

africa|mechanize

ISSUE
03
2024

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



Food and Agriculture
Organization of the
United Nations

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

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Figure 1. No-Till Seeding of Wheat in Morocco

Editorial

This is the third issue of the 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 highlight the various aspects relating to agricultural mechanization and the different efforts and activities of partners to operationalise F-SAMA, under the auspices of the African Union and FAO and coordinated by the African Conservation Tillage Network (ACT) and other partners to date.

Agricultural mechanization is a leading factor for agricultural modernization and human development. The level of agricultural mechanization has a significant positive impact on the cost, output value, income and return rate of all types of crops.

Evidence from Hubei Province from China, for example, show that for every 1% increase in the level of mechanization, the yields of all crops, grain crops and cash crops increase by 1.2, 1.6 and 0.44%, respectively. 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. Mechanization is essential to agricultural development and it links agriculture to industrialization. It is therefore fundamental that mechanization be a part of a country's agricultural transformation agenda rather than a stand-alone activity (FAO and UNIDO, 2010; FARA, 2014). The potential role of agriculture in Africa is similar to the role it played in the economic transformation and industrialization of economies in Asia (FAO, 2015). For agriculture-based economies in Africa, its role becomes even more important. Furthermore, if agriculture is linked to manufacturing through mechanization across the value chain, it can lead to the economic transformation of many countries in Africa (AfDB, 2016; ACET, 2017). Industrialization can drive development and alleviate unemployment and poverty by providing decent jobs for large numbers of workers, reduces dependence on imports, saves foreign exchange; and facilitates the supply of parts and services.

However, African agriculture presents several paradoxes. The average age of a farmer in the youngest continent is 60 years. The youths hate the drudgery and poverty associated with farming; they do not hate farming. It sounds awkward, that 80% of the food is produced by smallholders, yet the poorest are

from the very smallholder producers! These hard working and resource rich smallholder's give-away their sweat to middlemen traders in inequitable trading systems, and pass-over the value-addition benefits to middlemen for lack of mechanization along the value chain. In depth strategic analysis, conversations, knowledge and information sharing needs to be undertaken to demystify the presumed paradoxes unique to the continent, to remove the risks and exploit the opportunities using, among other avenues, the AfricaMechanize Platform.

Nonetheless, under the African Union's CAADP/Malabo Declaration which will be ending by 2025, the aspiration to retire the hand hoe to the museum, and the F-SAMA sets the necessary and robust framework to harness the power of mechanization for sustainable development of agriculture in Africa.

AU member states explicitly committed themselves to making investments in 'suitable, reliable, and affordable mechanization and energy supplies' in order to double productivity by 2025. In spite of this commitment, however, only a few countries have actually included mechanization in their National Agriculture Investment Plans (NAIPs). This for sure is a worrying trend and we must now get to our feet and collectively activate this commitment in operationalizing the F-SAMA. Currently, Africa is the continent with the least mechanized agricultural system in the world with 50-85% of farm work continues to depend entirely on human power without the support of draft animals or machinery. Only 10% of total power for land preparation in sub-Saharan Africa comes from engine-powered machines, usually using fossil fuels.

Availability of machinery and implements, equipment, spare parts and other supplies is essential for successful & sustainable adoption and utilization of agricultural mechanization inputs. Agricultural mechanization includes the development of local industries that produce machinery and implements.

The development of supply chains and services should be an integral part of the agricultural mechanization process to ensure a better choice of equipment for particular types of users and uses and to guarantee the availability of spare parts and technical services.

1 Revamping Manufacturing of Agricultural Machinery in Africa

The Featured Issue covers the information presented at Webinar 12 of the AfricaMechanize Webinar Series, jointly organized by the Food and Agriculture Organization of the United Nations (FAO), the African Union Commission (AUC), and the African Conservation Tillage Network (ACT) under the Framework for Sustainable Agricultural Mechanization in Africa (F-SAMA).

The Theme of the Webinar was Revamping Manufacturing of Agricultural Machinery in Africa. An introductory presentation was made by Prof Geoffrey Mrema, to provide participants with the background to F-SAMA, explain the objectives of Webinar 12, and place the session within the broader strategy for operationalizing sustainable agricultural mechanization across Africa.

The presentation, available at <https://africamechanize.org/webinars/presentations/4/download>, explains that the F-SAMA was endorsed by the African Union's Specialized Technical Committee in 2017 and officially launched by the AUC and FAO in Rome on 5 October 2018. F-SAMA serves as Africa's continental roadmap for integrating mechanization into agricultural development, supporting both the Malabo Declaration and the African Union Agenda 2063. The framework identifies ten priority elements that guide countries in developing national agricultural mechanization strategies aimed at increasing productivity, improving food security, and promoting sustainable agricultural transformation. The AUC, with technical support from FAO and in collaboration with ACT Network, is coordinating efforts to operationalize the framework through broad stakeholder engagement.

To support implementation, the AfricaMechanize Webinar Series was launched in November 2020 as a platform for dialogue among Directors and Heads of Agricultural Mechanization and Engineering Services (HAMES), policymakers, researchers, private sector organizations, manufacturers, development partners, and other stakeholders. By the time of Webinar 12, the series had successfully conducted 11 webinars, attracting more than 1,760 participants from 75 countries, demonstrating strong international interest in advancing sustainable agricultural mechanization in Africa.

The presentation outlines the 2024 webinar programme, which addresses several of F-SAMA's priority elements. Webinar 12 focuses on Element 3: Revamping Manufacturing of Agricultural Machinery and Implements in Africa, featuring keynote presentations by UNIDO and contributions from the Agricultural Machinery Manufacturers' Association of India (AMMA), the European Agricultural Machinery Association (CEMA), and the Research Centre for Agricultural Mechanization Development of China.

