



MAPPING AND PROFILING OF CONSERVATION AGRICULTURE STAKEHOLDERS IN TANZANIA



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ACRONYMS

ACT	African Conservation Tillage Network
AGRA	Alliance for a Green Revolution in Africa
ARI	Agricultural Research Institute
ASA	Agricultural Seed Agency
ASDP	Agricultural Sector Development Programme
AU	African Union
CA	Conservation Agriculture
CAMARTEC	Centre for Agricultural Mechanization and Rural Technology
CARE	Care International
CBO	Community Based Organization
CFU	Conservation Farming Unit
CIMMITY	International Maize and Wheat Improvement Center
CSAClimate	Smart Agriculture
DAICO	District Agriculture Irrigation and Cooperatives Officer
EAC	East Africa Community
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
FBO	Farmer Based Organizations
FFS	Farmer Field School
GAP	Good Agricultural Practices
GPS	Global Position System
HRNS	Hanns R. Neumann Stiftung
ICRAF	Centre for Research in Agroforestry (World Agroforestry Centre)
IITA	International Institute of Tropical Agriculture
LGA	Local Government Authority
MATI	Ministry of Agriculture Training Institutes
MoA	Ministry of Agriculture
MVIWATA	<i>Mtandao wa Vikundi vya Wakulima Tanzania</i>
NAPA	Tanzania National Adaptation Programme of Action
NCATF	National Conservation Agriculture Task Force
NEMC	National Environmental Management Council
NGO	Non-Governmental Organization
NM-AIST	Nelson Mandela-African Institute of Science and Technology
NORAD	Norwegian Agency for Development Cooperation
PELAM	Participatory Ecological Land Use Management
RECODA	Research, Community and Organisational development Associates
SACCOS	Savings and Credit Societies
SIDA	Swedish International Development Agency
SUA	Sokoine University of Agriculture

SUCASA	Strengthening Coordination, Scaling Up and Governance of Conservation Agriculture (CA) in Southern Africa
SWOT	Strength, Weakness, Opportunity and Threat
TARI	Tanzania Agricultural Research Institute
TBS	Tanzania Bureau of Standards
TOSCI	Tanzania Official Seed Certification Institute
TPRI	Tropical Pesticides Research Institute
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
VICOBA	Village Community Bank
WRS	Warehouse Receipt Systems

EXECUTIVE SUMMARY

The Food and Agriculture Organization of the United Nations (FAO) in collaboration with several countries in Southern Africa developed a project that focuses on supporting scaling up the transformation of current low productivity, non-climate resilient, conventional production systems to high productivity and sustainable CA approaches, through improved stakeholders coordination, strengthened partnerships and increased knowledge sharing.

In implementing the Strengthening Coordination, Scaling Up and Governance of CA in Southern Africa (SUCASA) project, the Ministry of Agriculture (MoA) and FAO developed a study on mapping and profiling exercise of stakeholders involved in testing, modelling, promoting and disseminating CA technologies and practices in Tanzania. This report provides major findings of the mapping study and recommendations for the way forward.

Four agro-ecological zones i.e. Northern, Central, Southern Highlands and Lake Zones were visited during the study and further information from the other 3 zones that are the Western, Eastern and Southern zones was gathered through various means such as emails and mobile phones. Various stakeholders were interviewed including District Agriculture Irrigation and Cooperatives Officers (DAICO), representatives of various institutions, agricultural machinery dealers, the academia and CA practising farmers. A total of 160 farmers practicing CA were interviewed during this study.

It was observed that there are several actors who are promoting Conservation Agriculture (CA) in the country. These include Government Ministries, Local District Authorities (LGAs); public institutions; Universities and Colleges; International Organizations; Non-Governmental Organizations; Church Based Organizations; Farmer Organizations; and private companies including agro-processors, commercial farms, traders, agricultural machinery dealers, and manufacturers.

Some prominent NGOs involved in promoting Conservation Agriculture are Conservation Farming Unit (CFU)-Tanzania, African Conservation Tillage Network (ACT-N), ECHO, RECODA, World Vision, the Diocese of Central Tanganyika (DCT), Canadian Food Grains Bank (CFGB), Tanzania Gatsby Trust, HRNS, MVIWATA, PELUM, CARITAS, HELVETAS, AGRA, the Diocese of Rift Valley (DRV), Christian Council of Tanzania (CCT), World Vegetable Centre, Africa Inland Church of Tanzania (AICT)– Geita Diocese and Mara and Ukerewe Diocese, World Renew Tanzania, Project Concern International (PCI), RUDI, BRITEN and Clinton Foundation. Several international organizations and development partners have also been supporting activities on Conservation Agriculture, agroforestry and climate change in the country among them are FAO, UNDP, NORAD, SIDA, IRISH AID, European Union, CIMMYT, ICRAF, IITA, African Union (AU) and the East African Community (EAC).

Conservation Agriculture (CA) technologies promoted by stakeholders include reduced/minimum tillage by using both oxen and tractor drawn rippers and hand hoes; use of cover crops and crop residues; crop rotation and/or association; manually made planting basins; jab planters and weed management by herbicides. Some Agricultural Research Institutes under the Tanzania Agricultural Research Institute (TARI) such as TARI - Uyole, TARI - Selian, TARI – Ukiriguru, TARI – Maruku, TARI - Ilonga and TARI - Mlingano have been involved in screening of various cover crops and testing of tillage systems suitable to smallholder farmers context.

Despite these efforts in the promotion of CA, it was observed that the uptake of CA by smallholders is relatively low. Many farmers practice one or two elements of Conservation Agriculture and only very few have adopted the full package involving the three principles, i.e. minimum soil disturbance, permanent soil cover and crop rotations/associations. Farmers usually adopt the most doable technology first and with time, others follow as more tangible benefits unfold. Key entry points differ from one farmer to the other; to someone it might be rain water harvesting to curb moisture stress (drought); reduced labour; while to the other it might be improved soil fertility; attractive prices of cover crops or compatibility with the intercropping system.

Generally, the most common CA practices familiar to farmers are use of cover crops (61%); ox ripping (59%) and crop residues (48%) while the least used CA practices are power tiller ripping (14%), green manure crop cover (16%) and herbicides (18%). The use of Jab planters and Chaka hoes was minimal possibly because of the high labour requirement as they are manually operated. The main source of information on CA is from NGOs as reported by 94% of the respondents, Government Extension (53%), neighboring farmers (33%); Radio/TV (26%) and 24% received information from Farmer Organizations. The most common methods used by the majority of actors in the dissemination of CA technologies and practices include Farmer Field School approach, Lead Farmer (LF) approach, farmer-to-farmer contact, farmer groups, the individual farmer method, demonstrations, field days, exchange visits and agricultural exhibitions like the Nane Nane show.

The main challenges in adopting CA highlighted by the stakeholders during the survey, include limited access to CA implements due to non-availability and high prices of the equipment and implements which was reported by 72% of the respondents; shortage of agro-inputs including cover crop seeds; and pests and diseases as reported by 38% and 33% of the interviewees respectively. Other constraints that were reported include limited knowledge of CA, communal grazing of livestock in CA fields which makes crop residue retention in the fields difficult, bush fires during land preparation, poor marketing systems for agricultural produce and low enforcement of by-laws to restrict free grazing of livestock.

It was observed that some commercial farms have been instrumental in promoting Conservation Agriculture in their localities such as Rutuba farms and Clinton Foundation in Iringa and Kilolo districts; Kibaigwa Flour Supplies Ltd in Kongwa district; Fieldmaster and Naberera in Arusha; HADS in Babati district and West Kilimanjaro farms. These farms are engaged in contract farming which provides guaranteed markets to producers and increases accessibility to inputs and mechanization services on credit terms thus contributing to the up scaling of Conservation Agriculture in the country. Commercial farms in Tanzania contribute to the highest number of hectares put under Conservation Agriculture i.e. 22,000 ha compared to 11,000 ha which are under smallholder farmers.

It was further observed that, although there are many actors who are promoting CA in the country; they normally act on individual basis with limited interaction amongst them which leads to little impact in CA adoption. The approach is location specific covering few farmers only in a district, dealing with specific aspects of CA only such as training or skills development. Such interventions have been short lived giving little time for farmers to assess and evaluate the new technologies leading to many activities being abandoned by farmers as the projects ended back pedaling the adoption of CA.

A holistic programme approach (Value Chain) rather than fragmented project approach as practiced by many actors in the country is needed in combination with entrepreneurial CA service provision in agro inputs and machinery services. Some business models that can be used in up scaling of CA in Tanzania include contract farming, out grower schemes, Warehouse Receipt Systems and Input Output Aggregation Groups. The main actors in the model will include smallholder farmers, FBOs, NGOs, the public sector, agro-inputs dealers, trainers/extension, machinery hire service providers, microfinance institutions, traders/processors and others.

Collaborative activities among the various actors promoting CA should be emphasized as more tangible results may be obtained through pooling of resources and expertise while avoiding duplication of efforts and sending different messages which sometimes may be conflicting. Hence the revival of the National Conservation Agriculture Task forces (NCATFs) is important to enable the creation of common platforms for actors for sharing of information and knowledge on CA and partnering in delivering CA services to farmers.

Capacity building should be carried out at all levels of the value chain and strong linkages should be built among the various actors to ensure that they deliver better quality services in their respective specialty areas. Awareness creation and training on Conservation Agriculture and increased accessibility to financial resources for all value chain actors should be given special attention. As farmers become aware and knowledgeable and see tangible benefits, demand for Conservation Agriculture technologies and services will be created attracting the various actors in the value chain to provide the services.

Aspects of financing such as promotion of Savings and Credit Societies (SACCOS) and Community Microfinancing should be encouraged and incorporated in FFS as they have been influential in supporting small businesses in the villages which may partly cover the financing in the procurement of CA equipment and services while ensuring sustainability and continuity of activities even after end of respective projects.

