Combined Project Information Documents / Integrated Safeguards Datasheet (PID/ISDS)
# BASIC INFORMATION

## A. Basic Project Data

<table>
<thead>
<tr>
<th>Country</th>
<th>Project ID</th>
<th>Project Name</th>
<th>Parent Project ID (if any)</th>
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<tbody>
<tr>
<td>Africa</td>
<td>P165581</td>
<td>Africa Regional Scholarship and Innovation Fund for Applied Sciences, Engineering and Technology</td>
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<th>Estimated Board Date</th>
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<td>21-Jun-2018</td>
<td>Education</td>
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<th>Borrower(s)</th>
<th>Implementing Agency</th>
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<td>Investment Project Financing</td>
<td>International Centre of Insect Physiology and Ecology</td>
<td>International Centre of Insect Physiology and Ecology</td>
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**Proposed Development Objective(s)**

To strengthen the institutional capacity for quality and sustainable doctoral training, research and innovation in transformative technologies in sub-Saharan Africa.

**Components**

- **Component 1: Capacity Development for the operation and management of the Scholarship, Research and Innovation Fund**
- **Component 2: Scholarships and research grants for ASET**

## PROJECT FINANCING DATA (US$, Millions)

### SUMMARY

<table>
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<th>Total Project Cost</th>
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<td>Financing Gap</td>
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### DETAILS

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Apr 18, 2018
The review did authorize the team to appraise and negotiate

B. Introduction and Context

Regional Context

1. Diversification of the economic structure and across-the-board productivity improvements are necessary to enhance and sustain GDP growth in Sub-Saharan African (SSA) and make it inclusive and poverty-reducing. In particular, the non-agricultural sectors are expected to grow and contribute to export diversification and structural transformation. While improvement in the business environment is critical for the private sector, at the firm level, the use of new technology and modern management practices is associated with greater export orientation, introduction of innovations in products or processes and higher productivity. At the same time, resilience to climate variability and change is vital to the region’s ability to reduce poverty and protect the development progress made in recent decades.

2. Rapid advances in technology, particularly transformative technologies that could have far reaching impact on society and the productive sector, constitute both an opportunity and a challenge for African societies. On the one hand, these advancements, sometimes called the “Fourth Industrial Revolution,” which is characterized by an amalgamation of rapidly evolving technologies such as 3D printers, internet of things and artificial intelligence (AI) that cut across the physical, digital and biological spaces, could dramatically improve productivity in many sectors, such as food, energy, transport and other infrastructure and health. They offer the potential to respond to Africa’s specific challenges, provided it is geared towards facilitating

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1 Transformative technologies refer to those technologies that have far reaching impact to society such as artificial intelligence, precision agriculture, highly efficient energy systems, big data, smart materials, genomics and bioinformatic and other biotechnologies. McKinsey in 2013 estimates that Internet’s transformative impact in Africa in six sectors including finance, education, health, retail, agriculture and government are expected to reach $148 billion to $318 billion by 2025. Examples include mobile money and banking, e-books and educational contents delivery through tablet, remote diagnostics, treatment and health education, e-commerce, information provision on weather, crop selection, pest control and financial management in agriculture sector. McKinsey & Company (2013), “Lions go digital: The Internet’s transformative potential in Africa.”
the application of technological solutions on a large scale and is supported by financing. For instance, 3D printing will enable fast designing and prototyping and producing prefabricated and standardized components for rapid and low cost construction; while Internet of things, autonomous vehicle and drones, AI and machine learning, robotics, and digital traceability will affect the value chain of retail sectors by enabling individualized shopping experiences, reducing operating and transportation costs, increasing traceability and accountability, enabling real time and customized manufacturing and secured online transactions and record keeping using blockchain technologies. On the other hand, the inability to prepare high level professionals to generate and adopt new technologies and remain competitive can lead to job losses even in the currently small formal sector and relegate millions of new and existing job seekers to low productivity jobs, widening income disparities.

3. SSA’s stock of skilled human capital is very limited and of poor quality, and the absence of a critical mass of applied scientists, engineers and technologists can constrain the expansion of industries, the emergence of new sectors and the adoption of innovations. While an improved business environment and other supportive measures are required, the growth of firms and diversification of manufacturing and services will depend critically on access to skilled labor, which can influence productivity growth through innovation and integration into regional and global markets. Recent analysis of the use of professional services (such as engineering, architectural, legal and accounting) in several countries, using a survey of firms in COMESA countries (which include 19 SSA countries) and Enterprise Skills Surveys for Tanzania and Zambia, show that this unambiguously increases firm-level productivity. This gap of highly skilled professionals is often filled by expatriate workers. Moreover, with the onset of the Fourth Industrial Revolution, the demand for skills is changing and the jobs on the continent will require digital literacy and advanced knowledge in applied sciences, engineering and technology (ASET) areas.

4. SSA has just 1.1 percent of the scientific researchers in the world, with less than 92 scientific researchers per million inhabitants compared to an average of 1083 for the world. Not only does this impact industry and hinder the growth of firms across sectors, it also contributes to a shortage of qualified faculty in African universities, especially in ASET fields, which in turn affects the quality of graduates. Expenditure on R&D across the region is low (0.41 percent of GDP) and only 1.4 percent of global scientific publications originate in SSA. Further, SSA – barring South Africa – is not seen by multinationals as a destination for undertaking research. This is reflected in the choice of Africa as a destination for a mere 0.8 percent of R&D-related projects financed through foreign direct investment (FDI) compared to 28.7 percent for China and India. The growth of such “research clusters” is known to increase innovation through the diffusion of technology in new firms. As of

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2013, only 233 patents (0.1 percent of global share) were submitted by SSA researchers compared to 848 by India and 1,757 by China.

