Harnessing Science, Engineering and Medicine (SEM) to Address Africa's Challenges:

the Role of African National Academies

Report

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July 2019

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FOREWORD

The InterAcademy Partnership (IAP) is a global network of over 140 science, engineering and medical academies that work together to support the role of science in seeking solutions to the world's most challenging problems. In 2016, a component of the Partnership, IAP for Policy (formerly IAP for Research), hosted by the US National Academies of Sciences, Engineering and Medicine, launched a three-year project on *Harnessing Science, Engineering and Medicine (SEM) to Address Africa's Challenges*. Funded by Carnegie Corporation of New York and undertaken in partnership with the Institute for Advanced Study (IAS) in Princeton, this project was governed by an international working group and supported by a professional secretariat.

The primary objective of the project was to strengthen the African science community's capacity to support both the UN Sustainable Development Goals (SDGs) and the AU STI Strategy for Africa (STISA), with a particular focus on mobilising national science academies. The Working Group has drawn evidence from a survey of African academies, both senior and young; gained insights and perspectives from regional and national policy practitioners; engaged with different parts of the UN and AU systems on the continent; and piloted programmes on strategic priorities identified by the Working Group.

Rigorous peer review is a hallmark of IAP studies. We would like to thank the following reviewers for their constructive comments:

- **Professor Amal Amin,** Associate Professor, National Research Centre, Cairo, and cofounder and alumna, Global Young Academy
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- **Professor Cheikh Mbacke**, Senior Fellow, Center for Research on Applied Economics and Finance, Thiès University, Senegal
- **Professor Tilahun Yilma**, Distinguished Professor of Virology, School of Medicine and School of Veterinary Medicine, University of California, Davis; and Member, US National Academy of Sciences

We would also like to thank the Project Co-Chairs, members of the Working Group, the Project Director and Secretariat, all host academies for working group meetings, contributing academies and practitioners, and our generous funder, Carnegie Corporation of New York.

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EXECUTIVE SUMMARY

Africa is a **unique continent**, in part due to its size and diversity, with more than fifty nations spread across a continent larger than the combined area of the United States, Europe, China and India. The continent presents **huge opportunities**: it is home to some of the fastest growing economies in the world, and more than half of global population growth over the next thirty years is projected to occur in Africa. Its young, vibrant and entrepreneurial population is a major asset if harnessed effectively and equitably.

Despite encouraging progress in some areas and in some countries, the continent continues to face **severe challenges** in improving education, strengthening infrastructure, ensuring food security and access to sustainable water resources, building resilience to natural disasters and climate change, and combating infectious diseases, amongst others. Whilst extreme poverty has declined, it still affects 35% of Africans, or 395 million people.

These challenges and opportunities are encapsulated in the **United Nation's Agenda 2030** (Sustainable Development Goals, SDGs) and the **African Union's Agenda 2063** (underpinned by a continental plan for Science, Technology and Innovation, STISA-2024): these are the global and continental frameworks, respectively, for social, economic and environmental development over the next few decades. The realisation of these frameworks requires access to, and the application of, the best available evidence from global and African science communities. Independent expert advice is a vital part of evidence-informed policymaking at global and continental levels, and at the national level where policies are typically formulated, implemented and reviewed: **strengthening the evidence-policy interface** at all these levels is imperative for achieving the objectives articulated in the SDGs and STISA-2024.

In a three-year project, "Harnessing science, engineering and medicine (SEM) to address Africa's challenges,"[1] the InterAcademy Partnership (IAP)[2] has explored how African science academies can play their part more effectively at this interface and in the sustainable development of the continent. It has focused on academies because they are important sources of current and emerging leaders in SEM, as well as advocates for science, technology and innovation (STI), and can help connect their respective government and research communities. The project complemented another IAP project running concurrently that explored global policymaking and the UN SDGs, whose final report[3] was published in May 2019.

The Africa project objectives were (1) to mobilise African leaders in SEM to develop and implement new approaches to addressing shared challenges; (2) to strengthen merit-based academies in Africa as effective civil society organizations and respected sources of evidence-informed advice to their societies; and (3) to build stronger, sustained linkages and partnerships between African and global expertise in SEM/STI and the policymakers and donor organisations working to address Africa's challenges. **The project focused on science broadly, with less emphasis on engineering and medicine (or technology and innovation)** *per se*. **Throughout the report, "science" is used as a catch-all for all disciplines covered by the academies**, with the term "evidence" pertaining to all knowledge.

1. http://www.interacademies.org/Activities/Projects/36052.aspx

2. http://www.interacademies.org/

3. https://www.interacademies.org/50429/SDGs_Report

The project was framed around the UN's 17 Sustainable Development Goals (SDGs) and AU's Science, Technology and Innovation (STI) Strategy for Africa (STISA-2024) because both frameworks encapsulate Africa's key policy challenges. Building on previous capacity building programmes for African science academies,[4] the project has found that the vital importance of (1) national investment in science (including engineering and medicine, technology and innovation) by African countries and (2) the role of science in informing robust policymaking is not widely recognised by African policymakers, and there remains a **strong advocacy role** for national science academies to champion science on the continent. Furthermore, as research output and capacity of AU member nations increases, African science academies have an increasingly important role to play in **sourcing and utilising Africa's scientific knowledge** to help meet the continent's challenges. Yet with few exceptions, African academies have limited visibility and voice on the continent and in their own countries, and are still developing their own capacities and capabilities with the scarce resources they have to-hand. **The importance of working together through the** Network of African Science Academies (NASAC)[5] **is paramount**.

Following a survey of African academies, whose results made clear that awareness and under-standing of Agenda 2030/SDGs and Agenda 2063/STISA was limited,[6] a short guide to the UN SDGs[7] was prepared. Chapter 3 of the current report provides a complementary overview of the processes and structures for feeding STI advice into policymaking on the continent. These respective accounts of UN and AU systems identify **opportunities for academies to engage at continental, regional and national levels.** These include involvement with the AU Human Resources for S&T (HRST) Division and the African Observatory for STI (AOSTI), UN Economic Commission for Africa (UNECA) and its annual fora on sustainable development, AU Regional Economic Commissions, Voluntary National Reviews, and national platforms and coordination mechanisms. Official continental, regional and national reports on SDGs' implementation progress are presently subject to little scrutiny by policymaking or academic communities, and on STISA implementation practically absent altogether. These are some examples of the many opportunities for academies to support policymaking and bring a more rigorous, evidence-informed approach and accountability to policy processes in Africa, at the same time raising their own visibility and demonstrating their value. This project has, in various ways, strengthened the African academies' ability to perform these important roles.

This report explores some of these opportunities and sheds light on the barriers and challenges to more systemic policy engagement, whilst at the same time building capacity in areas identified as weak or missing. Working closely with IAP's regional network, NASAC, and other regional science players, the project has **experimented with different ways of strengthening the science-policy interface**, by (i) engaging directly with UN and AU policy processes, (ii) convening different stakeholders in policy-focused workshops, (iii) engaging with members of the African science diaspora, and (iv) building science policy literacy and leadership amongst early career researchers. The growing number of African National Young Academies (NYAs) is testament to the passion and commitment of the next generation of African scientists and researchers to use science for the benefit of society.

4. For example, the USNAS ASADI programme, http://www.nationalacademies.org/asadi/, and the Royal Society/Pfizer programme, https://royalsociety.org/~/media/Royal_Society_Content/about-us/international/2012-04-23-pfizer-report.pdf

5. http://nasaconline.org/

6. Reasons for lack of awareness and understanding of the SDGs and STISA amongst the academies included the complexity of the policy landscape at all levels, poor connection with policymaking communities and key influencers, and lack of institutional capacity.

7. http://www.interacademies.org/37864/IAP_SDG_Guide

Their establishment is a notable achievement but also a reflection of ongoing frustration that senior academies are not playing their part *fully*. Facilitating engagement between the two has been explicit throughout: this project has **benefited from IAP members, the Global Young Academy (GYA) and NYAs working together and drawing on their respective strengths**.

Key findings of the project are:

- There are many opportunities for academies and policymakers – nationally, regionally and continentally – to work together, all the more effectively if they understand and respect each other's operational contexts and realities. However, opportunities are being hampered by a weak science-policy interface, a lack of expressed demand for evidence from the policymaking community, and resource and capacity constraints in the science community. Both communities must show willingness, and move beyond the rhetoric to genuine, respectful cooperation.

- The vital role of science in Africa's development is still not acknowledged by policymakers across the whole of the continent. There are multiple reasons for this; one might be that scientists have failed to justify the value of investing in science, as witnessed by governments manifestly and continuously failing to invest in it nationally. Whilst progress is being made, Africa's development will be impeded if it does not invest more in science, alongside contemporary education and skills development.

- The African science community must be more proactive in seeking to support policy formulation, implementation and review, especially with respect to monitoring and evaluation (M&E) of policy interventions. There is an urgent need to identify and capitalise on synergies between SDGs and STISA priorities to multiply the value of specific actions; to plug data gaps and strengthen data integration; to strengthen weak indicators; and to develop an M&E framework for STISA-2024 and its subsequent phases to facilitate implementation and improve accountability across the continent. Efforts are in progress to develop such a framework for STISA.[8]

- The respective roles of the International Science Council Regional Office for Africa (ISC ROA) and the TWAS regional offices (TWAS-SAREP and TWAS-AREP) in the UN system, and the African Academy of Sciences (AAS) in the AU system, need more support from the wider science community on the continent, e.g. in helping to source appropriate expertise. To facilitate this, ISC ROA, the TWAS regional offices and AAS could be more open and inclusive about their roles. NASAC and its members bring an essential national perspective, critical to help translate and take action on UN and AU priorities at the national level. Representing over 3,000 academicians, NASAC is an underutilised resource: its member academies can provide access to a wealth and diversity of expertise as well as convening power, supporting and supplementing the work of AAS. This, in turn, builds capacity.

8. Notably by the AU's African Observatory for STI (AOSTI) and Science Policy Research Unit (SPRU) at Sussex University, UK: https://blogs.sussex.ac.uk/policy-engagement/evaluating-public-policies-in-africa/

- Academies can be useful resources for policymakers, convening experts and helping to devise evidence-informed solutions, and helping to address the dearth of data on the continent. Conversely, policymakers can be useful resources for academies, providing insight into policy questions perplexing governments and the complexity of policymaking. Cooperation is most effective when academy and policymaking communities treat each other as full and equal partners, co-designing and co-framing questions, not simply as audiences for their respective messaging. This includes respecting and accommodating language, cultural and operational differences at all levels. For example, some organisations might require a Memorandum of Understanding (MOU) as a precursor to formal cooperation.

- Programmes and platforms that facilitate academies, in particular a mix of senior and young academies, working together with policymakers, are well received and can be productive. Diversity brings value: the project has benefited from engaging with different constituencies in academic and policymaking communities, and from interdisciplinary, intergenerational and intersectoral insight.

- There is an appetite amongst African GYA members and NYAs to work together on policy issues, but there are also capacity (people and finance) constraints. They require secretariat support to do this, and this should be a high priority for future funding. IAP, NASAC and the GYA should discuss ways in which they can work together on this vital issue.

- There is presently an unmet demand for scientists in the African diaspora to help build scientific capacity in Africa, at both institutional and individual levels. Few diaspora programmes appear to target or proactively integrate African scientists, perhaps because a compelling case has not been made. There are opportunities to plug this gap by implementing bespoke programmes for diaspora scientists to support African universities and academies and/or integrating the diaspora science community into existing programmes, e.g. in educational or entrepreneurial sectors.

- There is also an unmet demand from early career researchers for training in science-advice-for-policy skills, which could be addressed through leadership programmes, mentoring programmes, training workshops, immersive fellowships in policy active institutions, or exchange programmes for scientists and policymakers.

A major recommendation of the project is to more fully exploit existing platforms, such as the UNECA Annual Fora on Sustainable Development, and create more opportunities for bringing together policymakers and scientists in Africa, using these to support the different elements of the SDGs and STISA implementation process. These platforms can help:

- the different constituencies understand and appreciate each other's ways of working and operational constraints;

- bridge the gap between knowledge supply and knowledge demand;

- provide opportunities to advocate for national investment in STI;

- develop indicators for the SDGs and STISA priorities, and devise effective monitoring and evaluation frameworks;

- develop a systems-wide perspective, to understand the interactions between the SDGs and STISA priorities – their interdependencies, synergies and trade-offs;

- provide independent assessments of what is working and what is not, in order to advise policymakers constructively and hold them to account;

- conduct foresight studies of the scientific transformations required to meet tomorrow's challenges.

