

Rwanda Science, Technology and Innovation (STI) Partners Meeting 15 June 2007

Executive Summary

The STI Partners meeting was organised by the Ministry of Science, Technology and Research (MINISTR) to bring together partners supporting the STI agenda in Rwanda. The meeting was timed to coincide with the visit of DFID's Chief Scientist (Professor Sir Gordon Conway) and Chief Economist (Professor Tony Venables) and the completion of World Bank supported studies of STI capacity building needs assessments and action plans.

Main Conclusions

Partnerships for STI in Rwanda

The Partners Meeting described a complex and highly interdependent institutional landscape for STI in Rwanda. The stakeholder consultation to be facilitated by the STIR project will need to consider the best way to build functional partnerships between the multiple government, private sector and civil society actors engaged in supporting STI in Rwanda. Within the GoR it will be necessary to delineate responsibilities between MINISTR, the proposed NCSTI and NRF and relevant sectoral ministries, ensuring that budget and human resource is allocated in such a way that promotes efficiency and delivery of results. The Ministry of Finance and Economic Planning (MINECOFIN) will also need to be engaged in this process. MINISTR's proposal for a STI Sector Wide Approach (SWAp) would help to promote donor harmonisation in support of relevant STI activities in Rwanda.

Demand for STI

STI will have a major role in Rwanda's future development contributing to broad-based growth, human well being and good governance. The meeting demonstrated a vision of how this could happen in Rwanda and government ministries presented their priority problems and proposed actions. STI was seen to be a cross cutting issue, but one that requires government leadership and coordination through the Ministry of Science, Technology and Research. The private sector was seen to be best placed to assess demand and to create innovation in the economy.

A demand-led and results-focused approach to government investment in STI was considered essential. This will need to link into planning frameworks including specifically the EDPRS and sectoral strategies and plans. Priorities should be established through broad-based stakeholder consultation and the system of governance for STI proposed in the National STI Policy should create opportunities for this through the National Commission for Science Technology and Innovation.

A broad-based approach to delivering innovation will require the development of *effective* Public-Private Partnerships. This approach should recognise that agriculture makes up the largest component of the private sector and that farmers should be treated as potentially significant entrepreneurs.

Priority actions

A number of priority actions were identified by participants. These are described in the presentations of individual sector ministries. Gordon Conway (DFID) identified six areas and noted that in nearly all cases the technology required to make significant progress was already in existence. The resulting discussion concluded that there is no need for Rwanda to "reinvent the wheel", rather it was essential to start delivering significant and rapid results by identifying potential actions that could deliver "quick wins".

The six areas highlighted by Gordon Conway included:

- Increased agricultural production
- Malaria.
- National and local energy systems (including specifically small-scale hydroelectric generation)
- Food processing for domestic consumption.
- Value added commodities for export.

- Transport and communications systems (to provide access for businesses to markets and raw materials).

His Excellency President Kagame was subsequently briefed on the discussions that took place during the meeting and the need to identify and implement ways to apply science and innovation to promote development, including the potential for quick wins, during a meeting with Minister Murenzi and Sir Gordon Conway.

Enabling environment for STI

One of the most important priority actions for government and private sector action to promote innovation was considered to establish an enabling business and regulatory environment. This was considered to be one of the most important current impediments covering aspects such as incentive measures, access to knowledge, finance, infrastructure (roads and communication), energy and most importantly human resources with relevant skills. It was recognized that these represent very significant challenges which need to be addressed if the National STI Policy is to produce results.

In addition to the business environment, the meeting discussed other actions that would be required to promote economic growth through innovation. The energy and education sectors were both highlighted as having synergetic relationships to the STI Policy, since both required their own inputs of technology for innovation, but where also significant progress in these sectors is essential if national strategy for innovation is to succeed. Investment in infrastructure was highlighted through the urgent need to improve road networks to give businesses access to markets and raw materials.

Delivering and measuring results

A constant theme was that government investment in STI needed to deliver results that made a difference to the national economy and people's lives. This reinforced the importance of embedding STI into the revision of the EDPRS. It also led to a recognition of the importance of the development of effective systems for monitoring and evaluation of STI activities by MINISTR.

The need to link investment in STI with potential economic development led to the comment from DFID's Chief Scientist and Chief Economist that the relevant ministries in Rwanda should consider establishing a similar dynamic to assist in priority setting and measuring results by creating innovation groups with representation of scientists and economists. It was also noted that a similar dynamic could be very beneficial within the leadership team for the proposed National Commission for Science, Technology and Innovation.

DFID and World Bank support for STI in Rwanda.

