

Workshop on
**Sustainable Financing and Governance of
Regional Initiatives in Higher Education in Africa**

Case Study on the Regional Initiative in Science and Education (RISE)

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Executive summary

The primary objective of the Regional Initiative in Science and Education (RISE) is to strengthen higher education in sub-Saharan Africa by increasing the population of qualified academic staff teaching in universities in that region. Specifically, RISE supports preparation of PhD- and MSc-level scientists and engineers through a program of five research and training networks, each consisting of universities or institutes in at least three countries.

A linked objective of RISE is to build regional capacity in science, technology and innovation (STI), both by training students in the RISE network universities and by applying and extending network expertise more broadly in society. Potential channels for extending knowledge include technical, vocational and secondary institutions as well as the entrepreneurs and small businesses that drive economies. Diverse partnerships that harness the full power of STI are central to sustained development.

The use of networks is increasingly central to the practice of science and mathematics worldwide, helping to generate professional partnerships and advance interdisciplinary thinking. In the case of RISE, it further addresses the common challenge of insufficient knowledge resources in individual universities, caused by inadequate funding for graduate education, for academic salaries, and for scientific equipment. Such resource deficits have diminished the educational experience for the next generation of scientists and engineers throughout the region. Networks allow students and faculty alike to access resources beyond those available at single institutions, including skilled mentoring in multiple fields of study, research expertise, partnerships, and research equipment, and to offer specialized courses and workshops open to all students in the network.

RISE, funded by Carnegie Corporation of New York, completed its first three-year phase of operation in December 2010 and has entered its second phase. A recent program-wide evaluation, along with expert reviews and regular reports from each network, have helped identify some primary achievements and challenges.

To date, the network structure has facilitated progress on multiple fronts, including better access to mentoring and instrumentation, increased opportunities for interaction with peers and collaborative research, added leverage for fund raising, and creation of

multi-national research and training environments that are conducive to multidisciplinary problem solving. Challenges have included difficulty in coordinating financial management across different countries and currencies, the high cost of travel for face-to-face collaboration, uneven quality and effectiveness of email to enhance collaboration, language barriers in one network, and in some cases lack of research support upon returning to the home institution. The value, flexibility, and wide applicability of the regional network model are becoming increasingly apparent, as are issues that will need to be addressed to enable regional networks to achieve their full potential.

The program enters its second phase with four primary objectives: (1) to continue to address the challenges described above; (2) to develop additional sustained support from African governments, donor organizations, and the private sector; (3) to use this support to scale up existing networks and create additional networks in underserved countries; and (4) to form more international partnerships to help utilize the applications of STI in the private sector and throughout African societies.

Background

The design process for RISE was driven by African university and scientific leaders. This process was facilitated by the Science Initiative Group (SIG), based at the Institute for Advanced Study (IAS) in Princeton, New Jersey, USA, and by Carnegie Corporation of New York (CCNY), which funds the program.

SIG has worked for more than a decade, primarily in partnership with the World Bank, to support science and educational capacity in the developing world. Guided by an international board of scientific leaders, SIG is chaired by Phillip Griffiths, professor emeritus and former director of the IAS, and managed by two full-time staff members in Princeton.

In 2007, SIG was invited by CCNY to submit a proposal for an initiative to support higher education in Africa. The invitation was based on (1) CCNY's desire to build on its past support for African universities, and (2) its familiarity with SIG's ongoing work in science capacity development.

In setting a strategy, SIG began with the knowledge that African university vice-chancellors had identified academic staff development as their top priority. SIG was also aware of increasing interest among Africans in the use of networks to link isolated pockets of excellence in many fields. Early in 2007, SIG received a planning grant from CCNY to further explore these themes. In June 2007, SIG convened a planning meeting in Nairobi to gather ideas from African stakeholders as well as outside experts. This was followed by a series of visits by SIG to African countries for in-depth discussions with university leaders, professors, and organizations. SIG submitted its proposal to CCNY in October 2007.

In January 2008, CCNY awarded a three-year grant of \$3,358,800 to SIG to implement the IAS-Carnegie Regional Initiative in Science and Education (RISE). The grant was to support three RISE networks and SIG's management of the RISE program. Early in 2008, SIG emailed a Request for Proposals (RFP) to science and engineering departments at universities throughout sub-Saharan Africa, using mailing lists provided by the Academy of Sciences for the Developing World (TWAS) and the Association of African Universities (AAU).

The RFP defined the selection criteria as follows: "Selection criteria will include scientific merit, training capacity, research activities, evidence of institutional support, added value of the network versus separate support to individual institutions, and potential for sustainability. Especially important is a strategy for retaining at universities in the region faculty members who have received their training through RISE."

