Eastern and Southern Africa Higher Education Centers of Excellence Project

Project Background, Description, and Results Framework
(draft)

(a reference document for the Call for Proposals)

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ABBREVIATIONS AND ACRONYMS

ACE  Africa Higher Education Centers of Excellence
ACE I Western and Central Africa Higher Education Centers of Excellence Project
ACE II Eastern and Southern Africa Higher Education Centers of Excellence Project
AU  African Union
CBA  Cost-Benefit Analysis
DAAD German Academic Exchange Service
DLI  Disbursement Linked Indicator
EAC  East African Community
EEP  Eligible Expenditure Program
ESA  Eastern and Southern Africa
ESMP  Environmental and Social Management Plans
FM  Financial Management
GDP  Gross Domestic Product
GRS  Grievance Redress System
ICP  International Comparison Program
ICT  Information and Communication Technology
IDA  International Development Association
IEC  Independent Evaluation Commission
IPF  Investment Project Financing
IRR  Internal Rate of Return
IS  Implementation Support
IUCEA  Inter-University Council for East Africa
MoU  Memorandum of Understanding
MoF  Ministry of Finance
M&E  Monitoring and Evaluation
NIH  National Institutes of Health
NPRC  National Performance and Review Committee
PASET  Partnership for Applied Science, Engineering and Technology
PDO  Project Development Objective
PPA  Project Preparation Advance
PPF  Project Preparation Facility
P-RAMS  Procurement Risk Assessment and Management Systems
RFU  Regional Facilitation Unit
RSC  Regional Steering Committee
R&D  Research and Development
RUFORUM Regional University Forum for Capacity Building in Agriculture
SADC  South African Development Community
S&T  Science and Technology
SSA  Sub-Saharan Africa
STI  Science, Technology and Innovation
STEM  Science, Technology, Engineering and Mathematics
TVET  Technical Vocational Education and Training
USAID United States Agency for International Development
STRATEGIC CONTEXT

A. Regional Context

1. Sub-Saharan Africa (SSA) experienced remarkable economic growth, improvement in human development, and boost in productivity. Annual Gross Domestic Product (GDP) growth has accelerated from an average of 2 percent in the 1990s to 5.5 percent in the last decade. Putting South Africa aside, low-income economies grew at 6 percent (a compound annual growth rate of 8.16 percent\(^1\) for years 2000-14), surpassing the world average and the average of similar countries in Europe and Central Asia, East Asia and Pacific, and Latin American and Caribbean region. Domestic productivity in agriculture and manufacturing, and foreign investment (reached $43 billion by 2013\(^2\)) are main forces driving this vigorous growth. The share of the population living below the poverty line ($1.25 per day) in the region declined from 57 percent in 1990 to 47 percent in 2014. The African middle class has tripled in size over the past 14 years and the boom is gathering speed\(^3\). Overall, the growth has been driven largely by relatively sound fiscal policy, improved business environment, domestic production and consumption power, and increased trade and investment in specific sectors including agriculture, extractive industries, infrastructure construction, services, information and communication technology (ICT), and tourism.

2. Eastern and Southern Africa (ESA) shares the growth dynamics, with a heavier reliance on agriculture and manufacturing sectors. From 2003 to 2013, annual real GDP growth in the region averaged 5.3 percent. Some East African countries such as Rwanda, Tanzania and Uganda have averaged an annual GDP growth rate around 7 percent during the same period.\(^4\) Growth in oil, gas, mining, and agriculture together proportioned 60 percentage of the overall economic growth. These large sectors and their potential of growth attracted significant amount of foreign investment inflow. East Africa alone has grown by 11 percent ($6.8 billion).\(^5\) These investments are mainly targeting on the fast expanding sectors, such as gas in Tanzania and the textile sector in Ethiopia.

3. Despite these periodic achievements Africa—in particular the ESA countries—will remain challenged in terms of (a) global competitiveness with other fast-growing and maturing regions and emerging economies, (b) its own growing population and increasing longevity\(^6\), compounding its ability to effectively address the demand for higher productivity, human capital, and more advanced technology, and (c) its ability to mount regional and sub-regional integrated approaches to improve its global competitiveness by pooling its investments regionally in human capital creation. Robust economic growth comes with higher demand for sustainable productivity and human capital gain. Africa is at its turning point in solving these immediate challenges in the next couple of decades. Many countries in ESA are still suffering from low productivity in major industries, slow adoption of advanced technology, and a shortage of demand-driven human capital accumulation. The status quo—capital

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\(^1\) Compound annual growth rate (CARG) formula: \(\left(\frac{\text{End Value}}{\text{Start Value}}\right)^{\frac{1}{\text{Periods} – 1}} - 1\)


\(^3\) “Africa’s middle-class boom is real,” Geoffrey York, The Globe and Mail, August 19, 2014

\(^4\) IMF World Economic Outlook


\(^6\) Uganda, for example, is among the countries with the highest population growth rate in the world, at 3.3%; at this rate it takes Uganda a mere 21 years to double its population (e.g. from 38 million in 2014 to 76 million in 2035); several ESA countries experience the same demographic pressures—see Figure in Annex 1, page 42
stock in both human and resource—will not be sufficient to lead Africa to grow further in a sustainable manner. ESA requires a systematic and strategic approach to focus on development areas including science and technology (S&T), innovation, health, and agriculture. This requires investment in human development in exchange for capital creation and the capacity to advance technology and innovation.