DFID and the World Bank described the current status of their support for STI in Rwanda and future plans. It was noted that there is an emerging shared agenda between the Government of Rwanda, The World Bank and DFID which emphasises the contribution that STI will make to the future development of Rwanda. DFID announced their support for a new programme of Technical Assistance through the "Science, Technology and Innovation for Results (STIR)" project which will assist MINISTR to build legal frameworks (laws and regulations) and institutional structures designed to ensure future government investment in STI delivers real and measurable improvements to the lives of people in Rwanda. The World Bank announced that their future support was likely to support the implementation of capacity building measures in high priority areas that would be designed to deliver against the need for evidence of success through the application of STI in Rwanda.

Next Steps.

The priority action for the Government of Rwanda will be to incorporate the results from the capacity building needs assessment and action plans into the EDPRS and for each sector ministry to continue to articulate how STI would contribute to achieving their missions. MINISTR would need to ensure that the EDPRS also reflected the need for a coordinating function for STI within the government.

MINISTR would work with the new STIR project over the next year to establish an enabling environment for innovation starting with the legal frameworks and institutional structures for STI. Current World Bank support for STI would end in June 2007, but there are plans to respond to needs expressed by the GoR to support implementation of priority action plans.

Specific Recommendations

1. Government investment in STI needs to be demand-led and producing results supporting economic growth and development in Rwanda. Priorities for future investment in STI through MINISTR and other line ministries need to be articulated through the EDPRS.
(MINISTR / Line ministries)
2. Rwanda needs STI to deliver against priority problems through a series of “quick wins” within agreed priority sectors.
(Line ministries / MINISTR / World Bank)
3. The development of an enabling environment for innovation in Rwanda needs to be given a high priority, including the addressing critical impediments such as the business environment, access to knowledge and finance, infrastructure and human capacity. The private sector needs to be fully engaged through the development of effective Public-Private Partnerships as part of an emerging National Innovation System (NIS).
(MINISTR / MINECOFIN)
4. There needs to be broad stakeholder engagement in setting priorities for and assessing impact of STI in Rwanda and linking this to relevant development targets. The National Commission for Science, Technology and Innovation (NCSTI) should be designed to facilitate this.
(STIR / MINISTR)
5. The GoR’s STIR project (funded by DFID) needs to support MINISTR in defining appropriate functional partnerships and responsibilities in support of STI in Rwanda covering the public and private sectors and civil society.
(STIR / MINISTR)
6. GoR should consider creating a dynamic between scientific and economic advisors in the oversight of development and innovation in sectoral ministries and specifically in the proposed NCSTI.
(STIR / MINISTR)
7. MINISTR needs to develop a results-focused monitoring and evaluation framework for STI in Rwanda.
(STIR / MINISTR)

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Summary of the STI Partners Meeting

Background

The STI Partners meeting was organised by the Ministry of Science, Technology and Research (MINISTR) to bring together partners supporting the STI agenda in Rwanda. The meeting was timed to coincide with the visit of DFID's Chief Scientist (Professor Sir Gordon Conway) and Chief Economist (Professor Tony Venables) and the completion of World Bank supported studies of STI capacity building needs assessments and action plans.

The structure of the meeting (Annex 1) was designed to link demand for STI with supply and delivery, through a process which included a Ministerial Session where the needs for STI could be related to the areas of education, energy, agriculture, health, environment and industry. All speakers and discussants were asked to consider how STI could deliver against Rwanda's current needs, how progress could be measured (monitoring impact) and how priority needs could be expressed within the ongoing revision of Rwanda's Economic Development and Poverty Reduction Strategy. (EDPRS).

This report is designed to distil the key messages that emerged from the meeting and associated discussions. All of the powerpoint presentations from the meeting are available for download from <http://www.geos.ed.ac.uk/homes/paulvg/stimeeting> and specific details are not reproduced here.

Setting the scene: STI, economic and social development in Rwanda.

A number of speakers were given the task to set the scene for the application of STI to support Rwanda's development from both a national and international perspective. The key issues emerging from their presentations and resulting discussion are presented here. The order that information is presented differs from that adopted during the meeting.

Contribution of STI to economic development and poverty reduction.

Hon. Mrs. Monique Nsanzabaganwa, Minister of State in Charge of Economic Planning

The Minister started by questioning how S&T is adding value to economy, develop and poverty reduction and how to monitor and evaluate this impact. She stated that STI are essential for economic development especially in resource scarce landlocked countries like Rwanda where there is high population pressure on land, a limited natural resource base, high transport costs and many other challenges such as environmental degradation. STI was presented as being vital for the next phase of the EDPRS because of the need to diversify the economy into higher value produce in agriculture and services. This was presented through the need to utilise existing resources more efficiently.