Entrepreneurial CA machinery hire services should be promoted especially to the youth as they increase the availability of power to the smallholders who do not have the capital or skills to buy and manage the machinery. As through this arrangement, smallholders will be required to meet only the machinery hire charge which is affordable to the majority.

1. INTRODUCTION

Conservation Agriculture (CA) is a proven win-win alternative Climate Smart Agriculture (CSA) approach that can contribute to the building of resilience of smallholder farmers and assure them sustainable food and nutrition security and decent livelihoods. Despite its importance, CA practice by smallholders in the region is still low, leaving an untapped potential that could positively transform local farming systems.

Among factors contributing to the slow scaling up of CA in the region are the limited stakeholders' coordination, information sharing and messaging, resulting in a "muted voice" lacking of the thrust necessary to bring about the desired transformation from the conventional to the more resilient CA anchored production systems. The Food and Agriculture Organization of the United Nations (FAO) in collaboration with several countries in Southern Africa developed a project that focuses on supporting scaling up the transformation of current low productivity, non-climate resilient, conventional production systems to high productivity and sustainable CA approaches, through improved stakeholders' coordination, strengthened partnerships and increased knowledge sharing.

In implementing the Strengthening Coordination, Scaling Up and Governance of CA in Southern Africa (SUCASA) project, the Ministry of Agriculture (MoA) and FAO developed a study on mapping and profiling of stakeholders involved in testing, modelling, promoting and disseminating CA technologies and practices in Tanzania. This report provides major findings of the mapping study and recommendations for the way forward.

2. OBJECTIVES OF THE STUDY

2.1. Objectives

The key objective of this study was to map and profile stakeholders involved in testing, modelling, promoting and disseminating CA technologies and practices in Tanzania. Through identification and profiling key CA players (in both private and public sectors); the task addressed the following questions: who promotes CA, where is CA promoted, what CA technologies and practices are being promoted, who are the beneficiaries and how is CA promoted.

2.2. Scope of Work

Specifically, this study involved:

- i. Establishing an inventory and profiling of actors from both private and public sector undertaking and promoting CA technologies and practices in Tanzania.
- ii. Supporting the country to create a CA dataset and define targets in support of the CA platforms contribution to the Malabo CSA targets.
- iii. Identification of CA technologies and practices promoted by different actors.

- iv. Understanding the methodologies currently used to promote or disseminate CA technologies and practices and establish their SWOT;
- v. Establishing critical challenges/bottlenecks that inhibit adoption of CA and propose solutions; and
- vi. Provide recommendations of CA technologies and practices suitable to particular agro-ecological conditions and farming systems as well as efficient and effective method(s) for dissemination of CA to enhance adoption rate.

The Specific Terms of Reference (ToRs) are in Annex 4.

3. THE SURVEY METHODOLOGY

The major activities carried out during the assignment included preparation of tools for data collection to capture qualitative and quantitative information from CA players and beneficiaries; desk review of available information on key CA players in the country; field visits to collect both secondary and primary information from various stakeholders; data collection through newspapers and online advertisement; data analysis and report write up.

Field visits were conducted in 4 agro-ecological zones i.e. Northern, Central, Southern Highlands and Lake Zone and further information was gathered from the other 3 zones through various means such as literature review, emails and mobile phones. Stakeholders interviewed included District Agriculture Irrigation and Cooperatives Officers (DAICOs), representatives of various institutions, agricultural machinery dealers, the academia and CA practising farmers.

Systematic observations were made during the field visits, hence complimenting the gathered information. Secondary data was obtained from the respective Local Government Authorities (LGAs) and the Ministry of Agriculture (MoA). The study mainly generated qualitative data collected from the various actors through prepared check lists. The data collected was consolidated, collated and processed using simple Excel analysis and results of the analysis were summarized into tables and graphs for presentation and report preparation.

During the survey, 23 district and 2 City Councils (Mbeya and Dodoma) were visited; all of which are involved in the promotion of Conservation Agriculture in collaboration with several Non-Governmental Organizations (NGOs). They include Mbeya, Bahi, Manyoni, Chamwino, Kakonko, Sengerema, Buchosa, Kwimba, Chato, Geita, Maswa, Itilima, Busega, Serengeti, Bunda, Tarime, Butiama, Arumeru, Monduli, Same, Moshi, Kilolo, Wanging'ombe and Mbeya. A total of 160 farmers practicing CA were interviewed during this study.

The Draft Report was presented at a CA stakeholders' workshop that was held on 22-26th November 2021 in Morogoro and at the CA stakeholders Validation Workshop that was held

on 13-17th December 2021 in Arusha where the participants provided some valuable inputs that improved the Report.

4. CONSERVATION AGRICULTURE IN TANZANIA

In Tanzania, some elements of Conservation Agriculture have been practiced by farmers since long ago even before independence using indigenous technologies. Some of these technologies include the famous matengo pits in Mbinga, mound cultivation, mulching, chagga home gardens and pot holing which reflect some elements of CA such as accumulation of residues on soil surface, minimum soil disturbance, crop rotation and seeding on mulch (Mutunga *et al.*, 2001; Reij *et al.*, 1996;).

Conservation Agriculture as defined today incorporates three principles that is minimum disturbance of the soil, permanent soil cover and crop rotations has mainly been promoted in the country through some pilot projects including those supported by FAO, development partners and some NGOs since the late 1990s. Some Agricultural Research Institutes under the Tanzania Agricultural Research Institute have been undertaking research activities and training in Conservation Agriculture while several Local Government Authorities and Non-Governmental Organizations have been engaged in training and undertaking promotional activities in Conservation Agriculture such as conducting demonstrations and field days (Annex 2).

Conservation Agriculture in Africa accounts for about 1 million hectares which is less than 1% of the total global CA area. South Africa has 368,000 ha under CA, Zambia 200,000 Ha, Mozambique 152,000 Ha while Tanzania has about 33,000 ha out of which 11,000 ha are under smallholder farmers and 22,000 Ha are under large commercial farms. The smallholder farmers usually manage an average of 0.6 ha using hand tools such as hand hoes and dibble sticks and animal drawn implements. Large scale commercial farmers manage 400-1,600 ha using high capacity tractor drawn seeders which are sometimes Global Position System (GPS) guided (Mkomwa *et al.*, 2017).

5. MAJOR FINDINGS

5.1. Conservation Agriculture Actors in Tanzania and CA Technologies Promoted

There are several actors who are promoting Conservation Agriculture in the country. They include Government Ministries, Local Government Authorities; public institutions; Universities and Colleges; International Organizations; Non-Governmental Organizations; Religious Based Organizations; Farmer Organizations; and private companies including agro processors, commercial farms, traders, agricultural machinery dealers and manufacturers (Annex 2).

5.1.1. Government Ministries

The Ministry of Agriculture has been engaged in promoting Conservation Agriculture mainly through training of farmers using farmers groups and Farmer Field Schools (FFS); conducting demonstrations and holding field days. The Ministry of Agriculture in collaboration with several Development partners has been supporting the LGAs through the Agricultural Sector Development Programme (ASDP) to implement some projects on Conservation Agriculture. The Ministry of Agriculture also provides some technical backstopping to LGAs on Conservation Agriculture and conducts some exhibitions where various agricultural technologies as well as CA equipment and implements are displayed. The MoA also conducts workshops and seminars in collaboration with development partners and NGOs aimed at creating awareness on Conservation Agriculture to the communities and also it chairs/coordinates the National Conservation Agriculture Task Force

(NCATF). The MoA has recently been reviewing the Tanzania Agriculture Policy of 2013 in which CA will be spelt clearly.



Figure 1: Participation of high level MoA officials at CA workshop 2019

The Vice President's Office is undertaking some activities on environmental issues including focus on climate change as part in the implementation of the Tanzania National Adaptation Programme of Action (NAPA). The Vice President's Office places much emphasis on Climate Smart Agriculture and among the activities that are undertaken include promoting drought tolerant crops and improving water availability in drought-prone areas in Shinyanga, Dodoma and Singida regions to contribute in improving food security and supporting smallholders in climate change adaptation through participatory reforestation on Kilimanjaro Mountain.

5.1.2. Local Government Authorities

Local Government Authorities are involved in promoting Conservation Agriculture through their extension services. There are several extension officers from the district, ward and village level who are involved in training farmers and providing advisory services on Conservation Agriculture. The LGAs also conduct CA demonstrations and some organize farmers' field days. LGAs participate in exhibitions especially the National Agricultural show famously known as 'Nane Nane' organized annually by the Ministry of Agriculture in

collaboration with Regional Administration and Local Government (RALG) where various agricultural technologies as well as CA technologies are displayed.

Local Government Authorities have also been involved in implementing small projects in Conservation Agriculture by providing training to farmer groups through their District Agricultural Development Plans (DADPs) under the Agricultural Sector Development Programme (ASDP) supported by the Ministry of Agriculture.

District Councils that have been actively involved in promoting CA include Arumeru, Karatu, Babati, Hanang, Kilosa, Mvomero, Kiteto, Kongwa, Dodoma, Bahi, Chamwino, Mbeya, Njombe, Sumbawanga, Kilolo, Bukoba, Moshi, Momba, Ileje, Rungwe, Ludewa, Madaba, Wanging'ombe, Monduli, Same, Butiama, Bunda, Serengeti, Tarime and Bunda Town Council. The LGAs mostly work in collaboration with Central Ministries, NGOs and the private



Figure 2: Training farmers on CA in Mlowa village, Chamwino District Council
Figure 3: TSP training on direct seeder in Same District Council

CA technologies promoted include manually made planting basins and minimum tillage both by oxen and tractor drawn rippers; use of cover crops and crop residues; crop rotation, jab planters and weed management by herbicides are also promoted. The Farmer group and Lead Farmer (LF) approach are commonly used in training farmers in Conservation Agriculture. Other dissemination methods used include conducting CA demonstration plots, farmers' field days (FFDs), promotion events of mechanization tillage service and facilitating farmer exchange visits.



