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

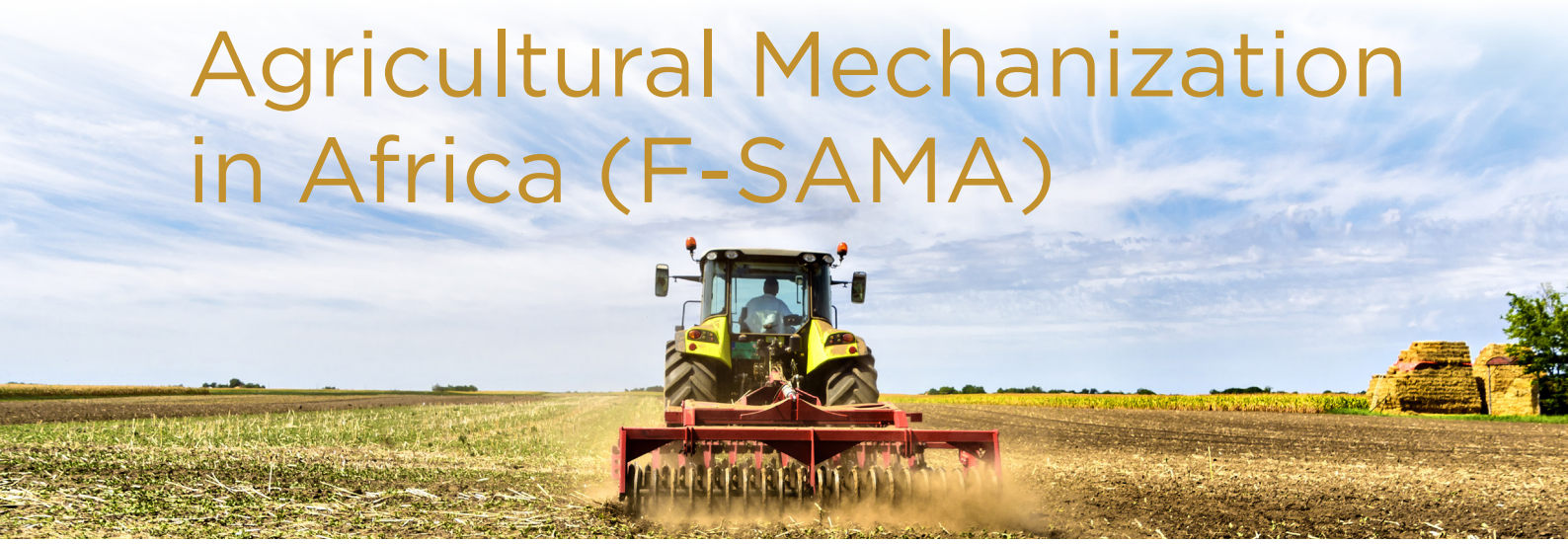
This is the first quarterly newsletter of the AfricaMechanize Platform, with the objective of connecting stakeholders in sustainable agricultural mechanization (SAM), and supporting the joint actions for operationalization of *the Framework for Sustainable Agricultural Mechanization (F-SAMA).*

In this first issue, we introduce the F-SAMA and the activities of partners to operationalise it, under the auspices of the African Union and Food and Agriculture Organization of the United Nations (FAO) and coordinated by the African Conservation Tillage Network (ACT) and other partners to date.

In this issue

The AfricaMechanize platform is a result of the December 2016 Nairobi Conference which was organized by ACT, AUC, FAO, The World Bank, and AGRA among other organizations. This was followed by the launching of the F-SAMA by FAO & AUC in Rome in 2018 and signing of the MoU between ACT and FAO in 2019 with one major activity being initiation of the implementation of the F-SAMA. AfricaMechanize and its Newsletter are products of this process.