A further major recommendation of the project is to continue to invest in the capacity development of young and senior academies on the continent, to help them realise their potential to be vital, independent, high quality parts of their national and regional science systems. Building on and learning from pilot studies funded under this project, further funding should be sought for:

(1) collaborative grants to facilitate cooperation between senior and young academies, and policymakers, on shared challenges, especially at the regional level;

(2) engaging African science diaspora to help build institutional capacity; and

(3) more training opportunities for bringing science to society and integrating this skillset into African science leadership programmes.

Chapter 1: Introduction to the project

Summary

Latest indications are that no country is on target to meet all of the SDGs, and that African countries face more substantial challenges than those on other continents. Set against this backdrop, the IAP project endeavoured to explore how the African science community, and science academies in particular, can help science serve society and contribute to Africa's socioeconomic and environmental development.

This chapter describes the project's objectives, governance and methodology.

Africa is a unique continent that presents huge opportunities, if it can overcome major challenges. A diverse continent of 55 nations spread across an area larger than the combined area of the United States, Europe, China and India, it is home to some of the fastest growing economies in the world,[9] and more than half of global population growth from now to 2050[10] is projected to occur in Africa. With an average age of 19 years, Africa's young, vibrant and potentially entrepreneurial population can be a major asset. Yet 35% of Africans,[11] or 395 million people, continue to live in extreme poverty.

Africa's challenges, at continental, regional and national levels, are encapsulated in the UN's 17 Sustainable Development Goals (SDGs)[12] to 2030 and the AU's Agenda 2063,[13] which sets out a path for Africa's positive socioeconomic transformation over the next 50 years. Science, broadly defined, is increasingly critical to informing policy on a wide range of shared challenges under these frameworks. A number of continent-wide initiatives set out priorities and frameworks for STI. Most notably, the African Union's (AU) Science, Technology and Innovation (STI) Strategy for Africa (STISA-2024)[14] outlines six priority areas – roughly analogous to the SDGs – for STI focus: food security, disease prevention, communication, environmental protection, effective governance, and wealth creation.

More than any other region in the world, Africa faces substantial challenges in achieving the SDGs. Its SDG performance is low by international standards, resulting in African countries appearing mostly "red" (denoting major challenges) in the global dashboards.[15] Countries can track their progress using interactive tools.[16] The 2019 Africa SDG Dashboards[17] present an assessment of African countries' current progress and trends in achieving the SDGs, using a traffic-light system (Figure 1.1). It is estimated that the steepest challenges are in good health and well-being (SDG 3), industry, innovation and infrastructure (SDG 9), and peace, justice, and strong institutions (SDG 16), with more than 80% of countries scoring red. No African country has reached green status (SDG achievement) in 13 of the 17 goals.

Furthermore, trends assessments in the same report reveal very limited progress, with no apparent progress in 13 out of the 15 goals that have trends data. The most promising progress is on climate action (SDG 13), with countries performing relatively well on sustainable production and consumption (SDG 12). In contrast, they perform poorly on goals relating to human welfare (SDGs 1-7 and 11). The worst trends can be seen in quality education (SDG 4), sustainable cities and communities (SDG 11) and peace, justice, and strong institutions (SDG 16) where a large majority of countries appear to be stagnating. Stagnation is also evident in many countries for no poverty (SDG 1), zero hunger (SDG 2), good health (SDG 3), clean water (SDG 6), affordable and clean energy (SDG 7) and industry, innovation and infrastructure (SDG 9). There is clearly an urgent need for progress to be accelerated across all SDGs.

To-date, only 35% of Africa countries (19 out of 54) have reported on their progress formally to the UN, with a further 16 countries expected to report for the first time in July 2019. Based on their assessed performance, the dashboards report classifies countries into five clusters: "continental leaders," "growing," "middle of the pack," "emerging" and "distressed".

Additionally, many countries in Africa lack the capacity to collect, manage and report on demographic, social, economic and environmental data. Nearly half of the 169 targets for the SDGs are not quantified and only 40% of the indicators have data.[18] According to the World Bank, Africa has the lowest average statistical capacity.[19] These data are vital for governments to be able to assess progress and develop better policies and practices

More than ever, there is a pressing need for the African science community, including African academies, to help science serve society and put Africa's social and economic development on a more positive trajectory.

9. https://qz.com/africa/1522126/african-economies-to-watch-in-2019-and-looming-debt/
10. According to the UN Population Division, DESA: https://www.un.org/development/desa/en/news/population/world-population-prospects-2017.html
11. https://read.oecd-ilibrary.org/development/africa-s-development-dynamics-2018_9789264302501-en#page6
12. https://www.un.org/sustainabledevelopment/sustainable-development-goals/
13. https://au.int/en/agenda2063/overview
14. https://au.int/en/documents/20141227
15. https://www.sdgindex.org/reports/2018/
16. https://africasdgindex.org/ and https://dashboards.sdgindex.org/#/
17. http://unsdsn.org/resources/publications/2019-africa-sdg-index-and-dashboards-report/
18. https://sdgcafrica.org/reports/
19. http://datatopics.worldbank.org/statisticalcapacity/

Figure 1.1: Africa SDG Index and Dashboards Report 2019
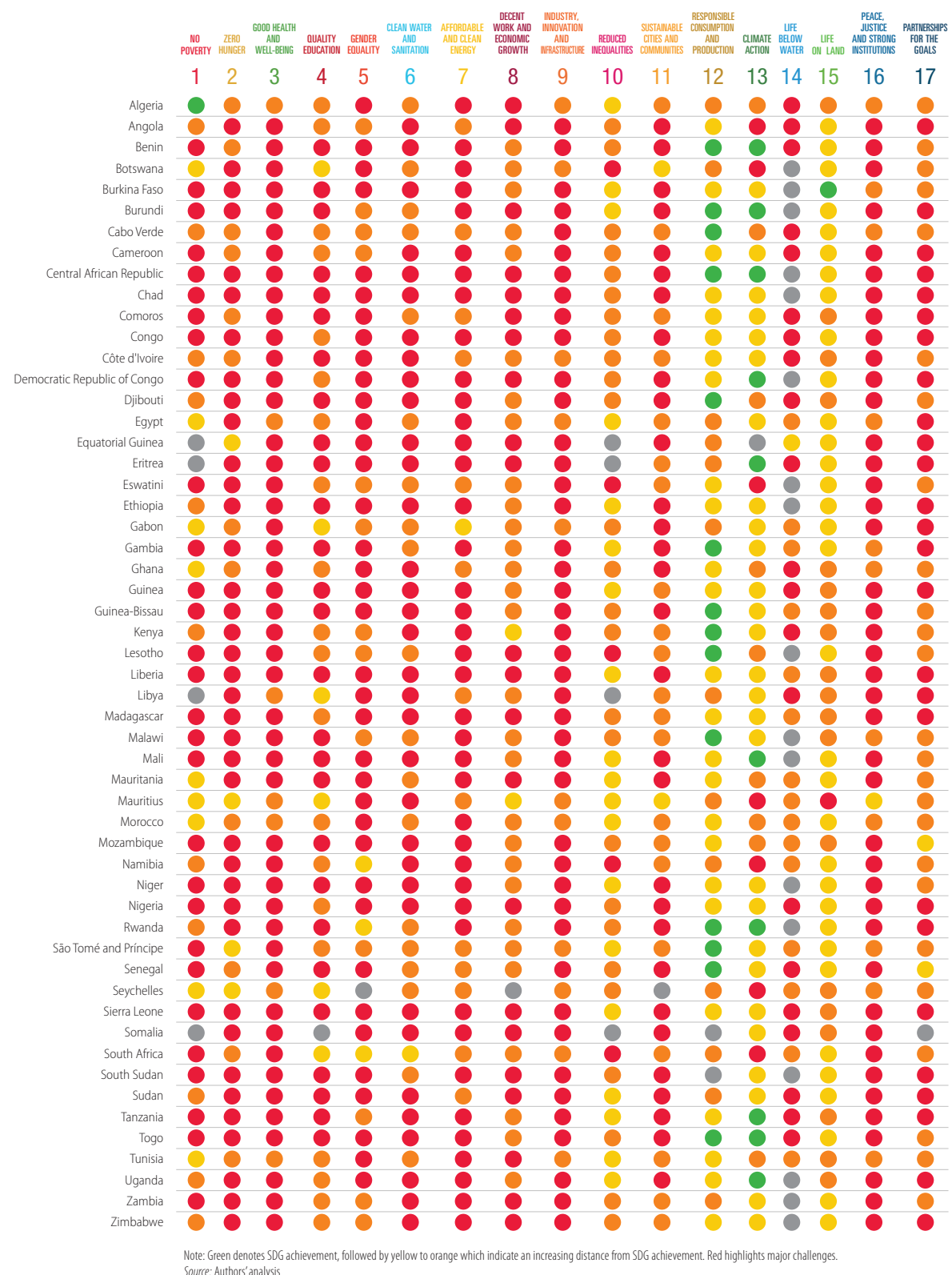
Note: Green denotes SDG achievement, followed by yellow to orange which indicate an increasing distance from SDG achievement. Red highlights major challenges.
Source: Authors' analysis

Source: http://unsdsn.org/resources/publications/2019-africa-sdg-index-and-dashboards-report/
Green denotes SDG achievement, followed by yellow to orange, which indicate an increasing distance from SDG achievement. Red highlights major challenges.

Equivalent assessment tools for progress on Agenda 2063 are being developed.

Project objectives

The project was framed around the continent's efforts to deliver the global SDGs and the priorities under STISA-2024, through the lens of the African national science academies. These academies have the potential to be vital parts of their national science systems as strong advocates for investment in science (including engineering and medicine), technology and innovation to strengthen Africa's SEM/STI base and provide advice to policymakers, which is especially important at the national level where policy design, implementation and review typically occur.

The project was underpinned by three pillars: mobilisation, capacity building and cooperation. It ran in parallel with a sister project, "*Improving scientific input to global policymaking: using the SDGs as a case study*,"[20] whose final report was published in May 2019.

The broad objectives of the project were to:

- **mobilise African leaders in SEM**, along with partners and stakeholders within Africa and around the world, in developing and implementing **new approaches** to addressing shared challenges;

- **strengthen merit-based academies** in Africa as effective civil society organisations and respected sources of evidence-based advice to their societies, demonstrating by doing and sharing good practice;

- **build stronger, sustained linkages** amongst scientists in Africa and around the world, and the policymakers and donor organisations working to address Africa's challenges.

Project design and methodology

An international working group (WG), drawn from African national academies and wider afield, met on four occasions – in Nairobi (September 2016), Addis Ababa (February 2017), Abuja (November 2017) and Cotonou (November 2018) – and heard evidence from policymakers and science policy practitioners (listed at **Appendix 1**).

The project was experimental in nature. It took its steer largely from surveys of academies and of young researchers, which explored their understanding of the SDGs and STISA processes; their awareness of, and engagement with, the UN, AU and regional and national systems of implementation; and their desire for opportunities for engagement including training in science advice to policy.

20. http://www.interacademies.org/36061.aspx

Figure 1.2: Working Group meetings 2016-2018

Nairobi, September 2016

Addis Ababa, February 2017

Abuja, November 2017

Cotonou, November 2018 (no photo)

There were four main workstreams:

(1)   understanding the African policy landscape and building new relations;

(2)   supporting regional academy consortia;

(3)   engaging with African science diaspora;

(4)   building science-advice-to-policy literacy and leadership.

The project engaged with, and complemented the efforts of, other African networks of scientists, including the Network of African Science Academies (NASAC), the Global Young Academy (GYA) and African National Young Academies (NYAs), the African Academy of Science (AAS), the International Science Council (ISC) Regional Office for Africa (ISC ROA), and the International Network for Government Science Advice (INGSA) Africa Chapter.

This report is an account of what was learned along the way and makes recommendations on future ways of working and priorities for further funding.

Chapter 2: Understanding the African Academy Landscape

Summary

National and continental African academies of science can be important sources of knowledge; advocates for investment in, and application of, science; and convenors of stakeholders endeavouring to use science to address Africa's challenges.