5. Women continue to be under-represented in science and technological fields in SSA though there have been some gains in recent years. There is a gender imbalance at all levels of education in the region, including tertiary education, with participation rates of women in tertiary education only at 31 percent in Ethiopia, 30 percent in Guinea, and 28 percent in Niger. Women form less than 30 percent of the tertiary education graduates in scientific fields in Ghana, Uganda and Swaziland, and between 35-40 percent in Angola, Madagascar and Rwanda. While women dominate health and life sciences-related fields, less than 20 percent of female graduates are in engineering. In addition, among the scientific researchers on the continent, only 30 percent are women. Women in SSA and across the globe have less access to research funding compared to their male counterparts.

6. Innovative high growth entrepreneurs for most SSA countries remain below the expected level from countries with similar R&D incentives. This is mainly due to a lack of R&D facilities, quality entrepreneurship education, and an inadequate entrepreneurship ecosystem in the region, as well as a lack of researchers and investment in R&D, innovation ecosystem including R&D facilities, entrepreneurship training, and finance. High growth entrepreneurs are a source of economic growth and job creation. Experience from other countries shows that in order for high growth entrepreneurs to succeed, technology adaptation and diffusion is critical, and this role often has to be played by specialized centers in universities.

7. A regional approach to build greater scientific and technical capacity that complements country specific initiatives has been accepted as necessary in Africa, given the small base of research capacity and the large number of countries. While some of the larger and richer countries have established national research funds or councils (such as South Africa, Kenya, Senegal and Ghana), many of the smaller countries do not have the organizational and financial capacity to do so. Even those that have research funds are not fully functional. They lack the budgets and capacity to establish a conducive research environment in their countries, run grant competitions to encourage research in fields crucial for Africa’s development, provide support to improve facilities, and link universities with industry. They are unable to fund applied research on a scale that would transform the research landscape on the continent and advance knowledge creation and innovation to drive economic growth in SSA. In February 2018, Ministers and Heads of delegations from Africa attended the Third Africa Forum on Science, Technology and Innovation (STI) held in Cairo, Egypt convened by African Development Bank (AfDB), and made a Ministerial Declaration committing to enhancing the relevance of national, regional, and continental research and innovation policies. Africa’s Science and Technology Consolidated Plan of Action (CPA, 2005–2014) communicated the continent’s common objectives and actions to improve capacity building, knowledge production and technology innovation for its socio-economic transformation. It also called for greater mobility of scientists across the continent. Its successor, the Science, Technology and Innovation Strategy for Africa (STISA-2024) aims to build on the outcomes of the CPA and accelerate Africa’s STI development. Regional economic communities such as the Economic Community of West African States (ECOWAS) and the Southern African Development Community (SADC) are working towards greater regional scientific integration and have adopted strategies for science, technology and innovation (STI) in the recent past. Similarly, the East African Community (EAC) aims to develop a Common

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Higher Education Area to establish internationally competitive and harmonized higher education systems in the region. The Bank’s Regional Integration Strategy also recognizes that research and development and scale up of new technology and innovations are better provided at a regional level.\(^\text{12}\)

8. Finally, climate change has been affecting the SSA region especially through an increase in temperature, extreme precipitation, floods, and droughts, which impact food security, migration, and infectious disease. In order to mitigate this impact, there is a need for developing human capital and knowledge base through research and innovation at the regional level.

Sectoral and Institutional Context

9. The number of graduates in ASET fields related to transformative technologies and the quality of higher education in these fields is impacted by the shortage of qualified faculty. African universities have about 50 percent more students per professor than the global average.\(^\text{13}\) The serious lack of qualified faculty is driven by three interrelated factors: (i) the absence of a sufficient number of good quality postgraduate programs to train faculty locally; (ii) inability to retain highly qualified faculty due to the poor quality of the academic environment including poor facilities and lack of research funding; and (iii) brain drain, with over 10 percent of Africa’s highly educated professionals living and working abroad.\(^\text{14}\) In recent years, the problem has been further exacerbated by low numbers of new entrants to the academic profession due to lack of scholarships to support their studies and research. There is a need to quickly build postgraduate faculty capacity in SSA countries, particularly in ASET disciplines. A critical element in developing this capacity and improving the quality of post-graduate programs is ensuring the financing of postgraduate programs, including support for students and research, improvement of facilities and faculty pay, and incorporating quality assurance mechanisms of post-graduate programs.

10. Doctoral training and the development of researchers who can tackle practical research questions are important aspects of developing technical-scientific capability. Not only are the PhD programs offered in SSA relatively few, but they have low levels of output and little relationship to the needs for highly specialized professionals, especially in those areas related to transformative technologies that could have far reaching impact in society and the productive sector. Further, most SSA universities do not provide post-doctoral opportunities for new PhD graduates through continued support and advice, and ideally working on challenging tasks faced by industry and society. PhD researchers are needed to generate new knowledge, adapt technologies for evolving needs, and innovate to identify solutions to social and industrial challenges. In addition, there is a need for inter-disciplinary research to identify holistic and sustainable solutions to these challenges.

