



SCIENCE GRANTING COUNCILS INITIATIVE IN SUB-SAHARAN AFRICA STRENGTHENING PARTNERSHIPS AMONG AFRICA'S SCIENCE GRANTING COUNCILS AND THE PRIVATE SECTOR

A BASELINE ASSESSMENT OF PUBLIC – PRIVATE PARTNERSHIPS IN RESEARCH AND SCIENTIFIC
COOPERATION IN ZAMBIA

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February, 2018



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Executive summary

The National Science and Technology Council (NSTC) is a science granting council that is located as a body within the state apparatus of the Republic of Zambia. It was founded by an act of parliament (No. 26 of the year 1997), called the science and technology act, with a mandate “to enhance Zambia’s capacity for scientific research and technological development, in order to create wealth and improve the quality of life in Zambia by promoting the development and application of science and technology.” It began operations in 2000.

NSTC has funded and facilitated various projects in science, technology and innovation by universities and national research institutes. It also recently established partnerships and collaborations with other science granting councils from neighbouring countries as well other countries (such as Germany).

The data collected for this case study comprised lists of projects and collaborations provided directly from NSTC, as well as limited information accessible through the internet about NSTC. Hence, the study is limited in size and information.

1. Introduction

The Science Granting Councils Initiative (SGCI) is a 5-year initiative that seeks to strengthen the capacities of science granting councils (SGC) in sub-Saharan Africa (SSA) in order to support research and evidence-based policies that will contribute to economic and social development. The objectives of the SGCI are to strengthen the ability of Science Granting Councils to:

1. Manage research;
2. Design and monitor research programmes based on the use of robust science, technology and innovation (STI) indicators;
3. Support knowledge exchange with the private sector; and
4. Establish partnerships between Science Granting Councils and other science system actors.

The report summarizes the findings of a baseline study about Zambia to evaluate the state of collaborations amongst the participating Science Granting Council (SGC), researchers, the private sector and other SGCs.

The specific objectives of the study were to:

- ✓ Articulate the factors that constrain or promote PPPs, Scientific collaboration and Knowledge Transfer.
- ✓ Gather information on the SGC's capacity needs and skills gaps for collaboration with other organizations, especially the SGC; and supporting research - productive sectors linkages.
- ✓ Review the legal and policy frameworks and environment under which SGCs operate (Institutional and National) in so far as support to PPP and CP is concerned.

2. Methodology

The study was based on limited data, some provided directly by NSTC and the rest found from desk research via internet browsing. Unforeseen circumstances prevented the research team of STIPRO (and ACTS consortium) from conducting a more thorough survey in Zambia as was planned. The material reviewed, besides the data provided by NSTC, included the Zambia act of parliament that established the National Science and Technology Council (NSTC), a paper by an NSTC staff for a relevant workshop in South Africa, 2015 (which included mentioning of the SGCI), and further information from relevant websites, including NSTC's official website.

3. State of collaborations in Zambia facilitated by NSTC

The National Science and Technology Council (NSTC) is a statutory body through which the Government of the Republic of Zambia directs policy on the development and application of Science and Technology in the country. It was established by an Act of Parliament, the Science and Technology Act No.26 of 1997.¹The council was inaugurated on 10th August 1999 and the Secretariat was established on 1st April 2000.² Prior to NSTC, there was the National Council for Scientific Research (NCSR).

¹ Zambia, Science and Technology Act, 1997. No. 26 of 1997. <http://www.nstc.org.zm/wp-content/uploads/2016/10/Science-and-Technology-Act.pdf>

² Commonwealth Network: Zambia. <http://www.commonwealthofnations.org/organisations/national-council-of-science-and-technology/>

NSTC defines its functions as follows:³

- **Promotion and Advocacy** – the development of indigenous technological capacity; the use of science and technology in industry, the integration of gender concerns in science and technology development of broad national priorities in science and technology.
- **Regulating** research in science and technology including the registration of research and research development institutions and initiating special projects.
- **Advising** the government on science and technology related policies, the establishment of any new research and development institutions and national research development priorities.
- **Mobilising** and making available financial, human and other resources including science and technology information to research and development institutions.
- **Coordinating** research in science and technology in Zambia.