This chapter describes the academies and other relevant science networks in Africa and identifies where they see their contribution to continental policy frameworks. It serves as a resource for the African policymaking community and for interested members of the science community.

Figure 2.1 is provided to help readers navigate their way through this chapter.

Figure 2.1: Schematic of academies' landscape in Africa and connections to global academy institutions

- - -▶ Some overlap in membership and/or shared observer status.
───▶ Direct or *ex officio* membership.
*   Networks of individuals
∞   Networks of academies
Σ   Networks of mixed institutions e.g. academies, funding agencies, government ministries

Note: African academies who are members of IAP, ISC and NASAC: Cameroon, Côte D'Ivoire, Egypt, Ghana, Kenya, Morocco, Nigeria, Zambia, AAS.
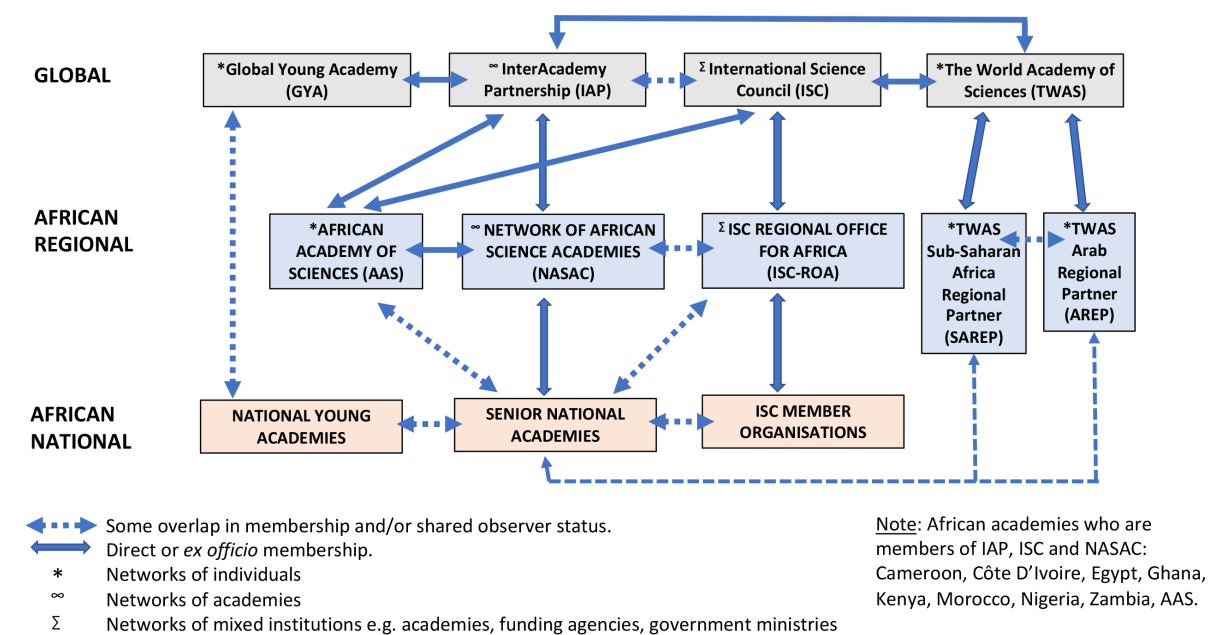
African national academies of science

National academies of science are merit-based institutions that recognise leading scientists within their respective countries (fellows or members) and elsewhere (foreign members) based on peer review by their existing membership. In addition to honouring top scientists, some national academies draw on the expert knowledge of their members to provide independent, high-quality advice to their governments. Academies experience mixed levels of success in fulfilling this role. This is due in part to the inherent challenges of influencing policy, but the strength of an academy's leadership and secretariat, degree and security of funding, and level of membership engagement and commitment

are also key contributing factors. These issues were highlighted in the ASADI review[21] conducted in 2014, the most comprehensive review of the African academies to date.

With the growing research output of AU member nations, African academies have an increasingly important role to play in sourcing and utilising Africa's best science to help meet shared challenges. Recognising this fact, European and North American academies, African governments, philanthropic organizations and the private sector have all supported African academy development, and the number of African academies has increased from 9 to 28 over the past 18 years.

Network of African Science Academies (NASAC)

Inter-academy collaboration and development in Africa are largely routed through NASAC, the network of 28 academies of science (see Table 2.1). At the time of writing, NASAC member academies hail from 27 countries, representing over 3,000 scientists, together with the African Academy of Science (AAS), whose membership is drawn from across the continent.

Table 2.1: NASAC members (as of June 2019)

COUNTRY	ACADEMY
Algeria	Académie Algérienne des Sciences et Technologies (AAST)
Benin	Académie Nationale des Sciences, Arts et Lettres du Benin (ANSALB)
Botswana	Botswana Academy of Sciences (BAS)
Burkina Faso	Académie Nationale des Sciences du Burkina (ANSB)
Burundi	Burundi Academy of Science and Technology
Cameroon	Cameroon Academy of Sciences (CAS)
Congo	Académie Nationale des Sciences et Technologies du Congo (ANSTC)
Cote d'Ivoire	National Academy for Cote d'Ivoire
Egypt	Academy of Scientific Research and Technology, Egypt (ASRT)
Ethiopia	Ethiopian Academy of Science (EAS)
Ghana	Ghana Academy of Arts and Sciences (GAAS)
Kenya	Kenya National Academy of Sciences (KNAS)
Madagascar	Madagascar's National Academy of Arts, Letters and Sciences
Mauritius	Mauritius Academy of Science and Technology (MAST)
Morocco	Hassan II Academy of Science and Technology, Morocco
Mozambique	Academy of Sciences of Mozambique (ASM)
Nigeria	The Nigerian Academy of Science (NAS)
Rwanda	Rwanda Academy of Sciences
Senegal	Academie des Sciences et Techniques du Senegal (ANSTS)
South Africa	Academy of Science of South Africa (ASSAf)
Sudan	Sudanese National Academy of Science (SNAS)
Tanzania	Tanzania Academy of Sciences (TAS)
Togo	Académie Nationale Des Sciences, Arts Et Lettres Du Togo (ANSALT)
Tunisia	Tunisian Academy of Sciences, Letters, and Arts
Uganda	Uganda National Academy of Sciences (UNAS)
Zambia	Zambia Academy of Sciences (ZaAS)
Zimbabwe	Zimbabwe Academy of Sciences (ZAS)
African continent	African Academy of Sciences (AAS)

NASAC's role is to serve as an independent African forum that brings together academies of science in the continent to discuss science-related issues of common concern, to make joint statements on major issues relevant to Africa and to provide mutual support to member academies. Its governing framework is the NASAC Strategic Plan,[22] whose current version, covering the period 2018-2022, sets out the following ambitions:

Table 2.2: NASAC STRATEGIC PLAN 2018-2022

MISSION: to aspire to make science academies in Africa vehicles of positive change for African societies; to make science contribute to Africa's full potential and sustainable development.

GOALS:

(1) Enable and inter-connect African science academies to contribute to science, technology and innovation.

(2) Make the voice of science heard by African and global decision and policymakers.

(3) Establish a culture of science in Africa.

CORE VALUES: institutional independence, mutual dependence, equity, integrity and respect for diversity.

OBJECTIVES:

(1) provide advice to regional bodies and organisations on science related issues of importance to Africa's development through its membership;

(2) assist in building the capacities of academies in Africa to improve their role as independent science advisers to governments and to strengthen their national, regional and international functions;

(3) assist scientific communities in Africa to set up national independent academies or associations of scientists where such bodies do not exist;

(4) promote excellence in science and contribute to a culture of science in Africa;

(5) serve as the authoritative voice of the science community in Africa.

Based in Nairobi, Kenya, with a secretariat comprising four staff members, NASAC provides a platform to coordinate interactions amongst national academies in Africa. Its members convene once a year at the Annual Meeting of African Science Academies (AMASA). NASAC has successfully organised major conferences and workshops across the continent, increased the capability of members' secretariats through training and capacity-building support, developed joint statements for political fora including G8 Summits, and produced a series of policymaker booklets (Figure 2.2).[23] It also led the African chapter[24] of the IAP interregional project on Food and Nutrition Security and Agriculture.

21. https://www.interacademies.org/News/25870.aspx

22. http://nasaconline.org/index.php/2018/02/23/2018-2022-nasac-strategic-plan/

23. http://nasaconline.org/index.php/2016/04/25/climate-change-adaptation-and-resilience-in-africa-recommendations-to-policymakers/, http://nasaconline.org/index.php/2016/04/25/changing-disease-patterns-in-africa-recommendations-to-policymakers/, http://nasaconline.org/index.php/2016/05/13/the-grand-challenge-of-water-security-in-africa-recommendations-to-policymakers/, and http://nasaconline.org/index.php/2016/09/12/biotechnology-policymakers-booklet-recommendations-to-policymakers-2/

24. http://nasaconline.org/index.php/2018/05/15/opportunities-and-challenges-for-research-on-food-and-nutrition-security-and-agriculture-in-africa/

Figure 2.2: Recent NASAC policy reports
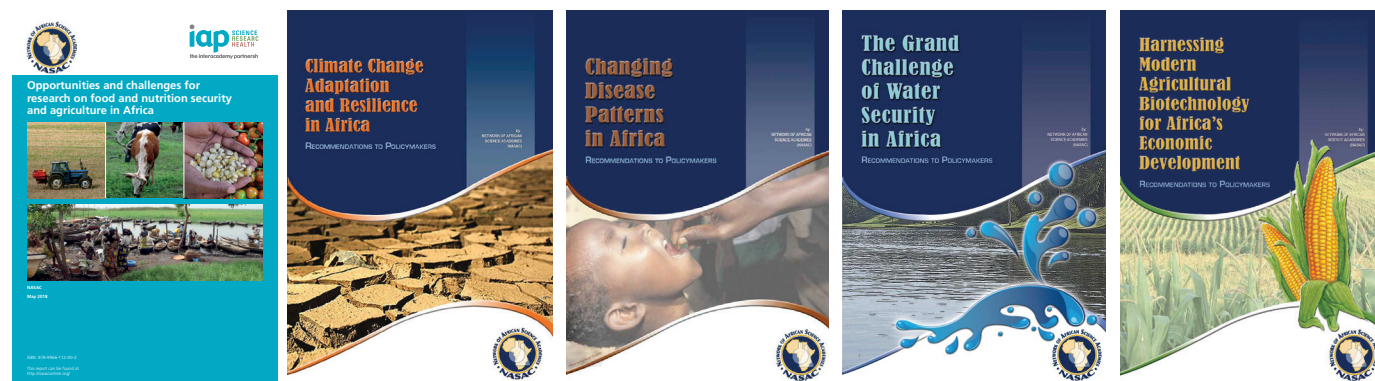
As one of four regional networks of IAP, NASAC receives a modest annual budget for core work and from which to leverage additional funds. It participates in many IAP initiatives and has worked with other academies outside Africa on specific initiatives, including the Leopoldina (Germany), the US National Academies, KNAW (Netherlands) and the European academies network, EASAC. NASAC also partners with the International Science Council Regional Office for Africa (ISC ROA) and the Swedish development agency, SIDA, to strengthen research capacity by providing support for integrated research projects on global sustainability across Africa,[25] linked to Agenda 2030. This five-year programme seeks to increase the production of high quality, integrated, inter- and transdisciplinary, solutions-oriented research on global sustainability by early career scientists in Africa. It provides two-year research grants to address thematic foci in global environmental change, disaster risk reduction, sustainable energy, and human health and wellbeing in urban environments.

NASAC's networking capacity and engagement with numerous academies and organisations enable it to serve as an effective resource for disseminating information, centralising and coordinating efforts, and serving as a voice for the African national science academies.

The African Academy of Sciences (AAS)

The African Academy of Sciences (AAS)[26] is an organisation of over 460 AAS Fellows, Associate Fellows and Honorary Fellows drawn from across the continent and elsewhere. Representing wide-ranging disciplines, these fellows hail from 45 African countries, with only ten countries not represented. There are also fellows from the USA, Canada, UK, Australia, Sweden, Switzerland and Italy, including some dual citizens). Since 2018, its new fellows must be members of their respective national academies.

AAS has five regional offices; a number of specialist committees; formal MOUs with the national academies in Ghana, Nigeria, Ethiopia, Kenya and South Africa; and it partners regularly with other academy and non-academy affiliated organisations within and outside of Africa. Its secretariat is composed of 19 staff, headed by an Executive Director who is an established scientist. With an endowment fund of USD 5 million, AAS has relative financial stability.

