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ALL ABOUT THE FRAMEWORK FOR SUSTAINABLE AGRICULTURAL MECHANIZATION IN AFRICA - F-SAMA

African Union

Food and Agriculture Organization of the United Nations

Joint Actions on Operationalization of the Framework for Sustainable Agricultural Mechanization in Africa (F-SAMA)

In this issue

This is the second quarterly newsletter of the AfricaMechanize Platform, with the objective of connecting stakeholders in sustainable agricultural mechanization (SAM), and supporting the joint actions for operationalization of *the Framework for Sustainable Agricultural Mechanization (F-SAMA).* In this issue, we present activities of partners to operationalise the F-SAMA, under the auspices of the F-SAMA steering committee, chaired by African Union, with technical support of FAO, and secretariat support by the African Conservation Tillage Network (ACT).

From traditional manual labour to a highly industrialized and technologically advanced sector, agriculture has come a long way. Farmers and agricultural businesses are continuously looking for different ways to maximize production and increase efficiency due to the serious rising food demand. After a long period of neglect, agricultural mechanization is back on the agenda, with a wave of new interest in the subject. For example, there are calls for "sustainable agricultural mechanization" in order to respond to rising demand for food created by increasing urbanization and population growth (FAO & AUC, 2018); intensifying agricultural production and building "green value chains" (Sims et al., 2016); and addressing gender inequalities through promoting labour-saving technology and more inclusive small businesses (van Eerewijk & Danielsen, 2015).

Moving forward, we reiterate that agricultural mechanization is best considered in broad terms, beyond a narrow focus on farming, or an emphasis on larger-scale equipment. We need to move past the big machine bias, and consider how mechanization technologies can be scale-appropriate and contextualized.

We continue to emphasize and advocate for provision of mechanization services in an approach that enhances wider access especially by smallholder farmers who are the majority in Africa. The F-SAMA reminds us that "the provision of mechanization services in the 21st century must follow some core principles: It has to be built along the entire agricultural value chain for increased systemic competitiveness; it must be private sector driven, therefore, it must make business sense; it must be affordable especially to small-scale farmers; and it must also target women who bear the brunt of African agriculture."
H.E. Josefa Leonel Correia Sacko, commissioner for Rural Economy and Agriculture of the African Union Commission

1 The first ever Global Conference on Sustainable Agricultural Mechanization (GAMC)

The Food and Agriculture Organization of the United Nation (FAO) organized the **first-ever Global Conference on Sustainable Agricultural Mechanization (GAMC)** under the theme "Innovation, Efficiency and Resilience" from 27th – 29th September 2023 at FAO headquarters in Rome, Italy.

The GAMC had over 8500 online registrations and over 300 attendees in person. 50 FAO Members registered to the event. Most registrations came from Africa (39%) and Asia-Pacific (29%). The discussions highlight the contributions and benefits stemming from the sustainable development of agricultural mechanization, showcasing current and emerging technological developments and related business models, supply chain aspects, agricultural machinery standards and the overall enabling environment for sustainable agricultural mechanization. Deliberations were organized in seven thematic sessions across the three-day event.

The event provided a neutral forum for FAO Members, farmers, universities, agricultural scientists, mechanization service providers, development agencies, policy makers, extension specialists, civil society, opinion leaders and private sector for focused dialogues to prioritise actions and strengthen technical networks for sustainable development of agricultural mechanization. What became clear and notable during the event is the recent and significant progress that has been achieved in sustainable agricultural mechanization in many countries around the world, which include appropriate tools, equipment and machines adaptation to sustainable plant production and protection, land management, and precision agriculture. These advances need to be scaled, according to local contexts, to achieve sustainable agricultural production and transformation of agrifood systems, protect the environment, manage natural resources, mitigate and adapt to climate change while creating decent jobs, social equity and achieving food security and improved nutrition.

The event concluded with **call to action points** are in line with the implementation of the FAO Strategic Framework 2022-31 and contribute to the achievement of the Sustainable Development Goals.

More information and the proceedings of this global event can be accessed through sessions recordings available on **FAO Webcast** and the summarized event visual recordings downloadable on **Visual Recording.**

2 The Third African Congress on Conservation Agriculture (3ACCA)

3 ACCA
THIRD AFRICA CONGRESS ON CONSERVATION AGRICULTURE
5-8 June 2023 | Rabat, Morocco

The 3ACCA was established with the goal of contributing to African countries' agricultural productivity initiatives as a key component in the achievement of the Malabo Declarations' Vision 25x25, Agenda 2063, and Sustainable Development Goals. The 3ACCA came in the backdrop of a new wave in Africa to transform agriculture to be more sustainable and climate resilient. The strategic purpose of the 3ACCA initiative was to facilitate diverse and open sharing of experiences and information on CA and SAM thereby fostering learning and widespread awareness and interest in the uptake and spread of CA and SAM.

