UNIVERSITY OF RWANDA (UR)

TOWARDS THE UNIVERSITY OF RWANDA WE WANT:
UR Concept Note for Research Capacity Development and Institutional Advancement
2018 - 2023

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ACRONYMS

ADB	African Development Bank
CASS	College of Arts and Social Sciences
CAVM	College of Agriculture and Veterinary Medicine
CBE	College of Business and Economics
CCM	Centre for Conflict Management
CE	College of Education
CEO	Chef Executive Officer
CGS	Centre for Gender Studies
CIP	Crop Intensification Programme
CMHS	College of Medicine and Veterinary Medicine
CoEB	Center of Excellence in Biodiversity & Natural Resource Management
CST	College of Science and Technology
DHS	Demographic Health Survey
EAC	East African Community
ECA	Economic Commission for Africa
EDDS	E resources and E documentary
EDPRS	Economic Development and Poverty Reduction Strategy
ESSP	Education Sector Strategic Plan
GDP	Gross Domestic Product
GoR	Government of Rwanda
HEC	High Education Council
HLI	Higher Learning Institutions
ICT	Information, Communication and Technology
IoT	Internet of Things
ISAE	Institute of Agriculture and Animal Husbandry
IUCEA	Inter University Council of East Africa
KHI	Kigali Health Institute
KIE	Kigali Institute of Education
KIST	Kigali Institute for Science and Technology
MINEDUC	Ministry of Education
MSc	Master of Science
NCST	National Commission for Science and Technology
NEPAD	New Economic Partnership for Africa
NISR	National Institute from Statistics in Rwanda
PG	Post Graduate
R+D	Research and Development
RAB	Rwanda Agricultural Board
REMA	Rwanda Environnemental Management Authority
SDGs	Sustainable Development Goals
SE4ALL	Sustainable Energy for All
STEM	Science, Technology, Engineering and Maths
STI	Science Technology and Innovation
UG	Undergraduate
UN	United Nations
UNEP	United Nations Environmental Programme
UP	Undergraduate Programme
UR	University of Rwanda
URLS	University of Rwanda Library Services
USD	United States Dollars
WEF	Word Economic Forum
WREM	Water Resources and Environmental Management

1. INTRODUCTION

This concept paper is about the University of Rwanda's capacity building plan for research and postgraduate education in the medium term (2018-2023) and the long term (up to 2028), so as to position UR as an internationally recognized institution excelling in research and innovation, teaching, learning, and community engagement in an environmentally and gender sensitive context. Higher education is expected to play a crucial role in Rwanda's development with research outputs that support evidence-based decision-making. As the only public university, and the largest and most comprehensive in Rwanda, the University of Rwanda is a key contributor. This concept paper directly supports the University's aim to produce innovative research and graduates with significant and sustainable contributions to Rwanda's development and the well-being of people globally. The plan will deliver on national and international strategies and goals, including Rwanda's Vision 2020 and 2050 and the Sustainable Development Goals (SDGs). The plan presents a path to achieve this aim. Although this concept note was developed in response to a request from the Embassy of Sweden in Rwanda, UR intends to use it to mobilize other funding sources, since it isn't expected that Sweden would fully fund the ambitious plan described here.

2. BACKGROUND

2.1 Historical Background of University of Rwanda

In the aftermath of the 1994 Genocide against the Tutsi which claimed the lives of more than one million Rwandans and seriously depleted the intellectual capital of the country, the post-genocide government recognized that rebuilding and expanding Rwanda's higher education was pivotal to the country's rehabilitation and development. The Government of Rwanda not only quickly reopened the National University of Rwanda and the Institute of Agriculture and Animal Husbandry, but also created new Public Higher Learning Institutions to address specific country reconstruction needs, including Kigali Health Institute in 1996, Kigali Institute of Science and Technology in 1997, Kigali Institute of Education in 1999 and the School of Finance and Banking in 2002. In 2006, a group of private Rwandan citizens created Umutara Polytechnic and two years later requested the Government take it over as a Public Higher Learning Institution, resulting in seven Public Higher Learning Institutions in Rwanda.

Discussions about the relevance of quality education for accelerating socio-economic transformation and development in the 2011 Rwanda National Leadership Retreat resulted in a recommendation to the Government to merge all Public Higher Learning Institutions into one university system. Following extensive consultations, the University of Rwanda (UR) was established by Law N° 71/2013 of 10/09/2013. The overarching aim of establishing UR was to transform public higher education for improved teaching and learning quality and efficiency through economies of scale to become a leading teaching and research institution in the region known for quality, relevance and impact of its programs.

2.2 University Vision, Mission and Objectives

The **UR's Vision** is "*to be a leading University that develops highly enterprising graduates prepared and dedicated to building a more just and sustainable society locally, nationally and globally, with appropriate innovations that advance quality of life*". The UR's **Mission** is *to support the development of Rwanda by discovering and advancing knowledge, and being committed to the highest standards of academic excellence, where students are prepared for lives of service, and leadership, transforming communities through finding solutions*.

The following objectives are aligned with Rwanda's development needs for the period 2016-2025:

- Develop problem-based academic programs that broadly draw on concepts from various disciplines to integrate relevant insights and perspectives
- Create research centers focused on problem solving that contribute to evidence-based policy development
- Ensure students have leadership, entrepreneurship and management skills
- Prepare students for service to their communities and country through applied service learning programs both nationally and internationally

- Develop continuous education programs aimed at upgrading skills and knowledge
- Integrate IT-based resources from around the world

The UR strategic plan for 2016-2025 establishes a set of core values: academic excellence, nation-centered, student-focused, honesty and integrity, innovation and creativity, freedom of inquiry, social justice, and accountability. Fostering partnerships through strategic engagements and initiatives that connect UR to other research networks in the region and the rest of the world is also an integral component of the UR strategic plan.

Finally, guided by the Government of Rwanda's desire of building a knowledge-based and technology-led economy as expressed in Vision 2020 and in EDPRS II, UR is placing more emphasis on science, technology, engineering and mathematics (STEM) education. However, UR recognizes that STEM is developed for and applied within a society, thus non-STEM will continue to be part of UR priorities with particular attention to research and analysis of policy and socio-economic issues embedded in Rwanda's socio-economic transformation, as well as support to STEM education for development goals. Since most of the 34 private universities in Rwanda offer only non-STEM courses, UR intends to progressively reduce enrollment in non-STEM, admitting only the best and brightest students and facilitating them to get professional degrees or engage in research.

2.3 University of Rwanda Structure and Organization

The University of Rwanda is currently organized into six Colleges across 14 campuses: College of Arts and Social Sciences (CASS), College of Agriculture and Veterinary Medicine (CAVM); College of Business, and Economics (CBE); College of Education (CE); College of Science and Technology (CST); and College of Medicine and Health Sciences (CMHS). However, a major reform is currently underway (see Annex 1) which will result into fewer colleges (five) and fewer campuses (10 campuses). Each College is composed of Schools with Departments.

A Chancellor is appointed by Presidential Order and exercises a mainly ceremonial role, presiding over graduation and award ceremonies. The highest governing and decision-making organ of the University of Rwanda is the Board of Governors composed of eminent individuals from academia, public and private sectors appointed by a Presidential Order, as well as senior administrative staff and representatives of teachers, research staff, administrative staff, and students. The day-to-day management of UR is the responsibility of the Vice Chancellor (as the CEO of the University), assisted by three Deputy Vice Chancellors: Deputy Vice Chancellor for Academic Affairs and Research, who acts as Vice-Chancellor when the Vice Chancellor is absent; Deputy Vice Chancellor for Administration and Finance; and Deputy Vice Chancellor for Institutional Advancement. Each College is headed by a Principal responsible for providing leadership in teaching, research, administration and management for the College.

The academic governance structure of the University of Rwanda includes the **University Academic Senate,** the main academic decision-making organ chaired by the Vice-Chancellor, which approves academic programs, rules and regulations and student graduation lists. The **College Academic Council,** composed of the Principal (chair), Deans, Heads of Departments and Directors of academic units is the main academic decision-making organ in each College and approves new academic programs before submission to the Senate. The **School Academic Council** is the academic decision making organ at School level within each College chaired by the School Dean with all academic staff of the School involved. The **Department Council** is the academic forum in each academic department, chaired by the Head of Department and involving all departmental academic staff members, where programs are developed and discussed. Departments are responsible for academic program delivery and appointment of examination committees.

2.4 Undergraduate and Postgraduate Training

Currently, there are 30,214 students (33% are female) enrolled of whom 1,435 are postgraduates (34% are female) (Annex 2). The University of Rwanda offers 67 undergraduate programs and 51 postgraduate programs distributed among the Colleges (Annex 3).

2.5 Current Research and Training Capacity

University of Rwanda has 1,375 academic staff (as of 2017); among these about 19% (262) are PhD holders (less than the ideal level of 60% according to IUCEA) who have a mandate to conduct research and with training, supervise PhDs (Annex 4). When considering only those academic staff with a postgraduate degree (1035 in total) 20.8% (216) are female compared to 79.2% (819) male. The number of female academic staff beyond the rank of lecturer is very low; among senior lecturers and professors, only 11% (20) are female and only four are professors. UR also has over 750 administrative staff of which 40% are female;17% of the administrative staff have MSc or PhD degrees (Annex 4).

UR is the only University in Rwanda that has research as part of the performance contract and 1,110 publications were produced since 2013 (Annex 5). There are nine Centers and Institutes dedicated primarily to research, and 78 laboratories supporting research and training, ranging from biological sciences, ICT, engineering to GIS. UR was the only African university to win four centres of excellence (ACE's) through competitive funding from the World Bank (ACE in Internet of Things, ACE in Energy for Sustainable Development, ACE in Data Science, ACE for Innovative Teaching and Learning Mathematics and Science). The UR library, the largest in the country, subscribes to 33,000 e-journals which are open to all higher education institutions in Rwanda. The University is active in hosting annual conferences, including science weeks that connect academia with private and public sectors. Partnerships with external funders and regional and international universities have been carefully cultivated. And finally, UR has some of the largest formal working collaborations with the government.

Despite these achievements, there are still many gaps. The number of PhD holders including supervisors for postgraduate studies is insufficient, and PhD training at UR is limited, with no PhD by coursework, only PhD by research. UR has high student to staff ratios in certain schools and suffers from limited teaching and learning resources. Research output is low even though reports (e.g., Thomson Reuters, Scopus) indicate the research output produced is of high impact, making it the second most influential university in East Africa after Makerere University, Uganda. UR is ranked 96th among all African universities on Webometrics. Capacity for communicating UR's research achievements is limited, and the need for improved linkages between academia and industry and government is high on UR's agenda. The research environment has been improving but infrastructure and facilities (e.g., ICT, library, labs) as well as administrative and technical capacity still need to be strengthened.

2.6 National Development Context

UR must support national development, and a significant aspect of this will be through research that contributes to evidence-based management and policy development. There are important opportunities for collaboration between academia and policymakers to improve policy and governance in the country. Rwanda's Vision 2020 aims at transforming the country to a middle-income society by 2020, from an agrarian to a knowledge-based economy. In the last ten years, Rwanda has been developing at an impressive rate in all sectors (governance, social, economic) as attested by many independent evaluations (i.e., 2016 Gallup Global Law and Order Report, 2015 Global Gender Index, World Bank Reports, World Economic Reports, 2016 Ibrahim Index of African Governance, Transparency International, Rwanda Governance Board Reports). From 2006 to 2011, Rwanda had an average annual growth rate of 8% on GDP with 1 million people lifted out of poverty. It is credited as one of the safest places in Africa and one of the few countries with the highest level of leadership accountability.

The Government has embarked on an ambitious plan to integrate science and technology into development strategies to accelerate the transition to a knowledge-based economy. This ambition requires highly educated, skilled citizens and research expertise to meet the demands of an increasingly complex, innovative and dynamic economy. This also demands collaboration between academia and policymakers for the provision of informed, evidence-based, quality policymaking. Academic research can act as a bridge between the various sectors of civil society working towards the same goal and UR is prepared to engage in this important endeavor. The establishment of the National Commission of Science and Technology (NCST) and the development of the National Science, Technology, Innovation and Research Policy (GoR 2016) provide a robust framework for Rwanda's research and innovation agenda. The Higher Education sector of Rwanda has grown fast, including 35 HLIs with a total of 80,335

students. UR is the largest, accounting for about 40% of the entire Higher Education student population in the country. The Higher Education Policy (2008) and Education Sector Strategic Plan 2013-2018 (GoR, 2013) require higher education institutions significantly increase research and innovative capacities of staff and graduates.

University of Rwanda is stepping up with specific strategies to produce skilled graduates capable of critical thinking and innovation, and to increase research outputs targeting key areas and gaps to support Rwanda's rapid economic transformation. To achieve this UR has a strong foundation: it is the main institution in Rwanda providing STEM education, and nearly 3/5 of all PhD holders in Rwanda are employed at UR, which has the highest research output in the country. Over the last three years, about 90% of all publications from Rwandan authors came from UR. Furthermore, a large proportion of UR academic staff are involved in policy issues, governmental advisory boards, and consultancies. It is the only university in Rwanda with a substantial professional development framework; 112 UR staff are on PhD studies outside Rwanda, and there are 117 enrolled at UR in PhD by research programs.

3. OBJECTIVES

This concept note describes activities that support UR to develop and provide Rwanda with academically trained scholars and practitioners including PhD holders and researchers contributing to national development. The overall objective is to *increase the production of relevant high quality scientific knowledge that contributes to Rwanda becoming a knowledge-based economy*.

This will be achieved through six specific objectives:

i. To strengthen the capacity of UR to conduct Masters and PhD research training and to internationalize these programs
ii. To increase the quantity and quality of relevant research for poverty reduction and social economic development
iii. To establish administrative and academic structures and systems including infrastructure to support innovation and promote a vibrant research environment
iv. To support and develop research management capacity at UR
v. To strengthen the capacity for scientific communication including communication of research results for evidence-based policy development relevant to sustainable national development plans
vi. To strengthen the capacity of UR for innovation and knowledge transfer including deepened collaborations between the UR research community and public and private sectors

4. EXPECTED RESULTS

UR will be a key player engaging with policy development, green economy initiatives, and achievement of sustainable development goals both locally and internationally.

Output 5 years	Long term Outcomes 10 years	Performance indicators
Objective 1: To strengthen the capacity of UR to conduct Masters and PhD research training and to internationalize these programs		
• 112 continuing PhD candidates and 63 Master's candidates complete their studies • 338 new PhD students are enrolled in PhD studies, 246 enrolled in UR programs • 95 sandwich postdoc grants • 51 current Masters programs sustained and running successfully • 35 new Masters programs running • A total of at least 6,450 Masters students enrolled	• Increased number of qualified staff and graduates with high quality knowledge and skills in different fields • Enhanced supervision capacity of PhD research • Recent PhD graduates remain engaged in research • Gender equality in postgraduate training is achieved	# Awarded PhDs # MSc graduates # Employed graduates and sectors of employment and Share of MSc graduates that continue to PhD studies # Publications derived from MSc and PhD theses and # Publications after PhD graduation # Females in postgraduate training #Academic staff involved in supervision of PhD # New programs approved and

Output 5 years	Long term Outcomes 10 years	Performance indicators
• Mentorship scheme established for younger or new researchers • 200 staff trained as effective PhD supervisors • 8,600 postgraduate students enrolled • 1,170 scholarships provided • Current relationships with international institutions sustained and vibrant, and new relationships developed to support research and training goals	• Increased number of international institutions and individuals actively engaged with UR	accredited by HEC # International relationships active
Objective 2: To increase the quantity and quality of relevant research for poverty reduction and social economic development		
• 120 Research grants involving at least 480 UR staff are funded • At least 1156 manuscripts are published in high impact journals • All research centres are running effectively • At least three prospective research centres are established and staffed • Interdisciplinary research teams within each cluster established	• Research produced by UR is increasingly recognized internationally • Research done in Rwanda contributes not only to academic fields but provides solutions to development challenges • Peer-reviewed publications annually have increased • More females are involved in research conducted and all projects are gender sensitive • Improved visibility of UR • More internationally funded research projects • Increased relevance of UR research outputs to industry and government	# publications accepted in peer-reviewed high impact journals # citations of publications # national debates emanating from research completed at UR # of research results integrated into national policies and strategies # females involved in research UR ranking # World and Africa ranking of University # Successfully funded multi-institutional grants # and composition of interdisciplinary research teams # manuscripts prepared with interdisciplinary themes
Objective 3: To establish administrative and academic structures and systems, as well as infrastructure to support innovation and promote a vibrant research and training environment		
• Performance based mechanisms that encourage participation research and innovation activities are developed and implemented • Training program for student services unit established • At least one printing and publication facility established and running • Science and engineering laboratories well equipped • Research laboratories functioning efficiently: training for 20 lab managers & 40 lab technicians to support research • Libraries on all UR campuses supporting high standards befitting the calibre of PhD training & research • High Speed Internet is accessible at all UR campuses	• Enhanced productivity of research teams • Optimal sharing of information that supports research activities • Increased funding for research • Improved quality of teaching and learning, and assessment environments • Market-oriented curricula and innovative on line learning and assessment • Enhanced student-focused approach with emphasis on acquisition of research skills	Feedback from research teams # hours allocated to research by academic staff benchmarked to Academic Workload Framework Annual income generated Student evaluations of modules and instructors Feedback from employers of UR graduates Share of UR budget allocated to research # research labs functioning with active research projects # lab managers & lab technicians # libraries upgraded # and use of e-learning systems # campuses with increased internet speed and bandwidth # laboratories equipped

