2016

Grand Challenges Africa Community Meeting

Celebrations, Conversations and Challenges

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This report is based on conference transcripts and speaker presentations. We would like to thank all presenters and moderators for allowing us to use their presentations.

Conference materials are available at http://aasciences.ac.ke/aas/en/test/test-pages/grand-challenges-africa-community-meeting/

Inspire Support Innovate

Contents

Acronyms

AAS	African Academy of Sciences
AESA	Alliance for Accelerating Excellence in Science in Africa
ANC	Antenatal Care
AU	African Union
BMGF	Bill & Melinda Gates Foundation
CSIR	Council for Scientific & Industrial Research
CSR	Corporate Social Responsibility
FGM	Female Genital Mutilation
GBV	Gender-based Violence
GC	Grand Challenges
GCC	Grand Challenges Canada
GCE	Grand Challenges Exploration
GCGH	Grand Challenges in Global Health
GDP	Gross Domestic Product
GMOs	Genetic Modified Organisms
HIV	Human Immuno-Deficiency Virus
ICT	Information, Communication and Technology
IDRC	International Development Research for Canada
KEMRI	Kenya Medical Research Institute
MDG	Millennium Development Goals
MFI	Micro Finance Institution
NCD	Non-Communicable Diseases
NCDs	Neglected and Communicable Diseases
NEPAD	New Partnership for Africa's Development
NGO(s)	Non-Governmental Organization(s)
NICD	National Institute for Communicable Diseases
NITD	Neglected, Infectious and Tropical Diseases
NSE	Nairobi Stock Exchange
R&D	Research and Development
SDG	Sustainable Development Goals
SRH	Sexual and Reproductive Health
STEM	Science, Technology, Engineering and Mathematics
STISA	Science Technology and Innovation Strategy for Africa
SWAGAA	Swaziland Action Group Against Abuse
TB	Tuberculosis
USAID	United States Agency for International Development
WRP	Walter Reed Project

Introduction

Grand Challenges Africa is a program aimed at inspiring innovation to address and significantly impact major development challenges preventing African countries from reaching the Sustainable Development Goals (SDGs).

GC Africa's vision is to achieve extraordinary innovations that transform health and address other developmental challenges in Africa.
The program's mission is to foster African-led scientific innovations that could help African countries achieve targets for the Sustainable Development Goals (SDGs)

The focus areas for GC Africa are to: -

- ✓ Consolidate and improve on the gains made through Grand Challenges support to African scientists over the last decade;
- ✓ Undertake outreach and awareness campaigns to extend the reach of the Grand Challenges funding model in Africa;
- ✓ Define and set the agenda and priorities for future Grand Challenges in health and other development programs in Africa and
- ✓ Jointly with other partners and/or independently craft, run and manage future African-centric Grand Challenges calls.

The GC Africa conference brought together grantees across Africa funded by BMGF, Grand Challenges Canada (GCC) and the US Agency for International Development (USAID). The objective of the conference was to strengthen the African Grand Challenges community and provide a platform for grantees, funders and partners to connect, share ideas and build from each other's work. The conference was aimed at providing answers to the following questions: -

- ✓ How to generate calls, activities and policies that foster African-led innovation.
- ✓ How to break down the barriers to innovation in Africa.
- ✓ How to achieve the SDGs, without, leaving any person behind.

The answers to these questions will help GC Africa to define: -

- ✓ Potential challenges that will shape and focus GC Africa
- ✓ How GC Africa can drive the innovation necessary for Africa to attain the long-term SDGs.

Conference theme

The conference theme was centered around; Celebrations, Conversations and Challenges.
Celebrations of two key groups:

- ✓ Leadership provided by AAS, AESA, NEPAD, and GC Africa and

- ✓ Grand Challenges partners (BMGF, GCC and USAID) who have since 2010 to date, invested **$120 million** in **380 projects** in **29 countries** across Central, East, Southern, North and West Africa.

Conversations centered on how to:

- ✓ Align and focus GC Africa on achievement of SDGs and
- ✓ Build capacity to discover, develop and deliver

Challenges emphasized three key areas:

- ✓ Generate calls, activities and policies that foster innovation.
- ✓ Break down the barriers to innovation in Africa.
- ✓ Achieve the SDGs without leaving behind any interested party.

1. Sessions Synopsis by Day

Day 1: Wednesday, February 24

Opening Plenary: Overview of Grand Challenges and the Post-2015 Innovation Landscape

Part 1: Welcome and climate setting

Berhanu Abegaz (Executive Director - AAS) and Thomas Kariuki (Director – AESA gave a brief background of AAS, AESA, GC Africa, GCC and BMGF outlining the role of these organizations in GC Africa. They also gave the rationale, theme and objectives for GC Africa conference. They welcomed participants to Nairobi and to the conference in their opening remarks.

Part 2: A Grand Challenges Conversation

Overview

The panel focused on experiences from the speakers' organizations, and their work in science and innovations particularly for Africa and in Africa. The organizations represented are currently funding 380 innovative projects in Africa. Their presentations provided insight on the challenges encountered, overview of the present landscape of innovations in the continent; opportunities and challenges that exist, funding and sustainability of innovation in Africa.

Speakers

Kedest Tesfagiorgis, Program Officer, Discovery & Translational Sciences, BMGF (moderator)
Steve Buchsbaum, Deputy Director, Discovery & Translational Sciences, BMGF
David Ferguson, Director, Center for Development Innovation, Global Development Lab, USAID
Peter Singer, CEO, Grand Challenges Canada

The highlights of the presentations of GC experiences were:

- ✓ Every project is a learning experience and contributes towards improving conditions in society regardless of its objectives being achieved or not. The key is to learn from the failed projects and improve on that experience and build on the successful projects.
- ✓ Early stage funding is critical in science. Funders are slow in evaluating proposals which is a great bottleneck. There is need for scientists to engage with funders through, among other ways, sharing the data with them.
- ✓ Build on existing projects, to provide an opportunity for other innovators and to engage the local communities and governments for sustainability and success.
- ✓ The recent past has seen a shift in ownership of innovation. Young Africans are now taking center-stage in identifying problems in their societies and solving them, something that needs to be encouraged.
- ✓ The next step in innovation is to move the focus of funding to Africa to avoid overreliance on the western countries and ensure sustainability. This can be achieved through commitment of the African government. Scientists need to engage the governments at all stages.
- ✓ There is need for a platform for continuous interaction among scientists and partners beyond the conferences.

Plenary Session II: Mobilizing African Resources to Generate and Scale Innovation to achieve SDG Targets

Overview

Innovation is essential in helping countries achieve the SDGs, particularly across the African continent. An African-led R&D will be crucial to unlock the transformative and innovative solutions necessary to tackle the continent's biggest challenges.

While Africa accounts for 15% of the global population, and 25% of the global disease burden, it currently only produces about 2% of the world's research output. In addition, most African countries spend less than 0.5% of their Gross Domestic Product (GDP) on R&D – far less than the global target of 1%. As such, an African-led and Africa-focused R&D agenda will require a scale-up of domestic resources from multiple sources and partners. It will require investments in bringing promising innovations to scale, and ultimately to impact.

To that end, the panel explored strategies to mobilize resources across Africa for R&D and to effectively scale innovations. Panelists examined existing frameworks, such as the African Union's Africa Health Sciences Strategy 2015-2030, and discussed how African

partners and platforms, including domestic governments, multilateral institutions, NGOs and the private sector, can drive the resources necessary to execute this work.

Speakers

Patricia Amira, TV Show Host; Journalist (moderator)
Aggrey Ambali, Head of Science, Technology & Innovation Hub, New Partnership for Africa's Development
Raj Bhan, Former Secretary, Department of Biotechnology, India
Ruth Kagia, Senior Advisor, Office of the President, Kenya
Gabriel Negatu, Regional Director, East Africa, African Development Bank
Allan Pamba, VP of Pharmaceuticals, East Africa & Government Affairs, GlaxoSmithKline
Marleen Temmerman, Chair, Department of Obstetrics and Gynecology and Director, Women's Health and Research, Aga Khan University East Africa

Role of the Kenyan Government in Research and Development (R&D)

The Kenyan government has made strides towards creating an enabling environment for innovating. Some of the efforts of the government include:

- ✓ Enactment of the Science and Technology Act that provides rules and regulations of research in the country.
- ✓ Creation of the National Convention for Science and Technology.
- ✓ Setting up of an Advisory Committee to support Science and Technology.
- ✓ Creation of Enterprise Kenya which was launched to support local ICT innovations to become big global entities.
- ✓ Government has committed funds to provide seed money for R&D.