The principal objective of Webinar 12 is to initiate strategic collaboration between African countries and agricultural machinery manufacturing associations from other regions of the world. Specifically, the webinar seeks to facilitate dialogue on strengthening manufacturing capacity, technology transfer, and industrial partnerships in support of F-SAMA Element 3, which focuses on building sustainable systems for the manufacture and distribution of agricultural mechanization inputs. Expected outputs include information sheets summarizing key technical and policy issues, an action plan identifying priority interventions and pathways for cooperation agreements, and a comprehensive proceedings report to guide future implementation efforts. Overall, the presentation positions Webinar 12 as an important step toward strengthening international partnerships, expanding local manufacturing capacity, and accelerating Africa's journey toward sustainable agricultural mechanization.

Summaries of the four contributing presentations to the webinar are presented below.

Overview of Agricultural Machinery Trade and Manufacturing in Africa

**By Niels Schulz, Industrial Development Officer,
UNIDO, Vienna, Austria.**

The presentation, delivered during Africa-Mechanize Virtual Webinar No. 12 on 13 June 2024, provides an overview of agricultural machinery manufacturing and trade in Africa from the perspective of the United Nations Industrial Development Organization (UNIDO). Organized under the F-SAMA by FAO, the African Union Commission (AUC), and the African Conservation Tillage Network (ACT), the presentation examines how industrial development can strengthen Africa's agricultural mechanization and agribusiness sectors.

The presentation begins by introducing UNIDO's mandate to promote inclusive and sustainable industrial development across its 172 Member States through technical cooperation, investment promotion, technology transfer, and industrial partnerships. It emphasizes that industrialization is fundamental to achieving the Sustainable Development Goals (SDGs), particularly through sustainable supply chains, climate-friendly production systems, reduced post-harvest losses, and stronger agribusiness value chains.

UNIDO's work in Africa focuses on developing competitive agribusinesses through value chain development, agro-industrial parks, food safety systems, agro-processing enterprises, innovation, climate resilience, and sustainable supplier networks. The organization promotes partnerships with institutions such as FAO and WFP while supporting small and medium enterprises (SMEs), capacity building, technology deployment, and innovative business models for agricultural mechanization. Its integrated approach also includes circular economy principles, restoration of degraded lands, climate education, improved market access, and value addition to agricultural products.

A key message of the presentation is that mechanization is rapidly evolving beyond simply replacing human

labour. Future mechanization should integrate precision agriculture, regenerative farming, climate-smart technologies, renewable energy, electrification, digital planning, artificial intelligence, and data-driven farm management to increase productivity while minimizing environmental impacts.

The presentation explains the statistical framework used to analyse agricultural machinery manufacturing and trade. UNIDO utilizes internationally recognized industrial classifications (ISIC), while trade statistics are obtained from UN Comtrade and the World Integrated Trade Solution (WITS) databases. Agricultural machinery includes tractors, soil preparation equipment, harvesters, sprayers, milking machines, and other specialized equipment. However, the presentation notes that industrial reporting remains weak, with only 9 of Africa's 54 countries regularly reporting agricultural machinery manufacturing data between 2010 and 2022.

Trade analysis shows that Africa imports approximately US\$2.8 billion worth of agricultural machinery annually—only 2.9% of global agricultural machinery imports, which total about US\$96.7 billion per year. Tractors account for the largest share of African imports (approximately 69%), followed by harvesting equipment and soil preparation machinery. Major importing countries include South Africa, Tanzania, Morocco, Zambia, Kenya, Zimbabwe, Egypt, Nigeria, Ethiopia, and several others (Figure 2), illustrating significant demand but also continued dependence on imported machinery.

Overall, the presentation concludes that expanding Africa's agricultural mechanization requires not only increased machinery imports but also stronger domestic manufacturing capacity, improved industrial data systems, greater investment, regional value chains, technology partnerships, and policies that integrate mechanization with sustainable industrial development. These actions are essential for achieving food security, climate resilience, rural industrialization, and long-term agricultural transformation across the continent.

The PowerPoint presentation is available at: <https://africamechanize.org/webinars/presentations/1/download>

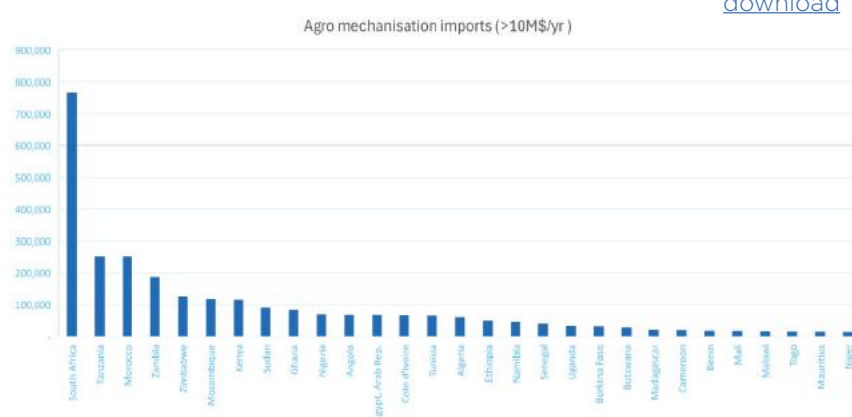


Figure 2. Agromechanization machinery and equipment imports by African countries

Agricultural Machinery Manufacturers' Association (AMMA-India)- Enhancing Africa-India Collaboration on Machinery Manufacturing and Supply:

By Sarbjeet Singh Panesar - General Manager, LandForce & Vice President, AMMA - India.

The presentation by the Agricultural Machinery Manufacturers' Association (AMMA-India) outlines a strategic vision for strengthening collaboration between India and Africa to accelerate agricultural mechanization, improve food security, and promote sustainable agricultural development. AMMA-India, the national association representing 742 agricultural machinery manufacturers, emphasizes its capacity to supply affordable, adaptable, and high-quality machinery for both domestic and international markets, making India a valuable partner in Africa's agricultural transformation.