1 Operationalization of the Framework for Sustainable Agricultural Mechanization in Africa (F-SAMA)



Sustainable Agricultural Mechanization (SAM) in Africa is an urgent matter and an indispensable pillar for attaining the Zero Hunger vision by 2025, as stated in the *Malabo Declaration of 2014, the Sustainable Development Goals - Goal 2, and the Prosperous Africa We Want of Agenda 2063.* Doubling agricultural productivity and eliminating hunger and malnutrition in Africa by 2025 will not be realized unless mechanization is accorded utmost importance. Understanding this situation, 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 F-SAMA, which was subsequently launched in Rome on 5th October 2018 during the FAO's 26th Session of the Committee on Agriculture (COAG), 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

Mechanization in the twenty-first century must follow some core principles. It must be built **along the entire agricultural value chain**. Must be private-sector driven, **environmentally compatible and climate smart**, and must also **be economically viable and affordable**, especially for small-scale farmers who constitute the bulk of African farmers. It is vital that it **targets women**, who bear the brunt of African agriculture. Finally, mechanization **must target youth**, specifically to **make agriculture more attractive and a choice for employment and entrepreneurship**.

To achieve impact, it is important to move quickly towards mobilizing the necessary support for implementation. In this regard, this report shares updates on some of the activities undertaken this far under the joint activities for operationalization of the F-SAMA by African Union, FAO, ACT Network and partners. The activities include: Retiring the hand-hoe to the museum, Series of 10 continental wide Webinars under the AfricaMechanize platform, Meeting of the Directors of Agricultural Mechanization and Engineering Services (DAMES) and Formation of an Interim Committee, Investment proposals under the FAO-ACT Directions for Investments (D4I) in 10 countries and P-SAMA project documents; the Third Africa Congress on Conservation Agriculture (3ACCA) with the Theme of Conservation Agriculture with SAM.

The operationalization model is based the schematic diagram below:

Read more on the F-SAMA joint Actions progress report at: **"F-SAMA: The Journey, 2018-2022**" and be part of the effort to operationalize F-SAMA.

2 Use of information and communications technology tools for tractor hire services in Africa

Information and communications technology (ICT) have a vital role to play in agricultural mechanization, which has the potential to transform and improve smallholder agriculture in sub-Saharan Africa. Although mechanization levels tend to be low in African countries, there is still evidence of demand for mechanization services from smallholder farmers, especially tractor hire services. Where such demand exists, tractor owners have formed private hiring markets to provide the required services. However, problems arise in these privately controlled markets. The main challenge is related to high transaction costs – incurred by farmers due to information distortion concerning the availability of tractor hire services and how to access them, and by tractor owners due to the difficulties locating farmers in need of their services and aggregating demand over distant, scattered, smallholder farm plots.

The use of ICT tools in tractor hire services may help solve some of these challenges. In recent years, many start-ups and companies have begun applying an ICT approach with the creation of a smart tractor network accessible via Short Message Services (SMS) or mobile phone applications, either directly or indirectly. The paper by FAO on the use of ICT tools for tractor hire services in Africa seeks to identify the benefits and challenges of such approaches by examining three ICT-based models in different African countries (Hello Tractor in Nigeria, Tinga Rentals Store in Kenya and TROTRO Tractor in Ghana). The results in this paper show that the most common ICT technologies adopted across all three models are SMS (where farmers can request services) and global positioning system (GPS) tracking devices (where tractor owners can monitor their tractors). While mobile phone applications exist and are increasing in popularity, most farmers do not use such apps directly; in Nigeria, booking agents help aggregate farmer demand and send requests via mobile apps.

Overall, the use of ICT tools can: improve the functioning of the tractor hire market by aggregating demand from farmers and ensuring better access to services; reduce the idle time of tractors; help tractor owners to monitor their tractors and operators; and reduce discrimination against and cheating of small farmers (thanks to a mobile interface that protects the identity of the farmer). ICT offers great potential for ensuring effective linkage between demand and supply actors. Innovative ICT tools can lower transaction costs for the provision of tractor hire services, thus improving access. ICT tools can be valuable for input distribution, improving targeting efficiency to make service delivery to farmers cost effective. Furthermore, they can help tractor owners better monitor and manage their tractors.

Read More on the paper at: https://www.fao.org/publications/card/en/c/CB2151EN/

3 Global Feature Issue

FAO Global Conference on Sustainable Agricultural Mechanization (GAMC), 27-29 September 2023

The Food and Agriculture Organization of the United Nations (FAO) is organizing the **Global Conference on Sustainable Agricultural Mechanization** (GAMC) under the theme "*Efficiency, Inclusiveness and Resilience*", from 27 to 29 September 2023 as a hybrid virtual/ physical meeting at FAO headquarters in Rome.