The congress held in Rabat, Morocco, 5 – 8 June 2023, was jointly organized by African Conservation Tillage Network (ACT), Kingdom of Morocco, the African Union Commission, the NEPAD Agency, the Food and Agricultural Organization (FAO) of the UN, INRA Morocco and the International Center for Agricultural Research in the Dry Areas (ICARDA), in collaboration with the Hassan II Agronomic and Veterinary Institute (IAVH2), Moroccan Association of Conservation Agriculture (AMAC), the National School of Agriculture of Meknes (ENAM) and other classified Sponsors. Its objective was to bring together and enable experts, practitioners, and policy makers across different sectors and interest groups at all levels of agriculture development from the public, private and civil society sectors to share and exchange information and knowledge about best practices that expand the Africa-wide adoption of CA and SAM as a basis for building resilience to climate change amid the increasing food and energy prices and disruptions in distribution systems. The 3ACCA Congress was founded on the theme "**Building a Resilient Future in Africa through Conservation Agriculture and Sustainable Mechanization,"** and was organized under four thematic areas of focus.

The monumental African hybrid event combined in-person attendance with virtual attendees, and presenters via live stream attracted 557 participants from 50 countries. The categories of these participants were as follows: 216 Physical Delegates; 21 Physical Speakers; 9 Physical Exhibitors; 294 Virtual Attendance; 12 Virtual Speakers; and 5 Virtual Exhibitors.

The 3ACCA was in succession to the first and second African Congresses on Conservation Agriculture which took place, respectively, in

2014 in Lusaka (Zambia) attended by 414 delegates from 42 African and other countries and in 2018 in Johannesburg (South Africa) also attended by 501 delegates, from 52 countries globally. African countries were represented by 37 countries. The delegates in the two events resolved a number of issues as captured in the congress Lusaka Declaration and Action Statement from Stakeholders of the Second Africa Congress on CA

The congress was officially graced and opened by the Minister of Agriculture, maritime Fisheries, Rural Development and water and Forests, Morocco H.E. Hon. Mohammed Sadiki and addressed by High level dignitaries who included Martin Kropff (Global Director CGIAR) and Jerome Afeikhena (AUC). The inaugural speech was delivered by Ms. Beth Bechdol, FAO DDG.

At the end of the Congress, **a 3ACCA Rabat Declaration** was drawn, adopted and promulgated as a part of the closing ceremony. Participants declared that Africa Countries must revitalise and/or establish joint CA and SAM institutional focal points and network coordination to support locally relevant partnerships and innovation platforms that can engage with government, development partners, and the business sector. Indeed, to achieve to achieve widespread implementation, African countries must use CA and SAM diagnostic, agronomic, and participatory on-farm researches, as well as model simulations that provide outputs and outcomes that simultaneously meet farmers' short-term aims while boosting the provision of socioecological dividends.

Therefore, the congress facilitated the development of a more effective and coherent way forward steps as Rabat Declaration geared towards; Helping the most vulnerable populations cope with the devastating impacts of climate change; Furnishing African countries with strategies to increase agricultural productivity in the implementation of the Malabo Declaration's Vision 25 x 25 and the Agenda 2063; and Consolidating the African position on CA and SAM and enhancing effective participation at the 9th World Congress on Conservation Agriculture (9WCCA) to be held in South Africa in July 2024.

More information on the congress and Rabat Declaration can be accessed on: http://www.africacacongress.org

3ACCA BY THE NUMBERS

557 participants

216 Physical Delegates

12 Virtual Speakers

50 countries

294 Virtual Attendance

9 Physical Exhibitors

21 Physical Speakers

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3 Global Feature Issue

Africa should learn from others: *Sustainable Agricultural Mechanization in China:* A Review of its Development Strategies and Perspectives – Provide worthy insights for Africa to learn from.

A review Report by The World Bank.

Agricultural mechanization is the main content and an important symbol as well as a leading factor for agricultural modernization. In seeking agricultural modernization, different countries have chosen different ways of development; however, no matter which way is chosen, the common point is to solve the challenges in agricultural mechanization.

Over the past few years, China has focused on poverty alleviation and has lifted 55.75 million rural dwellers out of poverty. The problem of absolute poverty, which had plagued the Chinese nation for thousands of years, has been solved in a historic way, creating a miracle in the history of poverty reduction. Agricultural modernization has made steady progress, annual grain output has remained stable at more than 650 million tons, and 100 million rural migrants have moved to cities. China's urbanization rate has reached 63.89 percent. China's economy has shifted from the rapid growth stage to high-quality development stage, and the focus of work related to agriculture, rural areas, and farmers has entered a new stage of comprehensively promoting rural revitalization and accelerating agricultural and rural modernization.

