CIMMYT

# The SIMLESA Journey

## *(2010-2014)*

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ETHIOPIA KENYA MALAWI MOZAMBIQUE TANZANIA AUSTRALIA

ACIAR CIMMYT PASARECA ILRI CIAT ICRISAT The University Of Queensland QAAFI

# Introduction

Maize and legume crops are important components in African farming systems. In addition to providing dietary foods, they provide cash income to smallholder farmers. Legumes also improve soil fertility through biological nitrogen fixation. Major legume crops include cowpea, common bean, soybean, pigeon pea and groundnut. While these crops are important in east and southern Africa, their production and productivity is limited by low adoption of the new and more productive varieties, shortage of and access to seeds and fertilizers, weak linkages of farmers to markets and limited knowledge and information transfer.

To overcome these challenges, the International Maize and Wheat Improvement Centre (CIMMYT) and its partners launched the Sustainable Intensification of Maize-Legume Cropping Systems for Food Security in Eastern and Southern Africa (SIMLESA-I- 2010-2014) March 2010. The main goal of SIMLESA is to improve the production and productivity of maize and legumes to ensure food security.
The program is funded by the Australian Centre for International Agricultural Research (ACIAR) and managed by CIMMYT, and implemented by national agricultural research systems in five partner countries – Ethiopia, Kenya, Tanzania, Malawi and Mozambique. Lessons from these five core countries are also implemented in other spillover countries of Botswana, Rwanda and Uganda.

SIMLESA program falls under the African Food Security Initiative (AFSI), launched in 2009/2010 by the Australian Government to assist selected African countries reduce poverty and eliminate hunger as part of fulfilment of Millennium Development Goal Number 1 (MDG1). It is aligned within the African Union (AU) initiated and led made-in-Africa solution known as the Comprehensive Africa Agriculture Development Program (CAADP). CAADP was established as part of the New Partnership for Africa's Development (NEPAD), and endorsed by the African Union Assembly in July 2003.

The main thrust of the SIMLESA program is increasing farm-level food security, productivity and incomes through promotion of maize-legume intercropping systems, in the context of reduced climate risk and change. 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 percent and to reduce the expected downside yield risk by 30 percent on approximately 650,000 farm house holds by 2023.

The first phase had five specific objectives; focussing on socio-economic aspects; agronomy practices , improving access to new maize and legume varieties; the development of regional and local innovation systems and on capacity building to increase the efficiency of agricultural research today and in the future.

SIMLESA's first phase ended with its Fourth Annual Regional Review, Planning and Program Steering Committee meeting in Addis Ababa, Ethiopia, on 7-11 April 2014. In July 2014, CIMMYY launched the second phase of SIMLESA (2014-2018), which ACIAR is also funding.

The program has laid down the foundation for developing conservation agriculture (CA) based sustainable intensification options, including integration of improved maize and legume varieties identified for their compatibility in CA practices; promoting technology adoption by both female and male farmers; capacity building for national agricultural research systems (NARS) of partner countries; the creation of enhanced partnerships and collaboration with established

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innovation platforms for a coordinated scaling out SIMLESA generated options and practices

In particular, SIMLESA had contributed to the release of 40 new maize varieties, which have yield advantages of 10 to 30 percent when compared to existing commercial varieties in its program countries. The program also trained more than 3,000 agricultural scientists in the maize and legume production value chains and engaged more than 40,000 farmers (almost half of them women) through farmer field days and exchange programs.

The program is considered a flagship program and is being adopted by donors as a framework for sustainable intensification. SIMLESA has significantly contributed to the generation and adoption of user-preferred maize and legume technologies, as well as information and knowledge that improve system productivity and profitability of the target farming systems. SIMLESA's unique contributions, in terms of resource allocations; developing human capacity and research facilities to improve the efficiency and impact in agricultural research is highly recognized by our NARS partners.

# Operational Challenges

SIMLESA1 faced the chronic problems of limited critical mass to undertake current tasks and expand (Malawi and Kenya); limited number of qualified researchers in most of the countries who are overstretched by various donor program and requirements, thus affecting some program deliverables. Failure of some SIMLESA country teams to clearly identify young scientists for both MSc and PhD scholarship opportunities remains our major concern. Moreover, institutional constraints to share resources with other scaling out partners (universities, private sector and NGOs) and building and incentives to bring them on board has been a major challenge Institutionalizing innovation platforms (IPs) in the communities, districts and regions has been is slow in some countries and there is a need to stream line the approach. Farmers regularly face the problems of accessing seed for recommended legume varieties as formal seed sector is no producing legumes Developing a targeted legume seed production initiative is strongly recommended.