The GAMC will provide an opportunity to raise awareness of how sustainable agricultural mechanization can contribute to achieving better production, better nutrition, a better environment and a better life. Discussions will focus on sustainable development: increasing production of nutritious food, generating income while protecting the environment, providing decent jobs and creating social equity.

The GAMC will provide a neutral forum for FAO Members, farmers, extensions, opinion leaders, policymakers, scientists and representatives from academia, civil society, NGOs, and private sector representatives for focused dialogues to prioritize actions and strengthen technical networks for sustainable development of agricultural mechanization.

Alongside the conference, an exhibit titled "Sustainable Agricultural Mechanization: Technological Paths to a Better Future" will be hosted at FAO headquarters from 25 to 29 September. The exhibit will feature over 20 exhibitors showcasing precision-technologies, automation and agricultural robots, illustrating the latest advancements in agricultural mechanization and digitalization. These technologies have the potential to be adapted to the specific context and needs of small-scale farmers in developing countries. In addition, two side events are organized during the conference to cover mechanization aspects related to (i) *Voices of Youth for Sustainable Mechanization & Digitalization,* and (ii) *Using Precision Seeding to optimize Crop Yields*.

FAO Members and all agrifood system stakeholders are welcome to participate.

Note that: Simultaneous interpretation will be available in the six official languages of FAO during plenary sessions.

For further information, please visit the GAMC website.

Paradigm Shifts and the Development of Agricultural Mechanization in Sub Saharan Africa: A Case Study of Farm Power

Author: Prof Geoffrey Mrema, Sokoine University of Agriculture, Morogoro Tanzania, and Member of the AUC-FAO-ACT Steering Committee on the Joint Actions for Operationalization of F-SAMA.

The development of agriculture in Sub Saharan Africa (SSA) using higher levels of farm power has had a chequered history over the seven decades from 1945 to 2015. Agricultural mechanization has been widely (and still is) supported in SSA by farmers, local leaders, policy makers and politicians. It has, however, been a controversial issue in some circles including among external experts and commentators. The mechanization paradigm of the 1950s & 60s did postulate that the provision of farm power, for field operations like land preparation, would be through mechanical technologies like tractors, without necessarily evolving through a transitional stage of using draft animals as had happened in other parts of the world. . The development programs of most countries in SSA in the 1950s & 1960s crafted by the departing colonial authorities with the assistance of major multilateral development agencies like the FAO, World Bank etc., were therefore based on this paradigm.

From mid-1960s, there were, however, concerns raised by several influential experts and organizations on the impact and efficacy of the tractorization paradigm in mechanization programs in developing countries. These included the intermediate technology movement which advocated for a more evolutionary approach through the so called intermediate or appropriate technologies; the International Labour Organization (ILO) whose concern was the effect the use of tractors had on employment of rural labourers and the environmental movement concerned with the impact on the environment. A global expert consultation was convened by FAO and OECD in Rome in February 1975 to resolve the issues involved. The consultation recommended selective or appropriate mechanization, which combines hand tool, animal and mechanically powered agricultural implements and equipment suited to the physical, cultural, economic, and technological environment of the country concerned. It noted specifically the difficulties of introducing draft animal technology to regions in Africa especially those where there was no tradition of animal husbandry.

A new paradigm proposed in 1987, attributed the lack of progress in mechanization in SSA to, *inter alia* the public sector dominated tractorization programs of the 1960s & 70s. A study published by the World Bank in 1987 recommended a shift of assistance from tractors to draft animal power (DAP). There followed then

The ten elements of F-SAMA:

A. UNDER THE COMMERCIAL SUSTAINABILITY PILLAR:

Element 1: Boosting farm power through appropriate technologies and innovative business models.
Element 2: Promoting innovative financing mechanisms for agricultural mechanization.
Element 3: Building sustainable systems for manufacture and distribution of agricultural mechanization inputs.
Element 4: Sustainable mechanization across agri-food value chains
Element 5: Innovative systems for sustainable technology development and transfer.