4. **Skill shortages and talent needs in science and technology are severe in energy, infrastructure and manufacturing, agriculture, health, and education and applied statistics.** The level of scientific and technological capacity embodied in the future ESA workforce will be critical to transforming the economies. This skills shortage is severe in the following sectors:

(a) **ESA needs highly skilled African professionals with specialized knowledge in Science, Technology, Engineering and Mathematics (STEM) skills in Energy, Infrastructure and Manufacturing.** Science, Technology, Engineering and Mathematics (STEM) skills are in high demand for developing businesses and innovating for increasing production. But ESA countries are not producing graduates in priority sectors to cover the demand (Table 1). Only 8.79 percent of higher education graduates in Burundi have studied science and only 0.79 have graduated in STEM. In Mozambique, only 2 percent of graduates are in science and approximately 4 percent in STEM. There are significant skill gaps in emerging sectors with high growth potential such as the oil, gas and mineral industries in Kenya, Mozambique and Uganda. These industries require civil, electrical and petroleum engineers, mechanical technicians and geoscientists. In Kenya, Malawi, Mozambique, Tanzania and Zambia, where mining is an important industry, there is a shortage of workers with skills and knowledge of mineral extraction and process (many mining companies in ESA countries continue to employ expatriate mining engineers, e.g. from Australia, jobs not performed by African mining engineers due to insufficient production of them). In Africa, over the next few years, energy generation is expected to grow by 9 percent annually with a projected annual investment of over US$ 10 billion, signifying huge opportunities. However, firm surveys show a shortage of highly skilled staff especially civil and electrical engineers as well as S&T skills for infrastructure, construction and transport.

Table 1. Percentage of higher education graduates by field of Study

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<tbody>
<tr>
<td>Education</td>
<td>30.15</td>
<td>33.55</td>
<td>20.40</td>
<td>28.21</td>
<td>8.82</td>
<td>34.84</td>
<td>22.59</td>
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<tr>
<td>Humanities and Arts</td>
<td>1.36</td>
<td>7.82</td>
<td>6.28</td>
<td>3.42</td>
<td>3.14</td>
<td>5.49</td>
<td>8.29</td>
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<tr>
<td>Science</td>
<td><strong>8.79</strong></td>
<td><strong>10.36</strong></td>
<td><strong>12.78</strong></td>
<td><strong>2.00</strong></td>
<td><strong>11.25</strong></td>
<td><strong>3.13</strong></td>
<td><strong>9.61</strong></td>
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<tr>
<td>Social Sciences,</td>
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<td></td>
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<tr>
<td>Business and Law</td>
<td>39.63</td>
<td>30.14</td>
<td>25.52</td>
<td>47.47</td>
<td>48.18</td>
<td>37.57</td>
<td>36.22</td>
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<tr>
<td>Agriculture</td>
<td><strong>4.81</strong></td>
<td><strong>7.68</strong></td>
<td><strong>7.96</strong></td>
<td><strong>4.61</strong></td>
<td><strong>7.90</strong></td>
<td><strong>2.61</strong></td>
<td><strong>2.04</strong></td>
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<tr>
<td>Engineering,</td>
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<tr>
<td>Manufacturing and</td>
<td><strong>0.79</strong></td>
<td><strong>4.88</strong></td>
<td><strong>17.45</strong></td>
<td><strong>3.82</strong></td>
<td><strong>11.20</strong></td>
<td><strong>6.40</strong></td>
<td><strong>19.78</strong></td>
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<tr>
<td>Construction</td>
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7 Firm surveys.
(b) **Skill constraints, slow adoption of technology and barriers to women have resulted in low levels of agricultural productivity** (figure 1), which in turn has *exacerbated the food insecurity challenge and deepened poverty*. The SSA region’s food imports are soaring, reaching US$ 50 billion annually. While the value of the food market in Africa is predicted to rise threefold in the coming decades, this demand will not be met by the agriculture sector as it stands now due to superior global competition in terms of price, quality, reliability and uniformity. Agricultural companies in Africa complain that the lack of skilled labor has impeded the expansion of the agro-processing sector. Throughout the value chain, there is a shortage of agribusiness specialists/managers, veterinarians, agronomists, water & irrigation engineers, and food preservation and processing specialists. Compared to the Latin America region, there has been a slow adoption of technology such as fertilizer usage, mechanization, and seeds of higher yield. As Figure 1 illustrates, agricultural productivity in SSA lags behind the other regions. Adoption of technology occurs at much lower rates in regions with skill shortages, particularly in S&T. Despite being a significant share of the agricultural labor force, women find barriers when it comes to access to land, markets, finance and technology.8 Productivity can be improved by the development of farming skills, partnerships and education9, and by promoting regional collaboration in research and development (R&D) and innovation.

**Figure 1: Agricultural Productivity by Developing Region**

Source: De Janvry and Sadoulet, 2010 cited by FARA

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8 AGRA, 2013.
9 Spillover effects are observed where uneducated farmers can improve their productivity by observing farming methods of educated farmers.
(c) The low life expectancy in ESA can be traced to a myriad of health challenges, local to the region and exacerbated by the lack of regional collaboration and integration. Life expectancy is 60 and 59 years for Eastern and Southern Africa respectively, much lower than the global average of 71. Most countries in the ESA region and the SSA region in general are susceptible to parasitic and infectious diseases that have been eliminated elsewhere. For instance, SSA is home to the majority of malaria cases, and tuberculosis is spreading across the continent. The ESA countries, including South Africa, were the world’s epicenter of the HIV/AIDS epidemic and they continue to face serious challenges dealing effectively with the epidemic and its longer-term consequences (incl. the higher tuberculosis infections that come with it). The recent outbreak of Ebola caused more than 10,000 deaths, albeit mainly in West-Africa this time (Ebola’s origins, however, are in DR Congo, not far from the western borders with Uganda, Rwanda and Burundi). The Organization for Economic Co-Operation and Development (OECD) pharmaceutical industry is largely focused on the development of drugs and vaccines that will address diseases afflicting the more lucrative OECD markets. Almost all medical technology and equipment in hospitals is imported and the lack of local knowledge means these are not always best suited to the local conditions. Though Africa is home to only 2 percent of the vehicles in the world 16 percent of the world’s traffic fatalities occur in Africa, largely due to a combination of lax regulatory policies, poor infrastructure and policing and lack of emergency care. Regional collaboration which would lead to better coordination of health policies, regulations on drugs, health & medical education, mobility of people and local R&D remains very weak in the region.

