Scoping Study

Africa-Britain-China (ABC) Agricultural Technology Research Collaborations for International Development

Executive Summary

29 February 2016

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The prospective Africa-Britain-China (ABC) trilateral agricultural technology (agri-tech) research programme has the potential to contribute to Africa's agricultural transformation. Research, development, adaptation, and adoption of sustainable agri-tech solutions will help Africa meet the future demands and challenges of the agricultural sector. A strong and growing agricultural sector will in turn help feed Africa's growing population and contribute to an expected $1 trillion agri-food industry by 2030.

The notion of this programme is being conceptualised in the context of significant international support to increase food security and improve nutrition through sustainable agricultural intensification, as well as to promote multilateral collaborations (North-South and South-South) for international development. However, significant gaps still exist in agricultural research and development (R&D), which this programme could address by mobilising public, private, and academic research expertise to develop and scale up new agricultural technologies that support critical value chains in Africa. Furthermore, a programme that could catalyse technology, innovation, and knowledge exchange is aligned with the United Nation's Global Goals for Sustainable Development as well as with Britain's, Africa's, and China's development strategies and national / continental interests.

In this Scoping Study, Elsevier B.V. (Elsevier), Development Finance International, Inc. (DFI), and CAB International (CABI) (hereafter "Consortium") present their findings and recommended approach for the design of a future programme in this report of the Scoping Study. To carry out this Scoping Study, the Consortium employed a programmatic and iterative approach, skilled experts with global networks, and a deep knowledge of current and past global agricultural programmes. The Consortium conducted a comprehensive assessment including: i) a bibliometric analysis of peer-reviewed and non-peer reviewed scientific publications, ii) a desk-based review of key strategy, policy, investment, and programme documents, iii) consultations with 157 stakeholders across Africa, Britain, and China, and iv) four consultative workshops. The findings from these four work streams are synthesised in this report, feeding into the four programme design options presented in Section VI and into the key decision points to be made in Section VII.

Key Findings

Through consultations and four workshops conducted in London, Beijing, Accra, and Nairobi, stakeholders confirmed receptivity for a trilateral ABC agri-tech research programme, understanding that the potential programme was still in the early stages of design. Broadly speaking, stakeholders agreed that there is a clear need to increase agricultural R&D for Africa and that a trilateral approach with Africa, Britain, and China could bring value by tapping into complementary expertise. Designing and launching an ambitious programme of this nature will come with some challenges and possible delays, but stakeholders agree that the potential for impact would justify the effort. The key findings in this Scoping Study will serve as a foundation for the Steering Committee and future institutional partners to take the trilateral agri-tech research programme forward.

African Agricultural Challenges: Macro-drivers such as climate change, population growth, and increased international trade, among others will shape the challenges in African agriculture over the next 20 years. The Consortium identified 12 broad technical challenges, as well as three other key challenges that indirectly impact African agriculture including the need to: i) increase and scale adoption of scientific research outputs, ii) build local African research capacity by attracting more youth and women, and iii) strengthen the policy and regulatory environment to promote and facilitate agri-tech research and development. With well below average investments in Africa's

agricultural R&D, a trilateral agri-tech research programme may attract further investments in agricultural R&D, which could have a multiplier effect and drive innovation and technology deployment to address Africa's agricultural challenges.

ABC Areas of Expertise: Africa, Britain, and China are well-positioned to address many of Africa's agricultural challenges over the next 20 years, whereby Africa brings a deep understanding of the needs on the continent and local context, Britain brings basic science research excellence in both agricultural technology and implementation science, and China brings strong experience in applied science, adapting, and scaling agricultural technologies and innovations. Specific technical areas in which ABC expertise align with African agricultural challenges include priority value chains in Africa such as aquaculture / fisheries and livestock / poultry, as well as key value chain segments such as inputs (e.g., seed and soil science) and post-harvest production (e.g., agro-processing and food safety).