Proposals were received from 48 groups, of which about half had good potential and a dozen were very strong. An international selection committee of six experts in a variety of fields, including three Africans and three non-Africans, working by email and conference call, selected three winners and urged SIG to seek funding to support two additional outstanding applicants. CCNY subsequently provided a supplementary grant of \$1,600,000, and the following five winners were announced:

- African Materials Science and Engineering Network (AMSEN)
- African Natural Products Network (RISE-AFNNET)
- Southern African Biochemistry and Informatics for Natural Products Network (SABINA)
- Sub-Saharan African Water Resources Network (SSAWRN)
- Western Indian Ocean Regional Initiative (WIORISE)

According to ground rules set forth in the RFP, each network consisted of partners or "nodes" in at least three countries, and identified both an Academic Directorate and a Secretariat.

The Rationale for Networks

When RISE was being designed and implemented, a number of researchers and development experts, including SIG partners in the World Bank, were making the case that multi-institution networks can bring new strengths to member institutions.¹ In line

¹ Selected studies:

- * Naoko Toriumi, *The Study on Higher Education Networks For Promoting Science, Technology and Innovation: Final Report*, International Development Center of Japan, March 2008, http://www.jica.go.jp/activities/issues/education/pdf/semi0805_07.pdf
- * Alfred Watkins and Joshua Mandell, *Global Forum Action Plan*, Science, Technology and Innovation Capacity Building Partnerships for Sustainable Development, September 1, 2010, http://siteresources.worldbank.org/INTSTIGLOFOR/Resources/STI_GlobalForum_ActionPlan.pdf
- * *What has IDRC learned about supporting networks?* IDRC website, http://www.idrc.ca/en/ev-95002-201-1-DO_TOPIC.html

with this recommendation, the RFP required applicants to describe ways in which they would link several nodes located in different African countries so as to benefit all participants. This approach was thought to overcome several significant impediments to higher education in African universities. For example, it opens to students the possibility of a wider variety of research and supervisory activity, and reduces the mentoring load of faculty by allowing them to share supervisory duties. It also allows graduate students and supervisors access to otherwise unavailable research equipment.

Advantages of Regional Networks

The regional aspect of RISE is important for several reasons. More diverse resources are available in a region than in any single country. Students have access to two or more supervisors with complementary expertise; opportunities for extra training; access to scientific instrumentation not available in their home institution; and in some cases access to research materials (such as natural products) not available in their home countries. RISE funding makes it possible for networks to organize workshops and sponsor students' participation. Examples in RISE's first phase included a thesis writing course given by the SSAWRN network and workshops on specialized aspects of materials research given by AMSEN. The AMSEN network reports that: "The workshops are proving to be very beneficial. The face-to-face interactions mean that there is sharing of more ideas, and students can inspire each other and share their needs." AFNNET reports that "students in the network receive training and supervision at regional level that make them think in ways that will make them solve regional in addition to the national problems." For WIORISE, "one Kenyan student based in Zanzibar needed equipment that was only available at the University of Cape Town, and was able to access that through the network. Another example is a Mozambican student conducting his master's in Tanzania who needed a GIS course, which [was] identified in South Africa."

Networks and Economic Growth

The role of STI as an engine of economic growth is generally accepted in Europe, the United States, and other regions of advanced research capacity. It is also understood that institutions of higher education, as generators of new knowledge, have a fundamental role in providing fuel for this engine.

In sub-Saharan Africa, the linkage between academic knowledge and economic growth is less familiar. RISE explicitly urges member networks to be alert for opportunities to build these linkages and to explore ways to make new knowledge useful to the private sector and other potential users. AFNNET, for example, has already reached out to communities of small-holding farmers, traditional healers, and government ministries; all three groups are receptive to working with academic partners.

* Jeffrey Fine, *Partnership for Higher Education in Africa Support for Collaboration in Research and Post-Graduate Education: Findings and Recommendations*, August 2006

As more government leaders in Africa recognize the need to build STI capacity, RISE can help by encouraging and helping to forge linkages between the universities and the productive sector. Tools to implement new technologies, including capital, infrastructure, and technical assistance are urgently needed. With the help of local business schools, as well as donors and other partners, the networks can begin to fill this implementation gap and empower potential entrepreneurs, small business owners, and users of technology at all levels. By bringing together students, faculty, and potential knowledge users at workshops, RISE can help strengthen the university's mission of community engagement. It can also directly catalyze STI-based economic development among eager and capable entrepreneurs. The benefits of such activities extend beyond a particular program; by reducing poverty, a stronger private sector in African countries strengthens the community of nations by generating new trading partners and increasing international stability.