(d) The education system is affected by a low quality teaching force and a lack of managerial skills, especially in math and science, from primary to tertiary levels of education. The poor quality in education affects 150 million primary school students in SSA, 52 million secondary education students, and 7.2 million tertiary education students. The poor quality especially at the primary and secondary levels is a significant obstacle since these students are then impeded in their efforts to access vocational and/ or higher education. Student teacher ratios at all educational levels are much larger than the rest of the world. At the core of this shortcoming lie poor teaching competencies across the board, but particularly in math and science, managerial skills of school administrators, and weak African capacity to educate innovative and efficient teachers, school leaders, and administrators. Most undergraduate and postgraduate education remains rooted in traditional 20th century curriculum structures, lacking the benefit of modern higher education methodologies and more horizontal interdisciplinary curricula. These are critical issues because low quality education systems will lead to weaker future generations with major handicaps to create knowledge and initiate positive change for the society.

(e) The absence of data in terms of timely availability and quality is a serious constraint to the promotion and monitoring of policies that will lead to improved

12 WEF, 2014.
outcomes in labor markets and various economic sectors. In SSA countries, data is simply not available or is of inadequate quality in certain sectors such as employment, road safety, and non-communicable diseases. Without adequate and reliable data, it is impossible to plan interventions without the ability to know the reality or having the ability to monitor and track progress. The lack of skills in terms of both quantity and quality is a major issue to improve statistical data. The lack of highly trained statisticians inhibits the region’s ability to provide crucial data and associated analyses to improve fact-based policy in a wide array of sectors. The National Statistical Offices and other services of national statistical systems (agriculture, education, vital statistics, etc.) need high level and experienced staff involved in the production of statistics.

B. Sectoral and Institutional Context

5. The challenges facing ESA’s quest for economic transformation and stability are enormous, and addressing them requires sufficiently high-skilled personnel. First and foremost, ESA needs to develop its human capital to overcome skills shortages, especially in the areas of energy, infrastructure and manufacturing, agriculture, health and innovation in science and technology. Second, the region is challenged by the quantity and quality of teaching and research. Third, by preventing women from fully participating in higher education and/or labor force, ESA is undermining its own economic growth. Fourth, the region has a low capacity in producing research and technological innovation essential to address development challenges that are unique to the ESA region and which require a local response. Fifth, there is little partnership and regional collaboration within the region, whether between academia or academia and industry or African diaspora. Finally, the lack of readily available and reliable data and the capacity to analyze said data, undermines any effort to combat barriers to human development.

6. The development challenges facing ESA can be bridged by investments and improvements in the following areas:

(a) Higher education ESA is under-developed, and the region faces severe constraints in terms of attaining a critical mass of human capital. Despite recent rapid expansion in enrollment in the region, comparatively higher education among ESA countries is low. In Zambia, higher education enrollment is only 1 percent, and it is 5 percent in Ethiopia, Malawi, Mozambique, and Rwanda,\(^\text{13}\) which is low compared with world average of 30 percent and low income country average of 9 percent. Female enrollment in higher education is low, with rates of just 1 percent in Malawi and Ethiopia,\(^\text{14}\) 6 percent lower than the world average of 7 percent. In STEM courses, female enrollment is only 9 percent of the total enrollment in Tanzania.\(^\text{15}\) Despite being a dominant share of the labor supply in agriculture (80 percent in Tanzania and 91 percent in Mozambique),\(^\text{16}\) female participation in agriculture and related courses is less than 25 percent in many countries.\(^\text{17}\) In Eastern and Southern Africa, at the postgraduate level, only 16 percent of female students are enrolled in agricultural


\(^\text{15}\) Hanekom, 2014.

\(^\text{16}\) AGRA, 2013.

\(^\text{17}\) Zséleczky, 2013.
programs. Investment in teaching and research faculty will allow for the expansion of higher education and improve quality. For example, in Kenya, 290 doctorates graduated in 2013, while enrolment expanded by 80,000. Even assuming full employment of all new PhD holders, the ratio of new qualified faculty to new students was 1:275. The production of Master’s and PhD has to be dramatically ramped up to safeguard the quality of higher education quality and leads to higher research capacity.

(b) **Innovative solutions to development challenges requires an Africa being an active knowledge creator than a passive recipient.** Africa contributes to only 0.07 percent of global patent applications. The region produces some of the lowest researchers in the world with Rwanda, Malawi, Uganda and Zambia produces only 123, 225, 325 and 356 researchers respectively. This is in comparison to Indonesia which has produced more than 20,000 researchers and Malaysia with 47,242 researchers. Africa only produces one or less scientist/engineer per 10,000 people; developed countries produce 20-50 engineers/scientists PER 10000. Improving these indicators is a top-priority for knowledge-based economic growth in Africa. Such investment will generate high quality professionals with higher order skills, entrepreneurial spirit, and research capacity within S&T fields. Part of the driving force of the East Asian economic miracle was a dramatic buildup of a technical and technological workforce prepared by an ever-improving education and applied research system, in close coordination with well thought-out national and sector policies. These are also capacities which the region requires for sustaining and accelerating economic growth, and for addressing challenges in energy, infrastructure and manufacturing, agriculture, health and education and applied statistics.

**Figure 2: % of Total Article Output by Field (2012)**

![Figure 2](source: Scopus (from WB, 2015))

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19 The investment will stipulate an initial prioritization of teaching over research faculty, integrating both later and ensuring that teaching is structurally informed by research findings and evidence.
(c) **Regional collaboration is required to increase local capacity of research in ESA to effectively tackle development challenges and bolster quality.** Research collaboration within the region is extremely low. Excluding South Africa, only 2 percent of research in Eastern Africa and 2.9 percent in Southern Africa results from inter-regional collaboration. Since increasing the quality and ranking of academia and research has been shown to benefit significantly from regional and international collaboration, most countries in the region rank low in the quality of their scientific research and their available pool of scientists and engineers.\(^{21}\) Despite low R&D production, existing publications are heavily relying on external support from developed countries (Figure 3) without the concomitant intrinsic national or regional African counterparts (e.g. Swiss, German or U.K. scientists just doing “their” research in ESA countries, without creating ESA research capacity and African scientists in the process). 80 percent of research publications in Southern Africa and more than 70 percent in Eastern Africa is the result of collaboration with Western researchers. (South Africa, among all ESA countries, has the strongest capacity in producing publications without collaborating with Western researchers.) This signifies a deficiency in the internal capacity to produce quality research, and has repercussions for the direction or focus of research. The fact that ESA lacks local capacity dealing with reducing the prevalence of malaria, HIV/AIDS and tuberculosis is another example of the shortage in scientists and researchers in the region.