The 14th Five-Year Plan for Economic and Social Development and Long-Range Objectives through the Year 2035 of the People's Republic of China clarifies that priority should be given to developing agriculture and rural areas, promoting rural revitalization, and basically realizing agricultural and rural modernization in China by 2035. Moreover, the law clarifies promoting rural revitalization on the road to socialism with Chinese characteristics; strengthening agriculture-industry and urban-rural linkages; promoting an innovative mode to optimize mutual improvement between industry and agriculture and the mutual complementarity between urban and rural areas; pursuing coordinated development and common prosperity; and accelerating agricultural and rural modernization. China attaches importance to optimizing the quality, efficiency, and competitiveness of agriculture; increasing overall agricultural productivity; strengthening support to agricultural science, technology, and equipment; and ensuring the effective linkage of poverty alleviation achievements and rural revitalization. It clearly emphasizes strengthening research and development (R&D) and extension of large- and medium-sized, intelligent, and complex agricultural machinery, and increasing the overall agricultural mechanization rate to 75 percent for crop production and harvesting. China's government work reports in the past five years have proposed promoting the mechanization of and intelligence for agriculture.

The world Bank '*Sustainable Agricultural Mechanization in China: A Review of its Development Strategies and Perspectives*' strives to comprehensively and systematically summarize the state of China's agricultural mechanization development; its impacts, experiences, and practices; as well as the related policies and measures adopted to reach the goal of agricultural and rural modernization by 2035, to drive smallholder farmers to enter modern agriculture, and to achieve sustainable development. The development of agricultural mechanization in China provides experiences for the world, especially for the developing countries.

The report is available on *Sustainable Agricultural Mechanization in China: A Review of its Development Strategies and Perspectives (English).* Washington, D.C.: World Bank Group. http://documents.worldbank.org/curated/en/099550201052322578/P1715180b0ee2706d0ac5b06af54576c07c

Emerging Trends & Innovations in Agricultural Machinery by Indo Farm Equipment Limited

From traditional manual labour to a highly industrialized and technologically advanced sector, agriculture has come a long way. Farmers and agricultural businesses are continuously looking for different ways to maximize production and increase efficiency due to the serious rising food demand.

A leading producer of tractor suppliers and agricultural equipment in India, Indo Farm has been at the forefront of embracing new trends and technologies in the tractor and agricultural industry.

In this blog, we will examine the most recent advancements in agricultural technology and how machinery advancement is helping them to influence farming in the future.

- **Precision Agriculture:** The use of precision agriculture by farmers is altering how they manage their resources & crops. Farmers can now access and enhance their fields with great precision, thanks to satellite imaging, GPS technology, and smart sensors. Farmers can do major operations like auto-steering, variable rate fertilizer and pesticide application, and yield monitoring with the help of high-tech GPS-enabled tractors, which boost crop yields and resource efficiency in farming.
- **Autonomous Farming Machinery:** Autonomous farming vehicles are becoming more common in sectors other than the automotive industry. Drones are becoming more common in agriculture nowadays. With the ability to independently perform operations like planting, harvesting, and ploughing. Autonomous agricultural machinery is able to decrease the need for hard labour and boost agricultural output. Additionally, drone technology helps farmers to keep an eye on the condition of their crops, spot problem regions, and even spray pesticides precisely where they are required, reducing waste and damage to the environment. It's efficient and getting popular in terms of modern farming techniques.
- **Opting Renewable Energy:** Today's modern farming techniques are using renewable energy sources in their machines with an emphasis on sustainable operations. Irrigation systems and other agricultural operations are increasingly supported by wind and solar energy, reducing the need for traditional fossil fuels and lowering greenhouse gas emissions.
- **Artificial Intelligence Powered Machinery:** The world of agricultural machinery is changing because of artificial intelligence (AI) and machine learning (ML). With the use of these technologies, machines can collect large volumes of data and evaluate it to improve machine performance. To improve resource management and increase crop

yields, AI-powered machinery can forecast weather patterns, optimize irrigation schedules, follow-up patterns, and offer crop-specific methods.

- **Energy-Efficient Machinery:** Modern agriculture is increasingly concerned with sustainability. To develop machinery that is energy-efficient and lowers the carbon footprint of the sector, big tractor and automobile companies are actively funding research and development. The business is dedicated to creating environmentally friendly solutions that support overall environmental goals, from low-emission engines to solar-powered tractors.
- **Nanotechnology Applications:** Nanomaterials have the potential to improve soil health as well as the potency of herbicides and fertilizers. The apparatus uses nanotechnology to apply these nanoparticles precisely, leading to increased nutrient uptake and reduced environmental effects.
- **Vertical Farming Technology:** Growing in popularity is the idea of vertical farming as urbanization quickens. Given the promise of this technology, companies are working day and night to create specialized equipment for vertical farming systems. In order to maximize productivity in small fields, this technology uses controlled settings and resource-wise procedures.
- **3D Printing in Spare Parts:** For continuous functioning, agricultural machinery maintenance is important. To swiftly and efficiently make replacement components, some tractor companies are using 3D printing technology. Farmers experience less downtime as a result, the supply chain is streamlined, and a big inventory is no longer required.