Program Goals

The overarching objective of RISE is to establish networks that draw on the strengths of individual partner institutions (network nodes) for the collective benefit of the network and its member institutions. Within this objective are related goals that have been suggested by SIG and applied with considerable variation by RISE networks:

- **Stronger institutions:** The RISE model focuses on both (1) providing challenging and regionally relevant research opportunities for MSc and PhD students, and (2) supporting current staff members as they improve their professional and supervisory capacities. The combination of these activities is thought to strengthen both research and supervisory capacities within institutions and disciplines.
- **Student advancement:** In general, each student is expected to present written reports or publications each year, as well as oral reports to a reasonably sized audience. Every student is also expected to attend and present at a professional conference, as well as an annual or biannual network workshop. The rationale for these requirements is that when academic-staff-in-training are professionally strengthened in such ways, their universities and academic programs will ultimately be strengthened as well.
- **Student supervision:** Most students have two or more supervisors: a primary supervisor who monitors general aspects of program participation, and additional supervisor who may have primary or supplementary technical skills not possessed by the first.
- **Nurturing "next generation" academics:** Each network is required to train at least 20 PhD and MSc students; some will graduate more. A general approach has been to identify current pre-PhD faculty for recruitment into the program and to encourage them to return to their home universities after they have earned their

degrees.² There is usually no formal requirement to return home, but a “good faith” agreement that this will happen.

Network Management

Overall management of RISE is the responsibility of the Science Initiative Group (SIG), which coordinates the program and organizes cross-network activities. SIG works with partners and potential partners in and outside of Africa to develop productive linkages and support for the RISE networks. For example, TWAS has agreed to give priority to RISE scientists who apply for TWAS grants.

SIG works to disseminate information about RISE and generate broader awareness of its goals and structure. It maintains a RISE website³ where it posts periodic informal updates submitted by the networks. It also maintains a blog with profiles of RISE faculty and students, written by visiting SIG staff. An “opportunities” page provides links to grant competitions and scientific conferences. The main RISE page has had more than 12,000 hits since it was created in 2008.

While SIG serves an overall coordinating and support role, the networks themselves are responsible for all academic, management, and financial decisions. Duties are divided between the academic directorate, which is responsible for research and educational activities, and the secretariat, which is responsible for administrative and financial management. (In all cases but one, the academic directorate and secretariat are at the same university.) SIG sends funds once a year to each secretariat for distribution. Networks are required to submit formal narrative and financial reports twice each year, as well as the more frequent short, informal updates that are posted on the RISE website.

Specific activities are discussed intensively at the RISE annual meeting by leaders of all the networks. In the first phase, the third annual meeting was combined with a scientific conference, where the students gave presentations about their work; SIG plans to repeat this cycle during the second RISE phase. In partnership with a professional monitoring and evaluation (M&E) practitioner, Dr. Donna Podems of OtherWISE, SIG is developing a system of both quantitative and qualitative metrics to track network progress.

Network management also formally includes the participation of the host universities themselves. The network leaders are charged with developing and strengthening these connections. The initial RFP required that all proposals include letters of support from

² Because of the general shortage of qualified faculty at most universities in Africa, many faculty members are hired without a PhD, and often without even an MSc. Many such faculty linger for years without the needed support to advance professionally.

³ <http://sites.ias.edu/sig/rise>

the vice chancellors of participating universities, though in practice some VCs are more aware and involved than others.

The RISE Networks

Within the general RISE network model, each of the networks sets specific goals and guidelines that fit geographic and disciplinary needs. Some have had to address logistical challenges, and others have had to make structural shifts (such as the placement of the secretariat) or to intensify training in certain areas (such as language abilities). All five networks have set high standards and responded with enthusiasm to program goals and opportunities. The following summaries are extracted from the network-specific portions of the RISE evaluation that was completed in September 2010 (see Monitoring and Evaluation below for more detail about the evaluation).

AMSEN

AMSEN consists of five universities: University of the Witwatersrand, South Africa; University of Nairobi, Kenya; University of Namibia; Federal University of Technology, Nigeria; and University of Botswana.

The AMSEN model is built on the idea that current faculty members need to be strengthened, which in turn will strengthen the node universities and their academic programs. Eight specific criteria guided the program model and are faithfully followed by the program. General features of AMSEN's model include: better utilization of equipment; sharing of library and human resources; the building of personal relationships across national borders which serves to cement the AMSEN network; and a wider exposure of students to different working environments.

As of September 2010, AMSEN had 18 students: 10 PhDs and 8 MScs. AMSEN's model specifically benefits the network nodes in two ways. First, it contributes to staff development through AMSEN graduates taking up posts at their home institutions. Secondly, it raises the profile of the nodes through conference attendance, presentations, and academic publications. The network's recruitment process contributes to sustainability by targeting current faculty who will not be solely reliant on AMSEN funding.

The challenges faced by AMSEN include: connectivity and power supply problems in a number of countries, hindering email contact; uneven flow of finances within the network due to fluctuating exchange rates; and challenges to long-term sustainability from difficulties in keeping academics at their home institutions. Some students voiced concern that once they return to their own university, they will be unable to continue their research.

