

## Creation of research linkages in Africa by regional bodies

Gitao, C.G.<sup>1</sup> & Akundabweni, L.S.M.<sup>2</sup>

<sup>1</sup> Faculty of Veterinary Medicine, University of Nairobi, P. O. Box 29053-00625, Kangemi, Kenya

<sup>2</sup> Faculty of Agriculture, University of Nairobi, P. O. Bo x 30197-00100 Nairobi, Kenya

**Corresponding author:** cggitao@gmail.com

### Abstract

Agriculture is the mainstay of most African countries and research in the sector is one of the key ways to make it more efficient and thus beneficial to the rural communities. Establishment of research linkages is key to enhancing efficiency. A case study of two research projects supported by the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) was undertaken to analyze the development of these linkages. The first case was for a research project based in Vihiga Kenya and Jinja in Uganda. The design of the project allowed the MSc students from the respective country to visit, use public transport, undertake research, learn and exchange views with communities in the alternate country. This enriched the experience for all stakeholders especially because the students were both male and female. Undoubtedly, there were higher costs due to travel but the experience achieved a network output that was beyond the initial expectation. The second case study involved an investigation of Peste des Petits Ruminants (PPR) a goat disease that has devastated East African countries. The research was carried out in both Tanzania and Kenya. Due to challenges of distance, remoteness and the fact that one of the two students was pursuing a PhD course, in addition to RUFORUM, leveraged funding and support was obtained from an NGO-Vetworks East Africa; training skills for participatory research were obtained from International Livestock Research Centre (ILRI); Veterinary Government officials were trained by funds from FAO and PCR tests were performed in the government Vet laboratory with assistance of IAEA. In Tanzania, Mtwara Vet labs assisted with the PCR diagnosis. In Tanzania, PPR vaccination was commenced by the Government due to the irrevocable proof by the student that PPR was the cause of deaths in goats. The two Principle Investigators (PIs) (Gitao and Karimuribo) later wrote another proposal to EAPP on dairy in East Africa which was funded. Research networks can therefore create synergy within the network and achieve more than expected. Research networks can grow and include other stakeholders which enhance sustainability and impact.

They can also achieve a life of their own and establish a knowledge network.

Key words: Linkages and networks, regional bodies, RUFORUM, Universities

## Résumé

L'agriculture est le support principal de la plupart des pays Africains et la recherche dans ce secteur est l'un des principaux moyens pour le rendre plus efficace et donc bénéfique pour les communautés rurales. L'établissement de liens de recherche est essentiel pour améliorer l'efficacité. Une étude de cas de deux projets de recherche soutenus par le Forum Régional des Universités pour le Renforcement des Capacités en Agriculture (RUFORUM) a été entreprise pour analyser l'évolution de ces liens. Le premier cas était un projet de recherche basé à Vihiga au Kenya et à Jinja en Ouganda. La conception du projet a permis aux étudiants de maîtrise de pays respectifs à visiter, utiliser les transports publics, entreprendre des recherches, apprendre et échanger des vues avec les communautés dans le pays alternativement. Ceci a enrichi l'expérience de toutes les parties prenantes en particulier parce que les étudiants étaient à la fois des hommes et des femmes. Il ya eu sans aucun doute de hauts coûts de voyage, mais l'expérience a réalisé une création du réseau qui fut au-delà des prévisions initiales. La seconde étude de cas concernait une enquête sur la peste des petits ruminants (PPR), une maladie de chèvre qui a sévi dans les pays d'Afrique Orientale. La recherche a été menée en Tanzanie et au Kenya. En raison de problèmes de distance, l'éloignement et le fait que l'un des deux étudiants suivait un cours de doctorat, en plus de RUFORUM, ont augmenté le ratio d'endettement sur le financement et le soutien a été obtenu auprès d'une ONG- Vetworks East Africa; les aptitudes de formation pour la recherche participative ont été obtenues à partir du Centre International de Recherche sur l'Elevage (ILRI); les fonctionnaires vétérinaires de l'Etat ont été formés par des fonds provenant de la FAO et les essais de la PCR ont été exécutés dans le laboratoire vétérinaire de l'Etat avec l'assistance de l'IAEA. En Tanzanie, les laboratoires vétérinaires de Mtwara ont aidé avec le diagnostic du PCR. En Tanzanie, la vaccination contre la PPR a été introduite par le gouvernement étant donné la preuve irrévocable de l'étudiant que la PPR était la cause de décès des chèvres. Les deux chercheurs principaux (Gitao et Karimuribo) ont écrit plus tard un autre projet de recherche à l'EAPP sur les produits laitiers en Afrique de l'Est, qui a été financé. Les réseaux de recherche peuvent donc créer

