



Fostering Dissemination of Innovative R&D Opportunities for National Development

NCST Quarterly Newsletter - Issue No :001 - September 2021

The role of Science, Technology, Research and Development (R&D) continues to be more required for Rwanda's social economic development and transformation. The Government of Rwanda's vision to become a middle-income country by 2035 and a high-income country by 2050 will be accelerated by concerted efforts by Rwandans to operationalize the Science, Technology and Innovation (STI) Policy approved by the Cabinet in June 2020.

The law n° 40/2017 of 16/08/2017 establishing the National Council for Science and Technology (NCST) and determining its mission, organization and functioning; assign it with among others, "to advise the Government on policies, legislation and regulation in the fields of science, technology, research and innovation and monitor the implementation of such policies and legislation". To achieve its Mandate several policy and programs have been implemented. For example, in June 2020, a national research coordination committee was established to ensure joint quarterly planning, implementation and monitoring of R&D output, and to facilitate national institutions to advance national scientific research capabilities so that Rwanda emerges as a global research hub on the African continent.

KEY MESSAGES

- The National Council for Science and Technology (NCST) supports the Government of Rwanda's vision to become a knowledge-based economy, utilizing the power of science, technology and research and development (R&D) to promote national industrial transformation. Becoming a knowledge-based economy requires that all national stakeholders take advantage of the opportunities under the Science, Technology and Innovation (STI) policy, specifically on effective STI governance, increased R&D and innovation financing and improved human capital and knowledge network development.
- After the Government of Rwanda established National Research and Innovation Funds (NRIF) in June 2018, ninety one (91) research projects have been implemented totaling about four (4) billions Rwanda Francs under a) Academia-industry collaboration (19 grants); b) Excellent Research (11 Grants); c) Rwanda Innovation Challenge (36 grants), d) Special Collaborative Schemes to address COVID-19 (17 grants), and Sector Strategic Research Grant (8 Grants). Besides, there have been various efforts to provide equal opportunities to women scientists such as 'Women in Science' Awards with best prizes every year since 2019 as: i) Women Leadership Award; ii) Research Award and iii) Rising Star Award.
- In June 2020, NCST established Research Coordination Committee (RCC) to address inadequate coordination of R&D programs. The 11-members of the RCC committee from research and university institutions support proper coordination creating an environment for mutual planning, implementation and monitoring and Evaluation (M&E) of R&D programs.
- Funding opportunities of each of NRIF programs will be increased, and specifically leveraged by increasing international development and grant funding opportunities. In this regard the NCST and its stakeholders will establish Grand Challenge Rwanda to fund Big Ideas, Bold Minds to support research for technology development in specific priority areas.

In June 2018, the National Research and Innovation Fund (NRIF) was launched to provide a platform for investment in R&D programs, specifically to focus on funding programs that support technology development, prototypes and innovative research in Rwanda. To-date academic-industry collaboration grant scheme, special collaborative grant to address COVID-19 pandemic, Rwanda Innovation Challenge (RIC) among others are presented in this newsletter.

These grant schemes aim at bridging the collaboration gap between academia-industry collaboration, and respond to national needs. For instance, Rwanda Innovation Challenge scheme aims at strengthening Rwanda's innovation capacity to promote technology breakthroughs through a wide range of competitive opportunities. Qualified scientists across national institutions are accessing the needed technical and financial support in various areas including ideation, developing prototypes, testing, commercializing technologies as well as intellectual property technical and financial support.

This first newsletter provides an overview of existing STI Policy, NCST coordination efforts through establishment of national research coordination committee and R&D grant schemes funded to-date.

Science Technology and Innovation (STI) Policy and Its Instruments

The STI Policy:

The NCST in collaboration with its stakeholders developed an STI policy, which then was approved by the Cabinet on 02 June 2020.

The policy is aligned with the 2050 Rwanda's vision and emphasizes the need to fast-track the transformative change at the social-technical system level to embrace various forms of National Innovation System (NIS) ranging from technological, social, institutional, products and services innovations. The STI Policy stipulates the NRIF as the key funding instrument through which the Government of Rwanda supports national research, science, and technology development, as well as technology-led innovation. It is government-wide policy, imbuing a wide range of government institutions and private sector with responsibilities for implementing its imperatives. Here, the NCST is positioned as the agency to coordinate and monitor progress against this policy.

