

# BUILDING STRONGER UNIVERSITIES PROJECT PHASE THREE (BSUIII) KNUST-DANISH CONSORTIUM PARTNERSHIP PROPOSAL

## I. Rationale, and main lessons learnt during BSUII

### Main Achievements and Lessons Learned in BSUII

The Kwame Nkrumah of University of Science and Technology (KNUST) is made up of six constituent academic Colleges, and requires research capacity building across its colleges in order to fulfill its role in national development. The BSUII initiative has contributed to developing research capacity at KNUST in line with the university's key research and teaching mandate<sup>1</sup>. Within the three thematic areas, namely Climate-Smart Agriculture and Environmental Management (WP1), Entrepreneurship and Job Creation (WP2) and Health Delivery Systems (WP3), short courses, methods-oriented workshops, engagement with industry and mentored pilot projects have provided the opportunity for a number of young researchers in the Colleges involved<sup>2</sup>, to hone their research skills.

Under BSUII, over 80 KNUST staff have directly benefited from research capacity building activities facilitated by both south and north partners. The knowledge acquired is evident in the ability of the participating staff members to undertake pilot research projects, develop research proposals for external funding as well as the writing of manuscripts for publications. A typical example is the publication of an article on the locally fabricated cookstove pilot project in the MDPI Energies Journal. A total of 7 (3 from WP1 and 4 from WP 3) research proposals were also jointly developed and submitted to the Danish Ministry of Foreign Affairs for research grants (FFU) by the BSUII pilot study teams in all WPs out of which 1 (WP3 ) has been accepted for phase two.

A coherent and mentored learning approach has sought to ensure that researchers apply the theories and methods gained to tangible research problems (as opposed to merely scientific questions) and gaining of experience at each step of the research process, from formulation to communication of results. Pilot research projects in the three thematic areas, have contributed to building capacity in problem-based research concepts manner for addressing specific societal problems that fall within KNUST's research remit.

In the area of postgraduate education, three new and one revised PhD curricula have been developed to address specific needs in the areas of Climate-Smart Agriculture and Entrepreneurship (2 WP1 and WP2). To augment KNUST's efforts to reach out to industry partners, BSUII under the WP2 has sponsored the development of an Academia-Industry (AI) linkage database and the creation of office space to facilitate the process. The AI database has created a common platform for KNUST researchers to interact with other researchers, industry partners, donors, alumni and students.

---

<sup>1</sup> The strategic mandate of KNUST is to provide higher education, undertake research, disseminate knowledge and foster relationships with outside persons and bodies.

<sup>2</sup> Colleges of Agriculture and Natural Resources, Engineering, Health Sciences and Science

In addition, BSUII engaged in activities aimed at strengthening the university-wide research support systems, including ready access to literature, laboratory services, and grants management. This has yielded the dual benefit of strengthening the administrative capacity for sustainable research processes as well as equipping the staff to conduct high quality research.

Under the University-wide Services and Facilities Supporting Research Work Package (WP4), a number of university-wide research support initiatives has been introduced, all of which should be considered important elements towards KNUST's framework for institutionalizing a research-responsive administrative system. This framework will facilitate consolidation of grants and research as well as graduate education and training guidelines for easy access by internal and external stakeholders. These initiatives include the development of a Research Management Information System (ReMIS) and the Grants Accounting Management Software (GAMS), upgrade of facilities and resources at the 'Research Commons' of the University library and enhancement of the central laboratory standard operational and management processes. Other initiatives are development of postgraduate education and training guidelines/policies including enhancement of written and oral thesis examinations, PhD Supervision guidelines, Publication Policy, Graduate Student's Handbook and introduction of new and enhanced PhD Curricula to address emerging market trends and societal needs. In addition, the development of an automated tracking system for thesis submission and examination has been prepared to empower the School of Graduate Studies to provide graduate students the needed support to complete their programmes within stipulated time frames. This will improve KNUST's overall visibility and make KNUST the university of choice in Ghana for postgraduate education and training.

South-led management of donor supported projects is gradually becoming the norm at KNUST as the university requires of its staff to initiate and submit winning research proposals for external funding. The south-led mode of BSUII has also led to increased ownership at all levels of the project, in comparison with the north-led BSUI. The KNUST research management capacity has benefitted from the north-south interactions with respect to structured project planning and implementation of the partnership, with logical framework based approaches as key ingredients. Members of the Danish consortium have also benefitted from networking, particularly with respect to research collaboration and the contextual perspectives derived from the interactions, leading to identification of new researchable areas.

These gains notwithstanding, BSUII faced a number of challenges during implementation. The delayed start of the project coupled with the short timeframe for implementation resulted in the need for a no-cost extension to enable the effective completion of activities. Implementation of activities with a relatively high number of Danish partners was also challenging. The relatively high number of different people involved in the different work packages sometimes made it difficult to follow through and achieve timely implementation optimum knowledge sharing, synergies and efficiency. The continued partnership will therefore aim at enhancing south-led initiation of TORs, joint and timely negotiation for timelines suitable to team members, improving communication between north and south partners and timely submission of assignment completion reports. This will lead to improved timely completion of

activities by assignment holders, consolidation, coherence and greater degrees of institutionalization of the outputs.

### **Rationale for Continued Support**

The overall objective of BSUIII is that the partnering African universities will enhance their roles as providers of scientific knowledge and of research-based education and advice to society. This objective is well aligned with those of KNUST. As outlined above, BSUII has created a sound foundation for further advancing the research capacity of KNUST. However, the institutionalization of novel research paradigms and support systems is a long-term and continuous process that requires further efforts within the three thematic areas, as well as with respect to creating sustainable research support systems.

In the case of a large university such as KNUST, the aim is primarily to address the objective at the Colleges particularly in the Colleges of Agriculture and Natural Resources, Science, Health Sciences, Engineering as well as the Humanities and Social Sciences. KNUST thus acknowledges the need to consolidate and focus activities for better effect in the Colleges that reflect the WP thematic areas.

## **II. Strategic Direction and Theory of Change**

### **Priority Research Capacity Development Areas**

The major strategic research capacity development areas for the BSUIII partnership are conduct of problem-based (demand-driven) research (PBR), innovation, entrepreneurship, outreach and research support systems and structures. In BSUII, capacity building for conduct of research was at a pilot scale, directed at and carried out by specialized groups and individuals with limited diversity as regards disciplines, expertise and skills. While useful research has been carried out and capacity built among those involved, we expect that adoption of the new research paradigms at college level, as well as better outreach will be more effective through multi-disciplinary research groups. As will be accounted for later, capacity building of these research groups will revolve around a climate-smart agriculture, environment and health research nexus, with focus on one or more catchment areas<sup>3</sup>, with the promotion of innovation and entrepreneurship as key ingredients. This nexus aligns with KNUST and national priorities, reflects the competences and resources of the work packages, and holds promise for integrated training and research.