![Figure 3: Level of International Collaboration (2012)](source: Scopus (from WB, 2015))

(d) **Partnerships with industry and diaspora is critical to achieve necessary quality and cover the range of required skills.** Higher education is widely regarded as having a strong effect on stimulating economic growth. However, country cases have shown clear evidence of skills mismatch and disconnect between the supply and demand. Equipping students with the most labor market relevant education and training is the most efficient way to maintain the momentum and foster further growth in major

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\(^{21}\) Global Competitiveness Report, 2015.
industries. In addition, public sectors in ESA have absorbed the majority of the higher education graduates in the past. However, the demand will stagger because public sectors usually do not expand or grow fast. The potential lies within private sectors. This requires a more proactive engagement with private sectors through three approaches: (i) from the systematic perspective, governments and institutions need flexible regulations to ensure a more vigorous partnership with private sectors for resource inflow; (ii) from the institutional perspective, there is a demand for a proactive engagement with private sectors in R&D collaboration, program and curriculum design and (iii) from the planning and analytical perspective joint public-private sector labor market analysis per discipline or profession would provide the necessary data and evidence as to employment and job creations by sector.

(e) ESA countries suffer from insufficient financing and from internal inefficiency issues in their higher education system. Historically, private cost to attend higher education is much higher in ESA countries than the rest of the world (more than 80 percent of non-food expenditure per household per student in poorer families). This is already accounting for government subsidies and the high public unit cost (an average of over $1,500 per student per year). Some of the governments in ESA stated clear commitment by increasing public investment in higher education. However, this never stimulated higher enrollment, nor generated more incentives for students to pursue higher education. R&D funding, as a portion of overall higher education investment, remain very low in ESA countries. This goes along with the lack of focus, weak connection with industry, and the existing low capacity in initiating R&D activities. An innovative co-financing approach, together with engagement of the private sector and well targeted areas for development could address this issue more effectively.

7. In light of the development challenges in ESA, Africa Higher Education Centers of Excellence (ACE) aims at fostering local capacity and empowering local communities to help create an Africa with highly skilled professionals with a foundation in Science, Technology and Innovation (STI). Maintaining the development momentum needs a collective effort of boosting capital (human and material), and a strong focus to feed the needs in fast growing areas such as energy, infrastructure and manufacturing, agriculture, and health. In the case of ESA, there’s clear evidence of skills and capacity shortages in areas above. Enlarging access to high quality resources, investing in critical mass of human capital (teaching force, researchers, and students), engaging closely with private sectors, and generating cost-efficient mechanisms are necessary and urgently needed within the region. ACEs will help ESA countries to initially establish platforms within targeted development areas to create innovative and creative solutions. Setting such foundation helps to encourage local initiatives to scale up models as such. This would eventually help to build stronger local communities and sustain knowledge and innovation generation within ESA.

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22 This goes so far as the weakly targeted public funding of medical specialization residencies of ESA postgraduate students abroad, for example in Mumbai, India, in view of the absence or lack of capacity in Kenya to provide postgraduate education to train as a medical specialist (e.g. as a pathologist, radiologist or a cardiologist), the Kenyan Government is subsidizing from general revenues the training of a fairly large number of Kenyan graduate students at medical schools and teaching hospitals in Mumbai (not too far away from Kenya, after all), at the expense of foreign currency reserves and without guarantees of a return; in some cases this amounts to reverse development financing by poorer countries to health care human capital creation in richer countries.
8. The ACE project sets a global example for effectively stimulating collaboration, networking, and partnerships to cost-effectively solve development issues. The establishment of ACEs strategically provide a solution with a strong collaboration among centers of excellence, a broad sources-sharing network, and innovative partnership mechanisms to closely connect with private sectors. ESA countries share similar development issues such as the shortage of highly skilled labor, low capacity of R&D in STI, and the increasing demand for productivity increase. ACEs strategically provide a solution for the common issues within ESA. Through the collaboration among ACEs, R&D capacity could be reconstructed by pooling and sharing high quality faculty, researchers, and well-trained students. ACEs bring together resources through information technology, and best utilize local strengths and advantages, and advance technology through the most cost-efficient way. A stronger partnership with the private sector not only ensures the higher private return to higher education for ACE graduates, it also stimulates a system that enables more institutional autonomy and practicality of program design. By best utilizing geographical specialties and existing human capital resources, ACEs will serve as a successful example for regional initiatives to generate spill-over effects that maximize benefits with a strong focus in areas that are in severe need for development.

C. Higher Level Objectives to which the Project Contributes

9. The proposed Eastern and Southern Africa Higher Education Centers of Excellence Project (ACE II) is fully aligned with Pillar 1 of the World Bank’s Africa Strategy: to strengthen competitiveness and employment through the production of quality high-skilled human resources in priority growth sectors. Through a sector-based approach, ACE II is designed to identify and address higher skills and innovation requirements for priority sectors in the region. There is extensive global evidence on the importance of higher education in helping to build critical human capital and drive innovation and growth. Countries in SSA have lagged behind in developing the higher education sub-sector, thereby jeopardizing their growth potential. ACE II is designed to help address this issue through the creation of Regional Centers of Excellence that address critical human resources and innovations in priority sectors and will have the potential to become the regionally leading scientific and academic institution in its particular field among all the ESA countries and serving all of them collectively with regard to the development challenge they all face together.

