The Biosciences eastern and central Africa Hub

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As a continent, Africa has vast natural resources, from precious metals and stones to plant, animal and microbial genetic diversity. Yet despite its natural wealth and invaluable contributions to the world's agriculture and global well-being, Africa still has 15 of the least developed nations in the world. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO) *Science Report 2010*, Africa represents only 2.2 per cent of the world's researchers. Of this, sub-Saharan Africa (excluding South Africa) represents only 0.6 per cent. These

'The challenge of food security in sub-Saharan Africa is formidable, the timeframe for action is tight and the investment required is substantial. But the potential gains for human development are immense.'

Africa Human Development Report 2012: Towards a Food Secure Future, United Nations Development Programme

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figures are unacceptable if knowledge-intensive growth for more than a billion people is to be generated. There is no reason for Africa to continue to be a continent of glaring contradictions: a land of poverty amid plenty.

However, positive change is happening and there is so much to be optimistic about. In the past decade, a number of the world's fastest growing economies happen to be in Africa, and these have further expanded even at a time that some in Europe are struggling. This growth should be backed by a strong focus on and investment in people: a well-educated, skilled, motivated and well-nourished workforce for a knowledge-intensive and sustainable growth.

Investing in Africa's capacity to deliver its own solutions

Having studied and worked abroad for much of my career as a molecular plant pathologist, I returned to Africa in 2007 to help build African science leadership. I firmly believe that by fostering a knowledge-intensive growth approach to development, we can feed our continent and avoid future famine. In order to harness Africa's vast human capital, there is a need to invest in people and to ensure that more African scientists devote their talents to addressing regional challenges.

Not only do we need to foster the talent that lies within Africa, we need to retain it. One way of doing this is to create an enabling environment for cutting-edge science through substantial and sustained investment in science, technology and innovation. Current levels of agricultural research and development (R&D) spending in sub-Saharan Africa are inadequate for agricultural growth, establishment of food and nutritional security and poverty reduction.

Studies show that investments in agricultural R&D generally provide high returns. Average rates of return have been documented in the range of 35 per cent for sub-Saharan Africa to 50 per cent in Asia in several studies. Without increased investment, Africa will continue to see ground-breaking discoveries in crops built on plant traits from African natural resources being conducted outside the continent, largely due to the shortage of bioscience researchers and adequate infrastructure on the continent.

Despite these challenges, the exciting journey to build Africa's science capacity has begun. A wide range of programmes is under way to build and strengthen Africa's agricultural research for development establishment and human capacity. In collaboration with the international R&D communities, we are seeing some real progress and exciting advancements for Africa.

The *Biosciences eastern and central Africa – International Livestock Research Institute Hub* (BecA–ILRI Hub) is one of many such initiatives. It is a leading biosciences research and capacity-building centre for Africa. Based in Nairobi, Kenya, its mission is to improve the livelihoods of resource-poor people in Africa through the development and use of new biosciences technologies. All activities focus on developing and producing technologies that help poor farmers to improve their productivity and income, secure their assets and increase their market opportunities.

The BecA–ILRI Hub was developed within the framework of the New Partnership for Africa's Development (NEPAD)/African Union African Biosciences Initiative. The establishment of the BecA network, alongside three others – the North Africa Biosciences Network, the Southern Africa Network for Biosciences and the West Africa Biosciences Network – is in line with the aim of the Comprehensive Africa Agriculture Development Program (CAADP): to help

African countries reach a higher path of economic growth through agriculture-led development.

The BecA–ILRI Hub serves 18 countries of Eastern and Central Africa, namely Burundi, Cameroon, Central African Republic, Congo Brazzaville, Democratic Republic of the Congo, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Kenya, Madagascar, Rwanda, São Tome and Principe, Somalia, South Sudan, Sudan, Tanzania and Uganda. While keeping a focus on its mandate in the region it is responding to the growing demand for its services across the whole of Africa.