In terms of collaborations, NSTC provides a list of projects funded/co-funded and facilitated by it, and conducted by universities or national research institutes in Zambia (Table 1 and 2). From the list, it appears that NSTC established a good network with academic and national institutes, but not yet with the private sector.

Overall, NSTC lists the following organizations as some of the partners with which it collaborates “in order to achieve its goal”:⁴ *National Research Fund (NRF), The University of Zambia (UNZA), National Remote Sensing Centre (NRSC), The National Technology Business Centre (NTBC), The Copperbelt University (CBU), Zambia Information and Communications Technology Authority (ZICTA), The Zambia Agriculture Research Institute (ZARI), National Institute for Scientific and Industrial Research (NISIR), The Technology Development and Advisory Unit (TDAU), Central Veterinary Research Institute (CVRI), Fundo Nacional de Investigaç o (FNI), The National Malaria Control Centre (NMCC), Junior Engineers, Technicians and Scientists (JETS), The Engineering Institution of Zambia (EIZ), The Ministry of Higher Education (MoHE), Government Ministries, and Industries.*

³ NSTC Website: About us. <http://www.nstc.org.zm/our-functions/>

⁴ NSTC Website: Our partners. <http://www.nstc.org.zm/our-parteners/>

Table 1: List of projects funded by the Zambian National Council for Science and Technology as of October 2017

| Title of project | Partner research institutions and private sector actors | Status of project | Year of project launch | Key focus of the project | Key outputs |
|---|---|--------------------------|-------------------------------|--|--|
| Assessing the Effects of Malaria Treatment with Artemether/Lumefantrine | Tropical Diseases Research Centre (TDRC) | Completing | 2014 | assessment of the effects of malaria treatment using artemether-lumefantrine | Effects of malaria treatment using artemether-lumefantrine on parasite load and body composition in Zambian children aged 3-5 years determined. |
| Assessing Radioactive Contamination of Surface, Groundwater and other Resources in Mining areas of the Southern, Copperbelt and North-Western Provinces of Zambia | National Institute for Scientific and Industrial Research (NISIR) | Completed | 2014 | Assessment of the level of radioactive contamination in mining towns | Levels of radioactive contamination determined and compared against the WHO recommended minimum levels. |
| Utilisation of Lemon fruit as a source of Vitamin C in soya bean-based feeds for <i>Oreochromis andersonii</i> in Zambia | National Aquaculture Research and Development Centre (NARDC) | Ongoing | 2015 | Investigation of the potential use of lemon fruit as a source of vitamin C in fish feed and formulation of fish feed with most ideal levels of Vitamin C for fingerling survival, fish reproduction, growth and prevention of disease. | Vitamin C levels in two lemon varieties were determined |
| Earth observations for drought, soil and vegetation monitoring – EO4DSVM | National Remote Sensing Centre (NRSC) | Completing | 2015 | Test and extend existing models for evapotranspiration mapping to map drought risk, with a model specifically adapted to Southern African agricultural conditions | Capacity to utilize existing operational tools that implement evapotranspiration mapping models and parameterization of drought indicators, Application, testing and customizing models to |

| | | | | | |
|--|--|--|--|--|-----------------------------|
| | | | | | Southern African conditions |
|--|--|--|--|--|-----------------------------|

Table 2: Overviews of University research projects facilitated or funded by the Zambian Council for S&T