The Minister stated that the Government of Rwanda (GoR) believes in the power of S&T to foster economic growth and poverty reduction in Rwanda and this was recognised through the establishment of the Ministry of Science, Technology and Research (MINISTR) within the Office of the President and the subsequent production of a National Science, Technology and Innovation Policy. She stated that government support of STI needed to stress the links to application, ensuring that STI was put to use. She suggested that engaging the private sector would be critical in delivering impact, especially through the development of Public-Private Partnership (PPP). She also suggested that STI activities needed to be designed to have very close links with potential beneficiaries (e.g. farmers, business) during all stages from research through to applications.

The monitoring and evaluation (M&E) of impact of STI actions were presented as being very important during implementation of the STI Policy. It was recommended that research institutions will need to enhance their own M&E systems and that these should be overseen by MINISTR.

The EDPRS was presented as a coordinating mechanism that could link demand with potential results. The strong demand for STI in a range of sectors was presented as a general recognition of the need to *apply* technology and linked to a statement that a number of *quick wins are required* and that in most cases the required technology was already available and the real problem was one of access and application. Business entrepreneurs were considered as being able to drive the application of technology for Rwanda's development. It was suggested that the government needs to build strong and strategic partnerships with the private sector (PPP) and with development partners to support innovation for development. Within the context of the forthcoming EDPRS it was stated that Rwanda needed to make progress through the application of innovation over the next five years, using the best currently available opportunities and to use this as a learning process monitoring impact and any lessons learnt.

Rwanda's agenda for building STI Capacity

Hon. Prof. Romain Murenzi, Minister of Science, Technology and Scientific Research

Minister Murenzi presented a vision for how STI could contribute to national development in Rwanda. He stated that there is committed political leadership demanding that STI contributes to economic growth and development starting from the President and working down. It was stated that knowledge needs to be used to deliver growth, if it's not used research and technology doesn't make a difference.

The National STI Policy was presented as providing a long-term basis for STI to underpin development through the establishment of institutional structures (and their legal basis) that would direct and fund a science technology and innovation system for Rwanda. Improving the governance of STI in Rwanda was seen as being critical to encourage the delivery of results or impact.

The private sector was presented as being a key partner in the innovation process either directly or through Public-Private Partnerships. There was a recognition that existing government-funded research and extension institutions are underperforming with a question of "where are the results from current investment?"

Minister Murenzi made a number of key points:

- The National STI Policy presented a vision for how STI could contribute to economic growth and development.
- Rwanda needs to create a new culture (or environment) that supported innovation.
- There is a need for several "quick win" options relating to investment in STI. Proposed World Bank (WB) support may help to develop some of these.
- The private sector will drive growth and innovation. The free market is important, competition brings innovation.
- Government-funded STI in Rwanda needs to be responsive to demand and deliver measurable value.
- MINISTR's priorities and those of other ministries for STI needed to be represented in the EDPRS.
- There is a need for a strong monitoring and evaluation framework for STI investment that measures impact and results.
- MINISTR would like to build partnerships with development donors in support of STI leading eventually to a Sector Wide Approach (SWAp) for STI.

World Bank: STI for development.

Ms Joy Phumaphi, Vice President & Head of Human Resource

Development Network;

Susan Opper, Senior Education Specialist

World Bank staff presented a set of broad comments. STI was presented as being essential (not an option or luxury) which is integrated into everything that is done to support development. STI was presented as being an essential component of development activities that assists developing countries to move forward. The important and cross-cutting nature of STI means that it is necessary to assess needs and opportunities associated with innovation early in any dialogue on development and to engage and consult a wide range of stakeholders.

Innovation was seen as being much more than the production of relevant research, it was seen as about thinking and acting differently. The management acquisition and dissemination of knowledge was seen as being important and requiring new approaches to education and training. The broad definition of innovation was seen as including all sectors of the economy including financial, marketing and retail sectors. It was stressed that management, business and process innovation can be equally or even more important than strict scientific innovation.

Susan Opper summarised some of the early discussion during the day stating that the meeting was "talking about wealth generation through the application of science, technology and innovation using and building up the human resources in Rwanda, linked systematically through international channels to provide practical

solutions to practical problems while not sacrificing the high ambition of producing world class and world relevant research”

Science and Economics of Development (DFID).
Prof. Sir Gordon Conway, Chief Scientific Adviser
Prof Tony Venables, Chief Economist.

Gordon Conway linked the discussion of STI in Rwanda to the international context and the activities of the UK’s Department For International Development (DFID). He stated that STI has a growing prominence as a driving force for development in Africa and that Rwanda was providing leadership to the Continent as evidenced by President Kagame’s speeches to the Royal Society in London in 2006 and the African Union Summit in Addis Ababa in January 2007.