The vision of STI policy is "Rwanda attains and sustains an innovation-driven society through efficient and effective application of knowledge and technology"; while the mission is "To establish a vibrant STI environment with capacity, enabling policies, and adequate funding capable of producing quality graduates, research and modern technology products and services to cater for the needs of the productive sector and the society"

The STI policy identifies a number of cross-cutting structural interventions needed to strengthen the national STI system. Specifically, the STI Policy sets out a range of system-level strategic imperatives for science and innovation under five policy objectives:

- **Effective STI governance:** The policy broadly encompasses establishing an enabling conducive environment as well as coordination mechanisms. Key interventions include i) Strengthen STI coordination by putting in place a strong monitoring and evaluation framework; ii) Developing STI legal and regulatory framework; iii) Defining STI agenda in line with national goals; iv)

Strengthen intellectual property (IP) system; and v) Strengthening advisory on strategic and cost-effective STI investment.

- **Increased scientific and technology output:** The policy supports the need of boosting national capability in terms of adapting, investing and innovating technology products and services, as key to increase scientific and technology output: i) Technology innovation support mechanism (from concept to utilization); ii) Technology import and adaptation (leveraging local and traditional knowledge and expertise), iii) Promoting research and innovation in new and emerging technologies; iv) Strengthening the cooperation with the diaspora and international scientists, and innovators; and v) Promoting advancement of indigenous knowledge, home grown solutions and local technologies
- **Increased R&D and innovation financing:** The policy supports the need for funding R&D to support the different levels of technology development, entrepreneurship, human capital development, and infrastructure development. In particular, underscores the need for: i) Increased investments in R&D and innovation from public and private sector sources; ii) Diversified initiatives and strategies to promote women in STI; iii) Ensuring adequate research infrastructure; and iv) Incentivizing academia and private sector collaboration.
- **Improved STI Capacity and knowledge networks development:** The policy stresses the need for STI human capital development in forms of critical mass of Rwandans with knowledge, skills, and competencies to support a knowledge-based economy. Here different interventions

have been suggested including: i) Ensuring dynamic STI human resources development (capacity building through education spectrum in STI fields); ii) Stimulating research and innovation culture and mind-set; iii) Promoting researchers' profession and learned societies; and iv) Strengthening STI community outreach

- **Enhancing international cooperation in the fields of science and innovation:** The policy promotes bilateral, multilateral, regional and international cooperation to strengthen Rwanda's National Innovation Strategy (NIS) performance. Strategies include: i) Promoting STI strategic cooperation and partnerships and collaborations; and ii) Attracting foreign R&D and Innovations firms

Moreover, the STI policy outlines six thematic domains as national priorities areas for STI. All six priority areas are linked to societal challenges, both at national and international levels. NCST is funding and supporting programs to deliver high-impact science, technology, research and innovation (STRI) within these areas: sustainable energy, food security and modern agriculture, life and health sciences, local production and value addition, digital services, products and lifestyles and resilient environment and natural resources.

National research and Innovation Agenda (NRIA)

As of its responsibilities, NCST in collaboration with its stakeholders developed the national research and innovation agenda (NRIA) which was disseminated on the 24 June 2021.

