Sustainable Agricultural Mechanization

Josef Kienzle

(FAO-Group leader, Mechanization group)
The background
(Why Sustainable Agricultural Mechanization)
Smallholders in Africa in 2016

Most of the smallholders are women (as a result of rural-urban migration and lethal pandemics)
Soil degradation and erosion

• Mostly erodible sandy soils
• Exposed to soil degradation and soil losses through surface erosion
• Many soils have low productivity
• Pulverization and compaction through excessive cultivation
Additional Challenge: Climate Change

Higher temperatures and greater chance of crop failure
Sustainable intensification

“Sustainable intensification means a productive agriculture that conserves and enhances natural resources. It uses an ecosystem approach that draws on nature’s contribution to crop growth and applies appropriate external inputs at the right time, in the right amount.”

Quote: Graziano da Silva, Director General, FAO
Climate resilient (smart) systems

Conservation Agriculture (CA) is an approach to managing agro-ecosystems for improved and sustained productivity, increased profits and food security while preserving and enhancing the resource base and the environment. CA is characterized by three linked principles, namely:

1. Continuous minimum mechanical soil disturbance.
2. Permanent organic soil cover.
3. Diversification of crop species grown in sequences or associations.

www.fao.org/ag/ca
Sustainable Agricultural Mechanization (SAM)
What is sustainable agricultural mechanization?

• Sustainable mechanization involves the application of different forms of power sources used in conjunction with appropriate tools, implements and machines to be able to do useful work in agricultural production and along the agri-food value chain.
What is sustainable agricultural mechanization?

• Thus mechanization must meet farmers’ needs efficiently and effectively and result in improved farm productivity and reduced drudgery, as well as contributing to the development and competitiveness of the food supply chain.

• To be sustainable, mechanization must take economic, social, environmental, cultural, and institutional issues fully into account.
Mechanization provides opportunities for intensifying production in a sustainable manner, value addition and food systems development, and improved local economies and livelihoods. It also plays a key role in enabling the growth of commercial agrifood systems and improving the efficiency of post-harvest handling, processing and marketing operations. It can have a major influence on the availability and accessibility of more nutritious food, contributing to increased household food security.

The application of farm power to appropriate tools, implements, and machines – “Mech mechanization” – is an essential agricultural input in sub-Saharan Africa with the potential to transform the lives and economies of millions of rural families.

Agricultural mechanization
A key input for sub-Saharan African smallholders
Key elements of SAM

1. Sustainable agricultural practices for smallholders:
   • Mechanization technologies should enable smallholders to increase yields through the adoption of intensification, conservation agriculture, and other climate-resilient, labour- and energy-efficient, and gender-friendly practices
   • They also should enable rational and efficient farming in the long term, leading to sustained profitability, increased ecosystem resilience and result in the long-term sustainability of smallholder systems
Key elements of SAM

2. Specific models for smallholder upscaling

- **Identification and specification** of appropriate business models for smallholder mechanization
Key elements of SAM

3. Economic, social and gender advantages of mechanization for smallholders

• Identify models that provide economic benefits to farmers, which can be independently sustainable in the development of the smallholder sector, and also deliver social benefits
Key elements of SAM

4. Institutional and organizational arrangements:
   • Identifying appropriate models for smallholder aggregation that are formal and can be institutionalized internally as well as with other external institutional frameworks and systems
Key elements of SAM

5. Private sector development

- Increases the **manufacturing and service provision base** for agricultural mechanization
- Provides opportunities for **more South-South Cooperation** among manufacturers, dealers and institutions
Key elements of SAM

6. Integration of smallholders into agri-food value chains

• Mechanization applies at farm level, and it has an important role in value addition, for example in improved post-harvest operations, processing and marketing activities.

• Mechanization enables smallholders to increase their production as well as incomes.
Key elements of SAM

7. Field-based capacity development

• Field-based methods of **capacity building** and capacity **development** for agricultural mechanization need to be integrated with proven and well tested training methodologies.
8. Regional Centres for SAM (CSAM)

- Centres focused on stakeholders’ needs and interests
- Leading Mechanization Centres: for policy and strategy development, data and information, standards and protocols, capacity building, facilitating private sector involvement in SAM based agribusiness and trade
Key elements of SAM

9. Integration of agricultural mechanization into pan-African policy frameworks:

- It is essential to develop appropriate policies, supra-national in nature and refocused at regional level and ensure complementarity with other agricultural development thrusts.
Key elements of SAM

10. Increasing and strengthening South-South Cooperation

- **Common** lessons learned during development and the **sharing** of **experiences** within the context of South-South Cooperation can create a **knowledge sharing platform**
11. SAM strategies

- For a consistent and coherent change in the use of agricultural mechanization, it is necessary to **formulate** and **implement** a **plan**, especially since **major changes** are required for sustainable agricultural mechanization.

Source: FAO, 2013c.
The action...

**Theme 1:** New collaborative models of Private-Public Partnerships (including finance for demand-enhancing models of sustainable mechanization)

**Theme 2:** Modalities, approaches for establishing a global sustainable mechanization knowledge exchange platform

**Theme 3:** Discuss the establishment of a Regional Centre for Sustainable Agricultural Mechanization in Africa (CSAM)
Thank you for your attention

Josef Kienzle - Josef.Kienzle@fao.org
Joseph Mpagalile – Josef.Mpagalile@fao.org
Martin Hilmi – Martin.Hilmi@fao.org
Santiago Santos Valle – Santiago.SantosValle@fao.org