| Title of project | Partner institutions and private sector actors | Status of project | Year of project launch | Key focus of the project | Key outputs |
|---|--|--------------------------|-------------------------------|--|--|
| Assessment and evaluation of potential efficacy of indigenous knowledge systems (IKS) based preparations in the treatment of hypertension (HTN) in Zambia | University of Zambia School of Medicine | Completing | 2014 | Identification and determination of the efficacy of the indigenous based preparations used in the management of HTN | Determination of the efficacy of the indigenous based preparations used as well as the knowledge, attitude and practice of Traditional Health Practitioners in the management of HTN |
| Exploring the Carbon Sequestration potential of selected Miombo woodland sites in Mozambique and Zambia | Copperbelt University School of Natural Resources | Completing | 2014 | Determination of the variation in biomass stock across different land use practices over time | Development of models for land use change |
| Prototyping and experimental evaluation of an improved small-scale timber drying kiln | University of Zambia Technology Development and Advisory Unit (TDAU) | Ongoing | 2015 | Developing a small-scale timber kiln design for the timber industry | Designing and construction of a prototype of the small-scale timber kiln |
| Action research to enhance Female participation in Science, Mathematics and Technology | University of Zambia School of Education | Ongoing | 2015 | Investigation of modalities to improve the access and performance of girls in Science and Technology at secondary school level | empirical research data on the status of girls' participation and performance in Science and Technology |
| Synthesis, Characterisation and Evaluation of the Safety of Cu, CuO and ZnO Nanoparticles Using | Copperbelt University School of Mines and Mineral Sciences | Ongoing | 2015 | Investigating the safety of Cu, CuO and ZnO nanoparticles | Safety levels of Cu, CuO and ZnO nanoparticles determined |

| | | | | | |
|--|---|------------|------|---|--|
| Proteomics techniques | | | | | |
| Modified magnetic nanoparticles for pollutant removal | University of Zambia School of Mines; Department of Geology | Completing | 2015 | Development and application of modified magnetic sorbents with Moringa seed protein for extraction of nitro-based explosives and heavy metals | Recommendations on possible remediation strategies for decontamination of heavy metals and organic compounds polluting surface water in and around mining areas |
| A System Augmenting agricultural activities in Marginalized Rural Areas of Zambia and South Africa | University of Zambia Department of Computer Studies | Completing | 2015 | Development of web-based systems for management of farming input support services and post-harvest services and marketing | Development of web-based systems for monitoring temperature, humidity, pests and security in food storage silos and sheds, and development of web-based system to solve the problems of farming input support to small scale farmers and the tracking of grain marketing |
| Mineral Law and Governance in Africa | University of Zambia School of Law | Completing | 2015 | Governance of the extractive industry | Book on good governance in the extractive industry as well as corporate social responsibility in mining industries |
| Characterising the transition from Mid to Low latitude within the African sector | University of Zambia, School of Natural Sciences; Physics Department | Completing | 2015 | Investigating the variation of the magnetic field over the African region by utilizing magnetometers installed in various parts of Africa | Development of the ionospheric electron density map for the African region indicating ionospheric electron density gradient Public and community awareness of the importance of space science. |
| Development of materials for high efficiency | University of Zambia | Ongoing | 2015 | Development of materials for high | Preparation and characterization of inorganic and polymer |

| | | | | | |
|--|--|------------|------|---|--|
| and low cost solar cells /Enhancement of Photo-Conversion Efficiency in PCBM:P3HT:SQ3 ternary System using Plasmonic Cu-Nano | School of Natural Sciences; Dept. of Chemistry | | | efficiency and low cost solar cells | solar cells |
| Occurrence of Estrogens in water and Wastewater in relation to bacterial diversity and fish health | Copperbelt University, School of Medicine; Dept. of Basic Sciences, | Completing | 2015 | Investigation of contamination of surface water with | Levels of contamination of surface water with pesticide materials and other synthetic estrogen disposals. determined |
| Chemical characterization and bioactivity of Steganotaenia extract | University of Zambia, School of Medicine; Centre for Primary Care Research | ongoing | 2015 | Determination of the uterotonic potential of Steganotaenia araliacea root extract | Identification and isolation of the bioactive constituents of Steganotaenia araliacea root extract with uterotonic properties |
| Developing Ecological models for forest restoration of mining generated wastelands-dump sites. A contribution towards sustainable mining in Zambia | Copperbelt University (CBU) School of Natural Resources | Ongoing | 2015 | Developing models for forest restoration of tailings | establishment of nurseries, production of biochar from wood shavings, bamboo and chicken manure were produced for use in the experiments |

3.1 State of PPP collaborations

Based on acquired information from NSTC and from desk research, there are not yet substantive PPP collaborations to report.