11. Recognizing these challenges, a few regional initiatives have been launched, including several scholarship programs for graduate studies, to complement country-level initiatives. While the programs vary in scope and recipients, they can be broadly categorized as supporting degrees in three areas: agriculture, population and public health, and general sciences and engineering. Programs such as Building an Alliance for a Green Revolution (AGRA), African Women in Agricultural Research and Development (AWARD) and Vavilov-Frankel Awards support direct efforts towards agricultural development in Africa. Initiatives like the


\(^{14}\) OECD (2013), “World Migration in Figures”.

Consortium for African Research and Innovation (CARI) and Consortium for Advanced Research Training in Africa (CARTA) predominantly focus on the health sector while Africa Development Bank’s East Africa Centers of Excellence focus on biomedical sciences. The MasterCard Foundation, the German Academic Exchange Service (DAAD), the Regional Initiative in Science and Education (RISE), and the Carnegie Foundation Africa Diaspora program offer scholarships for general science and engineering degrees. These programs support scholarships for degrees at the Bachelors, Masters and PhD levels. However, most similar initiatives in the SSA region mostly have involved training in foreign institutions and are largely driven by development partners, and therefore have not directly addressed the weak capacity on the continent to train researchers and conduct research as well as the lack of sustainability.

12. **The World Bank financed Africa Centers of Excellence (ACE) projects target the higher education challenge and skills demand on the continent at the sub-regional level.** The Africa Higher Education Centers of Excellence for West and Central Africa (ACE I) and East and Southern Africa (ACE II) are competitively selected centers from African higher education institutions, with a focus on research and training of postgraduates (mostly Masters level students) in sectors such as science, technology, agriculture, health and education. The projects encourage regional student mobility by providing scholarships to Master’s students to pursue graduate training in the specific sectors within the ACEs in their sub-region, which are identified centers within universities.

13. **The Partnership for skills in Applied Sciences, Engineering and Technology (PASET) was launched in 2013 by African governments with facilitation from the World Bank.** As a unique program led by highly-committed African governments with strong African ownership, and focused on priority sectors for the region, PASET offers a sustainable approach to address the region’s needs. It brings together diverse partners including governments, private sector, traditional and new development partners to build competencies from the technician level to the post-graduate level focusing on the skills requirements of priority sectors of SSA countries and the region as a whole. Led by African governments, PASET is governed by a Board of Directors currently comprised of Ministers of Education or Higher Education of five SSA governments – Senegal, Rwanda, Ethiopia, Kenya and Cote d’Ivoire – and representatives of the Korea Development Institute and World Bank. It is expected that governments or partners that contribute to PASET will become formal members and join the PASET Board of Directors, thus growing the partnership. The Board sets the strategic direction of PASET that are executed by the Executive Committee (EC) with advice and expert guidance provided by a Consultative Advisory Group (CAG) comprised of African scientists, academics, and representatives from the private sector and international partner countries. Collectively, the PASET governance bodies shape PASET’s initiatives in response to the needs of the SSA countries and region.

14. **The Regional Scholarship and Innovation Fund (RSIF) is the flagship initiative of PASET.** RSIF aims to support doctoral training and post-doctoral research and innovation in about 10 priority economic sectors for growth and development across SSA. These include non-agricultural sectors, which are currently underdeveloped and have high growth potential, and receive relatively little research funding, such as materials, minerals and mining, electrical power and energy, manufacturing, telecommunication, transportation and financial services. The approach followed by RSIF of supporting three windows, scholarships together with research and innovation grants that improve the quality and relevance of the PhD programs and guarantee

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15 The World Bank will recuse itself from the PASET Board for all discussions on The Regional Scholarship and Innovation Fund (RSIF).
16 A review of PhD scholarship and research funding in SSA shows that these are heavily tilted towards agriculture and health, given the priorities of donor partners.
continuity and sustainability of research and innovations once the scholars graduate, follows global best practices for such programs. RSIF incorporates “sandwich” training options that include international study at leading partner universities; provides comprehensive support to students at all stages including post-graduate research support; and provides grants to researchers at universities for undertaking work that is relevant to industry or to set up enterprises. The program also aims to build research excellence in ASET fields in about 5-10 SSA universities outside of South Africa by developing the capacity for PhD training and undertaking applied research and innovation in partnership with a network of renowned international partner universities and strengthen research capacity regionwide by prioritizing the scholarships to African faculty that lack PhD training. In the first phase, RSIF universities are competitively selected from among the ACEs, taking advantage of synergies in the two programs.