Based on lessons learned from SIMLESA 1, Phase II is mainly focusing on broader technological focus (core thrust: on CA-based sustainable intensification), System orientation (from plot to farm), Impact orientation (Adoption, impact pathways, value chain linkages), Partnership in scaling up/out technology and competitive grants.

The following sections highlight the achievement sand results of SIMLESA (2010-2014) under the main objectives of the project.

# Understanding farmers' circumstances and potentials for sustainable and profitable farming systems

During the implementation period, a total of 500 farming communities compared with a target of 188, were selected in the maize/legumes farming systems in different agro-ecologies within the five SIMLESA implementing countries. A total of 3,580 households (3,020 males, 560 female headed households) were interviewed to generate data on adoption, production, marketing, and risk management strategies, among other issues.

Crop types and varieties grown in the communities were by breeders and agronomists in collaboration with farmers in SIMLESA countries. Access to agricultural inputs and services (establishment of innovation platforms) were also identified and analyzed during the implementation of SIMLESA initial phase. End line survey was conducted in collaboration with the Adoption Pathways project.

The typologies that were carried out were based on age, education, household size, farm size, and maize area, number of goats and sheep, access to information and value of assets among others. The findings from this exercise varied from country to country, for instance, in Malawi, with an average plot holding of 1 hectare, farmers allocated about 0.47 hectare to maize production, and about 0.2hrctare to legumes, this was an indication that there is room for continued adoption of the SIMLESA technologies for the two crops across all the districts, in case farmers opted for intercropping the two crops. The results in Malawi further reveal that the majority of the respondents owned 50 percent of the land on which they cultivate, while the remainder was rented. This also might have good implications for adoption and continuity of CA technologies in the impacts sites

The adoption monitoring surveys conducted revealed that in general SIMLESA program is on track in terms of progress against milestone targets and deliverables. Within the initial four years of the program a total of 46,978 (29,259 male and 17,719 females) farmers were reached against a target of 44,323. This shows that the program managed to surpass the target by over 2,500 farmers mainly due to effective implementation extension strategies. Positive results were also noted on the adoption monitoring where 18,569 adopted SIMLESA technologies against 11,581 deliverable targets by end of 2015 as detailed in table 1.

*Table 1: Number of households adopting SIMLESA Technologies*

| Country | Research communities | | Targeted and reach | | | | Target and actual adoption | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Country | Target | Achieved | Target | Reached | | | Targeted adopters | Actual adopters | | |
| | | | | Male | Female | Total | | Male | Female | Total |
| Ethiopia | 54 | 54 | 10,454 | 8781 | 1673 | 10,454 | 3,800 | 3,192 | 608 | 3,800 |
| Kenya | 38 | 30 | 8,913 | 5,364 | 8,236 | 13,600 | 3,240 | 1,401 | 2,066 | 3,467 |
| Tanzania | 38 | 40 | 8,913 | 6,715 | 3,128 | 9,843 | 3,240 | 2,088 | 1,199 | 3,287 |
| Malawi | 36 | 36 | 8,022 | 2,177 | 2,263 | 4,440 | 2,916 | 1,137 | 1,089 | 2,226 |
| Mozambique | 36 | 36 | 8,022 | 6,222 | 2,419 | 8,641 | 2,916 | 3,763 | 2,026 | 5,789 |
| Total | 222 | | 44,323 | 29,259 | 17,719 | 46,978 | 16,112 | 11,581 | | 18,569 |

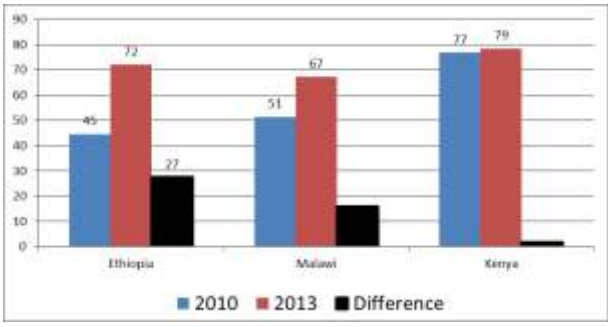
| Country | Total host farmers | % host farmer expanding beyond demonstration plots | Area expanded (ha) |
|---|---|---|---|
| Ethiopia | 73 | 85 | 0.335 |
| Kenya | 48 | 50 | 0.279 |
| Tanzania | 69 | 75 | 0.401 |
| Malawi | 36 | 72 | 0.829 |
| Mozambique | 83 | 63 | 0.480 |

It was discovered that host farmers in SIMLESA countries are, in addition to focusing on farmer field schools, they are taking new seed varieties and farming practices to their own fields.
The number of host farmers varies from one country to the other. Host farmers are responsible for the day to day management of demonstration plots mainly on-farm plots. A total of about 50 households from the surrounding areas can easily access demonstration plot to learn innovative ideas from them.

