



PAFO-COLEAD INNOVATIONS SERIES: Innovations and successes of African farmer-led businesses and SMEs

SESSION N°15

Technological innovations in the agrifood sector: adoptions by SMEs and entrepreneurs

Thursday 9 November 2023 – 12:00-14:00 UTC / 13:00-15:00 CET

Online ([Zoom](#))

English-French-Portuguese interpretation available

1. Context

The agrifood sector has seen significant transformations in recent years, driven by technological innovations that have revolutionised every aspect of the industry, from production to distribution and consumption. Small and medium-sized enterprises (SMEs), smallholders and entrepreneurs have played a pivotal role in embracing and adapting to these innovations, reshaping the way food is produced and supplied.

Technological innovations can equip smallholders and SMEs with the necessary tools to support climate resilience, improve productivity, manage natural resources sustainably and be a catalyst of agrifood systems transformation.

In view of the urgency to modernise the agricultural sector in Africa and the need to attract youth into the sector, SMEs and entrepreneurs need to further leverage technological innovations to drive sustainability, efficiency, and economic growth and use technologies to increase the efficiency of the value chain operations. To succeed, they also need to access technology and finance and upgrade their skills for adoption and upscaling.

2. Technological innovations supporting SMEs, entrepreneurs and smallholders

Food processing provides an opportunity to create value-added products from raw agricultural commodities. It adds value to crops, supports small-scale farmers, and creates employment opportunities along the agricultural value chain, from production to processing and marketing, increasing incomes for value chain operators. **Solar drying** is an eco-friendly and cost-effective method used to dehydrate various foods, including fruit, vegetables, and grains. It is particularly



valuable in regions with abundant sunlight. **Fermentation** is a traditional method widely used in Africa for food preservation and flavor enhancement.

In many African countries, a significant portion of the food produced is wasted due to inadequate processing and storage facilities. **Food processing technologies**, such as drying, canning, and refrigeration, help reduce food waste by preserving food products for a longer duration. Logistical innovations, such as **cooling systems**, refrigeration and cold chains, reduce food losses and waste and reinforce the quality and safety of the food, reducing economic losses for the operators and facilitating market access. However, many African rural areas lack access to reliable power. Innovations need to focus on climate-friendly refrigeration systems based on renewable energy (i.e., solar energy) to reduce dependency on fossil sources.

Advances in packaging technology, including vacuum sealing and hermetic storage, help maintain the quality of products while preventing moisture and pests from contaminating the food. The introduction of modern agro-processing equipment, such as grain mills, fruit pulpers, and oil extraction machines, has improved efficiency in food processing. These machines have been particularly beneficial for small-scale farmers and entrepreneurs, enabling them to process crops more effectively.

The African continent has accomplished tremendous progress with respect to the utilisation of mobile smartphones towards improving agricultural productivity. The increased use of mobile phones amongst smallholders and SMEs has contributed to efficiencies in the value chain and access to markets and led in many cases to the adoption of **mobile money** enabling reduced transaction costs.

However, there remain several fundamental challenges that include inadequate mobile smartphone infrastructure, limited cell phone network and internet coverage and high cost of communication/data. In addition, reliable broadband remains limited in rural areas where most of the agricultural activities occur.

One of the most notable technological advancements in agriculture is **precision agriculture** which uses data-driven methods (i.e., sensors, drones, GPS technology, Internet of Things (IoT)), to optimise crop management, enhance productivity, reduce resource wastage, and improve overall farm profitability. These innovations can monitor soil conditions, crop health, and irrigation needs, and can be accessed remotely and analysed, helping SMEs and entrepreneurs make informed decisions in real time that impact productivity and profitability. **Farm management software** could be a game-changer for smaller agricultural enterprises. SMEs and entrepreneurs are using such platforms to streamline farm operations, monitor inventory, track finances, and handle logistics.

Technology allowing food **traceability** increases consumer's information about the origin of food and farmers producing it, promoting transparency in pricing and making supply chains more efficient and accountable as information is shared amongst value chain actors.

Innovations in food packaging (i.e., organic packaging solutions, smart labels such as QR codes) can maintain the quality, safety and nutritional value of food products required by the market and consumers while minimising food losses and supporting the circular economy.

E-commerce platforms offer new opportunities for SMEs and entrepreneurs shortening value chains and increasing their market access by selling their products directly to consumers, cutting out intermediaries and retaining higher profit margins. However, a barrier to the adoption and scaling of e-commerce persists and is mainly due to the unequal access to internet connectivity in some regions.

As climate change makes rainfall more erratic and increases the risks of floods and droughts, investing in improved water management and infrastructure is even more important. It will require consistent investment in water infrastructure, operations, and maintenance; efficient management of water resources; and strengthened policy and regulatory frameworks. Investing in green infrastructure will play a huge role in providing safe, clean, and regular water flows. Technologies

to optimise production include **water and energy-saving technologies**, such as rainwater harvesting and storage to optimise water-use efficiency in rainfed agriculture, drip irrigation, mulching, energy-efficient irrigation pumps or solar-powered irrigation systems. Access to green technology and infrastructure should be facilitated for SMEs and businesses. SMEs can help in the rapid implementation of off-grid renewable sources like solar, wind, and other sources, especially in rural areas that are not yet connected to the national grid.¹

Vertical farming (i.e., hydroponics) is revolutionising how food is produced in urban areas as they allow for year-round cultivation and offers opportunities for countries with limited land such as islands but also to urban and peri urban spaces supporting shorter supply chains and especially important for horticultural crops. In addition to technology, the high energy cost remains an issue. Digital services such as shared asset services can enhance farmer **access to mechanization** hire services and significantly reduce transaction costs for small-scale producers. Digital technologies also have the potential to facilitate cost-effective, uninterrupted and scalable extension and **advisory services** in rural areas.²

On the digital part, you can find illustrations of existing SmartTech solutions for horticultural value chains in ACP countries in the COLEAD report.³

3. Challenges for wide adoption of technological innovations by SMEs and smallholders

While technological innovations offer numerous advantages, SMEs and entrepreneurs in the agrifood sector also face challenges in their adoption in terms of initial investment, technological skills, access to suitable technologies, infrastructures and maintenance service as well as in some cases data privacy.