15. The most distinguishing features of RSIF are: (i) it goes beyond the center level and supports selected SSA universities to establish a concentration of research excellence within and across inter-related disciplines; (ii) it explicitly links doctoral training, post-doctoral research not only to the application of but also to developing new and optimizing existing transformative technologies; and (iii) it embeds sustainability and ownership by African governments and partners in its design. RSIF’s pan-African, focused and sustainable approach contributes to a solution to the challenge of building, in selected host universities in SSA countries, the high-quality training and research expertise required for transformative technologies, that would benefit the whole region through its graduates and research and innovation results. By focusing its doctoral program on faculty without PhDs, it generates broad spillover and network effects on a larger group of SSA universities beyond the host universities. Furthermore, because of its regional scope, RSIF targets funding from governments, private sector, cooperation agencies and international donors. Currently, five PASET countries have committed to contribute US$2 million to the RSIF initiative. Kenya and Rwanda have made their contributions, and other countries are making active efforts to follow suit. Five additional SSA countries have expressed interest in joining the initiative. In addition, several private sector organizations have demonstrated interest in supporting RSIF.
16. Since 2015, several steps have been taken to operationalize the RSIF, particularly its PhD training window. The Institute of International Education (IIE) was recruited as a third-party technical assistance organization to help design and operationalize the scholarship program. In 2016, the PASET Steering Committee (the forerunner of the Board of Directors) appointed the Association of African Universities (AAU), to host the RSIF Implementation Unit in the initial phase. To raise the quality of the PhD programs, in late 2016, PASET signed Memorandums of Understanding (MoUs) with the Korea Institute of Science and Technology (KIST) in Korea, and Maastricht University in Netherlands to collaborate under the RSIF. In early 2017, four Africa Centers of Excellence were formally selected competitively as the RSIF host institutions in three thematic areas of food security, minerals, mining and materials engineering, and information communications and technology (ICT). These four host institutions signed individual agreements with KIST in late 2017. In addition, technical assistance was hired to develop a 5-year financial model for the entire program and a fundraising strategy with an initial target to raise $100 million. A preliminary operational manual for the scholarship program was developed detailing the objectives, procedures, guidelines and governing principles for all the stakeholders of the program. Finally, in mid-2017, PASET launched a call for its first cohort of RSIF students. Over 1000 applications from 31 African countries were received indicating a strong demand for scholarships for a regional doctoral training program. Of the 101 students shortlisted and admitted by the host universities, 19 were women and 44 were current faculty members. The first cohort of competitively selected 16 students will enroll in the host universities in May 2018.

17. In 2017, a preliminary fundraising strategy for RSIF was prepared to guide the expansion of the Fund. The financial model was developed with a per student cost of US$97,600/student for a four-year PhD program.

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17 The Institute of International Education currently manages the Fulbright Program in the United States.
(or US$24,400 annually). It aims for implementation of 5 cohorts (from 2017/18 to 2024/25) amounting to 1000 PhDs at a total cost of US$97.6 million. The strategy estimates that about 70 percent of the funds required would be raised from the private sector and the remaining 30% from contributing SSA countries. Private sector donors will be targeted from both the corporate and foundation sectors with support amounts ranging from US$1 million to US$10 million. These targets were derived from benchmarking corporate R&D contributions from USA, China and Japan along with other criteria relevant for the African context. The selected corporate sectors targeted are retail, manufacturing and the extractive sectors. An initial listing of target companies has already been developed. Foundation donors will be targeted through open calls for applications and donors known to members of the PASET network. or foundation partner, the funding strategy sets the target of US$2.3 million based on a benchmarking exercise.

18. Contributions from SSA countries have been set at a minimum of $2 million. This decision was taken by the PASET Board of Directors to encourage African countries to contribute. It was felt that a higher threshold may exclude countries. At the same time, the Board felt that countries needed to make a real contribution if they are to participate in the governance of PASET and benefit from the Fund. In order to assist countries with their contribution, and to grow the fund, countries can use IDA to contribute to the fund. For instance, RSIF is a component of the proposed ACE for Impact project through which countries could make a contribution. Several countries participating in ACE for Impact have shown interest in this option with total contributions estimated at US$10-12 million.

19. Implementation of the fundraising strategy will require dedicated staff who have specialized skills and extensive experience in this area. At the same time, it will be important to build these skills within Africa to continue fundraising to finance enhancement of skills on the continent on a sustainable basis.

20. The Government of Korea has agreed to contribute US$10 million to RSIF to support PhD training and research. About $9 million from this contribution, to be administered by the World Bank through a Trust Fund, is expected to be transferred to the RCU and used along with funds from other sources to finance scholarships for doctoral training of African students and research grants to promote research. It will also support partnerships with additional Korean universities for “sandwich” programs under the RSIF. The collaboration builds on Korea’s existing partnerships with PASET on RSIF, knowledge sharing and its governance. The agreement will be formalized through a MoU expected to be signed in May 2018.

21. There has also been interest from the private sector and research agencies to provide financial and in-kind support to RSIF. Philips Research Africa has committed to support scholarships while IBM is keen on hosting RSIF PhD scholars at their research labs in Africa as part of a structured “sandwich” program. DAAD and German Research Foundation (DFG) expressed interest in issuing joint Calls for Scholarships with PASET while the French Research Institute for Development (IRD) proposed hosting RSIF scholars at their centers and labs in addition to having joint applications for research funding by IRD and RSIF researchers. MoUs have been prepared and discussions are on-going between PASET and these organizations. Active outreach efforts continue with other private sector companies and organizations.

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18 $1 million from this will be used for Bank executed activities and the standard cost recovery fees for Bank management of the trust fund. The remaining $9 million will be available for RSIF implementation.
22. The experience of designing and operationalizing the RSIF over the last two years shows that there is strong commitment and ownership by African governments to establish a sustainable pan-African science fund that will raise the quality of doctoral training and research in African universities and institutions. However, difficulties of coordination across countries, lack of technical expertise and lack of dedicated efforts to mobilize funds have hampered efforts to take it to scale. The World Bank has been providing support through small trust funds to provide technical assistance to establish the design and necessary processes for the RSIF doctoral training window, coordinate governance, convene governments and partners, and support fundraising efforts for the initiative thus far. With the basic platform, operational design, and governance structure now in place for RSIF, it is an appropriate time to take the initiative to scale. To do so, dedicated support is required to raise the quality of the programs, select RSIF host universities, improve the student selection process, identify partner universities, establish international review panels, and use data to benchmark and improve quality of universities. The research and innovation windows also require detailed technical design and definition of operational procedures. In addition, committed efforts in terms of outreach and communication are needed to fundraise from governments, donors and other organizations.