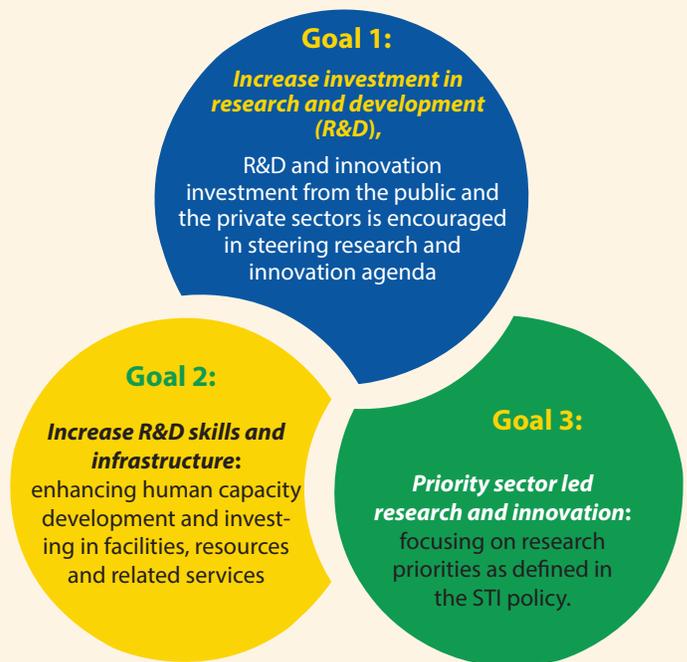
The purpose of the NRIA is to ensure that investments in STI accumulate value in the form of knowledge, solutions, research and development skills and high-tech research infrastructure in terms of equipment and laboratories that are important inputs to the creation of a knowledge-based economy to drive national economic

transformation and competitiveness. Specifically, the NRIA has three goals, illustrated in figure 1.

In order to achieve goals 1 & 2, the NRIA emphasizes the need to: i) Invest in research and technological innovation (establishment of the NRIF); ii) Coordinate the research and innovation system (establishment of a coordination mechanism); iii) Create new researchers (promote especially STEM programmes, strengthen collaboration, attract international talent, build capacity among researchers); iv) Build new research infrastructure (strengthen research facilities in Rwanda, promote international cooperation); v) Promote academia and industry collaboration; and vi) Nurture researchers and innovators through improving the environment (establish technology hubs, strengthen IP rights management)

With regard to goal 3, the NRIA provides details of key research and innovation interventions for each of priority area.

Figure 1: Three goals of the National Research and Innovation Agenda



Establishment of Research Coordination Committees (RCC)

In the last decade or so, the Government of Rwanda established numerous public institutions that undertake, support, and promote science, research, and technology development and innovation programs. These include but are not limited to the Ministry of ICT and Innovation (MINICT), the Rwanda Biomedical Centre (RBC), the Rwanda Kigali Innovation City (KIC), the National Industrial Research and Development Agency (NIRDA), the Rwanda Green Fund (FONERWA), the Rwanda Agriculture Board (RAB), the Rwanda Information Society Authority (RISA),

and the National Council for Science and Technology (NCST), as well as the establishment of one public higher learning University– the University of Rwanda (UR).

These institutions have various complimentary mandate in terms of policy and implementation to ensure that programs across the institutions are well aligned and coordinated. With the support of line Ministry, NCST established a Research Coordination Committee (RCC) in June 2020 to support proper governance framework of R&D programs,

and to create an enabling environment for mutual planning, implementation and monitoring of research programs.

The RCC role is to coordinate specifically R&D programs that are funded by the Government of Rwanda, as well as other programs funded from private and development partners funding. The R&D programs are funded through various funding mechanisms, as well as through National Research and Innovation Fund (NRIF) managed by the NCST. The role of coordinating R&D programs ensures that the diversity of the programs are well aligned to form synergy, and to avoid the risk of duplication, overlap and inefficiency in investment.

The establishment of RCC ensures better inter-institutional and inter-departmental coordinated planning and budgeting for R&D activities to improve financial efficiencies. This will enable the Government of Rwanda to support well-managed and focused research activities, by Higher Learning Institutions (HLIs) and Research Institutions, aligned with the national strategic goals.

Overall Goals:

- To ensure improved inter-institutional coordination, collaboration and joint planning of R&D performance and productivity to achieve national targets.
- To facilitate platforms to advance national scientific research capabilities with contemporary capacity and facilities so that Rwanda emerges as a global research hub on the African continent.

Composition

RCC is currently composed of eleven (11) senior researchers and managers at senior level with relevant technical and research experience. The number of Members of RCC may change depending on national development priority sectors.