The presentation highlights that agriculture remains the backbone of most African economies but continues to face low productivity due to limited access to appropriate mechanization technologies. India's experience in developing cost-effective machinery for smallholder farming provides an opportunity to support African countries in modernizing agriculture through technology transfer, knowledge exchange, and industrial

partnerships. Indian manufacturers produce machinery suitable for a wide range of crops—including cereals, pulses, root crops, and cash crops—as well as tractors ranging from 15 HP to over 70 HP, allowing equipment to match diverse farm sizes and production systems.

A major focus of the presentation is the India-Africa Dialogue on Scale Appropriate Farm Mechanization, held on 21 January 2024 in collaboration with ICRISAT. The dialogue brought together representatives from eight African countries alongside machinery manufacturers, importers, research institutions, farmer organizations, and development partners. Its objectives were to identify affordable mechanization solutions, strengthen public-private partnerships, and establish a long-term learning platform for Africa and India on farm mechanization - notably, ACT Network Executive Director Eng. Saidi Mkomwa participated among the international delegates, highlighting ACT's growing leadership in continental mechanization initiatives.

The presentation identifies several barriers to mechanization, including limited availability and affordability of machinery, inadequate financing, weak farmer awareness, insufficient technical skills, and institutional constraints such as land tenure and gender inequities. It proposes solutions including joint venture financing, government incentives, regulatory harmonization, stronger logistics systems, and support from international financial institutions such as the World Bank and African Development Bank.

Embodying a New System

The NEW solution proposes an integrated technology transfer system as a core solution with X Labs serving as the visible nodes to enable the system. It aims to facilitate the exchange of knowledge, skills, and technologies from researchers and development organizations to smallholder farmers by establishing physical X Labs on-the-ground.

X Labs will serve as the local hubs where farmers can access information, training, equipment, inputs and resources to improve their productivity, profitability, and resilience. By establishing a network of interconnected X Labs, farmers can learn from each other's experiences and best practices, access market information, and leverage their collective bargaining power - all enabling wider systemic impact.

The creation of a technology transfer system with X Labs as the visible nodes holds the potential to

create a virtuous cycle of innovation, learning, and collaboration that enhances smallholder farmers' livelihoods and contributes to achieving food sovereignty across Africa.



Figure 3. Embodying a new system – Establishing physical X Labs on-the ground.

An innovative feature of the presentation is the X Lab concept, which proposes local technology-transfer hubs combining equipment access, farmer training, innovation, business incubation, peer learning, and partnerships. X (illustrated in Figure 3) Labs are envisioned as integrated centres that enable smallholder farmers to adopt regenerative agriculture technologies while strengthening local innovation ecosystems and knowledge exchange.

The presentation concludes that enhanced Africa-India collaboration offers significant opportunities for economic growth, technology transfer, industrial

development, increased agricultural productivity, food security, and sustainable development. AMMA-India proposes deeper public-private partnerships, localized machinery manufacturing, equipment adapted to African farming systems, and structured farmer training programmes as practical pathways to achieving large-scale agricultural transformation across the continent.

The PowerPoint presentation is available at: <https://africamechanize.org/webinars/presentations/2/download>

Introduction on Alternative Fuels for Agricultural Machinery – European Agricultural Machinery Association (CEMA)

By Jelte Wiersma, Secretary General, CEMA aisbl, Brussels, Belgium.

The presentation, delivered during the Africa-Mechanize Webinar under the F-SAMA on 13 June 2024, introduces the European Agricultural Machinery Association (CEMA) and explores how Europe can contribute to Africa's agricultural mechanization and sustainable energy transition. It emphasizes that agricultural mechanization should increasingly integrate alternative fuels, digital technologies, and climate-smart innovations to support sustainable agricultural transformation.

CEMA, established in 1959, represents Europe's agricultural machinery industry and serves as the umbrella organization for manufacturers producing more than 450 different types of agricultural machinery (Figure 4). Europe is presented as the world's largest exporter of agricultural machinery by value and the single largest supplier of agricultural machinery to Africa. Beyond representing manufacturers, CEMA provides advocacy, technical expertise, statistical exchange, product coordination, research collaboration, and international partnerships that strengthen the competitiveness of the agricultural machinery sector.

The presentation highlights CEMA's extensive international engagement through strategic partnerships with the Food and Agriculture Organization (FAO), Agrievolution, and the



Figure 4. What is CEMA?H

Association of Equipment Manufacturers (AEM). It also plays an active role in European Union research programmes that promote innovation in agricultural robotics, digital agriculture, smart farming, carbon farming, renewable energy, and alternative fuels. Manufacturers participating in these research initiatives gain access to the latest scientific developments while contributing to Europe's agricultural innovation agenda.

A central message is the urgent need to accelerate agricultural mechanization across Sub-Saharan Africa. The presentation notes that approximately 65% of farm power still comes from manual labour, 20% from animal traction, and only 10% from mechanized power. These low mechanization levels contribute to poor agricultural productivity, with 281 million people experiencing hunger and nearly one billion people lacking access to adequate diets. The presentation argues that improving access to appropriate agricultural machinery is essential for increasing food production, reducing labour drudgery, and enhancing rural livelihoods.

The presentation compares Africa's mechanization trajectory with other regions of the world. While the United States, Western Europe, Asia, Latin America, and the Near East experienced rapid growth in tractor ownership and mechanized agriculture over recent decades, Sub-Saharan Africa has largely stagnated. Tractor numbers increased only modestly before declining after 1990, leaving Africa far behind countries such as India, China, Brazil, and Thailand, despite having more tractors than many of these countries in the early 1960s. The presentation attributes this divergence to insufficient investment, limited policy support, and slow technological adoption.

The presentation concludes by proposing stronger collaboration between FAO and CEMA to support agricultural mechanization projects across Africa. Priority actions include training young people to operate and maintain agricultural machinery, promoting improved farming practices, and integrating modern technologies and alternative fuels into African farming systems. Despite acknowledging that political instability has delayed some initiatives, the presentation calls for renewed partnerships to advance mechanization, strengthen food security, and contribute to ending hunger across the continent.