23. A sustainable pan-African fund is required given that building technical-scientific capacity, especially in the new emerging transformative technologies, demands sustained investment and a regional approach. To increase sustainability and leverage funds from governments and donors, it is proposed that the RSIF will be composed of two funds, (i) a General Fund which will be used to finance the grants for PhDs, research and innovation grants on an-ongoing basis; and (ii) a Permanent Fund whose returns will be used to finance these grants in the long run. Contributors to the RSIF may contribute to either the General Fund or the Permanent Fund, or both; they may also contribute to one or more of the grant windows and/or specify which disciplinary areas they wish to sponsor. A regional approach addresses fundamental diseconomies of scale, as a critical minimum size is required for creating impact and to improve efficiency through lower administration costs. Furthermore, a regional platform brings together scarce organizational capital to attract and manage funding in an efficient manner from diverse partners who may wish to contribute to different windows or areas. In addition, a pan-African fund would complement the efforts of national research funds to build research and innovation capacity, creating a fertile environment for innovations and transformative technologies, and facilitate partnerships with industry and international partner universities.

24. The World Bank proposes to support RSIF through (a) a regional grant for capacity building of a regional organization to administer and grow the RSIF; (b) country contributions using national and regional IDA credit (in addition to their own resources); and (c) contributions from other donors, including governments and foundations, that prefer to channel their contributions to the fund through the World Bank. In addition, other donors, including the private sector, could also transfer funds directly to the RSIF, as it will comply with international standards for governance and fiduciary oversight, as well as efficiency of implementation.

25. There is a need of a technically strong and capable regional organization to manage, implement and grow the RSIF to scale. Given the efforts and expertise required to scale up the RSIF and coordinate across multiple stakeholders, a forward-thinking organization with efficient financial systems, ability to manage large grants, experience implementing programs in Africa from concept to the operational stage especially in higher education, science, technology and innovation, and experience working with governments, donor organizations and private sector is critical to serve as the Regional Coordination Unit (RCU). The PASET EC welcomed Bank support for RSIF and agreed that a call for proposals for the RCU, which would fulfil the mandate of the RSIF, should be issued. Accordingly, the Bank project team issued a call for proposals to ensure
a fair, transparent and rigorous selection process for the RCU in 2017. The issue was further discussed at the PASET Board of Directors meeting in January 2018, which endorsed the call for proposals and further advised that members of the PASET EC and CAG should be involved in the selection.\textsuperscript{19} The Board stressed that the selected organization should be an African organization with a regional mandate.

26. Following a competitive selection, the International Centre of Insect Physiology and Ecology (icipe) based in Nairobi, Kenya, was selected as the organization best placed to serve as the RCU for its strong processes and systems, governance and demonstrated experience in PhD capacity building and research commercialization. \textit{icipe} is a leading scientific organization with a nearly 50-year history that has contributed to science and innovation in sub-Saharan Africa. It has an extensive network of partners in Africa and across the world including 43 partner universities and 300 other partners including governments, donors (like UK Aid, Sida, SDC, BMZ) and organizations in the areas of research, capacity building and translating research into societal impacts. It has followed a unique inter-disciplinary approach in relation to research on insects, focusing on crop, animal and human health as well as environmental sciences and biotechnology. This has allowed \textit{icipe} to develop a strong cross-disciplinary network of scientists. The organization has existing capacity to facilitate strong partnerships for RSIF to raise its quality further and attract greater financing. Furthermore, \textit{icipe} has strong private sector collaboration experience including expertise in the commercialization of research. These areas all align perfectly with the focus of the RSIF on PhD training, research and innovation. \textit{icipe} currently manages several similar initiatives in Africa. Under the BioInnovate Africa project funded by the Swedish International Development Cooperation Agency (Sida), it supports research and innovation for multidisciplinary teams of scientists and innovators and supports PhD training. It also supports PhD training with funding from the German Academic Exchange Service (DAAD) and various other donors.

27. However, given the scale of the RSIF and the fact that this is a new initiative, there is need to build the capacity of \textit{icipe} further to implement the initiative successfully and sustainably and serve as a scientific, technological and innovation capacity builder for PhD programs and universities in the SSA region, especially regarding transformative technologies. Specifically, \textit{icipe}’s technical and financial capacity and systems need to be strengthened to build and manage PhD training, research and innovation programs from inception, including the definition of detailed processes, to coordinate across diverse actors like governments, donors, universities and private sector, over a variety of sectors, and to set up and grow a sustainable fund that can support the initiative over the long-term. The capacity of \textit{icipe} as the RCU will be critical for realizing the vision for RSIF.

C. Proposed Development Objective(s)

Development Objective(s) (From PAD)
To strengthen the institutional capacity for quality and sustainable doctoral training, research and innovation in transformative technologies in sub-Saharan Africa.

28. Institutional capacity relates to the capacity of the RCU (\textit{icipe}) and the selected SSA host universities that will benefit from capacity building from the RCU.

29. While the broad list of transformative technologies is provided in paragraph 2, each round of university

\textsuperscript{19} PASET Board of Directors Meeting Minutes, January 2018, PASET.
selection will list the precise disciplinary areas, based on advice from the PASET governance bodies and the CAG.