Lessons learned from India's work to mobilize resources for investment in Research and Development (R&D) and innovation

India's has built a thriving R&D sector over the years. This has been enabled by:

- ✓ Acknowledging that innovation is created by experience and not schools. Training institutions trigger the critical mind but the potential is realized through practical engagement in R&D.
- ✓ Political goodwill has been key in India's R&D and innovation. The government is at the center of R&D and has provided an enabling environment including financial support that has led to the sustainability of innovations in India.
- ✓ Innovators do not work in isolation, ideas and findings are shared with relevant stakeholders from within and outside (e.g. funders, academic institutions, corporates etc.) the government. This has facilitated the flow of funding.
- ✓ To make funding seamless, R&D and innovations need to attract institutions, partnerships and funding.

- ✓ Challenges of water, new diseases etc. in India have created an opportunity to sell science and innovation.

How to design cross-sector partnerships between government and other institutions that drive investments in R&D and innovation, particularly in the women and reproductive health space.

‘*’We cannot achieve anything if we work in silos”*. The power of collaboration is key in solving African problems e.g. the success made towards achieving Millennium Development Goals (MDGs) is greatly attributable to partnerships, various sectors coming together to achieve a shared objective.

Establishing partnerships will begin with scientists communicating with governments. Research in the continent has failed to attract government and private partnerships because of the way the findings are communicated. How scientists communicate matters, importantly, scientists have to learn to communicate with Ministers of Finance using a language that promotes action.

There is power in using champions, for example the First Lady of Kenya, who has championed efforts to reduce maternal and child health and cervical cancer. Her advocacy has attracted participation from the private sector, the community and government.

The role of the private sector as a complement to philanthropic and governmental resources, and how the sector strikes a balance between its immediate bottom line and its support for less resource-rich innovators

Whereas the private sector is driven by profits, they have a substantial portion of their budgets dedicated to Corporate Social Responsibility (CSR) which innovators can tap into. In addition, research centers in Africa need to partner with, among others, pharmaceutical technology companies. To help unlock budgets of the private sector, African governments need to increase investments in the training of scientists and work with institutions of higher learning to develop curricula that create critical minds.

In addition, a platform that provides for a place where innovators can interact amongst themselves, with funders, governments, private sector and the consumers is key to unlocking innovation on the continent. An internet based innovations market place can provide this platform and will help scale up innovation.

NEPAD/AESA’s leadership on the development of a Pan-African Health Research and Innovation Strategy, and how it fits into the African Union’s strategy; how countries can pursue and resource complementary strategies.

African Governments have made progress towards acknowledging the role of research and innovations in solving the problems on the continent and steering the continent to greater economic levels. NEPAD has been key in pushing the R&D agenda amongst African states. As a result, Science Technology and Innovations (ST&I) is now part of the African Union (AU) agenda, having adopted the Science, Technology, and Innovation Strategy for Africa (STISA-2024) in 2014. By adopting the strategy, countries have committed towards supporting ST&I in their countries and allocating a part of their GDP to this end. Countries have started putting science in their development agenda and many have now established governance structures and programs in R&D.

The agenda now is how to move from science to science for development - take it to the community. To do this there is need to identify structures that will enable this translation and advocating for governments to meet their funding commitments.

The perspective of an African multilateral development finance institution on how to invest sustainably in innovation to drive progress and economic growth, and how the African Development Bank supports innovation across the continent.

The African continent needs to change its mindset on funding innovation. The funding crisis in the continent is largely attributable to how we value R&D. To change this, the continent needs to find sustainable funding sources which are spear-headed by the local governments and the private sector.

Research needs to be linked to resource markets. Innovators have to think of how they can engage these markets in order to create a sustainable pool of funding resources for innovation. It is therefore key that innovators engage with governments and funders at an early stage, to provide support to develop products which are relevant and that the public and private sector will be willing to invest money in. Another way of creating a sustainable pool of resources for the continent is by exploring ways to make the projects/products revenue generating and that can be traded in future markets such as the Nairobi Stock Exchange (NSE).

Adopt alternative business models where smart partnerships will ensure sustainability. Strathmore University's biogas project with the Kenyan government where the university generates biogas energy and the Kenyan government provides gas cylinders is a good example alternative models. For long term sustainability, stakeholders need to come together to invest in science and technology. It is necessary to invest in science right from the primary school level of the education system and not concentrating it at Masters and PhD levels.

Plenary Session III: Putting Women and Girls at the Centre of Development

Keynote speaker: Nyaradzayi Gumbonzvanda, General Secretary YWCA

Women and girls face a myriad of challenges including inequities in access to education, employment, Female Genital Mutilation (FGM), early child (forced) marriages etc. According to Nyaradzayi Gumbonzvanda, to invest with women and for women, "we need to invest in our research and academic institutions and in young minds so that they can innovate from a young age in order to have a pool of innovators in the continent."

A critical understanding of the invisible gender inequalities that exist in the continent is key to solving the problems of women and girls. In addition, acknowledging the female innovators is necessary as they understand their problems better and are best placed to push their agenda of course without down-playing the role of men. It is not just enough to innovate for young girls and women but we also need to innovate with them.

A society cannot make progress if slightly more than half of its population is not a part of the development agenda. Gender indicators and measures need to be integrated in all programs to be able to measure progress towards achieving equity in all sectors.

There is need for women to be owners and decision makers. We need to move from focusing on women as beneficiaries to increasing their potential.

Overview

The ratio of women to men in Africa is almost equal, yet women have less access to opportunities compared to men. They face a higher rate of challenges such as gender based violence (GBV), poor sexual and reproductive health (SRH), illiteracy, lack of power to make decisions etc. which prevent them from fully participating in economic development. They are the ones that carry a pregnancy, deliver and take care of a child yet majority of them lack the power to decide on Antenatal Care (ANC), hospital delivery, and immunization. The cost of this inequality is borne not just by women but the entire society. Discrimination against women can undermine economic development by limiting food security for families as women provide almost 43 percent of the world's agricultural labor force. Many research programs ignore the needs and aspirations of women.

In this session panelists discussed the role of women in science and why it is important to innovate for them and with them.

Speakers

Sarah Hendriks, Director of Gender Equality, Bill & Melinda Gates Foundation (moderator)

Cebile Manzini-Henwood, Executive Director, Swaziland Action Group Against Abuse (SWAGAA)

Priya Nanda, Group Director, Reproductive Health and Economic Development, International Center for Research on Women

Jemimah Njuki, Senior Program Officer, International Development Research Centre, Canada

Innovating for women

Women and girls are more vulnerable, as they lack the social and economic power to negotiate. Innovative approaches that address power relations are necessary in improving the health of women and girls especially for HIV and SRH related illnesses.
Women's empowerment is key in realizing the goals of innovations. They need to be empowered to make decisions to enable them to become producers and consumers of innovations. For example, women's decision making power is key for child and maternal health and nutrition. For innovations focused on improving sectoral outcomes like maternal and child health, nutrition, food security etc. it is important that they include an element of women's empowerment.

To work with women to ensure innovations and to articulate the voice of the women the following three issues need to be recognized: - (i) women do not live in isolation-recognize the role of boys and men in women empowerment; (ii) men need to be part of discourse in gender empowerment and (iii) legal and institutional barriers that are restricting women from achieving their potential.