The PowerPoint presentation is available at:

<https://africamechanize.org/webinars/presentations/3/download>

China's Agricultural Mechanization and International Cooperation: by Prof. Minli Yang, Director of the China Research Center for Agricultural Mechanization Development at China Agricultural University,

during Webinar 12 on Revamping Manufacturing of Agricultural Machinery in Africa held on 13 June 2024. It presents China's experience in developing sustainable agricultural mechanization and explores opportunities for international cooperation, particularly with Africa, to strengthen agricultural productivity, food security, and rural transformation.

The presentation begins by emphasizing the central role of smallholder farmers in global agriculture. Referring to the 2023 FAO Global Conference on Sustainable Agricultural Mechanization (GAMC), it highlights that mechanization is a key driver of efficient, inclusive, resilient, and environmentally sustainable agri-food systems. The presentation notes that small family farms account for more than 84% of the world's farms while producing approximately 36% of global food, demonstrating why mechanization strategies must prioritize smallholders, women, and vulnerable farming communities.

China's own agricultural structure is presented as a useful example. More than 98% of agricultural business entities are small farmers, with approximately 230 million farming households averaging just 0.52 hectares each. Smallholders account for 90% of agricultural workers, while nearly 48% of agricultural workers are women. These characteristics have shaped China's mechanization policies, which focus on enabling small-scale farmers to benefit from modern technologies despite fragmented landholdings. The presentation credits agricultural mechanization with supporting China's remarkable achievements in poverty reduction, rapid urbanization, and sustained grain production exceeding 650 million tonnes for nine consecutive years.

The presentation explains that China's mechanization strategy has evolved from traditional farming systems to mechanized agriculture, and increasingly toward intelligent and digital agriculture supported by smart machinery, digital management platforms, and precision technologies (Figure 5). Sustainable mechanization is portrayed as balancing productivity, economic efficiency, environmental protection, and ecological sustainability through optimized input use and improved resource efficiency. By 2022, China's comprehensive mechanization rate for tillage, planting, and harvesting had reached 73%, while wheat, rice, and maize production had become fully mechanized. Farmers are supported through field demonstrations, technical training programmes, mobile applications, and digital advisory services that facilitate technology adoption.

Digital transformation is presented as a major innovation. The National Agricultural Machinery Big Data System Platform (Figure 6) integrates data from more than 1.79 million agricultural machines, manages

Overview of sustainable agricultural mechanization in China

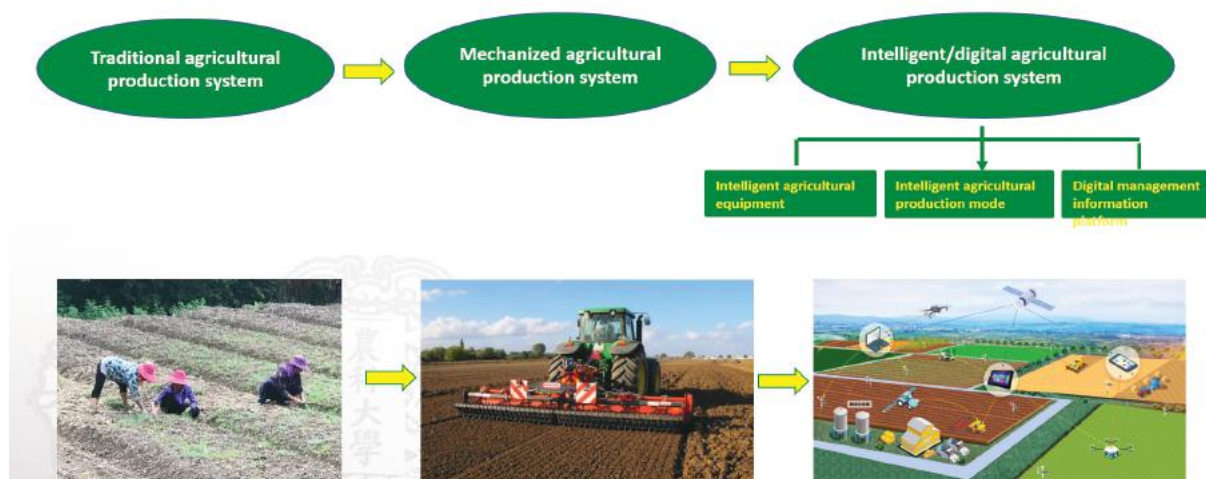


Figure 5. Overview of sustainable agricultural mechanization in China

National Agricultural Machinery Big Data System Platform

National Agricultural Machinery Big Data System Platform organized and developed by team of CAU and Golden Datian Technology Co., Ltd. has comprehensively improved agricultural production and management efficiency, guaranteed food security.



Figure 6. China National Agricultural Machinery Big Data System Platform

approximately 470 billion data records, and monitors operations covering over 187 million hectares across 28 provinces. The platform supports real-time monitoring, operational efficiency, and national food security planning through advanced digital technologies and satellite-based systems.

The presentation further explains that China's success rests on a comprehensive enabling ecosystem comprising supportive laws and policies, coordinated government institutions, strong scientific research and innovation systems, a large agricultural machinery manufacturing industry, technology extension services, and well-developed machinery hire services. By 2022, China had more than 8,000 agricultural machinery enterprises, producing over 4,000 types of machinery that satisfy approximately 90% of domestic market demand, supported by government subsidy programmes for machinery purchases.

Overall, the presentation concludes that China's experience demonstrates how integrated policies, manufacturing capacity, digital innovation, farmer training, and service delivery systems can successfully modernize agriculture while supporting millions of smallholder farmers. It proposes that these experiences provide valuable lessons for strengthening Africa-China cooperation under the Framework for Sustainable Agricultural Mechanization in Africa (F-SAMA), particularly in manufacturing, technology transfer, capacity development, and digital agricultural transformation.

The PowerPoint presentation is available at: <https://africamechanize.org/webinars/presentations/5/download>

2 Globally Featured Issue

Empowering Women Farmers, A mechanization catalogue for practitioners

A synopsis of a FAO publication by Justice, S., Flores Rojas, M., Basnyat, M. 2022.