Output 5 years	Long term Outcomes 10 years	Performance indicators
• E-learning systems are rolled out and used across UR • All modules available on the common learning platform		
Objective 4: To support and develop research management capacity at UR		
• Well-functioning research environment – 25 grant managers, 7 procurement officers, 14 finance administrators, 14 executive assistants and advisors, 7 research communication officers, quality assurance department • Well-functioning Office for Institutional Advancement and Research Directorates • Access to current and past research projects • PhD recruitment and research grant approval process includes stakeholders for orienting research questions to community needs	• Enhanced efficiency in the conduct and administration of research activities at UR: enhanced grant management; financial management, budget & planning, internal audit & compliance processes improved • Enhanced use of resources: staff trained to use and maintain equipment & facilities	# grant managers and support staff trained Efficiency (duration, product quality and cost) of procurement process Feedback from researchers Frequency of equipment usage # stakeholders involved in PhD recruitment process # business analysts trained Feedback from donor and funding agencies
Objective 5: To strengthen the capacity for scientific communication, including communication of research results for evidence-based policy development relevant to sustainable national development plans		
• Annual University-wide conference with research and science communication week attracting 240 papers • At least 235 UR staff attend international conference • Regular scientific seminars and public lectures organized • Production and distribution of high quality policy briefs, project reports, and science-based radio shows • A research communication strategy is developed and implemented • Popular Science Communication seminar series developed	• Increased research collaborations at local, national, regional and international levels • Increased participation in conferences and symposia • Increased visibility, uptake and recognition of research in policy circles	# research conferences # people attending research conference # staff attending international conferences # and attendance of scientific seminars and public lectures # commentaries and reactions on research from UR # staff trained in communication for science for public and policy sectors
Objective 6: To strengthen the capacity of UR for innovation and knowledge transfer including deepened collaboration between the UR research community and public and private sectors		
• At least 12 joint government-industry-university projects initiated (see Innovation and knowledge transfer) • Creative ideas from UR students and staff are nurtured into innovations applicable to society's needs • At least 25 manuscripts on Rwanda home grown innovations submitted for publication	• Increased # patents or innovation products • Increased research on application of home grown innovations to real world problems • Increased joint projects with industries and local communities	# of patents or innovation products registered Amount of funds dispersed from incubation funds # projects developed based on home-grown solutions # joint projects prepared representing industry-government-university partnerships

5. LONG TERM (10 YEAR OUTLOOK 2018-2028)

UR's 10 year plan aims to produce a critical mass of PhD holders and professional researchers that support the development of Rwanda through interdisciplinary, problem-based academic programs aligned with Rwanda's development needs. The aim is not to train PhDs for the sake of PhD training but

for targeted contribution to national priorities. Through this concept note plan, it is envisioned that UR will build its own capacity to produce top quality researchers and graduates with masters and PhDs for the higher education sector and other sectors of the economy. All analyses show that if UR is to contribute to building a knowledge-based society and participating effectively in the development of Rwanda, by 2028 it will have to build its capacity at the individual, organizational, and institutional level through:

- Investing in about 1,100 PhD holders (68%) for UR to ensure a critical mass of researchers through training both locally and internationally (see staff student projections in Annex 6)
- Strengthening and establishing relevant postgraduate training programs in Rwanda and ensuring that at least 14% of all UR students are postgraduates (see staff student projections in Annex 6)
- Putting in place structures and systems that promote and support innovation and an environment conducive to a vibrant research culture
- Creating an inclusive teaching, learning and research environment that ensures gender equity and environmental consciousness in all its practices
- Creating a performance management system that promotes research productivity
- Producing innovation and research outputs that play an instrumental role in achieving the national development agenda
- Disseminating and communicating research outputs nationally and internationally
- Increasing regional and international partnerships for research collaborations, training opportunities and resource sharing
- Internationalizing by establishing staff and student exchange frameworks with partner institutions

Given the current undergraduate programs, the number of candidates for postgraduate studies, existing human resources and plans for continuous training and research development, and the plans for developing a conducive environment for teaching and learning coupled with supportive leadership, there is no doubt that, if supported to implement this long-term plan, UR will contribute greatly to achieving Rwanda's targets for poverty eradication and sustainable development.

6. FIVE YEAR PLAN

6.1 Rationale

The UR strategic thinking provided in this 5-year plan is underpinned by Vision 2020, preliminary thinking for vision 2050 and government policies on poverty eradication, societal well-being and peace building. This plan is also justified by needs arising from the UN Sustainable Development Goals (SDGs), East Africa Community (EAC) Vision 2050 and African Union Agenda 2063. Over the last 22 years, Rwanda has been transforming at an impressive rate in all sectors and has moved from hopelessness to hopefulness. Likewise, UR has grown tremendously, making significant contributions to Rwanda's transformation.

However, Rwanda still faces a number of challenges including lack of necessary skills to support the move from an agrarian to knowledge-based society, high poverty and population density figures, limited natural resources, climate change impacts, and narrow industrial and services sectors. As the largest and most comprehensive university in Rwanda, UR is expected to play a major role in addressing the above-mentioned challenges and others. On the other hand, UR needs to continue to grow its teaching, research and community engagement capacities in order to meaningfully contribute to the transformation from an agriculture-based to a knowledge-based and technology-led economy and a middle-income country.

6.2 Research Clusters

UR has organized its 5-year plan for research training and capacity building activities into 10 interdisciplinary research clusters derived from emerging national and sectoral priorities aligned with national development goals (e.g., Capacity Development and Employment Services Board, Vision 2020), the UR strategic plan, College plans, and the SDGs. These clusters are supported by cross-cutting themes of environmental and gender sensitivity, as well as innovation and knowledge transfer.

The global socio-economic challenges related to energy, water, climate, food, and health require joint efforts from the natural, physical and social sciences for the development of comprehensive solutions that integrate relevant insights and perspectives. To contribute to addressing Rwanda's complex challenges, UR will transition to an interdisciplinary approach, understood as an *integration* of different disciplines to tackle a problem. Interdisciplinary research allows for a research problem or topic that is too broad or complex to be dealt with adequately by a single discipline to integrate multiple disciplinary perspectives for a more comprehensive outlook (Klein & Newell 1997). It may range from the borrowing of concepts from other disciplines to highly close interdisciplinary team collaboration. Furthermore, creating a highly interdisciplinary and integrative institutional culture has been shown to encourage breakthrough discoveries and innovation (Hollingsworth and Hollingsworth 2000). Interdisciplinary research is therefore the approach to be taken in developing research teams and niches.

In order for research to be undertaken in an interdisciplinary manner, UR will need to facilitate interactions among researchers by providing shared facilities and informal settings that promote regular interactions among different disciplines. Training to enable researchers to communicate their research across disciplinary boundaries will be offered. Educational and research stays in other research fields will be offered to allow researchers to train in new fields. UR will provide academic incentives (e.g., promotions) for interdisciplinary efforts. Apart from PhD Training and Postdoctoral schemes, UR will also create a research fund which will support research projects within the clusters.

The research clusters described below are not mutually exclusive. While a College will take the lead, all other Colleges can participate. Each cluster is linked to a development problem, and builds on current and potential UR contributions and capacity building needs to become an effective player in the next five years. While clusters may overlap each other, we have identified the boundaries that facilitate interdisciplinary approaches and ensure priority issues for development and economic transformation are met (Annex 7 and 8). A description of the operationalization of interdisciplinary approach is in Annex 9.

Research Cluster 1: Agricultural transformation and food security

This cluster will address research needs for sustained transformation of Rwanda's agricultural systems not only from agricultural scientists, but also an interdisciplinary approach including social scientists, engineers, economists, nutritionists, hydrogeologists, and ecologists. Agriculture is the mainstay of the Rwandan economy employing about 70% of the population and contributing to a third of the national gross domestic product (NISR, 2012; National Bank of Rwanda, 2015). Rwanda has realized significant improvements in crop yields: by 2013 maize yields have increased 500%, cassava and wheat rose 300%, and soybean, Irish potatoes and beans rose 200% (Kathiseran 2013) largely due to subsidies (e.g., fertilizers, improved seeds) under the Crop Intensification Program (CIP). However, levels of productivity are still below international standards (RAB Research Strategy, 2016), and climate change and crop diseases place stressors on agriculture systems and food security in Rwanda. A large fraction of farmers still apply unsustainable agricultural practices due to low technology uptake and adoption.

Key areas to address these gaps include: genetic enhancement of food resources, nutrition, irrigation, soil erosion studies, land characteristics, groundwater use and management, farm productivity, sustaining the natural resource base upon which production of plant and animal production depends, reducing postharvest losses, development of horticulture, post-harvest technologies, and food engineering, value chains and entrepreneurship development (Ministry of Agriculture Strategic Framework 2013-2018). These areas are address SDG 1 (end poverty in all its forms) and SDG 2 (end hunger, achieve food security and improved nutrition). UR will step in as a change agent for agriculture transformation and food security by addressing knowledge needs through research, training and community outreach activities. It is the intention of UR to engage in training extension officers by establishing an agricultural extension program. Similarly, developing collaborative research engaging farmers and integrating farmer context in the research setting will constitute a more efficient strategy for technology testing and uptake, with attention to the behavioral change needed for farmers to adapt. UR has created Masters programs in Animal Production, Crop Science, Agribusiness, and Agricultural Engineering, PhD training in Agricultural science, and has Memoranda of Understandings with key government institutions, such as the Rwanda Agricultural Board. However, staff numbers and capacities are still limited for effectiveness

in addressing these gaps. UR will train more PhD holders, highly skilled lab technicians, and more female staff. The lead College will be CAVM, with collaboration from CST, CASS, CBE and CMHS.

Research Cluster 2: Socio-Economic Transformation and Sustainable Development

Rapid changes in Rwanda are transforming livelihoods and presenting opportunities to design equitable and sustainable futures for people. This cluster will focus research on understanding the drivers of structural transformation and socio-economic effects on livelihoods, contributing to SDGs 8, 10 and 12. Topics include the relative contribution of manufacturing to GDP, declining shares of agricultural employment to total employment, rural to urban shifts, youth unemployment, climate change impacts on socio-economic systems, and emergence of modern industrial and service economies (ECA 2013).

The capacity and skills to conduct this research are limited in Rwanda. UR will contribute by providing training and research on the role of government policy, technological change and growth, industrial and rural industrialization and growth, business innovations and impacts of changing trends in workplace practices. Skills gaps will be bridged by training UR staff in PhD programs in various fields of economics, business and management, industrial organization, and creating related Masters Programs including Masters programs in Regulatory Economics and Management; Competitiveness and Strategy; Innovation, Creativity and Entrepreneurship; and Family Business Management. Research will be undertaken in close collaboration with the UN Centre of Sustainable Development currently hosted at UR and the SDG Centre for Africa based in Kigali. This cluster will be led by CBE with interdisciplinary interventions from CASS, CST and CAVM, especially with regard to understanding the role of engineering, construction and manufacturing in structural transformation, as well as socio-economic effects of shifting from small artisanal mining to more mechanized and industrial mining.

Research Cluster 3: Environment, Natural Resources Management and Climate Change

Rwanda's development goals, in addition to the nature of today's modern society, create opportunities, demands, and threats to the environment (e.g., urban development, consumption patterns). Rwanda aspires to be a leader in environmental protection, biodiversity conservation and climate change resilience as a platform for green investments embedded in its poverty reduction strategy (EDPRS II). This cluster will focus on research and training in sustainable natural resources management, biodiversity conservation, climate change science and environmental monitoring and change detection, delivering on SDG 13 (resilience and adaptive capacity to climate-related natural disasters), and SDG 15 (conservation, restoration and sustainable use of terrestrial and freshwater ecosystem services to enhance capacity to provide benefits for sustainable development).

Rwanda lies within the Albertine Rift, a biodiversity hotspot known globally for its high species diversity and endemism (Plumptre et al. 2003). A significant portion of the land surface in Rwanda is devoted to agriculture with natural forest cover relegated to four isolated national parks that face significant pressures from the surrounding human-dominated landscapes. Innovative approaches to monitor wildlife, reduce threats to biodiversity and sustain the provisioning of ecosystem services are needed. Climate change is affecting patterns of rainfall, disease outbreaks, and temperature regimes, resulting in flooding, erosion, droughts, food insecurity, and loss of life. Understanding and predicting these changes is crucial to economic transformation goals. Furthermore, Rwanda's reserves of methane, gold, tantalum, and other deposits, and its forestry resources are valuable to national development goals, and best practices to access these resources safely and sustainably are needed. Research needs include the application of geology for identification of efficient mine types, and environmental impacts of new mining or forestry operations in Rwanda. The National Science, Technology, Innovation and Research Policy (NCST 2016) highlights the importance of a research-oriented approach to sustainable and equitable use of resources, prevention of land, water and air degradation, and conservation of biological diversity. However the capacity to conduct research is limited.

UR will play a crucial role in meeting these needs through training in research for evidence-based management, community engagement to reduce threats to the environment, and creation of a critical mass of skilled individuals to study and manage Rwanda's natural heritage sustainably. UR has created

Masters programs in Biodiversity Conservation and Natural Resource Management, Geo Information Science for Environment and Sustainable Development, Atmospheric and Climate Science, and Water Resources and Environmental Management. It also hosts the Centre for Geographic Information Systems and Remote Sensing (CGIS) and the new Center of Excellence in Biodiversity and Natural Resource Management (CoEB). The recently established School of Mining and Geology aims to develop its capacity for training and research in mapping mineral resources, analysis and growing research capability in geology and mining sectors at BSc, MSc and PhD level. CST and CAVM will jointly take the lead with collaboration from CASS, CE, and CMHS.

Research Cluster 4: Inclusive Governance, Peace and Security

Rwanda's Vision 2020's first pillar is good governance and a capable state. Both Vision 2020 and Vision 2050 aim at turning Rwanda into a knowledge-based economy, characterized by effective governance, rule of law and respect for human rights and fundamental liberties. A landmark aspect of effective governance in Rwanda has been the introduction of home grown solutions that enhance the role of citizen participation in governance and economic development. Rwanda's effectiveness in the restoration of peace after the Genocide against Tutsi in 1994, its anticorruption achievements, and its contribution to international peacekeeping indicate the strides in the last 20 years. Rwanda is currently considered the most efficient government in Africa (WEF 2016).

UR has contributed substantially through research and training in needed skills, PhD graduates, establishment of the Centre for Conflict Management, the Centre for Legal Aid and Mediation, a School of Law, and collaboration with Rwanda's Peace Academy to run Masters programs for national and international security personnel. In collaboration with the Rwanda Association of Local Government Authorities (RALGA), UR is offering a master's degree in Local Government Studies. However, there are several areas needing attention, including security and development, youth unemployment, regional conflicts, sustainability of transparency, accountability of government to local communities, and active citizenship and participation. UR will contribute to research including prescriptive and predictive conflict management, governance as a method of social conflict resolution in non-violent and deliberative pathways, and governance as a central pivot in transformation and peacebuilding. This cluster will deliver in particular on SDG 16 with CASS leading and collaborations from CE.

Cluster 5: Urbanization, Green Cities, and Human Settlements

This cluster focuses on processes of urbanization and human settlement that meet Rwanda's development strategies including environmental sensitivity. Although Rwanda's urbanization rate is among the lowest in the world, the annual growth rate of the urban population (4.5%) far exceeds the worldwide average of 1.8%. Almost half of the urban dwellers are concentrated in the City of Kigali. Urbanization is challenging for such a small and densely populated country, exerting pressure on water, sewage, the living environment, and public health, which disproportionally affects the urban poor. Without good planning, urbanization leads to sprawl and marginalization, which is socially divisive and increases energy demand, carbon emissions and ecosystem degradation.

SDG 11 defines well-managed cities and human settlements as incubators for innovation and key drivers of sustainable development. Urban planning in Rwanda is expected to facilitate the transition towards a green economy (UNEP 2011). Well planned green cities can play an important role in conserving natural resources and strengthening resilience to environmental change through energy efficiency and savings on fossil fuel use. Implementation of green city plans brings to the fore many critical research questions including how urban planning strategies can reduce a city's vulnerability to climate change; adaptation of urban governance systems; and identification of innovative institutional solutions. Recently, Rwanda initiated the Smart Green Villages concept with the aim of supporting practices for integrated food, water and energy self-sufficiency for sustainable living among the rural poor and vulnerable (REMA, 2015). Rwanda's National Urbanization Policy 2015 explicitly calls for enhanced collaboration between public and private institutions, civil society, and academia in creating sustainable urban habitats.

There is tremendous opportunity for UR to play a leading role in bridging knowledge gaps in this area through research, training and community engagement. Priority areas include improved urban and rural

settlements development, planning and management systems; financing and supply options for affordable housing; institutional and human capacity development in urban and rural settlements; and geohazard mapping to identify exclusion areas for urban growth. However, urbanization, urban planning and green city studies are at their infancy at UR, with few trained staff and postgraduate training programs to tackle these issues. This cluster will develop capacity in urban planning, governance mechanisms, green city development, and implementation of SMART towns and rural settlements that are environmentally and gender sensitive. CST will take the lead with collaboration from CMHS, CASS, CBE and CAVM.

Cluster 6: Transformative ICT and Knowledge Management

Information and communications technology play a major role in transforming the economy, and are integral to achieving Rwanda's Vision 2020 and 2050 goals. This cluster, which delivers on SDGs (especially 9 and 11), will focus on research and training capacity in ICTs to contribute to socially, economically and environmentally sustainable development. ICT is transformational in that it offers opportunities to close technological gaps through rapid technology uptake in all sectors underpinning the social and economic development of the country. ICT can reduce service delivery costs, expand range of services offered and capitalize on scarce resources. Rwanda envisions ICTs as a drivers of the country's transformation.

The challenges facing Rwanda's quest for an ICT-enabled transformation for socio-economic development are enormous, ranging from research (knowledge creation), innovation (value creation), roll out and usage, to the need for sufficiently high-skilled personnel in the ICT sector. The National Council for Science and Technology has identified software engineering, cyber security, mobile app development, smart city and sustainable urban development, E-commerce and E-banking, E-health and telemedicine, IoT, among others, as priority areas. These areas of research and skilled labor needs will be met by UR within this cluster, building on achievements such as the newly established World Bank funded African Centre of Excellence for Internet of Things (ACEIoT) and computer laboratories. Together with partnerships and collaborations nationally and internationally, including Carnegie-Mellon University in Rwanda, CST will take the lead with collaborations from CASS, CE, CBE and the library.

Research Cluster 7: Health and Wellbeing for All

The health and wellbeing of Rwanda's people underpin its national strategies and targets. This cluster will deliver on SDG 3, good health and wellbeing through an interdisciplinary strategy of research, training, contribution to policy development, and community engagement. While Rwanda has made tremendous progress in maternal and child health, and prevention and control of communicable diseases, the country is faced with rapidly increasing incidences and deaths due to non-communicable diseases. The International Diabetes Federation estimated the prevalence of diabetes (Types 1 and 2) among 20-79 year olds in Rwanda at 4.1% in 2015. The Government of Rwanda has set an ambitious goal to eradicate Human Papilloma Virus by the year 2020 through a comprehensive immunization program. Significant decreases in maternal mortality ratios, childhood mortality, and neonatal mortality have been achieved (GoR 2015) but improvements are still needed.