---

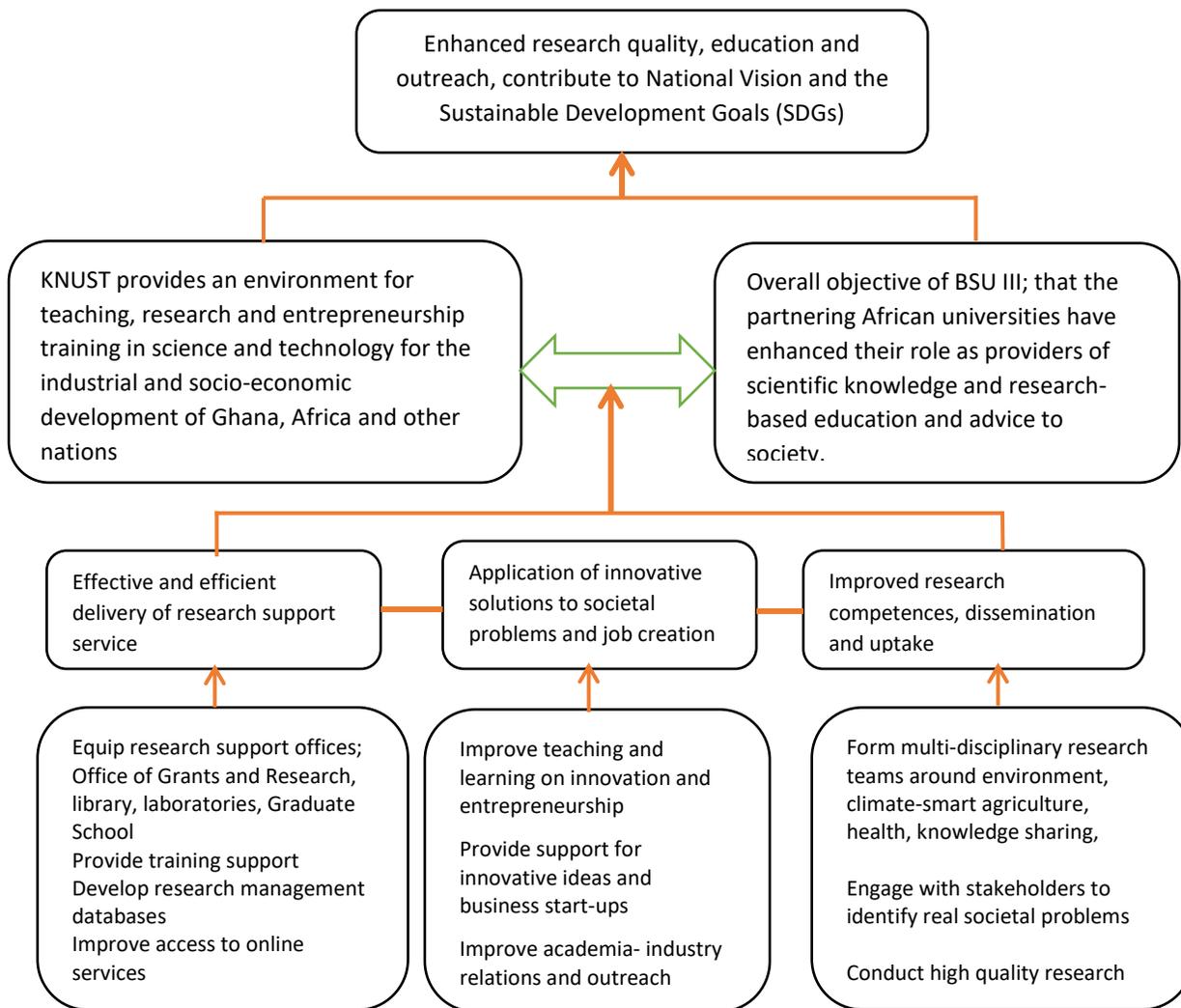
<sup>3</sup> The Owabi catchment in the vicinity of Kumasi is envisaged as the key 'field laboratory'. The catchment offers problematics that are relevant in natural resource management and public health perspectives, which are best addressed through multi-disciplinary approaches and the involvement of non-academic partners.

## **Theory of Change**

In line with the overall objectives of BSU III and KNUST's vision, three main outcome areas are envisaged in this proposal. These can be summarized as follows: strengthening the administrative capacity to support research; improving outreach/stakeholder collaborations for high quality research and improving university capacity by strengthening research and outreach practices and networks. These outcomes will be achieved by carrying out activities that will yield desired outputs, as outlined in the subsequent sessions. This is in line with the theory of change of the BSU III Concept Note, as it is believed that strengthening these areas, will enhance research quality, education and outreach and contribute to enhanced social and economic development.

Multi-disciplinary research groups are central to the strategies of the world's best universities, as they are seen to foster collaboration with external stakeholders, and have the potential to conduct high quality research that addresses societal problems in a relevant and holistic manner. The capacity of staff and students involved in this process will be enhanced through peer learning, training, networking and learning-by-doing. To ensure the success of this process, other administrative structures such as the Office of Grants and Research, the Library, laboratories and the School of Graduate Studies will be equipped with the relevant resources. This will be provided through staff training, equipment support and the provision of automated systems such as software and databases. The achievement of KNUST's vision will further be accelerated as the ability of both staff and students to proffer innovative solutions to address specific problems through teaching and research get sufficiently improved. This is illustrated in Figure 1.0.

Figure 1.0: Theory of Change



Source: KNUST-DA, 2017

To this end, KNUST will form cross-theme and cross-college research teams to promote synergies in the research processes and better respond to societal demand and enhance collaboration among staff and between colleges. This will stimulate and lead to adoption of multi-disciplinary research approaches with a view of enhancing problem setting and solving by the scientific research teams.. Furthermore, KNUST will apply a more demand-driven approach than was the case in BSUII. This will involve consultations with relevant stakeholders from industry, the public sector and communities. This is with a view to placing KNUST research in the relevant innovation landscape.