Rural women across the world work along agri-food value chains performing numerous agricultural operations. Their work is increasingly affected by land degradation, climate change impacts, and out-migration. It is often unrecognized, unqualified, and unpaid. Moreover, the traditional division of labour often relegates women to manual, time-consuming operations with high degrees of drudgery. The combination of family responsibilities and insufficient access to critical services, information, and technologies, affects women's work burden and their potential for income generation. For example, fewer rights over land make it more difficult for women to access subsidies, finance, or mechanization.

These underlying reasons that limit women's access to mechanization are embedded in the social norms that govern behaviour and drive inequality. These norms are often quoted by both men and women and perpetuated over generations: they focus on the concept that mechanization is for men; that women should spend their time on housework and childcare instead of using technology; that "women should not make money", to name a few. Adopting gender-transformative approaches that challenge these norms through dialogue and awareness-raising campaigns is, therefore, as important as promoting policies and strategies supporting agricultural mechanization service providers. These service providers can be women or men, who create income and jobs from hiring mechanization services. Introducing equipment and machinery that respond to women's needs and sensitize service providers to reach out to women farmers is particularly important in a context where male migration often leaves rural women to take over the entire management of farms.

There are three ways in which sustainable mechanization can empower women and respond to their needs: as **customers** of mechanization service providers - reducing their drudgery, and freeing up time for resting or opting for other social or economic

activities; as **operators** of machinery and equipment or **staff** of a mechanization hiring services business offering their service to others to earn an income; and as **entrepreneurs** managing their own mechanization hiring services agribusiness - providing a service for other farmers and generating revenue.

The goal of this publication/catalogue is to promote and support women's access to sustainable agricultural mechanization as operators and/or managers. It lists and provides information on market-tested machinery and equipment for crop production and post-harvest operations. This catalogue highlights the potential for smallholder farmers, including women, to earn an income via mechanization hire service. The information for each machine or equipment includes: its function, its main features, what it is suitable for, its technical specifications (key features only), where to buy and its pictures.

The target audience includes extensionists, gender experts, agricultural engineers, government officials, donors, micro-finance institutions, and implementing partners seeking to: promote inclusive agricultural mechanization interventions; reduce women's drudgery and improve the efficiency of tasks they perform; address gender issues in agriculture; and support economic opportunities for women as entrepreneurs.

Read more or **download** the publication on <https://doi.org/10.4060/cb8681en>



Farm Equipment Rental Market Analysis and Forecast 2022-2032

Authored by Acumen Research and Consulting

Farm Equipment Rental Market Size valued at USD 52.7 Billion in 2022 is on a trajectory to exceed USD 104.1 Billion by 2032, signalling a robust compound annual growth rate (CAGR) of 7.2%. The market has grown significantly in recent years, driven by a variety of factors including increased adoption of precision farming techniques, rising operational costs for farmers, and a desire to have access to the latest and most advanced agricultural machinery without having to own it. This market trend is especially noticeable in areas with a large number of small and medium-sized farms, where farmers may find it more cost-effective to rent equipment on a temporary basis rather than invest in costly machinery. The agricultural equipment rental industry is also benefiting from increased knowledge and attention on sustainable farming techniques, since rental services enable farmers to acquire specialized equipment for specific jobs, hence increasing efficiency and reducing environmental impact.

Furthermore, technological improvements, such as the integration of telematics and digital solutions in agricultural equipment, have made it easier to monitor and control rental machinery, improving overall operating efficiency. The farm equipment rental industry is likely to develop further as farmers seek flexible and cost-effective options to suit their changing agricultural demands while reducing the financial risks associated with equipment ownership. As the sector advances, cooperation between equipment manufacturers, rental service providers, and technology firms are anticipated to play an important role in creating the future landscape of the agricultural equipment rental market.

The farm equipment rental industry is expanding rapidly, owing to farmers' increasing use of rental options as cost-effective and flexible alternatives to traditional ownership. This trend is especially noticeable in areas with a large number of small and medium-sized farms, where farmers are rapidly





realizing the financial benefits of renting agricultural equipment. The need to reduce initial capital expenditures, avoid the financial risks associated with equipment ownership, and obtain access to a varied selection of specialized machinery for various farming needs is driving the trend toward rental services.

The farm equipment rental business is benefiting from agriculture's modernization, with technological improvements playing a key role. The integration of telematics, precision farming instruments, and digital platforms improves the efficiency and administration of rental equipment, which contributes to increased farm output. Furthermore, the emphasis on sustainable and ecologically friendly agricultural techniques encourages farmers to choose rental solutions, which aligns with the industry's emphasis on resource efficiency and decreased environmental effect. As the agriculture sector evolves, the farm equipment rental market is expected to increase steadily, driven by the desire for creative, cost-effective solutions and the increasing integration of new technology into agricultural processes.

Driven by the introduction of various and specialized rental equipment, creating a considerable opportunity for market development, agriculture is becoming more specialized and technologically advanced, forcing farmers to look for customized solutions for specific activities and crops. The availability of a

diverse variety of specialist rental equipment, such as precision planters, harvesters, and implements built for specific purposes, enables farmers to improve their operations without incurring the financial burden of acquiring specialized machinery. This tendency is especially noticeable in areas where agricultural techniques differ and farmers confront variable meteorological and soil conditions. The adaptability provided by specialized rental equipment allows farmers to respond to changing needs, seasonal demands, and evolving agricultural trends. Furthermore, advances in equipment design and technology help to produce unique rental solutions, which improve the overall efficiency of farming operations.