UR has a mission to provide quality training to health professionals, and research and community services that address these challenges and needs. The National Council for Science and Technology has identified the need for increased attention to medical specializations, clinical trial research, and preventative medicine, among others. Current research at CMHS covers biomedical and pharmaceutical sciences, public health and nursing, with a particular focus on maternal and child health, nutrition, and medical genetics. However, the number of PhD holders is still low (16% of the academic staff of CMHS). This cluster will focus on postgraduate training and research equipment acquisition in: nutrition, environment health, One Health approach, communicable and non-communicable diseases, climate change effects on disease occurrence, community health systems, and maternal and child health. CMHS will take the lead, with CAVM, CST, CE and CASS for interdisciplinary approaches to health, agriculture, environment and climate change.

Research Cluster 8: Sustainable Energy and Manufacturing

This cluster has two of the most crucial, emerging sectors of the Rwandan economy, flagged in the Science and Technology Policy (2016), the Capacity Building and Employment Services skills gap analysis (2015), and representing core STEM areas. Affordable, reliable, and sustainable energy for all is considered an important component in the transformation of people's lives and addresses SDGs 7 and 9. A building block for quality of life under Rwanda's Vision 2050 is affordable, sustainable, reliable and modern energy. Rapid economic growth in Rwanda has put pressure on energy use and demand. In order to contribute to increased access to modern energy such as micro-grids using solar, micro-hydropower, wind, and geothermal, the number and capacity of appropriately trained personnel needs to increase.

Similarly, the manufacturing sector in Rwanda is small but growing steadily at 7%/year. Manufacturing is being promoted as a rapid pathway to economic and structural transformation. The 'Made in Rwanda' campaign to promote consumption of locally manufactured items is evidence for the growing importance of this cluster. Policies such as the National Industrial Policy and the National Export Strategy aim to accelerate manufacturing and export growth. However, energy and manufacturing sectors lack capacities to sustain and contribute significantly to meeting these demands. The UR needs support to develop strategic skills in civil, chemical, electric and environmental engineering at all levels, including industrial process engineering, operational research applied to industry, quality assurance and management systems, automation of industrial processes, product engineering, and 3-D printing. CST will take the lead with collaboration of CASS and CAVM.

Research Cluster 9: Transformative Education, Culture and Creative Arts

This cluster is embedded in the humanities and social sciences, and their contributions to the economic transformation of the country. Rwanda's flagship development policies (Vision 2020, Vision 2050, EDPRS 2) highlight the importance of education in transforming societies. Education plays an important role in achieving all SDGs, but this cluster will particularly contribute to SDGs 4, 5, 8 10, 16 and 17. Rwanda has made tremendous progress in democratizing education and ensuring its access to all, but still grapples with issues of quality which need to be researched to adequately inform policies and strategies. Rwanda's embrace of home grown solutions to address economic challenges has shown how culture can be used as a driver of rapid development. Efforts such as sustaining Rwandan core values of self-sufficiency (kwigira) and solidarity and dignity (Agaciro) show how non-STEM disciplines can be rallied to drive economic transformation. Arts and culture also represent an important potential for business opportunities. Yet research on the role of arts and culture is limited, and needed skills to develop and apply this sector for the improvement of people's livelihoods are scarce.

The importance of education at UR is emphasized by the fact that there is a full-fledged College of Education which has been the national custodian of teacher education and research and arts and cultural studies are in the Center for Arts and Drama, as well as a new African Center of Excellence for Innovation in Teaching and Learning in Math and Science. UR will deliver on the SDGs 4 and 5, and contribute to Rwanda's home grown initiatives in this cluster by building capacity for research in education, culture and arts in strategic areas that will contribute to the process of accelerating and sustaining development. This cluster will be led by CE with collaboration from CASS.

Research Cluster 10: Transport and Logistics

Transport is key to economic transformation, and has been identified as a key sector for long term prosperity in Rwanda, driving the shift from a landlocked to land-linked position. An efficient transport system is crucial for the development of a modern society that supports healthy and sustainable living for all people. Although Rwanda is noted for the best business environment in Africa, challenges in the transportation sector exist, including high transport costs, over dependency on internal networks, a nascent aviation industry, lack of a railway system, limited application of IT to transport and logistics, limited supply chain skills, and a low number of transportation and logistics specialists. This cluster addresses research needs in logistics and transport in interconnected systems (road, air, water, railway), transportation engineering, SMART mobility and transport modelling.

UR has developed Masters and PhD training for students, and will offer a PhD program in Management, with a specialisation in Transport, Logistics and Supply Chains. Improvement in the quality of training

for logistics has occurred through partnerships with several Swedish universities (Linkoping University, Stockholm University, KTH, BTH, Orebro University and Lund University). For UR to contribute the critical mass of skilled people needed to tackle transport and logistics needs, including advanced research and innovative solutions, continued postgraduate training is needed (Masters, PhD, postdocs). Moreover, research capacity for innovation and entrepreneurship is needed in areas such as aviation, aviation engineering, railway, boats, roads, and pipelines. The lead College will be CST with collaboration from CBE. This cluster delivers on SDGs 8, 9, 10, 11 and 12.

6.3 Mainstreamed themes across UR

UR is committed to the promotion of environmental and gender sensitivity. These two aspects will be mainstreamed across UR systems, including research and development activities.

a. Gender Mainstreaming

Gender equality will be sustainably promoted when all students and staff enjoy equal opportunities, human rights and non-discrimination in all spheres of the university life (UR Gender Policy, 2016). Gender mainstreaming means there will be continuous intentional assessment of the implications of planned actions, policies or programs for women and men to ensure their concerns and experiences are an integral dimension of the design, implementation, monitoring and evaluation of those actions so that women and men benefit equally (Economic and Social Council, UN, 1997). Gender sensitivity will be applied to research clusters to ensure women and men have equal access to opportunities. By 2020 all UR statistics and data will be gender disaggregated with explanations for gender differences and strategies to address them will be implemented (gender scoreboard). UR plans to introduce a reward system for achievements in gender equality within the institution. The Centre for Gender Studies (CGS) which trains gender experts and practitioners, stimulates research in gender related fields and helps to build networks and partnerships needed to promote gender equality, women empowerment and gender awareness at local and national levels will be strengthened. See Annex 10 for details of the gender mainstreaming plan.

b. Environmental Mainstreaming

Environmental mainstreaming is understood and will be promoted as *the conscious inclusion of pertinent environmental concerns into the planning and functioning of the university that underpin its actions and offerings*. In practice this involves attention to the potential impacts of research projects on the environment, as well as energy use, waste management and all aspects of routine and planned maintenance, construction and renovation projects. This will be implemented through the creation of environmental impact assessments for research plans, and a sustainability plan aimed at reducing the environmental impact of UR operations, projects, and practices to promote environmental awareness and sustainability (i.e., sustainable construction and renovation, sustainable facility operations, resource conservation, recycling, and waste reduction). The UR will allocate an environmental mainstreaming fund to cover the activities identified in this stream. For more on the university plan on environmental mainstreaming see Annex 11.

6.4 Innovation and knowledge transfer

Innovation has become an important component of economic transformation, productivity, competitiveness and job creation, among others. The UR draft strategic plan highlights creativity and innovation as essential to producing graduates fit for jobs in a highly dynamic environment (UR, 2015). An innovation and entrepreneurship module is introduced to all students at UR, and a Centre for Innovation and Entrepreneurship has been created to coordinate activities. To more fully motivate innovation, a fund is needed to support the best innovations from UR students each year. While considerable effort has been made to introduce an innovation culture at UR, the capacity of staff to undertake innovation is low and support is needed to build capacity for innovation.

This is vital because knowledge and resources can be leveraged by industry from a research base, and UR aims to become that research base, the principal source of information for innovation. This requires bridges for knowledge transfer to occur, and will require overcoming inherent barriers that exist between universities and industry to facilitate knowledge flows from a research base to industry and communities.

There are currently no established mechanisms that join UR with communities, industry and government as has been identified in the National Science, Technology and Research Policy (NCST, 2016).

Bridges for knowledge transfer will be facilitated through projects undertaken by high quality researchers at UR (especially PhD students) under joint supervision from academic departments and industry. Increased interactions between industry, government, communities and UR will be promoted to identify and prioritize focus areas and product development. UR will collaborate with the National Industrial Research and Development Agency and other organizations through Private-Public Partnerships and Triple Helix strategies involving academia, industry and government to support innovation and technology initiatives. The triple helix potential for innovation is premised on a more prominent role for the university as a knowledge base, and collaboration with industry and government to create synergies and platforms for production, transfer and application of new knowledge. These initiatives represent knowledge transfer partnerships for UR that will promote innovation.

Another component of innovation for UR is Rwanda's Home Grown Solutions (HGS). HGS represent innovations in two ways. Modern practices have been adapted to the conditions and culture of Rwanda and then given a Rwandan traditional name, making it acceptable and understandable by society. For example, a HGS known as *Imihigo* are performance contracts with targets made and enforced at every level but cushioned in the traditional Rwandan practice of publicly vowing to achieve a target as a sign of excellence in society. A second form of HGS involves adapting a traditional practice from Rwandan culture to modern regulations to solve a problem in society. An example is *Gacaca*, a traditional method of resolving conflicts, which was institutionalized and given legal strength in order to handle the large number of genocide crime cases while at the same time acting as a medium of reconciling Rwandans. There are many examples of such homegrown solutions in Rwanda but virtually no scientific research on how this form of innovation can be sustainably promoted, new ones devised and scaled up and applied.

6.5 Research Support for Sustainability

The UR draft strategic plan for 2016-2025 clearly indicates that UR is to become a research led institution known for its ability to create new knowledge, contribute to the global knowledge economy and leverage its research partnerships. To achieve this level of performance, UR acknowledges the need for improved research management systems, infrastructure and equipment, and is determined to provide the required conducive environment for research. UR will need robust ICT infrastructure, business solutions, library and research management capacities, research funding and facility development and maintenance.

a. ICT infrastructure and business solutions

Rwanda has a highly ambitious ICT-based development strategy and UR has committed itself to bringing the role of ICT to a higher level integrated into all teaching, research, community engagement and administrative processes. To achieve this UR is poised to develop, deploy and maintain high quality and sustainable IT solutions and innovative services. Capacity development for IT staff is still needed, especially to ensure effective access to internet, library resources, and learning and research platforms as well as collaborative and management databases necessary for the fulfillment of the UR mission. UR has challenges to overcome to achieve modernization and integration of scattered and fragmented ICT systems and infrastructure, in addition to limited ICT personnel and capacity and retention mechanisms.

Several investments to address these challenges include development and implementation of an ICT master plan, acquisition of sufficient broadband and its efficient management, an integrated system for student management, HR and Finance, and creation of one UR network. The University ICT infrastructure and capacity will need continuous upgrading to cope with ever changing needs of the UR population. The following areas have been identified as priority areas:

i. **ICT Governance:** This includes how the university benefits from investments in ICT infrastructure, systems and applications, including development and implementation of ICT strategy, policies and procedures, as well as ICT resources and performance management.

ii. **Infrastructure Development**: Campus level focus to increase ICT technologies and services access. On each campus, standard ICT infrastructure will be put in place, including urgent infrastructure needs: well-equipped and modern switching rooms, server rooms, data centers, stable internet and electrical power supplies, backup systems and redundancy of services to ensure that each campus has reliable, scalable, adaptable, and secure ICT infrastructure and services.
iii. **Services and Support**: This area will be managed by individual campuses with the objective to avail standardized, unified and integrated service, support and applications across the university.

b. Library

The Library is an academic unit of UR, and librarians are academic support members. Further training at Masters (20 members of staff) and PhD (5 members of staff) are needed to support research at UR and create the human resources required to establish and run Library and Information Science programs at UR. Library and Information Science training is necessary not just for UR but other agencies (public libraries, documentation centers, repositories, museums, tele-centers). The Library will collaborate with the College of Education to establish undergraduate and postgraduate programs in needed areas.

University of Rwanda Library Services (URLS) seeks to provide access to academic, scientific, and professional research including peer-reviewed e-resources from over 50 international publishers and aggregators. URLS will provide the necessary research environment and training to support researchers, practitioners, and librarians in building viable research competencies. Currently, URLS provides essential services to ensure that teaching and learning as well as research are performed as stipulated in the draft UR strategic plan 2016-2025, and in the policy regarding Libraries in Rwanda. For support to research functions and enhancement of a research environment, library services need to be strengthened. Currently, the URLS lacks a harmonized Integrated Library System, which makes it difficult to provide library services and resources across the whole UR campus system, including the ability to place reservations, self-service, issuing, return and renewal. URLS cannot easily circulate items, generate statistics and reports, and carry out inventory control. To cover capacity gaps, ICT infrastructure, subscription to E-resources, Electronic Document Delivery (EDDS), and end-user training to enhance further access to research information are necessary.

c. Facility (Laboratories) support

The University of Rwanda is determined to contribute to filling the acute skills gap in the country. Railway construction is planned to link Rwanda to other East African Countries and will require highly skilled railway engineers. Likewise, architects are in great demand to enable Rwanda to effectively construct human settlements promoting sustainable development. Human Medicine and Veterinary Medicine and Agriculture technologies are changing rapidly and becoming more advanced. In order to produce graduates with high research capabilities and practical skills, well equipped and functioning laboratories are needed.

Currently UR has 78 laboratories supporting research and training in biological sciences, ICT, engineering and GIS. However, Architecture and Highway engineering lack laboratories. For Human Medicine, Pharmacy, Veterinary Medicine and Agriculture, laboratories are either very basic or are not functioning though well-equipped due to lack of service of equipment or trained technicians capable of running high quality/PhD research laboratories. It is therefore planned to establish laboratories for architecture and highway engineering, and strengthen laboratories for Human Medicine, Pharmacy and Veterinary Medicine including regular equipment servicing. All laboratory technicians will be trained more regularly for increased competency. There will be close collaboration with the East African Centre of Excellence for Biomedical Engineering and eHealth in undertaking these tasks. A fund will be established to facilitate implementation of laboratory improvement and training of the technicians.

d. Research Management and Institutional Advancement

UR recognizes the need to establish robust institutional research management structures with strategic and operational competencies to ensure that research is encouraged and contributes to solving the nation's problems. The Research Management component will cater for various cross-cutting activities to ensure harmonization and coherence across the UR. UR's research strategy and other relevant policies

(e.g., workload policy, financial management, HR, intellectual property) provide research direction and focus. A research incentive scheme has been introduced to promote high performers in research and innovation though it is yet to be fully operation. Two research managers are being trained at PhD level in different aspects of research management support but they have not reached full functioning as yet as they are still in training.
The Research Management component proposed in this phase will focus on institutional advancement activities related to policy development, strategic planning and reform, and Managerial and Leadership training of senior managers. The aim is to strengthen UR's capacity for planning, procurement, financial management, donor coordination, communication and resource mobilization. Research management will also support research coordination units which will manage and administer research funds for ordinary and postdoctoral projects, Masters Scholarship schemes in acute skills gap areas, and PhD research for UR registered candidates. For this to happen, capacity in grant management will be built at UR and college levels. With regards to UR capacity for data retrieval and access, as part of the research management system UR will establish a research database (with information such as projects undertaken, publications made and funding agencies) which will serve as an idea bank to record research interests and ideas in order to support networking between researchers towards interdisciplinary undertakings.

The research management component will also coordinate training in postgraduate supervision, organization of PhD cross cutting courses (e.g. research methodology), postgraduate program curriculum development and training of academic staff in various research skills including research communication for uptake of research output, mentorship of young researchers and support for international conferences and symposia. UR intends to build research management capacity at the PhD level for a few staff in research management units (four) with the purpose of understanding the best mechanisms to support research and innovation and knowledge transfer. . Collaboration with African (e.g., SARIMA) and international bodies (e.g., INORM) for research management will be promoted.

7. ADDITIONAL RESOURCES REQUIRED FOR UR TO ACHIEVE ITS GOAL

Over the past decade, with support primarily from the Government of Rwanda and some partners, UR has invested heavily in training its staff in Masters and PhD and improvement of the research environment. Activities supported include investment in ICT and library infrastructure, physical infrastructure, equipment, supporting publications, organizing conferences, supporting staff to attend international conferences and building capacity in research administration. UR plans to consolidate gains by improving its own research capacity to train PhDs locally. This requires not only financial support and physical space but also increased collaboration and partnerships to establish and run quality Masters and PhD programs that also attract international students, support supervision, mentorship, innovation, laboratory acumen as well research management and leadership. Additional support is required to establish a stable research environment with proper access to Internet facilities, scientific material and other learning and research resources. Physical space especially for the library (research commons) is needed. UR will need funding and collaboration of developed universities to run PhD programs and train UR staff where capacities are lacking.

To reach its goal for research and achieve its ambition of a vibrant research environment (infrastructure, human capital, research funds), UR will need to mobilize an additional USD 110 million in the next five years. The Government of Rwanda is exploring mechanisms to support research and postgraduate training at UR; a national research fund will be created, the UR will continue to be subsidized for its staff and operational costs, and the government will continue to mobilize resources for the UR, which is currently at USD 20 million from the World Bank for four African Centers of Excellence; USD 14 million for the EAC Regional Centre of Excellence for Vaccines, Immunization and Health Supply Chain Management; USD 784,612 for the Centre of Excellence for Health Systems Strengthening; and USD 17.3 million for the Centre of Excellence in Biomedical Engineering and E-Health. This is in addition to the current Sida Program funding of approx. USD 50 million between 2013-2018, from which UR has achieved much and learned numerous lessons (Annex 14). There has been an increase in research projects funded by other partners, such as ARES and NUFFIC.