une synergie au sein du réseau et atteindre plus que prévu. Les réseaux de recherche peuvent se développer et inclure d'autres intervenants qui améliorent la durabilité et l'impact. Ils peuvent aussi mener une vie qui leur est propre et établir un réseau de connaissances.

Mots clés: Liens et réseaux, organismes régionaux, RUFORUM, Universités

## **Background**

The African vision as expressed by AU/NEPAD is that regional agricultural production needs to grow at an annual rate of 6% by 2015. This would be achieved, among others, through a dynamic agricultural markets among nations and between regions. This would enable the continent to be a net exporter of agricultural products; have food available, affordable, and equitable distribution of wealth; be a strategic player in agricultural science and technology (S&T) development and have a culture of sustainable use of natural resource base. Roughly one-third, 300 million hectares, of East and Central Africa's (ECA) total land area is devoted to agricultural uses. Agriculture is therefore the most common occupation in ECA, and agriculture is the key sector in national economies throughout the region. Overall, agriculture accounts for 43% of the regional Gross Domestic Product (GDP).

Research is one way of identifying innovative ways in production and marketing that can enhance the role of agriculture. The Regional Universities Forum for Capacity Building in Agriculture (RUFORUM), a consortium of 29 universities in Eastern, Central and Southern Africa, was established in 2004. The consortium originally operated as a programme of the Rockefeller Foundation from 1992. RUFORUM has a mandate to oversee graduate training and networks of specialization in the Common Market for Eastern and Southern Africa (COMESA) countries. Specifically, RUFORUM recognizes the important and largely unfulfilled role that universities play in contributing to the well-being of small-scale farmers and economic development of countries throughout the sub-Saharan Africa region. RUFORUM strongly believes in Innovative and Responsive Research, High Performing Proactive Graduates, A Dynamic Platform for University Networking, Advocacy for Agricultural Higher Education and University Transformation for Relevance.

## Literature Summary

One of the key ways to achieve greater output in agriculture that requires attention is the creation of linkages that link farmers to researchers and other stakeholders. The postindustrial era (Bell, 1973) and information age (de Sola Pool, 1990) that emerged in the late 20<sup>th</sup> century focused on knowledge and information as primary productive processes. Again, remarkable developments in computing and telecommunications have engendered new organizational forms. These new network organizational forms are likely to dominate organizational life well into the 21<sup>st</sup> century (Miles and Snow, 1995; Monge and Fulk, 1999). Network forms of organization are neither vertically organized hierarchies like their bureaucratic predecessors nor unorganized marketplaces governed by supply and demand (Powell, 1990). Rather, the network organizational framework is built on generalized network structures that link people and knowledge in all parts of the organization to each other, while simultaneously tying them to multiple external contacts (Contractor *et al.*, 2000). These new forms are knowledge intensive (Badaracco, 1991), agile, and constantly adapting as new knowledge links are added and dysfunctional ones are dropped. Thus, the hierarchical structure gives way as the evolving network form begins to define the organization. The structure of this networked organization is fluid, changing shape as relationships within the network play a lesser or more dominant role. As networks have transformed the private sector, the potential to transform how communities, including rural communities, interact with stakeholder groups is undeniable. The network form is an effective means of structuring community development and managing knowledge.