The scientific themes of BSUIII will focus on issues that are relevant to Ghana especially in the achievement of Sustainable Development Goals 1, 3, 6, 9 and 13, Ghana National Climate Change Policy

as well as other relevant national policy documents<sup>4</sup>. While the three thematic areas under BSUII will be maintained, the focus will be narrowed to developing capacity for conducting problem-based/ demand-driven research (i.e. research that is based on actual problems of relevance to society), through the application of innovative processes with an entrepreneurial mindset as opposed to research of a purely scientific and theoretical nature. Research groups will be formed to address Climate Smart Agriculture and Environmental Management and Health Delivery Systems research questions under WP1 and WP3 respectively.

WP2 (Innovation and Entrepreneurship) in BSIII will be used and applied as a more focused tool to foster innovative processes and entrepreneurial thinking in conducting research. Thus, WP2 will focus its activities, from training to mentoring, at the research groups in WP1 and WP3 with the aim of ensuring that innovative and entrepreneurial processes and opportunities are explored in research. WP2 will also be used to expand KNUST's business incubation concept to unearth innovative ideas by staff and students for job creation. Lessons will be learnt from the Danish model of business incubation particularly at Aalborg University to improve upon KNUST's existing model.

WP4 (Research Support Services and Facilities) will continue to focus on University-wide research support services and facilities. The Office of Grants and Research, Library, Central Laboratory and the School of Graduate Studies will continue to be supported in providing quality research support services to staff and students of KNUST. In particular, the Office of Grants and Research will continue to improve its research-responsive support system to facilitate the institutionalization of research and research-based educational programmes across the university. Pilot research projects will be designed to collect baseline data needed for the development of externally funded research projects. With the institutionalization of BSUIII outputs and other processes, KNUST will be better placed to serve, as a knowledge hub that provides innovative solutions to developmental problems in Ghana, Africa and beyond. Furthermore, BSU III outputs will contribute to the improvement of the academic ranking of KNUST because of the improved research culture, increased research publications, citation counts and online presence.

### **Ultimate Outcome (Goal)**

By 2021, KNUST will be recognised as an innovation platform for teaching, demand-driven research and entrepreneurship for the accelerated achievement of relevant Sustainable Development Goals (SDGs). KNUST, as a centre of excellence will be better positioned to provide scientific and technological support to countries, especially in Africa, for the achievement of the SDGs and other development targets. This will be evident in the visibility of KNUST researchers and postgraduate students in various problem-

---

<sup>4</sup> Ghana Strategic Investment Framework (GSIF) for Sustainable and Management, Climate Change in Ghana: impacts on agriculture and policy implications, Identifying opportunities for climate-smart agriculture investment in Africa, Ghana Forest and Wildlife Policy, Climate change adaptation: A primer for water conservation, flood risk reduction and irrigation strategy for Northern Ghana, Climate change and disasters: perspectives from Ghana three northern Regions, National climate adaptation strategy, Increased resilience in Northern Ghana through the management of water resources and diversification of livelihoods.

solving endeavours such as policy-oriented research, innovation, public policy and private sector development across Africa

### **Assumptions**

The attainment of the intermediate outcomes and their transition to the ultimate outcome rests on the following assumptions:

- a) KNUST has well-trained researchers capable of undertaking problem-based research projects to promote and disseminate knowledge and other research outputs to relevant stakeholders. This implies that BSUIII will enhance and sustain the ongoing efforts.
- b) KNUST is an international centre for the promotion of excellence and advancement of scholarship. BSUIII support will be a catalyst for striving to enhance KNUST's visibility during and after the project.
- c) KNUST's industry partners are willing and able to collaborate with researchers throughout the research cycle.

### **Major Development and Changes from BSUII**

Overall, BSUIII will focus on developing for conducting problem-based research in multi-disciplinary research groups at the level of individuals.. This involves a focus on synergies and the convergence of hitherto scattered skills in the context of a climate-smart agriculture, environment and health axis. WP2 in BSUIII will seek to develop capacity for innovation and entrepreneurship in the context of this axis, i.e. through training and the promotion of (pilot) research that includes innovation and entrepreneurship dimensions, when addressing agricultural, environmental management and health delivery problems. Pilot research projects will be identified and implemented with stakeholders ensuring their involvement in the research process.

Improved monitoring and evaluation of processes at college level represents an additional element of consolidation, the aim being to better internalize capacity building processes. Furthermore, improved monitoring and evaluation will foster more effective communication of the capacity building experience to the university leadership, thereby enhancing the potential for seeing the scaling up of approaches to the university wide level.

Under WP1 and WP3, multi-disciplinary Research Groups will be formed across Colleges of Science, Agriculture and Natural Resources, Engineering, Health Sciences, and will in some cases also involve Humanity and Social sciences. The groups will comprise both young and experienced faculty members who will work together with external stakeholders to identify and conceptualize real life research problems. The Research Groups will be taken through various methodology training, and be introduced to state-of-the-art in the specific fields. Experienced researchers from both KNUST and the Danish partner institutions will be assigned to the groups to provide mentorship. The idea is to ensure that KNUST research becomes well-equipped for providing solutions to societal problems in a holistic manner. The approach is also expected to promote research dissemination and uptake by appropriate stakeholders.

## **Emphasis on Outreach, Innovation and Entrepreneurship**

Increasingly, the government of Ghana, along with industry, has voiced concern about universities' ability to carry out research needed for solving the country's development problems. The global and the national development agendas are becoming closely aligned with the UN's 17 Sustainable Development Goals (SDGs) framework. Achieving these goals demand concerted efforts, through engaging with external stakeholders in the private and the public sectors, in the identification, conduct and dissemination of research. The strategic mandate of KNUST charges it to provide higher education, undertake research, disseminate knowledge and foster relationships with external stakeholders. The mission of KNUST also mandates the university to provide knowledge and expertise that directly support the industrial and socio-economic development of Ghana. In line with this, BSUIII will build on KNUST's mission to provide relevant solutions to Ghana's developmental problems through the generation of new knowledge for use by social and economic actors, especially in the areas of climate-smart agriculture, environmental management and health delivery systems.

An important feature of the SDG agenda is its holistic approach to development, with emphasis on working in partnership with to achieve goals. Therefore, the intensification of KNUST's partnership with public and private sector actors in addressing critical developmental issues in the selected thematic areas under BSUIII is therefore appropriate and consistent with the global agenda. Developing the capacity of KNUST researchers in applied multi-disciplinary research and institutionalizing problem-based research as the norm, will make research more relevant for addressing existing societal challenges. In BSUIII, these processes will include the strengthening of linkages with the government, private and public sector operators as well as with civil society. Moreover, WP2, as already indicated, will be assigned a much more 'cross-cutting' or integrating role, as regards improving capacity of WP1 and WP3 research teams in the use of conceptual and concrete tools innovation and entrepreneurship. Acquisition and use of such knowledge will enhance KNUST's capacity to provide the innovative solutions needed for the industrial and socio-economic development of Ghana.