As the agricultural environment evolves, the farm equipment rental industry is prepared to capitalize on the need for diversified and specialized equipment, giving farmers with the resources they need to manage their specific problems and enhance output. This expansion reflects not just farmers' cost-consciousness, but also a global movement toward more sustainable and efficient farming techniques. In North America, notably in the United States and Canada, the agricultural equipment leasing sector is well-established and expanding. Large-scale commercial farms and a heavy emphasis on precision agriculture drive demand for technologically advanced rental equipment. The move towards sustainable agricultural techniques, along with the necessity for cost-effective solutions, makes equipment leasing an appealing alternative for farmers in the region. Farm equipment leasing services are increasingly popular in European countries, particularly in Western Europe. This is being pushed by the frequency of smaller farms, high machinery prices, and a rising understanding of the advantages of shared machinery usage. Government regulations supporting sustainable agriculture and environmental protection help to promote the farm equipment leasing business in Europe.

The farm equipment rental business in Asia-Pacific is impacted by the country's agricultural variety. Countries such as India, China, and Southeast Asia have a mix of smallholder and large-scale farming activities. Agriculture's rising automation, combined with initiatives to enhance agricultural production, is boosting the region's equipment rental sector.

Read more on <https://www.acumenresearchandconsulting.com/press-releases/farm-equipment-rental-market>

Agricultural Robots Industry: Innovating Solutions for the Challenges of Modern Farming

Authored and published by Krishak Jagat Agriculture Newspaper



Agriculture Robots Market is rapidly expanding, driven by a diverse range of applications and types that are revolutionizing farming practices. These applications include agricultural inventory management, weather tracking and forecasting, pruning management, spraying, irrigation management, dairy farm management, field mapping, harvesting management, and soil management. Various types of agriculture robots cater to these applications, such as spraying robots, automated harvesting systems, milking robots, drones or unmanned aerial vehicles (UAVs), and driverless tractors. Each of these robotic systems plays a crucial role in enhancing efficiency, precision, and productivity in agriculture, addressing the industry's pressing challenges and paving the way for a more sustainable and technologically advanced future.

Agriculture robots are spearheading a quiet revolution in the heart of fields and orchards. These cutting-edge machines are transforming traditional farming practices while tackling critical issues like labour shortages, climate change, and the imperative for

sustainable agriculture. The integration of robotics into farming exemplifies human ingenuity and our relentless quest for efficiency and innovation. As these machines continue to advance, they are poised to reshape the agricultural landscape, enhancing productivity and promoting sustainability.

Historically, agriculture has evolved through various technological advancements, from the invention of the plough to the development of modern irrigation systems. Today, the agricultural sector stands on the brink of another significant transformation with the advent of robotics. Several factors are driving this change, including the rising global population, the increasing demand for food, and the declining availability of farm labour. Robots offer a solution to these challenges by performing tasks with greater precision and efficiency than human labour. This shift towards automation is not just about replacing human workers but about enhancing productivity and ensuring the sustainability of agricultural practices in the long run.

From planting to harvesting, various types of robots are now performing tasks once done by human hands. Autonomous tractors and drones are revolutionizing field management, allowing farmers to cover large areas quickly and efficiently. These machines can plant seeds, apply fertilizers, and monitor crop health with unparalleled precision. Harvesting robots are another significant development, capable of picking fruits and vegetables with the delicacy required to avoid damage. Weeding and planting robots are designed to identify and remove weeds, ensuring that crops receive the nutrients they need to thrive. Monitoring and maintenance robots use advanced sensors and AI to keep track of plant health, soil conditions, and pest activity, providing farmers with real-time data to make informed decisions.

The deployment of robots in agriculture offers numerous advantages, transforming traditional farming practices. One of the most significant benefits is increased productivity and efficiency. Robots can work around the clock, unaffected by fatigue or



adverse weather conditions, leading to higher yields. Their precision in tasks such as planting and spraying ensures optimal use of resources, reducing waste and improving crop quality. Additionally, the use of robots reduces labour costs and the reliance on seasonal workers, which can be scarce and expensive. This is particularly beneficial in regions where labour shortages are a chronic issue. Furthermore, robots enhance sustainability by minimizing the use of chemicals and reducing the environmental footprint of farming. By enabling more precise application of fertilizers and pesticides, robots help in maintaining soil health and reducing water contamination.

Despite their potential, agriculture robots face several challenges that must be addressed to ensure their widespread adoption. One of the primary obstacles is the high initial cost and investment required to acquire and maintain these machines. Small-scale farmers, in particular, may find it difficult to afford such technology. Technical complexities and the need for regular maintenance also pose significant challenges. Robots must be reliable and durable to operate effectively in the harsh conditions often found in agriculture. Additionally, integrating these robots with existing farming practices and systems can be complex and require substantial changes. Ethical considerations and the potential impact on the labour market are other important factors to consider. The displacement of human workers and the need for new skill sets for managing and maintaining robots are issues that need careful management.

As technology continues to evolve, the future of agriculture robots looks promising, with new advancements on the horizon. Emerging technologies such as AI and machine learning are expected to make robots even more intelligent and capable. These advancements will enable robots to perform more complex tasks, adapt to changing conditions, and make autonomous decisions based on real-time data. The potential impact on global food production is immense, with the ability to increase yields, reduce waste, and improve the overall efficiency of farming practices. Looking ahead, the next decade is likely to see significant developments in agriculture robotics, with more widespread adoption and integration into farming operations worldwide. This evolution will not only enhance productivity but also contribute to the sustainability and resilience of the agricultural sector.

Read More on: <https://www.en.krishakiagat.org/mechanization-technology/agricultural-robots-industry-innovating-solutions-for-the-challenges-of-modern-farming/>

3 Country Focus Issues

Government Extends VAT Relief for Agriculture, Pours Millions into Irrigation Projects

Authored and published by The Zimbabwe Mail

The Zimbabwean government has reaffirmed its commitment to boosting agriculture by maintaining the suspension of a 15% Value Added Tax (VAT) on agricultural inputs, implements, and produce. This policy, announced at the Zimbabwe Irrigation Investment Conference, is part of a broader strategy to attract investment in vital irrigation infrastructure across the country.