Conclusion

Indo Farm's passion for transforming the farming industry and helping farmers on a productive journey and is reflected in its progress and usage of new agricultural technology trends and developments. The company is bringing about beneficial change for farmers and the agriculture sector, from precision modern Indian tractors, farm machinery and equipment, and upgraded powerful and fuel-efficient machinery so that the technology remains within the affordable segment for the farmers.Indo Farm Equipment Limited company equips farmers with the resources they need to face the challenges of a fast-changing world and is reshaping the future of agriculture by investing continuously in efficient, sustainable, and technologically driven agricultural solutions. Lastly, the innovation will continue to be at the centre of Indo Farm's goal to assist farmers in their search for greater productivity and sustainability as we move forward.

Seven Future Agricultural Machinery Trends by Rachael Harper, Crop Production Magazine

Evolution appears to have transcended its natural confines, as humans constantly seek to explore and advance the world around them. In the world of agricultural machinery, this is no different. A report on *The Future of Agricultural Machinery* has investigated how the landscape is changing and what the major technological advancements in the sector are going to be.

Get the seven highlighted future trends from the report on **Seven Future Agricultural Machinery Trends** Crop Production Magazine.

4 Country Focus Issues

Agricultural Mechanization in Zimbabwe, Opportunities and Challenges Presented by The Pfumvudza Regenerative Conservation Agriculture Initiative

*Authored by **Eng. E S Zimunga**, Chief Director – Agricultural Engineering, Mechanisation & Farm Infrastructure Development, Ministry of Lands, Agriculture, Fisheries, Water and Rural Development*

With a mission to promote and sustain a viable, appropriately mechanised agriculture sector in a changing climate, government of Zimbabwe acknowledges that mechanization in agriculture plays a crucial role. Mechanization is among the critical ingredients services crucial to increasing production and productivity. This is more pronounced in the smallholder farming segment. Indeed, one of the constraints to the expansion and modernization of agriculture is the low level and limited use of mechanization, especially by smallholder farmers.

In Zimbabwe, most of the smallholder farmers estimated to be over 3 million are settled within the communal land and A1 settlement scheme areas after the 1998-200o land reforms and redistribution of land exercise. 67% of the Zimbabwe's population relies on this category of farmers for their food needs. In terms of the agro-ecological zones, there are five farming areas in Zimbabwe classified based annual rainfall patterns. The best region with high rainfall being region 1 and the worst region which is more or less arid and semiarid regions falls within region 4 and 5. In attempt to adopt to this discrete agro-ecological pattern, the government adopted agroecological regional tailoring approach where different crops are grown in different regions depending on their suitability. Farming communities are largely distributed according to this pattern lies within region 2 to 4. Therefore, the government have taken deliberate measures based on its mandate to make sure that strategic investments that is going to agriculture speaks to the requirement and the need of these smallholder farmers.

Low production and productivity daunted by climate change repercussions experienced by most of the smallholder farmers have significantly contributed to food and nutrition insecurity and low income among the smallholder households. This situation occasions the introduction and implementation of a program based on Conservation Agriculture concept 'Pfumvudza/Intwasa' targeting smallholder farmers. The Pfumvudza concept is based planting basins; often incorporated with improved seed varieties and mulching. The concept encourages the practice of sustainable agriculture, crop diversification, and conservation practices. This was adopted from Foundations of farming where household food requirements are done in a plot measuring 38 by 16 meters. In this plot, CA pot holing and covering with mulch practice is applied and is designed to meet food household security. The system was adopted nationally among the smallholder farming communities and significant household food security have improved tremendously. Many households were able to have enough staple food. However, the system is a bit labour intensive and with the challenges of labour shortage, its potential is limited.

Government have taken some strides and initiated support infrastructure at the facility level as strategic investments to bring the tenets of next level in terms of mechanization. Segregated by the farm operations and focused on land preparation tillage operations government developed a fully funded input package for Pfumvudza plots. Another facility on power equipment called Smallholder Pfumvudza Mechanization starter package was developed. This facility considers all operations across the value chain of a particular farm. The start- up facility of 6 million Dollars was offered on service providers model. Service provider model package consists of Two Wheel tractor and toolbar, direct seeder and a trailer and costs about 4,970 USD. This distribution of these equipment is being done by different financial institutions majorly banks through loan facility for manageable recovery.

The key issues for Pfumvudza Mechanisation include: the need to address critical needs as regard financing, labour, farm power shortage & support Infrastructure; provide effective and optional solutions for different

Pfumvudza planting system (Source MLAFWRD, 2024).

farm operations (tillage, seeding, chemigation, watering, harvest, transport, shelling, storage); provide income opportunities for men and women in rural settings; modernizes and make farming attractive for youth and i-Generation; and appropriate-scale machinery designed to suit the needs of smallholders farmers & others.

The government of Zimbabwe continues to develop and implement policies and strategies that enhance development of agriculture in the country. Agricultural economy policy emphases on more resources investments to develop infrastructure that support agricultural production, value addition, marketing and trade. Different national strategies such as National Development Strategy (NDS) 2020 – 2025, Agriculture & Food Systems Transformation Strategy (AFSTS) 2020 - 2025, agricultural economy strategic investments and other subsidiary policies and strategies support agricultural infrastructure, Machinery, Equipment & Technologies. These policies and strategies also strengthen the need for public private partnership in the section. Many government-led initiatives and facilities and private Sector led initiatives are being developed and implemented.