Critically, **AAS is recognised as a strategic and operational (or implementing) partner to the AU** and has good working relations with AUDA-NEPAD, the technical arm of the AU. In this capacity, AAS is invited to participate in the 14 technical ministerial commissions and is permitted to give presentations at AU summits. In the past, it has not typically consulted or engaged the national academies in its AU-related business. AAS is perceived to have less national interest than NASAC and the national academies. Like NASAC, AAS faces ongoing challenges of membership coverage in terms of geography (Central African, Francophone and Lusophone countries are sparsely represented) and disciplinary coverage (health and medicine predominate), as well as public engagement. At the time of writing, AAS was endeavouring to form regional groupings of members.

In 2015, in collaboration with NEPAD, AAS launched the Alliance for Accelerating Excellence in Science in Africa (AESA),[27] an agenda-setting and funding platform to support research leadership and promote scientific excellence and innovation to overcome some of Africa's developmental challenges.

The Global Young Academy and National Young Academies in Africa

The Global Young Academy (GYA)[28] is an organisation of young scientists from around the world in the first 3-10 years of their research careers. They are selected in recognition of their scientific excellence and commitment to service. In contrast to the typical lifetime membership of senior academies, GYA members serve five-year terms. The GYA has a maximum capacity of 200 members, with an alumni group of 216 as of 2019. Together, members and alumni currently represent 83 countries. There are 26 African GYA members, representing 13% of current membership, and 42 African GYA alumni, representing just under 20% of the alumni network.

The GYA provides a voice to young scientists all over the world. As an independent, member-led academy, it engages in science advice and policy-for-science initiatives; and it conducts independent, externally funded studies and publishes statements on international science policy, the research environment, science education and the SDGs. The GYA also supports the establishment and coordination of National Young Academies[29] around the world, acting as a facilitator for this growing network. Their membership policies are similar to those of the GYA, with limited terms and a commitment to serving society. As of 2019, there are 37 National Young Academies (NYAs) and 10 similar bodies for early career researchers worldwide (Table 2.3).

Africa is the fastest growing region for the establishment of NYAs, standing at time of writing at 13, or 35% of the total worldwide. This could reflect a proactive and aspiring generation of young science leaders in Africa and/or a perceived need to galvanise national academies to engage with policy development where this is not happening.

25. http://nasaconline.org/index.php/2016/04/26/programmes/
26. http://www.aasciences.ac.ke/

27. https://aesa.ac.ke/
28. Global Young Academy. Available at: https://globalyoungacademy.net/
29. Global Young Academy: National Young Academies. Available at: https://globalyoungacademy.net/national-young-academies/

Table 2.3: African National Young Academies (as of June 2019)

COUNTRY	ACADEMY
Benin	Academy of Young Scientists of Benin
Cameroon	Cameroon Academy of Young Scientists
Egypt	Egyptian Young Academy of Sciences
Ethiopia	Ethiopian Young Academy of Science
Ghana	Ghana Young Academy
Kenya	Kenya National Young Academy of Sciences
Nigeria	Nigerian Young Academy
Senegal	Académie Nationale des Jeunes Scientifiques du Sénégal
South Africa	South African Young Academy of Science (SAYAS)
Sudan	Sudanese Academy of Young Scientists
Tanzania	Tanzania Young Academy of Sciences
Uganda	Uganda National Young Academy
Zimbabwe	Zimbabwe Young Academy of Science
Similar Bodies and Young Scientist Networks in Africa	
Burundi	Burundi Council of Young Scientists

The GYA also runs an African Science Leadership Programme,[30,31] aimed at enabling young researchers in Africa to lead international, collaborative and transdisciplinary projects that focus on the challenges of their region and the global community. It does this largely through mentoring and support structures, and leadership training.

The potential of African senior and young science academies

Whether academies are senior or young, new or established, they face similar challenges: influencing policy is a test of diplomacy, advocacy and tenacity, and being able to exploit the opportunities available to them requires investment in skills, money and time that many feel they can ill afford without additional support.

Nevertheless, African academies can be providers and/or conduits for independent science advice, and agents for capacity building and change in national science systems. African national academies have the potential to become stronger advocates for (i) national investment in STI; (ii) science advice for policymaking; and (iii) galvanising support from the science community for implementation of actions to achieve the SDGs and STISA.

Other important science organisations in Africa

International Science Council Regional Office for Africa (ISC ROA)

The ISC Regional Office for Africa promotes the participation of African scientists, organisations and institutions in the programmes and activities of the ISC (formerly ICSU) family and its partners on the continent. The ROA aligns ISC's strategic planning for activities in Africa, promotes capacity building in Africa, the mobility of African scientists within the continent, and the free flow of scientific knowledge across borders. ISC ROA works with NASAC to strengthen transdisciplinary research capacity amongst young researchers through the Leading Integrated Research for Agenda 2030 (LIRA) Programme.[32]

ISC has a number of competitive advantages over the academy networks. Primarily, it has a formal voice in UN negotiations, playing a leading role in coordinating scientific and technological communities within the UN major group[33] system. It also has MOUs with leading UN agencies, e.g. UNESCO; and its CEO is one of the 10 scientists who lead the Technology Facilitation Mechanism, an important pathway for feeding STI into the UN system for implementing the SDGs.

INGSA - Africa Chapter

Under the aegis of ISC, and hosted by ISC ROA, the International Network for Government Science Advice (INGSA)[34] provides a forum for policymakers, practitioners, national academies, scientific societies and researchers to share experience, build individual and institutional capacities, and develop theoretical and practical approaches to the use of scientific evidence in informing policy at all levels of government.

The INGSA-Africa Regional Chapter brings together policy practitioners and scientists from across the African continent, largely through capacity-building workshops, and is presently mapping science advice in Africa to identify strengths, weaknesses and priorities for development.

TWAS Regional Partners for Sub-Saharan Africa and North Africa

The World Academy of Sciences for the advancement of science in developing countries (TWAS) is a programme unit within the UN Educational, Scientific and Cultural Organisation (UNESCO). It has two regional partners covering African countries: the TWAS Sub-Saharan Africa Regional Partner (TWAS SAREP),[35] hosted by the Academy of Science of South Africa in Pretoria; and the TWAS Arab Regional Partner (TWAS-AREP),[36] based at Bibliotheca Alexandrina and covering North Africa. Largely honorific in nature, their objective is to promote and profile the activities of TWAS and its affiliated organisations in the regions, including issuing grants and awards, as well as enabling networking amongst TWAS fellows through the establishment of national chapters. Many TWAS Fellows in Africa are also members of their national academies and/or AAS.

30. https://globalyoungacademy.net/activities/african-science-leadership-programme/
31. https://www.futureafrica.science/index.php/leadership-programmes/aslp
32. https://council.science/what-we-do/funding-programmes/leading-integrated-research-for-agenda-2030-in-africa
33. https://sustainabledevelopment.un.org/majorgroups/scitechcommunity
34. https://www.ingsa.org/
35. https://www.twas-rossa.org.za/about-twas
36. http://www.bibalex.org/TWAS-AREP/en/Home/Index.aspx

Survey of academies on SDGs and STISA

Under the IAP project, national senior and young academies in Africa were surveyed in late 2016/ early 2017. Nineteen African academies, or 55%, responded to the survey. Of these: eleven[37] were senior academies, representing 48% of the NASAC membership, and eight[38] were young academies, constituting 73% of all young national academies in Africa at the time.

Overarching themes

- Most respondents indicated their academies play a science advisory role, whether regularly or occasionally, especially at a national level.
- All respondents thought academies have a role to play in supporting the SDGs and/or STISA-2024. All SDGs and STISA priorities have been explored to varying degrees by academies, working nationally and/or regionally, deliberately or sometimes serendipitously.
- Academies' awareness of national implementation of regional and global policy commitments is limited.
- Many academies referenced the need (1) to promote the awareness of the SDGs and STISA- 2024 framework amongst academies and the wider science community; and (2) for a coordination framework/mechanism between government agencies, academies and other research networks.
- Key challenges identified for scientists influencing policy were lack of awareness, trust, funding and capacity, especially in knowing how to package science advice for policymakers.

Survey results are available online[39] as a slide pack designed for academies to use locally and share with their respective members. The survey helped the Project Working Group understand how the academies see their role in the implementation of actions to achieve the SDGs and STISA, what they are doing to this effect, what prevents them from doing more, and how they think they can best contribute to this agenda in future (Figure 2.3).

The survey also provided a map showing where African academies can bring knowledge to the SDGs and STISA (Figure 2.4). An IAP database of academy outputs[40] also grew out of the survey.

Figure 2.3: Priority areas identified by academies in the membership survey

African academies have an important role to play in supporting the SDGs and STISA-2024.

Ways of doing this include:

- Providing evidence-informed policy advice
- Supporting science education at schools level
- Providing information and raising awareness amongst the public and academy fellowships
- Hosting events for different constituencies in private sector and civil society
- Ensuring their respective countries adopt SDGs/STISA priorities and integrate them into their Long and Short Term Social-Economic Plans and annual budgets
- Monitoring and evaluation of national and regional implementation
- Working regionally – as a "united platform"
- Being a reservoir of advice, strategic leadership and expertise
- Interacting with well-known and respected leaders in given fields to stimulate thinking and challenge the (young) academies
- Engaging where there are opportunities and letting governments know how and where the academies can add value

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37. Benin, Ethiopia, Morocco, Mozambique, Nigeria, Senegal, South Africa, Sudan, Tanzania, Zambia and Zimbabwe
38. Egypt, Ethiopia, Nigeria, Senegal, South Africa, Tanzania, Uganda and Zimbabwe
39. InterAcademy Partnership: Results of the Survey of the Academies. Available at:
    http://www.interacademies.org/36188/Results-of-the-Survey-of-the-Academies
40. http://www.interacademies.org/35255/SDG?region=2

Figure 2.4: African academies' report upload by SDG

The size of the boxes is proportional to the number of reports. Transparent boxes denote no reports. African academies have published most reports on health-related issues (SDG-3), and no reports classified under inequalities, life below water or life on land (SDGs 10, 14 and 15).

Governments and international development agencies, amongst others, can use this database to source information and identify where there is local technical capacity and potential new in-country partners to help them deliver their development mandates.

Chapter 3: Understanding the Continental Policy Landscape in Africa

Summary

One of the barriers for scientists, and academies more specifically, in supporting policy frameworks in Africa is a lack of understanding and awareness of policy structures and processes, and pathways for science to feed into them.

This chapter is provided to help scientists navigate their way around UN and AU processes for implementing the SDGs and STISA-2024, respectively. It does not do this at the national level because national contexts are highly variable and context-specific.

The continental landscape is complex, with many structures established with good intent but appearing to stall, with little financial and/or administrative support. This is further exacerbated by little apparent effort to coordinate and/or integrate the work of these structures in order to maximise synergy and complementarity, and account meaningfully for resources going into science on the continent. Nonetheless, there are opportunities to engage productively.

Introduction

Agenda 2030, with its 17 SDGs,[41] was endorsed by the UN in 2015 and, earlier in the same year, the African Union adopted its long-term Agenda 2063[42] – "The future we want for Africa" – which set out a path for Africa's positive socioeconomic transformation over the next 15-50 years. Underpinning Agenda 2063, and resonating with the SDGs, the African Union's (AU) Science, Technology and Innovation (STI) Strategy for Africa (STISA-2024)[43] outlines six priority areas for STI focus: food security, disease prevention, communication, environmental protection, effective governance, and wealth creation.

The purpose of this chapter is threefold: (1) to raise awareness of Agenda 2063 and STISA-2024 amongst the African science community, particularly members of national academies; (2) to improve their understanding of how STISA-2024 is being implemented and of some of the key AU processes; and (3) to encourage scientists and academies to support STISA-2024 implementation more effectively. It complements equivalent work described in an IAP guide to the SDGs,[44] which includes ways in which academies can engage with the SDGs. The AU Handbook,[45] 254 pages long, available in English and French and updated annually, is a useful reference guide to the AU's infrastructure and operations, and informed much of this chapter.