What would it take to bring thoughts to reality for women and girls

Intention is quite critical in achieving innovations for women and girls. Unless projects really want to transform the lives of women and girls and place this as their core objective, the women and girls will continue to experience the problems that face them.
There is need to clearly define the evidence and process. The ingredients that make it work and evidence of context for it to work are critical issues that innovators need to address while seeking solutions to the problems of women and girls.
The challenge still remains how we can bring innovation to scale. There is need to bring in the key players in order to break attitudes/ our way of thinking. The key players include the local communities who are consumers of the innovation products.
The women and girls' agenda needs to be put the center of conversations. The conversations with donors, governments etc. ought to focus on them. Though the results will take time to be realized, innovators should not tire.

What is the way forward in innovation for women and girls

For people working to innovate with women and children, time is of essence-women and girls are a part and parcel of economic growth and development of the African continent. If they lag behind development in the continent lags behind. Results are long term thus requiring commitment especially from funders. Institutions need to change their mindset and adopt a multi-disciplinary approach. For example, if it is an agricultural institution it needs to realize that it's not just about agriculture but about life.

- ✓ Have clarity of intention- what is it we want to achieve, who is it we want to change etc.
- ✓ Let us engage government from the onset of the innovation project.

- ✓ Sustainability- think through how the initiatives will be sustained over time.
- ✓ We should be aware of why we are inventing and the end result i.e. we should be clear of the problem we want to address and the effect of our intervention on the problem
- ✓ Think through to identify the challenges and the partners to bring on board.

Plenary Session IV: All Children Thriving

Overview

All Children Thriving is a platform linking Grand Challenges programs targeting healthy births, growth, and development. This platform includes the global programs Saving Brains and Saving Lives at Birth and four new All Children Thriving programs launched simultaneously in 2014, three through Grand Challenges partnerships in Brazil, India, and South Africa, and one from the Gates Foundation. These new programs focus on new measurement tools and new combinations of approaches to ensure all children thrive – that they not only survive, but are also on a path to healthy physical growth and cognitive development.

Speakers

Evelyn Gitau, Program Manager, African Academy of Sciences (moderator)
Raj Bhan, Former Secretary, Department of Biotechnology, India
David D'Argenio, Program Officer, Bill & Melinda Gates Foundation
Karlee Silver, VP Programs, Grand Challenges Canada
Raquel Coelho, Head of the Health Sciences Division and Deputy Director of Life Sciences Directorate, National Council for Scientific and Technological Development, Brazil

Panelists examined the All Children Thriving platform as a potential model for how Grand Challenges Africa can identify priority goals and specific challenges, and achieve impact, including progress towards the SDGs.

Sustainability

In Brazil, priorities for research are set by the ministry of health. The strategy is to avoid concentration of grants in one region and build on a sustainable pool of researchers as well as prioritize on research needs.
The government should be engaged at all levels right from the preparation of proposals for grants to the dissemination of findings. This commits the government in ownership of the process and the end results thus making it easy to break into the markets or source for further funding.
To tap into young innovators' potential, higher education institutions have a role to play. In all research methodology training, 70% should be critical thinking and 30 percent methodology. In addition, the award of grants should consider the new/young researchers instead of always funding seasoned researchers.

Mental imagination and idea shaping

The way we identify and groom investigators is very important. Mentorship is key to building human resource in research. Capacity building of senior mentors to scout for talent at an early stage and mentor that talent to maturity is key in creating a pool of scientists. GC Africa can provide leadership in this by, for instance, recruiting passionate African researchers to be a part of its advisory team.

Should we target knowledge generation or go beyond

Innovation in the continent needs to identify gaps/problems in health system that need research and find innovators who can articulate the need for research in a very analytical way. Identifying strategic partnerships is key in turning innovation to development.

Technology in research

Maximum use of technology is inevitable if the goal is to improve the lives of Africans. To achieve this there is need to refocus where and how to recruit talent in order to transform lives using science and technology.

Plenary Session V: Global Health in Numbers

Integrated approach for global health data –how have things changed

Overview

Data generation is not an end in itself. Data needs to be shared for use by others including policy makers and planners. Awareness on the existence of the data is critical in creating demand for it. The session looked at the evolution of data in Africa and the stage that we currently are at. Challenges in terms of data collection, sharing and use were also discussed by the panelists.

Speakers

Shasha Jumbe, Senior Program Officer, Bill & Melinda Gates Foundation (moderator)
Jolene Esposito, Project Manager, Center for Open Science
Abdisalan Mohamed Noor, Director, KEMRI/WTRP Nairobi Program; Visiting Professor, Malaria Epidemiology, University of Oxford
Helen Kay Raseroka, Council Member, Research Data Alliance; Board of Trustees, International Network for the Availability of Scientific Publications

Data Sharing and Use

Researchers have personalized data with majority prioritizing the use of data to publish in a peer reviewed journal for professional growth. Journals are biased towards positive results. However, data should be shared for use by others including decision makers. Africa therefore needs to actively pursue policies and platforms that will enhance data sharing. Currently the Research Data Alliance is giving both the successful and unsuccessful data a chance to be seen and made available. Understanding data helps to

streamline the smart objectives-key outcomes, enhancement of critical thinking etc. whereas sharing data empowers the data collectors to have quality data.

Capacity Development

For a long time, data was collected in Africa and analyzed in the western world, a situation which is slowly changing. Developing capacity for data analysis locally is inevitable. The continent needs to have a critical mass of people who collect the data as well as analyze it. To build this capacity, there is need for clarity of purpose among African innovators, collaborations with other scientists and partners, owning the problem and the path towards solving it and learning from previous experiences. Communities form a part of the stakeholders, scientists are obliged to disseminate the data to them as well as to funders and partners.

Opening Speech

Presented by Director General NACOSTI Moses Rugut on behalf of Cabinet Secretary Ministry of Education Hon.Matiangi.

Jioni njema, good evening ladies and gentlemen

Let me begin by welcoming you to Nairobi. It is a suitable venue for this meeting on innovation as it has just been ranked the most innovative city in the Middle East and Africa by the City Momentum Index. **Karibu**

The African Academy of Sciences, the NEPAD Agency and their international partners have gathered you here to discuss and set a new agenda to guide scientific research and innovation in Africa. As you all know, this is the first time an event of such a kind is happening on the continent.

We, as Kenya, are glad to be the host country of this inaugural and important event as we believe that innovation is a key driver to economic development. Innovation is also essential for our countries to reach the Sustainable Development Goals (SDGs).

You only have to look at developed countries like the UK to see the impact that innovation can have on an economy. Kenya is following suit. Much of our economic growth to East Africa's largest economy is a result of the innovation taking place in many public and private institutions and indeed in schools and homes.

You will hear some of the stories of these innovators this week. Take for example, Keneth Ndua in Kenya whose innovation is a stove that cooks and purifies water simultaneously. It has potential of improving access to clean and safe drinking water for over 17 million Kenyans at a cheap cost. Fredros Okumu, a Kenya-born scientist based in Tanzania who has created an outdoor device to lure, trap and kill mosquitoes and other vectors. Your presence here testifies that Kenya is not the only African country where innovation is taking place. In Senegal, Nicolas Jouanard: is introducing prawns to its rivers to reduce

the transmission of bilharzia. Ndua, Okumu and Jouanard and indeed all of you, innovators here are targeting your work to reduce Africa's disease burden and promote food security.

Your work, however, cannot succeed without governments supporting innovation. As African governments, we are committed to seeing our economies grow. We still have a long way to go but are committed to ensuring that we promote a culture of innovation on the continent to ensure this economic growth.

In Kenya, our commitment is demonstrated by our move to create a National Innovation Agency to set up a database of the country's innovations to promote uptake and collaboration.

Elsewhere in Africa, Mauritius has become a preferred destination for business and is growing to surpass South Africa because of the policies it has pursued to encourage innovation.

But governments cannot do this alone. I encourage African businesses to join governments in efforts to fund and promote a culture of innovation. The AAS through the Alliance for Accelerating Excellence in Science's Grand Challenges Africa will provide the opportunities to connect business with innovators through the eMarketplace. The GC Africa eMarketplace is designed to bring innovators and potential partners together. This way businesses can easily identify innovations to upscale and fund while innovators, can find potential funders. I encourage businesses to support this initiative.

Africa needs to reduce the disconnect between industry and research so more R&D outputs can be commercialized and the number of patent applications can increase.