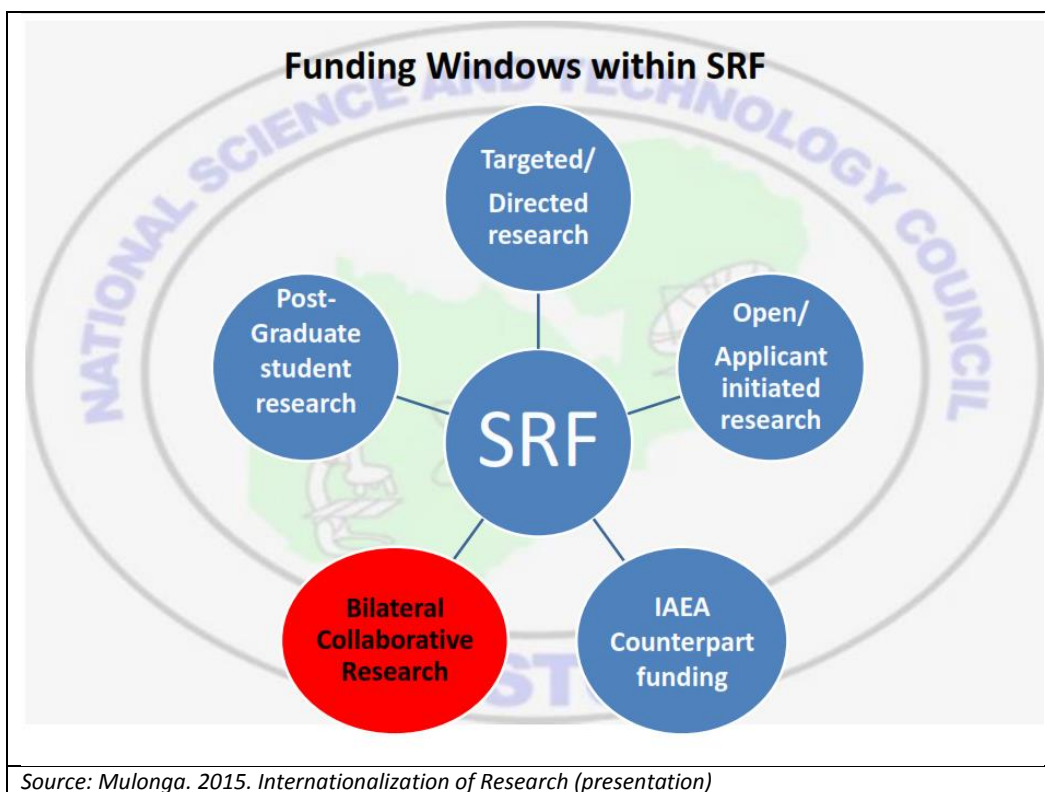
3.2 State of collaboration with other SGCs

Besides the list of 'partners', provided by NSTC, above, that included a few other SGCs, they also provided a list of particular collaborations with other SGCs worth highlighting (Table 3).

Table 3: Overviews of partner institutions and SGCs that have working relationships with the NSTC as of 2017 (those that have signed MoUs, or negotiating to sign MoU or simply informal working relationships)

| Partner country | Institution | Status of agreement | Year of agreement signed | Key areas of partnership | Key outputs |
|------------------------|---|--|---------------------------------|--|--|
| South Africa | National Research Foundation (NRF) | MoU operational | 2014 | <ul style="list-style-type: none"> • Joint funding of research • Joint conferences • Skills and knowledge exchange | <ul style="list-style-type: none"> • Two Joint calls with 18 joint research projects supported • Three exchange visits |
| Mozambique | National Research Fund (FNI) | MoU operational | 2017 | <ul style="list-style-type: none"> • Joint funding of research • Joint conferences • Skills and knowledge exchange | One Joint call with three joint research projects supported |
| German | German Research Foundation (DFG) | MoU operational | 2017 | <ul style="list-style-type: none"> • Joint funding of research • Joint conferences • Skills and knowledge exchange | <ul style="list-style-type: none"> • Co-hosted two joint researchers symposia • One trilateral joint call issued |
| Rwanda | National Council for Science and Technology (NCST) | MoU Signed Agreed to develop joint Implementation Plan | 2018 | <ul style="list-style-type: none"> • Joint funding of research in ICT, Mathematics, Mining and any other mutually agreed on STI areas | <ul style="list-style-type: none"> • MoU Signed on 22nd February, 2018 |
| Malawi | National Commission for Science and Technology (NCST) | Informal working relationship | N/A | N/A | <ul style="list-style-type: none"> • Cohosted the 2017 Science Granting Councils Africa Regional meeting • Discussed possibility of participating in each other's events |
| Uganda | National Council for Science and Technology (NCST) | Relationship still at discussion stage | N/A | <ul style="list-style-type: none"> • Exchange of best practices in the area of Policy | |

