

Preparing youth for high-tech agriculture



Ron Gilling/Linear/Still Pictures

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A prediction from international circles is that in the next 50 years the world will need to produce as much food as has been produced in the history of mankind. The world population is expected to reach 9 billion by then, translating to the highest demand for food ever. The irony is that few people can provide convincing responses to what I would consider the million-dollar questions: Where will the food come from? How will it be produced? Who will produce it? Depending on the region one comes from, some will say the food will come from supermarkets; for others, organic farming, intensification of agriculture, modern technologies, distribution from the 'haves' to the 'have-nots'; while others will just wish you away. What is certain is that food production will have to double or triple using fewer resources. With

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additional challenges from climate change and dietary shifts to greater meat consumption, global agricultural and food systems will have to change substantially to meet the challenge of feeding the expanding population. This will be more daunting in Africa where the population is projected to have doubled by then.

Where will the food come from?

A number of proposals have been advanced on potential global food sources, ranging from opening up new land to enhancing access to inputs and improving food distribution across the world. Common knowledge, however, asserts that most of the land suitable for agriculture in Africa has been overexploited while food is grown and consumed at source with very diverse cultural preferences. Encroaching into marginal lands, traditionally reserved for wildlife, has made a bad situation worse, resulting in loss of valuable biodiversity and in human-animal conflicts. Yet, this is the same land expected to feed the expanding population that is getting poorer and increasingly food-insecure by the day. Producing enough food for all will therefore require a 'business unusual' model – one that utilises the best of conventional methods with the best of appropriate technologies that demand the least amount of land with the least aggregate of external inputs in extremely harsh conditions (drought, salinity, flooding, etc.). Clearly, an appropriate use of modern scientifically based agricultural technologies will be essential.

How will the food be produced?

In a meeting of minds in agriculture in September 2012, the African Green Revolution Forum declared that Africa's agriculture remains backward due to limited application of modern science and technology. Despite being a source of livelihood for about 70 per cent of the population, the continent is still overdependent on rain-fed agriculture. It is also marked by low use of

high-yielding seeds, fertilisers and pesticides. While addressing the Forum, the Tanzanian President His Excellency Jakaya Kikwete lamented: *'Farmers lack modern agricultural production skills and knowledge and do not have access to financial and other supportive services. Consequently, farm sizes are small, yields are low and revenues from the agricultural sector remain meagre.'* Importantly, increasing productivity per unit of land, diversification of food-eating habits, access to high-yielding varieties and markets, increased nitrogen-use efficiency, breeding for tolerance to abiotic (drought, salinity, flooding) stresses and agribusiness will be the cornerstones of revitalising African agriculture, the Forum recommended. Clearly the modern science of genetics will have a key role to play.

Other land-saving technologies such as hydroponics and sunlight greenhouse farming where farmers can control and dictate their seasons without having to rely on rainfall patterns are necessary. They will, however, require aggressive promotion and support with high-yielding seed varieties, links to markets and guaranteed access to credit and inputs. Appropriate value chains with clearly defined service providers at each stage of the chain would also ensure that farmers do not become victims of their own success, with increased production failing to reach the market.

Who will produce the food?

A typical characteristic of African agriculture is the predominance of small-scale farmers (more than 60 per cent), mostly women who are semi-skilled and with little access to technology, inputs, credit and markets. Migration of young

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people from rural to urban areas has left food production in the hands of their elderly parents, most of whom are incapable of adjusting to modern high-tech farming systems. Farmers have therefore remained at the level of mere subsistence, with little mechanisation and rudimentary farming methods, a situation that perpetuates poverty and food insecurity. The status quo has only served to further demotivate the youth as farming is portrayed as a punitive, inferior and non-profitable enterprise. In addition, young people do not view themselves as part of the solution to the food insecurity problem. Yet their population is increasing at an alarming rate, higher than that of economic growth. The 2009 Population Reference Bureau report projects that there will be about 343 million young people (defined as people between the ages of 10 and 24) by 2015 – a big labour force with the potential to contribute to feeding the world!

How can youth be attracted and retained in the agricultural sector given their view of agriculture as a painful and low-end labour market? At the outset, youth are not being integrated in the agricultural sector, leaving food production in the hands of the elderly. The majority throng to cities in their millions, ending up in slums and on the streets doing menial jobs and hawking all manner of counterfeit imported goods – a sure way of killing their own innovations and the economy. The returns are low and, with time, many young people lose heart and some join criminal gangs or indulge in the illicit drinks trade. There is need therefore for a fundamental change in the mindsets of African youths to view themselves as key players in the food production chain.