Figure 5: Demonstration of a tractor drawn seeder in Chamwino District during a CA
Figure 4: Training farmers on manually made planting basins in Same District Council

UNIVERSITIES AND COLLEGES are mainly involved in training students in degree and diploma courses. They include the Sokoine University of Agriculture (SUA), University of Dar es Salaam (UDSM), The Nelson Mandela African Institution of Science and Technology (NM-AIST), University of Iringa, Mwalimu Julius Nyerere University of Agriculture and Technology and Ardhi University. Apart from training students they undertake research in various aspects of environment, climate change and Conservation Agriculture as part of some students' requirements to the accomplishment of their degree programmes. Also, SUA and University of Iringa have been conducting demonstrations on Good Agricultural Practices (GAP) including CA.

The Ministry of Agriculture Training Institutes (MATIs) are also involved in training students at certificate and diploma level, most of whom after graduation are employed as extension officers at various levels. They also provide short self-tailored courses to meet specific requirements of their clients mostly NGOs. The curriculum in agriculture at diploma level has recently been revised to include components of Conservation Agriculture.

5.1.4. Tanzania Agricultural Research Institute (TARI)

Some Agricultural Research Institutes such as TARI - Uyole, TARI - Selian, TARI - Ilonga, TARI - Ukiriguru, TARI - Maruku, TARI - Mlingano and TARI - Naliende have been undertaking some research activities in Conservation Agriculture. These include screening of various cover crops and testing of tillage systems suitable to smallholder farmers context; promotion of animal drawn rippers and no-till direct seeders and dissemination of Conservation Agriculture technologies through both on station and on farm demonstration plots and organization of field days (Shetto and Owenya, 2007). Other research centres that have been involved in Conservation Agriculture recently include Hombolo, Makutupora, Tengeru, and Dakawa. Cover crops that have shown high potential for soil moisture conservation, weed suppression and soil fertility improvement include *Mucuna spp.*, *Dolichos lablab*, *Canavalia*, *Pigeon pea*, *Calopogonium spp.*, *Centrosema spp.*, *Stylosanthes spp.*, *Tropical kudzu* and *Siratro spp.*

The Farmer Field School, Farmer groups and Lead Farmer approaches are extensively utilized in promoting



Figure 6: A visit by government officials at TARI Uyole demonstration farm

Conservation Agriculture. Tanzania Agricultural Research Institutes conduct workshops and seminars on CA awareness creation and prepare leaflets and posters that are widely distributed to the farming communities. TARI also organizes field days to display newly discovered agricultural technologies and participate in agricultural exhibitions such as NANENANE where various CA technologies are displayed.

5.1.5. Regulatory Authorities and Agencies

There are several Government authorities and agencies that have been involved in some aspects of conservation and sustainable land management including setting, monitoring and enforcing standards. Among these are the Centre for Agricultural Mechanization and Rural Technology (CAMARTEC) that is involved in testing of agricultural machinery and implements; the Tanzania Official Seed Certification Institute (TOSCI) that is responsible for certification and promotion of quality agricultural seeds including cover crop seeds; and the Tropical Pesticides Research Institute (TPRI) that is involved in testing and registration of pesticides including herbicides those used in Conservation Agriculture.

Others are the Tanzania Bureau of Standards (TBS) which is involved in developing standards and quality control of agricultural machinery including those involved in Conservation Agriculture; the National Environmental Management Council (NEMC) that is involved in environmental enforcement, compliance, monitoring environmental impact statements, research and awareness raising and the Agricultural Seed Agency (ASA) whose mandate is to produce and distribute good quality seeds including those for cover crops.

5.1.6. Commercial farms and Companies

Commercial farms in Tanzania contribute to the highest number of hectares put under Conservation Agriculture i.e. 22,000 ha compared to 11,000 ha which are under smallholder farmers. Majority of the commercial farms engage smallholder farmers in contract farming committing the growers to produce a certain commodity at a certain time for an agreed price while in return the contractor markets the commodity, provides extension services and agricultural inputs including mechanization services. Some prominent commercial farms that have been instrumental in promoting Conservation Agriculture in their localities are Rutuba farms and Clinton Foundation in Iringa and Kilolo districts respectively; Kibaigwa Flour Supplies Ltd in Kongwa district; Oljoro Plantations Ltd in Arusha; and West Kilimanjaro farms. Contract farming provides guaranteed markets to producers and increases accessibility to inputs and mechanization services on credit terms thus contributing to the up scaling of Conservation Agriculture in the country.

5.1.7. Non-Governmental Organizations

Some prominent NGOs involved in promoting Conservation Agriculture in recent years are CFU-Tanzania, African Conservation Tillage Network (ACT), ECHO, RECODA, World

Vision, the Diocese of Central Tanganyika (DCT), Canadian Food Grains Bank (CFGB), World Renew Tanzania, Tanzania Gatsby Trust, HRNS, MVIWATA, PELUM, CARITAS, HELVETAS, AGRA, the Diocese of Rift Valley, Christian Council of Tanzania (CCT), INADES FORMATION, The Lead Foundation, World Vegetable Centre, Africa Inland Church of Tanzania, Project Concern International, Sustainable Agriculture Tanzania (SAT), Lead Foundation, Clinton Foundation, Ilula Orphan Programme (IOP), Project Zawadi CARITAS –Iringa, Emmanuel International-Iringa, PUNCHWILL-SIHA and Envirocare-Hai(Annex 2).

5.1.8. International Organizations and Development Partners

Some international organizations and development partners have been supporting activities on Conservation Agriculture, agroforestry and climate change in the country either in collaboration with various Ministries or Local Government Authorities. These include FAO, UNDP, NORAD, SIDA, IRISH AID, European Union (EU), CIMMYT, ICRAF, IITA, African Union (AU) and the East African Community (EAC). These institutions mainly provide technical and financial support in promoting Conservation Agriculture.



Figure 7: Participation of development partners in the promotion of CA

5.1.9. Machinery dealers and Manufacturers

Several agricultural machinery dealers in the country such as LonAgro, Agricom, Hughes Motors, GMI and Noble Motors also import Conservation Agriculture equipment and implements which include rippers, subsoilers, direct seeders and boom sprayers. Local manufacturing of CA equipment in the country is almost negligible; NANDRA Engineering and INTERMECH Engineering are manufacturing some animal drawn rippers, jab planters and animal drawn direct seeders (Fig. 8 & 9). INTERMECH Engineering has recently developed a power tiller drawn direct seeder in collaboration with the Centre for Agricultural Mechanization and Rural Technology (CAMARTEC).



Figure 8: Locally made animal drawn direct seeder by Nandra Engineering Moshi



Figure 9: Power tiller driven direct seeder manufactured by Intermech Morogoro

5.2. Dissemination Methods of CA Technologies

The most common methods used by the majority of actors in the dissemination of CA technologies and practices include the individual farmer method, Farmer Field School approach, lead farmer approach, farmer-to-farmer contact, farmer groups, demonstrations, field days, exchange visits and agricultural exhibitions like the Nane Nane.

5.2.1. Individual extension methods

The individual farmer method or sometimes called the face-to-face method involves an extension agent meeting the farmer at home or on the farm and discuss issues of mutual interest, giving the farmer both information and advice. The farmer benefits from the agent's individual attention, building confidence between the agent and the farmer and often it is likely for the farmer to listen to the advice given by the extension agent.

However, it has been seen that individual extension methods can be costly in both terms of time and scarce extension resources, and that they reach only a limited number of farmers. There is also the danger that too much emphasis upon individuals can lead to undue concentration on progressive farmers to the detriment neglect of the poorer farmers.

5.2.2. Farmer Field Schools (FFS)

Farmer Field Schools are adult experiential learning tools where farmers with a common interest experiment with a particular technology e.g. Conservation Agriculture (Fig. 9). Farmers learn together practically on a particular topic in the field with the assistance of the facilitator following a specific curriculum. Farmer Field Schools empower farmers and

provide room for farmer decision making, building their capacity and confidence to deal with the problems they face.



Figure 10: Lead farmer training fellow farmers in FFS-learning by doing use of Jab planers in Monduli DC

5.2.3. Farmer groups

This involves an extension agent meeting or providing training to a group of farmers where ideas are openly discussed and analyzed. It allows the agent to convey a detailed, well-prepared message to his/her audience on a specific issue; for example, a new piece of technology can be presented in this way, and illustrated by visual aids. The group method offers a greater extension coverage, and is therefore more cost-effective. Using the group method, the extension worker can reach more farmers and, in this way, make contact with many more farmers who have had no previous contact with extension activities. The group creates a supportive atmosphere, and individual farmers can gain greater self-confidence by joining others to discuss new ideas and try out new practices.

5.2.4. Demonstrations

Demonstrations involve visual observation by farmers on a particular technology which has been laid down on a farm. Farmers like to see how a new idea works, and also what effect it can have on increasing their crop production. A demonstration gives farmers the opportunity to observe, at first hand, the differences between a recommended new crop practice and traditional practices. Sometimes until a farmer has actually seen the results of a certain practice, he will not be convinced by the agent's recommendation as "Seeing is believing".

The main advantage of demonstration is that the extension agent can explain simple farming skills to a large number of people, thus increasing the impact of his/her extension work. Its major limitation is that it takes a long time to mature and is thus a



Figure 11: Lead farmer demonstration plot at Chipanga A, Bahi District Council

costly use of extension resources. If, in the end, for whatever reason, the new practice should fail, it could have disastrous consequences. Often such failures (for example, because of lack of rain) are outside the control of the agent.

5.2.5. Field days

Field days bring together farmers and other stakeholders to observe and discuss openly



Figure 12: Farmer field day in Same District Council

agricultural practices on a well-prepared farm or research station. The purpose is often to introduce a new idea and a new crop in order to stimulate the interest of as many farmers as possible. Field days can range in size from a small group to annual events attracting hundreds of farmers. The extension agent's role on

the field day is to offer general guidance to ensure that things run smoothly and to be available to answer questions and queries.