10. ACE II is a complement to other regional initiatives in Africa that focus on developing science and technology skills through collaboration and partnerships. This includes the World Bank supported Partnership for Applied Sciences, Engineering and Technology (PASET) which seeks to build the technical and scientific skilled labor force for priority sectors, from the technical/vocational to higher education levels as well as research, to support the structural transformation of Africa and position itself more competitively worldwide.23

11. The countries within the ESA region strongly endorse a regional approach to higher education. There has been strong interest in establishing regional centers of excellence. All ten countries participating in ACE II – Burundi, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Tanzania, Uganda, Zambia, and Zimbabwe – have emphasized the alignment of the project with
their national development priorities. By pooling regional resources, these countries aim to improve the quality of training and research in higher education, and thus reduce the skill gaps in critical areas. The project is also synched with sector strategies for Africa such as the African Union (AU) Comprehensive African Agriculture Development Project and the Science, Technology, and Innovation Strategy for Africa. The East African Community (EAC) and the Southern Africa Development Community (SADC) are also working towards regional integration to achieve development objectives within their respective regions. While the interest of Governments for the ACE approach is strong, demand from ESA universities and other scientific institutions (who in several cases are fairly autonomous from their Governments) for an ACE Program is equally pronounced.

12. **The project is part of the Regional Integration Assistance Strategy which coordinates interventions for regional public goods.** The strategy foresees the proposed operation as facilitating economies of scale in the use of facilities, equipment and staff in specialized fields; to share innovations and good practices in teaching and learning; and to enhance cross-border research networks. The project also seeks to support the Bank’s efforts for regional integration in the Sahel and Greater Horn initiatives by fostering higher education collaboration between these countries.

13. **The project aligns with Country Assistance Strategies of the participating countries in three ways:** (i) strengthens on-going national operations to promote skills through a regional instrument (Malawi, Mozambique, and Tanzania); (ii) supports priority growth sectors through investments in skills and innovation (Rwanda, and Tanzania); and (iii) raise youth employability and skills (Kenya, Mozambique, Tanzania, and Uganda). National governments and universities view this project as an opportunity to scale up regional collaboration in higher education, establish high-quality regional programs to train faculty in critical development priority areas, establish a new model for business-academia collaboration, and reach a hitherto unachieved level of quality in higher education in the region.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

14. **The Project Development Objectives (PDO) for the proposed ACE II is to establish and strengthen specialization and collaboration among a network of higher education institutions in the Eastern and Southern Africa region to deliver relevant and quality education and applied research to address key development challenges facing the region.**

**Project Beneficiaries**

15. The IDA credit beneficiaries are:

(a) Students in participating universities and their partner institutions across Eastern and Southern Africa who will benefit from high quality education and training in high demand areas;

(b) Employers and targeted industries who will have easy access to high quality/skilled personnel, results of applied research, and scientific knowledge for productivity
improvement; as well as knowledge partners (including companies, governmental or non-governmental organizations) who will use research produced by the ACEs;
(c) Faculty and staff in the ACEs who will benefit from improved teaching and research conditions and professional development opportunities;
(d) Faculty and students in regional partner institutions who will benefit from improved capacity of the ACEs; and
(e) Faculty and students in STEM and other priority sector disciplinary areas who will benefit from fellowships/scholarships, exchange visits, and other knowledge-sharing activities across the ACEs organized by the ACE II Regional Facilitation Unit.

PDO Level Results Indicators

16. The following indicators will be used to measure progress towards achieving the above PDO:

(a) Number of non-national/regional students enrolled by the ACEs in Masters, PhD or short-term courses in the regional development priority areas;
(b) Number of students (national and regional) enrolled by the ACEs in Masters, PhD or short-term courses in the regional development priority areas;
(c) Number of internationally accredited or benchmarked education programs offered by the ACEs;
(d) Number of new research collaborations among the ACEs and other institutions in the region;
(e) Number of students and faculty of the ACEs with at least 1 month internship in companies/institutions relevant to their field;
(f) Amount of externally-generated revenue by the ACEs.

III. PROJECT DESCRIPTION

17. The proposed Eastern and Southern Africa Higher Education Centers of Excellence Project will support the governments of 10 participating countries - Burundi, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Tanzania, Uganda, Zambia, and Zimbabwe - to collectively address a set of key development challenges facing the Eastern and Southern Africa region through interventions in four critical areas: (a) selecting ACEs via a competitive and transparent process from existing higher education institutions which have certain capacity in specialized areas with great potential to help address those defined challenges; (b) strengthening these specialized ACEs and enabling them to produce excellent training and applied research which can meet the needs of highly-skilled personnel and knowledge transfer in those challenge areas; (c) building networks among these institutions to promote regional collaboration and foster partnerships with other institutions and the industry in training and applied research to produce innovative solutions for real development impact; and (d) developing a culture of results-orientation and accountability in institutional management through a performance-based financing mechanism of the project. The Project Development Objective for ACE II is therefore to establish and strengthen specialization and collaboration among a network of higher education institutions in the Eastern and Southern
Africa region to deliver relevant and quality education and applied research to address key development challenges facing the region.

A. Project Components

18. The proposed ACE II operation will implement the above envisaged interventions with two sets of activities: (i) establishing and strengthening 18-22 ACEs in ESA in the four defined groups of regional development priorities under Energy, Infrastructure and Manufacturing, Agriculture, Health, Education and Applied Statistics (US$122 million); and (ii) promoting and facilitating regional collaboration in teaching and research among the selected ACEs through piloting and institutionalizing world-class graduate curriculum in 2 regional priority areas, creating networking opportunities for knowledge-sharing and innovation, and providing fellowships for faculty development / collaborative research and scholarships for PhD/Masters students, as well as providing services to support higher education development in countries with emerging higher education systems (US$18 million). Below is a detailed description of the proposed activities to be financed by ACE II, including key features of design and implementation.