At the researcher level, the benefits of collaboration and networking can be seen to exist at two fundamental levels: in terms of inputs to the scientific process and the development of capacity and in form, quantity and/or quality of outputs, most notably in forms of new knowledge and methodology. In addition to these direct benefits there is an instrumental one, i.e., *behavioural and structural effects* which describes a change in behaviour from isolated single projects to cooperation and opening of interfaces to other projects and disciplines and thus, on aggregate, to a structural change in the science system. Output justification is also held to include what Katz and Martin (1997) refer to as the “usual outputs in terms of socially useful outcomes.”

The justification for networks are that when researchers are working together in a group, there are likely to be a broader range of skills present than may exist within a single individual, or a single research group. The presence of such extra talents leads to a certain critical mass assuring a higher probability that a scientific problem can be solved. Furthermore, working in groups is held to provide greater companionship and emotional support. A third benefit from collaborative work is that researchers learn from each other, not only at the level of disciplinary knowledge or knowledge from other disciplines, but in terms of methodology. Scientists working in groups are also more likely to acquire tacit knowledge (Polanyi, 1967; 1969). There is also strong evidence that the role of junior researchers is an important one in the transfer and distribution of tacit knowledge around the research system. A related area to the above is that of general personal learning which equips researchers with skills that might be useful beyond the project on which they are currently working and indeed beyond their academic career. These benefits can be anticipated or may arise to some degree accidentally. When these benefits are expected from the research collaboration, they can be defined as outputs.

Interdisciplinarity can be seen both as an input to research and as the output of collaboration and networking activity. Conceived as an input, inter-disciplinarity brings researchers together from a variety of fields in the expectation that to do so will make it easier to solve a problem, whether of an applied nature or at the pure basic level. Thought of as an output, inter-disciplinarity is the result of collaboration in the form of a new set of concepts, theories or discourses whose applicability may well extend beyond the problem they were generated to solve. It is also claimed that research collaborations and networks are more suitable mechanisms for the diffusion of scientific findings than smaller and single project working would allow. While there are strong arguments in favour of collaboration and networking, it should be noted that the difficulties of collaboration and networking are often significant. Certainly, there are costs involved in networking as a social activity (Wasserman and Faust, 1994), but it is not always appreciated in practice that the larger the network, the more nodes and any one node must remain connected with others to ensure that the whole network retains a certain level of connectedness (what is termed network density). At the level of the management of scientific work, the costs for collaboration networks can be higher for a number of

reasons. Firstly, collaboration may require increasing levels of travel and other forms of movement, perhaps of equipment or research results so that they can be shared across space. A further argument against collaboration and networking is that the management of such work necessarily involves the creation of bureaucracy to facilitate coordination.

## **Study Description**

The study is a subjective analysis through two case studies of how RUFORUM has contributed to the creation and establishment of sustainable research linkages amongst African Universities. The study analyses how such networks can be made sustainable and thus derive maximum benefits for the students, researchers, farmers and the region at large. The first case is that of Dr. Namutebi (Namutebi *et al.*, 2010) from Makerere University and Prof. Akundabweni from University of Nairobi who were awarded a grant to support the project on: Conserve and screen premium value indigenous plant biodiversity and products on women smallholder farming systems of East Africa. The RUFORUM study was a product of original work through Vices by both researchers. The two MSc students recruited were Joshua, a male student from Uganda based at Makerere University and Susan a female student from Kenya based at University of Nairobi. The study in Uganda was based in Njinja at Bundondo sub-county, Butiki, Kyekide Village. The Kenyan study was based at Vihiga in Kenya. Joshua Ssosi looked at antioxidants in both Kenya and Uganda while Susan Munialo investigated land use cropping bed in quality of vegetable in Jinja Uganda and Vihiga Kenya. The design of the project was such that although each student was undertaking a specific component, each would need to know what the other one was doing. One of the main outputs of this arrangement was a student supervisory link where each researcher became an official supervisor of the student from the other country. Each student had to travel and undertake research in the other country. The students used public transport and were therefore able to link with the “common man”. The students were thus exposed to alternate social and ethnic environments which enhanced and enriched their research. The students stayed together when they visited the respective University and their stay was approved officially as students irrespective of country/University. During field visits, the student farmer interaction was enhanced tremendously by the gender combination of the students, i.e., one was male and the other female. The student-farmer interaction across cultures was unique and enriching to both students and farmers. The project “offloaded” the logistics of