With clear recognition that with appropriate scale mechanization the process of rural agriculture transformation, industrialization and development can be expedited, the government of Zimbabwe has expressed solid commitment and initiated a number of mechanization facilities and initiatives that are currently being implemented. The facilities, described in detail in the presentation, include local machinery manufacturers and international machinery manufacturers such as John Deere, and Belarus. The implementation of these facilities is structured to allow all the machines be distributed by banks on behalf of the dealers, government and manufacturers. The process is intended to ensure transparency,

Direct Seeder + Tool bar

Trailer

Sheller/Thresher

Two-wheel tractor

Item	Cost (USD)
2-wheel tractor	1750
Toolbar	600
2-row planter	750
Sheller	1050
Trailer	800
Total	USD4,970
Payable over 3 years	

accountability and sustainability. The government remains to be a facilitated while the private sector takes led in these facilities and initiatives.

In a bid to promote the local industry and ensure sustainability, under the **Agricultural Mechanization Development Alliance**, the Ministry is working with the academia, local equipment manufacturers and dealers, as well as the country's university innovation hubs, to prototype and expand local capacity to produce various tools, equipment and machinery that support agricultural mechanization. **Agricultural Mechanization Development Alliance** is a multi-stakeholder platform for all mechanization value chain actors, manufacturers, researchers and academia, government ministries and departments where issues on technical, policy, commercial quality and standards, innovations, research and development of agricultural mechanization are discussed and acted upon.

In conclusion, Zimbabwe's economy is agro-based and mechanization should play a critical role in the competitiveness and productivity of the nation. The nation needs a dedicated policy and blueprint to support mechanization efforts. The emphasis remains that value chain approach to grow the mechanization portfolio and associated value chain actors is imperative and any investment must take it into consideration. Agricultural Mechanization is key and pivotal in Zimbabwe's growth and recovery path based on 2030 Agenda.

Conservation Agriculture adoption status in Malawi and the role of sustainable agricultural mechanization

*Authored by **Gertrude Kambauwa &Kefasi Jeremiah Kamoyo,** Ministry of Agriculture; Department of Land Resources Conservation, Lilongwe, Malawi*

In Malawi, Department of Land Resources Conservation (DLRC) under Ministry of Agriculture is mandated to provide policy guidance, land resource information and training in order to achieve sustainable land resources management and prevention of land degradation that will increase and sustain its productivity for agricultural growth and development. The goal is to promote efficient and diversified and sustainable use of land-based resources for both agriculture and other uses in order to avoid sectoral land use conflicts and ensure sustainable socio-economic growth and development. Currently the department is promoting Sustainable land management and climate smart agriculture using integrated catchment conservation and management approach model.

DLRC is promoting Conservation Agriculture using catchment conservation taking on board the core principles with its complementary practice. There are eleven (11) stakeholders in the promotion of CA in the country with three of them promoting mechanization of CA in the country using small tractors.

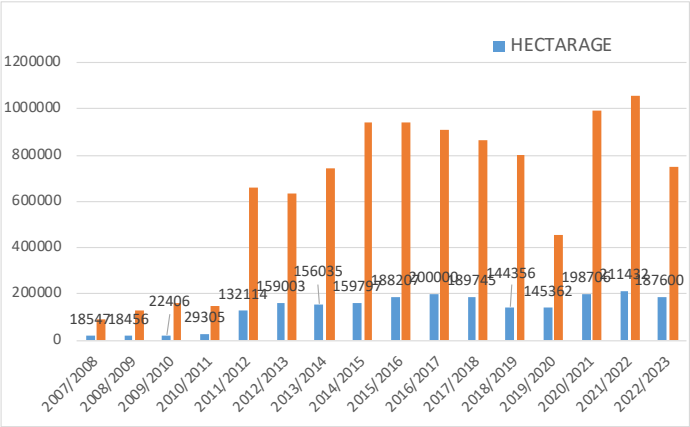
For long the practice of ridging and burning of residues has been the norm in Malawi with most smallholder farmers painstakingly practicing intensive ridging and shifting ridges every year in Malawi. These practices are labour intensive and limits the potential of agricultural development, especially among small holder farmers. It is estimated that 90% of farming power is predominantly sourced from human muscle, especially in crop cultivation with animal draft power and tractor power at 4% and 6% respectively. Essentially, there is limited use of engine-powered machinery and animal traction in both down and upstream agriculture activities. Agriculture mechanization has remained low, estimated at 13% of its potential. Low agricultural mechanization in Malawi contributes to low crop productivity, increase levels of post-harvest losses (Cossar, 2019), since land preparation is difficult and labour intensive, timely harvesting, quality primary processing, and storage of agriculture produce all get compromised in the absence of appropriate mechanization (Amadi, 2016). The smallholder sector remains largely unprofitable. This situation has been exacerbated by the climate change, weather variability has affected agricultural productivity given that Malawi relies heavily on rain-fed agriculture and has suffered from frequent droughts and erratic rainfall patterns. To achieve commercial-level production, smallholders must adapt good agricultural practices that helps mitigate the effects of climate change and enhance production. Government, non-governmental organizations and other players in the sector have been promoting Conservation Agriculture as one of the approaches to sustainably improve food production and reduce soil degradation as well build resilient farming systems.