Component 1: Establishment and Strengthening of Africa Higher Education Centers of Excellence (ACEs) in the Regional Development Priority Areas (US$ 122 million)

19. Eastern and Southern Africa faces challenges in four particular areas – STEM, Agriculture, Health, Education and Applied Statistics. The governments in the region agree that these areas should be given priority in development. After initial consultations with country and regional leaders, development partners, and business communities, further discussions were held at the ACE II regional workshop and during the Regional Steering Committee (RSC) meeting; the outcome of these discussions was a defined a set of specific topics under each of these four priority areas. Table 1 below provides detailed information on these topics. It is expected that the selected ACEs should be able to help address challenges and produce impact in these priority areas. To encourage flexibility, innovation and cross-cutting solutions, an ‘unspecified’ category was created to allow aspiring ACEs to develop proposals for consideration in areas not explicitly listed. It should be noted that the topics in Table 1 are to be used as points of reference, and it does not mean that for each specific area, an ACE would be selected.

Table 1: Regional Priority Areas for ACEs

<table>
<thead>
<tr>
<th>Regional Priority Area</th>
<th>Specific Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEM (6-8)</td>
<td>Energy (wind/hydro-power, geothermal and solar energy, energy generation/transmission etc.); Value Addition/Extractives (oil and gas sector, mining); Urban Design and Construction/Infrastructure, Transportation and Logistics; Disaster/Risk Analysis and Management, Hydrology and Water Purification; ICT (soft/hardware, applications, services, and teaching/learning); Product Design, Manufacturing; Marine Engineering; Railway Engineering; Unspecified</td>
</tr>
<tr>
<td>Agriculture (5-6)</td>
<td>Agribusiness (crop and livestock science, agricultural engineering, agro/food processing and packaging, and value chain); Climate and</td>
</tr>
</tbody>
</table>
Environmental Smart Agriculture; Agricultural Land Management; Water Resource Management, Hydrology and Irrigation; Marine and Ocean Sciences; Unspecified

Health (5-6)
Pharma bio-technology (drug discovery, science-driven traditional medicine and development); Bio-Medical Engineering (implant development, hospital infrastructure, and tissue-engineering); Bio-Physics/Bio-Chemistry (diagnostic tools); Molecular Biology (infectious diseases, vaccine development); Emergency Medicine and Trauma (with a focus on traffic injuries and deaths); Nutrition; Unspecified

STI and Quality of Education, and Applied Statistics (2)
Quality of Education (including innovations in STEM teaching/learning/curriculum development, assessment and management tools, e-learning and education tools, and creative design thinking); Applied Statistics (big data, bioinformatics, data mining, reliability modeling, research design, evidence-based policy analysis)

20. **About 18-22 ACEs will be selected through an open, objective, transparent, and merit-based competitive process across the participating countries in the defined regional development priority areas.**

The selection will be done through a call for proposals, followed by an independent evaluation of the submitted proposals from the participating countries. The selection criteria will reflect important aspects of the PDO such as the defined development priorities (including improving gender parity), potential for excellence in teaching, training and research/innovation, and regional collaboration and partnerships. To encourage the best proposals, both public and private higher education institutions should be eligible to participate, but client governments will ultimately determine their levels of participation. The proposals will be evaluated by an Independent Evaluation Committee (IEC), a body comprised of regional African and international experts in subject matters related to the defined priority areas, with desk reviews and site visits. The IEC will submit its recommendations to the RSC and the RSC will make the final decision on the selection, taking into account, in addition to the merits of the proposal, the need for a reasonably equitable balance in geography, language groups, coverage of disciplines and development priorities in light of the PDO. The selection will be managed by the ACE II Regional Facilitation Unit (RFU), with support and continued engagement of the Bank’s ACE II Team.

21. **To ensure regional collaboration for greater impact, ACE II will provide a mix of funding requirements and incentives to promote regional mobility of students and faculty, and regional and international partnerships.** Each selected institution will sign a performance and funding contract with their government which includes the following criteria, chosen so as to encourage regional collaboration, networking and partnerships:

(a) At least 15 percent of the funding must be invested in partnerships with the private sector, and at least 10 percent must be invested in partnership activities with partners outside the ACE hosting countries.

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24 Burundi is a country with an emerging higher education system and will more likely participate in ACE II under Sub-Component 2.2.
(b) A partnership agreement between the ACEs and their respective private sector partners will specify the work plan, budget and outcome arrangements.
(c) Civil works if needed, will be limited to 25 percent of the grant.
(d) The agreement will also include the Government’s existing commitments for continued funding of the institutional staff as part of the funding and performance agreement.

22. Each of the selected ACEs will implement their own proposal to address a specific regional development challenge and produce real impact. The ACEs will have the autonomy to implement their institution specific proposal that encompasses the following five elements:

(a) Enhance capacity to deliver regional high quality training to address the development challenge;
(b) Enhance capacity to deliver applied research to address the regional development challenge;
(c) Build and strengthen regional and inter-regional academic collaboration to raise the quality of education, raise the capacity of network, and raise the capacity of the ACE;
(d) Build and use industry/sector partnerships to enhance the impact of the ACE on development, and increase the relevance of these centers of education and research; and
(e) Enhance governance and management of the ACE, and the participating university to improve monitoring and evaluation.

Component 2: Regional Activities to support Higher Education (US$ 18 million)

23. Enhancing quality in research and training in priority areas in higher education will also require regional support to overcome a number of organizational failures that impede effective collaboration, networking and partnership in the region. To develop excellence, besides establishing ACEs, a number of supportive activities at the regional level are required in order to foster relationships for research and training between public and private institutions. Another challenge is supporting countries emerging from conflict which are building up their higher education systems. This component supports activities that enhances the capacity and sustainability of the ACEs and associated higher education institutions.