In addition, the innovation and entrepreneurship focus will create an enabling environment for interaction between KNUST and local SMEs geared towards improving teaching and mentored students' learning activities.

BSUIII will also strengthen institutional capacity in the provision of research-based advisory services and consultancy. The Danish model for public and private sector consultancy, i.e. research based-advice provided to public authorities and the private sector (typically ministries, companies and industry associations) will serve as guide. These activities, which are highly institutionalized in the Danish partner universities, represent outreach at a structural level. It is believed, that the combination of strengthening the ability of KNUST researchers to carry out applied research through research groups, with a focus on strengthening KNUST's ability to do so as an institution that serves key national authorities, will have far reaching capacity building potential that extends beyond the BSUIII timeframe. In BSUIII activities in this regard will revolve around inspiration and learning visits to Denmark, as well as seminars on typical models.

## **Gender Mainstreaming**

Even though women are underrepresented in the university teaching and research staff population, BSU III will ensure their effective participation in all the work packages of the project. In each work package, it will be ensured that women, representing various areas of expertise, are involved and in fair proportions. Overall, KNUST will stay committed to gender equality and increase female involvement in all the research, training and outreach processes in BSU III. In BSU II, about 25 percent of pilot study participants were females. Efforts will be made to increase female participation to 30 percent in all activities involving staff. This is also aligned with the University's increasing efforts to promote female career and education in Science, Technology, Engineering and Mathematics (STEM).

### **III. Objectives, Outcomes and Outputs for the Partnership in BSUIII**

#### **Development Objective**

The overall objective of BSUIII is to contribute to of KNUST's vision of producing high caliber graduates and knowledge to support the sustainable economic and social development of Ghana and Africa.

#### **Immediate Objective**

The immediate objective of the BSUIII is that KNUST has strengthened its frameworks, systems and practices for research to the extent that it is better able to engage with private and public sector stakeholders for the generation of new knowledge for addressing social and economic problems of Ghana.

#### **Overall Outcomes**

1. KNUST staff have access to highly improved research-responsive administrative processes and systems ( Danida Outcome Area 1)
2. KNUST has strong stakeholder collaborations and able to offer tailor-made solutions to societal problems through the conduct of demand-driven research (Danida Outcome Areas 2)
3. KNUST adopt the culture of innovation and entrepreneurship in teaching and research to foster technology transfer and commercialization of knowledge (Danida Outcome Areas 3)

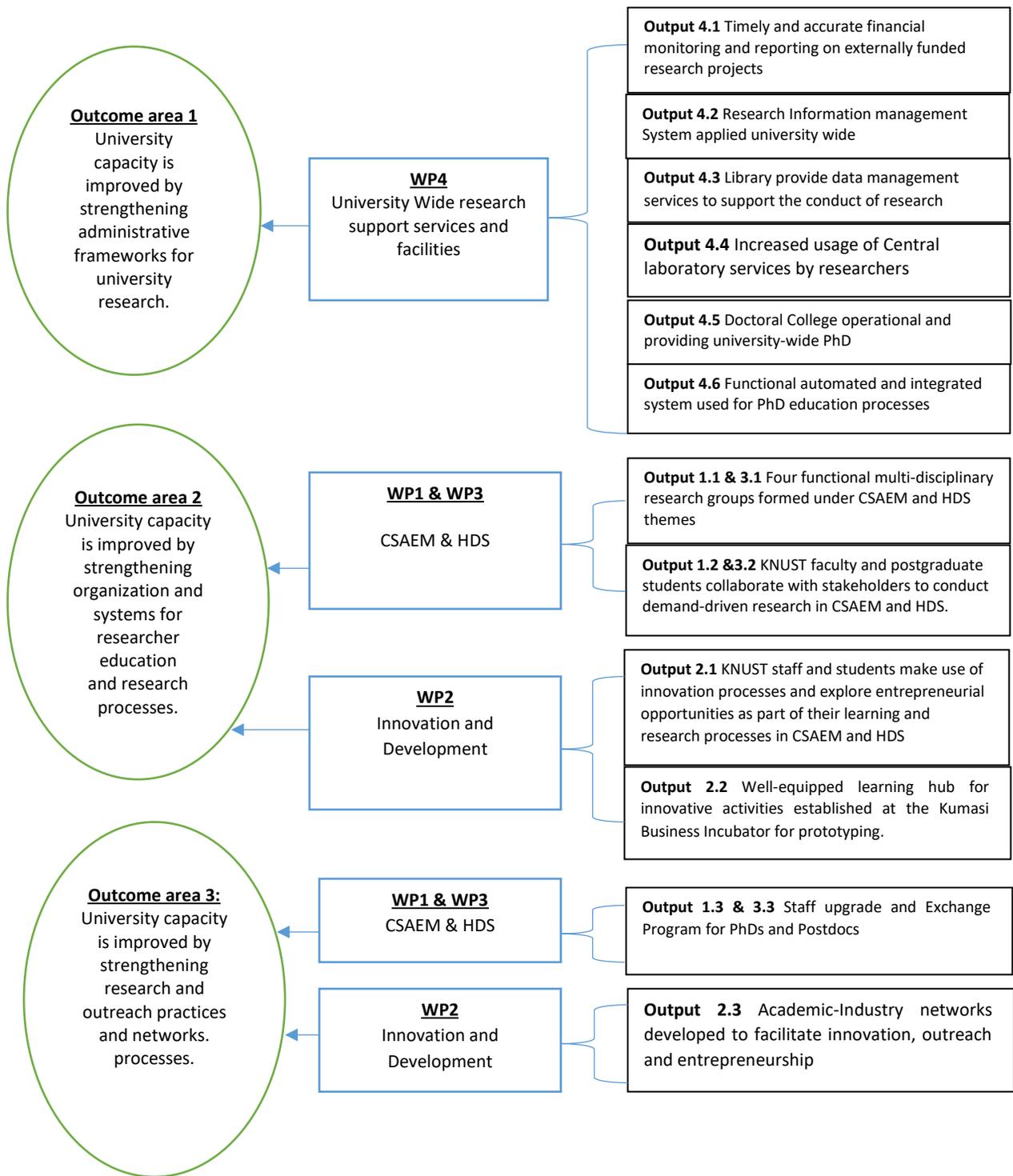
#### **DANIDA OUTCOME AREAS AND KNUST OUTPUTS**

In reference to the DANIDA Concept Note, three outcome areas are envisaged in the BSUIII Proposal: These are:

1. University capacity is improved by strengthening administrative frameworks for university research
2. University capacity is improved by strengthening organisation and systems for researcher education and research processes.
3. University capacity is improved by strengthening research and outreach practices and networks

KNUST's outputs for BSUIII in the four work packages have therefore been aligned to the above outcomes as illustrated in figure 2.