41. UN Sustainable Development Knowledge Platform at https://sustainabledevelopment.un.org/sdgs

42. https://au.int/en/Agenda2063/popular_version

43   https://au.int/en/documents/20141227

44. http://www.interacademies.org/37864/IAP_SDG_Guide?source=generalSearch

45. AU Handbook 2019: https://au.int/sites/default/files/pages/31829-file-au_handbook_2019_english.pdf

What are Agenda 2063 and STISA?

Agenda 2063

The AU vision is for an integrated, prosperous and peaceful Africa, driven by its own people and playing its part globally. Articulated in Agenda 2063: The Africa we want, Agenda 2063 was officially adopted by the AU Assembly in 2015. It provides a collective vision and roadmap to realise the AU vision and build a prosperous and united Africa based on shared values and a common sense of purpose. It was developed by the AU Commission (AUC), supported by the New Partnership for Africa's Development (NEPAD) Planning and Coordinating Agency (NPCA), the African Development Bank (AfDB) and the UN Economic Commission for Africa (UNECA) through a people-driven process.

At the heart of Agenda 2063 are seven aspirations: (1) a prosperous Africa based on inclusive growth and sustainable development; (2) integration and coherence; (3) good governance, democracy, respect for human rights, justice and law; (4) peace and security; (5) cultural identity, common heritage, values and ethics; (6) inclusive, people-driven development; and (7) global influence and partnership. Each of these aspirations has corresponding goals, broken down into priority action areas. Agenda 2063 is both a vision and a call to action and strives to be more bottom-up, people-driven, coherent, results-oriented and accountable than its predecessors.

A 50-year framework, the implementation of Agenda 2063 is envisaged as a series of 10-year phases. The First 10-Year Implementation Plan (2013-2023)[46] lays out the first-stage priorities and includes efforts to improve the education of African citizens and strengthen STI development.

Science, Technology and Innovation Strategy for Africa 2024 (STISA-2024)

AU Heads of State and Government adopted a 10-year Science, Technology and Innovation Strategy for Africa (STISA-2024) in 2014. Supporting Agenda 2063, it positions STI as an enabler for achieving the continent's development goals. STISA was designed to help foster social transformation and economic competitiveness through human capital development, innovation, value addition, industrialisation and entrepreneurship.

STISA is being rolled out in 10-year phases, with new priorities identified each decade (Figure 3.1). STISA-2024 is the first stage.

Figure 3.1: Timing of the STI strategy within Agenda 2063 (from STISA-2024)
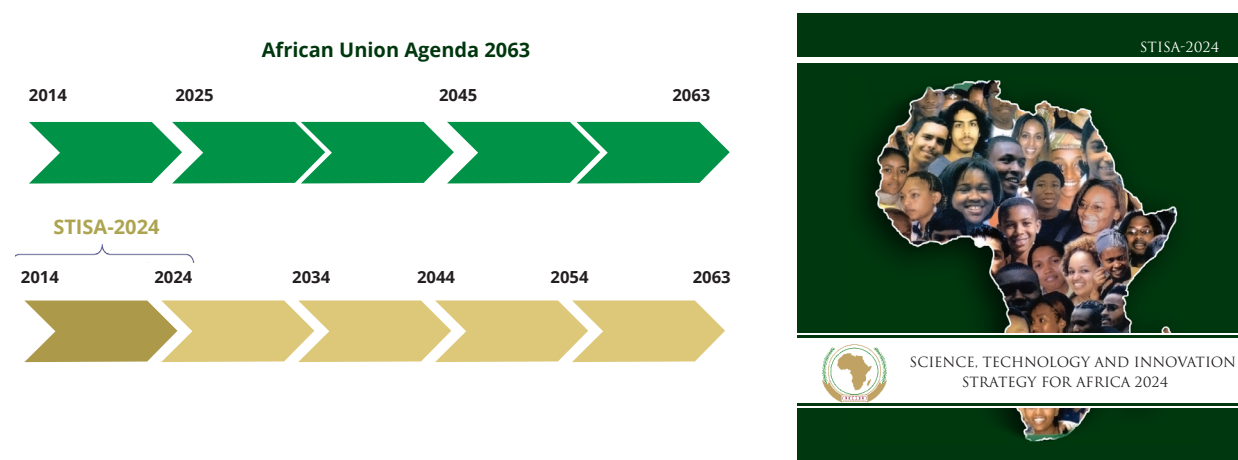
STISA-2024 comprises six socio-economic priority areas (Figure 3.2): (i) Eradication of Hunger and Achieving Food Security; (ii) Prevention and Control of Diseases; (iii) Communication (Physical and Intellectual Mobility); (iv) Protection of our Space; (v) Live Together-Build the Society; and (vi) Wealth Creation. These are underpinned by priority research and/or innovation areas (see Table 1) and four mutually reinforcing pillars: (a) building and/or upgrading research infrastructures; (b) enhancing professional and technical competencies; (c) promoting entrepreneurship and innovation; and (d) providing an enabling environment for STI development in the African continent.

Figure 3.2: Summary of STISA-2024 priority areas (taken from STISA-2024)

	Priorities	Research and/or innovation areas
1	Eradicate Hunger and ensure Food and Nutrition Security	- Agriculture/Agronomy in terms of cultivation technique, seeds, soil and climate - Industrial chain in terms of conservation and/or transformation and distribution infrastructure and techniques
2	Prevent and Control Diseases and ensure Well-being	- Better understanding of endemic diseases - HIV/AIDS, Malaria Hemoglobinopathie - Maternal and Child Health - Traditional Medicine
3	Communication (Physical & Intellectual Mobility)	- Physical communication in terms of land, air, river and maritime routes equipment and infrastructure and energy - Promoting local materials - Intellectual communications in terms of ICT
4	Protect our Space	- Environmental Protection including climate change studies - Biodiversity and Atmospheric Physics - Space technologies, maritime and sub-maritime exploration - Knowledge of the water cycle and river systems as well as river basin management
5	Live Together – Build the Society	- Citizenship, History and Shared values - Pan Africanism and Regional integration - Governance and Democracy, City Management, Mobility - Urban Hydrology and Hydraulics - Urban waste management
6	Create Wealth	- Education and Human Resource Development - Exploitation and management of mineral resources, forests, aquatics, marines etc - Management of water resources

As part of the Foreword for STISA-2024, the former Commissioner of Human Resources, Science and Technology, His Excellency Dr Martial De-Paul Ikounga, issued a call for all members of the African STI community to get involved, engage the younger generations and have conversations with other sectors. Implementation of STISA requires new knowledge and technology development, but also a concomitant monitoring and evaluation framework, informing policy and providing a constructive challenge function to hold politicians to account, precisely because Agenda 2063 is aspirational and without judicial accountability.

46. http://www.nepad.org/agenda-2063/publication/agenda-2063-first-ten-year-implementation-plan-2014-2023

## How do Agenda 2063 and STISA-2024 relate to the UN's Agenda 2030?

The UN's Agenda 2030 and the AU's Agenda 2063 were adopted in 2015, seven months apart. Agenda 2063 has 20 goals with 174 targets, compared to Agenda 2030's 17 goals and 169 corresponding targets. Whilst their respective goals, targets and indicators broadly converge, these agendas operate on very different time frames – 15 years for the SDGs, 50 for Agenda 2063 – and diverge in several important areas, so that quantitative comparison is not always straightforward. The AU and the UN Economic Commission for Africa (ECA) have agreed on a shared monitoring and evaluation framework for both agendas and a common reporting system in order to generate integrated, systematic reporting and to facilitate national implementation and tracking.[47]

Though they are not legally obligated to do so, AU Member States are expected to take ownership and establish national frameworks to implement Agendas 2063 and 2030. Whilst there is a relatively transparent process for implementation and review of the SDGs, as well as platforms for sharing good practice, the process for implementing and reviewing STISA-2024 is less well articulated, at least at the national level.

How is STISA being implemented?

The key AU/UN infrastructure on the continent for the implementation of STISA is mapped out in Figure 3.3, together with some of the main entry points for scientists to engage.

Figure 3.3: The institutional architecture for implementing STISA-2024
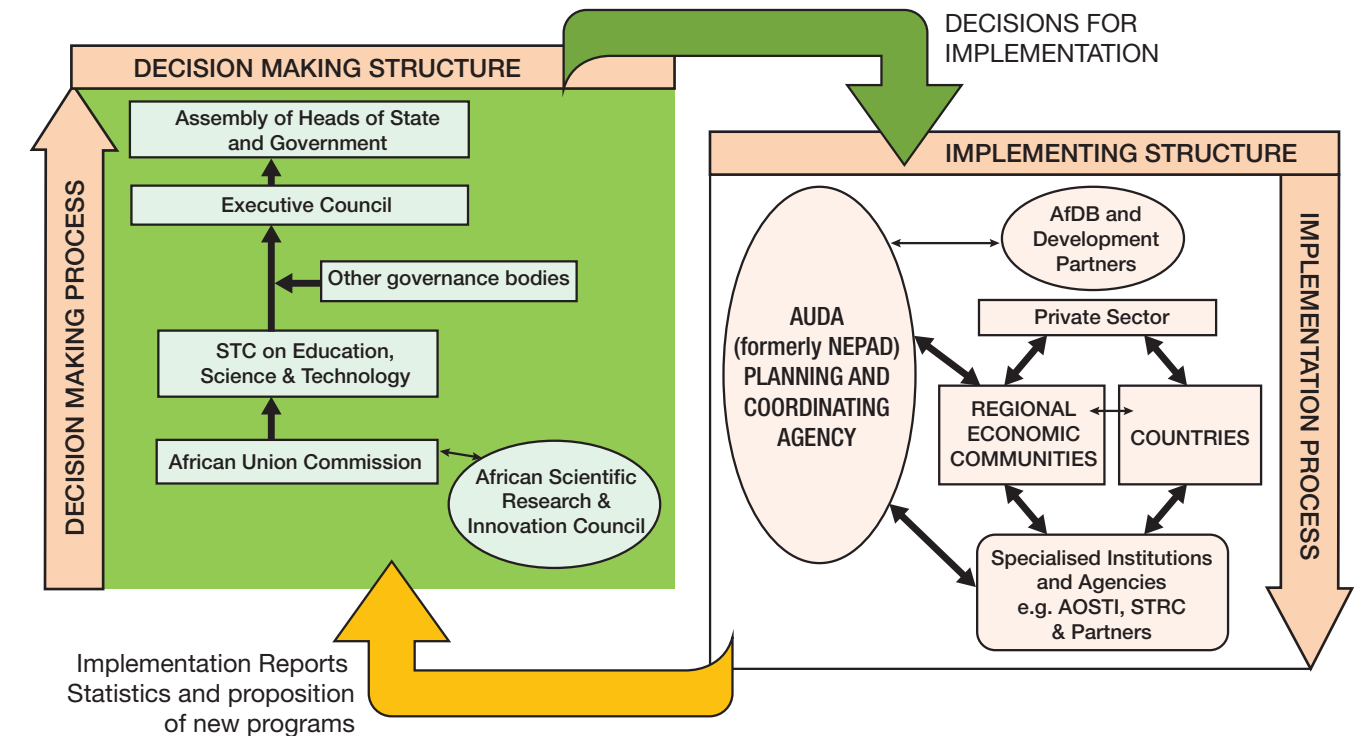
This is an amended version of Figure 6 in STISA-2024 (STISA-2024)

Key AU and UN structures at the continental level

Numerous structures within the AU and UN are nominally responsible for some aspect of STI governance and oversight on the continent.

Key AU structures

- The Committee of Ten Heads of State and Government on Education, Science and Technology in Africa (C-10),[48] established in 2015, comprises two representatives from each African region tasked with championing education, science and technology. It reports on their status to the AU Summit once a year.

- The African Union Commission (AUC)[49] is the AU's secretariat; its responsibilities include supporting and monitoring the AU's performance of its agreed policies, strategies and programmes. Based in Addis Ababa, Ethiopia, it comprises eight functional departments, headed by eight commissioners,[50] who are elected by the AU Executive Council and appointed by the AU Assembly for four years, renewable once. One of these Commissioners is assigned the human resources, science and technology (HRST) portfolio and is responsible for implementing all decisions, policies and programmes relating to HRST (Education, STI and Youth) on the continent.