The adoption of improved maize seed varieties were progressive since the inception of the project. It was discovered that more farmers were adopting improved seed varieties each year as evidenced by the adoption monitoring statistics.

# Adoption trends, fresh maize hybrid varieties (%households)

*Fig.1*




· Some key messages from empirical economic analysis strongly suggest that adopting technologies in combination provides the highest crop income and agro-chemical use reduction rather than adopting them in isolation. For instance, famers in Ethiopia were able to increase their net maize income by more than 66-92% when they adopted improved maize varieties together with maize-legume rotations and minimum tillage. In Malawi the increase in net maize and legume income ranged between 52-26 percent and pesticides reduction in the range of 0.4-0.6 liters per acre when farmers combined legume-maize intercropping and legume-maize rotations.

· Impact analysis results also showed that farmers can significantly reduce risk of crop failure by adopting crop diversification practices (legume intercropping and rotations) and minimum tillage in combination; suggesting technologies promoted by SIMLESA have win-win-win outcomes: increased crop income, reduction risk of crop failure and improved environmental quality.

The studies done under SIMLESA also point to the need for focusing on non-classical adoption variables in the technology adoption decision analysis (social capital and networks, spouse education, skill of extension workers, shocks [Rainfall, biotic and abiotic factors] etc.] to speed the process of technology adoption.

# Towards a productive and sustainable production system for smallholders

Out of the target of 10 potential systems, practices and risk management strategies identified in the farming communities, 12 were achieved with each implementing country achieving its target. In Kenya, two promising CA management practices namely furrows and ridges and no till, and CA no till combined with desmodium were identified by agronomists for testing with farmers , these practices were compared with the conventional tillage. Through a series of evaluations, it was observed that there was no difference between the conventional tillage and farmers' practice.

In Malawi, yield results from CA and improved seed trials showed that maize/soybean; maize/pigeon pea and maize/groundnut were identified in the farming communities as potential systems for risk management. In Tanzania, maize-legume cropping system involving the use of the Drought Tolerant Maize for Africa (DTMA) maize, intercropped with early maturing high yielding legumes and tillage practices were identified by researchers as practices that can reduce risk.

Throughout the implementation period, a total 240 major stakeholder creation meetings were organized out of a target of 223. The major stakeholders included farmers, agro-dealers, non-governmental organizations and seed companies.

Out of the 240 meetings, 50 were held in Tanzania, 67 were in Ethiopia, 50 in Kenya, 36 and 37 in Malawi and Mozambique respectively. It is through such meeting that stakeholders get to know what SIMLESA is doing and how they can benefit and/or create synergies.

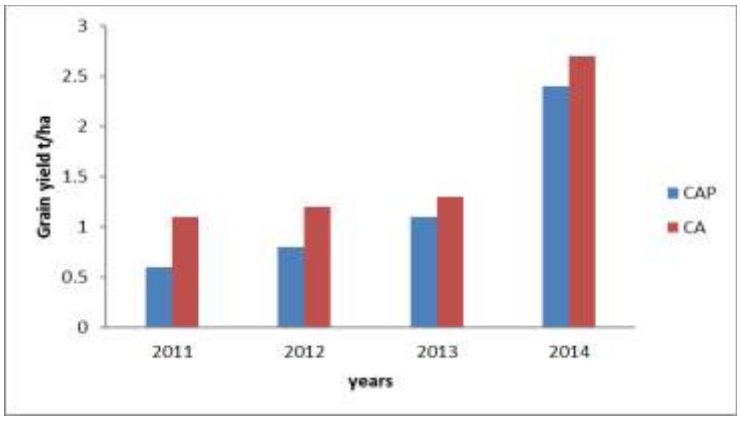
# Selection of best bet option through exploratory trials

A total of 492 out of 327 targeted exploratory trials were established, characterized and evaluated and farmers are using them. These trials include 116 in Ethiopia, 48 in Kenya, 231 in Tanzania, 51 in Malawi and 46 in Mozambique. A total of 28 best bet options were selected during the implementation out of the targeted 25. These include five for Kenya, six for Ethiopia, and seven each for Tanzania and Mozambique and three for Malawi. In Malawi, three best bet options were selected, these include CA and basins for lowland, CA and maize/legume intercrop for mid altitude and maize-legume rotation for both ecologies, and all these three options were based on the results of the grain yield. In Tanzania, researchers carried out the selection in 2011, but in subsequent years, farmers and extension staff were involved.

The selection of best bet options took into consideration, availability of both sexes. The best bet options that were selected included maize/pigeonpea intercropping under conservation agriculture in the two zones. Pigeonpea was the legume that performed better under intercropping in both zones, this was because it does not compete with maize since it grows slowly. In 2012 maize/beans was selected in the northern zone while in 2013 maize/cowpea was selected as another best option in the eastern zone.