Finance Minister Professor Mthuli Ncube emphasized the government's focus on agricultural growth, particularly in the face of climate change. He highlighted the importance of these tax breaks in helping farmers weather climate challenges and expand their irrigation capabilities. The VAT suspension applies to a wide range of agricultural equipment, including tractors, tillage machinery, combine harvesters, and irrigation systems like centre pivots, sprinklers, and pumps. This move aims to stimulate investment in irrigation infrastructure, a crucial factor in boosting productivity and resilience against Zimbabwe's ever-changing climate.

Stakeholders in the farming sector have applauded the government's decision. Industry leaders like Gary Grubb of Western Pivots Zimbabwe and representatives from farming unions expressed optimism about the potential impact of these incentives. They believe the VAT removal will not only attract new irrigation projects but also contribute to the long-term viability and growth of Zimbabwe's agricultural sector. Further demonstrating its commitment, the Treasury has allocated over ZWG\$88 million this year to support irrigation initiatives. These funds will be directed towards projects like irrigation system rehabilitation, dam construction, farm mechanization, and technological advancements. This financial commitment underscores the government's proactive approach towards promoting sustainable agricultural development and ensuring food security for Zimbabwe.

The suspension of VAT on agricultural equipment and inputs marks a significant policy shift aimed at fostering agricultural expansion and resilience. By incentivizing investment in irrigation and supporting farm mechanization, the government seeks to enhance agricultural productivity, mitigate climate risks, and ensure the long-term sustainability of this vital sector. [Read more.](#)



Investment Potentials in Sustainable Agricultural Mechanization in Benin

Authored by Justin EDAH & Marius S. AïNA, Directorate of Planning, Finance and Administration, 882 Cotonou, Rép. du Bénin

Despite a good agricultural land potential of 6.6 million hectares, Benin cultivates only 20% of it each year. Agriculture contributes 28.1% of GDP. Economic growth has improved in recent years, going from 4.0% in 2016 to 6.7% in 2018. This acceleration in economic growth is attributable to the good production of cotton, the vitality of the construction and construction sectors and the agro-industry and the dynamism of the autonomous port of Cotonou. The unemployment rate is relatively low (2.3% on average in 2015) and it is more of an urban phenomenon than a rural one. Benin's trade balance is in deficit due to the importation of food products (30% of imports). Accessibility is handicapped by the road infrastructure. Thus, access to the villages from the main road is provided by several types of roads (21.2% of the villages are accessible by paved roads; 60.0% by motorable tracks; 14.7% by tracks not passable; 2.3% by paths and 1.7% by river). About 33.2% of the villages are accessible in all seasons by road in good condition. Electrification affects an average of 37.3%, including 17.5% in rural areas and 57.8% in urban areas. Irrigation concerns 24,230 ha or only 6.4% of the irrigable area and 1.2% of the cultivated area. Therefore, the needs and margins of progress are enormous and indicate significant investment opportunities.

In addition, since 2017 Benin has experienced a reform of the agricultural sector by dividing the country into Agricultural Development Poles (PDA) with their head of the Territorial Agricultural Development Agencies (ATDA). The essential objective of this reform is to ensure a better combination of the sector approach and the territorial approach. Currently, 96.7% of farms are in crop production and 2.6% in animal production. In 2013, the main crops grown were maize (62.7% of farms), cotton (7.8%), yam (5.8%), cassava (5.3%), sorghum/millet/fonio (5.1%) and rice (1.5) and fresh vegetables (1%). Yields of the main crops are higher than the African average, but lower than that of South East Asia, except for maize where it is lower than that of Africa.

Farms in Benin are characterized by a low rate of use of fertilizers (30% of plots, 2014 figures) and phytosanitary products (16.4%). Family labour is the main form of work encountered. Other forms of labour are increasingly rare, which is pushing for the adoption of more advanced mechanization. Because when the cash crops are important (> 2ha) manual labour does

not allow ploughing and sowing at an optimal date, hence the use of oxen traction or motorization. But cattle traction is declining due to the new education reform which makes school compulsory for children under 14 (drivers of the team) and because of the difficulty of driving the animals and the exodus of young people to the big cities or to Nigeria. On the economic side, the main crops generate significant added value: 602,000 FCFA/ha for rice; 286,000 FCFA/ha for soy; 176,000 FCFA/ha for maize and 86,500 FCFA/ha for cotton.

Most agricultural work is done manually (87.8% of farms), while animal traction (6.9%) and motorization (0.6%) are used only for tillage and transport. With the exception of the southern zones, tillage is carried out during a short period of the year (May and July). This limits the number of hours of use per year (currently 100 to 530 h/year) and therefore offers few opportunities for profitability of motorized equipment. With regard to animal production, apart from state farms and modern private farms, it is poorly equipped with equipment for preparing livestock feed, milking cows, storing and processing milk.

At the request of the Government of Benin, FAO developed in 2020 a new national strategy for agricultural mechanization (SNMA) which draws lessons from the achievements and failures of past experiences (SNMA of 2005, PPMA-B) and recent political orientations, namely the creation of an autonomous body dedicated to AM (National Agency for Agricultural Mechanization, ANaMA) and the organization of decentralized structures of Agriculture into five Agricultural Development Poles (PDA) and the creation at the head of each pole, a public establishment, called the "Territorial Agricultural Development Agency (ATDA)". The main objective of this reform is the search for efficiency through a better combination of the sector/chain approach and the territorial approach. The strategy thus developed is currently being operationalized. It revolves around two axes of intervention: the **improvement of accessibility to mechanization** and the **rational use of equipment and the introduction of new adapted production techniques**.

SARO brings mechanisation to emerging- and small-scale farmers

Published by ProAgri, Zambia



The SARO team from the Kabwe Branch conducted a highly successful farm mechanisation demonstration at Kafinda village in Kapiri. This event, funded by the European Union, was part of our ongoing commitment to empower emerging and small-scale farmers with modern agricultural tools and techniques.