8. Quality Assurance

The current concept of developing a research based university comes at a time when quality is a major concern in the bid to contribute to rapid economic development in Rwanda. UR has to contribute the required human resources of high quality and on demand. In addition to existing quality control mechanisms, new quality assurance practices will need to be applied to ensure that the academic and research endeavors are benchmarked to national and international standards. Every UR academic program undergoes a rigorous review for quality assurance from the concerned department, School Council, external reviewers, College Directorate of Teaching and Learning Enhancement up through College Academic Council, University Directorate of Research Innovation and Postgraduate Studies, to the University Senate. Programs have to be validated by prospective employers of graduates before approval by the College Academic Council. Monitoring and evaluation of academic programs occurs within each College based on a self-assessment of internal quality framework. Rwanda has a National Qualification Framework governing accreditation of courses and programs which is administered by the Higher Education Council of Rwanda (HEC). HEC has Quality Assurance handbooks to ensure quality inputs and outputs of curricula in higher learning institutions and all new programs must be approved by the Council. Periodically HEC carries out program and institution audits. For sandwich PhD programs in Sweden, quality assurance by the Higher Education Council of Sweden applies. Quality in higher education in Rwanda is monitored through the East African Quality Assurance Network of the Inter University Council for East Africa (IUCEA). Regarding research, the Directors of Research Innovation and Postgraduate Studies at College and University level oversee quality of research proposals, research implementation processes, and peer review mechanisms for research and conference outputs. A number of policies and guidelines have been developed (see Annex 15). Collaboration with external partners with highly experienced professors assures the quality of publications and research outputs through hosting of joint conferences and workshops.

9. Partner and Donor Coordination

UR as the sole public higher learning institution in Rwanda is subject to government regulation on coordination of projects and donor support. Rwanda is signatory to the 2005 Paris Declaration on Aid Effectiveness, and has a Rwanda Aid Policy published in 2006. All external funds to UR are coordinated by the Single Project Implementation Unit (SPIU) since 2016. SPIU is a government approach passed by a cabinet resolution on 11 February 2011 and used in ministries and public organisations to instill best management practices for coordination, synergy, economies of scale and reduction in transaction costs among external partners. Instead of several Project Implementation Units leading to costly and parallel management structure all projects are coordinated from one unit for oversight and monitoring which facilitates collaboration by funders and exchange of experiences.

Since 2013, UR has received external funding of USD 160,483,096 from multilateral and research funding organisations as grants and soft loans to the Government of Rwanda (Annex 12). UR is collaborating with funders from seven countries: Belgium, The Netherlands, Canada, Germany, South Korea, Sweden and USA as well as multilateral organisations such as ADB, World Bank, UN and EU. The Exim Bank (South Korea) provided a loan of USD 46,832,180 which will be used to build UR headquarters, establish four distance learning centres and the School of Geology and Mining. The ABD provided a loan of USD 18,911,606 to build the Centre of Excellence in Biomedical Engineering and E-Health. UR recently won a competitive loan from the World Bank to establish four African Centres of Excellence. Regarding research funding and core university institutional development, Sida-Sweden is the major donor with about 50 million in support across all colleges and university central units. Other funding for research and capacity building in specific domains is at 29,943,776 USD. Most of these programs have coordinators in charge of day to day implementation. The Sida program given its size and reach has a separate coordination mechanism with a Project Coordination Office and team leaders who head the subprograms at different UR Colleges. UR will establish a forum of all its partners to create coordination and synergy for increased impact of their support in UR's development.

10. SEQUENCE AND TIMEFRAME

	18-19	19-20	20-21	21-22	22-23
Complete on going PhDs (numbers)	39	19	7	1	0
New enrollment of PhD students in sandwich mode	97	0	0	0	0
New Postdoc enrollment students in sandwich mode	20	25	25	25	0
Initiate Annual Research Grants	30	30	30	30	0
Hold Annual Conference	X	X	X	X	X
New enrollment in local PhD Program	51	100	90	0	0
New enrollment in local Masters Programs	1160	1860	1860	1860	0
Triple Helix Innovation Projects Initiated	3	3	3	3	0
Upgrade research laboratories	selected labs	selected labs			
Training & maintenance for laboratories	X	X	X	X	X
Upgrade UR libraries	X	X			
UR library maintenance			X	X	X
Upgrade ICT infrastructure	X	X			
ICT infrastructure maintenance			X	X	X
Start training for Research supporting staff	X	X			
Start training for Research Managers	X	X	X		
Train PhD supervisors (numbers)	X	X	X	X	X
Upgrade mini printing facility	X	X			
Start and run a child care centre to support gender	X	X	X	X	X
Put in place a Quality Assurance mechanisms	X				
Support Gender as cross cutting activities (PhDs)					
Support ICT for research management (PhDs)		1	1	1	1
Support Library capacity (PhDs)		1	1		
Monitoring and Evaluation mechanism established	1				

Of the 40 continuing PhD students, 20 will complete in 2018/2019 and the remaining by 2019/2020. New sandwich mode PhD enrolment for 97 students will begin in the first year of the plan. Post-doctoral projects are expected to start in the first year as there is already a mass of PhD graduates from Sweden and elsewhere. At least 20 post docs could be offered in 2018/19 and 25 each year till 2021/22. There will be no call in the final year 2022/2023. Those who do not succeed in the postdoc application process can apply for ordinary research grants (3 grants/cluster/year). Every year from 2018/2019 a minimum of 65 papers will be supported for publication through the UR Annual Conference Week, totalling 325 peer reviewed papers by the project's end. At least 51 people will enroll for local PhDs starting in year 1 of the project (2018/2019). Because new programs must pass an accreditation process, new local Master's programs will begin in year 2, and together with existing Master's program will enroll up to 1860 students every year. Maximum period of each Masters will be 2 years.

Library services upgrading will occur at six major campuses in 2018/2019 and 2019/2020, and the 2nd phase of the ICT master plan will be implemented at the same time. Library as a cross cutting activity will be in the plan for all years. To support research, 60 support staff will receive training in the second and third years of the plan. Cross-cutting activities (ICT, gender, environment, and research management) will run throughout the plan. Research Managers will receive training in the second (12 staff) and third years (13 staff). Training for PhD supervision will be annual from 2018/2019 to 2020/2023 for at least 50 staff members. Child care centres will be started on four campuses from 2019/2020 to support female academic staff career development. A quality assurance mechanism and internal monitoring and evaluation will be strengthened throughout the five years of the plan. Risks associated with these proposed activities and mitigation of these risks are presented in Annex 16.

11. BUDGET

Items	July 18 - June 19	July 19- June 20	July 20- June 21	July 21- June 22	July 22- June 23	Total	%ge
PhD training Continuing Students	1,868,382	776,474	286,069	40,867	-	2,971,792	2.70%
PhD training New Students Sandwich Mode	2,225,954	5,365,838	5,365,838	3,964,104	3,964,104	20,885,838	18.97%
PhD training Students to be enrolled at UR	624,971	2,955,896	6,226,416	7,440,289	5,995,202	23,242,775	21.11%
Sandwich Postdocs (95 projects)	761,850	1,672,543	1,852,601	1,852,601	900,289	7,039,884	6.40%
Research Projects (120 Projects)	341,618	683,237	683,237	683,237	341,618	2,732,948	2.48%
Joint (Academia, Public & Private Sector) Innovation Projects (12 Projects)	51,503	103,006	103,006	103,006	51,503	412,023	0.37%
Incubation Funds _ Innovation Projects	26,885	26,885	26,885	26,885	26,885	134,427	0.12%
Support to Critical Acute Skills Gap-MSc progams at UR	532,905	1,554,307	1,554,307	1,554,307	1,554,307	6,750,132	6.13%
Masters Scholarship scheme in acute skills gaps – Masters programs	836,799	3,236,870	4,762,935	4,762,935	2,322,273	15,921,812	14.46%
Research Infrastructure Fund	2,226,312	2,629,757	1,555,376	1,249,792	1,309,133	8,970,370	8.15%
Gender Mainstreaming	356,248	356,248	356,248	356,248	356,248	1,781,240	1.62%
Environmental Mainstreaming	356,248	356,248	356,248	356,248	356,248	1,781,240	1.62%
Research Management Postgraduate Centre	1,424,992	1,424,992	1,424,992	1,424,992	1,424,992	7,124,960	6.47%
Research Management-Centralised Admin	1,424,992	1,424,992	1,424,992	1,424,992	1,424,992	7,124,960	6.47%
Overhead	391,790	677,019	779,375	757,215	600,834	3,206,232	2.91%
Total USD	**13,451,449**	**23,244,313**	**26,758,525**	**25,997,718**	**20,628,628**	**110,080,633**	**100%**
Total SEK	**116,355,030**	**201,063,306**	**231,461,244**	**224,880,265**	**178,437,635**	**952,197,480**	

Details on the budget see Budget Notes (Annex 13)

12. EXIT STRATEGY

UR aims for diversification of funding for postgraduate education and research in several ways. Foremost is by improving the visibility of UR, individual researchers and UR PhD graduates to attract competitive research grants. This will be attained by offering double degrees with the best Universities in the world, carrying out joint research projects, writing joint papers and publishing in top journals. With improved visibility, UR will be able to competitively attract a significant number of fee paying PhD students from the region and abroad. UR will work with industry partners from the earliest stages of research to ensure that technologies developed by UR staff have the appropriate patent/copyright protection and are commercialised to succeed as marketable products. Participation and improvement in global university rankings will contribute to enhanced reputation and increased visibility of UR.

In sustained support of research, UR has embedded research into its workload policy. The UR workload policy includes 25-50% of workload time (depending on status) dedicated to research which underscores the investment in research over the long term. Furthermore, the UR Research Policy mandates establishment of a research fund with a 1% annual contribution from its earnings, to fund research grants and conference attendance. The Government of Rwanda is also going to establish in its 2017-2018 budget a national research fund managed by the NCST which will be competitively accessed by all HLIs and research institutions. Finally, UR expects the Government of Rwanda to invest more in research and postgraduate training as promised, including introduction of a research and innovation levy. Sustainability is also predicated on the fact that UR is the sole public university directly controlled by the government, and the government is invested in the success of UR. The Government of Rwanda has prioritized STEM (Science, Technology, Engineering and Mathematics) education by targeting about 80% of the government scholarships to students enrolled in STEM fields. Moreover the government plans to allocate 0.2% of GDP to the UR by the end of this plan.

13. PROCESS OF FORMULATING THE CONCEPT NOTE

The Concept Note involved a wide range of consultations from all levels of UR and public and private sectors (see Annex 17). The Deputy Vice Chancellor in charge of Institutional Advancement (DVC IA) coordinated the UR response to the invitation by the Embassy of Sweden on 17 October 2016 to submit a Concept Note for a Research Training partnership. Each College Principal was invited to form a Task Force to facilitate a bottom up process of consultations and all team chairpersons and Principals met in a University-wide committee on 6 November.

The process of preparing College concept notes was launched on 10 November. The cross cutting units of gender, innovation, ICT and library services were invited to submit concept notes. A uniform template was issued to guide the drafting process, with instructions to consider what each College wanted to be in 10 years and a 5 year plan, with the Sweden collaboration as part of the broader concept of each College. Ideas were collected from each department and school council by email communication, in-person interviews and group discussions. Individual College Concept Notes, the first outputs of the process, were presented on 5 January 2017 with comments given in plenary meetings and email exchanges. Most teams held College retreats of up to three days to refine their notes. Concept Notes were exchanged and model College Concept Notes were circulated to help improve others and to identify interdisciplinary areas. Re-submission to DVC IA was on 15 January.

UR through the DVC IA then appointed a team of four people to synthesize the College Concept Notes, carry out further consultations, and prepare a final draft for submission to the Embassy of Sweden. The team consulted extensively with UR senior management, particularly the Vice Chancellor and Deputy Vice Chancellors through face to face discussions and debates, and inputs from Principals and team leaders. The team delved deeply into major UR policy documents, government and regional strategies, and the SDGs, and visited the Commission for Science and Technology and the Board for Capacity Development and Employment Services. Draft zero was produced on 21 January, discussed by the Senior Management committee on 4 February, by the Senate on 6 February, and an expanded Senate and Senior Management Committee session on 17

February attended by the Minister of Education and the Executive Director of the Higher Education Council. Inputs were gathered in these venues, especially on Research Clusters for research and capacity building to guide the University in the next five years. The draft concept note was also presented to the UR's Board of Governors on 22 February.

A final session was held by the team to assemble feedback into a single document which concluded on 25 February. After submission of the draft to the Embassy of Sweden a meeting was held on 7 March to receive inputs from the Embassy of Sweden and UR internal and external stakeholders. The meeting was chaired by the University Vice Chancellor and brought together the Embassy, Her Excellency Ambassador of Rwanda to Sweden, government Ministries, autonomous government agencies, Private Sector Federation and UR senior management. After the meeting College teams were also asked to provide comments on the proposed clusters. In the last week of March the drafting team met again to incorporate feedback from Embassy of Sweden, government and non-government stakeholders and College teams. The process has involved more inclusive consultations and participation than ever before in the University or former higher learning institutions.

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15. ANNEXES

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Annex 1. Current and New UR Colleges and Tentative New Schools

Proposed Name of College (Per Reform)	Current College Name	Tentative Proposed School Names
College of Engineering, Science & Technology (CEST)	College of Science & Technology (CST)	Architecture and Built Environment
		Engineering
		Mining Engineering and Applied Geology
		Sciences
		Information and Communication Technology
College of Agriculture, Environment and Veterinary Medicine (CAEVM)	College of Agriculture and Veterinary Medicine (CAVM)	Agricultural Sciences (SAS)
		Agricultural Engineering (SAE)
		Veterinary Medicine and Animal Sciences
		Forestry and Aquaculture
College of Medicine and Health Sciences (CMHS)	College of Medicine and Health Sciences (CMHS)	Medicine and Pharmacy
		Health Sciences
		Nursing
		Dentistry
		Public Health
College of Education and Library Science (CELS)	College of College Education (CE)	Education
		Inclusive and Special Needs
		Library Sciences
College of Business, Law, Arts and Social Sciences (CBLASS)	College of Business And Economics (CBE)	Business
		Economics
	College of Arts and Social Sciences (CASS)	Governance, Development and Society
		School of Communication Studies And Arts
		Law

Annex 2. UR Undergraduate and Postgraduate Students Enrolment

Undergraduate Student enrollment

Colleges	2013/2014			2014/2015			2015/2016			2016/2017		
	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total
CASS	443	1,225	1,668	486	1,403	1,889	549	1,509	2,058	596	1,569	2,165
CAVM	1,384	3,292	4,676	1,085	2,668	3,753	1,156	2,402	3,558	1,111	2,166	3,277
CBE	2,863	4,334	7,197	3,208	4,467	7,675	3,719	5,804	9,523	3,337	4,962	8,299
CE	1,984	4,107	6,091	2,222	4,530	6,752	1,814	4,161	5,975	1,707	3,807	5,514
CMHS	840	1,626	2,466	1,055	1,877	2,932	1,092	2,139	3,231	1,343	2,338	3,681
CST	1,727	4,262	5,989	1,539	4,335	5,874	1,447	4,538	5,985	1,458	4,385	5,843
Total	**9,241**	**18,846**	**28,087**	**9,595**	**19,280**	**28,875**	**9,777**	**20,553**	**30,330**	**9,552**	**19,227**	**28,779**

Postgraduate Enrollment PG)

Colleges	Gender	2013/2014			2014/2015			2015/2016			2016/2017		
		Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total
CASS	Post Dip		21	21			0		4	4	1	37	38
	Masters	1	20	21	33	148	181	84	155	239	51	126	177
	PhD		1	1			0			0	0	4	4
CAVM	Post Dip			0			0			0			0
	Masters			0	2	4	6	16	18	34	8	1	9
	PhD			0			0		2	2	1	13	14
CBE	Post Dip			0			0			0			0
	Masters	17	30	47	39	59	98	75	119	194	30	84	114
	PhD	1		1		4	4			0	5	15	20
CE	Post Dip	124	303	427	192	371	563	138	274	412	110	252	362
	Masters	17	36	53	21	45	66	15	13	28	13	18	31
	PhD			0			0			0	10	13	23
CMHS	Post Dip			0	15	18	33	4	5	9			0
	Masters	51	91	142	125	361	486	158	254	412	153	318	471
	PhD			0	1	6	7	3	22	25	8	18	26
CST	Post Dip			0			0			0			0
	Masters			0	16	66	82	18	53	71	91	25	116
	PhD			0			0			0	5	25	30
TOTAL	TOTAL	**211**	**502**	**713**	**444**	**1082**	**1526**	**511**	**919**	**1430**	**486**	**949**	**1435**

Total Enrollment Trends

School	Level	2013/2014			2014/2015			2015/2016			2016/2017		
		Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total
CASS	UG	443	1,225	1,668	486	1,403	1,889	549	1,509	2,058	596	1,569	2,165
	PG	1	42	43	33	148	181	84	159	243	52	167	219
CAVM	UG	1,384	3,292	4,676	1,085	2,668	3,753	1,156	2,402	3,558	1,111	2,166	3,277
	PG	-	-	-	2	4	6	16	20	36	9	14	23
CBE	UG	2,863	4,334	7,197	3,208	4,467	7,675	3,719	5,804	9,523	3,337	4,962	8,299
	PG	18	30	48	39	63	102	75	119	194	35	99	134
CE	UG	1,984	4,107	6,091	2,222	4,530	6,752	1,814	4,161	5,975	1,707	3,807	5,514
	PG	141	339	480	213	416	629	153	287	440	133	283	416
CMHS	UG	840	1,626	2,466	1,055	1,877	2,932	1,092	2,139	3,231	1,343	2,338	3,681
	PG	51	91	142	141	385	526	165	281	446	161	336	497
CST	UG	1,727	4,262	5,989	1,539	4,335	5,874	1,447	4,538	5,985	1,458	4,385	5,843
	PG	-	-	-	16	66	82	18	53	71	96	50	146
TOTAL	**UG**	**9,241**	**18,846**	**28,087**	**9,595**	**19,280**	**28,875**	**9,777**	**20,553**	**30,330**	**9,552**	**19,227**	**28,779**
	PG	**211**	**502**	**713**	**444**	**1,082**	**1,526**	**511**	**919**	**1,430**	**486**	**949**	**1,435**
	TOTAL	**9,452**	**19,348**	**28,800**	**10,039**	**20,362**	**30,401**	**10,288**	**21,472**	**31,760**	**10,038**	**20,176**	**30,214**

