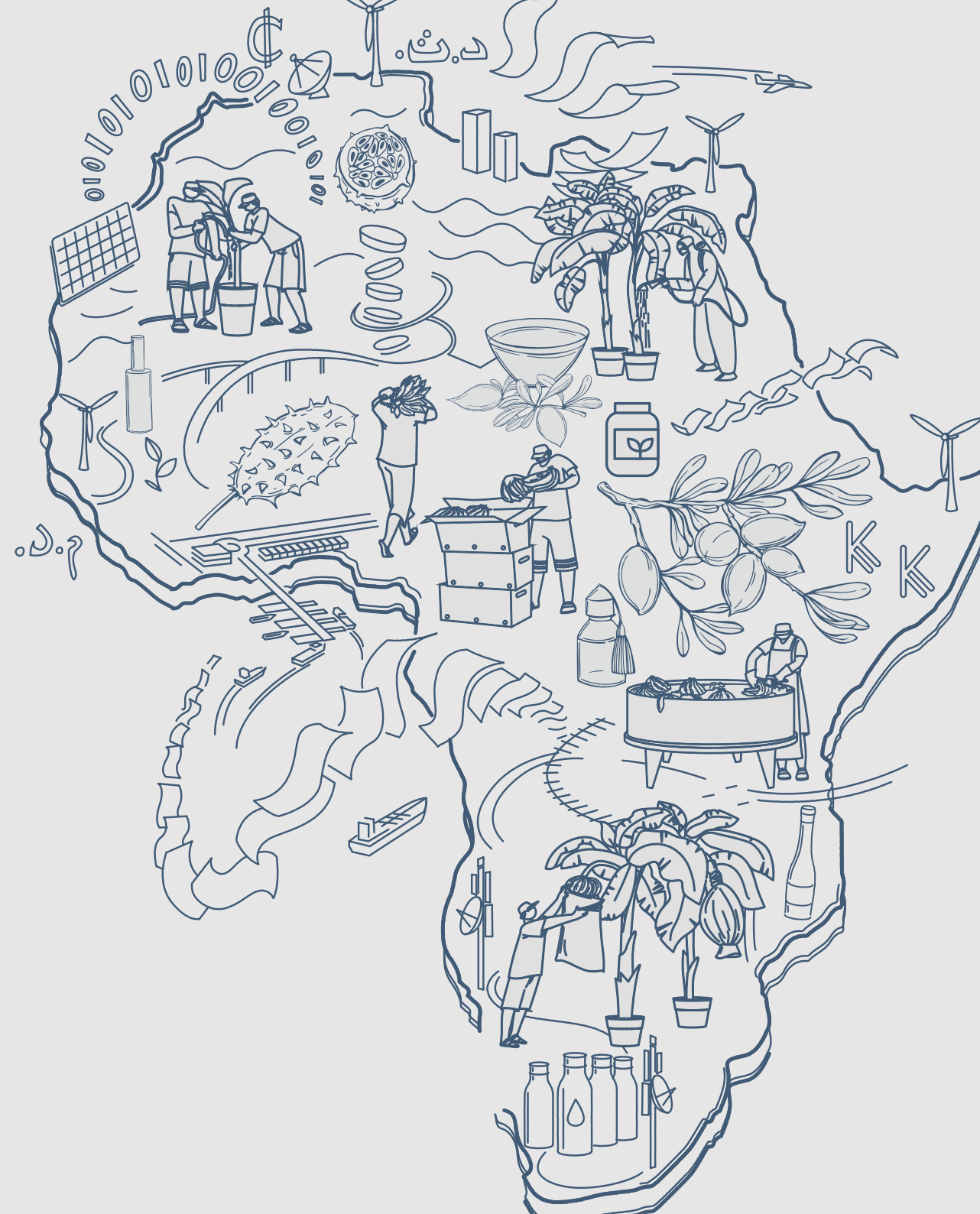


THE AFRICAN AGRI-TECH REVOLUTION

Africa Business Group Newsletter

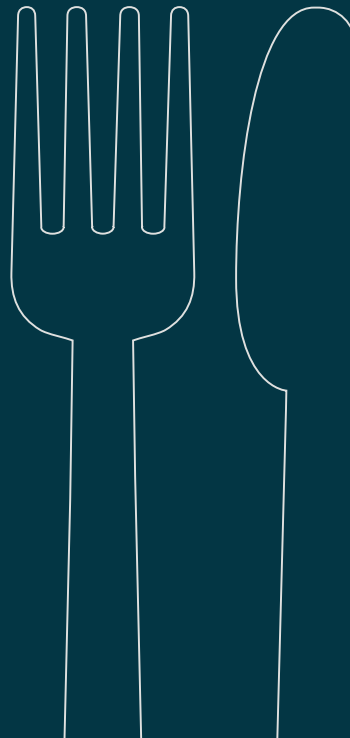


INTRODUCTION

MOST OF US ARE AWARE THAT WE ARE FACING A GLOBAL FOOD SECURITY CRISIS. GLOBAL POPULATION IS EXPECTED TO RISE FROM 7 BILLION TODAY TO 9.6 BILLION BY 2050, AND MORE THAN HALF OF THAT IS PROJECTED TO TAKE PLACE IN AFRICA. FURTHER IT IS ESTIMATED THAT WE WILL NEED TO PRODUCE AS MUCH FOOD IN THE NEXT 40 – 50 YEARS AS IN THE PREVIOUS 10,000 YEARS COMBINED.

Calamity aside, history dictates that where the world faces a significant problem or threat, solutions are found through the application of science and technology and brings with it a surplus of opportunity in new sectors and products. Most recently we have seen this throughout the Covid-19 pandemic, where suppliers have had to pivot and adapt in order to survive.

In this article we discuss the burgeoning opportunity in the agribusiness sector in Africa and provide a brief introduction to growing interest in agriculture technology (**Agri-tech**) globally, and its potential application in Africa.



WHY AFRICA?

Agriculture is big business in Africa. The sector employs over two thirds of the continent's labour force, and accounts between 30-40 percent of gross domestic product¹. It is estimated that of the world's surface area that is suitable for sustainable agriculture production, (i.e. non protected, non-forested land, with a low population density) Africa has 45% of the global total.

However, despite an abundance of labour, land and untapped water, Africa has been losing its share of the global agriculture market. For example, today, Thailand exports more food products than all of Sub-Saharan Africa combined. This is largely because 'The Green Revolution', or 'Third Agricultural Revolution' that occurred in Latin America and Asia, seemed to have by-passed Africa. There are a number of reasons