One main mechanism of collaboration with SGCs is the Strategic Research Fund (SRF) within NSTC's operations. SRF aims "to support basic and applied research and development in identified areas of national priority, and to enhance research capacity in Zambia."⁵ Bilateral collaborative research, involving other SGCs, is one SRF's objectives and one of its funding windows, (as indicated in the diagram below). Since the beginning of the SGCI, NSTC has also been active in seeking and building collaborations, and plans of collaborations, with other participant SGCs. Additionally, NSTC indicates that has been involved in similar collaborations through the Southern African Research and Innovation Management Association (SARIMA), the Global Research Council (GRC) and other existing initiatives.⁶



4. Factors constraining and enabling collaboration and knowledge transfer between SGCs

(no relevant information acquired)

4.1 SGC related policy frameworks

Zambia, Science and Technology Act, 1997. No. 26 of 1997. (available at: <http://www.nstc.org.zm/wp-content/uploads/2016/10/Science-and-Technology-Act.pdf>) and the Zambia National Policy on Science and Technology, 1996. What is also noticeable about the 1996 policy is that the word 'innovation' was mentioned many times in the policy, with emphasis on 'technological innovation', 'innovation of

⁵ Atridah Mulonga. Internationalization of Research. Paper presented at the Research Administrators Workshop (RAW), Port Elizabeth, South Africa, 2nd October 2015.

⁶ Ibid.

commercial products’, and protecting ‘traditional innovation’. This indicates that a fair understanding of the role of innovation in science and technology existed in the Zambia national framework since 1996.

4.2 SGC capacities and capabilities

(no relevant information acquired)

5. Factors constraining and enabling collaboration and knowledge transfer with the private sector

(no relevant information acquired)

6. Recommendations for SGCs

Zambia’s national policy on science and technology (1996) stated that “Science and Technology in Zambia has been constrained by lack of national Science and Technology Policy since independence in 1964. This lack of national policy has resulted in the following:- (i) Poorly co-ordinated Science and Technology System; (ii) Under popularisation of Science and Technology in the community; (iii) Rigidity in the Education System; (iv) Restricted Cultural System; [and] (v) Poor Information and database in the Science and Technology System.” Supposedly, the policy that was issued in 1997 (a year before establishing NSTC) changed those constrained, or at least some of them.

Given the limited information acquired, no evidence-based recommendations can be stated with sufficient confidence. However, being a participant of the SGCI, NSTC is understood to be seeking to increase its capacity and resourcefulness with regards to the goals of initiative. That would indicate NSTC’s self-assessment of requiring such improvements. If some of the aforementioned problems (in the 1996 policy) still persist, NSTC will have to address them, perhaps through a new STI policy. Tanzania, for example, opted for updating its national science and technology policy to become a national policy for STI, therefore addressing areas of systematic challenges that include innovation (while the previous policy did not address such areas). NSTC may be advised to push for similar measures in Zambia, as appropriate for context.

References

Commonwealth Network: Zambia. <http://www.commonwealthofnations.org/organisations/national-council-of-science-and-technology/>

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National Science and Technology Council of Zambia (NSTC) Official Website:

<http://www.nstc.org.zm/our-functions/>

Zambia, National Policy on Science and Technology, 1996.

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Zambia, Science and Technology Act, 1997. No. 26 of 1997. <http://www.nstc.org.zm/wp-content/uploads/2016/10/Science-and-Technology-Act.pdf>

(as well as NSTC Staff who provided data in tables 1, 2 and 3)