The interaction of cropping seasons and cropping systems showed significant maize grain yields with increasing yield trends of maize rotated with common beans while maize mono-cropping resulted in yield decrease across cropping seasons.The results from the exploratory trials showed an improvement of maize grain yield from 0.5 tons per ha-1 tons to about 3 tons ha-1 and 2.5 to 4 tons ha-1 for Eastern and Northern Tanzania respectively as summarized below:

*Fig.2 mean maize grain yields for low potential environment in eastern zone of Tanzania*




Maize grain yield in eastern Kenya increased from an average of 0.4 tons ha-1 in SR2010 to about 4.0 tons per hectare-1 at the end of 2014. At the same time, the sole bean yield increased from 0.2 tons per ha-1 in SR 2010 to over 2.0 tons per hectare-1. The yields increase was attributed to improved field management (e.g. appropriate plant density, fertilization and adherence to early sowing).

In attempting to address food insecurity and low-crop productivity in Africa, SIMLESA introduced CA technology which has brought a glimmer of hope among farmers on the continent. Conservation agriculture, among others, harnesses soil degradation, conserves soil moisture and saves labour. This is achieved through reducing soil tillage as little as possible, reducing soil water evaporation through organic mulch or residue cover and alternating crop types or rotations/associations. SIMLESA implemented CA, along with improved maize and legume varieties, to develop resilient and sustainable cropping systems, and improve food security and incomes.

*Fig 3: Effects of conservation agriculture technologies on water infiltration*

*Excessive ponding in farmer practice may lead to run-off generation and evaporation water losses after rain events...*

*While in CA all the water infiltrates and hence minimal losses!*

To date, farmers participating in the SIMLESA program, among other benefits, have realized that maize yields in CA systems involving crop rotations and intercropping with legumes increase yields. Furthermore, results from the field also show that CA saves labour, which enables farmers to plant timely, and leads to improved profitability. The use of herbicides in CA, which saves labour in managing weeds, is popular among farmers in all five SIMLESA partner countries – Ethiopia, Kenya, Tanzania, Malawi and Mozambique. Other observations are:

· Maize-legume cropping systems and crop varieties for various agro-ecological areas identified, evaluated and being scaled-out. Crops for inclusion for maize-legumes system intensification identified and tested.

· Conservation agriculture practices for increased labor productivity, water use efficiency and profitability, rotations and intercropping identified and being-scaled out.

• A summary of maize yields obtained in the lowlands of Malawi by cropping system since 2010 showing yield stability across environments

• Maize and bean varieties from both DTMA and TL-2 evaluated for performance in different AEZs. These are now in the registration process to enable commercialization.

• Duration was not long enough to show cumulative benefits of CA over other practices on grain yields. Nonetheless differences in crop yields e.g. in Malawi, between CA - based maize-legume rotation/intercropping systems progressively portrayed superiority over time compared to farmer practices although the margin of differences also depended on seasonal rainfall characteristics.

• Adoption of CA has higher prospects in areas with less livestock (Malawi) compared to other countries.

• Significant residue completion between competing uses (feed, fuel and mulch). Free grazing in some maize growing areas makes it difficult to leave any residue for mulch. Studies on minimum amounts of residues required to generate positive yield benefits were initiated on-station but results have not been conclusive but overall suggest complex interactions between the three factors namely residue application rates x Nitrogen x rainfall

• Introduction of fodder legumes into the system improves feeding quality of stover and also offer alternative source of feed hence enabling farmers to leave some residues for mulch.

• Termites pose serious threat to residue cover provision particularly in Mozambique and the drier parts of Malawi. Studies carried out show

that two of the CA principles namely reduced soil disturbance and provision of residues as soil cover generally contribute to increased termite activity observed in CA systems.

• Complementary on-station trials established at various strategic locations enabled more in depth measurements of different parameters including fertility and soil moisture as well as provide data for the parameterization of the APSIM model.

• Studies on soil moisture clearly demonstrate the improved moisture conservation benefits of CA based maize-legume cropping systems compared to farmer practices.

• Weed management studies carried out re-emphasize the importance of employing good weed control strategies and that irrespective of whether one uses chemical or manual methods, high yields could be achieved as long as weeds were effectively controlled. In Malawi the provision of high residue cover rates contributed to reduced weed pressure and no significant differences were obtained between manually weeded and chemically weeded systems suggesting that CA-based maize legume systems could successfully be employed even without the use of herbicides. Herbicides were however found to be popular among farmers due to reduced labor required for weeding.