for this which vary from country to country, but include amongst other things: lack of clearly defined agricultural policies or strategies; poor infrastructure; lack of finance for large scale and/or small-holder commercial farmers; general lack of international investment or interest throughout the 1970s to early 2000s; challenging post-independent transitional periods for many countries; the HIV/AIDs crisis; the fact that very little land on the continent is irrigated and modern inputs are grossly underutilized (Africa has, by far, the lowest rate of improved seed and fertilizer



AGRICULTURE ACCOUNTS FOR TWO THIRDS OF AFRICA'S LABOUR FORCE

use of any region); and government attention being diverted to other sectors, such as energy and infrastructure.

However, a myriad of factors in recent years as well as pressures in respect of the coming food crisis and covid, has put the spotlight on Africa again, presenting a golden opportunity for African agriculture to realize its full potential. Some of these are included below²:

- Global experience suggests that growing incomes, a rising middle class and urbanisation are driving a domestic African market in both downstream and upstream agribusinesses as people want more choice and higher end products;
- The World Bank estimates that food demand in Africa is expected to exceed US\$ 400 billion by 2030, requiring major agribusiness investment in processing, logistics, market infrastructure and retail networks;

¹Unlocking Africa's Agriculture Potential, World Bank, Executive Summary, 20.04.2021 (<https://openknowledge.worldbank.org/bitstream/handle/10986/16624/769900WPOS0A00Box374393B00PUBLIC0.pdf;sequence=1>)w

²Unlocking Africa's Agriculture Potential, World Bank, Executive Summary, 20.04.2021 (<https://openknowledge.worldbank.org/bitstream/handle/10986/16624/769900WPOS0A00Box374393B00PUBLIC0.pdf;sequence=1>)

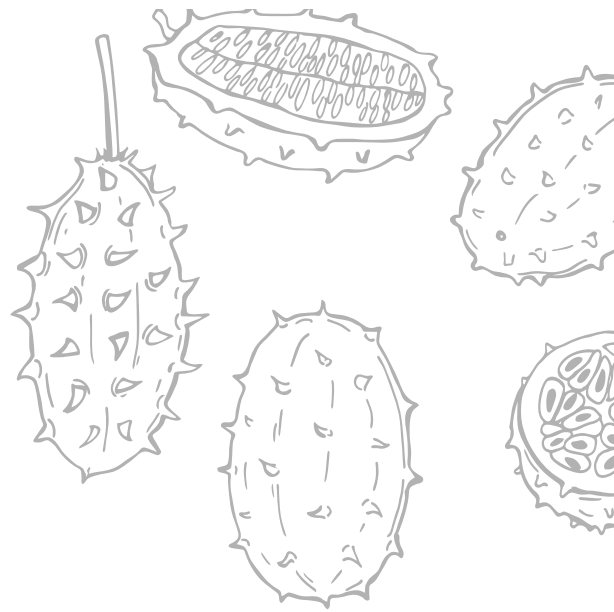
WHY AGRI-TECH?