Annex 3. UR Postgraduate Programs

College	Number of Masters Program
CASS	Masters of Arts in Translation &Interpreting LLM of International Criminal Justice And The Law Of Human Rights LLM in Business Law Master's In Development Studies Master of Social Sciences In Local Governance Studies Master's of Arts In Genocide Studies And Prevention Master's Program In Peace Studies And Conflict Transformation Masters In Security Studies Masters of Arts In Social Sciences: Gender And Development
CAVM	Masters In Soil And Agroforestry Masters In Agribusiness Masters In Crop Science Masters In Animal Production Masters In Agriculture Engineering
CBE	Master's In Business Administration With Various Options (8) Masters Of Science In Economics
CE	Masters Of Education In Curriculum And Instructions Postgraduate Diploma In Education Postgraduate Certificate Of Learning And Teaching In Higher Education Masters Of Education In Education Leadership And Management Postgraduate Diploma In School Guidance And Counselling Postgraduate Diploma In Vocational And Technical Pedagogy Masters Of Education In Special Needs Education Postgraduate Diploma In Special Needs Education
CMHS	Master Of Science In Field Epidemiology And Laboratory Management Master Of Science In Epidemiology Master Of Science In Health Informatics Master Of Public Health Master Of Medicine In Urology Master Of Medicine In Neurosurgery Master Of Medicine In Ear, Nose And Throat, Head And Neck Surgery Master Of Medicine In Anatomical Pathology Master Of Medicine In Psychiatry Master Of Science In Clinical Psychology And Therapeutics Master Of Pharmaceutical Sciences, Quality Assurance And Quality Control Master Of Medicine In Anaesthesia Master Of Medicine In Paediatrics Master Of Medicine In Internal Medicine Master Of Medicine In Obstetrics And Gynaecology Master Of Medicine In Surgery Master Of Medicine In Orthopaedic Surgery
CST	Masters In Highway And Transportation Engineering Masters In Gis For Environment And Sustainable Development Masters In Ict (Option: Operational Communications) Masters In Is (Option: E-Government) Masters In Is (Option: Internet Technology) Masters In Water Resources And Environmental Management Masters In Biodiversity And Natural Resources Management Masters In Applied Mathematics Masters In Renewable Energy Masters In Atmospheric Science

Annex 4. UR Academic and Administrative Staff

I. Academic Staff as of February 2017

1. Distribution of UR Academic Staff by College

COLLEGE	GENDER				TOTAL	%
	FEMALE	%	MALE	%		
CASS	31	2%	136	10%	167	12%
CAVM	33	2%	131	10%	164	12%
CBE	32	2%	104	8%	136	10%
CE	30	2%	149	11%	179	13%
CMHS	132	10%	204	15%	336	24%
CST	72	5%	321	23%	393	29%
TOTAL	**330**	**24%**	**1045**	**76%**	**1375**	**100%**

2. Distribution of UR Academic Staff by Qualification

QUALIFICATIONS	COLLEGES						TOTAL	%
	CASS	CAVM	CBE	CE	CMHS	CST		
FEMALE	**31**	**33**	**32**	**30**	**132**	**72**	**330**	**24%**
BACHELOR	2	3	4	3	72	21	105	8%
MASTER	19	27	27	22	47	45	187	14%
OTHERS (Adv. Dipl.)	0	0	0	0	9	0	9	1%
PhD	10	3	1	5	4	6	29	2%
MALE	**136**	**131**	**104**	**149**	**204**	**321**	**1045**	**76%**
BACHELOR	21	24	7	26	67	64	209	15%
MASTER	70	74	74	80	96	192	586	43%
OTHERS (Adv. Dipl.)	0	0	3	0	14	0	17	1%
PhD	45	33	20	43	27	65	233	17%
TOTAL	**167**	**164**	**136**	**179**	**336**	**393**	**1375**	**100%**
BACHELOR	23	27	11	29	139	85	314	23%
MASTER	89	101	101	102	143	237	773	56%
OTHERS (Adv. Dipl.)	0	0	3	0	23	0	26	2%
PhD	55	36	21	48	31	71	262	19%

3. UR Staff on Study Leave (PhDs and Masters)

QUALIFICATIONS	COLLEGES						TOTAL	%
	CASS	CAVM	CBE	CE	CMHS	CST		
FEMALE	**0**	**10**	**4**	**1**	**5**	**20**	**40**	**23%**
MASTER	0	3	0	0	3	9	15	9%
PhD	0	7	4	1	2	11	25	14%
MALE	**12**	**25**	**14**	**18**	**7**	**59**	**135**	**77%**
MASTER	4	13	0	2	5	24	48	27%
PhD	8	12	14	16	2	35	87	50%
TOTAL	**12**	**35**	**18**	**19**	**12**	**79**	**175**	**100%**
MASTER	4	16	0	2	8	33	63	36%
PhD	8	19	18	17	4	46	112	64%

4. Distribution of UR Academic Staff by Rank

COLLEGES	RANK	GENDER				TOTAL
		MALE	%	FEMALE	%	
CAVM	Professor	6	4%	0	0%	6
	Associate Professor	7	4%	1	1%	8
	Senior Lecturer	16	10%	0	0%	16
	Lecturer	30	18%	7	4%	37
	Assistant Lecturer	49	30%	21	13%	70
	Tutorial Assistant	23	14%	4	2%	27
Sub Total		131	80%	33	20%	164
CASS	Professor	5	3%	0	0%	5
	Associate Professor	3	2%	1	1%	4
	Senior Lecturer	20	12%	4	2%	24
	Lecturer	51	31%	8	5%	59
	Assistant Lecturer	38	23%	16	10%	54
	Tutorial Assistant	19	11%	2	1%	21
Sub Total		136	81%	31	19%	167
CBE	Professor	2	1%	0	0%	2
	Associate Professor	4	3%	0	0%	4
	Senior Lecturer	6	4%	1	1%	7
	Lecturer	33	24%	8	6%	41
	Assistant Lecturer	54	40%	19	14%	73
	Tutorial Assistant	5	4%	4	3%	9
Sub Total		104	76%	32	24%	136
CE	Professor	1	1%	0	0%	1
	Associate Professor	7	4%	0	0%	7
	Senior Lecturer	13	7%	2	1%	15
	Lecturer	39	22%	5	3%	44
	Assistant Lecturer	66	37%	20	11%	86
	Tutorial Assistant	23	13%	3	2%	26
Sub Total		149	83%	30	17%	179
CMHS	Professor	4	1%	0	0%	4
	Associate Professor	8	2%	0	0%	8
	Senior Lecturer	22	7%	7	2%	29
	Lecturer	42	13%	15	4%	57
	Assistant Lecturer	46	14%	29	9%	75
	Tutorial Assistant	68	20%	72	21%	140
	Clinical Instructor	14	4%	9	3%	23
Sub Total		204	61%	132	39%	336
CST	Professor	3	1%	1	0%	4
	Associate Professor	11	3%	1	0%	12
	Senior Lecturer	28	7%	2	1%	30
	Lecturer	58	15%	4	1%	62
	Assistant Lecturer	158	40%	43	11%	201
	Tutorial Assistant	63	16%	21	5%	84
Sub Total		321	82%	72	18%	393

COLLEGES	RANK	GENDER				TOTAL
		MALE	%	FEMALE	%	
TOTAL	Professor	21	2%	1	0%	22
	Associate Professor	40	3%	3	0%	43
	Senior Lecturer	105	8%	16	1%	121
	Lecturer	253	18%	47	3%	300
	Assistant Lecturer	411	30%	148	11%	559
	Tutorial Assistant	201	15%	106	8%	307
	Clinical Instructor	14	1%	9	1%	23
Sub Total		1045	76%	330	24%	1375
TOTAL		**1045**	**76%**	**330**	**24%**	**1375**

II. Administrative and Support Staff as of February 2017

1. Distribution of UR Administrative and Support Staff by Colleges

COLLEGE	GENDER				TOTAL	%
	FEMALE	%	MALE	%		
CASS	48	6%	102	13%	150	20%
CAVM	35	5%	78	10%	113	15%
CBE	36	5%	38	5%	74	10%
CE	53	7%	82	11%	135	18%
CMHS	68	9%	63	8%	131	17%
CST	40	5%	44	6%	84	11%
UR Head Office	25	3%	50	7%	75	10%
TOTAL	**305**	**40%**	**457**	**60%**	**762**	**100%**

2. Distribution of UR Administrative and Support Staff by Qualification

TOTAL	GENDER				TOTAL	
	FEMALE		MALE			
PhD	3	0.39%	8	1.05%	11	1.44%
MASTERS	52	6.82%	67	8.79%	119	15.62%
BACHELORS	187	24.54%	255	33.46%	442	58.01%
DIPLOMA (A1)	44	5.77%	34	4.46%	78	10.24%
OTHERS	19	2.49%	93	12.20%	112	14.70%
TOTAL	**305**	**40.03%**	**457**	**59.97%**	**762**	**100.00%**

Annex 5. UR Peer Reviewed Publications 2013 -2016

College	2013-2014	2014-2015	2015-2016	Total
CASS	27	33	54	114
CAVM	32	42	11	85
CE	63	57	51	108
CMHS	187	91	128	406
CST	87	75	71	233
CBE	32	33	36	101
Total	**428**	**331**	**351**	**1,110**

*Publication include journal papers, books and book chapters

Annex 6. UR Staff and Student Projections

Year	# Enrolled Student	# Enrolled Postgraduate students	%ge of the postgrad students	# of Graduates	Graduation Rate	Total Acad Staff	Nr of Teaching & Research Staff with PhD	%ge of Staff with PhD	Student/ Staff Ratio
2016-2017	30,214	1,435	5%	7,015	23%	1,378	265	19%	22
2017-2018	30,910	1,507	5%	6,500	21%	1,392	278	20%	22
2018-2019	31,642	2,561	8%	9,750	31%	1,406	362	26%	23
2019-2020	32,299	3,637	11%	15,600	48%	1,419	434	31%	23
2020-2021	32,800	3,746	11%	10,873	33%	1,447	443	31%	23
2021-2022	32,800	3,859	12%	10,929	33%	1,475	452	31%	22
2022-2023	32,800	4,013	12%	11,007	34%	1,504	632	42%	22
2023-2024	32,800	4,134	13%	11,067	34%	1,534	733	48%	21
2024-2025	32,800	4,258	13%	11,129	34%	1,565	821	52%	21
2025-2026	32,800	4,385	13%	11,193	34%	1,596	912	57%	21
2027-2028	32,800	4,517	14%	11,258	34%	1,628	1,003	62%	20
2028-2029	32,800	4,652	14%	11,326	35%	1,629	1,103	68%	20
% Annual Rate *(2018-2019 to 2023-2024)* -3%									
% Annual Rate *(2024-2025 to 2027-2028)* – growth in student numbers will be relatively being stable									

Observations:

a. For the student population estimate we assumed a moderate 3% percent growth from next year until 2020/2021 because of our focus on STEM and the reduction in the enrollment of non-STEM students and a zero % growth afterwards leading to student population of UR plateauing at about 32,700.
b. For the number of graduates: - n the current 2nd year we have an abnormally high number of students because in 2015/2016 academic year the government of Rwanda sponsored an unusually high number of students. This will have as consequence that in 2017/2018 UR will graduate higher than usual number of students. - Because in 2017/18 the UR is introducing a 3-year degree program for many of its programs, in 2019/2020 the UR will graduate 2 cohorts at the same time, i.e the first in 3-year and the last 4-year cohort in many programs leading to an unusually high number of graduates.
c. With the projected increase in the number of post-graduate programs at UR, the number of post-graduate students is expected to more than double in the next 10 years and reach 13% of the total student population.
d. In the next 10 years, the percentage of academic staff with PhD is going to increase from current 19% to 68% which the recommended excellent level by the IUCEA. However, since the increase in the percentage of PhD holder comes with the increase in the wage bill, the UR may not be able to significantly improve on the academic staff to student ratio which will oscillate around 20.

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Annex 7. Proposed Training within clusters and sub-themes (5 Year Plan)

CLUSTER 1	**Agriculture Transformation and Food Security**	
Subtheme	i. Food Security ii. Agricultural engineering iii. Postharvest technology iv. Value chains and entrepreneurship development v. Plant breeding and genetic enhancement vi. Animal production vii. Agribusiness	
Areas of Capacity Building	**Numbers**	**How to achieve it**
i. PhD training	49	*** Training Abroad** *** Training at UR: 4 Program under development** i. PhD in Food Science, Nutrition and Food Security ii. PhD in Agricultural Sciences iii. PhD in Animal production and health iv. PhD in Agricultural mechanization
ii. Master Training	**5 Masters Programs continue to run at UR** i. Crop science **ii.** ii. Animal production **iii.** iii. Agriculture Engineering **iv.** iv. Agribusiness **v.** v. Soil and Agroforestry	
Research Centres	**Already functioning:** i. Potato Seed Centre **Proposed** i. Food Health and Nutritional Security ii. ii. Centre for Postharvest Technology iii. iii. Livestock research Centre of Excellence	
iii. Laboratory Managers	Training For all labs	
iv. Postdoctoral grants	11	
CLUSTER 2	**Social Economic transformation and sustainable development**	
Subtheme	i. Government policy analysis ii. Poverty, inequality analysis, unemployment and pro-poor growth iii. Demography and sustainable development iv. Urban and rural industrialization v. Business and management accounting vi. Industrial organization and management vii. Sustainable production and consumption viii. Green growth and investments	
PhD training	22	* PhD by research. * No PhD by Coursework &Thesis
Master Training	**2 Master's program running** i. Master's in Business Administration ii. ii. Master's of Science in Economics **3 Masters program** i. Masters in competitiveness and strategy ii. Masters in innovation, creativity and entrepreneurship iii. Masters in Family Business Management	
Postdoctoral grants	6	
Research Centres		Human Resources Development and Research
CLUSTER 3	**Environment, Natural Resource Management and Climate Change**	
Subthemes	i. Geology, mining, and mineral processing engineering	

	ii. Water resources engineering and conservation iii. Sustainable natural resource management and assessment iv. Biodiversity conservation, landscape restoration and ecosystem services v. Protection and Promotion of Sustainable Tourism Resources vi. Climate science vii. Geoinformation science for environment and sustainable development	
PhD training	35	* PhD by research. * No PhD by Coursework &Thesis
Master Training	Master in Highway and Transportation Engineering Master in Geo Information Science for Environment and Sustainable Development Master in ICT (Option: Operational Communications) Master in IS (Option: E-government) Master in IS (Option: Internet Technology) Master in water Resources and Environmental Management Master in Biodiversity and Natural Resources Management Master in Applied Mathematics Master in Renewable Energy Master in Atmospheric Science	
Laboratory Managers	Training for all labs	
Postdoctoral grants	9	
Research Centres	Center of Excellence in Biodiversity and Natural Resource Management Center for GIS	
CLUSTER 4	**Inclusive Governance, Peace and Security**	
Subtheme	i. Transparency and government accountability ii. Predictive conflict management iii. Peacemaking, peace building, and conflict resolution **iv.** Corporate governance **v.** Security studies	
PhD training	33	Developing 1 PhD programme by Coursework and Thesis in Peace, Conflict and Security Studies
Master Training	Masters of Arts in Translation &Interpreting LLM of international criminal justice and the law of human rights LLM in business law Master's in development studies Master of social sciences in local governance studies Master's of arts in genocide studies and prevention Master's program in peace studies and conflict transformation Masters in security studies Masters of Arts in Social Sciences: Gender and Development	
Postdoctoral grants	9	
Research Centres		Centre for Conflict Management
CLUSTER 5	**Urbanization, Green Cities, and Human Settlements**	
Subtheme	i. Planned green cities and villages ii. Urban environmental resilience **iii.** Urban and rural settlement development including affordable housing	
i. PhD training	31	* PhD by research. * No PhD by Coursework &Thesis
ii. Master Training	**Two (2) MSc program to be developed** MSc program in Highway and transportation engineering MSc program in Civil engineering	
iii. Laboratory Managers	Training For all labs especially architecture lab	
iv. Postdoctoral grants	8	
CLUSTER 6	**Transformative ICT and Knowledge Management**	
Subtheme	i. Software engineering & app development ii. Cyber security	

	iii. ICT applications to smart cities and urban development iv. E-banking, e-commerce, e-health and telemedicine **v.** Internet of Things	
PhD training	31	* PhD by research. * No PhD by Coursework &Thesis
Master Training	Masters in Egovernance, in ICT operational communication, in Embedded Systems, in Cyber security	
Postdoctoral grants	8	
Research Centres		African Center of Excellence in Data Science African Center of Excellence for Internet of Things
CLUSTER 7	**Health and Wellbeing for All**	
Subthemes	i. Nutrition and environmental health ii. One Health iii. Communicable and climate change iv. Non-communicable diseases v. Maternal and childhood health	
PhD training	33	2 PhD programs by coursework and thesis being developed i. PhD in Biomedical Sciences ii. PhD in Pharmaceutical Sciences
Master Training	**2 Masters programs:** Master of Science in Clinical Physiology Master of Science in Clinical Microbiology	
Laboratory Managers	Set up the clinical microbiology lab and Training of staff for all other labs	
Postdoctoral grants	9	
Research Centres	Center for Mental Health Center of Excellence in Biomedical Engineering and E-health Center of Excellence in Health System Strengthening Center of Excellence in Health Supply Chain Management	
CLUSTER 8	**Sustainable Energy and Manufacturing**	
Subtheme	i. Energy sources & supplies (Hydro, gas, petrolium, geothermal, solar, wind power) ii. Energy conversion and distribution (Smart Grid, Systems Bionergy and Waste, transmission and Distribution System, turbo machines, materials, etc) iii. Energy Demand side: Smart and Sustainable cities, rural electrification, Sustainable & Energy Efficient Architecture iv. Socio-economic, business, legal , modelling and regulatory aspects of energy: Global, National, City, Local levels v. Engineering (industrial, civil, product, electric, environmental) for Manufacturing sector	
i. PhD training	31	* PhD by research. * No PhD by Coursework/dissertation
ii. Master Training	Masters in renewable energy + other to be developed under the Centre of excellence	
iii. Laboratory Managers	Training for all labs	
iv. Postdoctoral grants	8	
Research Centre	African Centre of Excellence in Energy for Sustainable Development	
CLUSTER 9	**Transformative Education, Culture and Creative Arts**	
Subthemes	i. Arts and Drama ii. Cultural and language studies iii. Innovative teaching and learning techniques	
i. PhD training	27	* PhD by research. * No PhD by Coursework &Thesis
ii. Master Training		
iv. Postdoctoral grants	7	
Research Centres	University Centre for Arts and Drama African Center of Excellence in Innovative Teaching and Learning in Math and	