Conservation Agriculture being promoted and practiced in Malawi aims at promoting sustainable and profitable farming based on three principles of minimal soil disturbance, permanent soil cover; and crop rotation as one key strategy to help reduce poverty and climate resilience in addition to increased agricultural productivity. However, the system is largely based on the manually practices, land preparation and crop husbandry practices involve the use of hand hoes, dibble sticks and mulching.

Despite the many challenges, adoption of CA in the country among the smallholder farmers has significantly improved over time. Figure 1 show the adoption trends CA in terms of number of farmers and the land size under CA. Notably, in 2018 and 2019 there were fall army worm infestation in the fields which farmers associated it with CA which affected adoption.

The government of Malawi through relevant departments through various initiatives and programs promote agricultural productivity and sustainable management of land resources to achieve food security and increased incomes and ensure sustainable socio-economic growth. Crops Development Department, which was created to facilitate producers' access to improved and locally appropriate crop production and agro-processing technologies is responsible for the implementation of farm mechanization programs. Specifically, it offers training to extension agents and farmer groups in crop production technologies and in post-harvest

Formation of the Mechanization Association of Malawi, Lilongwe, 2024)

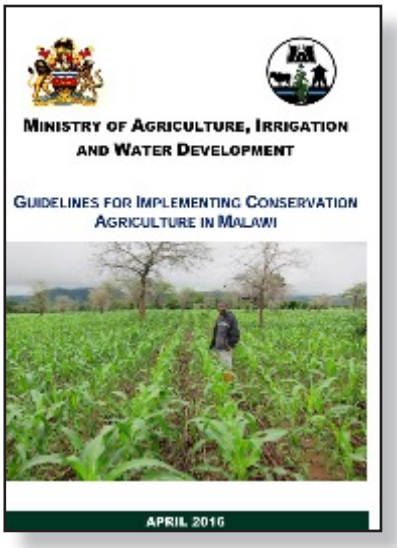


management of crops, including agro-processing. The Agriculture Development Divisions (ADDs) within the sector play an important role in the mechanization process. Each of the divisions is organized in a different way to reflect local structures and context for instance, the ADD in the Kasungu region promotes sustainable crop production through appropriate technologies and the provision of services such as subsidized farm inputs, mechanization, seed production, and crop protection.

The Agriculture mechanization project has managed to buy and distribute 92 tractors and accessories to producer organizations (PO) with secured markets. This is an opportunity for sustainable mechanisation in the country. In addition, the establishment of Mega Farm Unit within the Ministry to transform Malawian agriculture provides a platform for One-Stop Private Sector Mega Farms initiatives that supports 844 medium and large-scale farmers with implements for mechanization. Further action government is taking include the formation of the Mechanization Association of Malawi and revamping and restructuring of ADD-based farm machinery hiring scheme and provision of 8 new tractors. However, the problem still stands that there are no readily available accessories that are in tandem with CA. this is an opportunity of the country to start thinking on SAM under CA.

Some of the main challenges facing the farmers in adopting CA includes:

- Resistance to Change: Compelling evidence is needed to show that CA offers greater benefits than the tradition of ridging and clean fields (small landholdings making farmers risk averse).
- Lack of understanding on the long-term benefits of organic matter accumulation compared to reduction of yield in the first year due to high C/N ratio.
- Conflict interest on the use of Stover i.e. Livestock vs mulching. Amount of the mulch is adequate?
- Quality Training: Lack of practical knowledge on CA highlights the need for quality training to extension staff from Government, Projects, NGOs and the private sector on how to implement CA practices on the ground.
- Focus on inputs: Farmers and extension staff believe that specific inputs and/or tools are needed to undertake CA (e.g., fertilizers, herbicides, and large amounts of crop residues (often imported).
- Little access to appropriate mechanisation: without functional equipment for direct seeding of crops it becomes a protracted exercise to properly test, and, more importantly, demonstrate the benefits of CA
- Conflicting Policies: MoA has maintained the old policy on conventional ridges on contour which is in direct opposition to Conservation Agriculture



As part of government efforts to support the development of the sector, several policies, guidelines and frameworks have been developed and largely advocating for promotion of Conservation Agriculture in Malawi. However, these policies emphasize less on SAM in CA. These policies and strategies include: Malawi 2063 Agenda, National Land Resources Management Policy (2000) under Review, National Agriculture Policy (2016) Under Review, The Malawi Agricultural Sector Wide Approach (ASWAP) – aligned to the Comprehensive African Agricultural Development Programme (CAADP) and the Development Assistance Strategy, Malawi National Agricultural Investment Plan (NAIP), Guidelines for implementing Conservation Agriculture Guidelines in Malawi (2017), and Malawi National Climate Smart Agriculture Framework