RISE-AFNNET

RISE-AFNNET consists of three universities: Makerere University, Uganda; University of Nairobi, Kenya; and Sokoine University of Agriculture, Tanzania.

The RISE-AFNNET model is focused on building skills within the discipline of natural products research by developing a new, inter-disciplinary curriculum that is implemented through collaboration of all the network universities, increasing the number of masters and PhD graduates in the field of natural products and building staff relationships across the nodes. Key achievements are: the registration of 21 students, including 11 PhD and 10 MSc candidates; development of an interdisciplinary curriculum; and launching of the natural products research program and a public-private-academic partnership (the Natural Products Forum) that paves the way for a skills development program.

Sustainability underpins the RISE-AFNNET approach. The premise of the network is that academic programs should address issues relevant to Africa, especially issues affecting people's livelihood, poverty, health, and sustainable development. RISE-AFNNET is designed out of the belief that the natural products industry has the potential and the opportunity to address these social issues by training researchers and academics in natural products, focusing their research, and using it for the betterment of society. Using students' research findings to address community problems is a key focus of the academic program.

SABINA

SABINA consists of five universities: University of Namibia, University of Dar es Salaam, Tanzania; University of the Witwatersrand, South Africa; University of Pretoria, South Africa; University of Malawi; as well as two institutes: the Tea Research Foundation of Central Africa, Malawi, and the Council for Scientific and Industrial Research, South Africa. The office of the African Centre for Gene Technologies, based in Pretoria, provides coordination among South African partners.

SABINA focuses on upgrading the qualifications of current staff members as well as supporting new students. Data suggested that this program encourages next generation academics by recruiting current or potential academics as students into the program, and contributes towards professional development of academics by encouraging publication and speaking at conferences. Further, supervisors from different universities interact regarding their program and students, strengthening ties between universities in the network. Some data suggested an increased likelihood of obtaining grants for a network or association of universities, rather than for any individual institution. Institutionalized processes appear to have resulted in more publications and more theses. Additional evidence pointed to support of a multinational and cross-cultural environment that appeared to provide students with an enriched learning environment. As of October 2010, SABINA had 7 PhD and 6 MSc students, including at least one at each node.

One challenge faced by SABINA is that it requires each student to spend time at other universities. This requirement was put in place to encourage stronger networking ties. A

few students interviewed (particularly those based in South Africa) did not see the value of spending time at universities with lesser facilities where they could not conduct their research or continue their focused studies. This practice may need to be addressed in future years.

A second challenge that was also mentioned by other networks is that fees vary between universities within the network. Because each student receives a standard financial package, funding for post-fees living expenses varies considerably at different universities.

SSAWRN

SSAWRN consists of four universities: Rhodes University in Grahamstown, South Africa; Eduardo Mondlane University in Maputo, Mozambique; Makerere University in Kampala, Uganda; and the Okavango Research Institute, part of the University of Botswana located in Maun.

SSAWRN aims to attract students with a broad range of research interests within the area of water research and to facilitate networking among these students, as well as with researchers outside of RISE. The model is built on the idea that as students move through the RISE program, research and supervision capacity within the discipline will be improved, increasing the number and quality of researchers contributing to the knowledge base.

An increase in both breadth and depth of water research in the region was seen as an inevitable result of the program, which is expected to lead to further opportunities for networking, supervision and co-supervision within the program and between the nodes, all of which contribute to the long-term sustainability of the network.

Main achievements include academic publications and presentations; the successful implementation of a thesis-writing course, providing both practical skills and networking opportunities; 16 students (8 PhD and 8 masters) within the network progressing towards their degree, contributing toward the RISE goal of increasing research skills and developing competence in an area of critical importance for the region; and an increased awareness among the SSAWRN students of the different aspects of water research, setting up the opportunity for future networking and multidisciplinary problem solving.

The program faced challenges due mainly to the insufficiency of email communication for effective networking, as well as high staff turnover at some nodes. Another challenge was the breadth of topics represented by students' research interests, which stretched available supervisory expertise as well as students' input into each others' research. Lack of strong administrative capacity at some of the nodes appeared to be a challenge, particularly in terms of financial reporting.

WIORISE

This network consists of three universities: University of Dar es Salaam, Zanzibar, Tanzania; the School of Marine and Coastal Studies at Eduardo Mondlane University in Mozambique; and the University of Cape Town (UCT), South Africa. UCT has the only department in southern Africa offering graduate training in physical oceanography, climate science, and atmospheric science.