He stated that DFID has two main foci for their work, the Millennium Development Goals (MDGs) and economic growth. He stated that STI can deliver against both of these priorities. It was suggested that for most of the poor in Sub-Saharan Africa, growth would equate to rural economic growth (or development) and growth in agricultural, forestry and fisheries activities. It was noted that Africa’s own science-base has been able to make significant contributions to development and growth, for example improved rice and bananas produced using tissue culture.

Tony Venables presented an economic perspective starting with the question of “what is the comparative advantage in a landlocked country in the centre of Africa”? He suggested that growth in a country such as Rwanda can come about in two ways: doing existing activities better (raising productivity) or creating new activities (new jobs and products). He suggested that in Rwanda, agriculture must have the most urgent priorities and challenges with 80 % of population activity engaged in some sort of agricultural activities. Increasing yields was presented as the most immediate problem with energy supply being almost equally important.

Gordon Conway stated that the key to progress was to identify demand and both stated that the private sector (including farmers) would be best placed to define this. Six areas of most urgent priority were suggested that would promote growth and improve the livelihoods of households:

- Increased agricultural production
- Malaria.
- National and local energy systems (including specifically small-scale hydroelectric generation)
- Food processing for domestic consumption.
- Value added commodities for export.
- Transport and communications systems (to provide access for businesses to markets and raw materials)

It was noted that these areas of need were likely to overlap, for example value added exports can improve the livelihoods of households while improved energy supply can promote food processing which in turn can improve livelihoods and eventually contribute to exports. It was suggested that **within each of these areas demand needs to be identified by entrepreneurs.** It was also noted that technological solutions already exist for most of these issues in Rwanda and that the urgent challenge was to identify, adapt and apply appropriate technologies and that this was at the heart of the process of innovation.

Innovation

The process of innovation was presented as being central to Rwanda’s future development. It was presented as being wider than just a scientific process recognising that in some circumstances business innovation and the enabling business and economic environments may be equally or even more important. A favourable business environment encourages entrepreneurs to take risk through ensuring access to materials, labour, finance and marketing opportunities.

It was noted that growth comes from the process of innovation which involves doing existing things better and for entrepreneurs to start doing new things which can be very important in creating new jobs, often in the export sector. A question was posed to define what new business activities for are possible Rwanda? It was stated that high-volume labour intensive exports such clothing are not well suited for a landlocked nation

such as Rwanda. Rwanda needs to find areas where it has a comparative advantage. It was suggested that this should not be a role primarily for government, but instead suggested that this would be an important role for business, through its process of innovation which the science and technology community should then respond to. Finding opportunities was presented as a process of business innovation trying new things, through discovery, experimentation, primarily by business with entrepreneurs spotting and developing market opportunities.

Tony Venables presented three priorities for innovation in Rwanda's economy:

- **Innovation capacity** including human capacity.
- **Openness.** It was suggested that up to 99 % of the ideas behind potential innovation will come from the outside world. Rwanda had to remain open to ideas, communication networks and external investment.
- **Economic environment**, making sure that there are returns to investment, incentives and an environment that makes it easy for business to innovate and for private investors, including farmers make the investment decisions required to use new technology.

An important role of government was to get the economic environment and incentives right. Using farmers as an example, it was suggested that they will make investment decisions to use improved technologies (varieties, fertiliser) based on issues such as land tenure, the availability and price of fertilisers and seeds (known, existing technologies), transport infrastructure (i.e. road networks) and access to finance including microcredit for small farmers. He also suggested that governments need to become intelligent consumers of research, needing to know where to find or commission research and how to apply it to support economic growth.

Gordon Conway suggested that most modern scientific innovation is stimulated by innovation systems and pathways. The example of insecticide treated bednets was presented as being the result of an international innovation system linking the public and private sectors in many countries. The use of these has been shown to make significant reductions in the incidence rates of malarial infections.

A major challenge for developing countries will be how to get access to or develop their own innovation systems? It was suggested that the key is to identify demand as there are very few occasions that supply drives demand most notably the expansion of use of mobile phones. Public-Private Partnerships were presented as a way to promote innovation with governments providing the institutions and policies that overcome the obstacles to investment in innovation and the private sector (entrepreneurs) who identify demand and seek appropriate innovations.

It was suggested that building a national system for (scientific) innovation required in Rwanda required:

- **Coherent policies** for science, technology innovation, business and economic development.
- **An educated workforce.**
- **Innovative enterprises.**
- **Effective and responsive** Educational, Vocational Training, and R&D Institutes.