5.2.6. Studytours or Farmer exchange visits

An extension method which enables farmers from a certain area to visit other farms in another area to see how certain technologies work, and what kind of problems the farmers in that area are facing. A tour is a series of field demonstrations on different farms, or at different centers, and can often attract a lot of interest from local farmers. A tour provides local farmers a chance to exchange ideas and experiences with other farmers and it is easier for them to adopt new practices or technologies which are workable in the visited area.

5.2.7. Farmer-to-Farmer extension approach

This involves farmers who have been trained in specific subjects such as Conservation Agriculture, soil fertility, pest management, grain storage, and more others; training other farmers within their locality. Sometimes they are called Lead farmers or, master farmers, or motivators, or champions or contact farmers. Farmer trainers also receive training on or facilitation methods and working with groups to enable them to conduct the training to farmers more effectively. They may provide hands-on training on one-on-one basis or through larger groups of 25-30 people using a more formal curriculum provided by the project. Other duties of farmer trainers may include keeping records, organizing field days and managing demonstration plots.

Farmer-to-Farmer extension methods are an efficient method of reaching a wider audience at less cost and their sustainability is high since they usually remain in the community after the

project ends. However, sometimes jealousy may arise in some communities resulting to some farmers shunning away from such trainings as they see these farmer trainers as a privileged group. Experience shows that, for this approach to be more effective and sustainable, the farmer trainers being farmers themselves with family duties and responsibilities, have to be provided with incentives in terms of either inputs e.g. seed, fertilizer, agro-chemicals, or any other arrangements to encourage them to provide training to fellow peer farmers.

Therefore, a combination of different methodologies may be used in the dissemination of the CA technologies based on the resources available and life span of the project. The farmer-to-farmer methods when blended with the government extension system may be useful as they can be more cost effective reaching a wider cross-section of the farming community at a shorter period of time. The farmer trainers and extension staff may form core teams at the village level delivering similar CA messages and they are more sustainable as the Lead farmers will continue to live in their villages even after the end of the project.

5.2.8. Use of digital platform

Statistics show that nearly forty-three million people own cell phones Tanzania. This is a great opportunity for government institutions and stakeholders to use cell phone technology to solve various social challenges, including access to agricultural, livestock and fisheries markets.

Mobile Agriculture (M-Agriculture) is a mobile technology that aims at assisting farmers, livestock keepers and fishermen to access markets through their mobile phones. This enables them to reach markets and especially the buyers of their products without the hassle of transporting the products to the market. The technology provides information on prices and the location where the produce is available. This connects retailers and consumers in the country and reduce the cost of access to agricultural products. Therefore, this platform can be used to disseminate CA technologies to smallholder farmers as well as link them to different service providers.

5.3. CA Technologies Practiced by Farmers

During the study it was observed that farmers practice some elements of Conservation Agriculture and only a few have adopted the full package involving the three principles that is minimum soil disturbance, complete soil cover and crop rotations. Similarly, different actors promote different technologies with some, leaning to one or two components of Conservation Agriculture only. Farmers usually adopt the most doable technology first and with time, others follow as more tangible benefits unfold. Key entry points differ from one farmer to the other; to someone it might be rain water harvesting to curb moisture stress (drought), reduced labour, to the other it might be improved soil fertility, attractive prices of cover crops or compatibility with the intercropping system (Nkala *et al.*, 2011; Derpsch *et al.*, 2010; Kassam *et al.*, 2009; Lugandu, 2015).



Figure 14: TSP providing ox ripping services in Wanging'ombe District Council



Figure 13: TSP providing tractor ripping services in Babati District Council

5.3.1. Farmers' Knowledge and Practices on Conservation Agriculture

The most common CA practices familiar to farmers found in the survey are cover crops (61%); ox-ripping (59%) and crop residues (48%) while the least familiar CA practices are power tiller ripping at 14%, green manure crop cover at 16% and herbicides at 18% (Table. 4.1).

Table 1: CA practices most familiar with farmers in the study

CA Technologies	Frequencies (N=160)	Percentages
Hand hoe	114	71
Ox-ripping	95	59
Power tiller drawn ripping	22	14
Tractor drawn ripping	43	27
Basins	44	28
crop rotation	56	35
crop residue	76	48
Cover crops	97	61
Herbicides	29	18
Green manure crop cover	25	16

However, it was observed that in the Central Zone, farmers were more familiar with cover crops (80%) and ox-ripping (61%). In the Southern Highlands Zone farmers were more familiar with use of crop residues (86%), ox-ripping (70%) and planting basins (53%). In the Northern Zone farmers were more familiar with crop rotations (70%), cover crops (63%) and crop residues (60%); while in the Lake Zone farmers were more familiar with use of cover crops (86%) and ox-ripping (66%) (Table. 4.2). Generally, the results prove that, despite CA is universal, its adoption and application is site-specific influenced by many intrinsic and extrinsic factors.

Table 2: CA practices most familiar with farmers in different zones

A: Central Zone	Frequency (N=41)	Percentages
Ox-ripping	25	61
P/tiller-ripping	8	20
Tractor-ripping	0	0
Basins	1	2
Crop rotation	2	5
Crop residues	5	12
Cover crops	33	80
Herbicides	3	7
Green manure crop cover	3	7
B: Southern Highlands Zone	Frequency (N=43)	Percentages
Ox-ripping	30	70
P/tiller-ripping	14	33
Tractor-ripping	24	0
Basins	23	53
Crop rotation	16	37
Crop residues	37	86
Cover crops	7	16
Herbicides	9	21
Green manure crop cover	2	5
C: Northern Zone	Frequency (N=30)	Percentages
Ox-ripping	11	37
P/tiller-ripping	0	0
Tractor-ripping	3	0
Basins	3	10
Crop rotation	21	70
Crop residues	18	60
Cover crops	19	63
Herbicides	3	10
Green manure crop cover	2	7
D: Lake Zone	Frequency (N=44)	Percentages
Ox-ripping	29	66
P/tiller-ripping	0	0
Tractor-ripping	16	0
Basins	17	39
Crop rotation	17	39
Crop residues	16	36
Cover crops	38	86
Herbicides	14	32
Green manure crop cover	18	41

5.3.2. Source of CA information

The majority of farmers obtained information on CA mainly from NGOs and Government Extension Officers. About 94% of the respondents in the survey indicated that the main source of information on CA was from NGOs; 53% obtained information from Government Extension Officers; 33% get CA information from neighboring farmers; 26% receive CA

information from Radio/TV and 24% obtained information from Farmer Organizations (Table. 4.3).

Table 3: Farmers' Source of Information on CA

Source of Information on CA	Frequencies (N=160)	Percentages
Local experience	6	4
Neighbor farmers	52	33
Schools	3	2
NGO	150	94
Government extension officers	85	53
Input & agro dealers	17	11
Radio/tv	41	26
Farmers Organization	38	24
Newspapers/magazine	18	11

5.3.3. Main crops grown under CA

The main crops grown under CA by the respondents include maize, beans, pearl millet, sorghum, sunflower and cowpeas (Fig. 18). The respondents indicated that the average area under CA per household was 1.9 acres for Central Zone, 2.5 acres for Northern Zone, 3.2 acres for the Southern Highlands Zone and 6.2 acres for Lake Zone.

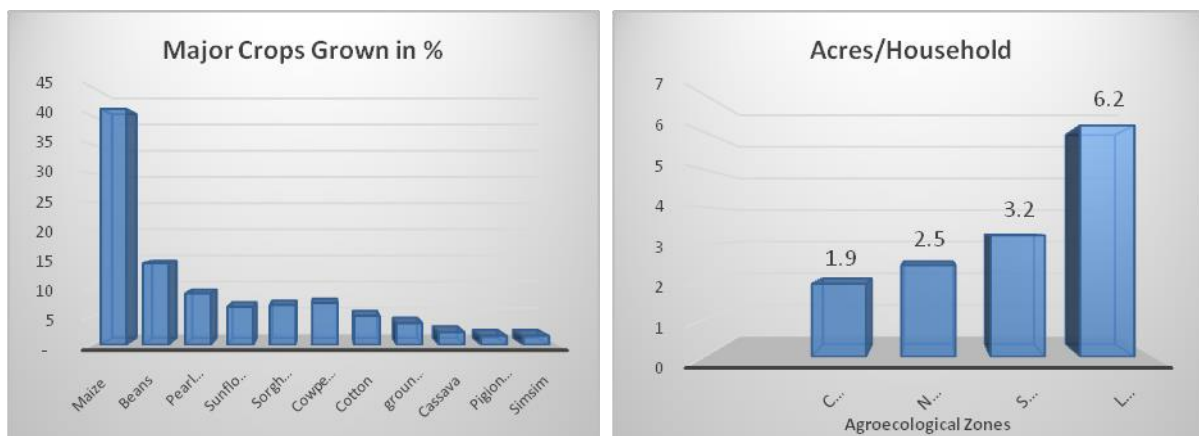


Figure 17: Major crops grown under CA and Average area (acres) per Household

The main cover crops used include Canavalia as reported by 33% of the respondents, *Dolichous lablab* reported by 31% of the respondents and beans reported by 26% of the respondents (Table 4.4). Other cover crops used are Mucuna (23%), Cowpeas (22%) and to a limited extent groundnut. It was also observed that crop residues either from the previous crop remains or imported mulch are used to cover the land as reported by 42% of the interviewed respondents.

Table 4: Main Cover Crops used by farmers in CA

Cover Crops	Frequencies (N=159)	Percentages
Lablab	49	31
Mucuna	37	23
Canavalia	53	33

Beans	41	26
Cowpeas	35	22
Groundnuts	7	4
Crop residues	67	42

However, it was found out that the most common used cover crops differed from one zone to the other. In the Central Zone the most used cover crops are Cow peas (63%), *Dolichous lablab*(59%) and Cannavalia (53%); while in the Southern Highlands Zone crop residues are highly utilized as reported by 54% of the interviewees and the most used cover crop is beans (41%). The most common cover crops used in the Northern Zone as reported by respondents are beans (34%) followed by *Dolichous lablab*(22%) and in the Lake Zone the most used cover crops were Mucuna (53%), Groundnuts (43%) and Canavallia (42%).

