

Research Application Summary

**Center of Excellence in Phytochemicals, Textiles and Renewable Energy
(PTRE): Achieving Teaching and Research Excellence through
Internationalization of Academia**

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Abstract

Internationalization of quality higher education has been a major concern not only at universities in developed countries but also to universities in developing countries such as in Kenya. The main drive for internationalization is the need to have excellent academic programmes that are recognized and acceptable worldwide. Such programmes attract students from all over the world as well as academic staff. In order to realize this internationalization, it calls for partnerships among institutions of higher learning and the respective industry. Ever since its establishment in 1984, Moi University has continually prioritized internationalization. It has been training postgraduate students from various countries and recruits academic staff worldwide. Moi University has excelled in initiation of partnerships and collaboration through diverse approaches. The University subscribes to a number of academic forums including the VLIR Institutional Universities Cooperation Programme and Regional Universities Forum for Capacity Building in Agriculture (RUFORUM). Moi also participate in the development of strategic academic models that yield ideal international institutional networks like the Academic Model for Providing Access To Healthcare (AMPATH). The university is also keen at instituting Memoranda of Understanding with international universities and industrial partners. It is through these strengths that the university managed to submit a competitive proposal that won The World Bank Group funding as one of the 24 centers of Excellence in Eastern and Southern Africa and among the only three in Kenya. The Moi University African Center of Excellence in Phytochemicals Textiles and Renewable Energy (PTRE) will further propel internationalization through attracting more staff and students regionally and internationally. In this cause the Center shall collaborate with universities as well as private sector nationally, regionally and internationally. The Center shall achieve excellence derived from being the only university in the region offering PhD programs in Textile engineering that are anchored on ground breaking innovative research that has earned patents and awards worldwide; exploiting state of the-art-laboratories; residence and visiting professors in addition to short term exchange programmes. Adoption of ICT for facilitating continued intellectual interaction shall be embraced. Among the expected outcomes of the Center of Excellence is the developing and review of curricula to be accredited internationally. The university shall train postgraduates that are highly skilled and knowledgeable, ultimately

generating an experienced workforce capable of introducing novel manufacturing technologies and energy alternatives. The partners will benefit from each other's strengths in terms of competent academic staff, internships, well equipped laboratories, experience and benchmarking, among others. In the long run the region will have enhanced capacity in various disciplines that will contribute a lot in terms of sustainable development hence realization of Kenya's Vision 2030 and Africa Agenda 2063.

Key words: African Centre of Excellence, internationalization, Moi University, partnerships

Résumé

Internationalisation de l'enseignement supérieur de qualité a été une préoccupation majeure non seulement dans les universités des pays développés, mais aussi pour les universités des pays en développement comme au Kenya. Le principal moteur de l'internationalisation est la nécessité d'avoir d'excellents programmes universitaires qui sont reconnus et acceptables dans le monde entier. Ces programmes attirent des étudiants de partout dans le monde, ainsi que le personnel académique. La réalisation de cette internationalisation appelle à des partenariats entre les établissements d'enseignement supérieur et l'industrie concernée. Depuis sa création en 1984, l'Université Moi a toujours priorisé l'internationalisation. Elle a formé les étudiants de troisième cycle de divers pays et recruté du personnel académique de par le monde entier. L'Université Moi a excellé dans l'initiation de partenariats et des collaborations par diverses approches. L'Université souscrit à un certain nombre de fora universitaires, y compris le programme VLIR pour coopération institutionnelle des universités et le Forum des universités régionales pour le renforcement des capacités en agriculture (RUFORUM). L'Université Moi participe également à l'élaboration de modèles académiques stratégiques qui produisent des réseaux institutionnels internationaux idéaux tels que le Modèle académique pour donner accès à des soins de santé (AMPATH). L'université est également désireuse d'instituer des protocoles d'entente avec des universités internationales et des partenaires industriels. C'est grâce à ces atouts que l'université a réussi à présenter une proposition compétitive qui a gagné le financement du Groupe de la Banque mondiale en tant que l'un des 24 centres d'excellence en Afrique orientale et australe et parmi les seulement trois se trouvent au Kenya. Le Centre universitaire Moi africain d'excellence en Phytochimie, les textiles et les énergies renouvelables (PTRE) va encore propulser l'internationalisation en attirant davantage de personnel et des étudiants régionaux et internationaux. Dans cette cause le Centre collaborera avec des universités ainsi que le secteur privé au niveau national, régional et international. Le Centre atteindra l'excellence tirée du fait d'être la seule université dans la région offrant les programmes de doctorat en ingénierie du textile qui sont ancrés dans la recherche originale innovatrice qui lui a valu des brevets et des récompenses dans le monde entier; en utilisant des laboratoires ayant des technologies dernière génération; la résidence, et les professeurs visiteurs, en plus des programmes d'échange à court terme. L'utilisation des TICs pour faciliter l'interaction intellectuelle continue devra être adoptée. Parmi les résultats attendus du Centre d'excellence figure le développement et la révision des programmes d'études pour être accrédités au niveau international. L'université formera des diplômés qui sont hautement qualifiés et compétents, en fin de compte générer une main-d'œuvre expérimentée capable d'introduire