Gordon Conway described DFID's support for innovation within the pro-poor growth agenda as involving a broad range of actions including:

- Rural-urban linkages
- Small scale rural and urban entrepreneurship
- Larger scale industrial innovation for domestic consumption and exports

The role of technology.

The application of technology was presented as needing to respond to demand and that Rwanda should seek to locate and adopt the most appropriate technology to meet its needs (noting that most of the required technology is already available).

Appropriate technology was defined as being:

- Appropriate for the socio-economic and environmental conditions;
- Producing a high return on investment;
- Being affordable and accessible;
- And sustainable.

A series of questions were presented by Gordon Conway as a way to assess potential technologies:

- Is the technology or process effective in meeting the desired ends?
 - Does it help meet the MDGs for example
- Is it value for money?
 - Does it produce the desired effect relatively cheaply or is more cost effective than the alternatives?
- Is it equitable and sustainable?
 - Do the poor benefit or only the better-off and once introduced will it be relatively easy to sustain?
- What are the downsides?
 - Are there undesirable side-effects?

Some concluding observations

At the end of the meeting Gordon Conway made a series of observations. He considered that it had been significant and important that the government ministries represented at the meeting had been able to articulate their needs (demand) and the potential for STI to provide relevant solutions. The link was made to the EDPRS process suggesting that the sectoral presentations had provided a plan for growth and development in Rwanda through the identification of priority problems and proposed actions.

The need to identify “quick wins” was highlighted such that STI activities could make a real difference over the next five years. It was suggested that in most cases there are known technologies either in Rwanda or internationally which could deliver this for example increasing yields, preventing malaria or microgeneration whilst recognising that other issues such as the large-scale safe and sustainable extraction of methane from Lake Kivu to generate electricity will be a challenge for high-level S&T.

The most important actions to promote innovation were presented being developing favourable economic and social environments such that entrepreneurs (from business people through to individual farmers) can find, adopt or modify technologies to produce the solutions needed by the country. It was stressed that neither science nor economics can provide solutions in isolation. A view emerging from the meeting was that technology, finance and government need to be balanced through dialogue. *It was suggested that each ministry should consider bringing together scientists with economists and entrepreneurs to find innovative approaches to deliver solutions and economic development.*

Gordon Conway concluded that Rwanda is well on the path to become a country that can show the rest of Africa how to use science and technology in an innovative framework designed to really make a difference in things that matter like hunger, human health and energy.

Building Legal and Regulatory Frameworks for STI Dr Paul van Gardingen, Consultant to DFID Rwanda

Paul van Gardingen presented an overview of DFID support to STI in Rwanda. It was suggested that innovation creates opportunities for people to improve their own lives and that public investment in STI must be focused on delivering against the priorities and needs of society. Rwanda's EDPRS and the National STI Policy were presented as the government frameworks to deliver this process and deliver results.

DFID's support for STI in Rwanda was described as being intended to build legal frameworks (laws and regulations) and institutional structures designed to ensure future government investment in STI delivers real and measurable improvements to the lives of people in Rwanda. DFID's STI support in Rwanda were presented as being part of an emerging shared agenda between the Government of Rwanda, World Bank and DFID which emphasises the contribution that STI will make to the future development of Rwanda.

The structure and objectives of STIR were described through its four outputs:

1. Definition of institutional structures and relationships required to implement the National STI Policy.
2. Draft legal and regulatory frameworks required to implement Rwanda's National STI Policy.
3. Definition of requirements for processes of building human capacity and institutional change required to support implementation of the National STI Policy.
4. An integrated approach to measure the benefits and impact of government investment in STI .

The critical importance of being able to measure impact as part of the EDPRS cycle was expanded. It was stated that the ability to measure the benefits and impacts of the STI Policy will: challenge STI institutions and practitioners to adopt new ways of working; promote their focus on delivery of results and generate the evidence required to ensure continued support for STI activities.

In summary, it was reiterated that public investment in STI needs to deliver results that address the priorities and needs of society including: economic growth; poverty reduction; health; human well-being and good governance. DFID support the Government of Rwanda's implementation of their STI Policy will be delivered through the "Science, Technology and Innovation for Results" (STIR) project providing the legal, regulatory and institutional frameworks required for implementation of the Policy and a monitoring framework to measure benefits and impact in relation to the EDPRS.

Building STI Capacity to Meet Economic and Social Development Goals Dr Alfred Watkins, Science and Technology Programme Coordinator, World Bank

Al Watkins presented an overview of recent World Bank (WB) funded activities designed to define the needs for STI capacity building and develop associated action plans in six priority areas defined by the GoR. He noted that people in government are committed to try to go beyond talking about STI to innovation for results. The aim of the WB support was presented as building the capacity of Rwanda to use science to solve its own problems, effectively finding practical solutions for practical problems facing ordinary people. The guiding principle was that the application of STI is a necessity, not a luxury.