In many parts of Africa, inadequate infrastructure and unreliable access to electricity, as well as a shortage of skilled labor can hinder the adoption of advanced food processing technologies.

Digital technology can also increase the digital divide, excluding those who do not have connectivity or mobile phones, in particular smallholders. Investments in capacities, funding and technology would be needed for smallholders and operators to seize the transformative potential of technology.

To unlock the full potential of food processing technologies in Africa, it is essential to address infrastructure limitations, provide education and training, and create an enabling environment for small-scale entrepreneurs and agribusinesses to thrive.

SMEs in various sectors face several challenges when it comes to adopting and integrating technological innovations into their operations. These challenges can hinder their ability to compete effectively and realize the full benefits of modern technology.

Smallholders and SMEs often lack the financial resources required to invest in technology. High upfront costs for equipment, software, and training can be prohibitive. Access to loans and credit for technology adoption is limited, and interest rates can be too high for small businesses to afford.

¹ Daniel F. Runde, Conor M. Savoy, & Janina Staguhn. [Small and Medium-Sized Enterprises, Blended Finance, and Climate Change in Sub-Saharan Africa](#). 2021. CSIS Briefs.

² FAO, IFAD, UNICEF, WFP and WHO. 2023. The State of Food Security and Nutrition in the World 2023. Urbanization, agrifood systems transformation and healthy diets across the rural–urban continuum. Rome, FAO. <https://doi.org/10.4060/cc3017en>

³ FFM-SPS Programme (2022) [Technologies and digital solutions for ACP horticulture](#). Fit for Market - Strengthening sanitary and phytosanitary systems of the ACP horticultural sector (FFM-SPS) programme. Brussels: COLEACP.

Many smallholders and SME owners have limited exposure to modern technology and may not have the necessary digital literacy skills to operate and maintain technological solutions effectively. This lack of knowledge can be a significant barrier to adoption.

In many rural areas, the infrastructure required for effective technology usage, such as reliable electricity and internet connectivity, is lacking. This hampers the ability of smallholders and SMEs to access and utilise technology effectively. Even if smallholders and SMEs manage to acquire technology, they may struggle to maintain and operate it due to high ongoing costs. Technical support and skills development are indispensable for smallholders and SMEs as they lack the capacities of larger companies and cannot afford any wrong investment in technology.

Knowledge and compliance with data privacy and security regulations can be particularly challenging for those without access to legal and technical expertise (i.e., on regulations in the country where data is hosted) and due to the absence of regulations in many African countries...).

4. The way forward

Technological innovations in the agrifood sector can be instrumental in improving sustainability, efficiency, and economic growth for producers and SMEs. While challenges exist, governments, organisations, and educational institutions must continue to support these stakeholders in adopting and adapting to these technologies.

Addressing these challenges requires a multi-faceted approach that involves government policies, financial institutions, capacity-building programmes, and industry stakeholders. Initiatives to provide affordable financing, improve digital literacy, develop technology infrastructure, and streamline regulatory processes can help smallholders and SMEs overcome these obstacles and fully harness the benefits of technological innovation in their operations.

Additionally, fostering a culture of innovation and promoting the value of technology adoption among these businesses is crucial for their long-term success and competitiveness in the modern business landscape.

Investments are needed to support the development, diffusion, and adoption of technologies by value chain actors and importantly to support inclusiveness to avoid that technologies reinforce inequalities. Therefore, technologies and innovations must be adapted to local needs, opportunities, and constraints, to ensure they are accessible to all who want to adopt them.⁴

Key points for discussion:

- What are the key technological innovations that farmers and entrepreneurs develop and adopt that contribute to effective value chain development?
- What type of investments are needed to support entrepreneurs to contribute to the design, adoption and use of technological innovations?
- What incentives can be provided to SMEs and smallholders to better understand and use technological skills to improve farm management?

⁴ The State of Food Security and Nutrition in the World 2023.

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Agenda

Moderator: *Isolina Boto, Head of Networks and Alliances, COLEAD*

12:00-12:15 Introduction:

- *Dr. Babafemi Oyewole, CEO, PAFO*
- *Jeremy Knops, Délégué Général, COLEAD*

12:15-13:00 Panel: successes from value chain actors

- *Pyrrus Koudjou, Founder and CEO, ClinicAgro, Promagric, Cameroon*
- *Abraham Natukunda, Founder and Managing Director, InterConnect Point Ltd, Uganda*
- *Ulrich Djido, Co-Founder and Chairman, BioLife Tech, Benin*

13:00-13:20 Discussants

- *Stephen Muchiri, Executive Director, EAFF, and CEO, e-Granary, Kenya*
- *Daniel Annerose, Founder and CEO, Manobi Africa*

13:20-13:50 Debate

13:50-14:00 Key takeaways and conclusion

- Presentation of [Agrinnovators](#), *Axelle Rupert, Project Manager, COLEAD*



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