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This can be possible if farming becomes pleasurable and profitable with supportive infrastructure to make it exciting, worthwhile and

recognised as an important contribution to modern society. Access to efficient technologies and assurance of access to high-quality seeds, inputs and links to markets would be good starting points. This would be a remarkable change from what rural societies have done over the years. According to Dr James Mwangi, a Kenyan and winner of the 2012 Ernst & Young World Entrepreneur award, also a council member at the G8 New Alliance for Food Security and Nutrition, lessons can be borrowed from fast-growing sectors with successful youth entrepreneurship ventures. Examples include the Techno-entrepreneurship (ICT) and social entrepreneurship sectors using social causes (cooperatives) to drive entrepreneurship and growth.¹ Kenya and Ghana have invested in facilitating incubation centres for ICT and social entrepreneurs such as iHUB and mLABs. An ICT hub (iHUB) is a space where technologists congregate to bounce ideas around, network, work, program and design. This is achieved through an enabling environment where a community of tech entrepreneurs can grow and innovative ideas can be born from collaborations and the atmosphere of the co-working space.² The mLABs on the other hand are wireless informal focus group meet-ups aimed at creating forums for exchange of views and networking between mobile application developers and practitioners in various industry sectors. Simulation of the introduction of such models in the agricultural sector could provide opportunities for youth to develop successful agribusinesses.

Further, there is compelling evidence that modern biotechnology applications such as tissue culture can greatly enhance productivity by generating large quantities of disease-free, clean planting material. This is applicable to the mass production of Africa's key staple foods like banana, cassava, sweet potato and yam.³ Youth with a first degree in agriculture or biological sciences should be encouraged and facilitated to establish low-cost tissue-culture business facilities at community level. African governments should also start considering young

people's views and perceptions in policy-making and in reviewing agricultural and biosciences education curricula.

Experience of nearly two decades with biotech crops globally has demonstrated the power of marker-assisted conventional breeding and genetic engineering in developing superior crop varieties resilient to various biotic and abiotic stresses. Modern biotechnology has enabled development of crop varieties that can withstand pest attack, particularly insects and weeds, and nutritionally enriched (biofortified with vitamins and micronutrients such as iron and protein, vital for women and for the early growth and development of children). Extensive work is also ongoing to develop drought-tolerant and nutrient-use-efficient crops appropriate in Africa. Such powerful technologies will further increase opportunities for young people to pursue more efficient, pleasurable agricultural enterprises with high chances of success. Even without land, they can engage in a revitalised agricultural economy not controlled by large farms but with high-value crops and land-saving technologies such as modern biotechnology.

The myths surrounding agriculture, which portray it as punitive and an occupation for the desperate, should be challenged as efforts are directed to encouraging youth engagement in the sector. Radical measures such as the use of celebrities (musicians, artists, comedians, etc.) to spearhead food security campaigns could also ignite passion for agriculture among young people, as is happening in other social spheres. Platforms should be explored to promote successful youthful role models in agriculture through popular social media – for example, Facebook, Twitter, etc. – where young farmer entrepreneurs could share their experiences. Literature abounds with examples of small businesses of various sizes and industries that have transformed their online presence with innovative social media marketing practices.⁴ By organising youth for higher-tech agriculture using social media, greater receptivity could be expected,

particularly in risk aversion, mental activity and scientific understanding, since the majority of young people greatly trust social media.

Conclusion and moving forward

Agriculturalists agree that the long-term sustainability of existing food production systems will largely depend on appropriate uptake and application of modern science and technologies. Education, empowerment and motivation of young people to take up agricultural activities are a prerequisite for improved and sustainable food production in Africa given their big numbers. However, this is not an overnight endeavour and calls for long-term investment and an overhaul of agricultural education curricula and support systems that enable the youth to apply agricultural innovations in a pleasurable and profitable way. The mass media have an important role in changing this perception. With better opportunities for access to technologies, entrepreneurial skills and social marketing, young people could funnel their youthful idealism, energy and determination into a positive force for change within the agricultural sector. This would ultimately result in sustainable production of the food required to support the growing population in Africa.

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