WIORISE focuses on building capacity in the utilization and conservation of marine resources in the Western Indian Ocean region, actively recruiting students from across the region. WIORISE recognizes that there are important strategic partners outside of the network and therefore also recruits students from non-network WIO countries. Achievements include development of a strong secretariat, and activities that build on established ties with universities outside the program, which suggest the potential for long-term sustainability of the program. WIORISE has recruited and placed 12 students, six each pursuing PhDs and masters.

The WIORISE network provides working examples that clearly demonstrate the RISE regional networking vision. For example, one Kenyan student based in Zanzibar needed equipment that was available only at UCT, and RISE enabled him to make use of it. Another example is a Mozambican student conducting his masters in Tanzania who needed a course in GIS techniques; the South African node identified an appropriate course at UCT. UCT students, in turn, conduct their field work in Mozambique, and while there is not yet a strong academic program in Mozambique, there is continuing academic support for the Mozambican graduates when they return to their country after completing their studies. This includes resources supported by RISE including key faculty members, an improved communication system, and new laboratory equipment.

Challenges exist in the form of an apparent lack of commitment to the strategic planning and management of the network by one of its nodes, as well as issues associated with language barriers, as there are three main languages spoken in the WIO region: English, Portuguese and French.

Early Outcomes: Students

By the end of the first three-year phase of RISE in December 2010, a total of 83 students had received advanced degrees through RISE, including 44 PhDs and 39 MScs, and two students had completed their postdoctoral studies. It is projected that a total of 137 degrees will have been awarded through RISE by the end of 2013. A breakdown by network is included as Appendix A, following page 19. A majority of graduates plan to return to or take up academic appointments at universities in their home countries, as shown in the appendix.

Some Positive Effects of Networking

An earlier draft of this case study elicited the following question: “We guess that RISE should be more cost effective than sending students abroad in the USA or Europe, but how does it compare to local costs of training PhDs?”

Formal cost comparisons have not been undertaken yet, though anecdotally, per-student cost seems to be about comparable to that of PhD and MSc students trained at a single university in Africa. (A breakdown of RISE network costs can be found in Appendix B.) The relevant comparison is not simply cost per student, but cost per student for education of comparable quality to that offered by RISE. This is especially important in view of the repeated emphasis on excellence in so many World Bank and other documents that discuss issues facing tertiary education in Africa.

The RISE networks were asked in 2010 to draw up Work Plans for 2011-2013, stating their goals and sharing some early results of the first phase. One question was, “Is a graduate of your RISE network likely to become a better academic staff member than another degree recipient from the same university?” All of the networks responded positively, as indicated by the following excerpts:

AMSEN: “Yes; better exposure to international practices, better access to facilities at network institutions, which will enhance the quality of their research work. This originates from the better interaction between staff and students from the various AMSEN nodes, attendance at workshops and conferences, presentations, three annual reports, more supervisors (a Research Team rather than one supervisor) and exchange visits to other countries, which would otherwise not be possible.... All of this has allowed greater sharing of ideas, cultures and inspiration. The Research Teams have provided a more robust environment which does not solely rely on a single academic. These prepare the students as far better trained academics having a regional/international profile... The AMSEN students are already a cohort who will be able to call on each other for support and collaboration in future years, when they have returned home... There has also been increased service rendering, for example, a professor in South Africa becoming a reviewer for the *Kenya Journal of Mechanical Engineering*.”

RISE-AFNNET: “...students in the network receive training and supervision at the regional level that make them think in ways that will enable them to solve regional in addition to national problems. The students also benefit from other participating institutions in the network through the staff exchange program....”

SABINA: “The fellows are now well capacitated; they have been exposed to modern research approaches and facilities protocols through network secondment to advanced research institutions in South Africa. They are now able to design a project implementation plan based on local and regional support services and also exploit facilities across the region.....”

SSAWRN: “[RISE-trained] members of academic staff will play a pivotal role in doing research and mentoring scientists in the field of water resource management and fisheries. RISE students carry out their training in problem-solving-oriented topics and are more exposed to other research environments... They also enjoy more autonomy in terms of the research program activities compared to other graduates... RISE students are likely to produce better results than other students. This can be expected, as they have the support of a whole network and they work under a framework where the scholarship is for academic advancement. A further advantage is that, being part of a network, they can expect additional support after graduation... In other respects a main advantage of the RISE network is the additional number of students that can be trained in water resources science in a region that desperately needs more people who can undertake research and further training in this very important field.”

WIORISE: “...the WIORISE students will have more exposure than their fellow students. They travel to meeting/workshops, thereby interacting with fellow students and senior academicians from different Institutions. WIORISE students have a chance to use equipment located at other nodes; such a chance may not be available to other graduate students... The exposure and networking will produce a mature scientist in marine science. Eventually, these students will transform into better academic staff who will be good mentors for the next generation.”

