

The project aims to improve the decaling farm power through two options:

1) Increasing power supply: Mechanization



2) Decreasing power demand: Conservation Agriculture



The project will operate in eight sites (two per country) half of them selected as a subset of existing *ACIAR*-funded project sites (*SIMLESA* - Sustainable intensification of maize and legume cropping systems for food security in eastern and southern Africa - and *ZimCLIFS* - Integrating crops and live-stock for improved food security and livelihoods in rural Zimbabwe), the other half representing sites where NARS have conducted long-term CA and/or mechanization work. The project will be implemented mainly via national agricultural research centers (or national NGOs) and regional net-works in each participating country. There will be strong links with CGIAR, Charles Sturt University, Australian university, and African Conservation Network (ACT) partners who will provide specific training on agricultural engineering, as well as mentoring, capacity building, and academic support. *CIMMYT* will coordinate the project implementation through its Ethiopia office.

Farm Mechanization & Conservation Agriculture for Sustainable Intensification

The project was conducted by Mechanization Research Directorate of Ethiopian Institute of Agricultural Research (EIAR).



Preamble

Farm Mechanization & Conservation Agriculture for Sustainable Intensification

The need for sustainable intensification in Sub-Saharan Africa (SSA) is widely recognized. Although a lot of emphasis is being placed in current research for development work on increasing the efficiency with which land, water and nutrients are being used, farm power appears to be a “forgotten resource”. However, farm power in SSA countries is declining due to the collapse of most tractor hire schemes, the decline in number of draft animals and human labor (e.g. stemming from rural-urban migration and pandemics). A consequence of low farm mechanization is labor drudgery, which affects women disproportionately (in e.g. weeding, threshing, shelling and transport by head-loading). Undoubtedly, sustainable intensification in SSA will require an improvement of the farm power balance through increased power supply –via improved access to mechanization, and /or reduced power demand via energy saving technologies such as conservation agriculture.

In SSA; population is growing faster than food production (*ca 3% vs. ca 2%*), unmet demand: rising number of undernourished people therefore, there should be a way to reduce dependence on food import, thus, producing more and differently requires more power.

Objectives

The overall goal of the project is to improve access to mechanization, reduce labor drudgery, and minimize biomass trade-offs in Eastern and Southern Africa, through accelerated delivery and adoption of two-wheel tractor-based technologies by smallholders.

The project has four principal objectives:

- To evaluate and demonstrate 2WT-based technologies to support CA systems, using expertise and implements from Africa, South Asia and Australia.
- To identify improvements in national institutions and policies for wide adoption of 2WT-based mechanization.
- To improve capacity and create awareness of 2WT-based technologies in the sub-region, and share knowledge and information with other regions.

Methods

The proposed project will be implemented in Ethiopia, Kenya, Tanzania and Zimbabwe. A range of methodologies will be implemented by the project in these sites, including (1) on station and on farm evaluation of 2WT-based technologies; (2) Business model development; (3) institution and policy analysis; (4) establishment of permanent knowledge platform; and (5) establishment of an international mentoring platform aiming at building research capacity in the NARS by funding mentoring and training visits from countries such as Australia and India and exchange visits between Africa and Australia/South Asia. A common M&E system including gender disaggregated data will be developed.

Farmer using oxen for farming



Farmer using 2WT for farming



Study areas in Ethiopia

Hawassa zuria is located on the shores of Lake Awasa in the Great Rift Valley at the 7.15° N and 38.6° E.

Kulumsa is located at 7.98° N & 39.18° E

Output and Impact

A large body of knowledge will be generated and strong linkages amongst stakeholders (including private sector actors involved in business models) will be established. Thus, at the end of the project, we anticipate that ~360 rural service providers would have emerged, ~9,900 farms would benefit from 2WT-based CA, and ~25,200 farms would benefit from 2WT-based transport, threshing and/or shelling. With service providers expected to double their income, smallholders adopting 2WT-based CA expected to increase their income by 50% and smallholders adopting 2WT-based transport, threshing and shelling, expected to increase their income by 20%, such an adoption pathway would translate into an approximate cumulative economic value of US\$ 19 million at the end of the project.