47. https://uneca.org/sites/default/files/PublicationFiles/au-un-implementation-framework-for-a2063-and-a2030_web_en.pdf

48. https://blog.ruforum.org/2016/11/10/african-union-chairperson-announces-a-committee-of-ten-heads-of-state-and-government-to-champi-on-higher-education-in-africa/
49. https://au.int/en/commission
50. https://au.int/en/auc-commissioners

- The Specialised Technical Committee on Education, Science and Technology[51] (STC-EST) provides the overall governance of STI in Africa. It was formed in 2015 as a merger of the African Ministerial Council on Science and Technology (AMCOST) and the Conference of Ministers of Education of the African Union (COMEDAF) and comprises ministers of science and education. STC-EST meets every two years to review progress and make decisions on the implementation of STISA-2024; it also oversees continental strategies for education and the SDGs, including establishing performance indicators.

- The African Observatory of Science, Technology and Innovation (AOSTI)[52] is a specialised technical office of the AU under the Department of HRST. Its objective is to stimulate and promote the use of science and technology to support sustainable development in Africa. AOSTI is mandated to serve as the repository for science, technology and innovation (STI) data and to champion evidence informed STI policymaking continentally, regionally and nationally. It is charged with assisting Member States to map and strengthen their STI capabilities to meet development challenges and for STI policy formulation, evaluation and review, as well as technology foresight and prospecting.

- The New Partnership for Africa's Development (NEPAD) Agency,[53] which became the AU Development Agency (AUDA)[54] in January 2019, is an AU technical body and the implementing arm for the AU's Agenda 2063 development strategy. It is mandated to facilitate and coordinate the implementation of regional and continental priority development programmes, develop an indicators framework, and to push for partnerships, resource mobilisation and research and knowledge management for the implementation of the First Ten-Year Implementation Plan of Agenda 2063.

- The Scientific, Technical and Research Commission (STRC)[55] is a specialised technical institution of the AU under the Department of HRST. Its role is to help implement STISA-2024, promote intra-African research activities, identify new and comparative priority areas for research, and popularise the scientific and technological research culture in Africa.

- The African Scientific Research and Innovation Council (ASRIC)[56] was launched in late November 2018 after its statute was adopted by the AU Assembly in January 2016. With STRC providing the secretariat, ASRIC's mandate is to promote scientific research and innovation and address the challenges of Africa's socio-economic development. It **has been constituted from representatives of African academies of science (five presidents)**, who now have an opportunity to influence policy directly through this council.

Key UN structures in Africa

- The UN Economic Commission for Africa (UNECA)[57] is a UN body for the continent responsible for overseeing and facilitating regional and national implementation of the SDGs. It also helped shaped STISA-2024. UNECA hosts an Annual Regional Forum on Sustainable Development (ARFSD)[58] where regional progress on SDGs implementation is assessed and good practice shared amongst member states. UNECA has been tasked with developing an annual African STI Multi-stakeholder Forum, in cooperation with the Department for Science and Technology (DST) in South Africa, to feed intelligence into the global equivalent that meets every May/June at the UN Headquarters in New York.

- The SDGs Center for Africa[59] was established by African leaders in July 2016 to support SDG implementation in line with the African Union's (AU) Agenda 2063. Based in Kigali, Rwanda, it works to create partnerships across the SDGs to ensure their effective implementation across Africa. The Center helps prepare the Africa SDG Index and Dashboards,[60] a tool that draws on official and proxy SDG indicators as well as elements of the Agenda 2063 to help African countries benchmark their progress, identify priorities for action, and highlight specific challenges facing Africa. Fifty two countries are included in the Index ranking, and all 54 African countries have country dashboards.

Other organisations of interest to STI governance

- The African Development Bank (AfDB)[61] has its own policy framework – the High Fives (Hi5s)[62] – within the AfDB 10-year strategy (2013-2022), which resonates closely with Agendas 2030 and 2063.

  Two African science organisations formally recognised by the AU and UN are also worth noting:

  - The African Academy of Sciences (AAS)[63] is recognised by the AU as the voice for science on the continent through its role as a strategic partner to the AU Commission (AUC). This enables the AAS to participate in key AUC initiatives.

  - The International Science Council Regional Office for Africa (ISC ROA)[64] is recognised by the UN as the voice for science on the continent through its role as a co-organising partner for the S&T Community Major Group,[65] one of 13 major groups that provide channels through which broader participation is facilitated in UN activities related to sustainable development. Twenty-six African countries are represented by this office, eight of them academies of science. The remainder are largely funding agencies and research institutes.

51. https://au.int/en/stc
52. http://aosti.org/
53. http://www.nepad.org/
54. https://www.un.org/africarenewal/news/nepad%E2%80%99s-transformation-african-union-development-agency
55. http://austrc.org/
56. https://au.int/en/newsevents/20181127/first-conference-african-scientific-research-and-innovation-council-asric-abuja

57. https://uneca.org/
58. https://uneca.org/arfsd2018
59. https://sdgcafrica.org/
60. https://sdgcafrica.org/reports/
61. https://www.afdb.org/en/
62. The AfDB High 5s: Light Up and Power Africa, Feed Africa, Industrialise Africa, Integrate Africa, and Improve the Quality of Life for the People of Africa
63. https://aasciences.ac.ke/
64. https://council.science/regions/roa
65. https://sustainabledevelopment.un.org/majorgroups/scitechcommunity

Key AU and UN structures at the regional level

- The UN Educational, Scientific and Cultural Organisation (UNESCO),[66] one of the key UN structures for STI-for-the-SDGs, has regional field offices[67] located in 17 African countries, responsible for developing strategies, programmes and activities in consultation with national authorities and other stakeholders. It is also worth noting that UNESCO National Commissions[68] are located in 46 Africa countries, tasked by their respective governments to facilitate "consultation, liaison and information" and mobilise and coordinate partnerships with wide-ranging national stakeholders.

- The Regional Economic Communities (RECs)[69] are eight regional groupings of African states that have developed independently, and consequently have differing roles and structures. They are described as the AU's building blocks, and their broad objective is to facilitate regional economic integration between their respective members. They are increasingly involved in coordinating AU Member States' interests in wider areas such as peace and security, development and governance. Some countries are members of more than one REC.

  The eight RECs are:
  - Arab Maghreb Union (UMA)[70]
  - Common Market for Eastern and Southern Africa (COMESA)[71]
  - Community of Sahel–Saharan States (CEN–SAD)[72]
  - East African Community (EAC)[73]
  - Economic Community of Central African States (ECCAS)[74]
  - Economic Community of West African States (ECOWAS)[75]
  - Intergovernmental Authority on Development (IGAD)[76]
  - Southern African Development Community (SADC)[77]

At the time of writing, some RECs are endeavouring to organise regional networks of academies to assist them in their work.[78]

With the multitude of structures and mechanisms in the AU and UN systems for feeding STI into the policymaking process, some apparently non-productive and working independently from each other, it has been challenging to determine how to gain access and traction. The development of ASRIC presents an interesting opportunity for the academies, given the central role of five academy presidents, if funds can be committed by the AU to support it adequately. Working together at all levels, the academies can potentially help improve the efficiency of these complex AU and UN systems. Given the complexity, the most fruitful approach in the first instance might be to begin by engaging at the national level where policy implementation occurs.

66. https://en.unesco.org/about-us/introducing-unesco
67. https://en.unesco.org/countries/field-offices
68. http://www.unesco.org/ncp/index-typo.php?lc=E&region=1&module=national_commissions-typo&web=&showPresidentsSecretariesGeneralNac=1
69. https://au.int/en/organs/recs
70. https://www.uneca.org/oria/pages/amu-arab-maghreb-union
71. https://www.uneca.org/oria/pages/comesa-common-market-eastern-and-southern-africa
72. https://www.uneca.org/oria/pages/cen-sad-community-sahel-saharan-states
73. https://www.uneca.org/oria/pages/eac-–-east-african-community
74. https://www.uneca.org/oria/pages/eccas-economic-community-central-african-states
75. https://www.uneca.org/oria/pages/ecowas-economic-community-west-african-states
76. https://www.uneca.org/oria/pages/igad-intergovernmental-authority-development
77. https://www.uneca.org/oria/pages/sadc-southern-african-development-community
78. For example, ECOWAS: https://leadership.ng/2018/09/18/proposed-west-african-science-academy-will-spur-regional-devt-onu/amp/

Why should academies support the SDGs and STISA?

The imperative for African academies and the wider scientific community on the continent to engage on STISA and the SDGs is clear. Technically, all AU Member States are committed to Agendas 2063 and 2030 and to reorientating and integrating national development priorities around them so that they are mainstreamed within their countries. This means that national research agendas, policy and funding priorities should reflect these the goals and priorities of these policy frameworks. As an important part of their national science systems, academies should support this process, drawing on the wealth of expertise in their membership and wider science community. Critically, they have a role to play in advocating for the importance of national and continental investment in science, technology and innovation to further Africa's sustainable development.

Unlike national implementation of the SDGs, where the Voluntary National Review process of national reporting facilitates the sharing of good practice, there is little clarity and guidance on how STISA-2024 is implemented at the national or any level. Certainly, a key factor for the successful implementation of Agenda 2063 is the capacity of individuals and institutions to support its domestication. The First Ten-Year Implementation Plan includes a Capacity Assessment Study to address the capacity needs of continental and regional institutions, which will later be extended to the member states. Such a national assessment study may present opportunities for the national academies, if they are able to articulate the value of their contributions within national implementation systems.

Academies can provide expertise to put STISA priorities into context and explain their importance, causes and trajectories; help devise monitoring and evaluation frameworks for national implementation; identify gaps, complementarities, synergies and trade-offs across STISA priorities and between STISA and the SDGs; explain complex or big data; facilitate the sharing of knowledge through open science; help develop national science, technology and innovation (STI) roadmaps and action plans; promote and practice interdisciplinary and collaborative work; and provide independent assessments of what is working and what is not.

The academies can play their part in national, regional and global systems as recognised, independent and honest sources of expertise; as trusted and respected advisers and convenors; as advocates for investment in research and strong scientific institutions; and as mentors and partners to empower young scientists.

How can academies support the implementation of STISA and the SDGs?

NASAC and its member academies are well placed to be (i) providers and/or conduits for independent science advice at national, regional and continental levels; and (ii) agents for capacity building and change in national science systems to help support implementation of both STISA and the SDGs.

There is an increasing recognition of the need to develop national, regional and global **action plans or roadmaps for STI**, to underpin implementation of the SDGs and STISA-2024. These roadmaps can help identify gaps and opportunities in skills, expertise, research needs, and the financial planning and investment required. But whilst there are numerous online documents that reference such mapping, their translation into action is limited. Academies can help facilitate this process, not least as honest brokers and trusted convenors, but also as integral parts of their national science systems and through the way they organise themselves on the continent.

NASAC, its member academies, National Young Academies and the Global Young Academy members on the continent can support STISA, and concomitantly the SDGs, by:

- **promoting the importance of STISA and the SDGs** across all science and technology endeavours, and engaging and sensitising their own members, governments, parliaments, civil society, the public, academia and the private sector through open lectures, discussion and outreach programmes:
  - o convening different constituencies through workshops/meetings/fora/symposia to promote dialogue;
  - o working together as members of senior and young academies to complement each other's strengths in supporting the SDGs.
- **listening and providing advice to governments** directly or through other appropriate sources, helping them to interpret, prioritise and implement STISA priorities, SDGs and their targets locally, nationally and regionally:
  - o framing policy challenges and explaining how science can help solve them in a way that resonates with policymakers;
  - o nominating experts to serve on advisory or other committees within public and private sectors;
  - o advocating for stronger national investment in science;
  - o encouraging governments to implement coherent research policies that target basic as well as applied research in support of STISA and the SDGs;
  - o acting as interlocutors between policymakers and academia/research communities – the role of academies is vital in communicating evidence with policymakers, but also policy and research needs to scientists;
  - o preparing timely position statements, reviews, policy briefs, summaries, consultation responses and expert consensus reports from an integrated, interdisciplinary perspective in order to provide clear, evidence-informed recommendations;
  - o engaging with the newly formed African Scientific Research and Innovation Council (ASRIC), helping it develop into a strong institution for science governance on the continent.
- **bringing new knowledge** to the SDGs and STISA-2024:
  - o exploring trade-offs and complementarities between and across STISA priorities and the SDGs, and horizon scanning to identify future challenges and anticipate obstacles;
  - o monitoring and evaluating progress of STISA priorities and the SDGs, including developing indicators, especially for poorly defined goals;
  - o advocating for governments to invest more in STI to produce more locally relevant knowledge;
  - o engaging with the African diaspora to help build capacity, especially those with experience in research and/or policy governance;
  - o helping to raise the profile of NYAs and the GYA, and the voice of young scientists on the continent, opening doors for them and facilitating their integration into national and regional policy initiatives;
  - o seeking and promoting intergenerational and interdisciplinary perspectives in future initiatives.