B. UNDER THE ENVIRONMENTAL SUSTAINABILITY PILLAR:

Element 6: Sustainable transformation of land preparation and crop/animal husbandry practices

C. UNDER SOCIO-ECONOMIC SUSTAINABILITY

Element 7: Social sustainability and the roles of small-scale farmers, women and youth
Element 8: Human resources development and capacity building for SAMA

D. OVERARCHING ELEMENTS FOR SAMA:

Element 9: Need for a long-term vision: Policy and strategy issues.
Element 10: Creating sustainable institutions for regional cooperation and networking.

[from pg.82-83 of FAO & AUC, 2018].

a wave of relatively well funded DAP programs and networks throughout SSA implemented for much of the 1990s. However, by 2005 it became apparent that the DAP programs and networks were not the panacea to the mechanization problem in SSA while tractor imports had significantly declined in all countries. A re-examination of the whole process of agricultural mechanization development then commenced which culminated in the approval, in 2018, of the *Framework for Sustainable Agricultural Mechanization in Africa F-SAMA* with its ten priority elements.

The priority element no. 1 of F-SAMA is therefore***: Boosting farm power through innovative business models.*** The goal is to ubiquitously provide mechanization services including farm power as an input in agricultural production through commercially sustainable enterprises. It is posited that development of the innovative business models and systems through which the enterprises are enabled to offer mechanization services such as primary land preparation for a significant part of the year and across countries and sub regions is the sure way to efficiently and effectively, boost the availability of farm power to all the farming groups be they small, medium, or large scale through environmentally and socio-economically sustainable mechanisms. Highlights of other key issues like size of tractors, impact on the environment, human resources and the institutional framework required for successful implementation of this element of F-SAMA are discussed. The SSA countries need to remain focused on the long-term goal as well as exchange information and experiences through the AfricaMechanize platform if they are to succeed in implementing this element of F-SAMA.

Read the full paper at: https://www.africamechanize.org/resource/discussion-paper-paradigm-shifts-and-the-development-of-agricultural-mechanization

4 Country Focus Issues

Increasing Agricultural Productivity by Accelerating Mechanization in Nigeria: Ongoing Activities and Plans. Green Imperative Project (GIP): A Nigeria - Brazil Bilateral Agricultural Development Project in Nigeria

Author: Engr. Abdullahi G. Abubakar, Director (Mechanization) & Deputy National Project Coordinator (GIP), Federal Ministry of Agriculture & Rural Development, Abuja – Nigeria.

The **More Food International Programme (MFIP)** tagged the 'The Green Imperative Project" was launched by His Excellency, Prof. Yemi Osibanjo, Former Vice President of Nigeria, on the 17th January, 2019 in Abuja. The MFIP aims at strengthening the productive capacity of smallholder farmers in African countries. It was created using the Brazilian Model that seeks to provide support to agrarian development projects; and to increase family farming production in participating countries. In Nigeria, the MFIP will enhance Agricultural Mechanization, Specialized Extension Services and Agro-Processing in the 774 Local Government Authorities (LGAs) including the six (6) Area Councils in the Federal Capital Territory (FCT).

The objectives of this project are to further develop the Agriculture based on a sustainable private business model, through a food value chain approach, involving a full technology package transfer that will cover all stages, from agricultural production to agro-industrial processing and marketing. This landmark project is contributing towards driving the Agricultural sector of Nigeria to the next level.

Under this arrangement, the Brazilian Government is funding the project with a loan of 1.2 Billion USD or Euro 995 million (In-kind) from the Deutsche Bank (DB), and the Development Bank of Brazil (BNDES). The interest rate is 3% over a period of 15 years including a moratorium of 3 years for the BNDES and 7 years including 2 years' moratorium for the DB.

The programme is designed to enable the country to acquire: 10,000 units of tractors; 50,000 units of assorted implements and equipment for assembly in Nigeria; Training of the Project beneficiaries for over five years; Establishment of 632 Primary (Type 1) and 142 Secondary (Type 2) Service Centres in Nigeria that will help smallholder farmers prepare the soil, cultivate,

produce and harvest farm produce and process products respectively all with equipment maintenance. The project is expected to benefit 300,000 young people directly and to impact on five million people indirectly.

