassa and Hawassa research centers' intervention sites on February 2 and March 5, 2012 respectively. The objective of the meetings were to review project activities, facilitate knowledge and experience sharing between participants, devise strategies to strengthening the innovation platforms at local level and plan for the 2012.

A total of 61 and 52 participants attended the meeting at Melkassa and Hawassa respectively drawn from: Melkassa: researchers from Melkassa Research Center, Meki Batu Union, Lume-Adama Union, Oromia Seed Enterprise, private seed producers, district and zone experts, community workers, NGOs working in the intervention sites (CRS, WVE, RCEDO), local administrators and farmers. Hawassa: NGOs (CARE, SOS Sahel), Sothern Seed enterprise, district and zone experts and heads, community development workers, Southern region research institute (SARI), Wondogent research institute, Hawas Agricultural research center, Local administrators.

During the meeting, past achievements and constraints encountered were presented by respective objective researchers or coordinators. The target outputs of the project were also presented and roles and responsibilities of partners revised.

A plan for action for 2012 was developed by partners from the respective districts. Emphasis was also given to promote the promising conservation agriculture practices such as inter cropping, crop rotation, minimum

tillage as well as preferred varieties of maize and pulses. In addition, participants from seed enterprise/companies, zone bureau of agriculture and unions discussed on the plan to support the project activities by facilitating input availability in the implementation areas. Participants agreed on the need to identify focal person at each project implementation areas to follow up the implementation of activities as per the agreed work plan as well document and report the results to respective partners. Finally, the participants agreed to organize field days, exchange tours and appropriate trainings to enhance the dissemination and adoption of CA technologies.

### Bako

Another innovation platform meeting was also held at Bako Agricultural Research Center (BARC) on 24 August 2012, to review and discuss the status of SIMLESA on-going activities in Gobu Sayyo and Bako Tibe districts. A total of 36 innovation system members from different institutions participated in the meeting. Briefings were made on on-going activities both on-station and on-farmers fields. Participants had thorough discussions on participatory selection of maize and legume varieties, adoption of conservation agriculture and other crop management practices and seed supply systems. During the meeting action plans were develop and tasks shared among all stakeholders to effectively implement the project activities, reach more number of farmers in the years to come and realize the expected project impacts in the target areas.



Participants of the innovation platform included researchers, extension officers from District Office of Agriculture and Zonal BoA from the two SIMLESA hosting areas, private and public seed companies, farmers and World Vision-Ethiopia.

## Ethiopian and Mozambican researchers take a study tour to Malawi



From February 12 to 18, 2012, a team of Ethiopian researchers jointly with another from Mozambique undertook a study tour to Malawi to learn and share experiences on SIMLESA activities in the three countries.

The Ethiopian team consisted of Mekonnen Sime, SIMLESA-Ethiopia National Coordinator and Mr. Solomon Jemal, SIMLESA Agronomist [both from Hawassa Research Center of the Ethiopian Institute of Agricultural Research (EIAR)], Mr. Solomon Admassu, SIMLESA Breeder, Melkassa Research Center, EIAR and Mr. Zerihun Abebe, SIMLESA Agronomist, Bako Research Center, Oromia Agricultural Research Institute (OARI).

During the period, the teams visited CA sites like Salima, Nkhotakota District in Mwansambo EPA, Chitdizi District, Chiwiri PA, Mchingi District and Chitala Research Center, and Chinjuluwe PA. These are sites that are supported by SIMLESA and other partners like IFAD.

On-farm CA treatments include:

- Maize-legume rotation under CA Cowpea intercropping under CA,
- Sole maize under CA,
- Sole ground nut under CA,
- Sole legumes and Maize under conventional practices (Ridge making, no residue and planted on the ridges).

As it was clearly observed from the plots, there were great variations among treatments. Both maize and legume plots planted under CA practices had better soil properties than those not under CA. Besides having higher organic matter content, the soil physical and chemical properties of soils under CA were improving. Most of the exploratory trials were well managed and showed good performance for both legumes and maize.



### CA plots in Malawi, Salima/ Nkhotakota district

Farmers observed that CA practices are less demanding (labor, time and energy), reduced weed population, conserve the soil and moisture that help to overcome the dry spell and generally, improve soil fertility. The CA practices have the potential of reducing fertilizer cost by one-fourth as compared to the conventional practices.