Chapter 4: Building Relations with Key Stakeholders

Summary

A vital element of this project was building and sustaining links with key stakeholders, enabling academies to learn from each other and engage with influencers, including the policymaking community.

This chapter summarises how the project engaged with different stakeholder communities, and shares what was learned in the process. This includes the importance of systems thinking and mapping work, the mutual value of senior-young academy cooperation, facilitating regional multi-stakeholder cooperation, being proactive and being part of the conversation, and assisting with monitoring and evaluation of policy frameworks.

Engaging with the academies

(1) AMASA and NASAC meetings

The project was represented at **Annual Meetings of African Science Academies (AMASA) and NASAC Board meetings** in 2016, 2017 and 2018 to help inform the project and share its learning. The project was also the focus of the annual "learning collaborative" preceding AMASA-2016, where academies explore specific issues in detail and learn from peers and other practitioners. Here, more than 50 representatives from 17 senior and 11 young academies, together with the NASAC and AAS secretariats, helped inform the rest of the project by establishing several priorities for the academies:

- Articulating the **role of academies within national and regional STI systems:** bridging disconnects with key constituencies, notably governments and active research communities; working sub-regionally (North, South, East, West, Central) and with Regional Economic Communities; supporting AAS in its observer status to the AU; and engaging the African diaspora.
- **Challenging, scrutinising and supporting national responses** to national and regional commitments.
- **Building strong institutional links between senior and young academies** that draw on their respective strengths.
- **Enhancing trust amongst academies** and developing structures that better engage academicians in (inter)academy work, more readily sharing good practice and lessons learned at project level.
- **Facilitating Francophone, Lusophone and Anglophone academies** to work together.
- Developing a pipeline of **strong science leaders.**

(2) Worldwide Meeting of Young Academies and biennial meeting of African National Young Academies

National Young Academies endeavour to meet every two years to celebrate achievements, discuss shared challenges and learn from one another. The project was represented at the July 2017 meeting in South Africa, co-hosted by the South African Young Academy of Science (SAYAS) and the GYA, where the project Co-Chair gave the keynote address and the secretariat moderated two sessions. Convening more than 60 representatives from 35 Young Academies and equivalent organisations from around the world, this was a further opportunity to gauge the needs of the young academies and tailor methodology and output accordingly.

Key messages were:

- Young academicians are passionate about their role as **advocates for science**. The degree of outreach activities, even in relatively new Young Academies (YAs), was impressive. There was a very lively schools outreach activity in one of the local townships after the meeting.

- Young academicians appear to see their role primarily as a **voice for young people** and to **inspire the next generation of young scientists**, working with schools and universities and making science "cool." They are understandably less confident working at the science-policy interface and would welcome support in this role, including mentoring from more established and experienced young and senior academies. There was also an appetite for gaining insight into UN and AU policy processes and structures, especially portals and platforms for YAs to have a voice.

- Concerns amongst African YAs included **transboundary mobility including travel and visa issues, language barriers, funding and visibility. Regional collaboration in Africa** – and indeed elsewhere in the world – is limited; academies would like to have more funding opportunities to work with each other and with their senior counterparts.

- **Science leadership** was a recurring theme, including learning how to communicate scientific concepts effectively to non-specialist audiences, how to package research to be accessible and intelligible, and how to influence policy broadly.

- YAs see their role as helping to build trust through responsible science, engaging with and learning from policymakers, and better understanding risk.

It was evident that IAP and African senior academies can support African YAs in a number of ways, including: (i) supporting the African Science Leadership Programme (ASLP); (ii) identifying senior scientists willing and able to mentor and inspire young scientists; (iii) facilitating regional cooperation; (iv) involving YAs in their own programmes/initiatives; (v) providing funding; and (vi) talking to funding agencies together, in coordination.

In the next ten years, African YAs would like to be able to influence critical policy agendas; be a legitimate source of advice on matters of science; be financially independent but confident enough to work with others; be taken seriously by senior academies; be able to talk to funding agencies coherently and effectively; and be more visible, proactive, action-oriented, innovative and inventive.

Engaging with the policymaking community
Guest speakers at Working Group meetings

Continental, regional and national policy practitioners were invited to Working Group meetings through the course of the project (Appendix 1), leading to some ongoing relationships. These participants provided valuable insight, including identifying opportunities for NASAC and its members.

For example:

- **Professor Jacqueline McGlade**, UNEP Chief Scientist to 2018, talked about the widening gap between often supply-driven research presently undertaken, and research that is needed by governments to address societal challenges, a proportion of the latter being undertaken by think tanks or intermediaries rather than expert scientists. She urged academies to help bridge this gap by helping to re-align research agendas and provide a platform for scientists to exert influence. She encouraged academies to tap into existing funding schemes and prizes, which can help seed new research proposals; help UN agencies and others nurture research leaders in vital areas through SDG financing platforms; help connect the science community with technical communities within the UN system and within national governments, which need support and often work with significant constraints; and empower young scientists to build networks and become more policy-literate.

- **Dr Mahama Ouedraogo**, Head of Division, Human Resources, Science and Technology Department, African Union Commission, spoke about the context of STISA-2024 within Agenda 2063; its six strategic priorities; the key actors and inputs for its implementation; and the interplay and translation of STISA-2024 at national, regional and continental levels. It was noticeable that science academies were absent from a long list of key implementers that he presented, though he reassured WG members that academies can contribute to agenda-setting, decision-making, implementation and monitoring and evaluation.

- **Dr Chux Daniels**, Member of the AU Commission's Monitoring and Evaluation Committee of STISA-2024, spoke about the challenges, opportunities and priorities for STI in Africa's development; where he sees the academies adding value (coordination, convening, policy advice, governance, international engagement); and the requirement to move from linear to systems thinking, and to multidisciplinary working.

- **Dr Ahmed Hamdy**, Executive Director, AU's S&T Research Commission (STRC), spoke about STRC's mission and invited academies to help identify experts for AU Standing Committees; survey existing science networks; and bridge the language divide between policymakers and scientists. At the same time, he emphasised that the AU has no money to build the capacity of science academies *per se*.

- **Dr Almamy Konte**, Senior Expert, Innovation Policy, AU Observatory for STI (AOSTI), AU Commission, gave an account of AOSTI's work and the limited data available on African STI at the national and continental level. He highlighted the instability of STI ministries and STI policy processes, and the lack of monitoring and evaluation frameworks on the continent. Dr Konte emphasised the importance of increasing and reinforcing collaborative links between African countries: many rely on international funding and partnerships rather than African ones, which tends to mean that national R&D does not align with national development priorities. The academies can play an important role in this regard. He invited academies to assist with the monitoring and evaluation of STISA; champion evidence-informed policymaking; promote the development of national and regional STI observatories to help plug the dearth of data and metrics (c.70% of countries have no data, prompting the question – how do we know where we're going, if we don't know where we are?); initiate studies and policy briefs on STI policy and the development of indicators; organise public events; and help mobilise human and financial resources. He advised that an MOU between the AU Commission and NASAC would be a prerequisite for effective cooperation.

Engaging at the continental and regional level

(1) UN Economic Commission for Africa (UNECA)

UNECA[79] is an important agency for assisting, and accounting for, the continent's implementation of the SDGs. The project was represented at the UNECA Annual Regional Forum on Sustainable Development in May 2018 in Dakar, Senegal, where Member States shared good practice and lessons learned on implementing the SDGs. The objective of engaging with UNECA was to raise the profile of NASAC and the African national academies as potential sources of independent advice and regional expertise; to identify gaps and challenges and explore opportunities for cooperation; and to build connections with regional policymakers and national delegates.

A small delegation of senior and young academicians participated, including running a bilingual side event titled "Engaging scientists in Africa to support Agendas 2030 and 2063." This event was attended by representatives from government and research communities and civil society, and covered wide-ranging issues including developing science literacy and skills amongst young people; building a cadre of more socially aware scientists for the next generation; building skills and opportunities for innovation and entrepreneurship; reforming higher education systems and infrastructure; and reforming in-country infrastructure for research in Africa.

From presentations and discussions at the 2018 Annual Regional Forum, it became evident that:

- there is little integration of Agendas 2030 and 2063 at either regional or national levels; in fact, there were no visible representatives from the AU or NEPAD at the UNECA meeting;

- implementation of the SDGs varies between countries; for example in South Africa, it is top-down, driven by government, in contrast to Tanzania, where implementation is bottom-up, driven by civil society;

- there is little coordinated reporting at continental, regional or national levels; an AU Special Committee on STI, with representatives from SA, Senegal, Egypt, Rwanda and Kenya, put forward a motion to initiate a formal STI reporting agenda for Agendas 2030 and 2063;

- language can be a significant barrier to inclusion, but this can be overcome through timely translation of printed materials and the availability of interpreters at meetings.

An African Multi-stakeholder Forum for STI was borne out of this meeting; its purpose to help African countries build and strengthen partnerships, identify African STI needs and gaps, and prepare for coordinated representation at the annual UN STI Multi-stakeholder Forum and the High-Level Political Forum. NASAC and its national members have been encouraged to support this process.

(2) AU structures: AOSTI, AUDA-NEPAD

Through contacts made during the project, the academies were invited to nominate representatives to join the **STISA-2024 Monitoring and Evaluation Committee** meeting in August 2017. Consequently, IAP was invited to support the STISA mid-term review process (2014-2019) by preparing an evidence-based case for a reliable monitoring and evaluation (M&E) framework to underpin both STISA's implementation and its review; and providing some pointers on what an M&E framework for Africa might look like.

Based on desk research, questionnaires, and phone interviews with key stakeholders, a report examining the status of regional and national implementation of STISA and STI policy frameworks preceding it, most notably the Consolidated Plan of Action, was prepared for AU's African Observatory for STI (AOSTI). The report found that a succession of STI policy frameworks in Africa over the past three decades had had little visibility or policy traction at continental, regional/RECs, or national levels; nor had there been any clearly defined frameworks for monitoring and evaluating progress on the implementation of STI policies and programmes. The report concluded that without an M&E framework to support both implementation and review, STISA is likely to go the way of its predecessors; that is, to be invisible at the level of national policy implementation. The executive summary of the report is in Figure 4.1.

A short review of M&E practices for regional and international STI frameworks in other parts of the world, including the EU and OECD, was also prepared as a benchmark for recommendations on key M&E criteria practicable in Africa, complementing indicators work by NEPAD and AOSTI, and improving the prospects of policy learning. This review is available on request (projects@iapartnership.org). Both the report and review were shared with AOSTI in preparation for its Specialised Technical Committee on Education, Science and Technology (STC-EST) meeting in June 2018.

Collectively, this work has helped to build good working links with parts of the AU system and demonstrate where the academies can add value.

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79. https://uneca.org/

Figure 4.1: Executive summary of the IAP project's review of continental STI policy frameworks

A Review of Africa's continental STI policy frameworks: devising a way forward for STISA

EXECUTIVE SUMMARY

Science, technology, and innovation (STI) policies play a critical role in the foundation of a knowledge-based economy. In Africa, policies that emphasise technological innovation are promising mechanisms by which governments can promote economic growth and leapfrog out-of-date technologies; they have been part of African development policy for decades. Implementing effective STI policy has the potential to advance the continent's socio-economic development sustainably, and help African countries meet their commitment to global and continental policy frameworks (such as Agenda 2030 and Agenda 2063, respectively).

This paper is a review of STI policies over the past four decades, with focus on Africa's current STI policy, Science, Technology and Innovation Strategy for Africa 2024 (STISA-2024), to gauge the extent to which they have been implemented and had an impact. In doing so, it provides advice to both policy-creating and policy-implementing organizations to help give the first phase of STISA a realistic chance of being implemented and subsequently effecting positive change.

The following project methodologies were deployed to evaluate the challenges and opportunities of STI continental policy implementation:

- examining the history of African STI policy implementation through online research, highlighting that challenges to implementation have existed for all previous policies and that consequently impact has been negligible;

- reporting regional and national progress to-date of implementing STISA-2024, warning that STISA may similarly be at risk of not having an impact;

- interviewing a limited number of regional and national agencies tasked with implementing STISA, revealing the challenges that these organisations face: they feel constrained financially and receive little coordination or support from the AU or, in the case of national agencies, the Regional Economic Communities (RECs).