	Science	
CLUSTER 10	**Transport and Logistics**	
Subtheme	i. Transport engineering – railway, roads, waterways ii. Logistics management **iii.** Aviation engineering	
i. PhD training	29	* PhD by research. * No PhD by Coursework &Thesis
ii. Master Training	Highway & Transportation Engineering	
iii. Laboratory Managers	Set up and training for all lab managers	
iv. Postdoctoral grants	8	
PHD TRAINING IN CROSS-CUTTING AREAS		
Innovation and Knowledge Transfer	4	
Gender	4	
Library	4	
ICT Infra	2	
Research Management	4	

Annex 8. Mapping the Sustainable Development Goals with UR Research Clusters

Sustainable Development Goals		University Research Clusters or Mainstreamed Theme
1	End poverty in all its forms everywhere	Research Cluster 1: Agricultural transformation and food security
2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture	Research Cluster 1: Agricultural transformation and food security
3	Ensure healthy lives and promote well-being for all at all ages	Research Cluster 7: Health and Wellbeing for All
4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	Research Cluster 9: Transformative Education, Culture and Creative Arts
5	Achieve gender equality and empower all women and girls	Research Cluster 9: Transformative Education, Culture and Creative Arts Gender Mainstreaming Plan
6	Ensure availability and sustainable management of water and sanitation for all	Environmental Mainstreaming Plan Research Cluster 3: Environment, Natural Resources Management and Climate Change
7	Ensure access to affordable, reliable, sustainable and modern energy for all	Research Cluster 8: Sustainable Energy and Manufacturing
8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	Research Cluster 2: Socio-Economic Transformation and Sustainable Development Research Cluster 9: Transformative Education, Culture and Creative Arts Research Cluster 10: Transport and Logistics
9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	Cluster 6: Transformative ICT and Knowledge Management Research Cluster 8: Sustainable Energy and Manufacturing Research Cluster 10: Transport and Logistics
10	Reduce inequality within and among countries	Research Cluster 2: Socio-Economic Transformation and Sustainable Development Research Cluster 9: Transformative Education, Culture and Creative Arts Research Cluster 10: Transport and Logistics
11	Make cities and human settlements inclusive, safe, resilient and sustainable	Cluster 5: Urbanization, Green Cities, and Human Settlements Cluster 6: Transformative ICT and Knowledge Management Research Cluster 10: Transport and Logistics
12	Ensure sustainable consumption and production patterns	Research Cluster 2: Socio-Economic Transformation and Sustainable Development Research Cluster 10: Transport and Logistics
13	Take urgent action to combat climate change and its impacts	Research Cluster 3: Environment, Natural Resources Management and Climate Change
14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	
15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	Research Cluster 3: Environment, Natural Resources Management and Climate Change
16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	Research Cluster 4: Inclusive Governance, Peace and Security Research Cluster 9: Transformative Education, Culture and Creative Arts
17	Strengthen the means of implementation and revitalize the global partnership for sustainable development	Research Cluster 9: Transformative Education, Culture and Creative Arts

Annex 9. Operationalizing the Interdisciplinary Approach

Harnessing disciplines is of strategic importance to the institutional development of UR and the usefulness of clusters to providing development solutions to Rwanda. Thus it is important to understanding the define the interdisciplinary approach in the concept note and particularly how it can be operationalized at implementation level and how is conceived at UR and the institutional aspirations in harnessing the multiple disciplines.

Choi et al. (2006) have made a distinction between the three; multidisciplinary draws on knowledge from different disciplines, inter-disciplinarity analyses, synthesizes and harmonizes links between disciplines into a coordinated and coherent whole. Trans disciplinarily integrates the natural, social and health sciences in a humanities context and transcends their traditional boundaries. A few more aspects of the trio concepts are summarized in Table 1 as a way of making a distinction between the concepts.

Table 1: Meaning of multi – inter – and trans disciplinary

	Multidisciplinary	Interdisciplinary	Trans disciplinary
1	Working with several disciplines	Working between several disciplines	Working across several and beyond several disciplines
2	Members from different disciplines working independently on different aspects of a project working in parallel or sequentially	Members from different disciplines working together in the same project working jointly	Members from disciplines as well as stakeholders non academic, on scientist participants
3	Individual goals in different professions	Shared goals	Shared gals and shared skills
4	Summation and juxtaposition of disciplines	Integration and synthesis of disciplines	Integration, amalgamation, assimilation, incorporation, unification and harmony of disciplines views and approaches
5	Separate methodologies	Common methodologically	
6	External coherence (motivated by a desire to focus on client's needs)	Internal coherence(motivated by a desire to focus on team needs)	
7	Participants maintain won discipline roles	Participants surrender some aspects of their own disciplinary role but still maintains a discipline – specific base	Participants develop a shared conceptual framework drawing together discipline specific bases

Source: Choi et al. 2006

It is clear that all the concepts are relevant to UR structure and positioning in Rwanda. With the current six Colleges, UR has disciplines and sub disciplines. It hosts the largest number of disciplines than any other institution in Rwanda and will continue to be the base of developing high level disciplinary training and specialization. However, the nature of development problems requires solutions derived from interventions and interactions of different disciplines preferably in an organized manner. UR is thus undergoing a transition to an interdisciplinary approach which will foster the shared search for solutions and ultimately develop conceptual frames beyond the disciplines.

First level of operationalization is the development of clusters elaborated in the Concept note. In each cluster participants from different colleges and schools under a lead College will develop and define priorities and areas that need capacity building and research. The projects either as research or training can be undertaken singularly as in the case of PhDs or jointly as in the case of research. The

interdisciplinary approach supports the desire to have PhDs, Masters and research projects that are relevant and directed to offering solutions to society and advance knowledge. For example, development transport and logistics capacities in Rwanda is not an engineering challenge only but it is something that involves business, economics, management and an understanding of society's needs. One health is not a medical objective alone but involves agriculture, environment and social economics. The practical application of the interdisciplinary approach will be articulated in the specific proposals to be developed with prospective partners and with SDGs, Vision 2020, Vison 2050 and sectoral strategies in the horizon as guiding beacons. In principle then operationalizing the interdisciplinary approach is not an end in itself but a process that will continue to make use of disciplines in addressing multifaceted problems. Table 2 shows an approximate status of multiple disciplinary needs in Rwanda

Table 2. Use of multiple disciplines at UR

	Multidisciplinary	Interdisciplinary	Trans disciplinary
Our understanding	Disciplines and sub disciplines in Colleges and Schools, medicine, natural sciences STEM and non - STEM, agriculture, social sciences.	Links and interaction between the disciplines in common projects to look for solutions to multifaceted problems	Involving the non-academic, non- scientist stakeholders in a robust triple helix approach
Current Example (Research)	Health research e.g. nutrition needs inputs beyond medicine including agriculture, cancer involves physics and medicine Development research, involves economics, ecologists, agriculture and health sciences	Limited collaboration between different schools; few multidisciplinary research teams; e.g. in biotechnology, ecological economics	Links to industry and community and collaboration needs to be strengthened
Current Example (Teaching)	Teaching is coordinated in schools and colleges	Limited multiple disciplinary departments	External stakeholders involved in limited activities
Aspiration	High quality disciplinary capabilities	Integration of multiple disciplines in research and solution seeking; interdisciplinary activities scaled up e.g biotechnology, clinical approach to development research	Involvement of stakeholders outside UR in industry, communities, private sector, government and civil society

To operationalize the interdisciplinary approach UR will develop in the context of the concept note a monitoring framework of the transition to harnessing multiple disciplines in seeking solutions for national development problems and needs.

Annex 10. Gender equity plan for UR – How Gender will be mainstreamed

Key areas to consider	5 years plan 2018-2023	10 years plan to 2028
Increase female student enrolment at UR to attain gender parity	-Female student enrolment to increase to 40%	-Female student enrolment to increase to 50%
	○ -Reach out to secondary schools through activities like mentorship programs to motivate female students to enroll at UR ○ -Initiate scholarships & bursaries targeting female students to increase their numbers at UR, especially in STEM subjects ○ -Introduce more flexible teaching and learning schedules such as distance learning, evening and weekend programs to appeal to needs of different students (employed, stay home mothers, etc.) in both UG and PG progs and campuses ○ -Develop infrastructure for accommodation, classrooms, washrooms, and play areas that are more gender inclusive. In particular, female students' accommodation on or near campus should be given priority ○ -Increase access to reproductive health information, family planning and contraceptives through-out the university health centers, and train the staff in the health centers to employ youth friendly approaches ○ -Strengthen the university career guidance and counselling services in order for them to effectively cater for students needs in a gender sensitive manner	On-going
Address gender disparities in academic and administrative staff recruitment, training & professional development and participation in decision-making	○ -Increase administrative female staff recruitment to 50% ○ -Increase female academic staff recruitment to 35%	Increase female academic staff recruitment to 50%
	-Introduce gender equity and affirmative action principles in recruitment, training and promotion of female administrative and academic staff to increase their numbers in decision-making organs. -Negotiate international scholarships that are gender inclusive and sensitive to the needs of women while pursuing further studies like PhD programs. -Develop local capacity for PhD programs to ensure that women and men enrol for further studies within the country, in order to reduce on the challenges and costs of studying abroad. -Create gender friendly spaces and facilities such as girls' rooms, breast-feeding rooms, child day care facilities, to be available in all UR campuses. Day care facilities will provide accessible child care for children of both students & staff at UR and surrounding communities.	On-going
Engender curriculum design, content, teaching and learning approaches and materials	○ Review existing curricula to ensure gender inclusiveness & sensitivity in content T&L approaches, etc. ○ Train academic staff in gender responsive pedagogy, gender sensitive curriculum design and create gender awareness among all university staff. ○ Create a gender sensitive teaching and learning environment that caters for specific needs of all students and staff.	On-going

Key areas to consider	5 years plan 2018-2023	10 years plan to 2028
d) Mainstream gender in all UR policies, strategies, plans, rules and regulations, services and departments	-Establish a Gender Mainstreaming Directorate at the UR Headquarter level that will lead the process of mainstreaming gender at HQ, at College and Campus levels in partnership with all relevant UR stakeholders. -Review existing policies, rules and regulations for students and staff to ensure that they are gender inclusive	Gender will be mainstreamed in all UR official documents, and there will be guidelines on how to develop policies and strategies from a gender perspective.
	-Develop gender-related performance indicators, goals and objectives within all UR policies, strategies and plans. -Adopt gender budgeting to ensure that financial resources to implement gender responsive programs and activities are available within UR.	On-going
Mainstream gender in Research, Innovation and Out-reach programs	Develop mentorship schemes within UR Colleges where senior academic staff mentor junior academics, in research related activities, in particular the female academic staff whose numbers are still low. -Develop international collaborations to create research programs that build capacities of academic staff in research, especially female academics at the UR -Develop guidelines and build capacities of UR researchers on how to mainstream gender across research in different disciplines, programs and research programs. -Create incentives such as research funds for female academics and researchers to increase the quality and volume of research outputs and outcomes by women academics/researchers -Design and create competitive grants for gender oriented research especially in science -Ensure that all UR funded research have a gender dimension	On-going
Ensure a secure environment where students and staff are free from Gender-Based Violence and Sexual Harassment.	-Conduct gender awareness campaigns and capacity building on gender issues, especially on GBV for all female and male students and staff -Develop procedures to be used in reporting, investigation, and disciplining of perpetrators of GBV and SH, as well as counselling and support and reintegration of victims of GBV and SH back into the University community.	On going
Generate periodic sex-disaggregated statistics across UR, (e.g. in T&L, research, community service, administration, staff and student welfare, etc.) to facilitate proper planning.	-Equip the UR statistics office & GMD with the required orientation and training and resources to generate sex-disaggregated data. -Establish linkages between the UR statistics office and the Gender Mainstreaming Directorate at the UR and at college levels in order to generate coordinated data. -Create partnerships between the GMD with external stakeholders like the National Gender Machinery and the NISR, in generating and utilising sex-desegregated statistics in order to follow-up on the delivery of National Gender Commitments.	On-going

Annex 11. Environmental Mainstreaming at UR

Environmental mainstreaming will have two components. One component deals with research training activities and the other involves campus development activities. Environment mainstreamed within the research arena will involve a commitment to evaluating the impacts of research and development activities carried out within UR to ensure that negative or harmful impacts are avoided or mitigated. Each research project will pass through an evaluation process to ensure negative environmental impacts are reduced. Secondly, the University of Rwanda' s 10-year outlook plan for research capacity building and postgraduate education envisions the renovation of existing infrastructure, development of additional infrastructure and facilities, expansion of operations, and increase of human and technical resources across various campuses. These activities can have significant environmental costs including increased resource use (water, energy) and production of waste, emissions, pollution, etc. These are systemic issues that require an integrated approach encompassing analytical and participatory approaches to address related cumulative and spatial environmental impacts.

Some environmental costs can be addressed and reduced through planning and design processes, and opportunities can be sought to maximize both direct and indirect benefits. The University of Rwanda is committed to integrate environmental considerations into strategic plans and activities for the protection and enhancement of the natural environment, enhanced resource efficiency, pollution prevention, and a transition to a low carbon development. This will ensure that environmental management systems are underpinned by University management practices through a comprehensive approach that encompasses the development of environmental plans, campus community involvement, and the presence of control processes that optimize social, economic and environmental benefits. There is therefore a need to develop specific initiatives and measures that strengthen the capacity of UR to orient technical knowledge and managerial skills among staff and students in the mainstreaming of environmental sustainability across the various campuses. Potential benefits include the development of tools, resources and capacity to inform, educate, influence and improve planning decisions in various sectors outside University settings.

Areas of intervention include:

- Establish an environmental assessment template for research projects and a committee to manage this process
- Establish 'environmental champions' among UR staff and students to head up and support the coordination of activities
- Assess the extent to which environmental management is mainstreamed in the University and areas where attention is needed; this may include the presence of environmental plans, the extent of community involvement and the presence of control processes
- Review of operations that affect the environment and determination of measures to minimize negative and promote positive environmental impacts
- Analyze carbon footprint at campuses and development of low carbon initiatives
- Analyze energy and water consumption, and energy and water use efficiency
- Integrate biodiversity enhancement actions in the built environment
- Establish acceptable practices for handling, collection and disposal of waste to ensure environmental protection, and landfill diversion strategies
- Develop digital tools and resources to inform and educate about the environment and sustainability for disseminating life changing research solutions to sustainability challenges
- Establish environmental performance targets embedded in UR Schools and Departments
- Financial support for student-staff collaborations in the development and implementation of projects aimed at enhancing campus environmental sustainability
- Develop skills and capacity among students through environmental clubs, student-staff collaborations, and other platforms (e.g. employing students to carry out environmental audits, environmental campaigns) to embed sustainability across the UR campuses as well as externally

Mainstreaming environment at University campuses may involve various degrees of intervention adapting to the local conditions, needs and context. Priorities might also be set depending on the sensitivity of campus landscapes and the surrounding communities and land uses.

Annex 12. Current UR External Partners and Experience with Fund Mobilisation

1. Partner Country and Total Funding in USD

Country/Mult-Agency	Construction*	Construction & Development**	Development***	Research****	Research & capacity building	Grand Total (USD)	Number of projects/ programs	Type
African Development Bank		18,911,606				18,911,606	1	Loan
Belgium			1,257,644			1,257,644	1	Grant
Canada				522,241		522,241	3	Grant
Germany		11,749,100	3,608,024	68,102		15,425,226	4	Grant
Korea	46,832,180					46,832,180	1	Loan
The Netherlands				763,296	715,882	1,479,178	2	Grant
Sweden			50,000,000		998,111	50,998,111	4	Grant
UN			101,515			101,515	2	Grant
USA			784,612	2,947,864	1,222,918	4,955,394	10	Grant
World Bank			20,000,000			20,000,000	4	Loan
Grand Total	**46,832,180**	**30,660,706**	**75,751,795**	**4,301,503**	**2,936,911**	**160,483,096**	**32**	

* Construction: Building

**Construction & development: Beyond the building it include short-term capacity building of staff and some external

*** Development: Programs that train PhD, Masters and also support aspects of Institutional Advancement: Library, Labs, ICT, UR Management

****Research: A research project without any capacity building

2. Partner Country and total funding in USD

ID	Country/Organization of funder	PROJECT NAME	COLLEGE INVOLVED	Converted USD	Start Date	End Date
1	African Development Bank	CoE Biomedical Engineering and E-Health (CEBE)	CMHS	18,911,606	2015	2019
2	Belgium	ARES Project	CAVM, CST, CMHS	1,257,644	2014	2016
3	Canada	Grand Challenges Canada (GCC) Implementation Research on Hypertension in Low and Middle Income Countries: Utilizing HIV/AIDS Infrastructure as a get way to chronic care of Hypertension in Africa	CMHS	423,205	2012	2017
4	Canada	Professional Social Work in East Africa - Towards Sustainable Impact (PROSOWO II)	CASS	28,965	2010	2018
5	Canada	Synthezing Indigenous and International Social Work Theory and Practice in Rwanda	CASS	70,071	2013	2017
6	Germany	EAC Regional Centre of Excellence for Vaccines, Immunization and Health Supply Chain Management (RCE-HSCM)	CMHS	3,392,322	2014	2016
7	Germany	EAC Regional Centre of Excellence for Vaccines, Immunization and Health Supply Chain Management (RCE-HSCM)	CMHS	11,749,100	2014	2019
8	Germany	ESRI Project	CST	215,703	2014	2016
9	Germany	GlobE-Wetlands	CST	68,102	2015	2018
10	Korea	Infrastructure Development Project	HQ	46,832,180	2014	2019
11	The Netherlands	EKN Nutrition program	CMHS	715,882	2014	2016
12	The Netherlands	NICHE/RWA/164	CAVM	763,296	2013	2016
13	Sweden	East Africa Universities Mathematical Program (EUMP)	CST	57,457	2016	2016
14	Sweden	Rwanda Astrophysics, Space and Climate Science Research group (RASCSRG)"	CST	180,000	2014	2017
15	Sweden	FOJO Media Institute/School of Journalism and Communication	CASS	760,654	2015	2019
16	Sweden	UR-Sweden Programme for Research, Higher Education and Institutional Advancement	ALL	50,000,000	2013	2018
17	UN	Center of Excellence in Biodiversity and Natural Resources Management (CoEB)	CST	15,000	2014	2018
18	UN	EAC Regional Centre of Excellence for Vaccines and Immunization	CMHS	86,515	2016	2017
19	USA	Assessment of postharvest constraints and testing of interventions in horticulture value chains in Rwanda	CAVM	235,791	2016	2017

ID	Country/Organiza-tion of funder	PROJECT NAME	COLLEGE INVOLVED	Converted USD	Start Date	End Date
20	USA	Building an Integrated Model for Pediatric Diabetes Care in Under-Resourced Countries	CMHS	120,362	2016	2017
21	USA	CoE for Health System Strengthening (CoE HSS)	CMHS	784,612	2010	2016
22	USA	Evaluating The Performance Impact and Costs of a large Scale e HEALTH Systems	CMHS	968,211	2013	2017
23	USA	Feed the Future African Greatlakes Region Coffee Support Program (AGLC)	CAVM	196,700	2016	2018
24	USA	Harvard Sub recipient project	CMHS	58,300	2016	2017
25	USA	National Oral Health Survey of Rwanda	CMHS	60,600	2016	2017
26	USA	PEAL I: Dairy development initiative	CAVM	254,707	2015	2018
27	USA	Preterm Birth Initiative East Africa-PTBi	CMHS	1,915,499	2015	2019
28	USA	Simplifying hepatitis C antiviral therapy in Rwanda and elsewhere in the developing world (SHARED)	CMHS	360,612	2016	2018
29	World Bank	ACE for Innovative Teaching and Learning Mathematics and Science	CE	4,500,000	2016	2021
30	World Bank	ACE in Data Sciences	CBE	4,500,000	2016	2021
31	World Bank	ACE in Energy For Sustainable Development	CST	5,500,000	2016	2021
32	World Bank	ACE in Internet Of Things	CST	5,500,000	2016	2021
Total				**160,483,096**		

Annex 13. Budget Notes

The budget has been developed based on the historical cost, a full cost recovery has not been applied reason why a 3% of the total budget is proposed as overhead.