Farmers from Kafinda and the neighbouring Mukonchi village attended the event in large numbers, eager to witness first-hand the transformative potential of mechanization. The centrepiece of the demonstration was the versatile Two Wheel Tractor, which captivated the audience with its various attachments. Among these, the Soybean Reaper, Boom Sprayer, and Rippers stood out, showcasing their ability to significantly enhance farming efficiency and productivity. The adaptability and ease of use of these attachments left a lasting impression on the farmers, many of whom expressed keen interest in integrating such equipment into their agricultural practices.

In addition to the Two Wheel Tractor, the demonstration also highlighted the crucial role of water pumps in mitigating the impacts of drought. By ensuring a reliable water supply for irrigation, these pumps can help farmers maintain crop yields even during periods of water scarcity. The demonstration of the Push Planter underscored the importance of precision planting in maximizing crop output, while the Petrol-Powered Mini Hammer Mill illustrated how small-scale farmers could process their own grain, adding value to their produce and increasing their profitability.

The success of this event underscores SARO's dedication to enhancing the livelihoods of small-scale farmers through innovative solutions. By providing access to affordable and efficient mechanization tools, we aim to foster sustainable agricultural practices that can withstand the challenges of climate change and improve food security. The enthusiastic response from the farmers at Kafinda village reaffirms our belief in the transformative power of mechanization and encourages us to continue our efforts in collaboration with partners like the European Union.

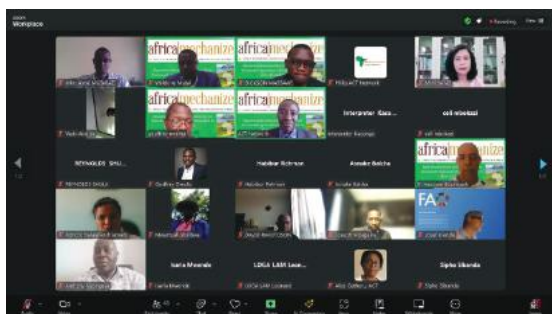
SARO Agro Industrial Ltd, a Zambian owned company, is part of the SARO group of companies that commenced operations in 1987 with SARO Agri Equipment Ltd. The focus then was on the import and distribution of Agricultural Equipment for the Small-Scale Farming and Crop Processing sector and on pumps, Electric motors and Irrigation equipment. Over the time, the product range was expanded to meet the requirements of the commercial and Emerging Farming sector and the Water Utility/ Municipal sector.

Read more on <https://proagri.co.za/saro-brings-mechanisation-to-emerging-and-small-scale-farmers/>



4 Recent & Upcoming Events

The AfricaMechanize F-SAMA Webinar Series 2024



The African Union Commission (AUC) and the Food and Agriculture Organization of the United Nations (FAO), through an Africa- wide consultative process, developed the **Framework for Sustainable Agricultural Mechanization in Africa (F-SAMA)** in response to the request of the African Union Specialized Technical Committee (STC) on Agriculture, Rural Development, Water and Environment. The framework was subsequently launched in Rome on 5th October 2018 and has ten priority elements geared towards informing policy and decision-makers in the Member States, the Regional Economic Communities (RECs) in Africa, and the wider development community dealing with agricultural development on the significance of mainstreaming SAM in their overall national and regional agricultural development programmes.

As part of operationalization of this framework, AfricaMechanize www.africamechanize.org has been established as a SAM platform geared towards enhancing knowledge management, information sharing, networking, and partnerships in Africa. Through the platform, since November 2020 to date, twelve webinars have been conducted with Directors of Agricultural Mechanization and Engineering Services [DAMES] and other key stakeholders and practitioners of SAM in Africa on the ten priority elements of F-SAMA and operationalizing the framework in Africa.

To continue with the momentum, AfricaMechanize Webinar Organizing Committee organized two webinars on 22nd and 23rd July 2024 as part of the 9WCCA plenary sessions as follows:

Webinar No.	Title	Scheduled Date
Webinar 13	Discussions on Element 6: The Role of Sustainable Agricultural Mechanization in Scaling up the Adoption of Conservation Agriculture by Smallholder Farmers in Africa. Panel discussion at the 9WCCA introduced by FAO & ACT. Panellists: AUC, ACT, CIMMYT, DAMES committee, FAO, and World Bank.	22 July 2024
Webinar 14	Discussion on Element 7: Scaling CA with SAM in the Context of Gender Equality, Youth and Social Inclusion (GEYSI). Introductory remarks by CIMMYT. Panellists: CIMMYT, ICARDA/INRA, UM6P/AI Moutmir, and ACT network.	23 July 2024

Materials and information on the previous 12 webinar series are available on: <https://www.africamechanize.org/previous-webinars/>

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”, was held in Cape Town, South Africa, 22-25 July 2024. The congress was 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 was 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.

World Without Hunger Conference



Hunger and malnutrition remain among the most vital challenges facing humanity. Achieving the Sustainable Development

Goals (SDGs) requires a well-coordinated effort among all stakeholders.

To deliberate on the gravest challenges of our time, the World Without Hunger Conference planned to take place on **5-7 November 2024 in Addis Ababa, Ethiopia**, is a three-day long event consisting of solution-oriented technical sessions, an investment forum, and a high-level political forum that will result in a Conference Declaration to achieve Zero Hunger.

Over 1,500 high-level stakeholders, including Heads of State/Government, Ministers, UN agencies, the private sector, financial institutions, donor community, DFI/IFI, civil society, non-governmental organizations, academia, and media will be present.

The conference is co-organized by the United Nations Industrial Development Organization (UNIDO), the African Union Commission (AUC), and the Government of Ethiopia, with technical assistance of the Food and Agriculture Organization (FAO).

Please [PRE-REGISTER](#) if you are interested in taking part in World Without Hunger Conference. Once pre-registered, in the next weeks you will be contacted by the registration team for further action.

5 Sustainable agricultural mechanization in Video



[How sustainable agricultural mechanization can help transform our agri-food systems](#)

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To subscribe to the SAM-CoP-L list, send an e-mail to secretariat@africamechanize.org leaving the subject line blank and placing only the one-line message: '**SUBSCRIBE SAM-CoP-L Name Surname**' in the message part without any further text such as an address, etc.