Business has a stake in supporting innovation.

Businesses that innovate are more productive and prosperous. For example, the UK's productivity growth in the eight years leading up to the 2008 financial crisis was attributable to innovation. China has grown its economy through innovation.

Public and private sector partnerships are also essential to encourage innovation particularly because of its risky nature. These public and private sector partnerships also ensure that risks are shared and generate investor confidence.

Endorsement from government goes a long way in promoting the uptake of innovations especially in institutions serving the public who benefit from these innovations. As African governments we can offer our support to your work by endorsing your innovations so they are used by public institutions and the public in general.

Ultimately the success of innovation is dependent not just on money but on the support it gets from users and the provision of an environment to promote a culture to innovate. Together we can!

I wish you fruitful discussions as you map out Africa's innovative agenda. **Asante, thank you!**

Day 2: Thursday, February 25 2016

Opening Plenary: Introduction to Grand Challenges Africa
Opening Plenary: Defining Grand Challenges Africa

Presentation by Tom Kariuki
Tom Kariuki took the participants on a Grand Challenge tour. Grand Challenges is a family of initiatives fostering innovation to solve key global health and development problems. Grand Challenges uses public, transparent challenge calls to focus attention and effort on specific health and development problems that affect those most in need. Grand Challenges is heavily funded by Bill and Melinda Gates Foundations and other donors including USAID. The Grand Challenge approach has been adopted in many places across the world. Grand Challenges Canada, uses the Grand Challenges approach to save lives at birth, supports new approaches to ensure children thrive by protecting and nurturing early brain development, implementation research on hypertension in low and middle income countries and among the aborigine communities within and outside Canada and innovation in point-of-care diagnostics that are sensitive, specific, affordable, simple to use and amenable to use in low-resource settings. Grand challenges Brazil builds on Brazils strong and widely recognized commitment to health equity, its extensive health system and its robust research networks and manufacturing capabilities. The program's first focus was on the burden of preterm births. Grand Challenges China is a commitment to help the world's poorest by delivering safe, affordable and widely-used interventions-be they vaccines or drugs-for the cure or prevention of communicable diseases in resource limited setting. GC Africa was born from the successes of Grand Challenges South Africa and Grand Challenges India. In future we hope more Grand Challenges will be born from the GC Africa.

Panel I**:** Innovation as a Tool to Achieve SDG targets in Africa

Overview
While the global community committed to achieve the SDGs by 2030, the current tools are insufficient. Achieving the SDGs will require a deep and universal commitment to innovation, from early-stage R&D, to scaling promising innovations, to the widespread adoption of innovative – and even disruptive – technologies.

As such, this panel explored how partners can best support innovation to achieve the SDGs in Africa and how to engage both traditional and unconventional stakeholders in this work. In particular, panelists examined how to improve every facet of the innovation pipeline: from engaging innovators in health and development work, to matching

promising innovations with the partners necessary to take it forward, and scaling proven innovations to impact. Panelists reflected on how the innovation ecosystem will evolve in Africa over the next fifteen years, and how investments will need to change with time to ensure sustainability.

Speakers

Peter Singer, CEO, Grand Challenges Canada (moderator)
Haitham El-noush, Senior Advisor, Innovation in Health and Development, Norwegian Agency for Development Cooperation
Eleanor Fish, African Academy of Sciences Fellow; Senior Scientist, Toronto General Research Institute; Professor, University of Toronto
Agnes Kalibata, President, Alliance for a Green Revolution in Africa
Thomas Kariuki, Director, Alliance for Accelerating Excellence in Science in Africa

Innovations and development

The African continent boasts of innovations that have driven development. These include among others the:

- ✓ African Enterprise Challenge Fund (AECF) is a multi-donor funded financing vehicle that provides grants and interest free loans to businesses who wish to implement innovative, commercially viable and high impact projects in Africa. It also supports initiatives in media and information services where they relate to these three sectors. Examples of projects include the Tanga Fresh company in Tanzania that has set up a modern dairy service network to increase the production, collection and supply of milk from smallholder dairy farmers. The network has increased incomes and improved livelihoods for 4,500 farmers. Biolands International in Sierra Leone, has transformed cocoa market by improving the quality and quantity of cocoa, working with farmer to market the improved cocoa at higher prices. The project has benefited of over 30,000 farmers.
- ✓ Micro Finance Institutions (MFI) that allow technology to meet innovation e.g. Kenya's M-kopa which is a credit system that is lighting rural homes using solar energy;
- ✓ The use of technology in agriculture to improve credit access and information in order to boost production.
- ✓ Invention of drought tolerant maize that has improved food security in arid and semi-arid areas.

Scaling up innovation

To scale up innovation, Africa needs the right political atmosphere -regulatory and legislative frameworks that support new ideas that are needs driven and partnerships to take innovation to development. Investing in innovation hubs will provide an interactive platform for all stakeholders including policy makers, farmers, consumers and partners.

Innovation driving SDGs

Innovation is key to achieving the SDGs. A framework of good governance-transparency and accountability will provide an enabling environment for innovation that will steer the continent to greater heights. This can be achieved through continued interactions between regulator and scientists.
Proper understanding of the innovations value chain is key towards the continent's achievement of the SDGs. Commercialization of the innovations- a pipeline linking innovation to investors will accelerate development on the continent; as well as increase the capacity of innovators to be able to design delivery measures in order to measure progress and the devise the best way forward.
To scale innovation, there is need to push demand. Governments are best placed to push demand by being the first customer. Demand creation will lead to job creation by promoting the livelihood of innovators and others along the value chain.
Taking technology to scale has become difficult because communities do not appreciate it. The government/policy makers should take up the role of creating awareness among community members.
Funders need to realize that in research it's not a "one-size fit all" - every proposal needs to be considered based on its setting/context needs.
Celebrate failure "*the issue is not* to *fail but to fail fast and cheap and l*earn *from it*, " learning from failed projects is critical in a resource constrained setting which is overburdened with problems whose solutions are time bound Failed projects should not be shelved away, their findings should be shared so that other researchers can learn from them.

Panel II: Grand Challenges in Global Health (GCGH) Programs: Celebrating African Leaders, Building Excellence in Capacity

Overview

Global health challenges are intertwined with inequity, poverty and resource constraints which hinder access to prevention and quality care. To address this global issues GCGH grantees have embarked on various projects which have exposed them and increased their capacity, they have also experienced challenges along the way. This session focused on the benefits accrued and challenges faced by GCGH grantees.

Speakers

Fil Randazzo, Deputy Director, Discovery & Translational Sciences, BMGF (moderator)
Lucas Amenga-Etego, Research Fellow, Navrongo Health Research Centre
Rachel Chikwamba, Vice President/Group Executive, Council for Scientific and Industrial Research, South Africa
Martin Matthew Okechukwu Ota, Research and Immunization Officer, Regional Office for Africa, World Health Organization

Jerome Singh, Head of Ethics and Law, Centre for the AIDS Program of Research in South Africa
Florence Wambugu, CEO & Director, Africa Harvest Biotech Foundation International

Benefits besides innovation

GCGH grantees have made gains in other areas in addition to the success of their projects. They have been empowered in research, they are able to develop a proposal, implement the project and analyze data and disseminate findings. This gains are largely through the mentorship program, which has also developed their leadership, networking, critical thinking and management skills. They are also able to leverage on partnerships built to move their innovations to the next level. GC Africa has the challenge of achieving the same among African innovators within the continent.

Innovations marketing

Bringing innovations to the consumers, has been a challenge as gaps in the value chain have prevented innovations from moving to the next scale. To scale up innovation to products, scientists and the stakeholders need to:

- ✓ Develop platforms for sharing and networking.
- ✓ Appreciate contributions of local communities and governments.
- ✓ Change the mindset of the markets that we are researching for e.g. need for regulations and policies for Genetically Modified Organisms (GMOs).

For Africa, a lot of challenges are hidden in the failures-let us focus on mining the failures in order to achieve success.