This note serve to clarify the distribution of PhD Students numbers, Research grants and Masters programs' support, other areas are explained in the main text (e.g infrastructure fund made of ICT, Library and facility support) or at separate annexes (eg. Gender mainstreaming, environmental mainstreaming)

1. Overall the biggest investment (more than 43%) of the proposed concept not aims at having a critical mass of well-trained researchers who can take the UR research agenda to the next level. Such endeavour will be achieved mainly through PhD training and Postdoc Training for early career researchers.
   a. *PhD training for Continuing students*: Currently there are 61 students enrolled on PhD studies under the cooperation of University of Rwanda and the Swedish International Development Agency and from July 2018, 39 would not have completed the PhD studies, the UR shall mobilise fund to get them supported till the completion of their studies. The PhD students will graduate progressively, the support will range from 6 months to a year and out of the 39 to be supported at the beginning of FY 2018-2019, 20 will graduate by the end of the year, 12 will graduate by 2019-2020, 6 by 2020-2021 and the last will graduate in 2021-2022. Their cost is estimated according to the current PhD training cost within the Sida research bilateral program (for supervision in Sweden is estimated at 250,000 SEK approx. 29,000 $ per student).

A. Training in the UR PhD Program: UR intends to train a good number of people in Rwanda not only it will be relatively cheap (half of the training cost abroad) but also to encourage research uptake in Rwanda. Over five year UR will enrol about 241 within the UR Program, 51 in the first year, in the second year 100 will be enrolled while in year 3 (2020-2021), 90 PhD students will be enrolled

B. *New PhD training in Sandwich model*: while the UR in-house training sound attractive, the UR still need to train a relatively smaller number abroad who can be able to complete their PhD by 2023, for this category 97 student are planned to start their PhD in sandwich model at partner universities straight in 2018.

C. *The Postdoctoral grants: After PhD graduation UR need to put mechanism through which the early career researchers could continue to do research however this is not always easy given heavy teaching demands (due to a shortage of well qualified lectures) and administration, to balance* UR has settled to offering sandwich postdoctoral grants, a model, which was successfully tested at the centre of conflict management, and where the post doc are expected to get a research time off (eg 3 months each year for 2 years) to be at host university. The deliverables out of the postdoc grants are at least two publications that usually are connected to previous PhD studies. 20 Projects last for two years will be given to early career researchers in 2018-2019 and in the following year 25 grants will be given.

Overall it is expected that at least each PhD graduate would have produced two scientific paper published or submitted for publication, while the sandwich postdoc is expected to produce two scientific paper published or submitted for publication but also 1 policy brief or a popular science paper which can be used by the practioners in the field. Apart the training and formal degrees, UR expects that more than 500 publications can be produced out of PhD training and postdoc grants.

2. Research Fund: The UR recognises that there are researchers at UR at different levels, and if in the future UR aims at becoming a research led university, it is important that also those who are already qualified can keep doing research.
   a. UR plans to have a research grant scheme where 3 projects per each cluster will be given to the most competitive peers review research proposals each year. Innovative projects with potential to produce an innovation product will be encouraged. The project will last two years with maximum total cost of 17,000 USD and shall involve at least 4 researchers, one compulsorily being a woman. With 10 clusters and 3 projects per cluster over 4 years, 120 interdisciplinary projects will be undertaken. It is assumed that at least 240 publications will come out and given the

interdisciplinary nature of these projects, Each cluster shall produce 1 policy brief or another type of documentation which can inform practioners and community in a particular area.

b. The UR Plan clearly states the intention for innovation, and plan to launch 12 innovative projects (1 per cluster and 2 that may be cross cutting) which will be run jointly by people from UR (Academia), Public (Government and Community) and the private sector. These projects might be a continuation of innovative research undertaken at UR or they can be innovative ideas worth exploring in a triple helix model. The current innovation pilot projects that will run at UR from April 2017 to June 2018 will give insights and learning on the best way possible to organise this process. Each project will cost 30,000 $

   However, the UR recognises that not all projects will mature to the level of being undertaken as a joint initiative between academia/public and private immediately and rather may be facilitated to reach that level. On the other hand the innovative ideas do not come from researchers alone, they can come from students (masters and undergraduate as well). A small fund for 19,000$ each year will be established with the purpose of identifying, encouraging, nurture (little facilitation and mentorship) innovation ideas within the university community before potential larger mobilisation could be done.

3. Support to Masters Training: The whole concept note is premised on the fact that UR need to support the development of Rwanda by providing highly skilled personel in all areas of Rwanda development. UR chose to do it at undergraduate and at postgraduate level. At postgraduate level UR intends to run more than 85 programs. In some areas, there is capacity in Rwanda, in other areas there are limited capacity which require the external support at least to secure few lecturers for key courses. Out of that number UR intends to mobilise additional fund to run masters with acute skills gap in Rwanda (e.g. all sort of engineering-agricultural, transport, railways, aviation, mechanical among others, clinical microbiology, and so on), These masters will be supported to attract lecturers from abroad and the cost is estimated at 40,000 USD per year and per master's program. Related to that skills gap and for long term capacity building of UR, UR would establish a scholarship scheme for top best students to enrol in such programs, at graduation the students will serve as pool for PhD recruitment and also placement in key agencies. The scholarship shall cover a 10-month (each year) stipend and tuition fee. Based on the recently won World Bank Projects for African centres of excellence 300$ will be provided as stipend. Initially 12 masters will be supported, 10 students in each master will be given a scholarship afterwards 35 masters programs (including new ones that would have been developed be supported. In total UR would give 1170 scholarship to masters' students.
   All together

Below is the distribution of the numbers around the above scenarios

Distribution of PhD Training at UR and in Sandwich Mode

Items	July 18 - June 19	July 19- June 20	July 20- June 21	July 21- June 22	July 22- June 23	Total
PhD training Continuing Students	39	19	7	1	-	
New PhD student Cohort 1 (sandwich)	97	97	97	97	97	
New PhD student Cohort 1 (In-house prog)	51	51	51	51	51	
New PhD student Cohort 2 (In-house prog)		100.00	100.00	100.00	100.00	
New PhD student Cohort 3 (In-house prog)			90	90	90	
TOTAL NUMBER OF PhD Students	187	267	345	339	338	
Planned Graduation from Continuing PhD training	**20**	**12**	**6**	**1**		39
Planned Graduation from New PhD training-sandwich	0	0	0	0	97	97
Planned Graduation from New PhD training-In-house					51	51
TOTAL Graduation of PhD students						**187**
Minimum Publication expected-(2 per students)						**374**

Postdoc grants

Items	July 18 - June 19	July 19- June 20	July 20- June 21	July 21- June 22	July 22- June 23	Total
Sandwich Postdoc grants position- Cohort 1	20	20				
Sandwich Postdoc grants position- Cohort 2		25	25			
Sandwich Postdoc grants position- Cohort 3			25	25		
Sandwich Postdoc grants position- Cohort 4				25.00	25.00	
TOTAL	**20**	**45**	**50**	**50**	**25**	
Total Expected grant (minimum2 paper per grant)		40	50	50	50	**190**

Distribution of research Grants

Items	July 18 - June 19	July 19- June 20	July 20- June 21	July 21- June 22	July 22- June 23	Total
Research grants 3per subprogram over 10 Clusters-cohort 1	30	30				
Research grants 3per subprogram over 10 Clusters-cohort 2		30	30			
Research grants 3per subprogram over 10 Clusters-cohort 3			30	30		
Research grants 3per subprogram over 10 Clusters-cohort 4				30	30	
TOTAL	**30**	**60**	**60**	**60**	**30**	
Total Expected Policy Brief (minimum 1 per cluster)		**10**	**10**	**10**	**10**	**40**
Total Expected grant (minimum2 paper per grant)		60	60	60	60	**240**

Distribution of Joint project (Academia-Public-Private)

Items	July 18 - June 19	July 19- June 20	July 20- June 21	July 21- June 22	July 22- June 23	Total
Joint project (Academia-Public-Private)-Cohort 1	3	3				
Joint project (Academia-Public-Private)-Cohort 2		3	3			
Joint project (Academia-Public-Private)-Cohort 3			3	3		
Joint project (Academia-Public-Private)-Cohort 3				3	3	
TOTAL	**3**	**6**	**6**	**6**	**3**	
Total Expected Policy (minimum 1 per cluster)		**10**	**10**	**10**	**10**	**40**
Total Expected grant (minimum2 paper per grant)		6	6	6	6	**24**

Support to Master's program

Items	July 18 - June 19	July 19- June 20	July 20- June 21	July 21- June 22	July 22- June 23	Total
Cumulative number of masters to be supported	12	35	35	35	35	
Masters Students Scholarship (10 per each Masters)-Cohort1	120	350				
Masters Students Scholarship (10 per each Masters)-Cohort2		350	350			
Masters Students Scholarship (10 per each Masters)-Cohort3			350	350		
Masters Students Scholarship (10 per each Masters)-Cohort4				350	350	
TOTAL Student supported per year	**120**	**700**	**700**	**700**	**350**	

Annex 14. Achievements and Lessons from the previous Sida support to UR

This section summarizes achievements of research cooperation of Rwanda with Sweden as reflected in the second phase of the Swedish bilateral cooperation with National University of Rwanda (NUR) from January 2007 to 2013 and the third phase with University of Rwanda (UR) from 2013-2018. The 2013-2018 agreement debuted with the merging in 2014 of seven public higher learning institutions including the NUR to form the UR. The cooperation has aimed at building a sustainable research capacity and the University institutional development.

The support of Swedish International Development Cooperation Agency to NUR was centred on Research training programmes that focused on Applied Mathematics, Education, Environment, ICT Research, Medicine and Health, Peace and Conflict Studies and the training of female staff to PhD; on Research infrastructure programmes which covered the University Library and the University ICT infrastructure and research management cluster which was comprised of the central Directorate for Planning and Development (DPD), the Directorate of Research, Management Information Systems (MIS) and the Central NUR administration.

With the merger of Rwanda public institutions of higher learning in 2014, the support expanded and was divided into three clusters:

- Research Training Program cluster which comprises sub-programs of Agriculture, Applied Mathematics and Statistics, Geographical Information Systems and Remote Sensing, Economics and Management, E-Government, Medicine and Health Sciences, Law, Peace Conflict and Development studies, Environment, ICT research and Female training
- Research Infrastructure cluster which comprises of cross-cutting programs that include ICT infrastructure, Innovation, Instructional Technology and Library
- Research Management cluster which includes the Research Fund, PhD training, and support for operations of Programme Coordination office, Coordination of Research and Post-graduate Studies, PhD training, Management Information Systems (MIS) and Institutional Advancement

With the expansion of the programme, the number of partner Swedish universities also increased from 5 to 12. These are Blekinge Institute of Technology (BTH), Karolinska institutet, Linköping University, Uppsala University, Swedish University of Agricultural Sciences (SLU), Lund University, Umeå University, KTH Royal Institute of Technology, Jönköping University, Stockholm University, Örebro University and University of Borås. The Swedish Universities collaborate with the University of Rwanda through the three clusters with the implementing six colleges of the University: College of Arts and Social Sciences (CASS), College of Agriculture, College of Animal Sciences and Veterinary Medicine (CAVM), College of Business and Economics (CBE), College of Education (CE), College of Medicine and Health Sciences (CMHS), and College of Science and Technology (CST). The sub-programmes are spread across all Colleges of the UR and in some cases in multiple campuses of the University.

1. Results from the 2007-2013 and the 2013-2018 bilateral agreements

This section summarises achievements of the two agreement periods in terms of building capacity in research, developing a conducive environment for research and support to the institutional advancement. It is noteworthy to highlight that stronger engagement of Sida through the appointment of a permanent member of staff in charge of the programme management at the Sweden Embassy has strengthened monitoring of the programme and allowed a more transparent, consistent and substantial strategic orientation of the programme with regard to the set objectives.

1.1 Capacity building in research

In the past 10 years, there has been a gradually increased level of research funding at NUR and later at UR. The largest support in this category is for PhD training in Swedish partner Universities in the various programmes described in the Research training cluster. Since 2011, the programme has been strengthened with improved procedures to align research topics with the national development agenda and national research priorities in order to address problems of development in various fields. Swedish Universities and NUR and later UR have jointly recruited the PhD candidates and these are supervised by

both Swedish supervisors and qualified Rwandan supervisors. Monitoring of progress has been strengthened with time with proper reporting structures. From 2010 to date, the programme has successfully produced 40 PhD graduates out of 98 enrolled students since 2007 including six candidates in non Swedish Universities. Many graduates are still University of Rwanda academic staff and a few have been appointed in government managerial positions.

In particular, the programme has advocated for increased enrollment of female academic staff on PhD studies, which was previously very low. Sida funding has considerably increased the enrollment of qualified female academic staff through its specific scheme of bringing children and sponsoring their stipends while on PhD studies. To date, 32% of women graduated since 2010, a tremendous contribution to UR.

The current UR research capacity in various academic domains is low due to the fact that higher learning institutions in Rwanda have been mainly teaching-led institutions. UR's aim to be a research led-institution has been strengthened by Sida support in various areas: the development of 9 new PhD programmes and 12 new Master's programmes to be offered at UR; trainings in postgraduate supervision and grant proposal writing; trainings in research methodologies and scientific paper writing; 108 research grants and 41 post doc awards; mentorship for post doc fellows; international conference attendance and preparation of in-house conferences; regular research seminars and public lectures; research exhibitions and roadshows, and support for scientific paper publications.

In 2009, the Government of Rwanda introduced a policy where education has to be conducted exclusively in English. This presented a challenge for the academic staff the majority of whom were French speaking. Sida therefore supported English language trainings for 53 qualified academic staff that could not write or speak English, to enable them to successfully conduct their teaching and research work in English as per the government policy. The trainings have contributed towards an increased load of scientific outputs including public talks and publications in English among the trainees.

Overall, 276 peer reviewed international publications came out of Sida programme support since 2007. Three books of research were published by Springer out of the Economics and Management conference at UR with 24 papers out of 51 from UR staff. Although there was not a systematic plan in the Sida programme for research uptake and the appropriate strategies for feeding research findings into development policy and practice, several exciting initiatives have resulted from the programme. The Sida programme funded a series of trainings on research uptake and research communication at the University to fill this gap. Research results in the areas of Environment, Medicine, Health, Peace, Conflict and Development studies, GIS and Law have informed and shaped policies and programmes and have been adopted into practice in Rwanda. A series of debates on topical issues and interface with stakeholders have been initiated for Law, Peace and Conflict Studies based on the research outcomes.

1.2 Development of a conducive environment for research

Sida funds supported the development and implementation of key research infrastructure including facilities and equipment according to sub-program needs, and some cross cutting projects have been funded by the Sida programme. Key facilities are the ICT research and teaching labs, which include the advanced mobile and wireless simulation communication system; the advanced microprocessor and micro-controller and the Open source software development laboratory; the Rainfall attenuation research laboratory and Space weather research laboratory jointly built with the support from Trieste, Italy and Boston College, USA. Due to these developments, the Economic Community of the Great Lakes Countries (ECGLC, in French CEPGL) selected the Master's in ICT at former NUR to host the CEPGL's Centre of Excellence in ICT.

The Sida programme support for research equipment and facilities for PhD students conducting fieldwork has been an important investment with cascading impacts for UR research support - other researchers including staff and students working on similar long-term projects have benefited from these investments. In the Environment sub-program, examples include the instrumentation and infrastructure for monitoring of abiotic (climate) and biotic (photosynthesis, plant growth) variables such as five large

weather stations mounted in Nyungwe National Park and in Huye and their accessories. In the Medicine sub-program, a modern ultrasound machine was acquired for studies in foetus growth. An audio-visual lab in Educational research was also established to facilitate the production of audio-visual/multimedia-based eLearning materials. For other sub-programs, important investments were done to establish computer labs with relevant software and related accessories for research and teaching in the Sida supported post-graduate programmes.

The Sida programme has also made significant investment to the central functional capacity of the university. The sub-programme of ICT infrastructure has been instrumental to respond to the needs of expanding the reach, reliability and quality of access to broadband Internet over the whole University. For example, since 2007 significant investment has been put on the rollout of a University wireless hotspot. Access to the wired network has also expanded to reach every office in the Huye campus (former National University of Rwanda). However, with the formation of UR in 2013, the need to provide the University community with instant connectivity, faster downloads, secured data and dependable access from anywhere has become even greater. The support also extended to training of IT technicians to facilitate researchers and ensuring quality in running of Master's programmes.