Key Results

30. The project is expected to benefit:
   (a) Existing young academic faculty of African universities and other young Africans who will receive PhD scholarships;
   (b) Young African scientists and engineers entering academia, industry or business;
   (c) icipe that becomes a science, technology and innovation capacity building hub for SSA;
   (d) African institutions that train PhD students and become internationally recognized in ASET fields;
   (e) Faculty and students of the African institutions hosting or hiring RSIF scholars who benefit from the improved quality and capacity of the institutions;
   (f) Industry that can hire better graduates, increase innovation capacity and use transformative technologies; and
   (g) Society that will benefit from the use of transformative technologies.

31. The following indicators will measure progress toward achieving the PDO:
   (a) Growth of the Regional Scholarship and Innovation Fund.
   (b) Number of implemented networks between SSA host universities and international partners for PhD training and research collaboration.
   (c) Number of students/staff that take cross-cutting courses, entrepreneurship and/or research commercialization courses supported by the project.
   (d) Number of PhD scholars that have enrolled in RSIF programs (%female)
   (e) Number of research papers submitted by staff members or scholars supported by the project for publication to internationally indexed journals.

D. Project Description

32. The Project will build on the established framework of the PASET Regional Scholarship and Innovation Fund (RSIF) to strengthen the institutional capacity for quality and sustainable doctoral training, research and innovation in the applied sciences and engineering fields that support transformative technologies. To this purpose, the Project will have two main components: a first component financed by an IDA Regional Grant with the objective of strengthening the RCU to become a scientific, technological and innovation capacity builder for SSA; and a second component financed by a grant from the Government of Korea that will finance the scholarships and research grants in selected ASET fields in order to improve the quality of doctoral training and research in selected African universities, in collaboration with international universities. As described earlier, additional funds for the scholarship, research and innovation grants will be leveraged through national/regional IDA for country contributions and contributions from other partners.

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20 Implemented networks means that there are signed agreements between SSA host universities and international partners. Networks must be made up of at least two host institutions and two international partners, at least one of them from outside Africa.
33. **Component 1: Capacity development for the operation and management of the Scholarship, Research and Innovation Fund (IDA Regional Grant US$ 15 million).** This component will support strengthening of the RCU to become a scientific, technological and innovation capacity builder for PhD programs and universities in SSA in the fields of applied sciences and engineering that support transformative technologies, to make it capable of operating and growing RSIF efficiently and sustainably.

a. **Subcomponent 1.1: Capacity building for managing and growing the RSIF General Fund and setting up a RSIF Permanent Fund:** This sub-component will build the capacity of the RCU to engage in innovative fund-raising strategies to reach diverse donors with different interests as well as the design, operationalization and enhancement of a permanent endowment fund to finance scholarships, research and innovation grants in Africa on a sustainable basis. This subcomponent will finance: (i) regular and efficient fund-raising from African governments, partner governments, individual and institutional donors, private sector, for both the General and the Permanent Fund and the different windows of RSIF, which allows for visibility for contributors; (ii) the design of a Permanent Fund including its statutes, governance, structure and funding strategies as well as identification and selection of a Fund Manager; (iii) design and implementation of robust systems for funds management, including endowments; (iv) studies necessary for successful implementation and guaranteeing the sustainability of the Permanent Fund, including studies related to mechanisms.
based on solidarity for the beneficiaries to return to the Permanent Fund part of the benefits received by: scholars once they graduate and find a job; and/or universities and industry once they have benefited from results from research and innovation projects financed by RSIF; and (v) activities to improve financial management of the RCU. The target for additions to the RSIF General Fund during the project period is US$ 50 million. For the Permanent Fund, the target is to obtain seed funding of US$ 15 million.

b. **Subcomponent 1.2: Capacity development for the operation and management of doctoral training scholarships in selected African universities and research grants in ASET fields.** This subcomponent will support setting up of a PhD scholarship and research grants administration unit at the RCU, to design and implement strategies to contribute to the improvement of RSIF PhD programs and to operate and manage the training of doctoral students, and manage research grants, in ASET fields that support transformative technologies in priority sectors of the region. Specifically, this subcomponent will finance the following activities: (i) development and implementation of all the managerial and ICT processes and systems required by the RCU for the scholarships and research grants and their interfaces in host universities. This includes defining a methodology for data collection and analysis, which enables the RCU to assess the impact of the scholarship in comparison with other universities in the region leveraging the ongoing regional benchmarking initiative under the PASEF; (ii) improve the design of and manage, under the guidance of the PASET EC, the selection processes for scholars, host universities and international partners; (iii) improve mechanisms and design strategies for increasing participation of women in PhD programs and undertake research; (iv) design and implementation of monitoring and evaluation strategies; and (v) pilot implementation of five research grants for faculty of host institutions to support research projects in ASET fields related to transformative technologies aligned with the needs of the priority sectors.

c. **Subcomponent 1.3: Capacity development for improving quality of PhD programs and research in ASET fields.** This subcomponent will aim to build the capacity of host universities and the RCU to improve the quality of PhD programs and of research conducted in RSIF universities through several capacity building activities including: (i) support RCU in the design and implementation of cross-cutting PhD courses, training courses and mentoring programs, including climate change and transformative technologies; (ii) support the creation and implementation of academic networks among host institutions and international partners participating in RSIF to promote the capacity of universities to plan and implement academic activities to improve PhD programs (such as curricular reform, sharing of infrastructure, research, link to industry and development of soft skills, among others) as well as among RSIF scholars and researchers; (iii) development of standardized MoUs and agreements between SSA host universities and international partner institutions to reduce costs of collaboration and development of frameworks for intellectual property; (iv) support SSA host universities to seek accreditation of PhD programs; (v) document, disseminate and promote the implementation among host institutions of good international practices in PhD training, including responsible conduct of research (ethics) and compliance; and (vi) increase the access to scientific, technological and innovation journals and other published material to the RCU and RSIF researchers and PhD students.