Breakout Session 1: Academic Mentorship That Drives Innovation-How to develop critical/analytical thinking amongst students

Overview
Academic mentorship is important to build on the future scientist. It however remains a challenge both for the mentor and the mentee. This session sought to share experiences, challenges and successes so as to provide a learning platform for participants.

Session Coordinator: Golbahar Pahlavan, Deputy Director, center for Global Health Research and Education, Institut Pasteur
Discussion
Majority of academic and research institutions in Africa lack a comprehensive mentorship program. To build capacity for R&D in the continent, student mentorship is inevitable. Student internships are necessary to mentor students in research. They should provide a capacity building opportunity that allow students to build skills in proposal writing, the

theoretical work of the research, writing papers for publications etc. Academic institutions need to develop partnerships with public and private sector to provide student placement. Understanding the cultural background of mentees is important in a mentorship program. There is no “cut and paste” in mentoring, thus mentors have the responsibility of understanding their mentees and creating a mentorship relationship based on the mentees cultural background or context.
A Structured mentorship program is key both in our academic and research institutions. This structure should call for accountability on the part of the mentor, strive for gender balance, adopt a multidisciplinary approach in mentorship is necessary and have a mentor support/resource groups that are critical in mentorship programs for exchange and learning. Support to mentors can include non-monetary incentives and they should never be paid for mentoring.

Breakout Session II: Pitching for Innovation

Overview

Marketing is key to delivering innovations to achieve development. Scientists are equipped with pitching skills to enable them scale-up their innovations. The goal of this session was to provide a platform for scientists to build partnerships with journalists and to train scientists to deal with and pitch their stories to the media. 20 applications were received for this session from which four were selected based on a laid down criteria.

Session Coordinator: Deborah-Fay Ndlovu, Communications Manager, AAS

Profiles of selected scientists and the products

J Coenie Louw, Medical Director for Gateway Health Institute, South Africa

Biography

JC Louw is the Medical Director for Gateway Health Institute in South Africa. He has more than 20 years’ experience in the medical field and has been active in various sectors: as a lecturer at the Medical University of South Africa (2003 to 2010). He progressed through the ranks to be appointed as a Senior Lecturer in the Department of Human Anatomy by 2007. He has been involved in the non-profit sector for more than four years; first as a Global Program Director based in Nigeria and then as Country Director in South Africa for Little Big Souls International Charitable Foundation.

Product - An oil-based delivery method for Amoxicillin

This innovation suspends amoxicillin, the preferred treatment for childhood pneumonia, in oil allowing it to extend its shelf life and reduce the risk of contamination. Currently, amoxicillin needs to be reconstituted in water before being administered to a patient, which breaks down its chemicals rendering it in-effective in two weeks. Using water also increases the risk of contamination and of waterborne diseases.

Betty Walakira, Health Child, Uganda
Biography
Walakira is the founder and a Board member of Health Child - a non-governmental organization based in Uganda. She has experience of over 11 years in implementing Maternal, New-born and Child Health projects mainly focusing on demand and supply of quality health care. Betty has a Masters in Science Population and Reproductive Health.

Product-Mama Kit
Walakira is working with communities to get them involved in interventions to decrease child mortality by mobilizing communities into saving groups to promote a culture of saving for health. Mothers saved for the mama kit, transport, warm clothing and a basin and this increased delivery in health facilities from 47% to 74%.

Kenneth Ndua, Social Entrepreneur, Jiko Kenya and Jiko Africa, Kenya

Biography

Keneth Ndua is a Social Entrepreneur who has been implementing projects in sustainable livelihoods development, social innovation, environmental care, HIV and AIDS for the past 16 years. With a Master's degree in Community Care HIV and AIDS and currently pursuing an MBA in Global Business Sustainability and Social Entrepreneurship.

Product – Water Purifying Stove

Ndua has added an extra component to the Jiko Kenya (firewood stove) and Jiko Africa (charcoal and briquettes), fuel-efficient biomass stoves that can be filled with 3 liters of water, enabling the homes to simultaneously boil and sanitize water while cooking. This feature, which helps to insulate the stove, makes it more efficient, and also traps waste heat that is used to boil water thus ridding it of impurities and micro-organisms, leaving it clean and safe for drinking.

Peter Lubega Yiga, Innovator, Natural mosquito repellant, South Africa

Biography

Peter Lubega Yiga has been involved in the research and development of innovative mosquito and insect repellents for more than 10 years. Despite having studied finance at

the University of the Witwatersrand, Peter was compelled to venture into the malaria field after suffering a severe bout of malaria. He has collaborated with various institutions including the Council for Scientific & Industrial Research (CSIR), National Institute for Communicable Diseases (NICD) and the Malaria Institute in South Africa.

Product: Natural repellent for malaria

Yiga has developed a natural repellent that can be safely used on babies and provides protection for four hours longer and at a cheaper cost than the current repellents in the market. The product provides at least six hours of protection and has been successfully tested by the South African Bureau of Standards. The recent Zika outbreak points to the need for topical mosquito repellents that offer personal protection. DEET, an active ingredient in many repellents, is not recommended for use on babies.

Winning pitch

Keneth Ndua was selected as the winner. He was selected because he used simple language, demonstrated impact of his innovation and brought the product for judges to see. He was also very articulate and used anecdotes and humour.

Afternoon Brainstorming Session: Developing Challenges for Grand Challenges Africa

Overview

The session orientation was done by Evelyn Gitau of AAS. Participants were divided into 6 groups based on their earlier responses to some survey questions. The three main themes of discussion were: prevention and treatment of diseases; mortality; and epidemics. The list of the topics discussed by each group is provided below. Initial conversations focused on narrowing down the priority topic and exploring possible focus areas for a new GC Africa challenge.

The topics:

Prevention and treatment of diseases

Group 1: Support the research and development of vaccines and medicines for neglected, infectious and other tropical diseases.

Group 2: Support the research and development of vaccines and medicines for non-communicable diseases and mental health.

Mortality

Group 3: Reduce maternal mortality to less than 70 per 100,000 live births.

Group 4: End preventable deaths of new-borns and children under 5 years of age.

Group 5: Substantially reduce the number of deaths and illnesses from trauma; hazardous chemicals; and air, water and soil contamination.

Epidemics

Group 6: Strengthen the capacity of all countries for early warning, risk reduction and management of national and global health risks

Summary of the group findings

Group 1: Support the research and development of vaccines and medicines for neglected, infectious and other tropical diseases (DRUGS)

Framing Question: Given the realities of the low-resource setting, how can we build an African ecosystem that encourages drug discovery, using either conventional or innovative approaches?

What we want: Cross cutting issues from discovery to delivery:

1. Approaches-models that deliver success-learn from the failures in the drug discovery and development from pharmaceuticals; promote In Silico (computer simulations) research across the continent; develop capacity in immunotherapy for infectious diseases; Gender inclusion; greener technologies and build cGMP, clinical capacity locally at international standards.
2. Data - build capacity to create and manage big data.
3. Funding-innovative Financial Mechanisms: patient seed, venture and growth capital that aligns with low resource settings; hubs (ANDI, big food networks) - have scientist, social entrepreneurs, regulatory, Clinical trials, IP and Policies to protect ownership of the bio-diversity (community/country level); seed, start-up and growth funding and a global entrepreneurial mindset that harnesses local biodiversity.

What We Want in Drugs and Vaccine Discovery

1. Novel and effective models, assays and approaches.
2. Developing new drug/vaccine targets against infections.
3. Discovering broadly neutralizing antibodies against infectious diseases.
4. Development of multi-pathogen drugs/vaccines to address co-infections.
5. Discovering new drug/vaccine delivery platforms.
6. Discovering unconventional sources of new pharmacophores.
7. Discovery of new drug resistance breakers.
8. Discovery of anti-virulence agents.
9. Creating a regional technical platform for standardizing experimental design, assays and the use of animal models.
10. New approaches for lowering cost, shortening time and limiting attrition.

What we do not want in Drug/vaccine Discovery:

1. Repeat failures.
2. Get stuck in discovery.
3. Total Grant dependency.

What We Want in Drug/Vaccine Development and Delivery:

1. Low cost counterfeit detection devices (mobile phone based/ database based).
2. Increased Capacity in Standard Formulations for drug delivery.

