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# INITIATIVE TO BUILD CAPACITY IN RESEARCH AND POSTGRADUATE TRAINING

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**Silas Lwakabamba<sup>1</sup>**

National University of Rwanda, Rwanda

**Abstract:** African leaders recognise that development of the continent depends on higher education and research. To that effect, the Africa Union (AU) and New Economic Partnership for Africa Development (NEPAD) have recommended that 1% of GDP by each African state should be spent on Research and Experimental Development (R&D) in order to support peace, stability, better governance and economic growth. However, higher education provision in Africa is mainly for undergraduate students. Postgraduate provision, research and knowledge transfer remain largely under. In the case of Rwanda, Higher Education Policy is very clear that development of the higher education institutions forms the foundation for applying scientific and technology for development. Already in 2010 Rwanda higher education institutions have nearly 1,200 teaching staff with Masters degrees needing PhD training urgently. Training abroad is very costly and just a few can be trained over a long period and contributes to brain drain. Also the enrolment expansion at undergraduate level is imminent requiring massive increases in lecturers with PhD and Masters level qualifications. The National University of Rwanda plans to set-up large scale PhD programs in 6 disciplines and 3 multidisciplinary themes. The aim is to train in an intensified, diversified and streamlined fashion, future lecturers and researchers who would contribute to filling the skills gaps in Rwanda HE Sector and R&D Institutions. By 2023, it is envisaged that 4,300 Masters, 1,500 PhD and 300 Post Doctoral students will be enrolled at NUR. It is planned that PhD student supervision will be done jointly between NUR staff and the most experienced staff from the external universities. PhD and Post-doctoral students, local and external supervisors will write joint publications over 60% focusing on solving Rwanda development problems. It is recommended that the government should invest in PhD training and Research from public expenditure and Rwanda Private sector.

**Keywords:** *Research and Postgraduate Training in Rwanda, National University of Rwanda Future Research Capacity Building, Research Capacity Building Initiative in Rwanda*

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<sup>1</sup>Prof. Silas Lwakabamba, Rector, National University of Rwanda, University Avenue, B.P 56 Butare, Fax: +250 (0) 252 530 121/210, E-mail: rector@nur.ac.rw, Rwanda

## INTRODUCTION

Higher Education and Research are not a luxury as many African Countries are made to believe. They are a productive power, pivotal to the overall social economic development of a country. For example, Rwanda believes the successful implementation of its development policies is dependent on the HE Sector playing its role of human capital development and providing research and innovation to support the realisation of knowledge transfer process, (Government of Rwanda (GoR), 2008).

The Africa Union and New Economic Partnership for Africa Development (EU-NEPAD) have recommended that 1% of GDP by each African state should be spent on Research and Experimental Development (R&D) in order to support peace, stability, better governance and economic growth, (AU-NEPAD, 2010). This is recognition that Africa problems can be solved through strengthening the Higher Education Sector and R&D.

However, higher education provision in Africa is mainly for undergraduate students. Post-graduate provision, research and knowledge transfer remain largely

under developed for most of Sub Saharan Africa (SSA) countries. When it comes to knowledge, research and higher education in Africa, the picture that emerges at all levels from local, regional and Africa-wide is threatening, (AU-NEPAD, 2010).

## AFRICA MUST EXPAND AND DIVERSIFY PHD TRAINING AND RESEARCH

### State of PHD Training and Research in Africa

Although the long-term development goals of many African nations enshrined in their Visions which were developed in 2000 and their poverty reduction and economic growth strategies which embrace the millennium development goals stipulate the aspiration to move to middle income states based on knowledge based economies, African universities have not build capacities to educate new PhD holders rather the tendency remains that of sending people to get PhD training from developed countries (GoR, 2000; GoR, 2007a). The lack of capacity to train PhDs in-house raises deep concerns about the continent's ability to produce new generations of academics and educators. For example, while preparing for

establishment of the African Doctoral Academy at Stellenbosch University in South Africa, it was established in 2009, that during the period 2000 - 2004, Africa produced only 1.8 % of the world's publications while India produced 2.4 % and Latin America 3.5 %. Also, it was established that South Africa and Egypt account for just above 50% of the continent's publications while the top 8 countries in Africa produce above 80% of the continent's research. Similarly for innovation, Africa produced less than 1,000 of world's inventions with 88% produced by South Africa alone, (African Globelics Doctoral Academy (AGDA), 2010).