**Figure 2: BSUIII Implementation Structure**



Source: KNUST-DA, June, 2017

## **Outcome Area 1: University capacity is improved by strengthening administrative frameworks for university research**

The outputs under this outcome area predominantly fall under WP4 – University-wide Research Support Services and Facilities and include the following:

### **4.1 Timely and accurate financial monitoring and reporting on externally funded research projects**

The use of the Grants Accounting Software and training of accountants and researchers in grant financial management will increase timeliness and accuracy in project reporting.

### **4.2 Research Management information systems providing synchronized data on research expertise and activities across the university**

Training on research management and the use of the Research Management Information System (ReMIS) will ensure that such information across the university is centrally available and accessible.

### **4.3 Library provide data management services to support the conduct of research**

BSUIII will initiate a research data management system for the university because this is currently non-existent. The library will lead this process that will eventually result in the provision of support for researcher data needs and storage of datasets that will be made accessible for further research.

### **4.4 Increased usage of Central laboratory services by researchers**

The central and affiliate laboratory system will reach out to the research community in the University and in industry, and provide equipment specific and application training in order to promote and expand use of the state of the art central laboratory. Use of Standard Operating Procedures (SOPs) and ISO certification will ensure that the laboratory is providing quality services to users.

### **4.5 Doctoral College operational and providing university-wide PhD courses**

A Doctoral College will be established at the School of Graduate Studies to institutionalize the provision of PhD skill enhancement training through the offer of mandatory PhD courses developed in BSUII.

### **4.6 Functional automated and integrated system used for PhD education processes**

The automated and integrated system for post graduate education processes developed in BSUII will be operationalized. Further upgrade will be done to capture the entire spectrum of graduate students' training processes at KNUST. Training of supervisors and students will facilitate understanding and appreciation of their specific roles and responsibilities towards enhanced postgraduate training and education processes.

## **Outcome Area 2: University capacity is improved by strengthening organisation and systems for researcher education and research processes.**

The Outputs under this outcome area relate to element of the 3 thematic areas: WP1-Climate Smart Agriculture and Environmental Management (CSAEM), WP2-Innovation and Entrepreneurship (I&E) as well WP3-Health Delivery System (HDS).

**1.1 & 3.1 Four functional multi-disciplinary research groups established** In many countries, multi-disciplinary research groups have proven to be one of the most effective ways of obtaining high quality holistic and relevant research findings whilst capitalizing on the benefits team dynamics. In KNUST, the research group concept is not well developed neither at the College level, nor across Colleges; rather, is research undertaken on an individual basis and in single-disciplinary fashion. As a result, capacity development and internalization at the collective level is limited, and while the research produced may be excellent in its own right, the societal relevance that may be achieved through the addition of multi-disciplinary perspectives, usually leaves room for enhancement.

The core research groups will comprise Danish partners, KNUST faculty, and PhD students, from relevant colleges. Research capacity building will revolve around an agriculture/climate change, environment and health research axis, with the Owabi catchment in the vicinity of Kumasi envisaged as the key microcosm 'field laboratory'. The catchment offers problematics that are relevant in natural resource management and public health perspectives, which are best addressed through multi-disciplinary approaches. Therefore, the research groups are also likely to include participants from social science and, may also, end up being mixed CSAEM-HDS groups. The exact composition and scope of these groups will be determined during the BSUIII inception/work planning. The groups will be trained and mentored to function as a strong research entity in KNUST.

**1.2 & 3.2 KNUST faculty and postgraduate students collaborate with stakeholders to conduct demand-driven research in CSAEM and HDS. .**

This output is tied to output 1.1 & 3.1 as the research groups will be trained on relevant models for stakeholder engagement and outreach. KNUST researchers will work together with external stakeholders to conceptualize relevant societal problems which will be taken up for further studies by the research groups as research projects. Findings from the research will then be shared with the relevant stakeholders for uptake.

**2.1 KNUST staff and students make use of innovation processes and explore entrepreneurial opportunities as part of their learning and research processes.**

Research groups in WP1 and WP3 will be taken through innovation processes of doing research with cases drawn from the Owabi catchment and elsewhere. External stakeholders (entrepreneurs, end-users) will also be taken through trainings to enable them appreciate the technical and commercial benefits of the research. Entrepreneurship clinics will also be organized across the university to create entrepreneurship awareness amongst staff and students.

## **2.2 Well-equipped learning hub for innovative activities established at the Kumasi Business Incubator for prototyping.**

With the establishment of the industry-academia database in BSUII, a linkage between industry and academia has been forged. A continuous collaboration between KNUST and Industry is therefore of utmost importance. KNUST has taken the lead to provide the necessary environment for introducing students to entrepreneurship and has gone further to establish the Kumasi Business Incubator to cater for students who have the passion to establish ICT-related businesses. Due to the limited capacity (25 offices) of the Business Incubator many students are turned away. However, there is physical space to support incubation of a larger group as well as virtual support to start-ups.

To upscale the innovative activities of students and members of the public, a fully equipped innovation laboratory will be established for the use of greater number of prospective job-creators across departments. This will be in the form of a well-equipped Makers' Space, where students and researchers can sit and develop creative ideas towards prototyping and product-development after extensive market research. What is important is that an enabling and guided environment is created for people with creative and innovative ideas towards job creation. In addition to the innovative lab, the major missing link is research and development funds. Furthermore, the capacity for lecturers across departments will be developed (e.g. in the CSAEM and HDS research groups) to support this center, in the area of business plan reviews, business support training and entrepreneurship coaching.

### **Outcome Area 3: University capacity is improved by strengthening research and outreach practices and networks**

The outputs under this outcome area relates to elements under WP1, WP2 and WP3.

#### **1.3 & 3.3 Staff upgrade and Exchange Program for PhDs and Postdocs in CSAEM & HDS groups**

Having high numbers of staff with PhDs is widely recognized as a core element in research capacity building. This output does not involve full scholarships for post-doctoral studies or PhDs, but will offer training and capacity building support to both young and old faculty members especially those who have had little or no further training after completion of their academic degrees.