The six needs assessments covered the following areas:

- Appropriate Technology Development and Diffusion
- Food Processing
- Delivery of clean water to rural villages
- Agriculture productivity.
- Geosciences and Geothermal Energy
- Adding value to natural resources.

The starting point used in the WB studies was that STI need to be applied to generate wealth (economic growth) and reduce poverty. Rwanda's isolation and poor transport infrastructure means that growth needs to be delivered through domestic activity or else through focus on low-volume, high value added exports. The six needs assessments had started by defining Rwanda's current capacity, then identified what was

required for the country to be able to address key issues and finally the development of an action plan to build required capacity.

Five components of capacity were highlighted as probably requiring action. These were the ability to:

- Formulate and implement policy by national and district governments;
- Find, adapt and import knowledge to solve Rwanda's problems;
- Utilise knowledge to innovate by businesses and entrepreneurs;
- Train people to do more sophisticated things and through this produce added value and generate income;
- Generation of new knowledge by research and development institutions (and business).

The importance of getting the right balance between these was stressed.

Main Findings

Detailed findings from the studies will be published jointly by MINISTR and the WB. The [presentation](#) from the Partners Meeting contains brief summaries of the findings from each study..

The studies had identified numerous development challenges. Reforms in individual sectors had been identified as being necessary, but not sufficient to drive growth and development. Building STI capacity was presented as being a cross cutting issue necessary at all skill levels with an associated need to think about an enterprise-based model for innovation

In addition to building skills, there is also a need to remove the barriers to innovation specifically those relating to businesses, making it easier for them to get started. Associated with this the studies identified a need to building entrepreneurship skills so that the nascent private sector has the ability to identify demand and use knowledge to meet that demand.

The priority action for the GoR in response to the studies will be to incorporate the results and action plans into the EDPRS revision. In addition donor coordination and harmonisation by the government will be important as will be starting a process to ensure that the private sector is fully engaged in the STI agenda in Rwanda.

General Discussion

The discussion and panel sessions provided further insight into how STI could contribute to Rwanda's environment and the necessary enabling conditions for this to happen.

Investment in STI.

The EDPRS and associated sector plans were presented as being the main way to link future government investment in STI with demand. It was stated this provided a way to link demand-led research needs with national planning systems and those to measure impact. Whilst it was recognised that government sector ministries have an important role there is a need for coordination at government (MINISTR) and that there needs to be strong cooperation and dialogue between stakeholders as STI solutions tend to be cross-cutting.

The need to engage the private sector and entrepreneurs was stressed on numerous occasions with a conclusion that Rwanda needs to start to build genuine Public-Private Partnerships to support building national innovation capacity. A number of speakers reiterated that farmers represent Rwanda's largest grouping in the private sector and that they need to be treated as entrepreneurs and encouraged to experiment and innovate.

Defining and agreeing priorities

The presentations and discussion clearly defined the need for Rwanda to set priorities for government investment in STI. This was split into two themes; the identification of constraints and making choices between competing priorities.

It was suggested that Rwanda needs to identify the critical constraints that can be address through government investment in STI and human capacity building. Gordon Conway noted that the presentations by the sector ministries provided a good start to this process. The following discussion highlighted that society needs to be involved in the decisions setting priorities for STI in Rwanda because people are the ultimate beneficiaries of development and this needs to respond to their needs

It was noted that the GoR needs to have mechanisms to make the decisions between a range of competing priorities in the STI sector. The combination of incorporating STI into the EDPRS and the proposed new governance system for STI was seen as providing a mechanism for all stakeholders to influence and have a voice in setting future STI priorities in driving economic and social development in Rwanda.

Promoting innovation

There are isolated examples of innovation in Rwanda, but these are currently rare. It was also stated that most of the knowledge and technology that is required to solve Rwanda's most urgent problems are already in existing. This raised the question of what is currently limiting the application of existing knowledge and solutions in Rwanda. Is it the absence of a suitable enabling environment, poor access to knowledge, access to finance or the lack of human capacity? These questions were presented as requiring urgent attention and promoting Public-Private Partnerships as one way to start overcoming the constraints.

It was suggested that Rwanda needs to start developing infrastructure and a business environment that promotes innovation (scientific and business). The starting point should be promoting the application and where necessary adaptation of existing technology to solve Rwanda's priority problems.

In his summary Minister Murenzi made the point that the STI agenda must be driven by results not be supply driven (by spending targets or responding to researcher's assessment of need). He observed that STI is a tool that only obtains value if applied. He stated that "money needs to be spent well and targeted to solve specific problems and deliver results relevant to demand".