- Many opportunities for profitability by expanding irrigated areas and increasing the use of modern technology have been identified;
- African farmers are far from the technological frontier which means that there is significant potential for catch-up and investment opportunity;
- There is a much higher level of development partner interest and activity in the agricultural sector today than there was in the 2000s, driven by a global need to invest in sustainable agriculture;
- Private sector interest is on the rise, driven by the factors mentioned above and perceived reduction in country risk, and this new interest has elevated the potential for the sector's profitability;
- The World Bank estimates that agriculture and agribusiness together will make up a US\$ 1 trillion presence in Africa's regional economy by 2030 (by comparison the U.S.A agriculture sector was estimated to be US\$ 313 billion in 2010); and
- Technology is improving rapidly and is becoming more affordable and accessible which has opened up a number of growth

opportunities, these growth opportunities are discussed in further detail below.



THE WORLD BANK ESTIMATES THAT AGRICULTURE AND AGRIBUSINESS TOGETHER WILL MAKE UP A US\$ 1 TRILLION PRESENCE IN AFRICA'S REGIONAL ECONOMY BY 2030



We might associate Silicon Valley with sectors such as media, communications and retail that have spawned the likes of Netflix, Facebook and Amazon, but Agri-Tech is slowly becoming the new face of California. In the 6 years prior to 2020, annual global investment in food-tech, from farm management systems to robotics and mechanisation, increased by more than 370% as reported in AgFunder's **2020 FarmTech Investment Report**³ and in 2019 Agri-Tech funding through investment or acquisition increased 6.8% from the previous year to USD 4.7bn. This demonstrates that around the world (pre-Covid 19), money was rushing into new forms of agriculture and food distribution, funding projects ranging from vertical farms and agricultural robots to alternatives to meat.

Agriculture is probably one of the last of the large sectors (possibly along with commercial transportation and infrastructure) that has yet to have had a 'market disrupter' in terms of innovation. At a time when agriculture faces two huge and conflicting pressures: (1) feeding a growing global population whilst (2) preserving the environment, many believe that agriculture production is ripe for the kind of innovation that changed finance in the 1980s, communication in the 2000s and social mobilisation in this decade. Development in advanced manufacturing, technology, connected



ANNUAL GLOBAL INVESTMENT IN FOOD-TECH, FROM FARM MANAGEMENT SYSTEMS TO ROBOTICS AND MECHANISATION, INCREASED BY MORE THAN 370% AS REPORTED IN AG-FUNDER'S 2020

devices and autonomous vehicles have rapidly increased over the last 10 years but little of this energy has been projected towards agriculture. However, as the world is becoming increasingly aware of the coming food crisis brought on by climate extremes, soil degradation, increased pest activity and an unsustainable food practices (see Netflix's Cowspiracy and Seaspiracy), this has triggered the interest in Agri-Tech as innovators can no longer ignore the opportunity.

Whilst it is expected that this rapid increase in investments in Agri-Tech is likely to take a hit

³ Burwood-Taylor, Louisa, 2020, 2020 Farm Tech Investing Report, page 10 (<https://research.agfunder.com/2020/2020-farm-tech-report.pdf>)

following the Covid-19 pandemic, the pandemic has forced a large number of suppliers to adapt in order to survive as supply chains are disrupted. This is particularly true across Africa where lock-down restrictions and borders closures have been constantly changing. This has therefore meant an interesting acceleration and adoption of new strategies and technologies which might otherwise have taken considerably longer to happen or indeed not have happened at all, and we see huge opportunities ahead for those businesses who are able to pivot and adapt. Start-ups supporting local supply chains and food security are likely to do particularly well.

We have identified three major growth opportunities in Agri-Tech in Africa, which are set out below:

- Farm Management Software;
- Farm to Consumer Systems; and
- Supply Chain Efficiency and Wastage

FARM MANAGEMENT SOFTWARE

Most of us are aware that everything we do, from online shopping, internet browsing, the television we watch and the content we consume, is monitored and sold for a price. We have never been more connected to each other

and knowledge and data has never been more accessible. This is also now true in farming.