3. Efficient Scheduling for immunizations.

What We don't Want- Drug/Vaccine Development and Delivery

Development

1. Working in silos.
2. Cultural factors (traditional meds - competing IP interest).

Delivery

1. Limiting mindsets, attitudes and practices.
2. Supply chain challenges (counterfeits, cold chain).

What We Want- Vector:

1. Development of combination treatments for Long Lasting Insecticide treated Nets (LLINs).
2. Research and Development of novel chemical and natural vector control compounds to address insecticide resistance.
3. Development of innovative environmental management strategies for vector control.
4. Establish new approaches for multi-sectoral partnerships for vector control.
5. Design innovative tools to manage behavioral changes in disease vector resulting from conventional vector control interventions.

What we don't Want- Vector:

1. Over-reliance on a few insecticide classes, cross resistance from use of pesticides from Agricultural sector leading to insecticide resistance.
2. Not being able to deal with Vector Population dynamics – changes in behavior and species variation.

Group 2: Support the research and development of vaccines and medicines for NCD's and Mental Health

What we want

1. Develop Innovative community communication strategy to improve awareness, case finding and uptake of evidence based intervention.
    a. ICT innovation, algorithm software that use the mobile phone to collect data
2. Develop Innovative community owned- generated data to be used for advocacy and influence policy.
3. Nutritional strategy
    a. Develop and test any nutritional strategy that prevents mental disorders in children and adults
    b. Identify nutritional deficiencies that lead to abnormal fetal development e.g. *Choline deficiency has been associated with fetal abnormal brain development which tends to be associated with mental disorders.*

4. Standardization and normalization of tools for mental health.
    a. Innovative ways to ensure mental health drugs availability at lower levels of care i.e. overcoming drug supply chain barriers.
5. Innovative approaches to promoting and early recognition and management of mental health problems among children.
6. Integrated mental health care screening for depression in antenatal and postnatal care and offering evidence based first line treatments for e.g. GSP

What we want- Neglected Communicable Diseases (NCDs)

1. Innovative approaches to awareness raising on NCDs.
2. Investigating therapeutics of natural remedies Drug discovery.
3. Innovative approaches for early diagnosis and intervention.

What should not be funded?

1. Roots and leaves without evidence (randomized control trials) should not be funded.
2. Any study without a clear intent for an intervention.

Group 3: Goal 3-Reduce maternal mortality to less than 70 per 100,000 live births

Framing Question: While we have made great progress reducing maternal mortality under the MDGs, this progress has been uneven. How do we ensure even progress moving forward, and how do we accelerate and innovate efforts needed to reach the new SDG targets?

What we want

1. Programs to be designed on key drivers of maternal mortality such as family planning.
2. Value chain partnership.
3. Technological advancement.
4. Advocacy and behavior change-behavior change to dispel myths and misconceptions on health service delivery and involving men as active agents of care, village /community health teams and first lady champions to advocate for maternal health.
5. Government commitment.
6. Trans-disciplinary and multi-sectoral involvement.
7. Sustainability-translation of innovations into practice/action, availability of simple life saving products at local level, improved knowledge by women to create demand and leveraging existing systems.
8. Robust M&E systems.
9. Documentation of innovations.

What we do not want

1. Statistics that do not speak
2. Nothing for women without them

3. No single disciplinary programs
4. Nothing without research or evidence
5. Innovations that cannot be applied
6. Intervention that focus on the mother without the child
7. Empty promises by government
8. Projects without sustainability
9. Lack of community engagement in program design and implementation

Group 4: Goal - End preventable deaths of new-borns and children under 5 years of age

Framing Question: While we have made great progress in reducing newborn deaths and children under five, we have failed to significantly reduce neonatal deaths. How can we ensure more even progress and accelerate efforts needed to reach the new SDG targets?

What we want:

1. Education
2. Health Systems Strengthening
3. Nutrition
4. Cost of Health Care
5. Economic Empowerment of girls and young women

What we do not want:

Interventions that are not

1. scalable,
2. affordable and
3. applicable to African settings

Group 5: Goal - Substantially reduce the number of deaths and illnesses from trauma; hazardous chemicals; and air, water and soil pollution and contamination

Framing Question: This has been a neglected area across the African continent. How can we drive investments in these public health issues, and link them to larger health systems strengthening?

Strategy/Approach

1. Legislation and its enforcement
2. Look at synergies (water contaminating the soil etc.)
3. Advocate for green approaches (recycling, use locally available resources, re-supply)
4. Education for farmers, government, Public awareness
5. Generate data that can be used to inform government
6. Develop point of use technologies (diagnosis, processing, treatment)

7. Enhance the D for development so technologies can be taken up
8. Good agricultural practices
9. Provide facilities to deal with trauma

Potential Challenges:

1. Cost to the consumer
2. Water and Air need no Visa to cross boarders
3. Food security
4. Lack of will on the government

Group 6: Goal - Strengthen the capacity of all countries for early warning, risk reduction and management of national and global health risks

Framing Question: How do we strengthen institutional and human capacity so that health systems are resilient and prepared, not just reactive? How can investments in health research, including centers of excellence, contribute to stronger health systems across the African continent?

What we want is:

To address full spectrum of the health system, to identify strategic areas where strengthening is required and it is linked to realities. To achieve this, we need the following:

1. Ownership: This is an African responsibility- African Governments have a critical role in ensuring local ownership of the processes and active engagement to ensure more effective health systems.
2. Resources: The funding should be from within the country or the continent. Investments should align with regional/African needs. National research funds currently allocated by governments is between 0.5-1% GDP- this is likely unacceptable for capacity building needed.
3. Capacity building: First identify where the gaps are and how to strengthen in sustainable way. Capacity building should be across different disciplines: lab personnel, health care workers, data base managers, surveillance expertise, outbreak coordinators etc. Access to and engagement with communities (understanding local context).
4. Networking: Strengthen regional and multi-country networks and exploit IT networks.
5. Infrastructure: Connect with skilled personnel and establish hubs e.g. biorepositories.

What we do not want:

1. The status quo is unacceptable
2. External control

Day 3: Friday, February 26

Welcome remarks by Dr. Thomas Kariuki, AAS

Tom gave a recap of the previous days' sessions linking it to the need for GC Africa, and the work that is ahead for GC Africa based on the challenges presented in the last two days. He introduced the High Commissioner of Canada giving hints on the support received from Canada for GC Africa

Opening Plenary: What is Needed for Grand Challenges Africa's Success?

Remarks by David Angell, High Commissioner, High Commission of Canada in Kenya

The continent has made great strides in Global Health Research for Africa. For example, the eradication of polio- no single polio case was reported in the continent last year (2015). In Kenya the Canadian government is supporting initiative in Maternal and Child Health – increasing vaccinations and bar-corded vaccines in rural Kenya.

One of the keys to creating sustainable innovations in the continent is to celebrate people/talent and innovations. This will attract investors, partners, more scientists to research and government investment.

Investment in partnerships is inevitable for innovations to accelerate economic growth in Africa and change lives.

Panel I: Building Partnerships for Sustainable Development

Overview

To achieve the ambitious targets set out in the SDGs, partners from diverse fields must work together in more efficient and collaborative ways than ever before. This includes "traditional" cross-sector collaboration, such as public-private partnerships, as well as complementary partnerships, such as those between research and delivery stakeholders and domestic and global actors. By mobilizing the combined expertise and resources of various stakeholders, partnerships can drive and unlock the transformative solutions countries need to accelerate progress toward these global goals.

This panel explored the role of partnerships in catalyzing innovation to advance health and development priorities in Africa. Panelists representing major research institutes, funders and government agencies reflected on their sector's unique contributions to strengthening R&D in Africa, while exploring opportunities for new and continued partnerships. Panelists shared their vision for a collaborative African innovation ecosystem, and how regional and international players could work together to help Grand Challenges Africa create a pipeline of game-changing solutions that in turn can help African countries deliver on their SDG priorities.