Read more on the Green Imperative Project by Director Engr. Abdullahi G. Abubakar at the following links:

- PowerPoint presentations: https://www.africamechanize.org/resource/webinar-3-increasing-agricultural-productivity-in-nigeria-ongoing-activities-and-plans
- Webinar downloads: https://www.africamechanize.org/webinar-3/?tk=1695060555

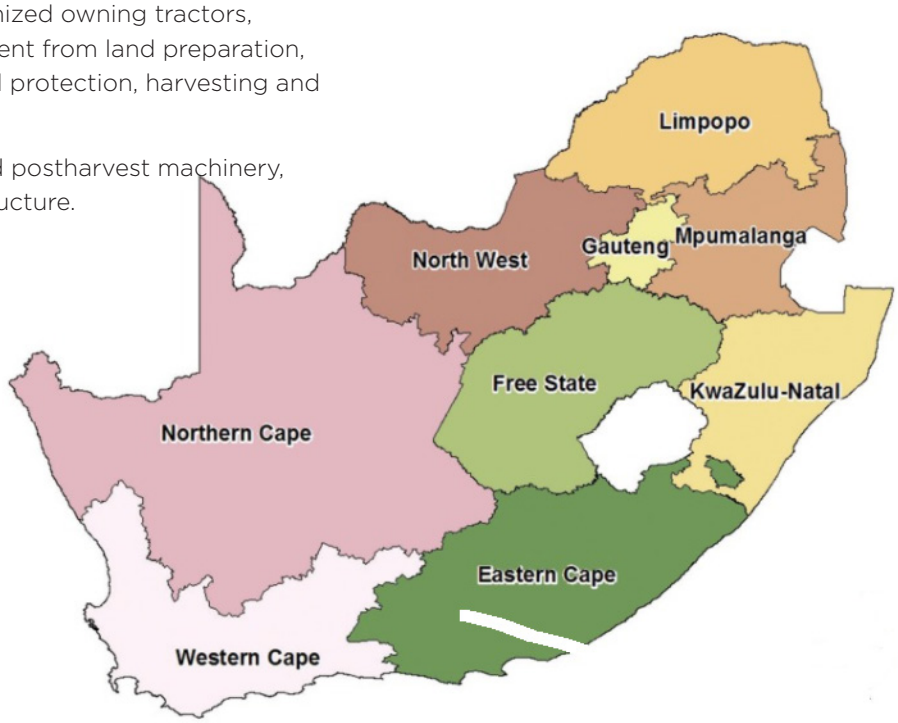
Mechanization for Smallholder and Subsistence Farmers in South Africa and Enabling Policy Agenda

Authors: Mr. Klaas Mampholo, Deputy Director in the Ministry of Agriculture, Land Reform and Rural Development, responsible for Land Use and Soil Management functions in South Africa; and Dr Sipho Sibanda, Agricultural Research Council, South Africa.

The agricultural sector in South Africa is dualistic consisting of large- and small-scale agriculture, however smallholder constitute 98% of the total number with **2, 668,503** farmers **using 2,005,818.86 ha.** Total area under agricultural cultivation is 14,208.116 ha: The farmers' typologies can be categories into: A) **Subsistence farming -** This constitute almost 2 million farmers, 54% involved in crop production, 31% doing mixed farming and 15% in livestock farming. They occupy limited land scape due to past injustices; B) **Small Scale Farming (SHF) -**Farms size is small in nature and is labor-intensive, uses traditional production techniques and lacks institutional capacity and support, Lack of equipment and poor maintenance of the existing ones, and Less than 12% of farmers own tractors and other farm implements; C) **Large scale – High level of mechanization (LSCF) -** Is well-integrated, highly capitalized commercial sector. About 40 000 farmers in SA are large scale and on average own 299 ha and utilise about 12 million ha of cultivated land. Total income of Commercial agriculture industry in 2017 was R332,8 billion

LSCFs own at least 90% of the tractors in the country.