5.3.4. CA implements used by farmers

It was observed that ripping was the most common practiced CA technology in the surveyed area with about 66% of the respondents practicing ox ripping and 34% practiced tractor ripping (Table 4.5). Knapsack sprayers were also used for the application of herbicides by 49% of the respondents. About 26% of respondents reported that they use power tillers. The use of jab planters and chaka hoes was minimal possibly because of the high labour requirement as they are manually operated.

Table 5: CA Equipment used in the Mapping Region

CA Equipment	Frequency (N=160)	Percentages
Jab planter	8	5
Direct seeder	12	8
ox – ripper	106	66
Sprayer	79	49
Chaka hole	18	11
Knife roller	15	9
Powertiller ripper	42	26
Tractor ripper	55	34

It was observed that the use of ox rippers and tractor rippers was more common in the Central Zone, Northern Zone and the Southern highlands zone while the use of knapsack sprayers for herbicides application was more common in the Lake Zone and Southern highlands Zones.

5.4. Challenges on the Adoption of CA Technologies

The uptake of CA in Tanzania like with other countries in Africa has been slow due to a number of challenges such as:

- change in mindset: farmers are familiar with conservation tillage as adopted from their parents;
- inaccessibility of appropriate mechanical equipment and cover crop seeds: local manufacturing of equipment is low and cover crop seeds not readily available;
- crop residue uses for livestock feed competing with soil cover needs: many farmers practice mixed farming with both crop production and livestock keeping;
- lack of capital investment: there is limited financial support from commercial banks for loans;
- the difficulty of weed control particularly during the first two years: application of herbicides is costly and lack of skills in application;
- little collaboration amongst various CA actors in the country. There is little coordination and limited participation of the government in CA activities organized by the private sector
- the Private Public Partnership (PPP) is weak in promoting and upscaling of conservation agriculture in the country
- land tenure:land ownership or tenure in Tanzania is guided by the Land Act. No.4 of 1999 (URT, 1999) and the Village Land Act No. 5 of 1999 (URT, 1999) and is held under customary or statutory right of occupancy. About 70% of the land cultivated by smallholder farmers is inherited or purchased and 30% rented. With rented land farmers are hesitant to invest in improved technologies including CA as it is leased for a short period and it can be claimed back by owner at any time after expiry of the rental period. The rented land usually accord less management measures, mainly short terms (Gilbert M., 2013;Shetto and Owenya, 2007).
- Gender and Youth: there is much evidence of gender and youth inequality in access to production assets like land, technologies, technical information, extension and marketing services, financial service, livestock and farm input. The result of the restricted services results to lower productivity to farms productivity on land farmed by women and youth.

During the study, the main challenges in adopting CA highlighted by stakeholders include inadequate CA implements, shortage of improved agro inputs including cover crops seeds because of the high prices of inputs and lack of capital; pests and diseases and inadequate CA knowledge. Other constraints include communal grazing of livestock in CA fields, bush fires during land preparation, poor marketing systems for agricultural produce and lack of bylaws to restrict free grazing of livestock. About 72% of the respondents reported that the major constraint to adoption was limited access to CA implements, 38% reported shortage of agro inputs and 33% reported that pests and diseases were a major constraint to adoption of CA (Table 4.6).

Table 6:Challenges on the adoption of CA by farmers

Challenges in adopting CA	Frequencies (N=159)	Percentages
Inadequate investment capital	12	8
shortage of improved inputs	60	38
Market for agricultural product	12	8
CA fields fire burning	6	4
Lack of CA bylaws	2	1
High cost of inputs	16	10
Inadequate CA knowledge	24	15
Inadequate CA implements	114	72
Livestock grazing in the CA fields	16	10
Insect Pests/birds/diseases	53	33

6. CA TECHNOLOGIES FOR AGRO-ECOLOGICAL ZONES AND FARMING SYSTEMS

6.1. Agro-ecological Zones and Farming Systems in Tanzania

Tanzania has seven detailed agro-ecological zones based on altitude, precipitation pattern, dependable growing seasons and average water holding capacity of the soils and physiographic features. The zones are identified as Coast, Arid Lands, Semi-Arid Lands, Plateau, Southern and Western Highlands, Northern Highlands and Alluvial Plains. Several farming systems have developed to adopt agricultural production techniques to the natural agro ecological conditions across the country. More than one farming system may be found in one agro ecological zone and one farming system may extend in more than one agro ecological zone.

There are 10 major farming systems in Tanzania which are the Banana/Coffee/ Horticulture; Maize/Legume; Cashew/Coconut/Cassava; Rice/Sugar cane; Sorghum/Bulrush millet/Livestock, Tea/Maize/Pyrethrum, Cotton/Maize, Horticulture, Wet – rice and irrigated system and the Pastoralists and Agro-pastoralist System. Different CA technologies may be suitable in the different farming systems based on the amount of rainfall received, cropping patterns and attachment to livestock keeping (Table 1). The SWOT analysis of the different CA technologies is shown in Annex 1.

Table 7: CA Practices in Different Farming Systems

No	Farming System	Location	Proposed CA Practices
1	Banana/Coffee/ Horticulture	Kagera, Kilimanjaro, Arusha, Kigoma and Mbeya Regions.	Cover crops, Crop residues/mulching, ripping/direct seeding, crop rotation.
2	Maize/Legume	Rukwa, Ruvuma, Arusha, Kagera, Shinyanga, Iringa, Mbeya, Kigoma, Tabora, Tanga, Morogoro, Kahama, Biharamulo	Ripping/direct seeding, crop rotation, cover crops, crop residues
3	Cashew/Coconut/Cassava	Coast region; eastern Lindi and Mtwara	Cover crops, Crop residues, ripping/direct seeding, crop rotation
4	Rice/Sugar cane	Alluvial river valleys	Cover crops, Crop residues, crop rotation
5	Sorghum/Bulrush millet/Livestock	Dodoma and Singida dry land; Sukumaland; Shinyanga and rural Mwanza	Ripping/direct seeding, crop rotation, cover crops, crop residues
6	Tea/Maize/Pyrethrum	Njombe and Mufindi districts in Iringa region	Cover crops, Crop residues/mulching, ripping/direct seeding, crop rotation
7	Cotton/Maize	Mwanza, Shinyanga Kagera, Mara, Singida, Tabora, Kigoma, Morogoro, Coast, Mbeya, Tanga, Kilimanjaro, Arusha	Ripping/direct seeding, crop rotation, cover crops, crop residues
8	Horticulture based	Lushoto district; Morogoro rural; and Iringa rural	Cover crops, Crop residues/mulching, crop rotation
9	Wet – rice and irrigated	River valleys and alluvial plains, Kilombero, Wami Valleys, Kilosa, Lower Kilimanjaro, Ulanga, Kyela, Usangu and Rufiji	Cover crops, Crop residues, crop rotation
10	Pastoralists and Agro-pastoralist	Semi-arid areas i.e. Dodoma, Singida, parts of Mara and Arusha; Chunya district and Igunga district	Ripping/direct seeding, crop rotation, crop residues, cover crops

7. CONCLUSIONS AND RECOMMENDATIONS

7.1. Conclusions

Many farmers who practice Conservation Agriculture have knowledge and acknowledge the benefits of the three pillars of CA when implemented together. Ripping by oxen or tractor and use of cover crops are the most common CA technologies practiced by farmers. In the dry areas farmers adopted options related to reduced tillage such as ripping and planting basins because of moisture stress, while in some areas like Arumeru, Karatu, Babati, Same and Mvomero districts, the good markets and price for lablab seed and pigeon peas by then provided good incentive for farmers to “enter” along the soil cover/live cover crop (lablab) option. NGOs and Government Extension Services have been an important source of information on CA for farmers and instrumental in awareness creation on CA.

CA brings in a new concept which may be difficult to be comprehended easily by farmers who have been practicing conventional tillage for many years as it contradicts much of

conventional farming knowledge and farming traditions. Thus, more time is needed on the learning curve including trying and observing for tangible benefits in farmers' small plot before adoption.

There are many actors who are promoting CA in the country who mostly act on individual basis with little interaction amongst them. The fragmented project approach in the promotion of Conservation Agriculture as practiced by many actors has little impact in its adoption in Tanzania and is not sustainable. It is location specific covering few farmers only in a district, dealing with specific aspects of CA only such as training or skills development. Such interventions have been short lived giving little time for farmers to assess and evaluate the new technologies leading to many activities being abandoned by farmers as the projects ended back pedaling the adoption of CA.

7.2. Recommendations

- Create awareness on Conservation Agriculture at all levels including, policy makers, MPs, Councilors, Regional, District, Ward and Village level by organizing public meetings, campaigns, demonstrations including distribution of fliers, posters etc and the involvement of the media and artists in delivering strong points on CA to the communities.
- Promote collaborative activities among the various actors in CA to avoid duplication of efforts and sending different messages which sometimes may be conflicting.
- Strengthen the National Conservation Agriculture Task Force (NCATF) to spearhead the promotion and up scaling of conservation agriculture in the country.
- Establish CA platforms for sharing information and knowledge on CA and partnering in delivering CA services to farmers.
- Promote a holistic programme approach (Value Chain) to CA upscaling inclusive of smallholder farmers – producers, FBOs, NGOs, policy makers, the public sector, trainers/extension, agro inputs dealers, machinery hire service providers, financial institutions, traders/processor and others.
- Conduct capacity building at all levels of the value chain and build strong linkages among the various actors to ensure delivery of better-quality services in their respective specialty areas.
- Review or update teaching materials focusing on CA and introduce agriculture subjects with emphasis on CA in primary to secondary schools.
- Introduce innovative financing mechanism in upscaling of conservation agriculture including lease purchase for equipment and promote Community Micro-financing including Savings and Credit Societies (SACCOS) to increase accessibility of financial resources.