Leveraging

The networks have leveraged their RISE funding in the ways listed below. These are grants and resources that had been received by the networks as of November 2010. Many other grant proposals, for support for everything from individual research grants to major network-wide projects, are pending or planned.

AMSEN:

- Additional equipment and facilities have been acquired at FUTA.
- A grant of BWP110,000 (US\$17,000) was secured from the Research and Development Program at the University of Botswana (UB).
- 50% of the cost of the purchase of a high temperature horizontal tube furnace valued at US\$20,000 was funded by the University of Botswana with the rest from AMSEN funds.
- UB has supported AMSEN students with travel grants to attend conferences and workshops in the region to a total value of BWP 15,000 (US\$ 2,300) during 2009 and 2010.
- UNAM is building up its facilities generally, and the presence of AMSEN has strengthened the case. UNAM has acquired a SEM as well as state-of-the-art mechanical testing equipment.
- At Wits, AMSEN has benefited from the relationship and additional funding from the Center of Excellence in Strong Materials (CoE-SM) and also access to other funds from the AMSEN academics there. Extra running expenses have been gleaned from

the CoE-SM, and Mellon Foundation funds have allowed the purchase of books and additional travel (e.g. it is planned that one AMSEN student will attend the Materials Science International Workshop in Germany, March 2011 for ~R40,000). Also the relationship with Mintek, a government Science Council, has allowed further access to equipment and loan of material. Wits funds, rewarded for journal publications, have also been used for the access of an SEM (~R20,000).

- The University of Nairobi node has received supplemental assistance from the following sources:
 - Bamburi Portland Cement Company (free cement used for testing on the bagasse ash project)
 - Government of Kenya in the form of subsidized rates while using X-ray spectrometer at the Mines and Geology Department
 - University of Nairobi (tuition waiver/salary for one student and general administrative support)
 - Jomo Kenyatta University of Agriculture and Technology (paid leave of absence for one student)

RISE-AFNNET:

- Parallel/side events held in conjunction with AFNNET meetings have led to leveraging of AFNNET resources including the EU-Edulink program (Trans-boundary Animal Diseases) and USAID–HED Program (Global Health and Bio-security).
- Some of those other grants have helped AFNNET acquire equipment, which is used by both AFNNET and non-AFNNET researchers.
- AFNNET received a supplementary grant of \$50,000 from Carnegie Corporation for development of a regional MSc curriculum on Natural Products Technology and Value Chain Management.

SABINA:

- The RISE grant has been significantly leveraged by €945,350 (US\$1.2 million) additional funding from the EU Africa-Caribbean-Pacific fund supplemented by US\$180,000.00 co-funding from South African Department of Science and Technology. Institutions continue to assist the network in various arenas through provision of airfare from home country to academic institution for members of staff pursuing studies in the network.

SSAWRN:

- Two RISE students at ORI received supplementary grants from their supervisor's research grants.
- One of the students at the IWR (Rhodes University, South Africa) has obtained additional support from Faculty of the Future, another will be part of a Water Research Commission (South Africa) project starting in 2011, while a third has leveraged funding from UNICEF for studying household water quality issues in Kenya.

- Some ad hoc funding has been received by several students to attend meetings and/or short courses. These activities have not only contributed to their academic development, but also allowed them to meet students from other organizations and therefore extended their personal networks.

WIORISE:

- The Swedish funding agency (Sida) and the Norwegian funding agency also provide funding for M.Sc. and Ph.D. students in marine sciences, thereby complementing the funds provided by Carnegie Corporation. This creates opportunities for more students to be trained, more equipment to be bought, and enhancement of other research activities by students and faculty.
- Internally within the network member universities, in-kind contributions are being offered by the universities paying salaries to faculty who supervise students.
- Other facilities, research equipment, computers, etc. were purchased by university funds or by other donors and are used by the WIO-RISE students.

Sustainability

This goal was emphasized in the RFP and continues to be discussed at meetings and in program communications. RISE participants are looking for ways to generate partnerships and sometimes revenue with various users of knowledge, including government agencies, firms in the private sector, and society. For example SSAWRN has interacted with the providers and users of fresh water systems, AMSEN with the mining and engineering sectors, SABINA with the tea industry, WIORISE with local fishermen and seaweed cultivators, and AFNNET with practitioners and entrepreneurs who develop and market natural products.

As outlined above, most of the networks have succeeded in leveraging their RISE grants and are expanding their capabilities, and two have received major additional funding. SABINA received a grant equivalent to about \$1.2 million from the EU to enhance its networking capacity. The funding supports two specific objectives: (1) building capacity to enhance research efficiency and ensure effective translation into meaningful outputs, and (2) developing an advanced web-based knowledge management system by setting up a virtual research environment.

Similarly, AFNNET leaders were instrumental in attracting grants from HED/USAID and from EDULINK/EU totaling about \$1.5 million for institutional development and partnership activities.