funds processing to both students who then became student managers and were well aware of the budget and limits. In many cases therefore, there was need to trim down costs to accommodate the student visits. The main challenge was that such complementally visits were not possible for co-supervisors.

The second case study was by Gitao *et al.* (2012). The Peste des Petits Ruminants (PPR) disease was suspected in 1992 but became a serious outbreak from 2006-2007 in all of East Africa and spread very quickly from Kenya and Uganda to Tanzania. As it was a new disease, there were no skills among veterinary staff and communities. The risk factors were unknown and there was poor disease description which led to confusion with other diseases for example CCPP. There were no laboratory models and no impact assessment had been done. Naive animals had high morbidity and mortality ranging from 80-50%. The situation was compounded by porous borders with no policy with regard to trans-boundary animal diseases (TADs). Traditional control efforts were generally in-effective. The study was set in Turkana which is a vast region characterised by insecurity, high poverty levels as well as regular flooding and drought. The region is far from Nairobi and require a full days travel. Pastoralism is the key livelihood. Women were the key participants as they manage small stock. Since Simon was undertaking PhD course, there was need to complement RUFORUM funding with funding from other agencies. FAO supported the training of veterinary officers who helped in participatory methods of data collection. ILRI assisted with a trainer on participatory data collection. Vetworks East Africa, an NGO assisted in logistical work. PCR technique was performed at the Veterinary Laboratory in Kabete with IAEA assistance. The samples from Turkana were experimentally re-infected in goats in the laboratory and this led to the genesis of another MSc study by Migwi on the development of a laboratory disease model. In Tanzania, Mtwara Investigation Laboratories assisted with the PCR test. The results by the student confirmed PPR in Southern Tanzania which convinced the Government of the need to vaccinate the goats in the whole region. The interaction between Kamuribo and Gitao (two Principle Investigators) led to the development of another proposal on dairy in East Africa to the East African Productivity Programme (EAPP) which was funded.

### Research Application

The two case studies illustrate how synergy can be inbuilt in the research project which increases the impact of the project

Table 1. Other examples of joint research among RUFORUM Universities.

No.	Grant Award No.	PI and University	Collaborator and University	Title of project
1.	RU 2009 GRG 08	Prof. Patrick Okori Makerere University	Prof. Samuel Gudu Moi University	Development of plant nutrient efficient use sorghum varieties to support livelihood strategies East African farmers
2.	RU 2009 GRG 06	Dr. Fetien Abay Mekelle University	Dr. Richard Edema Makerere University	Development of improved Scald tolerant Barley varieties with superior end-use (malt) northern Ethiopia
3.	RU 2010 GRG 18	Dr. Phillip Nyeko Makerere University	Dr. Linnet S. Gohole Moi University	Evaluation of <i>Metarhizium anisopliae</i> for integrated management of termites on maize and <i>Grevillea robusta</i> in Uganda and Kenya
4.	RU 2011 GRG 16	Dr. Rich Mulwa University of Nairobi	Dr. Johnny Mugisha Makerere University	Soil conservation practices as climate change adaptation strategies in semi-arid districts of Kenya and Uganda
5.	RU 2012 GRG 70	Dr. Marion W. Okot Gulu University	Donald Rugira Kugonza Makerere University	Enhancing local chicken Productivity through Strategic Breeding and Nutrition Management in Northern Uganda
6.	RU 2011 GRG 05	Prof. Majaliwa Mwanjalolo Makerere University	Prof. Baswira Sanvura Catholic University of Bukavu-DRC	Estimation of pollution loading into Lake Kivu basin
7.	RU 2012 GRG 82	Dr. Alice Amoding Makerere University	Prof. Jean Walangululu Catholic University of Bukavu-DRC	Improving water management in irrigated rice production for South-Kivu, DR Congo