Sectoral Priorities

Introduction

Presentations were made on behalf of six ministries which have a strong interest in STI for development. The material presented to the meeting is presented in summary form.

Energy

Hon Eng Albert Butare, Minister of State in Charge of Energy and Communications

The sustainable supply and management of energy in Rwanda was presented as being dependent on STI. At present 90 % of Rwanda's energy needs are met by biomass with the remainder provided by oil and electricity. Rwanda and the region are in an energy crisis resulting from lack of investment over the last 25 years, environmental degradation and the effects of climate change on water levels for hydroelectric generation. Rwanda has a very low level of access to electricity (4.5 %) and low generating capacity (50 MW) and one of the highest tariffs in the world. The EDPRS sets clear energy targets, to increase access to 5 %, and generating capacity from 50 to 115 MW.

Economic growth requires energy and this will require investment and innovation. Rwanda's energy strategy involves diversification ranging from small scale options such as micro-hydro and solar ranging to large-scale potential developments such the generation from methane to be extracted from Lake Kivu, the option with the most significant technical challenges. For all options it will be necessary to evaluate the technological options and assess potential environmental impact and risk.

The presentation concluded that STI and energy are in a symbiotic relationship where technology and innovation will be required to meet the future energy needs of Rwanda, but energy will also be required for STI to contribute to the country's economic development in other sectors. The contribution of STI would be measured through the EDPRS monitoring targets.

Agriculture

Hon. Dr Daphrose Gahakwa, Minister of State in Charge of Agriculture

Agriculture is the main activity in the economy, employing 80 % of the population contributing 40 % of GDP and 80 % of exports. At the same time 56 % of people live in poverty and hence are food insecure. The EDPRS sets high targets for the agricultural sector including a target of 6 % annual growth in productivity and at least 7 % for export revenues.

Agriculture faces a range of significant challenges. For cropping systems these include: low production (unimproved varieties), soil erosion, access to water in rain-fed systems, pests and diseases whilst animal production is limited by inappropriate breeds, animal disease and poor marketing systems. These are all accentuated through lack of financial investment in human capacity.

Increasing agriculture's contribution to the economy requires action on two fronts, to increase productivity and increased competitiveness. Science, technology and innovation was presented as having an important role in delivering against this agenda. It was concluded that addressing productivity and quality challenges are achievable and the private sector need to be engaged if this process is to succeed. The ways to monitor impact would therefore be related to indicators of agricultural production and value of agricultural exports.

Health

Dr Anita Asiimwe, Managing Director, Treatment and Research AIDS Centre

The challenges facing health in Rwanda are significant. These include disease burden, insufficient trained health professionals (1 doctor for 50,000 patients) and poor accessibility to healthcare as well as the general levels of extreme poverty and poor education. Malaria is the main cause of mortality and morbidity whilst TB prevalence is increasing as a result of HIV-Aids. HIV-Aids prevalence rates are an average of 3 % nationally rising to 7 % in urban areas.

Technology is seen as addressing many of the critical constraints in the health care system in Rwanda. Information technology and health information systems are helping to address the main problems and increase accessibility (e.g. telemedicine). Information technology provides a mechanism to collate data on health systems providing the Ministry the ability to enhance its own research base to understand progress of disease epidemics and the impacts of treatments.

Environment

Hon. Mrs Patricia Hajabakiga, Minister of State in Charge of Land and Environment

S&T are seen as being central to sustainable development as the key to ensuring intergenerational equity. S&T are seen as contributing information, analysis and options that facilitate the process of making informed decisions. Environmental policy requires S&T. Rwanda needs to promote a research agenda that addresses various environmental issues. Key challenges include climate change, energy resources and environmental (often land) degradation and pollution.

In relation to energy resources it is important to recognise that fuel wood is a major source of energy used in the country. There has been a major decline in forest cover from 23 % in 1993 to a current estimate of 18 %. The development of new large energy developments (such as Methane from Lake Kivu) may have associated potential environmental impacts which will need to be managed. Rwanda also needs to look for appropriate technologies as a way to reduce the environmental impact of industries as these develop.

It was recognised that strong partnership with all relevant stakeholders will be required to ensure that S&T is integrated into environmental management for sustainable development. It was stated that sustainable development cannot be achieved without building and strengthening relevant institutions and indigenous capacities for S&T.

Industry and Investment

Hon. Mr Vincent Karega, Minister of State in Charge of Industry and Investment Promotion

The industrial sector in Rwanda is still poorly developed, in 2004 employing only 3 % of the active population. The sector is expanding from this low base with a rate of 11.1 % in 2005. Exports currently are only one third of imports leading to a significant trade deficit. There is an urgent need to promote activities that add value to the economy through products that enhance productivity and give high returns. The GoR has a vision to move from a subsistence agriculture economy to a knowledge-based economy. S&T needs to add value throughout the whole chain from production, processing and marketing.