The following has contributed to this state of affairs, (AGDA, 2010): (i) Weak investment from national governments to promote continental knowledge infrastructure; (ii) Weak mobility of knowledge, research, researchers, curriculum and innovation horizontally; (iii) Brain drain to the Northern hemisphere. Brain migration is a real problem given the lack of brain circulation within the continent; (iv) Migration of good quality staff and researchers to the private sector also drains human capital away from education and research (v) Obstacles

and lack of incentives to stimulate inter-African knowledge communication; (vi) Poor or no representation in national development plans and bilateral donor support; (vii) Continuing 'competition' with universal primary education for popularity and extremely limited resources, (viii) Low reproduction rates. Increasing age profile of top researches with retirement of senior and experienced staff combined with decreasing candidates for replacement, (ix) National and regional needs for graduates far outweighing current higher education institutional capacity; (x) Poor levels of quality research and publications; (xi) Poor communications and transport infrastructure; (xii) Cross-border regulatory obstacles to regional collaboration; and (xiii) high dependence on international donors for the foreseeable future.

Although African governments now show the desire to promote research, higher education and knowledge across Africa, still African higher education institutions are befaced with a lack of concentration of talent, resources, acute governance crises and acute shortage of academic staff holding PhDs, ((AGDA, 2010). AU member states committed to

invest the 1% GDP of their countries to R&D by 2009, (AU-NEPAD, 2010). Few governments in the Sub-Saharan region have indeed honoured the commitment. South Africa, Uganda and Malawi have surpassed it on time, Tanzania has released the budget in 2009/ 2010 fiscal year, (AU-NEPAD, 2010; European and Developing Countries Clinical Trials Partnership (EDCTP) website, 2009). It should be noted that postgraduate training especially at PhD level is closely linked to R&D, (Organisation for Economic Co-operation and Development (OECD), 2002).

### **Rwanda Must invest in PHD Training and Research**

Rwanda higher education is challenged by low access rate where the average age participation rate for Rwanda is below 1% while the average for East Africa Community is 4%, for SSA is 5 - 7 % and that of the world is above 10%, (GoR, 2008). Also Rwanda is challenged by having few staff with advanced academic qualification and research experience and brain drain of a significant number of those who get training abroad. The Rwanda context is quite clear. Rwanda has no choice but to invest in high

level skills development not only at undergraduate level but also at Postgraduate level including PhD training (GoR, 2006; GoR, 2007b; GoR, 2008; NUR, 2010).

Based on the National Skills Audit report of 2009, the critical gap (required skills) in higher education institutions was estimated at 31 percent of required capacity. The shortfall of science lecturers was the most acute, at 44% of requirement, which in turn represents just fewer than 60% of the total deficit in the subsector. Also, the 2009 Skills Audit established that in Rwanda higher education personnel with PhD constitute 25%; only 35.6% have masters' degrees. Among the remaining, those who have only one degree are 25.7% and 12% possess other qualifications, (GoR, 2009). With these shortages, the higher education institutions in Rwanda are unlikely to meet the Vision 2020 without introducing extra measures. The current ratio of graduates to population, proportion of student population among cohort on training in higher education institutions and the number of lecturers and researchers in the higher education are far too low to support the aspirations for a capable state envisioned to be built by 2020.

There is a fast growing number of higher education institutions both public and private, established to assist in bridging the national skills gaps. The National University of Rwanda (NUR) is the oldest; it established in November 1963. Others have been established as follows: 1980 - 1989 (2), 1990 - 1999 (7), 2000 - 2005 (4), and 2006 - 2010 (15), (NUR, 2010b). The institutions, however, operate under difficult conditions with regards to infrastructure and equipment as well as qualified academic staff. They mostly have low qualified academic staff although they all experience the increasing number of students' population, (NUR, 2010b).

For example in 2010, the Rwanda Higher Education Council (HEC) recorded 29 Higher Education Institutions of which 26 are accredited. Of these 17 are public and 12 private. Among them, 15 are newly established in 2006 - 2010. Together they have 2,414 Lecturers. Only 377 (16%) of the lecturers have a PhD while 1,159 lecturers have a masters degree (NUR, 2010b). Africa (IUCEA) prescribes the ideal standard of the proportion of lecturers with PhD to be 60%, while 50% is good, clearly the 16% is

way below the good standard, (NUR, 2010a). The institutions have a total of 62,546 students. The average staff student ratio when counting only staff with masters or above is 1:41 which falls under "unacceptable" IUCEA standard. The ideal is 1:20, (NUR, 2010a). The PhD holder's student ratio is 1:160.

The Rwanda Higher Education Policy is very clear that development of the higher education institutions forms the foundation for applying scientific and technology for development. As stated in the policy, "... Higher education institutions must provide high quality teaching and research services and produce competent and skilled professionals - researchers in R&D institutions, engineers, agricultural specialists, managers, entrepreneurs, medical doctors, accountants, teachers and many others who will drive the nation to development taking the chosen path of a knowledge based and technology led economy..." , (GoR, 2008). Teaching and learning in higher education should not be isolated from research. However, research cannot be done without researchers, and researchers cannot be there without PhD training.