One huge growth sector in the agriculture industry globally, is the use of technology-based farm management systems (**Farm Management Software**) that identifies and manages variability in fields through observing, measuring and responding to data. Through the use of aerial or GPS imagery, real time data can be collected and farmers can monitor fertilizer, water and other agricultural inputs into particular areas of any given field.

In the past farmers have made field-by-field assessments, but Farm Management Software allows farmers to assess the needs of crops on a foot by foot basis, thereby significantly reducing waste and increasing yields through a more 'bespoke' approach to application of irrigation and inputs. For example, companies like John Deere have created technology ecosystems that combine unmanned tractors, drones, and other precision equipment, and can monitor anything from land preparation, planting and seeding, water management, steering, input control, and harvesting, all of which is fully integrated and allows farmers to connect their entire operation, allowing farmers to make real time decisions.

According to Ag Funder, investment in Farm Management Software was the most active

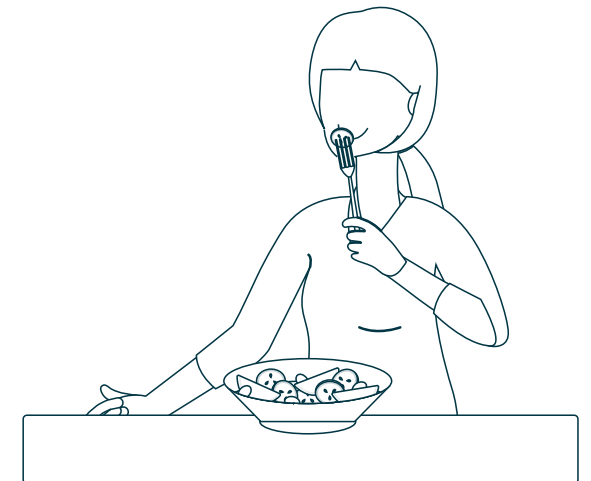
Similar schemes have been implemented successfully in other jurisdictions, for example in India where large scale co-operatives are more common, small-holder growers and off-takers have been able to use drones or 'unmanned aerial systems' (UAS) to improve yields and reduce inputs, because the commercial farm leading the co-operative has made the upfront capital payment, and then leases the drone to the small-holder. This model ultimately benefits both grower and off-taker as the smallholder-farmer, who would otherwise not be able to afford the technology, can benefit from the real-time information and take corrective actions to improve the crop, and the off-taker can (1) purchase higher volume higher quality crop and can (2) pass down and spread the cost of the technology to a large number of farmers in the co-operative. It is likely that we will see a rise in this form of cooperative in Africa, as the model can be rolled out for a variety of technologies - irrigation, solar powered personal fertiliser sprayers, and home solar systems, to name a few.

FARM-CONSUMER NETWORKS

In other sectors Africa has been able to 'leapfrog' over slow periods of technological advancement and innovation to match pace with developed nations. Probably the most significant of these has been the jump to smart-phones and the widespread

use of the internet. To date mobile technology in Africa has been associated with peer-to-peer transfer of money, which has, amongst other things, increased social mobility, allowed people to start their own businesses and has been responsible energy access in remote areas, where low-income homes can pay for electricity generated through personal off-grid solar generators.

Solutions to agricultural problems are now also being developed and there is considerable investment in the 'mobile' agriculture sector. In particular, farm to consumer networks that connect the smallholder to markets.



THE OPPORTUNITY IN AFRICA

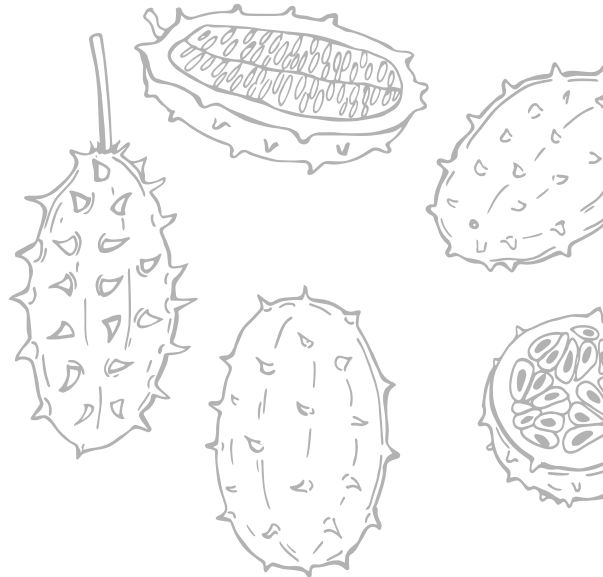
Apps such as WeFarm have the ability to link the independent farmer to an expansive market of buyers, bypassing middlemen and resulting in increased **incomes of up to 50%**⁴. Reliable access to markets and a steady stream of income also have a multiplier effect by increasing the chance of smallholders obtaining financing, allowing them to make investment in other technologies.