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Functioning

NCST is the secretariat, and supports coordination of all activities, including logistics and proceedings of all the meetings

Meetings are held on quarterly basis with a specific theme such as:

- **March** (Theme: Fiscal Year research Planning),
- **June** (Theme: Fiscal Year research Evaluation),
- **September** (Theme: Scientific & Research Productivity),

- **November** (Theme: Scientific Capacity Building & Partnerships)

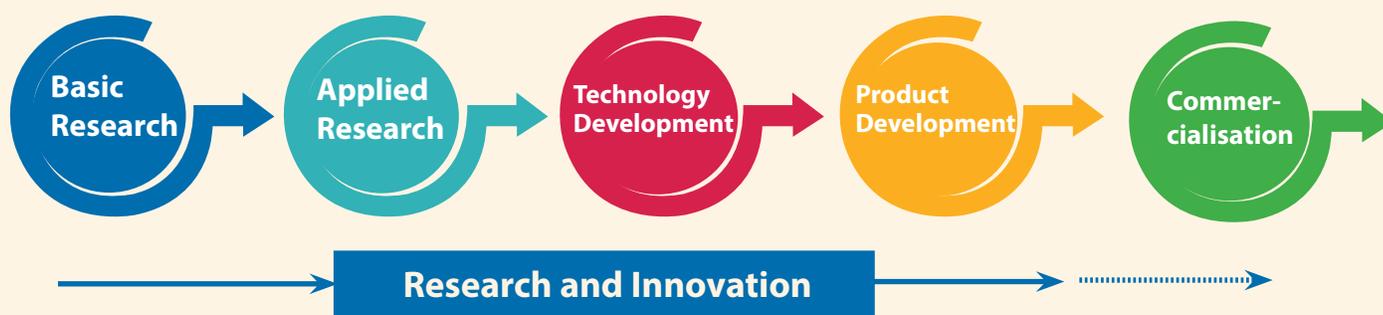
To-date there have been improved coordination of research activities planning from all public institutions for the FY 2021-2022, and recommendations to boost research productivity, strengthen STI coordination, and improve research and innovation funds management in Rwanda through a national designated budget line to ensure proper monitoring of R&D nationally.

Operationalization of National Research and Innovation Fund (NRIF)

The Government of Rwanda through the NCST established and operationalized the NRIF since June 2018. The NRIF was established with the goal to provide competitive grant opportunities to scientists, researchers and innova-

tors across the Research & Innovation Spectrum, mainly prioritizing research on technology develop towards prototypes (Figure 2).

Figure 2: Prioritization of technology development and innovation Research



Objectives of NRIF

The overall goal of NRIF is to support scientists, researchers and innovators to develop and accelerate research output and productivity under key priority areas through establishing and implementing funding schemes that provide competitive and merit-based funding opportunities towards fostering research uptake in Rwanda. The specific objectives of NRIF are:

- Build national research and innovation capacity and research excellence.
- Leverage R&D investment (including capital investment).
- Increase strategic collaboration between academia and the private, public and third sector.
- Contribute to addressing societal needs and grand challenges.

Since the establishment of NRIF, the NCST has made progress in supporting research and Innovation to ensure that Rwanda is transformed into a country where the potential of STI is fully harnessed and integrated to enhance people's wellbeing, sustainable national economic growth, entrepreneurship and competitiveness. A number of research projects is under implementation and are expected to advance Research and Development performance both quantitatively and qualitatively.

Expected outcomes of NRIF

The NRIF is expected to boost national research and innovation capacity and productivity towards socio-economic transformation.

Achievements



The technical team from INES-Ruhengeri were trained on how to use the FRAS technology for the measurements of the level of oxidative stress and antioxidant capacity, a project under Special Collaboration Research Grants to address Covid-19 Pandemic.



Bioethanol and hand sanitizer production from sugar cane molasse and aloae vera gel hand sanitizer, a project under Special Collaboration Research Grants to address Covid-19 Pandemic.