d. **Subcomponent 1.4: Capacity development for the operation and management of innovation grants.** The RCU will set up an innovation grants administration unit to manage innovation grants.
This subcomponent will strengthen the unit by supporting: (i) development and implementation of all the managerial and ICT processes and systems required by the RCU for the innovation grants; (ii) improve the innovation and entrepreneurship capacity within the RCU, so that it is able to transfer best practices in this area to other participating RSIF organizations through, for example, developing tailor made courses on entrepreneurship and business model development and developing professional business incubation capability, new forms of networking and partnerships, e.g. with private sector and social investors, innovation ecosystem strengthening and sound management of intellectual assets and intellectual property; (iii) scoping exercises to identify existing incubators, accelerators and tech hubs for potential partnership on capacity development and innovation, and professional networks, conferences, and competitions on innovation and entrepreneurship as well as venture capital and investors for Africa; (iv) a background study on best practices for IP office establishment and IP policy of host university countries; (v) design and implementation of monitoring and evaluation strategies of the innovation grants; and (vi) pilot implementation of six innovations grants to support innovation-enabling environments in host institutions and five innovation grants to support innovation projects and commercialization of research in ASET related areas aligned with the needs of the priority sectors, presented jointly by faculty of host institutions involved in a PhD program with RSIF scholars and private productive sector.

34. Component 2: Scholarships and Research Grants for ASET ($9 million from Korea). This component, financed by a $9 million contribution from the Government of Korea administered by the Bank, will provide financing for scholarships and research grants in ASET fields in Sub-Saharan Africa. SSA countries have shown interest in contributing funds to RSIF either through their own resources or through national/regional IDA credit. Some of these contributions may also be channeled through regional IDA projects, for instance the proposed ACE III, which is currently under preparation.

a. Subcomponent 2.1: Doctoral training in ASET fields in selected SSA host Universities and international partner universities: This subcomponent will provide scholarships to finance 3- 4-year PhD training programs in priority areas for citizens of SSA countries at African host universities competitively selected by an independent evaluation committee through a rigorous two-stage process (details in Annex 1). Scholars will be selected by the host universities and undergo a further stringent competitive selection process conducted by an independent international committee that will ensure that the best students with the strongest research potential and leadership capabilities are admitted into the RSIF program. Priority will be given to meritorious and promising young African faculty without PhDs and females. International partner universities will be selected from proposals from host universities and the RCU based on proven strength in PhD training, research, innovation in the corresponding area, experience and willingness to work with RSIF host universities and ASET fields relevant to SSA. Scholarships will include “sandwich” training that will allow students to complete part of their doctoral program at international partner institutions or companies. During the program, scholars will have a chance to be exposed to leading thinkers and practitioners to combine their research topics with transformative technologies to have a greater impact on society.

b. Subcomponent 2.2: Research grants: This subcomponent will finance grants to support research projects in ASET fields related to transformative technologies aligned with the needs of the priority sectors. There will be two types of grants: (i) grants to faculty of RSIF host institutions involved in a

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21 After accounting for cost recovery fees and Bank executed activities
PhD program with RSIF scholars; and (ii) grants to RSIF graduates who obtain a post-doctoral or permanent position in an academic institution or research center in SSA. In both cases the proposals will require endorsement and co-financing by the institution. Grants will be assigned through open competitive calls and will be selected by international selection committees to ensure independence and high quality and relevance of projects. Selection criteria of the grants include application to transformative technologies and a workshop will be held for the applicants to learn about these technologies and potential applications.

E. Implementation

Institutional and Implementation Arrangements

35. The core implementing unit is icipe which will play the role of the RCU that will receive and administer the grant funds under the supervision of the World Bank and with strategic direction of the PASET governance bodies. A transparent and rigorous competitive process was carried out to select the RCU to ensure fair selection of the most appropriate regional organization to host the RCU. icipe was selected as the organization with the people, processes and systems, and governance and stability to host RSIF. icipe is based in Nairobi, Kenya.

36. The RCU will be in charge of the overall coordination, planning, monitoring and evaluation of project activities. It will also take care of any financial management and procurement necessary to carry out project activities. It will be responsible for managing and growing the General and Permanent Fund by fundraising and making profitable and smart investments. Profits from the investments under the Permanent Fund will finance the RSIF General Fund which will be used to implement the three RSIF windows and their administrative costs as well as other capacity building activities at host universities as needed.

37. RSIF window administration units for the three RSIF windows will manage the activities of each of the RSIF windows for PhD training, research and innovation. Under the RCU’s supervision and coordination, the administration units will manage the key activities as well as day-to-day administration for the PhD scholarship program, the research grants and innovation grants including selection of RSIF PhD scholars, evaluation of proposals for research and innovation grants, coordinating with host universities and RSIF scholars and grant recipients to respond to their queries among other activities.