de nouvelles technologies de fabrication et les énergies alternatives. Les partenaires bénéficieront des atouts de tout un chacun en termes de personnel académique compétent, des stages, des laboratoires bien équipés, l'expérience et la standardisation des programmes, entre autres. A long terme, la région aura une capacité accrue dans diverses disciplines qui contribuera beaucoup en termes de développement durable d'où la réalisation de la Vision 2030 du Kenya et l'Agenda 2063 de l'Afrique.

Mots clés: Centre africain d'excellence, l'internationalisation, l'Université Moi, les partenariats

Background

The development of new technologies and innovations are crucial to a country's economic growth. This is usually an indicator of a country's improvement of the overall standards of living for its people. To accomplish this, universities must play a major role in providing quality postgraduate education and carrying out appropriate research geared towards generating new knowledge and disseminating through publications, extension and outreach programs. As such internationalization of quality higher education has been a matter of concern not only at universities in developed countries but also to universities in developing countries such as in Kenya. The main drive for internationalization is the need to have excellent academic programmes that are recognized and acceptable worldwide. Such programmes attract students from all over the world as well as academic staff. In order to realize this internationalization, it calls for partnerships among institutions of higher learning and the respective industry.

Partnerships are key in identifying technology needs, gaps in innovation, capacity building, facilitating development, transfer and dissemination of relevant technologies (Addis Ababa Action Agenda, 2015). Partnerships enhance academic mobility which fosters sharing of expertise, technology, financial resources while complementing efforts. In addition, partnerships promote transparency, accountability, and responsiveness with the goal of improving quality of services (Kenya Vision, 2030). Moi University undertakes technically oriented research both in basic and applied disciplines with an aim to maintain strong relations with communities, implementing national development objectives to strengthen research and teaching while seeking solutions to community challenges. Ever since its establishment in 1984, Moi University has continually prioritized internationalization. This has enabled improvement of its research capacity and establishment of more linkages with local and international institutions. In its efforts to continually produce high-level human resource for sustainable development of society, the strategic plan of the university has taken into consideration pertinent global, national and international policy frameworks. This is done to ensure University programmes contributes to achievement of the Sustainable Development Goals, the National Poverty Eradication Plan, and the Kenya Vision 2030, among other policy frameworks that put emphasis on the need for partnerships.

Motivation for Establishing PTRE at Moi University

The manufacturing sector contributes just 10% of Kenyan Gross Domestic Product (Kenya Vision, 2030). However, the sector is expected to play a critical role in the economic growth of the country, where, an annual growth rate of 10% is envisaged under Kenya Vision 2030 for wealth and employment creation. To make Kenya a dynamic industrial nation by the year 2030, adoption of the state-of-the-art technology that is both efficient and environmentally friendly is extremely important. This achievement would require increased postgraduate training in the area of Science, Technology, Engineering and Mathematics (STEM) to potentiate manufacture of skill-intensive products of high value and quality. The lack of professionals in textiles, phytochemicals, renewable energy and related manufacturing fields is revealed in data from the Kenya National Bureau of Statistics (KNBS) on university enrolment of 2007 – 2013. Moreover accelerated manufacturing activities is identified under the African Union Agenda 2063 (Africa Union Commission, 2015) as the key contributor to value addition of the African manufactured goods. The revitalization of the local textile industry is one of the key strategies of the Government of Kenya for achieving Vision 2030. The vision asserts that indigenous technology in Kenya is unmapped, thus exposing national heritage to misuse by external interest groups. There is, therefore, a need to build capacity to undertake research and develop products from these resources. These scenario is not unique to Kenya but throughout Eastern and Southern Africa countries where there is very low capacity, include students under training in the STEM fields. The African Cotton and Textile Industries Federation (ACTIF) in their policy research on the Kenyan textile industry noted that despite cotton being a strategic crop in Kenya key challenges in its optimization revolve around its processing energy sources, unqualified labour force and out dated technology (Rungruangkitkrai and Mongkholrattanasit, 2012). Additionally, the enrolment trend into energy related courses has seen a downward trend over the years hence there is a chronic inadequacy of professionals to support the textile industry. The Centre of Excellency in Textile, Phytochemicals and Renewable Energy (PTRE) establishment is therefore long overdue at this point in time. The motive for its creation is the cultivation of professionals who shall be adequately trained and empowered to increase the generation and utilization of research and development in the sector.