- Enhance Public-Private Partnership to ensure effective inclusion of all key players along the CA value chain and harness PPP to mobilize more resources for long term investments along the CA value chain.
- Promote Entrepreneurial CA machinery hire services especially to the youth to increase the availability of power to the smallholder.
- Improve women and youth access to production input such as land and farm inputs; reform land discriminatory laws and close women and youth's gaps in technology, agriculture finance, human capital, and extension services to provide equal opportunity for CA adoption.

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9. ANNEXES

Annex I: Strengths, weaknesses, opportunities and threats (SWOT) of the currently promote/disseminate CA technologies

No.	CA Technologies	Strengths	Weaknesses	Opportunities	Threats
1.			Ox - ripping		<ul style="list-style-type: none"> • Saving time • Reducing labour requirement • Timely operation • Reduce soil erosion • Reducing drudgery • Minimize soil disturbance <ul style="list-style-type: none"> • Take long term to breed good oxen • Not suitable for all areas especially for hilly land/areas • Availability of appropriate equipment <ul style="list-style-type: none"> • High demand <ul style="list-style-type: none"> • Inadequate number of experts in the field • Not all farmers can access • Livestock diseases outbreak • Forage availability
2.			Powertiller ripping		<ul style="list-style-type: none"> • Saving time • Reducing labour requirement • Timely operation • Reduce soil erosion • Reducing drudgery • Minimize soil disturbance <ul style="list-style-type: none"> • Capital requirements Constraints • Lack of collateral <ul style="list-style-type: none"> • High demand <ul style="list-style-type: none"> • Inadequate number of experts in the field

3.	Tractor ripping	<ul style="list-style-type: none"> • Saving time • Reducing labour requirement • Timely operation • Reduce soil erosion • Reducing drudgery • Minimize soil disturbance • Improve yields by enhancing soil health 	<ul style="list-style-type: none"> • Capital requirements • Constraints • Lack of collateral 	<ul style="list-style-type: none"> • High demand • Field expansion 	<ul style="list-style-type: none"> • Inadequate number of experts in the field • Not all farmers can access • Affordability
4.	Basins	<ul style="list-style-type: none"> • Provide good rooting conditions • Allows for an even and controlled plant population • Seeds and manure can be correctly placed and used effectively 	<ul style="list-style-type: none"> • Time consuming • Increase labour requirement 	<ul style="list-style-type: none"> • Room for developing new technologies 	<ul style="list-style-type: none"> • Youth migration to urban centre • Opportunity employment in other sector
5.	Crop residue	<ul style="list-style-type: none"> • Reduces labour requirement 	<ul style="list-style-type: none"> • Livestock grazing • Livestock 	<ul style="list-style-type: none"> • Zero tillage • Improve 	<ul style="list-style-type: none"> • Field fires • Livestock

		<ul style="list-style-type: none"> • Reduces soil particle detachment • Reducing erosion from the forces of water and wind • Improving infiltration and decreasing runoff 	crop conflicts	soil health	
6.	Cover crops	<ul style="list-style-type: none"> • Reduce the need for herbicides and other pesticides • Improve yields by enhancing soil health • Reduce soil erosion • Conserve soil moisture • Protect water quality 	<ul style="list-style-type: none"> • High cost of seeds • Inadequate supply of improved seeds • Availability of appropriate equipment 	<ul style="list-style-type: none"> • Increase nutrient recycling and balance • Mostly provide an excellent forage resource for livestock • Decrease use of external inputs 	<ul style="list-style-type: none"> • Pests attack

Annex 2: CA Actors and technologies promoted in Tanzania

CA ACTOR	LOCATION	CA TECHNOLOGY PROMOTED	DISSEMINATION METHOD	CONTACT PERSON	EMAIL/MOB NO
MINISTRIES					
Ministry of Agriculture	Dodoma	Cover crops, seeds, minimum tillage, ox drawn ripping, tractor drawn ripping & CA tillage equipment service providers	Promotion, technical backstopping & training	Eng. Anna G. Mwangamilo	anna.mwangamilo@hotmail.com
Vice President's Office		Climate Smart Agriculture	Training, Technical and Financial support to implementors of CSA		
LOCAL GOVERNMENT AUTHORITIES					
Monduli	Arusha	Cover crops, Minimum tillage: Ox, power tiller, tractor ripping, crop rotation & intercropping	Training, Demonstration,	Victor Barthazar kaiza	kaiza47@hotmail.com
Karatu	Arusha	Cover crops, Minimum tillage: Ox, power tiller, tractor ripping, crop rotation	Promotion, Demonstrations, Training	Getrida Kyekaka	0786780110
Babati	Arusha	Minimum tillage, Ox drawn ripping, Tractor drawn ripping	Training, Demonstrations, Field days, Promotion events		
Hanang	Manyara	Minimum tillage, Ox drawn ripping, Tractor drawn ripping	Promotion, Demonstrations		
Kilosa	Morogoro	Cover crops, Minimum tillage: Ox, power tiller, tractor	Promotion, Training, Demonstrations	Elina D. Dastan	

		ripping, crop rotation			
Mvomero	Morogoro	Cover crops, Minimum tillage: Ox, power tiller, tractor ripping, crop rotation	Promotion, Training, Demonstrations	Foya E. Hozeniel	0719816695
Kiteto	Manyara	Minimum tillage, Ox drawn ripping, Tractor drawn ripping, Planting basins	Training, Demonstrations, Field days, Promotion events	Christopher Simwimba	simwimbac@yahoo.com
Mbeya, Rural	Mbeya	Minimum tillage, Ox drawn ripping, Tractor drawn ripping, Planting basins	Training, Demonstrations, Field days, Promotion events	Aidan Mlawa	0754269037
Njombe,	Njombe	Minimum tillage, Ox drawn ripping, Tractor drawn ripping, Planting basins	Training, Demonstrations, Field days, Promotion events	Weisy Wikedzi	0754026749
Wanging'ombe	Njombe	Minimum tillage, Ox drawn ripping, Tractor drawn ripping, Planting basins	Training, Demonstrations, Field days, Promotion events	Benadetha Fivawo	0754870409
Iringa DC	Iringa	Minimum tillage, Ox drawn ripping, Tractor drawn ripping, Planting basins	Promotion, Demonstrations	Ramadhan Mlangi	0756486436
Kilolo	Iringa	Minimum tillage, Ox drawn ripping, Tractor drawn ripping,	Promotion, Demonstrations	Twilumba Kadeha	
Moshi Rural	Kilimanjaro	Minimum tillage, Ox drawn ripping, Tractor drawn ripping, Planting basins	Training, Demonstrations, Field days, Promotion	Fridolin Mpanda	mpandafridolin@yahoo.com

			events		
Same DC	Kilimanjaro	Minimum tillage, Ox drawn ripping, Tractor drawn ripping, Planting basins	Training, Demonstrations, Field days, Promotion events	Omary Mhina	0766275096
Rombo DC	Kilimanjaro	Minimum tillage: Tractor ripping, crop rotation	Promotion, Training	Emmanuel Sekwao	sekwao2244@gmail.com
Singida DC	Singida	Minimum tillage: Ox & tractor ripping, crop rotation	Promotion, Training	Natalia Mosha	0755862469
Manyoni DC	Singida	Minimum tillage: Ox & tractor ripping, crop rotation	Promotion, Training	Fadhili Chimsala	0784419783
Ikungi DC	Singida	Minimum tillage: Ox, power tiller, tractor ripping, crop rotation	Promotion, Training	Teendwa Senkoro	0767883254
Dodoma CC	Dodoma	Cover crops, Minimum tillage: Ox, power tiller, tractor ripping, crop rotation & intercropping	Training, Demonstration, study tours, Promotion of Savings & Credit societies	Eng. Adam Lau	0784976927
Chamwino	Dodoma	Cover crops, Minimum tillage: Ox, power tiller, tractor ripping, crop rotation & intercropping	Training, Demonstration, study tours, Promotion of Savings & Credit societies	Lilian Z. Pascal	0682543959
Bahi	Dodoma	Cover crops, Minimum tillage: Ox, power tiller, tractor ripping, crop rotation & intercropping	Training, Demonstration, study tours, Promotion of Savings & Credit societies	Hamisi Juma Mfuko	0755 641575

Kongwa	Dodoma	Minimum tillage: Tractor & Ox ripping, cover crops	Training, Demonstrations		
Kondoa	Dodoma	Planting basins – half moon	Training, Demonstrations	Juvenal A. Munishi	0755635920
Chemba		Planting basins – half moon	Training, Demonstrations	Kamili Makia	0786 577590
Sengerema DC	Mwanza	Cover crops, planting basins, ox-drawn implements, etc.	Promotion, Demonstrations	Peter Ntoba	0758889367
Busega DC	Simiyu	Cover crops, planting basins, ox-drawn implements, etc.	Promotion, Demonstrations	Msingi Lyeme	
Maswa DC	Simiyu	Cover crops, planting basins, ox-drawn implements, etc.	Promotion, Demonstrations	Robert Urassa	0784593057
Geita TC	Geita	Cover crops, planting basins, ox-drawn implements, etc.	Promotion, Demonstrations	Leonard Chacha	chacha.leonard@gmail.com /0763150814
Geita Dc	Geita	Cover crops, planting basins, ox-drawn implements, etc.	Promotion, Demonstrations	Daudi Lutema	daudi lutemadaud@gmail.com/lutema@gmail.com/0752996381
Chato DC	Geita	Cover crops, planting basins, ox-drawn implements, etc.	Promotion, Demonstrations	Berino Msigwa	0756630705
Musoma MC	Mara	Cover crops, planting basins, ox-drawn implements, etc.	Promotion, Demonstrations	Specioza Kifutu	
Musoma DC	Mara	Cover crops, planting basins, ox-drawn implements, etc.	Promotion, Demonstrations	Malongo Mathias	
UNIVERSITIES AND COLLEGES					
Sokoine University of Agriculture (SUA)	Morogoro	Minimum tillage, Cover crops, Terracing	Training, Research, Demonstrations	Dr. Salim Baanda	basalim2000@yahoo.co.uk