• APSIM simulations results from the University of Queensland's Queensland Alliance for Agriculture and Food Innovations (QAAFI) and SIMLESA national research systems (NARS) partners suggest maize residues applied as mulch to maize crops will alleviate effects of dry spells in only 20 percent of seasons across SIMLESA's African agro-ecologies, and increases N immobilization and N demand in 100% of seasons. Field measurements will be required to further verify these model outputs at least in the short term.

# Strengthening Seed Systems in Eastern and Southern Africa

SIMLESA, in collaboration with sister projects like DTMA and ICRISAT/Tropical Legumes-II and private companies in respective countries, released several maize and legume varieties during the reporting period. The released maize varieties and legumes were incorporated in the agronomy activities and evaluated by farmers and other stakeholders which resulted in the identification of farmers preferred varieties for scaling out. The program contributed to the release of 40 maize varieties, including 24 hybrids and 16 open pollinated varieties (OPVs). Selection of the varieties was undertaken with active participation of farmers and other partners. Yield advantages of 10 percent - 30 percent were noted for these new varieties as compared to the existing commercial varieties.

Released and pre-release maize varieties generated by various CIMMYT projects, such as Drought Tolerant Maize for Africa (DTMA), Water Efficient Maize for Africa (WEMA) and others, were used for the PVS. Field evaluations have been conducted twice per cropping season (at vegetative and maturity stages) with participations of key stakeholders, including farmers, extension experts and seed growers. Male and female selection criteria were used to identify preferred varieties for release. The criteria used include yield potential, ears per plant, disease and drought tolerance, earliness, taste, colour and grain texture. Researchers also analyzed grain yield and other important agronomic traits.

*Figure 4. Number of on-farm PVS trials conducted during 2010-2014 in each country*

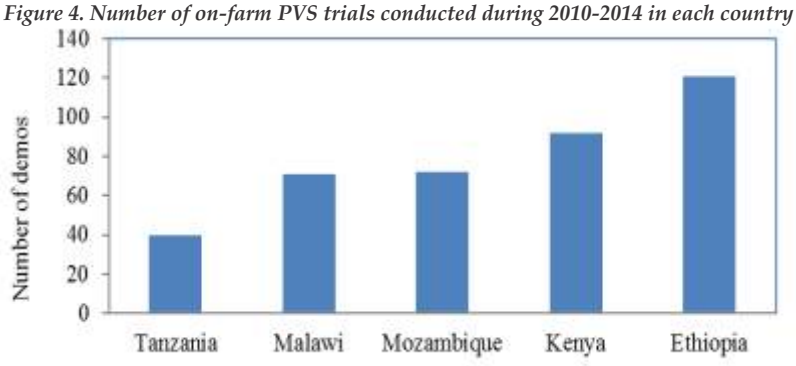



*Table 2.On-station PVS trials conducted to identify best performing maize varieties*

| Country | Number of maize trials conducted on-station | | | |
|---|---|---|---|---|
| | 2010 | 2011 | 2012 | 2013 |
| Ethiopia | 6 | 7 | 7 | 7 |
| Kenya | 3 | 3 | 4 | 4 |
| Tanzania | 2 | 2 | 3 | 3 |
| Malawi | 0 | 3 | 4 | 4 |
| Mozambique | 0 | 4 | 4 | 4 |
| Total | 15 | 19 | 22 | 22 |

Thereafter, maize varieties that met the requirements of the agro-ecologies of the targeted farming systems and farmer preferences were fast-tracked for release and scale up of seed production.

| SIMLESA Countries | Legume trials |
|---|---|
| Ethiopia | 119 |
| Kenya | 52 |
| Tanzania | 40 |
| Malawi | 87 |
| Mozambique | 80 |
| Total | 378 |

Considering the importance of legume in food security a total of 378 legumes based PVSs were conducted across the five program countries. The farmers had a chance to incorporate their criteria into the variety selection processes, giving a sense of the ownership of the results and therefore improving scaling out and adoption of the community endorsed varieties.

The varieties were identified and grown in a given site where they were evaluated on drought tolerance, pest resistance and growth habits at flowering, podding, and maturity stages. After harvest, the varieties were further evaluated on seed size, seed colour, and time taken to prepare the food product, taste and marketability by farmers. A total of 64 legume varieties across the five program countries positively met PVS team's criteria and therefore were selected for official release.

# Monitoring and evaluating of SIMLESA activities

Monitoring and evaluation of the planned activities were coordinated by ASARECA. In performing this function, ASARECA provided the leading role in the development of the broad M and framework for the project, it also participated in training for partners to facilitate evidence-based and adaptive management. Together with all partners involved, it applied its broad M&E framework, which is in line with the Comprehensive Africa Agricultural Development Program (CAADP) framework that is adopted by many of the Africa Union (AU) member states, to facilitate monitoring and evaluation of SIMLESA.