as in the Namutebi case. The Gitao case indicates how research networks can incorporate other agencies which not only increases impact but also establishes sustainability as there are many stakeholders interested to see the success of the project. The networks can also attain a life of their own and lead to other byproducts like research proposals. The fact that Government initiated vaccination in Tanzania based on results by the student indicates how research can lead development initiatives.

There are other collaborative projects among universities in the region being supported by RUFORUM (Table 1). They serve to enhance regional networking and facilitating wide spill-over benefit of research and training outputs.

### Acknowledgement

Special thanks to RUFORUM for supporting this research project.

### References

- Badaracco, J.L. Jr. 1991 *the Knowledge link: How Firms Compete Through Strategic Alliances*. Boston, MA: Harvard University Press.
- Bell, D. 1973. *The coming of post-Industrial Society*. New York: Basic Books
- Contractor, N.K., Carley, R., Levitt, P.R., Monge, S., Wasserman, F., Bar, J., Fulk, A.B. Hollingshead. and Kunz, J. 2000. Co-evaluation of knowledge networks and 21<sup>st</sup> Century Organizational forms: Computational Modeling and Empirical Testing. Working Paper University of Illinois at Urbana-Champaign
- De sola Pool, I. 1990. *Technologies Without boundaries: On Telecommunications in a Global Age*. Cambridge. MA: Harvard University Press
- Gitao, C.G., Kihu, S.M., Bebora, L.C., Njenga, J.M., Wairire, G.G., Maingi, N., Muse, E.A., Karimuribo, E.D., Misinzo, G, Mellau, L.S.B., Msoffe, P.L.M., Swai, E.S. and Albano, M.O. 2012. Comparison of Peste des petits ruminants disease between Tanzania and Kenya. Third Biennial meeting 20-24<sup>th</sup> September, 2012 Entebbe, Uganda. *RUFORUM Working Document Series 7:523 -528*.
- Katz, J.S. and Martin, B. 1997. What is Research Collaboration. *Research Policy* 29:1-18
- Miles, R.E. and Snow, C.C. 1995. The new network firm: A spherical structure built on a human investment philosophy. *Organizational Dynamics* 23:5-18

*Gitao, C.G. & Akundabweni, L.S.M.*

- Monge, P.R. and Fulk, J. Communication Technology for global network organizations. pp. 71-100. In: DeSanctis, G. and Fulk, J. (Eds.). *Shaping organizational form: Communication Connection and Community*: Thousand Oaks CA Sage.
- Namutebi, A. and Akundabweni, L.S.M. 2010. Conserve and screen premium value indigenous plant biodiversity and products of women smallholder farming systems of East Africa, Second Biennial meeting 20-24<sup>th</sup> September Entebbe, Uganda. *RUFORUM Working Document Series* 5:185 - 188.
- Polanyi, M. 1967. *The Tacit Dimension*, London: Routledge.
- Polanyi, M. 1969. *Knowing and Being*, Chicago: Chicago University Press.
- Powell, W.W. 1990 Neither market nor hierarchy: Network forms of organization. pp. 295-336. In: Staw, B. (Ed.). *Research in organizational behavior Vol 1* Greenwich CT: JAI Press.
- Wasserman, S. and Faust, K. 1994 *Social network Analysis*, Chicago: Chicago University Press.