University of Dar es Salaam	Dar es Salaam	Climate Smart Agriculture	Training, Research, Demonstrations	Prof. Amos Majule	amajule@ira.udsm.ac.tz
Nelson Mandela African Institution of Science and Technology (NM-AIST)	Arusha	Climate Smart Agriculture	Training, Research	Prof. Anna Treydte	anna.treydte@nm.aist.ac.tz
Mwl Julius Nyerere University of Agriculture and Technology	Butiama	Climate Smart Agriculture	Training, Research	Prof. Dominic Kambarage	kambaragedominic@gmail.com
University of Iringa		Climate Smart Agriculture	Training, Research		
GOVERNMENT INSTITUTIONS					
Tanzania Agricultural Research Institute (TARI)	Dar Es Salaam	Cover crops, Minimum tillage: Ox & Tractor ripping	Research, Training, Demonstration		
TARI Uyole	Mbeya	Cover crops, Minimum tillage, Planting basins: Ox & Tractor ripping	Research, Training, Demonstration	Adolph Katunzi	bugaiga@hotmail.co.uk 0755100541
TARI Kifyulilo	Mufindi	No-Till, Ox-ripping, Planting basins and Cover crops	Research, Training, Demonstration	Dr. Ndabhemeye Mlengera	namulengera@gmail.com 0735766812
TARI Maruku	Bukoba	Minimum tillage, Cover crops, Crop rotation and Intercropping	Research, Training, Demonstration	Raya Joseph Amara Nundu	rayanundu8@gmail.com 0622481861
TARI Ukirigulu	Mwanza	Cover crops, Minimum tillage	Research, Training, Demonstration	Saidia Paulo	076881855
TARI Selian	Arusha	Cover crops, Minimum tillage: Ox, Power tiller & Tractor ripping	Research, Training, Demonstration	Dr. Eutropia Vicent Tairo	evtairo1980@gmail.com comevtairo1980@gmail.com
TARI Hombolo	Dodoma	Climate Smart Agriculture	Research, Training, Demonstration	Sikitu Jonathan Kazungu	kazungujonathan4@gmail.com 0785266087
Centre for Agricultural Mechanization and Rural Technology (CAMARTEC).	Arusha	Rippers & planters/Seeders	Fabrication, Training and	Eng. Godfrey Mwinama	gmwinama@gmail.com

			demonstration		
Tanzania Official Seed Certification Institute (TOSCI),	Morogoro	Climate Smart Agriculture	Certification of seeds including cover crop seeds		
Tropical Pesticides Research Institute (TPRI)	Arusha	Climate Smart Agriculture	Testing, registration of pesticides and herbicides		
Tanzania Bureau of Standards (TBS),	Dar Es Salam	Climate Smart Agriculture	Developing standards and quality control of agricultural machinery		
National Environmental Management Council (NEMC)	Dar Es Salam	Climate Smart Agriculture	Promotion, Monitoring, Supervision of environmentally friendly technologies		
Agricultural Seed Agency (ASA).	Morogoro	Climate Smart Agriculture	Promotion, Seed production including cover crop seeds		
NON GOVERNMENTAL ORGANIZATIONS					
African Conservation Tillage Network (ACT)	Dar Es Salaam	Cover crops, Minimum tillage, Ox drawn ripping & Tractor drawn ripping	Training, demonstrations & advocacy	Eng. Richard Shetto	shettorichard@gmail.com
RECODA	Arusha	Cover crops & Ox – drawn implements	Training, demonstrations & advocacy	Dominic Ringo	ed@recoda.or.tz
HRNS	Arusha	Minimum tillage	Training, Demonstrations	Ina Wengrzyk	ina.wengrzyk@hrnstiftung.org
ILES DE PAIX	Arusha	CA mechanization	Training, demonstrations	Abiud Gamba	Adiud.gamba@tz.iled epaix.org

			& advocacy		
Electome Project	Arusha	Ox – drawn implements & Cover crops	Training, FFS & farmers exchange knowledge	Seth Mungure	sethmungure@gmail.com
Floresta Tanzania	Arusha	Minimum tillage, mulching, terrace & tree planting	FFS, field visits & events	Richard Mhina	0711728071
Conservation Farming Unit (CFU)	Monduli, Arusha	Cover crops, Minimum tillage, Ox drawn ripping, Tractor drawn ripping & Community CA tillage equipment hire services	Training, demonstrations & advocacy	Evasito Joshua	evaristojoshua@gmail.com
Conservation Farming Unit (CFU)	Moshi, Kilimanjaro	Cover crops, Minimum tillage, Ox drawn ripping, Tractor drawn ripping & Community CA tillage equipment hire services	Training, demonstrations & advocacy	Mesia Kifunge	kifungemesia01@gmail.com
Conservation Farming Unit (CFU)	Same, Kilimanjaro	Cover crops, Minimum tillage, Ox drawn ripping, Tractor drawn ripping & Community CA tillage equipment hire services	Training, demonstrations & advocacy	Musa Mwijarubi	mwijarubimussa@yahoo.co
Diocese of Central Tanzania	Dodoma	Cover crops, Ox – drawn implements & Ox - Carts	Training, demonstrations & advocacy	Lawrence Lwanje	lwanji2001@yahoo.co.uk
Canadian Food Grains Bank	Arusha	Cover crops, planting basins, ox-drawn implements, etc.	Training, research, farmer curricula	Neil Rowe Miller	NRMiller@FoodgrainsBank.ca /0689563931
Tanzania Gatsby Trust	Mwanza	Minimum tillage	Training,	Michael Kahindi	kahindimike@gmail.

			Demonstrations, Lead Farmer Approach		com
Care International		Terracing, contouring, cover crops	Promotion, Training, Demonstrations		
HELVETAS	Mbeya	Climate Smart Agriculture	Promotion, Technical & Financial Support	Daniel Kalimbiya	0756725390
Conservation Farming Unit (CFU)	Babati, Manyara	Cover crops, Minimum tillage, Ox drawn ripping, Tractor drawn ripping & Community CA tillage equipment hire services	Training, demonstrations & advocacy	George Mwakatobe	mwakatobegeorge90@gmail.com
Conservation Farming Unit (CFU)	Kiteto, Manyara	Cover crops, Minimum tillage, Ox drawn ripping, Tractor drawn ripping & Community CA tillage equipment hire services	Training, demonstrations & advocacy	Essau Mbilinyi	essau.mbilinyi@yahoo.com
MVIWATA	Arusha	Minimum tillage	Promotion	Richard Masandika	ricmasandika@gmail.com
AGRA	Dar Es Salaam	Cover Crops, Minimum tillage	Promotion, Technical and Financial Support		
Diocese of Rift Valley	Manyoni, Dodoma	Cover crops & seeds	Training & demonstrations	Yohana J. Mohammed	0754802987
Christian Council of Tanzania	Dodoma	Cover crops, seeds & mulching	Training & demonstrations	Azgard Stephen	sir.azgard@gmail.com
INADES	Dodoma	CA knowledge, training & demonstrations	Training & demonstrations	Herman Hishamu	herman.hishamu@inadeso.net

The Lead Foundation	Dodoma, Singida	FMNR, Half moon basins, water harvesting	Training & Demonstrations	Eng. Njamasi Chiwanga	0784 468442
World Vision	Dodoma, Singida, Morogoro, Iringa	Organic manure, Crop rotation, Agroforestry, FMNR,	Promotion, Training, Demonstrations	Stephano Mahenge	0784 687593
ECHO - Tanzania	Arusha	Cover crops & Ox – drawn implements	Training & advocacy	Charles Bonvetura	cbonaventure@echocommunity.org
World Renew Tanzania	Mwanza	Green Manure Cover Crops, CA – Mechanization, Minimum tillage,	Training and demonstrations; Advocacy for CA	Dr. Godfrey M. Kwidika	gkwidika@worldrenew.net
Agricultural Inputs Promotion Platform (AIPP)	Mwanza	Ox – drawn implements & minimum tillage	Training, demonstrations & Farmer’s field days	Focus E. Laurent	0762311285
Africa Inland Church of Tanzania (AICT)	Geita	Cover Crops, planting basins, ox-drawn implements	Training	Deogratias Ngotio	ngotio@gmail.com/0754318487
African Inland Church of Tanzania (AICT)	Mara	Green Manure Cover Crops, CA – mechanization, Minimum tillage,	Training and demonstrations; Advocacy for CA	Charles Loleku	lolekucharles@gmail.com/0755055523
BUFADESO	Bunda, Mara	Cover Crops and Minimum Tillage	Training, demonstrations, Farmer’s field school & sensitization	Baraka Kamese	0787926671
Project Concern International (PCI)	Mara	Seed technology, Cover Crops and Minimum Tillage	Campaign & sensitization	Amithay Kuhanda	0756792562
Misungwi Rural Housing Project	Misungwi - Mwanza	Minimum Tillage, Green Manure Cover Crops	Training and Demonstrations	Cosmas Phares	0713 473 784
One World Sustainable Livelihood (OWSL)	Mwanza, Geita, Mara and	Green Manure Cover Crops, Minimum	Training and Demonstrations	Dr. Theophil Kayombo	0754 872512

	Tabora	Tillage and CA – Mechanization			
Clinton Foundation	Iringa	Climate Smart Agriculture, Minimum tillage	Promotion, Training, Demonstrations	Monsiapile Kajimbwa	
COMMERCIAL FARMS & COMPANIES					
Rutuba Farm	Iringa	Minimum tillage, cover crop, crop residues/mulching, crop rotation	Training, minimum tillage service provision, agro input dealer	Otto Ulyate	rutuba@iwayafrica.com 0786 444093
Kibaigwa Flour Supplies	Dodoma	Tractor rippers and oxen rippers	CA implements fabricator	Sebastian Msollah	0765433132
Farm for the Future	Kilolo	Minimum tillage, crop rotation	Training	Osmund Ueland	osmund@ffftanzania.com 0629 935374
Capital Farm Tools	Dodoma	Rippers and provide spares, oxen carts and other CA mounting attachments	CA implements fabricator	Pascas Kisengo	0754300834
LonAgro	Arusha	Ripper, boom sprayers, rakes & knife rollers	Ago machinery dealer for CA implements	Ray Travas	ray.travas@gmail.com
NANDRA Engeering	Kilimanjaro	Rippers and provide spares and CA mounting attachments	CA implements fabricator	John/Frank	nandra@kicheko.com
Intermech Engineering C	Morogoro	Rippers & planters/Seeders	Fabricator and seller	Eng. Peter D. Chisawilo	pchisawilo@gmail.com
Field Master	Arusha	Tractor-drawn planters, custom planting	Fabricator and service provider	Mick Dennis	0784 327 630
Naberera	Manyara	Minimum tillage	Demonstrations		
West Kilimanjaro	Kilimanjaro	Minimum tillage	Demonstrations		