The program implementers, along with field-based teams played a major role in data collection and reporting. ASARECA participated actively in ensuring that the targets for the project are monitored and achieved, it designed a Performance Monitoring Plan (PMP), a living document that was regularly updated.

ASARECA attempted to establish a monitoring and evaluation system for implementation of the SIMLESA program. The main tool for the M and E system is Performance and Monitoring Plan which is linked to Performance Measurements Framework. These were developed in a participatory manner where all program key stakeholders were involved. Series of workshops were conducted in developing M and E system. Monitoring documents were being updated periodically as part of progress tracking mechanism.

The stakeholders that were trained in M and E aspects and using the skills in the projects, were in two categories, one category was trained by ASARECA, and the other by the SIMLESA staff involved in M and E. ASARECA M and E Unit conducted tailor-made trainings in M and E for selected SIMLESA implementers from all the five

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countries. A total of 49 people (34 males; 15 females) benefited from assorted M and themes.

In enhancing program M and E system a field monitoring and ground-truthing exercise was carried out by ASARECA in countries of operation to check and prevent or remedy double-dipping, commingling of project activities and any other irregularities in program implementation.

Various learning and reflection platforms were organized as part of program monitoring regularly. These platforms were in numerous forms for instances, annual partner meetings, innovation platforms, exchange visits and annual field monitoring visits.

The SIMLESA study on inventory of technologies and analysis of conditions for scaling out and spillovers was completed in July 2012. The report identifies and analyses various factors which either constrain or enable scaling out and spillovers of SIMLESA technologies. The factors were grouped into policy, institutional, agro-ecological and socio-economic. This was carried out by ASARECA.

ASARECA trained program implementers mainly through capacity building sessions, for example data management and gender mainstreaming. Gender focal person were selected and trained from each country of operation as a backstopping measure. Extension staff and Innovation Platforms (IP) partners were trained in gender mainstreaming during the reporting period. A two-day workshop provided tools to increase the number of female farmers participating in SIMLESA activities in the 2013/2014 farming season. A team from Mozambique attended a workshop to validate gender case studies documented by ASARECA. The case studies were validated with minor changes.

# Scaling up activities of CA based farming practices

• The use of innovation platforms and partnerships for scaling out has already started to pay off. In Ethiopia, maize-bean intercrop and rotations were the most popular CA practices scaled-out. In Kenya, it was mainly CA with ridges in drier areas and without ridges in wetter areas.

In Tanzania, Malawi and Mozambique complete CA practice was scaled-out.For example in Malawi through various partnerships and innovation platform activities SIMLESA technologies have been reached out to more 3,300 family households while in Mozambique an estimated 16,000 households have been reached based on the latest M&E results. In Mozambique SIMLESA activities increased from the 6 original core communities to 26 communities by 2012/3 season where SIMLESA directly engaged with at least 1050 households. In Malawi the number of communities increased from 6 to at least 21 sections involving over 240 households scaling-out CA based maize-legume technologies in the six districts.

• Lessons from the three years suggest that scaling-out can be achieved effectively through models combining both local innovation platforms and formal partnerships with other relevant institutions such as NGOs and farmers associations and that the model selected for scaling-out should take into account local social and institutional dynamics.

• A scaling out guide for use by partners was developed and is now being employed by implementing partners in countries such as Malawi and Mozambique

# Capacity building: training the next generation of scientists

The SIMLESA program has facilitated the training and mentorship of over 3,000 agricultural and socio economic scientists in a variety of areas relating to maize and legumes value chains. More than 45, 000 farmers were engaged through farmers' field days and farmer exchange programmes. SIMLESA has also prioritised women actors across the value chains. Specifically for farmer field days and farmers' exchange program, 46 percent and 39 percent women farmers were engaged respectively.

SIMLESA's capacity-building initiatives target researchers, extension practitioners, farmers and other actors along the maize and legumes value chains. Other notable beneficiaries of the program's capacity-building measures have included young people who have been supported for postgraduate training and mentorship. For example, through the program, 22 doctoral students have enrolled at numerous universities across South Africa, Australia, Ethiopia and Kenya. A further 42 students are pursuing Master of Science degrees at national universities in SIMLESA partner countries as detailed in the table below:

*Table 3. Trainings by country*

| # | Country | PhD | Country University | MSc | Country University |
|---|---|---|---|---|---|
| 1. | Kenya | 3 | Kenya | 1 | Kenya |
| 2. | Mozambique | 1 | Australia | 2 | South Africa |
| 3. | Rwanda | - | - | 1 | Kenya |
| 4. | Ethiopia | 2 | Ethiopia | 18 | Ethiopia |
| 5. | Ethiopia | 12 | Australia | 9 | Ethiopia-Only research funded |
| 6. | Malawi | 3 | Australia | 2 | Malawi |
| 7. | Tanzania | 1 | South Africa | 9 | Tanzania |
| **Totals** | | **22** | | **42** | |

SIMLESA also supported national agricultural research institutions with physical capital assets such as vehicles, irrigation facilities, information technology and laboratory equipment to strengthen research and agricultural development activities. This reinforces and complements SIMLESA's human capacity building component.