The support will include an exchange program with Danish partners, intensive training on research/grant proposal writing and networking for both postdocs and staff enrolled in PhD programmes in the two thematic areas of WP1 and WP3. This is expected to improve staff capacity in the teaching and conduct of research. Preference will be given to female staff members during the selection process.

### **2.3 Academic-Industry networks developed to facilitate innovation, outreach and entrepreneurship**

Processes to enhance academia-industry linkages at KNUST were initiated in BSUII. An academia-industry database was developed and an office equipped. A few pilot research collaborations were commenced and showcased on the AI Database. There is the need to strengthen collaboration with industry through sector by sector stakeholder meeting. Also surrogate/ external entrepreneurs will be engaged to provide entrepreneurial inputs into research and to convert innovations from the laboratory to a viable product in a market place. Further training and awareness on the use of the database, and capturing of appropriate data on the linkages is required to strengthen research collaboration and outreach.

## **IV. Risks**

- 1. Timely availability of research and other staff for implementation of project activities:** The risk of staff not being available for BSU III activities at scheduled time will be avoided by scheduling project activities in a manner that will minimize conflict with teaching and other duties of targeted staff. Project activities in a manner that will minimize conflict with teaching and other duties of targeted staff.
- 2. Institutional support:** The risk of inadequate support by the University for institutionalization of BSUIII outputs and outcomes, will be mitigated by aligning the project leadership to existing university management structures through the involvement of various College leaders and the BSU III Steering Committee to be constituted by the Vice-Chancellor.

**Delays in project implementation:** Delays in the inception phase processes as well as joint scheduling of activities by KNUST and Danish partners pose a risk to the timely implementation of activities. Adequate allocation of time for the planning phase and for the execution of activities will be ensured by the project leads. Project management support teams will help in the timely identification of implementation deviations and prompt introduction of corrective measures.

## **V. Coordination, Learning, Partnership and Management of BSUIII Support**

The overall coordination of the South-led partnership with Danish institutions will be anchored at KNUST. It will be aligned to and fully integrated into the existing university management structures as the leadership is designed to involve various College leaders and includes overall project accountability to the Vice Chancellor. KNUST, as the project holder, will have the overall responsibility of coordinating and managing the grant. A Steering Committee will be constituted by the Vice Chancellor to provide a higher level of supervision over the project. A Steering Committee will be constituted by the Vice Chancellor to provide a higher level of supervision over the project. KNUST leadership led by a Coordinator, will be responsible for the overall communication with the partners of the Danish Consortium, as well as Danida and DFC, when needed. He will also be responsible for technical coordination of BSUIII activities, including preparation of technical and financial reports with the help of a project administrator.

The planning, implementation and monitoring of the partnership will be managed by a joint north-south partnership management team led by the KNUST and Danish coordinator, the work package leaders at KNUST and the work package leaders of the Danish consortium. The north-south partnership management team will meet over Skype within a maximum of one month, or as needed. The Danish consortium coordinator and work package leaders will meet physically every 6 months.

Work Package Leaders, both north and south, will have academic backgrounds and experience relevant to the work package themes. This is expected to enhance professionalism in selection of assignment holders and in implementation of assignments, something which has a bearing on efficiency and consistency in project delivery. The work package leaders will draw on specialised and dedicated expertise in their academic and administrative hinterlands, and are expected to outsource activities to fewer and more specialised individuals as output leaders with a view to enhancing continuity, and sustained capacity development processes. This implies that WP leaders at the intra-WP levels communicate and agree on these matters. Efficient implementation, along the lines of these principles, will be ensured through detailed work planning at the inception workshop. The Danish consortium will be led by the Department of Agroecology, Aarhus University. The KNUST and Danish Consortium Coordinators will lead the day-to-day management and decision-making for the project, and will meet via Skype as and when needed. Aarhus University as the Danish lead institution will also be the legal entity that enters into the trilateral agreement with KNUST and DFC.

The Danish Consortium will be represented by three universities (Aarhus: WP1, Copenhagen: WP3 and Aalborg: WP2) and WP4-a private company (CG consult). All 4 entities have considerable BSU experience and will offer specialised expertise within the thematic areas. In the case of WP2, the expertise of Aalborg University will be augmented by an operational link to Access2Innovation, an organization specialized in support to innovation processes, bringing together civil society organisations, businesses, public institutions and the academic world in new collaborations, creating new sustainable solutions and business models targeting developing countries.