This sector is expected to be one of the largest growth areas in a **post Covid-19 world**⁵, as consumers look to local food systems to secure food.

SUPPLY CHAIN EFFICIENCY AND WASTAGE

Nearly a third of what the farmers grow in Africa is lost due to lack of refrigeration, poor market access and other related factors. Annual food losses for fruits and vegetables are an estimated 40 to 50 percent⁶. The most critical factor to keeping food and meat fresh is proper transportation and cold storage and despite this, the cold chain system (consisting of pre-cooling, refrigerated storage, and refrigerated transport) is still weak or non-existent in some countries, and it is particularly poor in Africa due to lack of access to cooling technology, inadequate financing options and poor electricity.

However, there are a multitude of solutions that can improve efficiency, each directed at tackling different levels of the supply chain. For example, most wastage occurs at production, and therefore increasing awareness amongst farmers and assisting in improving harvesting techniques can have a huge impact, especially in developing nations. Cold-chain technology will have the largest impact, and there are huge opportunities in warehousing and transport. For example, Cold Solutions Kenya Limited recently announced that it will invest KSh 7.5 billion (\$70 million) in constructing state-of-the-art, temperature-controlled cold storage warehouses across Kenya, and the Rockefeller Foundation is working with various NGOs to implement public-private-social partnerships for 'pay-as-you-go' solar-powered refrigeration units to help farmers in East Africa avoid spoilage and enable sale when market prices are more favourable.



⁶ Surya Kannothe, Africa's perishables transport: The cold hard fact, Logistics Update Africa, 20.04.2021, <https://www.logupdateafrica.com/africas-perishables-transport-the-cold-hard-fact-logistics>

Agri-tech will be vital for food security across the world, and if utilised correctly, could have a huge impact in Africa. As mentioned previously, whilst Africa has an abundance of viable land, working population and water resources, the sector has yet to take-off on the scales seen in other developing regions (Asia, South America). There is no doubt that in other sectors, technology and innovation have totally transformed Africa. As mentioned above, the rapid spread of mobile technology in the developing world has given rise to **leapfrogging**, where, countries can make '**a quick jump in economic development**'⁷ by harnessing technological innovation. Africa leapfrogged over expensive landline telephone infrastructure and directly invested in mobile technologies, as they were able to benefit from low-cost telecommunications technology and R&D done in the developed world. The agriculture sector should be no different.

It would be wrong however to assume that **Agri-Tech** will offer a quick fix in Africa. Agriculture in Africa is complicated, the level of development and mechanisation varies considerably from country to country and locally, the sector is divided between 80% small-holders and 20% commercial farmers, and the variety of products grown in one farming block can range from intensive, high-value, commercial berry production to subsistence maize production. Whilst the problems faced by

small-holder farmers in Africa are, in essence, no different to those of large scale commercial farms in Africa (volatile government policy, lack of access to markets, weak transport links, poor infrastructure, lack of finance, limited access to mechanisation) the Agri-Tech solutions that can be used to mitigate these problems, at least at the farmer level, are inherently different.

This diversity however is also what makes the opportunity in Africa so prominent. Due to the variety of farming practices at play, a range of solutions bespoke to particular sectors and crops will be required. Investors and innovators can develop specific tools that can be used in the farming of high-end cash crops and luxury fruit, as well as specific tools that can be used by small-scale subsistence farmers.

⁷ Leapfrogging: the key to Africa's development?, World Bank, page 17, (<https://openknowledge.worldbank.org/bitstream/handle/10986/28440/119849-WP-PUBLIC-Africa-Leapfrogging-text-with-dividers-9-20-17-web.pdf?sequence=1&isAllowed=y>)

CONCLUSION

In this article we have provided a high-level summary of the opportunity in Africa in the Agri-Tech space. It is impossible to provide a complete picture of the Agri-Tech sector and the tools being developed as it is such a vast and rapidly developing industry. There are also huge barriers to growth, which have not been discussed in detail in this article, such as lack of access to financing, lack of capacity and knowledge transfer, lack of critical infrastructure and a general distrust or reluctance to use modern techniques. There is no doubt however that we are heading into a new and exciting age of agriculture with considerable opportunities in Africa, whether at the small-holder or the commercial level.



FURTHER INFORMATION

For further information in relation to how we can assist you in the agriculture sector, and more details about the core Agribusiness Group at Addleshaw Goddard, please contact:



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