Speakers:

Patricia Amira, TV Show Host; Journalist (moderator)

Salim Abdulla, CEO, Ifakara Health Institute
Ayo Ajayi, Director, Africa Team, Bill & Melinda Gates Foundation
Christian Bréchot, President, Institut Pasteur
Simon Kay, Head, International Operations and Partnerships, Wellcome Trust
Julia Kemp, Head, East Africa Research Hub, Department for International Development

Role of partnerships

Grants for research enable development of innovative products while partnerships are necessary for value addition and linking researchers/products and consumers. Researchers should endeavor to form partnerships with governments, markets and the private sector. The continent needs to restructure not as a good end recipient but as a good partner recipient. Funding needs to move away from the traditional (western countries) sources to focus on funding from within the country including African governments.

Role of international governments in supporting innovation in Africa

Kenya is a large recipient for all DFID research funding and hub of East Africa research. This was established in 2013 to see how to strengthen national research and to support the knowledge economy. Governments of East Africa have committed to support science and innovation.
South Africa national research has collaborations with IDRC. They work through all stages together from the point when the idea is conceived. They have deliberations to consider research priorities and what works in making a good initiative in science, technology and innovation.
Partnerships bring in multidisciplinary approach which involves all stakeholders. The success of a partnership depends on how best they communicate. It is important to agree on a communication framework from the onset. Challenges in communication have made it difficult to focus – problems and projects are viewed from a global perspective and not at county level. Partnerships could also be used to lobby the government to commit to research and fund research projects.

How to provide innovations

For innovations to work, investment in education and training that develops critical thinkers who not only are able to conduct academic researches but are also able to innovate. Scouting and grooming such talent should start from the education and training institutions where great ideas from students are supported to the next level.
African governments need to take leadership in directing research and innovation in the continent by providing laws that govern licensing and patenting to the benefit of the scientists.

Agenda Support

Scout for and build partnerships that can fill in the gaps in the pipeline. Innovators need to involve partners from the start of the project in order to build their trust in the product and create ownership of the product by the partners. Clear engagement frameworks including communications framework need to be developed to sustain the partnerships. Local governments need to provide advocacy and awareness on the research agenda and the end products in order for other stakeholders to buy in.

Panel II: African Academic Leadership in Innovation

Overview

African academic institutions are a crucial center for innovation on the continent. They provide lab space and infrastructure for researchers, serve as liaisons to international institutions, play an invaluable convening role and act as a platform for engaging the next generation of scientists. But in order to successfully carry out these missions, clear pathways to other innovation centers must exist, including international actors and the global innovation community, as well as the international and domestic private sector, to translate discoveries into impact.

Work remains to smooth these pathways. Today, far too much of the research conducted by African institutions remains unincorporated with the knowledge base of the global research community, and researchers themselves are often not appropriately integrated. The reverse is also true, with international research not always shared with local innovators who would be best able to take research forward. And while an increasing number of African academic institutions embed knowledge and innovation into their research, access to available support mechanisms and funds remain limited. In order to successfully drive innovation on the continent, private sector/industry collaboration with academia must increase, including improved technology transfer and information collecting and sharing services.

The panel explored the role of the academic sector within the overall innovation system. Panelists focused on how all sectors can work together to build the innovation engine necessary for African countries to reach the Sustainable Development Goals

Speakers:

Charles Mgone, Chair of Scientific & Technical Advisory Committee, TDR, World Health Organization (moderator)

Idle Farah, Chairman, University Council, University of Nairobi

Clive Gray, Chair & Head, Division of Immunology, University of Cape Town

Jane Kengeya-Kayondo, Regional Coordinator, East & Southern Africa, Africa Research Excellence Fund

Gilbert Kokwaro, Director, Institute of Healthcare Management, Strathmore Business School

Kevin Marsh, Senior Adviser, African Academy of Sciences; Professor, Tropical Medicine, Oxford University

There is disconnect between different players-academic institutions, research institutions, funders, private and public sector, and government. Collaborations between these institutions is not strong yet a lot would be achieved if they operated as one unit.

African universities lack an innovative culture to propel the development of a pool of innovators in the continent. The academic institutions also lack mentorship programs that can provide linkages of the talent to grants.

As a result, there is untapped potential of ideas generated from PhD, Masters and Post-Doctoral researchers and Africa remains a net consumer of innovation.

Way forward

- ✓ The institutions of higher learning need to come up with mechanisms to attract funding and formal fundraising structures for research. For this to be achieved they need to appreciate research and develop an innovative culture among the students.
- ✓ Develop a marketing mind among masters and PhD students and provide a formal linkages system for these students to funders, private partners, government and the markets.
- ✓ Inculcate an innovative structure in the universities by creating an enabling environment that will identify talent, nature and allow that talent to thrive. A good mentorship program, with clear goals and roles can achieve this.

Spotlight session

Overview

The spotlight talks were meant to provide grantees with an opportunity to share findings from their innovations. In their presentations the grantees gave back ground information about themselves, the rationale and objectives of their projects, implementations and findings.

Presenter

Elaine Ubalijoro, Adjunct Professor of Practice for Public-Private Sector Partnerships, Mc Gill University.

Investing in generations

When facing challenging societal dynamics, women can find greater confidence in their leadership when they recognize and embrace their strengths and calling. Advancing meaning and purpose through that leadership increases their awareness of opportunities to grow/contribute to their families and community's food security. Although women are central players in the production, processing, and distribution of agricultural food products

in sub-Saharan Africa, they are often not consulted during the planning of projects related to food security, partly due to communication barriers. Ubalijoro and her team are using video clips and photography to record the problems faced by women farmers in three districts in Rwanda, and the women's ideas on how to address them. These records will then be passed on to policymakers.

Presenter
Ethel Nakimuli-Mpungu, Senior Lecturer, Department of Psychiatry, Makerere University College of Health Sciences.

Mental health care: The missing component of HIV Care

The intervention uses group support approach to fight depression among people living with HIV. The approach includes creating awareness of the symptoms of depression, and applying group therapy to them. 85 percent of the respondents indicated that this approach reduced their depression symptoms compared to 48 percent among those not exposed to this intervention.

Presenter
Fredros Okumu, Health and Ecological Sciences, Ifakara Health Institute.

Malaria prevention

The intervention provides an innovative entomological approach towards eliminating the spread of malaria by capitalizing on the behaviour of mosquitoes (how, when and where they are most likely to bite). Okumu and his team created new and easy-to-use outdoor devices to lure, trap and kill mosquitoes and other vectors. The innovation has already shown that is possible to contaminate and slowly kill between 74% and 95% of wild malaria vectors using these devices. In Phase II, the team will improve their decoy prototypes and explore practical ways in which the outdoor mosquito control strategy can be implemented by rural and remote communities in malaria endemic areas.

Closing Plenary

Overview
The session provided a brief of the discussions that had happened in the conference sessions. Conclusions drawn from the interactive and panel discussions formed a part of the presentation.

Presenters
Thomas Kariuki
Evelyn Gitau

The following are conclusions drawn from the GC conference dialogue:

Challenges: -

- ✓ Environmental conservation- we need to link our innovations to environmental conservation as it is inseparable from the problems experienced in the continent.
- ✓ Gender inequities which have affected access to education and health among others.
- ✓ Poverty in the continent that is impeding access to health care.
- ✓ Food insecurity.
- ✓ Limited funding resources for innovation especially scaling it up to development.
- ✓ Lack of a clear mentorship structure in research and higher learning institutions.
- ✓ Disconnect between institutions of higher learning, research institutions and the government with each one working in silos.
- ✓ Inadequate funding for research and development by the governments in Africa.

Opportunities

- ✓ NEPAD's and the individual government's commitment (financial, legislative and policy) to research and development.
- ✓ Poverty, disease, gender inequity, food insecurity and environmental challenges that provide a basis for innovative thinking.
- ✓ Existence of seasoned and young researchers.
- ✓ Existence of multinationals like pharmaceutical companies that have CSR funding that can be used to fund innovations.

