



Raising the bar

Technological innovation, especially in mobile, will be critical to improving agricultural productivity, but R&D funding must be ramped up after years of neglect

BY WENDY ATKINS

When Ismail Serageldin, director of the Library of Alexandria, told the World Intellectual Property Organisation (WIPO) that global population growth meant food production would have to increase by 70 percent by 2050, using the same amount of water, he identified agricultural innovation as the key to solving the problem. With global efforts to improve fertiliser quality, harvesting technology and water resources, what role can R&D and mobile communications play in transforming agriculture in Africa?

"Mobile technology can radically transform smallholder farmers' access to critical and timely information," says Fiona Smith, mAgri programme director at GSMA, an association of mobile operators. "New mAgriculture services being developed allow farmers to call a helpline and get advice from an agriculture extension service provider or receive personalised daily agriculture alerts through SMS or voicemail. They can exchange up-to-date information on pests and diseases, seed and input varieties, weather, market prices and so on. In many African countries, agricultural extension agents are stretched to service up to 4,000 farmers each, which results in long delays between visits. Mobile phones provide a complementary way to reach farmers with timely and personalised information."

In Nigeria, Nokia is active in this area with Nokia Life, a phone-based information service that provides updates tailored to the subscri-

ABOVE LEFT: A Kenyan coffee farmer checks prices on his mobile

ABOVE RIGHT: Indian grape and tomato farmer Sanjay Sathe phones an agri-call centre to check the weather forecast

PHOTO: GETTY

er's needs, such as weather reports; advice on when to sow crops, use fertiliser and harvest; and current prices for crops and fish.

Meanwhile, Sustainable Harvest, an Oregon-based coffee importer, has rolled out mobile-based technology to farmers across Latin America and Africa. Its Relationship Information Tracking System collects coffee data, including information on where coffee was washed, dried and stored, to help smallholder producers increase their cooperative's competitiveness and transparency. It has piloted the technology with the Kilicafe cooperative in Tanzania.

"By tracking key data, starting from individual farmers, Kilicafe received the information it needed to maximise the availability of their highest quality coffees and identify areas for quality improvement overall," says Pam Kahl, director of communications at Sustainable Harvest Coffee Importers.

"To date the programme has registered almost 3,400 farmers and tracked 131,485 kilograms of coffee - \$170,472-worth - all using the RITS Producer system. Additionally, we found that RITS Producer reduced the time spent collecting information for grower certification schemes by 65 percent."

Mobile technology is playing a role too, with mBanking and mPayments revolutionising the way people send and receive money. More sophisticated financial services are emerging, which allow rural citizens to make and receive payments without travelling long distances or carrying lots of cash.

The implications are huge, GSMA's Ms Smith says. "Previously, the majority of smallholder farmers lacked access to financial services. Input suppliers are now able to collect and manage payments from farmers; in turn farmers can aggregate their demand for inputs. Large buyers can pay thousands of producers. Governments and development agencies can distribute vouchers for fertiliser, seeds or other inputs," she explains.

"For example, the Nigerian government provides fertiliser vouchers to 10 million of the poorest farmers in the country via mobile phones. Weather-indexed micro-insurance allows them to insure the cost of their input supply purchases against the risk of bad weather and the payouts are provided through their mobile phone."

"Mobile gave birth to mobile money and this is feeding into areas such as mAgriculture, mHealth and mInsurance," agrees Gavin Krugel, chief customer strategy officer at Fundamo, the technology company. "What we're seeing is the unintended consequence of mobile money: people in rural areas are now using it to receive payments, as start-up capital for their agricultural businesses and even for crop insurance."

NGOs, governments and banks still play an important role. Akinwumi Adesina, Nigeria's minister of agriculture and rural development, has said publicly that banks should diversify their current agricultural portfolio to meet the needs of the sector. He adds that agricultural lending is currently heavily skewed to agribusinesses, while smallholders, commercial farmers and other small and medium-sized enterprises are unable to access affordable financing.

"The time has come for Nigeria to consider raising long-term bonds to finance the agricultural sector. The rising domestic debt is certainly of concern. However, this should not be used to argue against agriculture bonds. Many countries in the world are using the so-called green bonds to power their agriculture, including China and India," he says.

NGOs are also playing a role. Researchers from Michigan State University in the US, for example, are using a \$7.8m grant from the Bill & Melinda Gates Foundation to help eight African nations improve their sustainable farming methods. Over the next four years, the team will work with 10 African universities, institutes and ministries to promote effective government strategies that help local farmers become more productive and food secure. They also aim to improve the capacity of national policy institutes to guide and support their own countries' ag-

riculture ministries and eventually to accept and manage international grants.

The emergence of mobile applications is also helping to fuel a more tech-savvy workforce in Africa. "This is enabling greater uptake of new ideas, more localisation of agency work, and more innovation through the local private sector that is increasing market options and employment," says Shaun Ferris, senior technical advisor agriculture and environment, at Catholic Relief Services. "This is all fertile ground for R&D products and processes."

"After a decade of stagnation during the 1990s, investment and human resource capacity in sub-Saharan Africa's public agricultural R&D increased by more than 20 percent between 2001 and 2008," says Nienke Beintema, head of the Agricultural Science and Technology Indicators (ASTI) initiative, which is facilitated by the International Food Policy Research Institute. But most of this growth occurred in a handful of countries and was largely the result of increased government commitments to boost very low salaries and restore neglected infrastructure. It did not translate into more funds for research.

"Agricultural research and development projects in sub-Saharan Africa are still heavily dependent on donor funding and agricultural, science, technology and innovation systems are weak," says Judith Francis, senior programme coordinator, Science and Technology Policy, at the ACP-EU Technical Centre for Agricultural and Rural Cooperation (CTA).

Ms Beintema adds: "Private sector participation in agricultural R&D remains fairly limited in sub-Saharan Africa, and only a few companies operate their own research programmes, most of them in South Africa." Although there has been an increase in agricultural R&D, she says governments should address persistent underinvestment.

"This should comprise increased long-term and consistent levels of funding to agricultural R&D. Countries with serious capacity gaps will need to address the high turnover of agricultural scientists through a series of measures. They also need to develop innovative means of training to build sufficient human resources for agricultural R&D as well as improving take-up of existing technologies. National universities also have a role to play."

There may be reason for optimism, Catholic Relief Services' Mr Ferris says: "Given the complex nature of how R&D support changes, each of the R&D partners is steadily improving their methods and means of providing solutions. They are all getting to grips with the more modern communications in Africa, which is a very transformational process."