38. PASET’s Board of Directors will set the strategic direction for RSIF and monitor activities. The Board of Directors is currently comprised of the Ministers of Education or Higher Education of the African countries that are PASET members, a representative of Korea and a representative of the World Bank. Going forward, for all RSIF related discussions, the World Bank member will be recused from the PASET Board. Other countries or partners that contribute to the RSIF can become members of the Board. The Board of Directors will be responsible for the overall strategic direction and vision of the RSIF. The EC, currently comprised of senior technical advisors to the Ministers of the five PASET member countries, will monitor implementation of activities and provide overall guidance for effective project implementation. The PASET CAG, an advisory body composed of predominantly African scientists, academics and experts as well as representatives of private sector and international partners will provide guidance to the Board on regional priorities, goals and any technical aspects of the RSIF. The current governance structure is laid out in the PASET Charter and Governance Manual, which may be revised periodically as the partnership grows.
Figure 3: Organizational Chart

F. Project location and Salient physical characteristics relevant to the safeguard analysis (if known)

The project will be located in selected African Universities and in ASET areas. The project primary focus is institutional and individual skills development in ASET through implementation of the Scholarship and Innovation Fund. Research grants will support research projects in ASET fields aligned with prioritized needs of sectors. Although no civil works related infrastructure investment requiring land is envisaged under this project, it is important to ascertain that the individual projects or research grant funded projects will have minimal impacts.

G. Environmental and Social Safeguards Specialists on the Team

Svetlana Khvostova, Environmental Safeguards Specialist
Catherine Asekenye Barasa, Social Safeguards Specialist
### SAFEGUARD POLICIES THAT MIGHT APPLY

<table>
<thead>
<tr>
<th>Safeguard Policies</th>
<th>Triggered?</th>
<th>Explanation (Optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Assessment OP/BP 4.01</td>
<td>No</td>
<td>Environmental and social impacts for ASET research projects is expected to be minimal, as no civil works are planned under the project. No Environmental and Social Management Plan (ESMP) necessary to be prepared. On a precautionary basis, the Operational Manual for participating universities will include a reference to WBG General Environment, Health and Safety Guidelines to promote best practices for activities such as classroom renovations or equipment replacement. During the project implementation, the Regional Coordination Unit will carry out periodic monitoring and evaluation of any (if applicable) environmental and social aspects of the project activities.</td>
</tr>
<tr>
<td>Performance Standards for Private Sector Activities OP/BP 4.03</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Natural Habitats OP/BP 4.04</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Forests OP/BP 4.36</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Pest Management OP 4.09</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Physical Cultural Resources OP/BP 4.11</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Indigenous Peoples OP/BP 4.10</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Involuntary Resettlement OP/BP 4.12</td>
<td>No</td>
<td>The proposed project activities do not require any land acquisition or displacement of people (permanent or temporary) to support generation, technology testing and transfer activities /and or restrict access to resources or loss of livelihoods, compensation notes or ARAP will be prepared for such projects.</td>
</tr>
<tr>
<td>Safety of Dams OP/BP 4.37</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Projects on International Waterways OP/BP 7.50</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Projects in Disputed Areas OP/BP 7.60</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
KEY SAFEGUARD POLICY ISSUES AND THEIR MANAGEMENT

A. Summary of Key Safeguard Issues

1. Describe any safeguard issues and impacts associated with the proposed project. Identify and describe any potential large scale, significant and/or irreversible impacts:

No adverse or only minimal environmental impacts are anticipated under the proposed Project, given the small size of the civil works to be financed by grants to participating universities, which will only apply to existing buildings. No new structures or works of significant size are envisaged under the Project, and therefore the environmental or resettlement risks are expected to be negligible. No safeguards policies are being triggered, and the environmental category for the proposed project is C, with no Environmental and Social Management Plan (ESMP) necessary to be prepared.

2. Describe any potential indirect and/or long term impacts due to anticipated future activities in the project area:

No indirect or long term impacts are anticipated due to project activities.

3. Describe any project alternatives (if relevant) considered to help avoid or minimize adverse impacts.

No project alternatives were considered.

4. Describe measures taken by the borrower to address safeguard policy issues. Provide an assessment of borrower capacity to plan and implement the measures described.

No safeguards policies are being triggered, and the environmental category for the proposed project is C, with no Environmental and Social Management Plan (ESMP) necessary to be prepared. On a precautionary basis, the Operational Manual for participating universities will include a reference to WBG General Environment, Health and Safety Guidelines to promote best practices for activities such as classroom renovations or equipment replacement. During the project implementation, the Regional Coordination Unit will carry out periodic monitoring and evaluation of any (if applicable) environmental and social aspects of the project activities.

5. Identify the key stakeholders and describe the mechanisms for consultation and disclosure on safeguard policies, with an emphasis on potentially affected people.

The key stakeholders include staff and students of participating institutions.

B. Disclosure Requirements

C. Compliance Monitoring Indicators at the Corporate Level (to be filled in when the ISDS is finalized by the project decision meeting)

The World Bank Policy on Disclosure of Information
Have relevant safeguard policies documents been sent to the World Bank for disclosure?
NA
Have relevant documents been disclosed in-country in a public place in a form and language that are understandable and accessible to project-affected groups and local NGOs?
NA

All Safeguard Policies

Have satisfactory calendar, budget and clear institutional responsibilities been prepared for the implementation of measures related to safeguard policies?
NA
Have costs related to safeguard policy measures been included in the project cost?
NA
Does the Monitoring and Evaluation system of the project include the monitoring of safeguard impacts and measures related to safeguard policies?
NA
Have satisfactory implementation arrangements been agreed with the borrower and the same been adequately reflected in the project legal documents?
NA

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Borrower/Client/Recipient
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APPROVAL

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