NRIF Instruments

- **Establishment of Frameworks for operationalization of NRIF:** In order to operationalize the National Research and Innovation Fund (NRIF), NCST established various frameworks including the NRIF strategic framework, procedures manual and M&E framework.
- **Supporting Research and Innovation productivity and performance:** Since 2019 up to date the Government of Rwanda through NCST has committed four (4) billions Rwanda Francs under a) Academia-industry collaboration (19 grants); b) Excellent Research (11 Grants); c) Rwanda Innovation Challenge (36 grants), d) Special Collaborative Schemes to address COVID-19 (17 grants), and Sector Strategic Research Grant (8 Grants) as summarized in Table 1.

Excellent research Grants

This grant has been established in 2019 for a two-year period up to 2021 as one of the funding instruments towards supporting the growth of a portfolio of research projects that will create new knowledge and enable breakthroughs in Science, Technol-

ogy, Engineering, and Mathematics (STEM). Eleven (11) **Research Projects** have been supported in areas of ICT, Agriculture, Health, Energy, Mining and Natural Resources, Manufacturing, Climate change.

Rwanda Innovation Challenges Grant

To contribute in improving innovation outputs, **Thirty six (36)** Rwanda Innovation Challenge (RIC) grants were supported (year 2020-2021) through the Incubation Services Provisions towards strengthening the national innovation capacity and promoting technology breakthroughs – Areas of support include: Mentorship, Prototyping, Business Modeling, Market Research, team building, among others.

Special Collaboration Research Grants to address Covid-19 Pandemic

Due to COVID-19 pandemic, Rwanda has increased investment in COVID-19 related research, NCST is supporting **Seventeen (17) Research Projects** (Year 2020- 2021) under 4 main areas namely:

- **Improving Diagnostic and real-Time testing for COVID-19 infection** focusing on availability of timely and accurate diagnostic tests.
- **Improving Society Resilience to Mitigate the Impact of COVID-19 Pandemic** in Rwanda.
- **Strategic Innovations for Protective Equipment for Prevention and Management COVID-19 Infection in Rwanda.** The goal is applied research to demonstrate high-quality innovative technology of equipment for public prevention and/or management of coronavirus disease.
- **Predicting and Monitoring the Impact COVID-19 pandemic in Rwanda** to predict and monitor COVID-19 infection and morbidity rates, and to assess public health preparedness levels to prevent risks of widespread infection.

Academia-Industry Collaboration Research Grants

In order to increase strategic collaboration between academia and the private sector, the NCST through

NRIF is funding **Nineteen (19) Research Projects** (year 2021-2024) to ensure that these grants fuel industrial productivity and fast-tracking Rwanda's economic transformation especially in the area of technology for industrial development.

Funding mobilization

NCST is mandated to manage NRIF but also to mobilize funds for leveraging R&D outputs. In this regard, NCST managed to raise funding amounting to 500,000 CAD from the IDRC to support Eight (8) Research Projects in areas of Modern Agriculture and Sustainable Energy aiming to the development of products or services that directly address outstanding sector issues and express potential to benefit the citizenry.

Challenges

There are challenges noted in the process of boosting the national research and Innovation capacity and productivity. These include mainly:

- Low research investment by private sector.
- Low research productivity that can be leveraged by incentives to researchers through performance-based financing

Future plans

Rwanda needs to strengthen R&D outputs that lead to innovative solutions and technology development in order to contribute optimally to the country's social-economic development target. This will require commitment and collaboration from the government, high education, business, and private non profit sectors. In this regard, NCST is particularly planning to establish **"Grand Challenges Rwanda"** and other specific collaborative research grants schemes aiming at funding **"Big Ideas Bold Minds"** on research projects in specific priority areas.

Table: Summary of Research and Innovation Grants

Grant Name (Ongoing)	Focus Area (Group)	Applicants	Grants	Total Funding
Excellent Research Grant	Researchers & Academicians	97	11	532 millions
Rwanda Innovation Challenge Grant	Youth & Women Innovators	212	36	280 millions
Academia Industry Collaboration	Industry product development	44	19	1.7 billions
Sector Strategic Research Grant	Energy & Agriculture Sectors	28	8	480 millions
Special Collaborative Research Grant to address COVID 19 Pandemic	COVID-19 Interventions	23	17	992 millions



Besides enabling technology development and breakthroughs, the grants are intent on fostering uptake of Rwandan-based innovations