Already in 2010 Rwanda higher education institutions have nearly

1,200 teaching staff with Masters degrees needing PhD training urgently. Training abroad is very costly and just a few can be trained over a long period and contributes to brain drain, (GoR, 2008; Ministry of Education (MINEDUC)). Also the enrolment expansion at undergraduate level is imminent requiring massive increases in lecturers with PhD and Masters level qualifications.

### **The Nur Initiative**

NUR plans to set-up large scale PhD programs in 6 disciplines and 3 multidisciplinary themes. The aim is to train in an intensified, diversified and streamlined fashion, future lecturers and researchers who would contribute to filling the skills gaps in Rwanda HE Sector and R&D Institutions. By 2023, it is envisaged that 4,300 Masters, 1,500 PhD and 300 Post Doctoral students will be enrolled at NUR. It is planned that PhD student supervision will be done jointly between NUR staff and the most experienced staff from the external universities. PhD and Post-doctoral students, local and external supervisors will write joint publications over 60% focusing on solving Rwanda development problems, (NUR, 2010b).

This needs heavy investment for quality, efficiency and effectiveness of the planned training. As we build our own capacity initially we will need to hire experienced academic staff for lecturing and supervising PhD students using the block teaching mode and the PhD students will visit their main supervisors abroad for 4 to 6 months a year. To build teaching and supervision capacity of NUR staff, recent PhD holders will be mentored in teaching the modules and supervising theses. Each PhD research will involve one or several masters' and other staff in carrying out the research project and this will need availability of money for research grants. The existing infrastructure will need strengthening so as to cater for PhD training. This includes strengthening the Library and building capacity of Librarians, strengthening laboratories and building capacity of Laboratory Technicians and establishing centres for research equipment maintenance, (NUR, 2010b).

### **CONCLUSION & POLICY RECOMMENDATIONS**

NUR is approaching various external partners to support financially these initiatives. However, experience from others especially

Ethiopia shows that the government needs to invest in such an ambitious programme. Ethiopia is investing 20% of its budget to Addis Ababa University for training PhDs for the country's over 30 higher education institutions. The Private Sector should contribute a given percentage levy for postgraduate training and research. This should not be optional, it is the private sector which is now taking the cream of our graduates to work and produce for them. Also the private sector should commit to offer scholarships; a dedicated number of scholarships per year should be planned and made available to the coordinating ministry or directly to higher education/ R&D institutions. The private sector in Africa have a tendency to outsource external researchers to do carry out their research both sophisticated and routine investigations or surveys. A policy is needed which binds them to use local researchers and where the expertise does not exist to involve local researchers for capacity building. Finally the private sector should set up research departments which should cooperate with higher education and R&D institutions in terms of personnel, equipment and other resources.

Africa governments are able to actually get the 1% GDP for

PhD training and research from the public funds and collections from the private sector. Since this commitment has already been agreed by AU member states, what is needed is a mechanism to monitor the progress on the commitment and reward those who are on good track. Also there is need to put in place policy obliging each institution to innovatively stimulate and promote research by investing a prescribed percentage of all the institutional earnings to research, innovation and knowledge transfer by staff. This can boost the research activeness of the institution and would also be an attractor for staff retention and thereby curbing the brain drain. The funds would be used for example to support a researcher/ inventor based on the number of publications/ patents/ copy rights for research products such as software, crop varieties etc and the number of PhDs supervised to completion. The money would be used for travelling to attend conferences and research network meetings, research activities and paying for publications or other research products.

## **BIOGRAPHY**

**Professor Silas Lwakabamba** graduated in Engineering from

the University of Leeds in UK with BSc (1971), and in Mechanical Engineering with a PhD (1975). After graduating, he returned to Tanzania to join the staff of the Faculty of Engineering, which had just started at the University of Dar es Salaam from where he later attained the rank of professorship in 1981. He gained managerial experience along the way, becoming Head of Department, Associate Dean and eventually Dean of the Faculty of Engineering. In 1985, he joined the UN-sponsored African Regional Centre for Engineering Design and Manufacturing (ARCEDEM) based in Nigeria as a founding Director of Training and Extension Services. He became the founding Rector of Rwanda's Kigali Institute of Science and Technology (KIST) in 1997 and in 2006 was appointed the Rector of the National University of Rwanda, the largest public institution of higher learning in the country a position he still occupies to date. Professor Lwakabamba has been member of several boards and committees, National, Sub-regional and International. This included being a member of the Executive Board of UNESCO and Chairman of the Board of Directors of the African Virtual University (AVU)

and a member of various national commissions and steering committees on economic affairs, information and communication technology, human resource development and higher education. In 2008 he was named as the co-chair of the Advisory Board of the US Africa Higher Education Initiative and has been recently named the Chairman of the Governing Board of the Inter University Council of East Africa.

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