Objective of PTRE

The main objective of PTRE is to achieve learning and research excellence in the areas Phytochemicals, Textile and Renewable Energy through: Strengthening education capacity excellence – quality and productivity in phytochemicals, textile and renewable energy; strengthening education capacity and development impact in phytochemicals, textile and renewable energy; strengthening research capacity excellence – quality and productivity in phytochemicals, textile and renewable energy; and strengthening education and research capacity and demonstration of value to students and partners in areas of phytochemicals, textile and renewable energy.

Moi University partnerships methods. Moi University has prioritized subscription to academic forums to maintain active membership thereby instituting strong partnerships for research activities. Currently the ongoing projects in which the university is actively involved include:

- (i) The VLIR Institutional Universities Cooperation Programme. This is a Flemish Institutional University Cooperation with Moi University partnership whose objective is focused on review / development of academic programmes to deliver graduates in chosen areas and to develop human and infrastructure capacity for effective training, research and extension services
- (ii) The Regional Universities Forum for Capacity Building in Agriculture (RUFORUM). As an active member, the university is involved in various academic exchanges, graduate training and research. Moi University offers training in specialized fields including Textile Engineering for the wider RUFORUM Network. In addition Moi University works jointly with other RUFORUM Universities to advocate for agricultural higher education and university transformation for relevance
- (iii) Development of strategic academic models that yield ideal international institutional networks like the Academic Model for Providing Access To Healthcare (AMPATH). AMPATH is a partnership between Moi University, Moi Teaching and Referral Hospital and a consortium of North American academic health centers led by Indiana University working in partnership with the Government of Kenya to address issues of capacity building for professionals in the health sector and promoting community access to health services through collaborative actions within the network of international institutions
- (iv) The university is also keen at instituting Memoranda of Understanding with international universities and industrial partners. Recently Moi University has instituted the establishment of the PAMOJA PHC (Hubert Curie Partnership), a bilateral scientific cooperation agreement signed in 2015 between Kenya and France governments opening the doors of 400 French research laboratories to Kenyan research institutions and researchers.

The Moi University Centre of Excellence

The Moi University Centre of Excellence involves four departments, namely Department of Manufacturing, Industrial and Textile Engineering, Department of Chemistry and Biochemistry, Department of Mathematics and Physics, and Department of Mechanical and Production Engineering. All the four departments are involved in crosscutting research topics and training of students in Masters and Doctoral degrees. To boost learning and research excellence, co-supervision of post-graduate students and cross-cutting research projects shall be encouraged while considering equity in admission of students based on gender and regional balance. The Centre will involve national partners, regional and international partners (Table 1). The partner institutions will play various roles in addressing the development challenge, jointly with and under the guidance of Moi University. This will be through provision of internships places, technology transfer, undertaking joint research and training, joint research supervision and staff/student exchange.

Table 1. National, regional and international partners working with PTRE

Partner name	Partner role
RIVATEX East Africa Limited (REAL)	Research and Internships in Textile Engineering
Kenya Industrial Research & Development Institute (KIRDI)	Joint research/ supervision and internships in Textiles and Analytical Chemistry
Kerio Valley Development Authority (KVDA)	Outreach activities
Toyota Tsusho East Africa	Internships and technology transfer
Stellenbosch University	Research supervision & Staff/student exchange programs in Renewable Energy and Industrial Engineering
National University of Science and Technology	Research supervision and training in Textile and Analytical Chemistry
University of Gezira	Research supervision & staff/student exchange in Textiles)
Makerere University	Research supervision & staff/student exchange in Renewable Energy
University of Botswana	Research supervision and training in Analytical Chemistry and Industrial Engineering
University of Addis Ababa	Research supervision and training in Analytical Chemistry
Busitema University	Research supervision & staff/student exchange in Textiles
University of Eldoret	Research supervision in Analytical Chemistry
Regional Universities Forum for Capacity Building in Agriculture (RUFORUM)	Regional and International student/staff linkages and outreach
Linkoping University Sweden	International technology partner who helps identify the latest sectorial developments in renewable energy
RotaGuidosrl, Italy	Internships and technology transfer in Renewable Energy
University of Lorraine, France	Research supervision in Analytical Chemistry
North India Textile Research Institute (NITRI)	International technology partner who helps identify the latest sectorial developments in textile
Elsevier	Science Direct: Research journals and publications
Capacity Building	Monitoring, evaluation and governance
Kenya Ministry of Energy and Petroleum	Industrial linkages

Expected Output / outcomes of PTRE

The Moi University Centre of Excellence is anticipated to have quite significant impact. Figure 1 gives a summary of key activities that will be undertaken during the project, their indicators ones undertaken and to which objective of the project they will help attain. This will finally ensure that the PTRE center will achieve learning excellence, research excellence, quality assurance, equity dimensions, attracting academic staff and students from the region, and ensure financial sustainability. In addition, a minimum number of 30, 60 and 300 students for the PhD, MSc, and Short Courses, respectively are expected to have been trained by end of the five years.