24. A number of activities will be undertaken at the regional level to support effective relationship building for enhancing excellence in the ACEs. Curriculum development for premiere institutions needs to be developed drawing on the best of global knowledge and has to be institutionalized at the regional level for all priority areas in ACE over time. Currently curriculum in the region is benchmarked against minimum standards (if that) and is not aligned to global trends in these specific discipline areas. There are economies of scale in undertaking these activities at the regional level. Effective collaboration across academic and non-academic institutions are stymied by a lack of knowledge of what industry and researchers are respectively trying to develop and what is happening globally in their related disciplines. Researchers have few opportunities to network across disciplines (to foster interdisciplinary approaches to problem solving) or with industry (to understand challenges facing the private sector in production or service delivery). Intra and inter-regionally research collaboration with universities is further impeded by the lack of financing for research fellowships which would allow researchers across
the region the opportunity to work with their peers in the same physical space. Scholarships too are critical for supporting students for PhDs and Masters level. Part of the challenge is attracting the best students to the ACEs; this can be incentivized through scholarships and by developing a premiere brand for the scholarships program associated with the ACEs. Another challenge in the region is that the scholarships that exist are not effectively utilized. Matching students effectively with scholarship opportunities often proves a challenge, as often there are constraints other than financial that prevent students from applying.

25. **Sub-Component 2.1: Promotion of Regional Research Collaboration within Higher Education (US$ 10 million).** The activities under this Sub-Component will address challenges impeding the development of regional collaboration, partnership and networks for quality in research and training. The activities will focus on three areas:

(a) **Piloting and institutionalizing world class curriculum in priority areas.** The project will finance the development of world class curriculum in a few priority areas (the number to be determined) by bring together international experts, particularly utilizing the African academic diaspora, to work with local academics to produce cutting edge and relevant curriculum. The developed curriculum would be piloted and made available to participating universities under both ACE I and ACE II. The project will also finance technical assistance to explore how this process can be sustainably institutionalized to all priority areas after the lifetime of the project.

(b) **Creating networking opportunities for university leaders, faculty, students, and R&D managers and scientists from industry for knowledge sharing and innovation.** The project recognizes that a critical aspect of developing research collaboration, partnerships, and networks is a function of opportunities to meet and share knowledge about what are peoples’ research specialties, possible research ideas or ongoing research or problems to be researched. The project will finance opportunities to meet and network, structured around events such as conferences/fairs, where ACEs can showcase their research products; competitions, where ACEs can compete on different types of product development; and workshops, where the universities and private sector can brainstorm on critical problems that are effectively impeding economic activity. The events will be structured along the ACE II priority areas where possible.

(c) **Providing fellowships to support faculty research; scholarships to train PhDs and Masters’ students; and support for information sharing on existing scholarship programs for the region funded by development partners.** The project will support the following activities:

(i) Support a number of fellowships for faculty at ACEs to facilitate faculty to faculty collaboration on research and teaching methodologies

(ii) Leverage other initiatives like the PASET Scholarship initiative and the German Academic Exchange Service (DAAD) scholarships fund to develop a
platinum scholarship program, the *ACE Scholars*, which targets the premiere students in the region.

(iii) Provide technical assistance to centralize and improve information sharing on existing and evolving scholarships and provide other support identified which will lead to better matching of students to scholarships.

26. **Sub-Component 2.2: Regional Education Support to Countries with Emerging Higher Education Systems (US$ 3 million).** This Sub-Component is designed to provide countries with emerging higher education systems, fragile countries emerging from conflict with an avenue through which they can get support to improve their higher education systems. Proposed ESA countries who potentially can take advantage of this component are Burundi, South Sudan and Somalia. These countries currently do not have the capacity or readiness to host their own ACEs. The emerging higher education systems in these countries can benefit from accessing services (training/system support, research support and mentoring) provided by the ACEs established in both ACE I and ACE II. Countries with emerging higher education sectors will identify prioritized needs in areas of training, university system management, (HMIS, leadership training, curriculum development, quality assurance etc.) Once these needs are identified ACEs will be invited to compete to supply these services. The ACEs will also be invited to provide research support and mentoring through a combination of services including grants, scholarships, and joint research arrangements. The Inter-University Council for East Africa (IUCEA) will be the implementing body for this component and all related processes (request, review, service bidding, and evaluation) will be discussed with relevant regional committees, government ministries, national agencies, universities, and other key stakeholders during the project preparation phase. So far, Burundi is the only country that has expressed the need for such support services.

27. **Sub-Component 2.3: Enhancement of Regional Capacity, Evaluation, and Collaboration (US$ 5 million).** The sheer number of countries and institutions participating in ACE II has added complexity to the importance of facilitation and coordination of project preparation and implementation. The activities under this sub-component will be implemented by the RFU. As the RFU, the Inter-University Council for East Africa (IUCEA) will coordinate all aspects of ACE II project preparation and implementation with guidance from RSC and technical assistance and support from the Bank. These includes:

   (a) Facilitation of consultations;
   (b) Organization of workshops;
   (c) Coordination and administration of selection processes and other tasks;
   (d) Organization, coordination and facilitations of all upcoming RSC meetings
   (e) Provision of support to the RSC; and
   (f) Support to the following activities:
      (i) capacity building, knowledge sharing and coordination among the ACEs;
      (ii) regional monitoring and evaluation activities including studies in key policy areas related to the effective implementation of the ACEs; and
      (iii) technical assistance to regional bodies in policy-making on a regional higher education and science and technology agenda.
Annex 1: Results Framework and Monitoring

Eastern and Southern Africa Higher Education Centers of Excellence Project (P151847)

(To be completed by each selected ACE)

**Results Framework**

**Project Development Objective (PDO):** The Project Development Objectives (PDO) for the proposed ACE II is to establish and strengthen specialization and collaboration among a network of higher education institutions in the Eastern and Southern Africa region to deliver relevant and quality education and applied research to address key development challenges facing the region.