Zambia Government, FAO Launches National Agricultural Mechanization Strategy NAMS 2024 – 2028

By Mukaba, Communication Specialist, FAO Lusaka, Zambia. E-mail: mukaba.mukaba@fao.org

It is only through agricultural transformation that hunger will end and improve nutrition while accelerating economic growth for our country, Zambia's President Hakainde Hichilema has said. President Hichilema observed that agriculture Mechanization is fundamental to the transformation of Zambia's agriculture, improving farm productivity and enhancing the country's food security.

In a speech read for him by Vice President Mutale Nalumango during the launch of the National Agricultural Mechanization Strategy (NAMS), President Hichilema described the development as a milestone of his administration in the agriculture sector.

Government has partnered with the Food and Agriculture Organisation of the United Nations (FAO), the International Maize and Wheat Improvement Centre (CIMMYT), as well as experts from local universities, farmer representatives and the private sector to develop a comprehensive National Agricultural Mechanization Strategy (NAMS), which will be implemented for the next five (5) years.

The National Agricultural Mechanization Strategy was launched together with the **'Mechanise 360 Ulimi Okwana,'** which is a smallholder farmer's Mechanization promotion campaign.

"To ensure that the National Agricultural Mechanization Strategy is not just a document produced for the shelves, government shall, with immediate effect, run 'Mechanise 360 'Ulimi Okwana' through the Ministry of Agriculture with a target to mechanise 500,000 hectares of smallholder farmers land by 2027," explained President Hichilema.

He further said government will mobilize local and international investments through the hand-in-hand and south-to-south cooperation initiatives and will foster partnerships with multilateral and bilateral cooperating partners for technical and technological assistance to achieve the implementation of this Mechanization Strategy.

Meanwhile, FAO Deputy Director-General Ms. Beth Bechdol, congratulated the Zambian Government for the successful launch of the National Agricultural Mechanization Strategy, which she said is a significant milestone in the agricultural development of the

Vice President of Zambia Mutale Nalumango launching the National Agricultural Mechanization Strategy (Centre). Left - Minister of Agriculture Reuben Mtolo. Right – FAO Rep. Suze Percy-Filippini with EU Head of Macroeconomics Matthias Reusing (Credit:FAO)

country. FAO Country Representative to Zambia Suze Percy Filippini, read the speech on behalf of Ms. Bechdol during the Launch of the Strategy. "Prioritizing mechanization will bolster food supply chains and production, and enhance food security in Zambia," she said. Ms. Bechdol observed that empowering farmers with improved tools and technologies will transition them from subsistence to market-oriented farming, attracting more youths to the sector. She further observed that the 'Mechanize 360 campaign' was crucial in ensuring the successful adoption of mechanization among smallholder farmers

The level of mechanization should meet smallholder farmers' needs effectively and efficiently hence the reason the EU, through the Sustainable Intensification of Smallholder Farming System (SIFAZ) project in Zambia, promotes Mechanization technologies at small and medium scales, which are well adapted to local conditions and needs. "Mechanization reduces your manual labour, empowers you and lowers your production costs, while improving your livelihoods and food security", EU Ambassador to Zambia Karolina STASIAK said. "However, Mechanization must also be affordable and meet your pockets, which is why the EU aims to develop easily accessible Mechanization Service Centres, which offer a variety of services, including the leasing of agricultural equipment".

The NAMS was launched on 29th February 2024, a few hours before President Hichilema declared the prolonged dry spell the country has experienced as a national disaster and an emergency. Read more

New strides towards precision agriculture in Tanzania: Electronics and Precision Agriculture Lab (EPAL) innovations

The Electronics and Precision Agriculture Lab (EPAL), based at the Sokoine University of Agriculture (SUA), focuses on integrating advanced technologies into agricultural practices to enhance productivity, sustainability, and efficiency. The lab serves as a hub for cutting-edge research and development in robotics, Internet of Things (IoT), machine learning, and data science applied to agriculture. The EPAL mission is to empower farmers, agribusinesses, and stakeholders throughout the agricultural value chain by equipping them with advanced digital tools. These tools enable the adoption of sustainable and efficient practices, leading to increased productivity, profitability, and environmental stewardship. The lab leverages emerging technologies such as artificial intelligence, machine learning, robotics, Internet of Things (IoT), remote sensing, and big data analytics to address crucial challenges faced by the agricultural sector.