Exports are mainly of agro-industrial products, mainly coffee, tea, pyrethrum and juices with more limited exports of manufactured goods. There are opportunities to boost the quality and quantity of existing exports and to develop new or niche products most of which are currently untapped (e.g. silk, essential oils, and honey)

Science and Technology can help to develop new products and to add value to existing products. Rwanda needs to find, develop and apply appropriate technologies which will help to meet quality standards and develop niche markets. Development of commodity or value chains. Local industries can benefit from their late comer position through transfer of appropriate technology and skills. It is important to ask what skills are required to make this happen?

In order to make this happen, there needs to be better collaboration and partnership between the public and private sectors to ensure that STI supports business and sustainable growth. The impact of investment in S&T for industry should be monitored through results in terms of increased sales and better returns.

Education

Yisa Claver, Director of Planning, Ministry of Education

Education and training was presented as the starting point for the development of all sectors of the economy helping to meet well recognised capacity needs. For this reason the education sector will need to contribute to implementation of the National STI Policy. This is recognised in the 2003 Education Sector Policy which states that “the teaching of science and technology is at the heart of this [the Education Sector] Policy”.

The challenges related to education emerge from the competing demands placed on the sector. There is a need to provide the basic educational infrastructure (and staffing) from primary through to higher education, whilst balancing demand and investment at these levels. In addition it is essential to define which attitudes, competency and skills are required at each level leading to a stronger outcome measure of activity. The challenges and proposed responses need to be reflected in the EDPRS.

The solutions to these problems require a more holistic approach to education ensuring that the education system is delivering against the needs of employers. There is good dialogue with development partners through a Sector Wide Approach. Monitoring and evaluation for S&T in education is done through the Annual Joint Review of the education sector and is linked to examination performance, graduate tracer studies and employer satisfaction surveys.

Annex 1

Rwanda Science, Technology and Innovation (STI) Partners Meeting

Novotel, Kigali, June 15

Agenda



9:00 AM

Opening Session

- Hon. Prof. Romain Murenzi, Minister of Science, Technology and Scientific Research, Rwanda
Rwanda's Agenda for Building STI Capacity
- Ms Joy Phumaphi, Vice President & Head of Human Resource Development Network, World Bank
Science, Technology Capacity Building and Human Development
- Prof. Sir Gordon Conway, Chief Scientific Adviser, DFID, UK
Science, Technology and Innovation
- Joseph Kibui, Education Services Manager, Hewlett Packard, Africa Region
How private sector can use or build human and technical capacity in Rwanda

10:45 AM

Coffee Break

11:00 AM

- Victoria Kwakwa, Country Manager, World Bank
Chair and Opening Remarks
- Dr Paul Van Gardingen
Building Legal and Regulatory Environment for S&T
- Dr Alfred Watkins, Science and Technology Programme Coordinator, World Bank
Building STI Capacity to Meet Economic and Social Development Goals
- Plenary Session Discussion

12:30 PM

Lunch Break

2:00 PM

Ministerial Session

- Chair: Hon. Mrs. Monique Nsanzabaganwa, Minister of State in Charge of Economic Planning

Discussants: *Where Science and Technology is adding value to Economic development and Poverty Reduction, and how to monitor and evaluate the impact*

- Hon. Dr Jeanne Mujawamariya, Minister of Education
Building Science and Technology capacity through universities and schools
- Hon. Eng Albert Butare, Minister of State in Charge of Energy and Communications
Science and Technology for Infrastructure and Energy Solutions for Rwanda
- Hon. Dr Daphrose Gahakwa, Minister of State in Charge of Agriculture
Science and Technology for boosting competitiveness in agriculture sector
- Hon. Dr Innocent Nyaruhirira, Minister of State in Charge of HIV/AIDS and other Epidemic Diseases
Science and Technology for meeting health challenges in Rwanda
- Hon. Mrs Patricia Hajabakiga, Minister of State in Charge of Land and Environment, Rwanda
Science and Technology for building a sustainable environment
- Hon. Mr Vincent Karega, Minister of State in Charge of Industry and Investment Promotion
Science and Technology for building industrial capacity

Panelists: *Sir Gordon Conway, Tony Venables, Alfred Watkins, Paul Van Gardingen, Professor Lwakabamba, Rose Mukankomeje*

- Closing Remarks: Hon. Prof Romain Murenzi, Minister of Science, Technology and Scientific Research
Role of STI in meeting goals of Vision 2020