<table>
<thead>
<tr>
<th>PDO Level Results Indicators*</th>
<th>Core</th>
<th>Unit of Measure</th>
<th>Baseline</th>
<th>Cumulative Target Values**</th>
<th>Frequency</th>
<th>Data Source/ Methodology</th>
<th>Responsibility for Data Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No of non-national\textsuperscript{25} students enrolled in priority Master, PhD and/or short-term courses/ programs [% of which are females\textsuperscript{28}]</td>
<td>☒</td>
<td></td>
<td>25</td>
<td></td>
<td>Annual</td>
<td>ACE Progress Reports</td>
<td>ACE and RFU</td>
</tr>
<tr>
<td>2. No of students (national and regional) enrolled in priority Master, PhD and/or short-term courses/programs [% of which are females]</td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
<td>Annual</td>
<td>ACE Progress Reports</td>
<td>ACE and RFU</td>
</tr>
<tr>
<td>3. No of new research collaboration with the institutions in the region</td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
<td>Annual</td>
<td>ACE Progress Reports</td>
<td>ACE and RFU</td>
</tr>
<tr>
<td>4. No. of internationally accredited education programs</td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
<td>Annual</td>
<td>ACE Progress Reports</td>
<td>ACE and RFU</td>
</tr>
<tr>
<td>5. No. of Students and/faculty with at least 1 month internship in a private sector company or local institutions relevant to their field/ sector [% of which are female]</td>
<td>☐</td>
<td></td>
<td></td>
<td></td>
<td>Annual</td>
<td>ACE Progress Reports</td>
<td>ACE and RFU</td>
</tr>
</tbody>
</table>

\textsuperscript{25} Baselines and targets will be defined once the ACEs have been selected, as the baselines will significantly vary depending on the selected institutions, the involved sectors, their partner institutions etc.

\textsuperscript{26} Some of the indicators may require a target of zero or N/A for year one. If so, the rationale will be explained in the comments column, and milestones clearly set and defined.

\textsuperscript{27} The term ‘non-national’ in this results framework always refers to African students who are not from the country hosting the particular ACE.

\textsuperscript{28} Target numbers with respect to females might vary depending on the engaged sectors (e.g.: extractive industries vis. a vis. health).
## Intermediate Results

### Intermediate Result (Component One):

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Frequency</th>
<th>Data Source</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>No of faculty trained in an area relevant to the ACE-Program or organized through the ACEs [% of which are females]</td>
<td>Annual</td>
<td>ACE Progress Reports</td>
<td>ACE and RFU</td>
</tr>
<tr>
<td>2.</td>
<td>No of newly established or revised curricula (meeting labor market skills)</td>
<td>Annual</td>
<td>ACE Progress Reports</td>
<td>ACE and RFU</td>
</tr>
<tr>
<td>3.</td>
<td>Increase of internationally recognized research publications in disciplines supported by the ACE-Program (in %)</td>
<td>Annual</td>
<td>Data source is International bibliometrical databases, such as ISI Thomson Reuters and/or Scopus</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>No of partnership agreements including a 3-5 year cooperation implementation plan signed, by leaders of ACEs and partner institutions (including private sectors)</td>
<td>Annual</td>
<td>ACE Progress Reports</td>
<td>ACE and RFU</td>
</tr>
</tbody>
</table>

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29 External revenue could include funds from the private sector or any of the ACE´s Partner Institutions, governments etc. – however, would exclude governmental subsidies.
30 The externally generated revenue would need to be certified as part of the financial audit (see also Indicator No. 12).
31 ACEs to provide additional disaggregated data for % split between: (a) faculty from ACEs trained vs (b) faculty from Partner Institutions vs (c) faculty from the region trained.
32 The ACEs and PIs would establish a database collecting original and revised curricula. They would also include into their proposal a description of the process they will put in place for revising curricula as well as an outline of the timing/frequency, for ensuring input from private sector and other partners to ensure curricula meet labor market needs for the sector.
33 As part of the first proposal to be submitted, an agreement that the ACEs and PIs will partner around the programme outlining the main areas of cooperation/partnering with broad responsibilities will be required – this can, however, be an annex to existing MoUs. Once selected, ACEs and their PIs will need to provide more detail during the `proposal improvement´ phase.
**Intermediate Result (Component Two):**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Frequency</th>
<th>Reporting Body</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>No of knowledge sharing events with ACEs, partner institutions, private sector, academia and diaspora&lt;sup&gt;34&lt;/sup&gt;</td>
<td>Annual</td>
<td>RFU Progress Reports</td>
<td>RFU</td>
</tr>
<tr>
<td>6.</td>
<td>No of students from non-ACE hosting countries&lt;sup&gt;35&lt;/sup&gt; studying in selected ACEs</td>
<td>Annual</td>
<td>RFU Progress Reports</td>
<td>RFU</td>
</tr>
<tr>
<td>7.</td>
<td>No. of scholarships awarded to students for their doctoral studies in priority areas [% of which are females]</td>
<td>Annual</td>
<td>ACE Progress Reports</td>
<td>ACE and RFU</td>
</tr>
<tr>
<td>8.</td>
<td>No. of fellowships awarded to faculty in priority areas for professional development [% of which are females]</td>
<td>Annual</td>
<td>ACE Progress Reports</td>
<td>ACE and RFU</td>
</tr>
<tr>
<td>9.</td>
<td>Creation of internationally calibrated curriculum&lt;sup&gt;36&lt;/sup&gt;</td>
<td>Annual</td>
<td>ACE Progress Reports</td>
<td>ACE and RFU</td>
</tr>
</tbody>
</table>

<sup>34</sup> During these events, there will be a discussion of program process, lessons learned, and recommendations for addressing bottlenecks, all to be compiled in a report.

<sup>35</sup> Non-ACE hosting countries are countries who are participating in the project through Sub-Component 2.2. Currently, Burundi will avail services under Sub-Component 2.2; the services are yet to be decided.

<sup>36</sup> The curriculum will be co-created by African and work academic and industrial experts for ACE disciplines (STEM, Agriculture, Health and STI Capacity Development)

*Please indicate whether the indicator is a Core Sector Indicator (see further [http://coreindicators](http://coreindicators)).*