ABC Collaborations: Research collaborations between ABC account for 12.2% of Africa's total agricultural research publications. However, this is largely driven by bilateral collaborations between Africa and Britain, and Africa and China, whereas ABC trilateral collaborations are less common, accounting for only 0.28% of Africa's total agricultural research publications. Africa-Britain research collaborations have focused on research on pests and diseases (637 co-authored publications from 2005 to 2014, or more than one in ten co-authored publications between Africa-Britain in AgBio research) and agricultural output (550 co-publications). Africa-China research collaborations have also focused on pest and diseases (128 co-authored publications) but also topics relating to value chain efficiency (127 co-authored publications). Many of these research collaborations are based on long-standing partnerships between ABC institutions. It will be important for a future trilateral agri-tech research programme to build on existing research collaborations and networks as well as existing ABC development programmes and initiatives.

Feasibility: There are key developmental, political, and practical trade-offs to be considered when the programme is taken forward. Some of these trade-offs may be in direct conflict with one another (e.g., what may be politically expedient may not be considered best practices for international development). As noted above, there is broad receptivity, yet the challenge will be to flesh out the details of programme design in such a way that ensures a workable arrangement across funders, investors, and other institutional partners. It will be critical to work closely with the partners during each step of the design process to ensure the programme's alignment with all partner priorities, particularly as many initial decisions will impact downstream programme decisions

Though many trade-offs will need to be considered going forward, consulted stakeholders broadly agreed on the following upon reflecting on the six areas for consideration: Technical, Political, Governance, Financial, Private Sector Engagement, and Administrative:

- Emphasise integration of implementation science
- Increase agricultural R&D investments and capacity in Africa
- Take a value chain approach
- Promote African ownership and align with Africa's priorities
- Engage at higher political levels to seek co-funding
- Partner with the private sector
- Allow sufficient time

This Scoping Study presents four programme design options, integrating these points of agreement while highlighting differentiating aspects. Each design option has a Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis, which draws out some of the key trade-offs. Two of the

programme design options follow a more traditional R&D fund model, the third option presents a "centres of excellence" model, and the fourth option proposes scaling up an existing programme. These four programme designs offer a menu of options from which the trilateral agri-tech research programme could be designed.

Decision Points and Next Steps

Based on the findings of this Scoping Study, key decisions will need to be made in the early stages of the design process in order to mitigate potential challenges. The following, among others, will be critical to flesh out a preferred programme design option:

- Determine co-funding requirements from China
- Define programme's geographic scope
- Select programme structure
- Decide programme management
- Define role of the private sector

The Consortium notes that the decision making process may be challenging. Nonetheless, it is important to remember the strong receptivity for the agri-tech research programme and high potential to achieve impact through this trilateral approach. Should the programme move forward in the future, it has the potential to strengthen ABC's capacity to develop and adapt agri-tech research, innovation, and knowledge exchange that could contribute significantly to Africa's agricultural transformation and improve the livelihoods for many African food producers.

Structure of Report

The Scoping Study is organised as follows:

Section I: Objective, Rationale & Methodology of Scoping Study: Presents the objective for the Scoping Study, alignment with ABC strategies, and the programmatic approach implemented by the Consortium

Section II: Africa's Agricultural Challenges / Needs: Presents key findings around the future challenges facing African agriculture over the next 20 years

Section III: Africa, Britain, and China Agri-Tech R&D Expertise: Outlines the key technical areas of expertise in ABC to respond to Africa's challenges

Section IV: Past / Ongoing ABC Collaborations: Presents the technical and geographic scopes covered by recent ABC research collaborations

Section V: Feasibility of ABC Trilateral Programme: Synthesises stakeholder feedback around the Technical, Political, Financial, Governance, Private Sector Engagement, and Administrative aspects of the programme design

Section VI: Programme Design Options: Outlines a theory of change and four potential programme designs, each with a SWOT analysis

Section VII: Decision Points and Next Steps: Highlights key areas on which the Consortium requests guidance from the Steering Committee in order to flesh out the preferred option

Section VIII: Annexes