RISE itself contributes to sustainability in that the networks are built on existing partnerships, most of which already have other donors or universities as contributing partners. The addition of RISE support enhances the likelihood that such support will continue and/or increase.

Students are not the only beneficiaries of RISE support. Professors and mentors benefit from travel opportunities, conference participation, research collaboration, access to scientific instrumentation at partner universities, salary supplements, and increased ability to attract grants; universities benefit from equipment acquisition, improved Internet access, better qualified academic staff, curriculum development, and research management training for administrative staff; and non-RISE students engage in joint research with the RISE students and are exposed to a larger circle of potential collaborators. All these functions and activities increase the output of RISE and extend its effects into the future.

Another element of the model suggests program sustainability. When RISE students are already junior faculty members at their home institutions, they do not pay fees and still qualify for a staff salary. This means that the university does not use program funding to pay academic fees, which frees up funds for other needs, such as research costs.

One RISE outcome raised initial concerns about sustainability: many students are conducting research that requires instrumentation available only in South Africa. Some students have voiced concern that once they return to their own university they will be unable to continue their research at the level offered by RISE. This could result in some junior scientists abandoning research or deciding to leave their university for better opportunities elsewhere. Both outcomes would work against the program's goal of strengthening African universities. RISE is actively exploring mechanisms to enable graduates from under-resourced countries to continue their research, such as linkages among network nodes that allow RISE alumni continued access to instrumentation; acquisition of new instrumentation; equipment sharing via remote data linkages; and exchanges with other universities. At AMSEN, for example, a mechanism is being created to allow former AMSEN students to return to their RISE institutions for "mini-sabbaticals" during which they will be able to continue their research and gain access to necessary equipment, expertise, and advice.

Monitoring and Evaluation

SIG has closely tracked the progress of the RISE networks through monthly updates, personal interviews, and semiannual reports from the network leaders. In addition, brief outside assessments were performed by two senior scientists, Prof. Herbert Clemens of Ohio State University and the International Mathematical Union, and Prof. Marten Chrispeels of the University of California at San Diego. Both observers, who have extensive experience in international STI development, concluded that all networks were fulfilling the expectations of SIG and CCNY.

In addition, a more thorough, program-wide evaluation was carried out in early 2010 that sheds valuable light on the structure and implementation of the program.⁴ At the

⁴ The evaluation was commissioned by CCNY and carried out by Dr. Donna Podems, OtherWISE, Cape Town, South Africa. It is available upon request to sig@ias.edu.

time the monitoring and evaluation (M&E) exercise was carried out, most students had completed any necessary studies and made some progress in their research, and administrators could begin to appraise the progress of both the participants and the program activities. In addition, both CCNY and SIG were ready for an outside review that could help with planning and administration for the second RISE phase and beyond.

A more comprehensive monitoring and evaluation plan, which will include quantitative as well as qualitative data, will be implemented during the first half of 2011.

The 2010 evaluation included a desk review of available literature relating to the RISE networks, summaries of network achievements and challenges, and interviews and focus groups held with key staff members and students within each network.

In general, the evaluation concluded that most of the objectives of RISE were being addressed positively by the networks. In the words of one RISE academic leader cited in the report:

RISE networks encourage sharing of equipment and facilities, thus avoiding unnecessary duplication of expensive scientific equipment; enable students to gain skills that might not be available in their home institutions; encourage all institutions to have common, high academic standards; and help leverage additional funding.

More specifically, the report listed a group of findings indicating that the networks had complied with the features of the RISE model:

- 1) The evaluation found that every network has successfully recruited, retained and supported students, most of whom intend to further their career in academics. For those students who reported that they did not intend to remain in academia, most expressed their wish to stay in Africa in some type of research institution or position.
- 2) Each network has established a working secretariat. While the functionality of these secretariats varies, each secretariat reports achievements, such as a standardized process for recruiting students, organizing conferences, and fostering communication among the nodes.
- 3) All five networks enable researchers from multiple universities to use specialized scientific instrumentation that is only available at one of the sites. Some students have reported frustration at not having comparable facilities at their own university; addressing this difficulty is a high priority for the program.
- 4) Most networks reported that the nodes gained capacity through affiliation with the other nodes.
- 5) The cross-pollination of ideas and sharing of intellectual property were cited by nearly all the key interviewees as the most beneficial outcome of the RISE

networking approach. Each network adds value with its own particular approach and results.

Among other “lessons learned” reported in the evaluation were the following:

- The stronger networks appeared to be formed based on personal or prior working contacts.
- Collecting uniform data from the different networks was challenging. The lack of a uniform M&E framework and reporting system resulted in different types of data being available, and therefore different insights and conclusions. This is being addressed via a more formal M&E system being put in place early in the second phase.