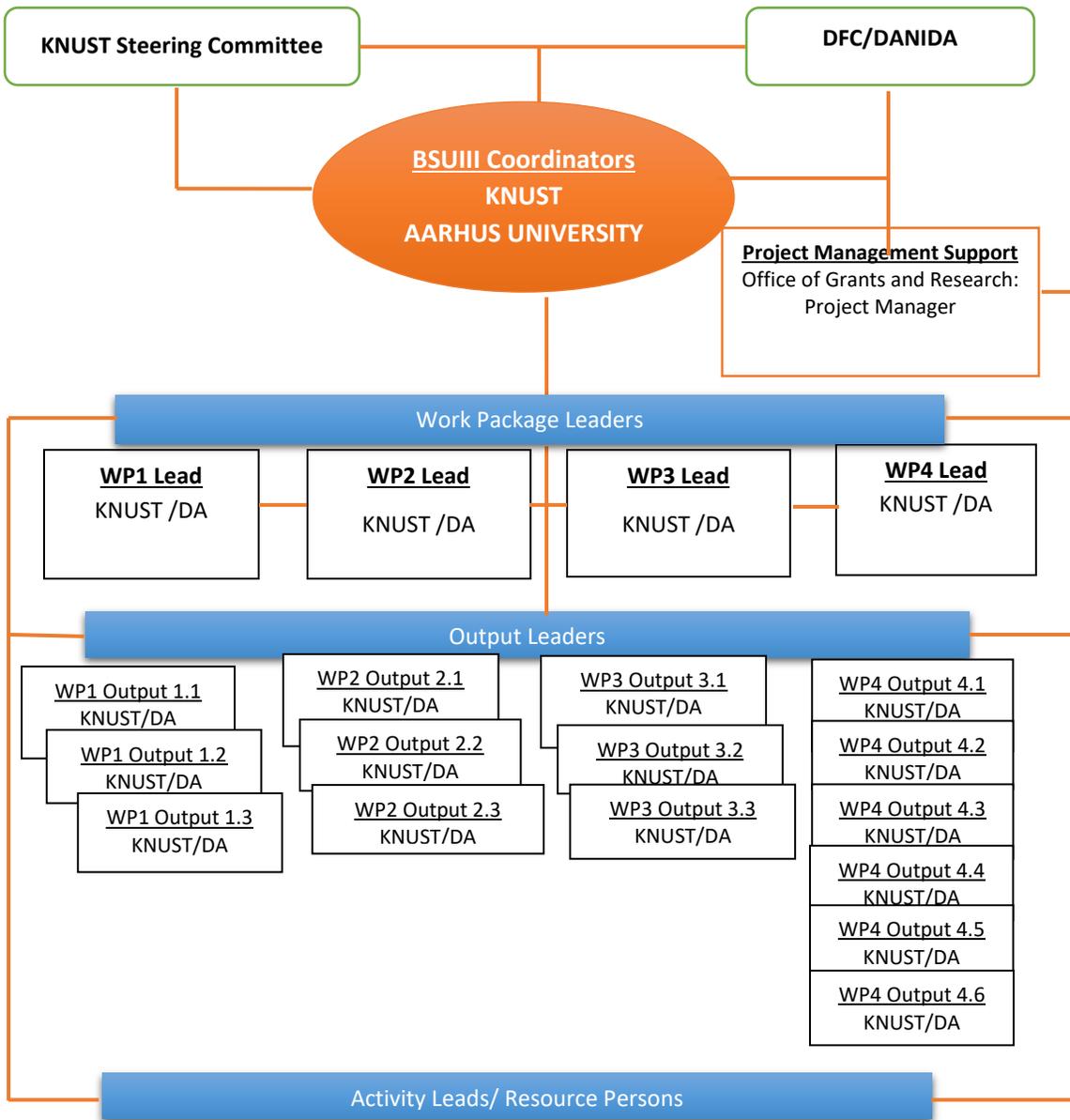
The chosen thematic areas will be consolidated and strengthened by focusing efforts on identifying and pursuing mutual learning and synergies from relevant ongoing and previous research collaboration and capacity building projects with Danish and other foreign collaborators. Building upon current and past experiences will also minimize duplication of work and efforts through encouraging joint planning and implementation of similar activities across Work Packages. The awareness at KNUST created during the BSUII project will be utilized in BSUIII to enhance effective communication among all research, training and outreach programs across the University. The up-scaling of results and continued insights and lessons learned during BSUIII are all envisioned to impact on KNUST's performance within the three outcome areas.

BSUIII will seek to strengthen networking, partnerships and communication through various activities including the organization of training workshops for the thematic leaders, research teams and their associated colleagues. These activities will assist the development of systems for communication,

information handling and sharing across and beyond KNUST. The partnership will develop South-South linkages as part of this phase to enrich the implementation and outcomes of BSUIII with contextual relevance, peer learning, potential synergies and optimized use of resources. These collaborations will enable the partnership opportunities to develop high impact and relevant research that contributes to building research culture of a cross disciplinary manner. The chosen thematic areas will be consolidated and strengthened by focusing efforts on identifying and pursuing mutual learning and synergies from relevant ongoing and previous research collaboration and capacity building projects with Danish and other foreign collaborators. Building upon current and past experiences will also minimize duplication of work and efforts through encouraging joint planning and implementation of similar activities across Work Packages. The awareness at KNUST created during the BSUII project will be utilized in BSUIII to enhance effective communication among all research, training and outreach programs across the University. The up-scaling of results and continued insights and lessons learned during BSUIII are all envisioned to impact on KNUST's performance within the three outcome areas.

BSUIII will seek to strengthen networking, partnerships and communication through various activities including the organization of training workshops for the thematic leaders, research teams and their associated colleagues. These activities will assist the development of systems for communication, information handling and sharing across and beyond KNUST. The partnership will develop South-South linkages as part of this phase to enrich the implementation and outcomes of BSUIII with contextual relevance, peer learning, potential synergies and optimized use of resources. These collaborations will enable the partnership opportunities to develop high impact and relevant research that contributes to building research culture of a cross disciplinary manner.

Figure 3: BSUIII Management Structure



Source: KNUST-DA, 2017

## VI. Sustainability Plan

The BSU intervention by DANIDA will eventually come to an end. Therefore, it is important to put in place mechanisms for sustaining the achievements garnered by the project. It is worth mentioning that the BSU intervention is well situated in KNUST’s mandate and vision as a science and technology university. This implies that it is highly unlikely for the university to relent its efforts on strengthening research capacity.

In BSUII, wide stakeholder consultations and involvement was used a tool to ensure ownership and commitment towards the project. This approach will be continued and even strengthened under BSUIII.

In the formation of research groups, Provosts of all Colleges will be directly involved in the nomination and selection of staff members to constitute the research groups. This will ensure that the research groups are continuously supported beyond BSUIII. The motivation to continue with the research group concept and even upscale it university wide lies in the ability of the research teams to submit research proposals external funding and ultimately increasing the size of KNUST's research fund portfolio. Therefore, training and skills development in grant proposal writing and successful delivery of projects will be given additional focus during implementation.

In addition, as mentioned earlier, the selection of work package leaders will be strategically done to ensure that the assigned tasks fall within the scope of work of the selected persons. This will ensure that BSUIII activities are incorporated in the day to day activities of the units the output leaders largely represent.

In BSUIII, improved documentation and dissemination of project achievements will be explored. Specific milestones on the project will be shared with all relevant stakeholders through dissemination meetings, university website and all other means possible. This will increase awareness and commitment towards the project.