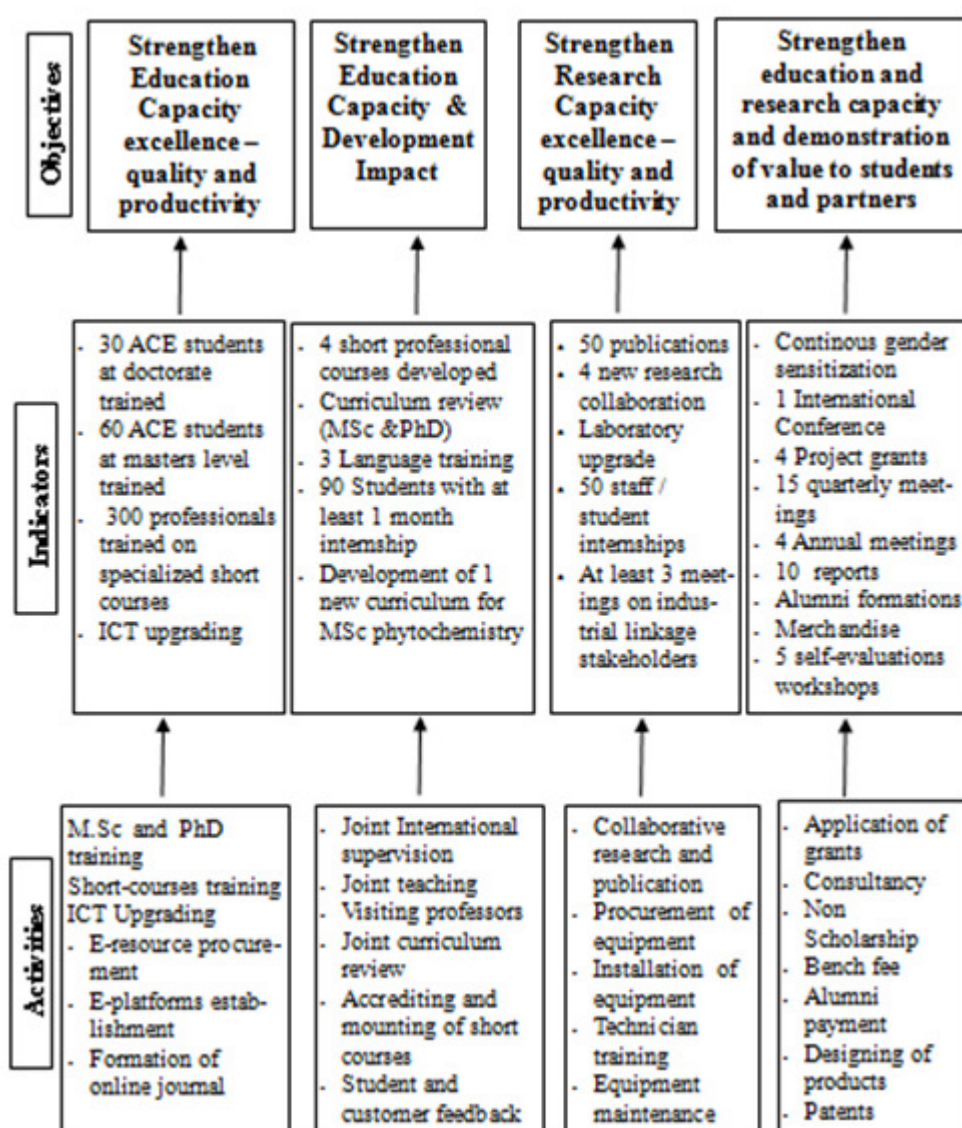


Figure 1. Link between activities to be undertaken at PTRE and outputs and objectives which they will contribute towards

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References

- African Union Commission. 2014. African Agenda 2063: The Africa We Want. The African Union Commission, Addis Ababa, Ethiopia
- Government of Kenya (GoK). 2007. Kenya Vision 2030: A Globally Competitive and Prosperous Kenya. Government of Kenya, Nairobi.
- Nattadon Rungruangkitkrai and Rattanaphol Mongkhorrattanasit. 2012. Eco-Friendly Textiles Dyeing and Printing with Natural Dyes. RMUTP International Conference: Textiles & Fashion held 3-4 July, 2012, Bangkok, Thailand.
- The Addis Ababa Action Agenda of the Third International Conference on Financing for Development (Addis Ababa Action Agenda), adopted by the General Assembly on 27 July 2015.