Some of the major projects at the EPA Lab include:

The Mofaro project, spearheaded by Dr. Kadeghe Fue, is supported by multiple organizations including SUA, TWAS, BMBF, and UNESCO. (Source: SUA EPAL)

Mofaro—The Model Farm Robot Project: One of the flagship projects at the EPAL Lab is the Model Farm Robot, affectionately known as Mofaro. This innovative project aims to revolutionize agricultural practices by introducing an autonomous robot designed for various farming tasks. The primary goal of Mofaro is to create an affordable unmanned ground vehicle (UGV) with a center-articulated oscillating chassis capable of performing precision tasks such as pesticide application, phenotypic data collection, plant counting, and pest and disease detection. Read more

Insects Surveillance System Using Automated Insect Traps: This project focuses on monitoring insects and pests critical for commercial crops to comply with phytosanitary requirements. The automated system uses imaging and machine learning algorithms to count pests, providing real-time data that can inform pest management strategies. This project is endorsed by the Food and Agriculture Organization (FAO). Read more

Flood Early Warning System (FEWS) for Songwe River Basin: In collaboration with HYDROC GmbH, this project integrates the Delft-FEWS with web mapping techniques for online flood model visualization. This advanced flood forecasting and early warning system aims to simulate and track rainfall, predicting floods in the Songwe River Basin. The project is funded by the European Union (EU). Read more

AI for More Crops Project: This project enhances crop yield prediction models using machine learning in the Internet of Agro Things (IoAT) framework. It aims to develop a model that uses historical multi-source data to predict maize and sorghum yields at the district level, deploy a small-scale smart farming system, and conduct an economic feasibility study for the use of IoAT and big data for small-scale farm monitoring and yield prediction. Key team members include Dr. Alcardo Alex Barakabitze, Prof. Camilius A. Sanga, and Dr. Kadeghe Fue. Read More

Tanzania Climate Sensitive Waterborne Diseases Dataset for Predictive Machine Learning: This project gathers data related to typhoid fever, diarrhea, and amoebiasis in Tanzania to create a comprehensive dataset for predictive machine learning models. The collected data will aid in the healthcare sector by enabling better prediction and management of these diseases. Dr. Neema N. Lyimo leads the project, with contributions from Dr. Joseph P. Telemala and Dr. Kadeghe G. Fue. Read more
In conclusion, the EPAL Lab at SUA stands at the forefront of agricultural innovation, driven by a committed team and ambitious projects like Mofaro. By leveraging advanced technologies, the lab is set to make significant contributions to precision agriculture, ultimately aiming to improve efficiency, sustainability, and productivity in the agricultural sector. The lab's diverse team, encompassing various fields of expertise, ensures a multidisciplinary approach to tackling the complex challenges faced by modern agriculture.

For more info about the lab please visit:
https://www.epalab.org

5 Upcoming Events

The 9th World Congress on Conservation Agriculture (9WCCA)

The 9th World Congress on Conservation Agriculture (9WCCA) with the theme "*Enhancing agricultural resilience by strengthening the impact of Conservation Agriculture",* will be held in Cape Town, South Africa, 22-25 July 2024. The congress is jointly organized by the Western Cape Department of Agriculture, South Africa's biggest agricultural media brand (Landbouweekblad), Conservation Agriculture Western Cape, the African Conservation Tillage Network, and the Food and Agriculture Organization of the United Nations (FAO).

Although Conservation Agriculture is a proven strategy for mitigating the impacts of climate change and enhancing carbon sequestration, adoption figures still need to be higher, especially in Africa. The 9WCCA will present practical farming solutions stemming from global research, international farming best practices, and the broader agricultural industry. The congress will enhance the adoption of Conservation Agriculture by addressing aspects such as quantifying soil health, including livestock integration into cropping systems, nutrient stratification, soil acidification and how to scale out/up progressively. The aim of the congress is to provide:

- Practical solutions to enhance CA adoption and scaling out/up even further and faster with special reference to Africa.
- Practical methods and examples by way of case studies, of dealing with real or perceived challenges in the CA system. This include nutrient stratification, integrated soil fertility and acidity management, weeding, livestock integration and integrated pest management.
- Monitoring, quantifying and measuring soil health.

Book you slot and register for the congress on the **Registration Link**.

More information on the congress are available on **https://wcca9.org/**

The F-SAMA *AfricaMechanize* Webinar Series 2024 continues

WEBINAR No. 12 on Revamping Manufacturing of Agricultural Machinery and Implements in Africa along the lines of SAM is schedule to take place on 13th June, 2024. This is part of the joint actions on Operationalization of the Framework for Sustainable Agricultural Mechanization in Africa (F-SAMA).

Therefore, the Webinar Organizing Committee invites you to join in the upcoming webinar on 13th June 2024. Webinar details to follow shortly.

Information on the previous 11 webinar series are available on https://www.africamechanize.org/previous-webinars/

6 Sustainable agricultural mechanization in Video

- Sustainable Agricultural Mechanization in Busia County, Kenya
- Global Conference on Sustainable Agricultural Mechanization
- Government of Zambia Efforts to Mechanize agriculture of smallholder farmers
- Bringing Mechanization Awareness to Zimbabwean Communities
- Embracing mechanized Agriculture – President Museveni asks farmers.

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