## VII. Framework Budget

NO.	OUTPUTS	KNUST	Danish Consortium	Total
		DKK	DKK	DKK
<b>OUTCOME AREA 1: STRENGTHENING ADMINISTRATIVE FRAMEWORKS FOR UNIVERSITY</b>				
4.1	Improved financial monitoring and reporting processes	267,000	542,963	809,963
4.2	Research Information Management Systems	144,000	452,963	596,963
4.3	Library providing data management services	223,000	272,963	495,963
4.4	Increased use of central lab services	172,000		172,000
4.5	Doctoral College	123,000		123,000
4.6	Automated PhD system	76,000		76,000
	Sub Total Outcome Area 1	1,005,000	1,268,889	2,273,889
<b>OUTCOME AREA 2: STRENGTHENING ORGANIZATION AND SYSTEMS FOR RESEARCHER EDUCATION AND RESEARCH</b>				
1.1	Form multi-disciplinary research groups in CSAEM	388,000	692,963	1,080,963
1.2	Stakeholder collaboration for demand-driven research in CSAEM	501,333	492,963	994,296
2.1	Staff and student capacity in innovations and entrepreneurship	270,000	692,963	962,963
2.2	Business Incubation Center	623,000	402,963	1,025,963
3.1	Form multi-disciplinary research groups in HDS	336,000	692,963	1,028,963
3.2	Stakeholder collaboration for demand-driven research in HDS	361,000	492,963	853,963
	Sub Total Outcome Area 2	2,479,333	3,467,778	5,947,111
<b>OUTCOME AREA 3: STRENGTHENING RESEARCH AND OUTREACH PRACTICES AND NETWORKS. PROCESSES</b>				
1.3	Staff upgrading and exchange programs (CSAEM)	1,070,000	180,000	1,250,000
2.3	Academia-industry linkages	137,000	270,000	407,000
3.3	Staff upgrading and exchange programs (HDS)	632,000	180,000	812,000
	Sub Total Outcome Area 3	1,839,000	630,000	2,469,000
	<b>OUTCOME TOTAL</b>	<b>5,323,333</b>	<b>5,366,667</b>	<b>10,690,000</b>
	Overhead (12%)	<b>638,800</b>		638,800
	Coordination Cost (8%)	<b>425,867</b>		425,867
	DK Overhead (20%)		1,073,333	1,073,333
	<b>SUB-TOTAL</b>	<b>6,388,000</b>	<b>6,440,000</b>	<b>12,828,000</b>
	Audit	112,000	60,000	172,000
	<b>OVERALL TOTAL</b>	<b>6,500,000</b>	<b>6,500,000</b>	<b>13,000,000</b>

## VIII. Annexes

### Information on KNUST

The Kwame Nkrumah University of Science and Technology (KNUST) is one of Ghana's public tertiary institutions. The campus is situated about seven kilometres from the centre of Kumasi, the Ashanti regional capital, and covers an area of about sixteen square kilometres of undulating land. The campus represents a panorama of beautiful and modern buildings interspersed with verdant lawns and tropical flora that provide a cool and refreshing environment congenial for academic studies. The University was established in 1961 and started awarding its own degrees in June 1964. Internal and external examiners examine all degree programmes. In addition, some programmes are reviewed by external moderators to ensure that high academic standards are maintained. The University runs both undergraduate and postgraduate programmes with a student population of about 40,000 and about 900 academic staff. Total graduate output of KNUST has increased from about 2000 in the 1999/2000 academic year to over 10,000 in 2014/2015 academic year.

The vision of KNUST is to advance knowledge in science and technology for sustainable development in Africa. The mission of KNUST provides an environment for teaching, research and entrepreneurship training in science and technology for the industrial and socio-economic development of Ghana, Africa and other nations. KNUST also offers service to the community. The University is open to all, and positions itself to attract scholars, industrialists and entrepreneurs from Africa and the international community. The University operates a collegiate system with six (6) academic Colleges namely: (1) College of Agriculture and Natural Resources (CANR); (2) College of Art and Built Environment (CABE); (3) College of Humanities and Social Science (CoHSS); (4) College of Engineering (CoE); (5) College of Health Sciences (CHS); and (6) College of Science (CoS). The Colleges are made up of Faculties and Departments, most of which are located on campus. Some of the departments and research stations of the University are located outside the campus. These include the clinical departments (Medicine, Surgery, Pathology, Child Health, Obstetrics and Gynaecology, Internal Medicine, Surgery, Anaesthesia and Intensive Care, Radiology and Eye, Ear, Nose and Throat) located at the University's affiliate Teaching Hospital (Komfo Anokye Teaching Hospital), the Dairy/Beef Cattle Research Station at Boadi and the Agriculture Research Station at Anwomaso, all in Kumasi.

KNUST is a public University established to train the science and technology manpower for Ghana and Africa. , Until five to ten years ago, KNUST produced about 90% of the manpower for Ghana's industries including engineers, architects, building technologists, planners and pharmacists. State funding has over the years reduced from 100% to about 49%. The University makes up this shortfall from student fees, other income generation activities and externally funded projects.

The University is currently expanding the conduct of research through increase in postgraduate enrollment and improving the institutional environment for research projects. These are being facilitated by academic departments as well as the School of Graduate Studies and the Office of Grants and Research. KNUST continuously seeks for collaborations to build its research and teaching capacity.

More information on KNUST can be found at [www.knust.edu.gh](http://www.knust.edu.gh).

## **Research Capacity and Research Collaborations with Other External Partners**

KNUST has a number of research capacity building collaborations with each focusing on a specific thematic area. Some of these collaborations are outlined below.

The Energy Center and the Department of Mechanical Engineering of KNUST are partnering with the Norwegian University of Life Sciences and Norwegian University of Science and Technology at Alesund to implement a project to build capacity in higher education and research within the fields of energy and petroleum. The five-year NORAD-funded project titled “Upgrading Education and Research Capacity in Renewable Energy Technologies at KNUST is expected to end in 2019.

The KNUST Department of Surgery is collaborating with the University of Washington to strengthen injury control research in Ghana and West Africa. This is being implemented through the training of Masters and PhD students in injury related research. The project, funded by the USA National Institutes of Health commenced in 2016 and will end in 2021.

KNUST is also hosting the Regional Centre of Excellence for Water and Environmental Sanitation Centre, Kumasi (RWESCK), a World Bank funded initiative under the African Centres of Excellence Programme to provide support for postgraduate training in water supply and environmental sanitation. KNUST is partnering with the National Water Resources Institute of Nigeria, University of Benin, Nigeria, Universite Cheikh Anta Diop, Senegal and the Ministry of Education, Gambia in this programme.

KNUST also participated in the Development Research Uptake in Sub-Saharan Africa (DRUSSA) initiative, a five-year DFID-funded programme supporting 22 universities across Africa to strengthen the management of research uptake. It was led by the Association of Commonwealth Universities and ran from October 2011 to September 2016. The purpose of DRUSSA was to help improve the capacity of universities to contribute research evidence in pro-poor policy and practice. The project provided training for staff of KNUST and other participating Universities and produced a wealth of programme-derived knowledge, tools, and resources that university leaders, research staff and research uptake managers can continue to use as they strengthen their own systems for getting research into use.

The capacity built in engaging stakeholders and outreach to non-scientific populations in the DRUSSA will be leveraged for the implementation of BSUIII. Persons with expertise built in areas including mentoring, collaborative research, interdisciplinary research in the other projects will be involved in BSUIII to ensure strengthening previous efforts and maximizing returns on investments. Joint planning will be explored with projects in similar areas to avoid duplication of activities. Experiences and lessons learnt in other capacity building projects will also be tapped into for learning.