Lessons learnt by Ethiopian team during the visit

- Improved water infiltration in CA plots as compared to conventional tillage practice (ridge) where plots hold much water and less prone to erosion and evaporation. Plots with conventional treatment experienced wilting in absence of rain while the CA plots look green and strong
- Malawi has lower cattle population as compared to Ethiopia and less difficulty for residue management
- Some farmers who are renting land are reluctant to use CA since they may not benefit from the gradual soil fertility improvement.

Success of the SIMLESA in the past two years in Malawi

- Good farmer commitment
- Farmers like residue retentions since reduced the effect of dry spell
- Considerable activities beyond the exploratory trials
- High number of participations by farmers and other partners
- Farmers convinced to plant on flat bed under CA practice rather than open ridge
- Commitment and ownership of the EPA for SIMLESA activities very encouraging

- Weed reduction from year to year due to the smothering effect and undisturbed seed bank
- Exchange benefit paid off among the farmers
- Most of the host farmers are very confident of what they are doing and they are like 'professionals'
- Good partnership with other stakeholders eg TLC, World Vision
- SIMLESA generally motivating the farmers in different communities

However, for the successful implementation of SIMLESA and attainment of maximum impact, the teams on tour observed the following challenges that should be addressed:

- Proper consultation on appropriate varieties selection, particularly in the first year
- Timely supply of inputs
- Wider participation of the other partners in SIMLESA activities, particularly on seed multiplication and scaling up of the promising technologies.
- Need to provide protective clothing for chemical spraying (gloves, eye protection, clothing- two sets per community to be delivered).

Generally, Malawi is well advanced in CA practices. The team from Ethiopia acquainted themselves with multiple advantages of CA in increasing crop productivity, profitability, resilience and sustainable use of natural resources in view of climate change, soil productivity maintenance, and soil moisture conservation and thus overcome dry spell problem. It was concluded during general discussion that CA merit is much better than its demerit since the farmers developed knowledge and skill to implement CA based farming.

The tour came up with the followings were recommendations

- Set up of new simplified demonstration of promising technologies in new villages outside current communities
- Organizing the field day at EPA, district levels. The district should involve the issue in their annual schedule
- Involve influential people in field organizing committee to ensure experience exchange among the farmers
- Scheduling the field day on IPS and survey before conducting the big field days at the district level.
- Creating scientific forum to share major finding achieved by the project with other players.
- Involve the CIMMYT/SIMLESA members for local annual review and planning meeting
- Promising technologies for up scaling -(Maize-Ground nut crop rotation for Salima and Ground nut-Maize for Balaka area)



## SIMLESA activities gather momentum in Mozambique

From 18th to 22<sup>nd</sup> February, SIMLESA scientists composed of CIMMYT and NARS partners from IIAM and other key value chain stakeholders toured SIMLESA initiatives in Mozambique. The field tours started at Angonia, Tete Province, where the group shared experiences with farmers from Chiphole and Cabango communities. Those in attendance included representatives of the International Fertilizer Development Centre, Agrodealers, ICRISAT, CIMMYT, Total Land Care (TLC), extension personnel and local or traditional leaders. More than 150 farmers with about 30% women representation participated in the field tours and discussions. During the event the group saw a well managed exploratory trial on farmer Adriana's site which has been a source of admiration by many in Chiphole community.

From Ciphole the team proceeded to Cabango where they witnessed some more impressive exploratory trials. They then proceeded to see some on-station trials

established at N'tengo Umodzi Research Station where they saw a long term CA trials options such as rotations and intercrop options including pigeon peas, sunhemp and cowpea. Other trials established included a weed control trial and a crop intensification trial. Despite the rather late start the rains have been good for both communities. And farmers were very impressed with the trials, many promising to start practicing CA.

The District Director of Economics, whose docket also deals with extension services, emphasized on the benefits of CA in terms of erosion control, efficient use of fertilizers and better weed control through herbicide use. He also reminded the farmers that SIMLESA was enabling them to access good quality maize and bean seeds that would also boost yields. He also stated that a new maize milling factory was being established at Ulongue which had the capacity of processing 100 000 tons of maize per day. This was thus going to provide farmers with a ready



market for their maize which would be an incentive for increased production. Farmers were encouraged by a TLC representative to start CA on small plots and gradually expand as they gain more experience with the technique.