QAAFI continued to support SIMLESA since inception of the project in 2010 in research, modelling, training and capacity building mainly through long term scholarships. PhD and MSc students are being supported by QAAFI in various SIMLESA countries. Students' thesis are directly linked to SIMLESA, this positively adds value to program research component. Recently, Daniel Rodriguez was appointed Course Advisor for the ADS Scholarships. A number of SIMLESA country students applied and were interviewed in Nairobi, Kenya in 2014. SIMLESA candidates have benefited from QAAFI specifically through information sharing and complementarity activities for instance facilitation of pparticipatory modelling workshop, development of experimental protocols, agronomic trainings, free online studies, scholarship and active project meetings.

# Case studies-Ethiopia: Women empowered to effectively participate in agriculture

The SIMLESA program has been implemented in Ethiopia since March 2010 with the aim of improving the productivity and management of maize and legume production in the project sites by improving soil fertility, improving land productivity and ensuring benefit sharing among the community members at household level. Gender issues were taken as a component of the intervention as it related to livestock feeding challenges and beans which are termed as women roles and crops relatively.

When the SIMLESA program started, the first two years focused on participatory technology evaluation and validation to identify best technologies for further scaling up. The selection of farmers to participate in the program was done in consultation with the District Bureau of Agriculture and Administration (DBAA) that has lists of all the farmers in the locality. The SIMLESA project staff discussed and explained the objectives of the project with the district officials who were then asked to propose names of farmers who would be willing to host the project. In this way, the host farmers were identified.

The community members are invited through the Community Development Workers and Administration Officers. Although SIMLESA staff usually proposes inclusion of female and youth farmers in the invitations, this is often not adhered to. In most cases, community development workers convey messages or information at meetings. This method of information dissemination does not favour women, because most participants at such meetings are men. Due to time and resource constraints, the Community Development Workers are often not able to travel to villages to pass information to women who are in most cases work around the homesteads.

*Host farmer & extension workers explain to female farmers on the field day*

Realizing this constraint, the program staff have tried to find ways of getting information to and generating interest among female farmers to participate and adopt SIMLESA technologies.

On August 30, 2012 a mini field day was organized in Badowacho District by the Hawassa National Maize project targeting female headed households/farmers. The field day was held on Fatima's field, a female farmer participating in exploratory trial undertaking conservation agriculture. The women discussed the new technology of conservation agriculture among other issues. They expressed their views on the importance of this technology in saving time and labour as well as expectation of higher yields and contribution to sustainable production.

The project is now undertaking technology scale out and information dissemination which offers a good opportunity for consideration of gender concerns. In Participatory Variety Evaluations, there is equal representation of men and women among the participants. This participation is purposefully done by ensuring that the invitation is sent to both the men and women specifically. The preferences shown by the men and women in these evaluations differ.

While as men tend to opt for trials on high yield and drought resistance, women on the other hand choose early maturing and taste characteristics. At one participatory maize variety evaluation held in Dehra District attended by 15 men and 15 women, it was mentioned that one of the eight varieties in the PVS trial was quality protein variety, especially suited for children. During the evaluation, the women were very keen on the observations and asked facilitators to show them the variety with the quality protein. At the end of the session, most women were volunteering for this particular variety.

## Good Practice

To promote the participation of women in the program activities it is important to design particular strategies to involve them. These may include specific ways to get information to women such as repeated visits to their homes to explain the program to them or organizing meetings in places convenient to women to attend.

## Lessons Learned

When women of Badowacho District were targeted and invited to a field day organized on another woman's farm, they fully participated and contributed in the process. Men and women have different reasons for participating in research. Women are more interested in characteristics such as nutritional value and taste because they have a primary responsibility for ensuring household food security. Men on the other hand may be more interested in characteristics that promote market value. These reinforce the reality that decisions are taken in accordance to the traditional gender roles assigned by society.

# Farmers' Voices from Malawi:
## *A Case of Adoni Nankhwani*

*Adoni and her husband in front of their house*

As far as Adoni can recall she has been farming since she was five years old, for her it is just part of growing up. When she got married at the age of 16 years, she was given 2 acres of land by her mother. Her husband also received about 1 acre from his mother. In the Chewa tribe, a husband lives with the wife's family as such Adoni and her husband mostly farm on her two acres because of proximity. Her husband's land is quite a distance and cultivating it necessitates sleeping over away from home.