Additional conclusions of the report were summarized as follows: “It appears that the RISE networks are moving toward the overall program goal of building academic capacity in African universities. The networks each use an individual approach to achieving this goal, based on their available resources, the strengths and weaknesses of the network partners, and each network’s individual context. Although challenges have been encountered in the beginning stages of this initiative, the significant achievements documented by the networks, as well as evidence of the RISE networking vision in action, suggest a valuable and sustainable future for the RISE initiative in Africa.”

The requirements to present their research to a critical audience and attend meetings were welcomed by the students. For example, several students from different nodes commented that their annual meetings better prepared them for the academic life. They felt that their network colleagues (both other students and professors) were motivated to help all students because they were all part of the same network.

The networks also experienced challenges. First, the value of having a network was not always apparent to all participants. For example, in one network, students said they were not aware of being part of a network. Second, for some networks there appeared to be a strong reliance on South African-based universities. While this is neither “good” nor “bad” in terms of creating and fostering African academics, it does suggest that some universities gain more benefits than others. Third, while the output levels were well documented (such as number of students enrolled), accurate ways of measuring outcomes and impacts was not entirely clear; this is being addressed in the second phase of RISE.

Recommendations

While emphasizing the preliminary nature of the 2010 evaluation, the report did make several recommendations.

In regard to the different approaches adopted by individual networks, the report suggested that some flexibility in individual practices was generally advantageous. The

report stated: “Networks developed unique approaches to achieving the RISE goal, and it is recommended that the networks continue to be allowed to interpret and apply their individual approaches, and SIG is encouraged to continue to support network-led interventions to capitalize on network strengths and address weaknesses. If this program is expanded or adapted to other contexts, it is important to allow the networks to choose and when necessary rethink and reform their partnerships.”

The report affirmed that “at this point in program implementation, networks should be given the opportunity to reflect on their strengths, weaknesses, and challenges, and permitted the freedom to make any necessary changes.”

Next Steps: Scale-up and Sustainability

Early in the design phase of RISE, virtually all of those who contributed their thinking, including SIG, CCNY, and the World Bank, foresaw the need to design a the post-program strategy to support scale-up, continuity, and sustainability. During the planning and implementation phases of RISE, the World Bank held two “Global Forums” in Washington, DC (in February 2007 and December 2009) to gather additional ideas and discuss best practices to develop S&E capacity. Its “STI Global Forum Action Plan” of 2010 stated that “Many developing countries are caught in a vise between rapidly increasing higher education enrollments and static or declining faculty rosters. How can they escape this trap? Partnerships may help them jump-start the capacity building process by allowing countries to build STI capacity when they do not have the indigenous capacity they need in order to meet the higher education demand.”

More specific suggestions were discussed at a RISE/World Bank meeting in November 2010, which may provide a basis for further planning and next steps. These suggestions included the following:

- Design a regional financing mechanism to expand (over a period of five years) the number of multi-country RISE networks by a factor of 10. This mechanism would provide support for a central secretariat to provide administrative coordination of all networks; shared equipment, including training and technical support; joint curriculum development; conferences and workshops; student recruitment and selection; student loan programs; faculty and student exchanges, including travel among nodes; and bandwidth with reduced cost negotiated by a multi-national consortium.
- Link RISE networks to Bank-funded national higher education programs. This might include country financing packages developed through Country Assistance Strategies to finance country-specific expenses, including student fees, supervisor compensation, research support, post-RISE grants for graduates to establish and maintain research groups, and communication and laboratory infrastructure.

- With Carnegie Corporation of New York, the Bank could co-sponsor a donor conference to link RISE to complementary initiatives sponsored by other foundations and development partners, including the Higher Education for Development initiative, the Global University Leadership Forum (GULF), and others.

Conclusion

In December 2010, RISE completed its first three-year phase of Carnegie funding, and in January 2011 the second three-year phase began. SIG is confident that that the knowledge generated by regional networks of research and education has the potential to increase the knowledge capacity of the universities of sub-Saharan Africa. More broadly, these networks, suitably scaled up and sustained, have additional potential to extend the value of new knowledge to those who need it – technicians, vocational trainers, farmers, entrepreneurs, and small businesses. By harnessing the power of STI, these diverse users can both profit from new knowledge and contribute substantially to economic growth and poverty alleviation.

There remains a critical role for potential outside partners willing to bring resources and expertise to this process. While many African heads of state have come to appreciate the need for strong local capacity in science, technology, and innovation, linkages between academia and the private sector remain weak. Realizing the full potential of STI requires a variety of tools and institutions to support entrepreneurs and young firms, and the development of financial and regulatory structures on which a knowledge-based culture depends. Donors, NGOs, expatriates, universities, governments, and other organizations can be effective partners in strengthening such knowledge-based cultures, which are fundamental to long-term economic development.