Annex 3: List of Participants at the Stakeholders' Validation Workshop

No	Name	Organization	Duty Station	Contacts
1	Eng. Henry G. Kilapilo	MoA	Dodoma	0754478550
2	Shakwaanande Natai	FANRPAN	Dar es salaam	0754893346
3	Hamisi Dulla	CFU Tanzania	Dar es salaam	0766603690
4	Jimmy F. Macha	MoA	Dodoma	0713299950
5	Imani E. Losioki	MoA	Dodoma	0759020025
6	Lawrence Lwanji	DCT	Dodoma	0769128128
7	Richard Shetto	ACTN	Dar es salaam	0754373395
8	Hendry Mziray	CFU Tanzania	Dar es salaam	0767497720
9	Fadhili A. Mngazija	MoA	Dodoma	0717933570
10	Moses Mjinga	CFU Tanzania	Dar es salaam	0767010965
11	Dr. Hassan B. Shelukindo	Independent Consultant	Dar es salaam	0715413162
12	Abdala Bofu	MoA	Dodoma	0762823103
13	Kamwesige Mtembei	MoA	Dodoma	0754247606
14	Felix F. Temu	CFU Tanzania	Morogoro	0655574692
15	Daud J. Lutema	DAICO	Geita	0752996381
16	Elizabeth J. Girangal	SAT	Dodoma	0759276667
17	Linus Ndoroma	AICT	Geita	0755524833
18	Pauline Patrick	Farmer	Geita	0766933686
19	Mathias D. Lusendamil	Agricom	Morogoro	0768206020
20	Agatha Kiama	ESRF	Dar es salaam	0764824409
21	Barnaba Mhagama	TARI-Selian	Arusha	0713420676
22	Siwajibu Selemani	Bahi DC	Bahi	0755546431
23	Lilian Z. Paschal	Chamwino DC	Chamwino	
24	Dr.Ndabhemenge Mlengera	TARI Kafyulo	Iringa	0755766812
25	Adolph Katunzi	TARI UYOLE	Mbeya	0755100541
26	Hendry C. Moshiro	MoA	Dodoma	0764356303
27	Lucy N. Nyalu	Iringa DC	Iringa	0754867756
28	Ramadhan Athuman	CFU Tanzania	wanging'ombe/Njombe	0655360942
29	Sifuel Ringo	CFU Tanzania	Monduli	0768235062
30	Musa A Mwijarubi	CFU Tanzania	Same	0758406317
31	Stella Msami	PASUDO	Dar es salaam	0714055625
32	Shabani Minja	Farmer	Same	0752413472
33	Essau Mbilinyi	CUF-TZ	Kiteto	0765415679
34	Lameck Hazali	C A Expert	Dodoma	0754865529
35	Fridolin Mpanda	Moshi DC	Moshi	0754865369
36	Mwinamila Changige	Farmer	Bunda	0767938249
37	Monica Kawanara	MoA	Dodoma	0767404969
38	Kelvin Msowa	Farmer	Kibaigwa	0762939363
39	Lutha Nyudike	Farmer	wanging'ombe/Njombe	0678006158
40	Glory Emmanuel	Farmer	Monduli	0755760038
41	Charles Bonaventure	ECHO-EA	Arusha	0754992079
42	Dr. Kenneth Masuki	R&D Consultation	Arusha	0715625567
43	Dr Jeremia G. Mowo	RFG Allience	Arusha	0783956227
44	Godfrey Mnyamale	DAICO-Chamwino	Chamwino	0713765953
45	Revocatus Lutunda	DAICO-Butiaama	Butiama/Mara	0754245190
46	Harith Hashim Hemed	KFS	Dodoma	0757467393
47	Theresia Massoy	FAO	Kigoma	0716126144
48	Prof. Mkubwa L. Manoko	UDSM	Dar es salaam	0784315230
49	Leo M. Mavika	PO-RALG	Dodoma	0754478003
50	Alex G. Mrema	PO-RALG	Dodoma	0755328226
51	Johnbosco Bisana	FAO	Dar es salaam	0767141412
52	Ray Traves	Ojoro Plantation	Arusha	0788233980
53	Wilfred Malki	TIA Fund project	Moshi	0754888563

Annex 4: Terms of Reference for Conducting mapping and profiling CA stakeholders in Tanzania

Introduction

Southern Africa predominantly practices subsistence agriculture, even though the sector is the biggest employer in most countries. *The Strengthening Coordination, Scaling Up and Governance of Conservation Agriculture in Southern Africa* (SSUGCASA) project focuses on supporting scaling up the transformation of current low productivity, non-climate resilient, conventional production systems to high productivity and sustainable Conservation Agriculture (CA) approaches, through improved stakeholder coordination, strengthened partnerships and increased knowledge sharing.

The intervention takes cognizance of the fact that due to non-resilient agricultural production systems, climate change has already resulted in an increase in the number of people suffering from food and nutrition insecurity as well as loss of livelihoods in Southern Africa.

In 2019, 41.2 million people faced food and nutrition insecurity in Southern Africa. This threatens sustainable development in the region. The number of people that are experiencing food and nutrition insecurity in Southern Africa is of major concern. The prevalent level of food insecurity in the region is an indictment of conventional farming approaches under the current environment of climate change and variability. The Malabo Heads of State Declaration of 2014, set to redress this situation by setting a target of 25 million farmers being assisted to adopt climate resilient production systems by the year 2025.

Priorities on CA align with the Malabo Declaration of 2014. This is an urgent transformative agenda through which all countries in Southern Africa should be supported to determine their contributions in terms of the target number of farmers practicing CA for each country. The government extension systems and services which are expected to play a major role in this transformative agenda are however not adequately funded leaving a delivery gap. Augmented complimentary actions that leverage on the collective actions of other actors in the region.

Conservation Agriculture (CA) is a proven win-win alternative Climate Smart Agriculture (CSA) approach that can contribute to the building of resilience of smallholder farmers and assure them of food and nutrition security and decent livelihoods. Despite this, CA practice by smallholders in the region is still low, leaving an untapped potential that could positively transform local farming systems.

Among factors contributing to the slow scaling up of CA are the limited stakeholder coordination, information sharing and messaging, resulting in a ‘muted voice’ lacking the thrust necessary to bring about the desired transformation from the conventional to the more resilient CA anchored production systems. Through the Conservation Agriculture Regional Working Group (CARWG) and National Conservation Agriculture Task forces (NCATFs), FAO and other partners have common platforms for sharing of information and knowledge on CA.

Through the project, the NCATFs will undertake a review of existing national development frameworks including the NAIPS, NAPS, in order to identify CA entry points, identify policy gaps and support necessary actions to address them. This will ensure sustainable programming for CA scale up in the targeted countries.

Objectives of the CA Stakeholders mapping and profiling exercise:

The key objective of this exercise is to map and profile stakeholders involved in testing, modelling and promoting/disseminating Conservation Agriculture (CA) technologies and practices in Tanzania. Through identification and profiling key CA players (in both private and public sectors), the task will address the following questions: who promotes CA, where is CA promoted, what CA technologies and practices are being promoted, who are the beneficiaries, how is CA promoted, to mention but a few. Specifically, this exercise will:

- (1) Establish an inventory and profiling of actors from both private and Public sector undertaking and promoting Conservation Agriculture technologies in Tanzania.
- (2) Support the country to create a CA dataset and define targets in support of the CA platforms contribution to the Malabo CSA targets
- (3) Identify CA technologies and practices promoted by different actors.
- (4) Understand the methodologies currently used to promote/disseminate CA technologies and practices and establish their SWOT;
- (5) Establish critical challenges/bottlenecks that inhibit adoption of CA and propose solutions; and
- (6) Provide recommendations of CA technologies and practices suitable to a particular agro-ecological conditions and farming system as well as efficient and effective method(s) for dissemination of CA to enhance adoption rate.

Activities:

To achieve the above mentioned overall and specific objectives of this exercise the following activities will be undertaken:

- (i) Preparation of tools for data collection to capture qualitative and quantitative information from CA players and beneficiaries
- (ii) Field data collection through one-on-one interview, Key informant interviews and focus group discussion
- (iii) Data collection through newspaper and online advertisement
- (iv) Data analysis
- (v) Produce preliminary report of the findings
- (vi) Validation of the findings through stakeholders' workshop
- (vii) Produce Final Report of the Mapping and Profiling

Methodology:

1. Desk review: Review of available information on key CA players in the country (e.g. farmer organizations, service providers, financial service providers, local and international NGOs; local and international Civil Society Organizations-CSOs; individuals, companies, Government agencies, Research Institutions, Universities, Regulatory Authorities, Ministries, Local Government Authorities in the country and collect more (recent) information on ongoing CA projects/programmes.
2. Newspaper/Online platforms: Through advertisements posted in newspapers/online platforms, CA stakeholders around the country will be requested to send specific information to the Ministry of Agriculture.
3. Field visits: This will be conducted in 4 agro-ecological zones i.e. Northern, Central, Southern and Lake Zones. Further information from the 3 other zones will be gathered remotely through various means.
4. Data analysis and report writing: The Field data collection team shall extract useful information from data collected to write two reports i.e. a preliminary report and a detailed mapping and profiling report.