The Sida support helped to build the capacity of librarians to provide timely quality information services to researchers and students in their field of expertise. The programme funded Master's and doctoral students in Library and Information Science to build capacity in Library resources management to strengthen research at the University. Library users including students and academic staff were also trained in the use of resources. The university library has also benefited from the Sida support in terms of subscription to the scholarly e-resources and therefore offering to the University community access to thousands of highly scholarly e-journals and e-books from very well-known publishers such as Oxford University Press, Cambridge University Press, Springer-Verlag, Sage, Wiley, and Emerald. By making international knowledge accessible to the University community, the Sida programme has significantly impacted the quality and quantity of research outputs. The number of volume added to the library collection has continued to increase since 2007. Most of these books are reference books and textbooks covering different disciplines taught at UR. Hence, subscription to electronic resourses and the expansion of the volume of library collection hold a significant share of Sida investment to the Library subprogramme.

1.3 Institutional Advancement for Research

Sida funds have supported the development of various key structures, strategic plans, policies and frameworks that effectively enable the development of research at the University and the enhancement of research outputs. The University developed an academic workload framework that ensures an allocated time for research. The policy sets out research performance accountability for research managers and academic staff, which also serve as a basis for academic promotion. Policies have also been developed to guarantee quality higher degree provisions. These include regulations and frameworks for both PhD and Master's programmes by research and by coursework. An in depth policy on gender at UR was also developed.

An important output in this category includes the development of the UR strategic plan, which was supported by Sida. In this category, SIDA support has also focused on strengthening research management at the University. Two PhD students in in Research uptake and Accounting in Research Management respectively are being supported in this regard. Trainings on grant management have also been conducted for research officers and managers at the University. Support for the coordination of research activities at the University has also enabled the development of relevant tools for research management and skills development of research managers and officers.
Another important investment regards the Integrated Management of the University through Management Information Systems (MIS) supporting the entire UR system. This tool holds all relevant organizational institutional data that are necessary to inform the planning, management and decision-making in the University. These data include taught modules, academic data, and research activities by staff to mention a few. Trainings are being conducted for staff users for effective usage of the tool. Sida

is also supporting the development of an ICT master plan to allow a more effective, strategic and oriented ICT infrastructure at UR.

2. Results analysis

The research culture at UR has taken root and is evolving with time due to the support in various areas especially Library, ICT infrastructure, development of various policies, provision of research grants and post docs, research dissemination such as research exhibitions and roadshows, international conference attendance and support to in-house conferences and seminars. There has been an increased number of staff engaged in research activities due to the Sida programme. Indicators of staff performance such as research outputs and staff promotion based on the number of published papers have also increased staff engagement in research. An increased number of PhD holders, development of skills and installation of equipment and infrastructure in certain disciplines has meant that research fields that will certainly address complex national problems and respond to Rwanda's development needs have been established.

Although the transition into the new UR setting has slowed some systems, the creation of research groups including more that are of an interdisciplinary nature has been progressive and will be strengthened by an increased number of researchers in different fields. Appropriate frameworks for formal research partnerships at the University with the government, industrial and other private entities are being put in place and will ensure substantial innovative research and growth. The joint development of post-graduate programs and their implementation by UR and Swedish Universities and co-supervision of PhD students have built capacity for UR academic staff and facilitated networks that have resulted in the development of new research projects especially through post doctoral fellowships.

3. Main challenges and lessons learnt

The growth of the University in terms of policies, structures, development frameworks and strategic plans has shown that research culture is a process and is improved gradually based on challenges and the search for appropriate solutions. In the future, UR will improve on the design and processes of how research funds are granted which will be more thematically specific to solving specific problems. There has not been a strong research network and collaboration between Swedish and UR researchers beyond PhD students and their supervisors and Post doc fellowships in the past 10 years. Despite this observation, there is a strong willingness of some partners brought about by the Sida research cooperation to extend partnerships even beyond the Sida cooperation. It has been observed that interface workshops with stakeholders can stimulate strong partnerships. For example, in Law subprogram, interface workshops have engaged collaboration through courses and internships and discussions on collaborative research projects are ongoing. In the future, emphasis will be put on improving mechanisms and processes for collaborative research partnerships to strengthen research areas, capacity and expertise at UR.

Much effort has gone into ensuring as smooth transition as possible of the various merged institutions into the new University setting. Developments in Library and ICT infrastructure in former NUR were halted or were slowed down so as to enable upgrading and harmonisation of the resources accessible to the whole UR research community. Lack of strategic plans for ICT development at the University has also slowed down the implementation of some key infrastructure. A capacity development plan for the University also needs to be put in place. This will allow preparedness of the institution at all levels of implementation. Improved planning at different units in the University is of paramount importance.

Development of in-house PhD programmes was initiated without established guidelines for taught PhD programmes. Continuous alignment of the programmes with UR guidelines is on-going. The Master's programmes have also been gradually developing and are running not without some challenges. Enrollment of competent students from undergraduate programmes has been challenging due to high tuition fees, lack of scholarship schemes and no part-time payment options. Scholarship schemes and module credit-based payments are being worked upon. Long procurement processes have also delayed planned activities especially in ICT, Library and have affected planned research activities in Agriculture and Medicine especially in the acquisition of laboratory equipment. However, stronger engagement with all concerned parties has emphasized that the whole procurement value chain needs to be analyzed, and while some improvements have been observed, challenges remain.

The concept note proposed here builds on the previous achievements of the Sida programme at UR. In particular, the Sida programme investments in research capacity among staff including PhD training and staff training has strengthened the research abilities at UR and the production of high quality research. The proposed concept note includes 10 research clusters that derive from Rwanda's national strategic plans and policies, as well as SDGs, and will help UR to further expand on the production of research to contribute to sustainable national development in a cohesive manner. The proposal includes an ambitious plan to significantly increase the number of PhD holders, as well as a critical mass of skilled individuals graduating from UR to contribute to Rwanda's transformation. This ambitious plan clearly builds on the previous Sida programme.

The issues of gender, environmental consciousness, and home grown solutions have been explicitly mainstreamed in the proposed concept in order to expand on the initiatives made at UR to date with Sida support. This includes acting on the gender policy recently developed at UR, and taking innovation to the next step through the home-grown approach. Mainstreaming environmental consciousness will enable UR to become a leader in campus sustainability following on the country's initiatives such as the banning of plastic bags.

Annex 15. UR Guiding documents (as links)

Academic Regulations & Policies

1. Revised UR General Academic Regulations for Undergraduate Program.pdf
2. ODL Academic Regulations
3. UR Framework and Regulations for Research Degrees
4. UR Revised Policy and Procedures on Academic Staff Appointments and Promotions.
5. UR Guidelines for Recruitment and Management of Tutorial Assistant
6. UR Guidelines for the Award of the Honorary Doctoral Degrees
7. UR Policy and Procedures for Honorary Appointments

Key documents and policies

1. Revised UR General Academic Regulations for Undergraduate Program.pdf
2. ODL Academic Regulations_Approved by the Senate meeting of 28th October 2014
3. UR Framework and Regulations for Research Degrees__Approved by the Senate meeting of 28th October 2014
4. Ministerial Instructions N°01/19.23 Of 01/08/2014 On Placement Of Public Servants After 2014 Restructuring Of Public Service
5. UR Workload Framework Approved By Senate 09/June/2014
6. Terms Of Reference For UR Research And PGS Committee
7. University of Rwanda Research Documents and Forms
8. Revised Policy and Procedures on Academic Staff Appointments and Promotions.
9. UR Guidelines for Recruitment and Management of Tutorial Assistant
10. UR Guidelines for the Award of the Honorary Doctoral Degrees
11. UR Policy and Procedures for Honorary Appointments
12. UR-consolidated Revised Procurement plan 2014-2015
13. Open_Access_Policy_and_Procedures.pdf

Research

1. UR Research Policy http://www.research.ur.ac.rw/?q=node/50
2. Ethics Guidelines&Procedures
3. Procedures for Research Clearance by UR Research Associates_Final
4. Template for Doctoral Degree Thesis
5. Format for Masters Thesis
6. PhD_Procedures_Summary
7. RDAER_Registration_extension
8. RDARG_Application_for_Registration
9. RDASR_Suspension of Registration
10. RDATR_Registration_transfer
11. RDCRM_Change_in_registration_mode
12. RDCST_Change_Supervisors
13. RDEXA_Application_Examination_Arrangement
14. RDNOW_withdrawal
15. RDPFC_prima_facie_case
16. RDPRS_Student_Progress_Report
17. RDRER_Re-examination_Report
18. RDSAQ_KeySkills_Questionnaire
19. RDTEX_Preliminary-Examination_Report
20. RDTSD_Thesis_submission
21. RETHC_Research_Ethical_Approval
22. Summary of procedures for PhD Education matters
23. Supervisor Code of Conduct
24. Supervisor TOR

Template for Data Collection on Publications

- Template for Short CV
- TOR University of Rwanda Research and Postgraduate Studies Committee-UR
- TOR UR Research Screening & Ethics Clearance Committee

Annex 16. Risks and mitigation

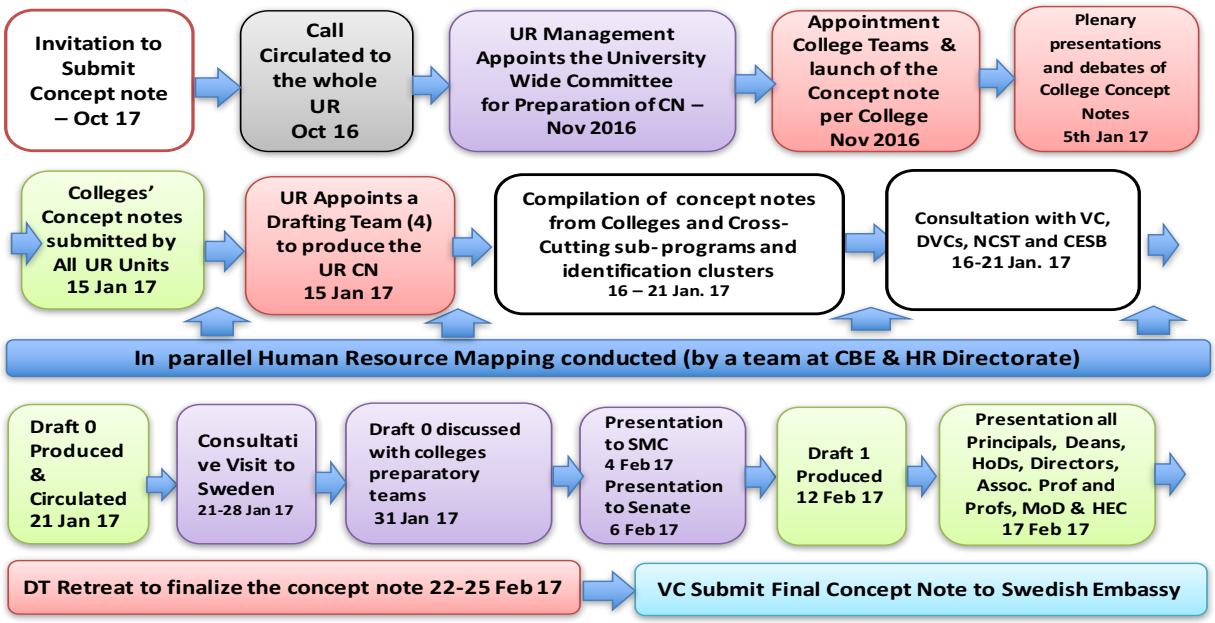
Output 5 years	Long term Outcomes 10 years	Performance indicators	Risks	Risk Mitigation
Objective 1: To strengthen the capacity of UR to conduct postgraduate research training at Masters and PhD level				
• 112 continuing PhD candidates complete their studies and 63 Master's candidates • 338 new PhD students are enrolled in PhD studies, 246 enrolled in UR programs • 95 sandwich postdoc grants • 51 current Masters programs running • 35 new Masters programs running • Total of at least 6,450 Masters students enrolled • Mentorship scheme established • 200 staff trained as effective PhD supervisors • 8,600 postgraduate students enrolled • 1,170 scholarships provided	• Increased number of qualified staff and graduates with high quality knowledge and skills in different fields • Enhanced supervision capacity of PhD research • Recent PhD graduates remain engaged in research • Gender equality in postgraduate training is achieved	# Awarded PhDs # MSc graduates # Employed graduates and sectors of employment and Share of MSc graduates that continue to PhD studies # Publications derived from MSc and PhD theses and # Publications after PhD graduation # Females in postgraduate training #Academic staff involved in supervision of PhD # New programs approved and accredited by HEC	• Unavailability of qualified candidates • Unavailabilty of scholarships • Low completion of PhD studies • Lack of PhD qualified supervisors	• Set up scholarship schemes for program with critical high skills gap • Establish flexible and credit based studies • Close monitoring and support for PhD candidates • Stronger partnerships with regional universities for supervision • Improve undergraduate and PhD training
Objective 2: To increase the quantity and quality of relevant research for poverty reduction and social economic development				
• 120 Research grants involving at least 480 UR staff are funded at least half of them are • At least 1156 manuscripts are published in high impact journals • All research centres are running effectively • At least three prospective research centres are established and staffed	• Research produced by UR is increasingly recognized internationally • Research done in Rwanda contributes not only to academic fields but provides solutions to development challenges Peer-reviewed publications annually have increased • More females are involved in research conducted and all projects are gender sensitive • Improved visibility of UR • More internationally funded research projects	# publications accepted in peer-reviewed high impact journals # citations of publications # national debates emanating from research completed at UR # of research results integrated into national policies and strategies # females involved in research UR ranking # World and Africa ranking of University # Successfully funded multi-institutional grants	• Insufficient quality research projects aligned to the UR research clusters • Inadequate research grants to support res • Poor research out put	• Rigorous review of research proposals • Provision of robust statistical support • Mentoring for writing skills • Release time for manuscript preparation
Objective 3: To establish administrative and academic structures and systems, as well as infrastructure to support innovation and promote a vibrant research and training environment				
• Training program for student services unit established • Access to current and past research projects	• Enhanced productivity of research teams • Optimal sharing of information	Feedback from research teams # hours allocated to research by academic staff benchmarked to	• Low motivation of staff • Slow procurement	• Recruit and train staff • Negotiate with

Output 5 years	Long term Outcomes 10 years	Performance indicators	Risks	Risk Mitigation
• At least printing and publication facility is established and running • Science and engineering laboratories well equipped • Libraries on all UR campuses supporting high standards befitting the calibre of PhD training & research • High Speed Internet is accessed at all UR locations • E-learning systems are rolled out and used across UR • All modules available on the common learning platform	that supports research activities • Increased funding for research • Improved quality of teaching and learning, and assessment environments • Market-oriented curricula and innovative on line learning and assessment • Enhanced student-focused approach with emphasis on acquisition of research skills	Academic Workload Framework Annual income generated Student evaluations of modules Feedback from employers of UR graduates Share of UR budget allocated to research # libraries upgraded # and use of e-learning systems # campuses with increased speed and bandwidth # laboratories equipped	process • Competition with external organizations for key support staff especially ICT	government for a unique procurement system that supports research better • Attractive retention/incentive packages for well trained staff • Regular training to avoid reliance on one individual
Objective 4: To support and develop research management capacity				
• Well-functioning research environment – training for 20 lab managers, 25 grant managers, 40 lab technicians, 7 procurement officers, 14 finance administrators, 14 executive assistants and advisors, 7 research communication officers, quality assurance department • PhD recruitment and research grant approval process includes stakeholders for orienting research questions to community needs	• Enhanced efficiency in the conduct and administration of research activities at UR: enhanced grant management; financial management, budget & planning, internal audit & compliance process improved • Enhanced use of resources: equipment & facilities	# lab managers, grant managers, lab technicians, and support staff trained # research labs functioning with active research projects Feedback from researchers Frequency of equipment usage # stakeholders involved in PhD recruitment process	• Low motivation of staff • Low qualification of staff • Limited understanding of academic research culture • Inhibiting procurement processes	• Engage in dialogue between administrative staff and researchers • Recruit and train staff • Regular training to avoid reliance on one individual • Incentive packages for good management
Objective 5: To strengthen the capacity for scientific communication and the communication of research results for evidence-based policies relevant to sustainable national development plans				
• Annual University-wide conference with research and science communication week attracting 240 papers • At least 235 UR staff attend international conference • Regular scientific seminars and public lectures organized • A research communication and strategy is developed and implemented • Popular Science Communication seminar series developed	• Increased research collaborations at local, national, regional and international levels • Increased participation in conferences and symposia • Increased visibility, uptake and recognition of research in policy circles	# research conferences # people attending research conference # staff attending international conferences # and attendance of scientific seminars and public lectures # commentaries and reactions on research from UR	• Research does not respond to national priorities • Limited involvement of stakeholders ot partners in research design • Low interest by stakeholders • Poorly developed research culture	• Dialogues with partners • Training staff in research communica-tion skills • Strong marketing staff skills

Output 5 years	Long term Outcomes 10 years	Performance indicators	Risks	Risk Mitigation
Objective 6: To strengthen the capacity of UR to contribute to innovation systems and deepen the collaboration of UR research community with public and private sectors in utilizing innovative research results				
• Interdisciplinary research teams for each cluster established • At least 25 manuscripts on Rwanda home grown innovation are submitted for publication • 12 joint Triple Helix projects are initiated (see Innovation and knowledge transfer below) • An incubation fund for bright ideas at UR is initiated • 20 patents, product licenses or copyrights	• Increased joint projects with industries and local communities • Increased research on home grown innovations • Increased # patents or innovation products	Number and composition of interdisciplinary research teams # manuscripts prepared # joint projects prepared #of patent or innovation product registered Amount of funds dispersed from incubation funds	• Limited availability of information & data • Low interest in partnering • Slow procurement processes • Slow patent process •	• Dialogues with partners • Rigorous mentoring at all stages of project development and completion • Train admin staff to support innovation process

Annex 17. Concept Note Development Process

1. Process



The College writing teams were made of researchers and current team leaders who reported to College Principals. The concept note development has been an enabling time for all colleges, not only because of its participatory approach but also the fact that it has been an opportunity for Colleges and central units to reflect on their 10 years goals and perspectives beyond Sida support.

2. Teams chairing the development of the concept note

	Name	Position
Overall Coordination		
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