- LSCFare highly mechanized owning tractors, machinery and equipment from land preparation, crop establishment and protection, harvesting and processing.
- LSCFs have established postharvest machinery, equipment and infrastructure.
- It is estimated that in 2010 there were 67,500 tractors in the country. Subsequently 6800 are sold every year from 2015 while a similar proportion is retired and normally sold as second hand to neighboring countries.
- Entrepreneurs run tractor for hire services, this is the dominant source to obtain tractor power for SHFs.
- South African agriculture has introduced conservation and precision agriculture equipment and drone technology is making significant strides.
- Tractors provided by government programmes is another way of empowering SHFs, and they include the Presidential package per province of 72 tractors, per province, 200 no till planters and boom sprayers provided to all provinces.
- The upscaling of conservation agriculture provide an enabling environment for the provision of sustainable mechanization to smallholder on annual basis through LandCare programme.



General state of mechanization in South Africa:

Mechanisation levels and state at smallholder farmer's level

- The majority of SHFs (88%) don't own any tractor at all.
- However, tractors have been widely adopted for SHFs either through acquisition or hire in various provinces.
- Less than 30% of the tractors and implements owned by SHFs are in good operational conditions.
- SHFs lack postharvest infrastructure and processing equipment and suffer huge postharvest losses of 20-80% depending on commodity
- Fruits & vegetable SHFs are significantly mechanized at the primary level

The way forward - Action plan to deal with challenges

- Provide sustainable and continuous support and of SHF in their mechanization requirements
- Match mechanization scale and farming size. It doesn't mean the bigger the better.
- Training SHFs in the operation, maintenance, calibration and servicing of tractors and implement and capacity development at college and district level
- Support and develop local manufacturers of machinery and equipment to develop moderate level of technology targeting SHF to alleviate laborious constraints, reduce water and soil contamination and improve productivity
- Mandatory government testing mechanization Centre and localization to advance SAMA element of innovative systems for sustainable technology development and transfer
- A government led coordinated approach about SAMA elements and action plan
- Aligned government mechanization support policy across programmes and SAMA

Read more on the aligned government mechanization support policy across programmes and SAMA by Director Klaas Mampholo at the following links:

- PowerPoint presentations: https://www.africamechanize.org/resource/mechanisation-for-smallholder-and-subsistence-farmers-in-south-africa-and-enabling-policy-agenda
- Webinar downloads: https://www.africamechanize.org/webinar-6/?tk=1695062014

Is Boda boda business model a proof of sustainable Agricultural Mechanization potential in Africa?

Watch this space, and read the full article in our next issue of the AfricaMechanize Newsletter

5 Upcoming Events

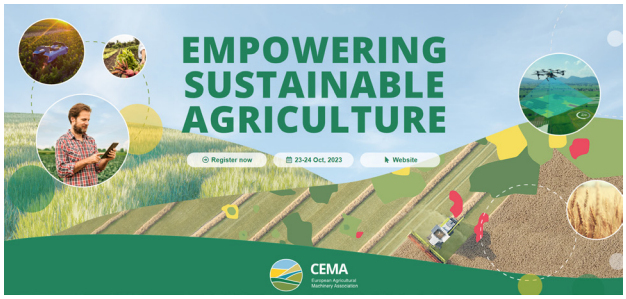
Global Conference on Sustainable Agricultural Mechanization (GAMC)

The Food and Agriculture Organization of the United Nations (FAO) is organizing the **first-ever Global Conference on Sustainable Agricultural Mechanization (GAMC)**, with the theme "*Efficiency, Inclusiveness and Resilience*" from 27 to 29 September 2023. This event will provide 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

Register here to participate. For more information visit **FAO Event website**

CEMA Summit 2023: Empowering Sustainable Agriculture

The event will take place in Brussels, Belgium, at the Autoworld Museum on the 23rd and 24th of October 2023. The CEMA Summit will look at the ways in which the EU has been addressing the sustainable transition in the agricultural sector. It will review the innovations enabling the development and deployment of sustainable farming practices. It will also highlight what is already possible and what the future of farming will look like. The debate will revolve around the contribution of the agricultural machinery industry to sustainability, presenting solutions and innovations developed by the sector. From robots to precision farming, from soil working machines to alternative fuels.



For more information on the summit: https://www.cema-summit.eu/ You can register for the event on: Register Now

The F-SAMA AfricaMechanize Webinar Series continues

Webinar No. 11: Directions for Investment in Sustainable Agricultural Mechanization for Africa is next

The Webinar organizing committee invites you to join in the upcoming webinar on the Directions for investments in SAM in November 2023. Webinar details to follow shortly.

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