Adoni has been participating in the SIMLESA program for the last three years. She narrated that in the past they used to construct ridges in the maize fields and then apply manure, a practice that was not only labour intensive but also expensive because the manure had to be transported to the fields. The SIMLESA technique on the other hand is very manageable because it only requires mulching and then you wait for the rains to plant. The only challenge is the inadequacy of stalks for mulching which at times have to be transported from some other farms.


*Traditional planting of soybean and cassava on ridges*

Adoni got involved in SIMLESA when the village heads called for a meeting and the people selected the hard working farmers. Although other farmers volunteered to host the trials, they could not meet the criteria such as farmer commitment and proximity of the plot to the road.

The first year she joined SIMLESA, Adoni harvested a lot more crop than the previous years when she used the conventional farming system.

After observing the good performance of the SIMLESA plots, Adoni decided to expand the CA techniques on her land expanding to 1½ acres under CA. She applies less fertilizer than before because she practices the 1x1 planting as compared to the 3x3 planting which takes more fertilizer. Her yields have also increased from 1 to six carts. Adoni is particularly captivated by the use of less fertilizer and increased yields that have accrued from engaging in SIMLESA activities.

The family's current food reserves will last February, a great improvement from proceeding years when food would be depleted by the month of June of the previous year. Before SIMLESA, the entire harvest could be transported on a bicycle, but she now has yields enough to dry, treat and store in bags in the house.

She is now able to sell some soybeans and maize which has improved the household income. With the improved income she can now access medical services from private clinics. She has also procured iron sheets and is planning to construct a brick house.

The couple has seven children and five of them are able to work in the fields. Adonis's husband only helps on the farm when his bicycle on which he trades firewood in the nearby town is broken down.

Occasionally, in times of critical labour shortage, he contributes money from his business to hire labour. The Chewa culture of having a husband live with the family of the wife curtails occasions of the woman facing domestic violence because she is surrounded by her relatives. Decision making is also more consultative among the couple.

## Good Practice

Inheriting and control over land, a major production asset, conferred upon Adoni some degree of authority that enabled her to participate in decision making processes and allowed more consultation with the male partner.

## Lesson Learned

Adoni does not draw differences between farming activities and her rural life, therefore understanding how gender differences affect agricultural production in relation to asset ownership and decision making is critical to the success of any innovation.

# Conclusion

Since 2010, SIMLESA has managed to identify best bet technologies which are compatible with climate change. During the reporting period over 40 improved maize seed varieties and a total 64 legume varieties across the five program countries were developed. Participatory variety selection techniques were used in selecting improved best seed varieties. Yield advantages of 10 - 30 percent were noted for these new varieties as compared to the existing commercial varieties. Improved agricultural inputs were complemented by good farming practices for instance conservation agriculture. A total of 46,978 farm households were reached in the initial four years of the program against a target of 44,323 farmers. Over 18, 569 farmers adopted new SIMLESA technologies against a four year target of 16, 498. The program is well on track in terms of attainment of desired milestones and deliverables at the end of its life cycle.

The program entered its second phase on July 1, 2014 which is focusing more on scaling out of new technologies which enhances food productivity in Africa. In this phase, the involvement of various key stakeholders is of paramount importance. New research partners the Internal Livestock Research Institute ((ILRI) and the International Center for Tropical Agriculture (CIAT)) and a streamlined role for ASARECA and ARC are expected to add value and enhance program deliverables For example, the program would focus on participatory research and development with farmers, extension agencies, non-governmental organizations, universities and agribusinesses along the value-chains, to ensure sustainable agriculture development in Africa.

SIMLESAII will continue to focus on developing and adapting (CA-based) sustainable intensification options that meet the needs of smallholder farmers, and generate new evidence on their benefits under smallholder farmer conditions in terms of productivity, stability, profitability and sustainability

The SIMLESA program management is further strengthened by a dedicated Project Manager and Communications Specialist. The recruitment of an M&E officer is almost finalized Alignment of SIMLESA to the MAIZE CRP and employing the Research Management System (RMS) are contributing to management efficiency. A new Competitive Grant system to allocate SIMLESA resources at country level accelerate scaling out activities by non-NARS partners will be implemented starting 2015 season.

SIMLESA being an intensive field program dealing with multiple partners the need to allocate adequate resources for country level coordination and oversight are being discussed and s agreed with the NARS management to be implemented in 2015.

Under SIMLESA II, collaborations with other sustainable intensification sister projects supported by ACIAR, BMGF and USAID (N2 Africa, AGRA Soil Health Program, Africa RISING, DTMAS and TAMSA) will be further strengthened.

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