Specifically, the BecA–ILRI Hub provides a common biosciences research platform, research-related services and capacity-building and training opportunities. These activities provide a focal point for the African scientific community and the aim is to support the activities of national, regional and international agencies and staff as they address agricultural problems of the highest priority for alleviating poverty and promoting development.

World class research facilities

In May 2003, Canada's commitment of CAD$30 million from the Canada Fund for Africa enabled the establishment of the BecA laboratory facilities; bringing Africa's research capability up to par with that of the world's most developed countries. Africa's scientists can now comfortably venture into new realms of science, using cutting-edge equipment without the constraints of inadequate laboratories, and without having to incur prohibitive costs and face restrictive regulations to conduct the same research overseas.

Many scientists have already used the capacities of the BecA–ILRI Hub in the crop, livestock and microbial sciences. The biosafety level containment

laboratory, BSL-3, is one of a handful in Africa for research on animal pathogens constraining livestock health in Africa. In order to serve the region's full agricultural improvement needs, the BecA–ILRI Hub also has state-of-the-art crop and microbial research laboratories. These include a non-containment tissue culture laboratory, BSL-2 plant transformation laboratories and a comprehensive bioinformatics platform for genome and meta-genome sequencing, as well as a greenhouse complex including three BSL-2 greenhouse compartments.

Building African science leaders

In order to address the lack of sufficient expertise in science and technology in Africa, a strong programme in capacity-building and training is central to the success of the BecA–ILRI Hub initiative. A highly skilled, healthy and well-paid workforce is critical in making Africa productive and globally competitive.

The Africa Biosciences Challenge Fund (ABCF) is a new and innovative way of enhancing African biosciences capacity while tackling agricultural constraints. It was established as part of the BecA–Commonwealth Scientific and Industrial Research Organisation (CSIRO) partnership with initial funding from the Australian Agency for International Development (AusAID). Subsequently, the Bill & Melinda Gates Foundation and the Swedish Ministry for Foreign Affairs through the Swedish International Development Cooperation Agency (Sida) have become valued contributors. The Syngenta Foundation for Sustainable Agriculture, an early technical and financial supporter of the Hub, also contributes core support to the ABCF initiative and other activities that help make the facilities accessible to the greater

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African scientific community. Research and capacity-building under ABCF is conducted via hands-on training workshops and provision of research fellowships to early-career African scientists with placements for periods of three to six months at the Hub to undertake research projects. The ABCF also funds institutional capacity-building and visits to BecA countries to raise awareness about the Hub, helping identify talents and agricultural research constraints.

Between 2007 and 2011, the BecA–ILRI Hub facilities and skills have been accessed by 316 graduate students and visiting scientists. Furthermore, 1,733 young Africans have received training in various biosciences-related fields at 54 events during this period. This demand is expected to grow significantly in the coming years as the Hub diversifies its own services and capabilities and strengthens relationships with international and African R&D institutes. The Hub has been identified as one strong networking model for making progress in capacity-building coupled with research that can lead to enhancing the productivity of the agricultural sector.[1]

Most importantly, the BecA–ILRI Hub enables collaborative research amongst African and international scientists focusing on neglected and under-researched areas that address food security. Agricultural research systems in sub-Saharan Africa are fragmented into nearly 400 distinct research agencies across 48 countries. Centres like the Hub facilitate synergies of skills and knowledge and create efficiencies in R&D in parts of Africa, thus ensuring that maximum benefits are realised for farmers and communities.

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It is my strong belief that the BecA–ILRI Hub model provides a platform for success that can be duplicated in other

regions across Africa. By advancing the science and technology capacity through institutions, we can help to provide the science that addresses food and nutritional insecurity. Initiatives like BecA are creating the next generation of technological innovators who will lead the coming agricultural revolution from within Africa, enabling a bright future for the continent.[2]

Global support from investors

BecA-ILRI Hub's global investors include AusAID, the Bill & Melinda Gates Foundation, the Syngenta Foundation for Sustainable Agriculture, the Swedish Ministry for Foreign Affairs (through Sida) and the Canadian International Development Agency.

References

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