The team also visited communities practicing CA in Sussundenga, Manica Province. However, unlike in other areas, Sussundenga had been hit by drought that had had negatively effected the crops. Despite this, the plots under rotation generally had a better crop while those planted using jab planters had a superior crop stand compared to basins and the conventional practice. In all CA trials visited rotation of cowpea with maize resulted in high performance of maize plants.

In Macate Gondola District the team visited Objective 3 variety testing and seed multiplication activities established by IDEEA-CA, a community based farmers association and a partner in LIP initiative. This LIP has one mother and more than 10 baby variety trials. The team witnessed extensive mother and baby trials on various maize varieties including hybrids and also a considerable number of soybean varieties.

It is evident from the visits that SIMLESA has made considerable strides towards developing functional innovation platforms which include private sector participation and has expanded seed testing and multiplication initiatives for both maize and legumes. In most communities, research committees had now become functional in articulating farmer needs while trial monitoring had also improved considerably from last season. Generally the linkage between objectives 1, 2 and 3 was also good.



## SIMLESA trials impress in Malawi

From 8<sup>th</sup> to 17<sup>th</sup> February SIMLESA scientists composed of CIMMYT, Ethiopia and Mozambique SIMLESA teams, University of Queensland and NARS partners and other key value chain stakeholders undertook field tours of SIMLESA sites in Malawi.

In Mitundu, Lilongwe District, the visitors witnessed well implemented exploratory Conservation Agriculture trials now in their second season. Through farmer exchange visits undertaken by SIMLESA to CIMMYT/Total Land Care sites in Chipeni as well as regular field days and farmer technical support services provided by the local extension services, the number of farmers trying out CA techniques have dramatically risen from six farmers in 2010 to 74 farmers in 2012. Key CA benefits highlighted by farmers include reduced labour from chemical weed control and not making ridges as well as the increased moisture conservation resulting in better mitigation of dry spells.

Over 189 people (111 men and 78 women) who attended a big field day in Mchinji, were able to see how residue application had paid off in mitigating against dry spells.

The tour also took the visiting team to the Chitedze Research Station where they saw variety testing and various maize-legume intercrop combinations. In the lowlands, the team visited the newly established on-station trials at Chitala Research Station and proceeded on to see more on-farm CA trials in Salima.

Discussions after the field tours highlighted SIMLESA's major successes this year, which included a high level of farmer commitment, reduced moisture stress in CA plots, more CA activities on the ground beyond trials, farmers excited and motivated about observed CA benefits, good weed control with use of herbicides, good emerging partnerships in Innovation Platforms and overall improved quality of trials.



## About the Bulletin

This bulletin is a bi-annual publication of the Sustainable Intensification of Maize-Legume based Cropping Systems for Food Security in Eastern and Southern Africa (SIMLESA) program, funded by Australian Centre for International Agricultural Research (ACIAR), and managed by the International Maize and Wheat Improvement Centre (CIMMYT). It is implemented by the National Agricultural Research Systems (NARS) of Ethiopia, Kenya, Tanzania, Malawi and Mozambique in collaboration with the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), International Crops Research Institute for Semi-Arid Tropics (ICRISAT), the Agricultural Research Council of South Africa (ARC), the Queensland Alliance for Agriculture and Food Innovation (QAAFI) in association with Queensland Department of Employment, Economic Development and Innovation, (QDEEDI) Queensland, and Murdoch University in Western Australia. SIMLESA aims to improve the livelihoods of smallholder farmers in drought-prone areas of Eastern and Southern Africa, through intensification of maize-legume cropping systems.

SIMLESA focuses on five countries in Africa—Ethiopia, Kenya, Malawi, Mozambique, Tanzania—and Australia, with spillovers anticipated in neighboring countries. The sustainable intensification of maize-legume cropping systems, while reducing yield variability, requires an integrated approach to the complex production and marketing system for these crops. Through participatory research and development with farmers, extension agencies, non-governmental organizations, universities and agribusinesses along the value chains, the program aims to improve maize and legume productivity by 30% and to reduce the expected downside yield risk by 30% on approximately 500,000 farms within 10 years.