Recommendations: -

- ✓ Participation and involvement of African government is key in steering development in Africa. The governments need to provide political goodwill, funding and setting the research agenda among others for innovations to enable their scaling up.
- ✓ Identification of young talent is important for sustainability. Capacity building is inevitable in proposal development, designing delivery measures, and scaling innovation to development.
- ✓ Communicating research findings is important for attracting funding and political goodwill. Research findings should be packaged in an easy to understand language for non-researchers. There is need for a communications strategy to be developed at country level.
- ✓ Partnerships with multinational companies such as pharmaceuticals is critical if innovation has to be scaled up. Build on existing partnerships and explore new partnerships both for GC Africa and grantees.
- ✓ Institutions of higher learning play a role in capacity building, emphasis on mentorship programs and creation of critical thinkers. A structured mentorship program is important to build and sustain capacity within the continent.

- ✓ Identify the 'enemies' of innovation and how to have conversations with them to identify issues and how to work together to achieve our ultimate goal of saving lives.
- ✓ Focus of center of excellences and best practices, learning from successes and failures on the best approach to achieve results.
- ✓ Data sharing-employ technology to disseminate the data collected.
- ✓ Innovation is expensive but it has great potential including job creation, poverty elimination etc.
- ✓ African governments need to take the initiative in leading research in the continent by providing legislative frameworks to guide research and patenting of products.

Closure of the Conference

Mr. Joseph Mucheru – Cabinet Secretary, Ministry of Information, Communication and Technology (ICT), Kenya.

Innovation is the essence of science and a key driver of economic development. The conference has had many conversations geared towards innovating for SDGs. The conversations need to be backed with commitment from the African governments.

For about 10 years the government of Kenya committed 0.5 percent of GDP to R&D, this figure doubled last year as the government was propelled to do so by the numerous innovations that were happening in the country. Kenya is an innovations hub with innovations like mpesa, mkopa, use of mobile platforms to create awareness among female youth on HIV/AIDs etc. that have revolutionized the lives of Kenyans, steered economic growth and created jobs.

GC Africa is providing the much needed support for innovation. Public-private-partnerships are critical for innovations in the continent. African governments need to provide support and build such partnerships for innovations and development

With his experience in public and private and his current position as a cabinet secretary, Mr. Mucheru is ready to be a thought partner for AAS and GC Africa to determine how best to drive the R&D agenda in the continent.

There is need for a working group within the continent to form a network that will come up with ways to support AAS and GC Africa in order to accelerate innovations in Africa and deliver development for the continent.

We are not yet where we ought to be – we still lack vaccines, access to quality health care etc. GC Africa and the partners need to build up on the conversations and continue to learn for cross-sector, cross-border collaborations.

"If you want to move fast go alone but if you want to go far, travel with others."

Appendices

Appendix 1: Acknowledgment

The conference would not have been a success without the efforts of the organizing teams (AAS, AESA, Bill and Melinda Gates Foundation, Grand Challenges Canada and NEPAD), intercontinental hotel staff, traveling agent staff, the St. John Ambulance and all the speakers and presenters.

Appendix 2: Background of Supporting Organizations

Grand Challenges is a family of initiatives fostering innovation to solve key global health and development problems. Grand Challenges uses public, transparent challenge calls to focus attention and effort on specific health and development problems that affect those most in need.
The Grand Challenges principles are:-

- ✓ Strategic and well-articulated grand challenges serve both to focus research efforts and to engage the world's best researchers.
- ✓ Projects are selected based on public, transparent calls for proposals seeking the best ideas.
- ✓ Funders, investigators, and other stakeholders actively collaborate to accelerate progress and integrate advances to ensure these advances serve those most in need
- ✓ Projects are selected not only for scientific excellence, but also for their likelihood to achieve the desired impact, and they are milestone-driven and actively managed to that end.
- ✓ Projects and investigators make global access commitments to ensure the fruits of their research are available to those most in need.

Since the beginning of Grand Challenges, Bill and Melinda Gates Foundation, Grand Challenges United States Agency for International Development have awarded more than 1700 grants to investigators in 81 countries.
New partners have adopted the Grand Challenges model to advance their work. They include:
Bill & Melinda Gates Foundation: In 2003, the Bill & Melinda Gates Foundation launched Grand Challenges in Global Health (GCGH), an initiative focused on 14 major scientific challenges that, if solved, could lead to key advances in preventing, treating and curing diseases of the developing world. In an effort to engage more of the world's innovators more quickly, in 2007 the foundation launched Grand Challenges Explorations (GCE). The foundation, with partner continues to launch new challenges that focus on key needs and has funded more than 1200 projects in 60 countries.
Grand Challenges Canada (GCC): Funds innovators in low and middle income countries and Canada who work on "bold ideas with big impact." In 2015, the Government of Canada renewed funding to GCC for a large scale initiative aimed at developing and

testing new innovations supporting maternal, newborn, and child health in developing countries.

US Agency for International Development (USAID): Since 2011, USAID has played a critical role in expanding Grand Challenges to address a range of global health and development issues. Most recently, USAID launched "Fighting Ebola" A Grand Challenge for Development" to help health care workers on the front lines provoke better care and stop the spread of Ebola

Grand Challenges Africa: On September 10, 2015, the African Academy of Sciences and the New Partnership for African Development launched the Grand Challenges Africa in Nairobi, Kenya. This program joins others within the GC family of grant programs supported by the Gates Foundation and its partners. Grand Challenges Africa will initially support existing Grand Challenges grantees in Africa and over time will run Grand Challenges calls. The focus areas for the Grand Challenges Africa are:

- ✓ Consolidate and improve on the gains made through Grand Challenges support to African scientists over the last decade. The Grand Challenges are the Bill & Melinda Gates Foundation Grand Challenges, Grand Challenges Canada and Grand Challenges for Development USAID.
- ✓ Undertake outreach and awareness campaigns to extend the reach of the Grand Challenges funding model in Africa.
- ✓ Define and set the agenda and priorities for future Grand Challenges in health and other development programs in Africa.
- ✓ Jointly with other partners and or independently craft, run and manage future Africa-centric Grand Challenges calls.

The African Academy of Sciences (AAS) is a pan –African organization headquartered in Nairobi, Kenya, that recognizes individuals who have reached the highest level of excellence in their field of expertise and have made contributions to the advancement of the field in the continent. These individuals are recognized on merit and designated as Fellows of the academy.

There are 330 AAS Fellows and Associate Fellows who are proven science, technology and innovation leaders, policy advisors and thinkers most of whom live and work throughout the continent. The process of recognition begins by nomination of an individual who may be an African who has excelled in his or her field or a non-African who has recognized expertise in Africa.

Relevant specialist committees assess nominees and those that are recommended are subsequently voted in by AAS fellows and finally approved by the governing council.

The AAS is the only continental academy in Africa, enjoying the support and recognition of NEPAD and the African Union as well as several governments and major international partners. These bodies also recognize the think-tank functions of the academy and its increasing role in setting the research agenda for the future development of the continent.

The current strategic plan of the AAS (2013-2018) identifies six STI areas of focus, namely

- ✓ Climate change
- ✓ Health and well being
- ✓ STEM (Science, Technology, Engineering and Mathematics)
- ✓ Water and Sanitation
- ✓ Food Security and Nutritional Wellbeing
- ✓ Sustainable Energy

The AAS' mandate has three pillar:

- ✓ Recognizing excellence
- ✓ Implementing science, technology and innovation programs
- ✓ Providing think-tank functions

Africa Alliance for Accelerating Excellence in Science in Africa (AESA): This is an agenda setting and funding platform established by the African Academy of Sciences and the New Partnership for Africa's Development (NEPAD) Agency.
AESA seeks to develop research leadership and promote scientific excellence and innovation to overcome some of Africa's development challenges. AESA is aligned with the Science Technology and Innovation Strategy for Africa (STISA 2024) the blue print for developing science.
AESA supports initiatives in all areas of science, particularly health research, relevant to Africa by: -

- ✓ Managing entire grant cycles to support research initiatives being implemented in partnership with other pan African and international organizations.
- ✓ Providing support to the scientific community through a range of workshops and mentorship programs for career researchers and grantees.
- ✓ Functioning as a think-tank, helping to set and align the science agenda for the African continent.