Whilst STI policy frameworks have existed at the continental level for the past four decades, an analysis of previous STI policies has revealed that in many cases they were not implemented or even adopted at regional or national levels. In some cases where policies had been adopted, this was decades later than proposed; and after policy adoption, implementation took even longer. This situation appears to persist: most recently, the RECs responsible for the regional implementation of STISA-2024 are doing so at slow and inconsistent pace, which is incongruous with the spirit of the Abuja Treaty.

A review of online documents of the eight RECs and 12 Member States has shown that the state of continental STI policy varies enormously. There is limited evidence of any formal regional STI plans supported by M&E frameworks to review progress, and few examples of STISA goals being written into regional or national strategies.

Integrating STISA priorities directly into regional and national policy is a necessary foundation for delivering Agenda 2063, to which all AU Member States are committed. Simply acknowledging STISA in regional or national strategies does not guarantee implementation: it must be accompanied by a practicable monitoring and evaluation (M&E) framework that enables tracking of progress, builds in positive feedback loops so that implementation policy can be adjusted and optimised where necessary, and at the same time measures impact.

Benchmarking against other regional and continental policy frameworks, it is clear that policy implementation is more likely to happen when accompanied by a reliable M&E framework to provide direction and accountability.

This report highlights the imperative for African governments and implementing agencies to develop an effective monitoring and evaluation framework to accompany STISA-2024 roll-out, and that of subsequent phases, so that STISA can be properly implemented and effect positive change. Without it, the realization of Agenda 2063 is seriously compromised.

[This report is available on request from the IAP Secretariat].

(3) IAP/NASAC regional workshop on the SDGs and STISA

In September 2018, a workshop was convened under the project to help academies better understand the SDGs and STISA-2024 and explore ways in which they can support them. Participants comprised 16 of the 24 NASAC member national academies, seven National Young Academies (NYAs), GYA members from the region, the International Science Council Regional Office for Africa (ISC ROA), and several representatives of the policymaking community.

Participants were informed about key continental, regional and national implementation processes and African scientists who are playing leadership roles in them. There are numerous ways in which academies can support these processes, including opportunities to support the work of the AU Commission Human Resources Science and Technology (HRST) and UN Regional Commission for Africa (UNECA), and to work with the ISC ROA. Participants expressed a strong desire to strengthen working links between NASAC members and NYAs in the region, looking to IAP to help them identify ways of doing this and to build capacity generally.

Many participants openly committed themselves to follow-up actions once home: examples included contacting their respective governments to support national efforts to implement the SDGs and STISA; holding workshops on these policy frameworks for their academy members; embedding the SDGs and STISA into their lecture programmes and curricula; being advocates within their research networks; and identifying academy focal points. A voluntary action plan was developed, setting out a range of possible actions at continental (NASAC), national (national science systems), institutional (academy) and individual (researcher) levels (**Appendix 2**). The plan contains examples of ways in which academies can engage, whether they are big or small, rich or poor, new or old, senior or young.

(4) Science Forum South Africa 2016-2018

The project created space for IAP, NASAC and the African academies to participate in the annual Science Forum South Africa,[80] which has fast become the leading science conference on the continent, engaging scientists and politicians from across Africa. In 2017 and 2018, the project ran side events addressing some of the ways that academies are engaging with the SDGs and STISA, regionally and nationally, and generating questions about how academies can help engage African diaspora, governments and civil society, and their advocacy role in championing the importance of national investment in STI. NASAC, AAS and the national academies have an increasing profile year-on-year at these fora, with the importance of engaging science communities at the national level a recurring theme.

Engaging at the national level

Arguably the unique contribution of NASAC is that its members are national academies. It is predominantly at the national level where policies are designed, implemented and reviewed, so having effective, proactive national academies of science is vital.

The project has provided space for national academies in Africa, both senior and young, to reflect on the relevance of their existing programmes to the SDGs and STISA, and to re-orientate future initiatives to respond more effectively to policy demand.

The Academy of Sciences of South Africa (ASSAf) is presently developing a model that will generically map out the stakeholders related to a specific SDG (focusing on SDG-6, water and sanitation), being mindful of the interdependencies between SDGs. The map will describe the nature of collaboration and support where it exists for this SDG and inform South Africa's national plan for STI in support of the SDGs. This work is being supported by a science policy fellow funded by the IAP project (see Chapter 5), through desk research and a stakeholder workshop to be held in July 2019.

In discussions with South African policymakers, it was clear that the multitude of stakeholders and active players working on the SDGs have limited awareness or collaboration of their individual efforts. This mapping exercise can help shape a roadmap for how agencies, activities and efforts can co-exist to achieve the implementation of the SDGs efficiently and effectively. Subject to funding, ASSAf will endeavour to replicate this process for clusters of interdependent SDGs and share its learning and methodology with other members of NASAC.

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80. https://www.sfsa.co.za/

Chapter 5: Pilot Programmes

Summary

Responding to priorities identified during Working Group meetings and through consultations and desk research, this chapter describes three pilot programmes that (1) facilitated cooperation between academies and wider stakeholders at the regional level; (2) enabled academies to attract members of their diaspora to help build their capacity; and (3) helped develop science policy literacy as part of a wider science leadership programme.

All three programmes were well received by participating scientists and academies, and they clearly satisfied an unmet demand. Institutional and personal links were initiated and many have been sustained, especially between academies. Sustaining relations with policymakers proved more difficult. Lessons learned along the way will help shape future programmes.

Introduction

Drawing on the IAP survey results, initiatives highlighted in Chapter 4, and priorities identified by the Working Group, three pilot programmes were designed to explore different ways of building the capacity of science academies in Africa – well-established and emerging, senior and young – to effectively fulfil their mandate to deliver respected, evidence-based policy advice to local, national, regional and continental policymakers and governments. STISA-2024 and the UN Sustainable Development Goals provided context and focus for the three programmes.

The **Regional Small Grants Programme** aimed to stimulate regional cooperation amongst African academies and to facilitate new conversations and new partnerships with national, regional and pan-African bodies by bringing together groups of academies and policymakers to share their varying perspectives on how to address pressing challenges.

The **Diaspora Fellows Programme** grew out of a recognition that, whilst African academies represent some of the best scientists in their respective countries and have great potential to provide much-needed evidence-based policy advice, many lack the capacity or confidence required to fulfil this potential. At the same time, it became clear over the course of the project that African scientists living outside the continent are eager to contribute to the development of their home countries but often don't know where to start. The programme, designed to bridge this disconnect, was modelled on the successful Carnegie African Diaspora Fellowship Program.

With its focus on early-career scientists, the **Science Leadership Programme** was a two-part undertaking, consisting of a workshop and a science policy fellowship programme. The programme was developed and conducted in partnership with the Africa Science Leadership Programme, an initiative of Future Africa and the Global Young Academy.

Regional small grants programme

Four competitively selected, broadly regional groupings of senior and young academies were awarded grants of USD 25,000 each for projects designed to help develop and strengthen their individual and collective capacity to provide evidence-based policy advice for their governments and other users.

The winning projects were chosen by a committee of Working Group members and independent reviewers. Projects were required to address one or more SDGs and/or STISA priorities, and to involve academies in a minimum of three countries including at least one senior and one young academy. Key selection criteria included likelihood of the project to strengthen the policy role of science academies in the short term and to influence national or regional policy over the longer term.

The meaning of "regional" varied; in one case, participating academies were all based in member countries of a Regional Economic Community in Northwest Africa; two groups involved academies in geographically proximate countries, in West/Central and Eastern Africa; and one, primarily in Southern Africa, gained its centre more from the pooled talents of mostly young academicians from across the continent coalescing around a policy challenge than from shared geography.

Projects, undertaken from late 2017 through early 2018, are summarised below, followed by analysis and recommendations.

Benin, Morocco, Senegal

The **Hassan II Academy of Science and Technology of Morocco** joined with the National Academy of Sciences and Arts of Benin, National Academy of Science and Technology of Senegal, and the National Young Academy of Science of Senegal – all in countries belonging to CENSAD, the Community of Sahel-Saharan States – to deliver a workshop on The Linkage of R&D and Innovation to Creating Wealth in African Context.

The workshop, augmented by extensive consultations beforehand and report dissemination afterwards, aimed to **raise awareness amongst the scientific community and non-academic stakeholders of the importance of strengthening linkages between R&D and innovation to create wealth, and to develop partnerships between these communities**. Results included concrete recommendations for decision-makers, with some immediate effect; for example, the Ministry of Health in Morocco was persuaded to create a Consortium for Tuberculosis Research as a forum uniting researchers and policymakers. More broadly, stakeholders from the three participating countries agreed to establish a network first to reinforce connections they had made with one another at the workshop, and then to broaden their scope to include additional African countries.

Nigeria, Benin, Cameroon, Ghana, Senegal

The **Nigerian Young Academy**, in partnership with the National Academy of Sciences and Arts of Benin, Cameroon Young Academy, Ghana Academy of Arts and Sciences, Ghana Young Academy, and National Academy of Young Scientists of Senegal, held a capacity-building workshop for young women scientists in West Africa. Its objectives were threefold: **to assess the current status and contributions to STI of this demographic; to identify motivations and challenges; and to make policy recommendations based on the findings**.

The project resulted in a list of recommendations for adoption of **a holistic approach to encouraging and increasing the participation of women in STEM education and research careers**, with academies well positioned to play a role in their implementation. These included a call for sustainable collaboration of national senior academies in the support of young women scientists; publication and dissemination of information on the achievements of women scientists in the public space to inspire others; and ensuring gender considerations at all stages of STEM research and innovation.

South Africa, Mauritius, Tanzania, Zimbabwe

In a project aimed to empower national young academies to lead international, interdisciplinary, and inter-generational dialogue on pertinent issues, the **South Africa Young Academy** teamed up with its counterparts in Mauritius, Tanzania and Zimbabwe, as well as the Academy of Science of South Africa (ASSAf), to deliver a workshop on *Policy Direction, Eradication of Hunger and Achievement of Food Security*. Two Pretoria-based organizations – the TWAS Regional Office for Sub-Saharan Africa (TWAS-SAREP) and the Organization for Women in Science in the Developing World (OWSD) South African National Chapter – also participated.

Whilst the South African Young Academy steered the event, they acknowledged that they had gained the confidence to convene workshops and to lead dialogues on pertinent issues from ASSAf, their senior counterpart. ASSAf members who participated in the workshop served a mentoring role for the young scientists, encouraging them to engage.

The project resulted in the publication of a 116-page report (https://www.sayas.org.za/wp-content/uploads/2018/10/SAYAS-Food-Security-Final-Report.pdf)[81] that includes the text of a policy brief **highlighting the role of young scientists and calling on policymakers to include scientists in the policymaking process**.

Ethiopia, Kenya, Tanzania, Uganda

In partnership with the Ethiopian Academy of Sciences, Ethiopian Young Academy of Sciences, Kenya National Academy of Sciences, Tanzania Academy of Sciences, and Uganda National Young Academy, along with the Kampala-based African Centre for Global Health and Social Transformation, the **Uganda National Young Academy** coordinated a **multi-national, multi-disciplinary consensus study to address the double burden of health affecting cities in East Africa**.

The major contribution of the project was the identification of spiritual health as a key component missing from the current discussion on cities and health, particularly in the East African context. As defined by the expert committee convened as part of the project, spiritual health refers to an individual's ability to live a fulfilling and personally meaningful life in the face of great hardship. In the group's final report, they asserted that integration of this broader understanding of human health into regional policy statements could have a lasting impact with respect to SDG-11 (make cities and human settlements inclusive, safe, resilient and sustainable) and STISA priority two (prevention and control of diseases).

Analysis and recommendations

Cooperation and community building amongst the academies involved in each project was arguably the strongest aspect of the programme. The partner academies worked together effectively in planning and executing their projects, and they maintained and reinforced their linkages after the projects had been completed. Young academies proved to be particularly energetic, contributing as much to their senior counterparts in terms of engagement and creativity as they gained in mentoring and high-level networking opportunities.

Engaging policymakers, in contrast, proved to be a challenge. Whilst all four projects produced tangible results with potential implications for policy, and all four involved policymakers to some degree in their activities, only the Morocco-based project succeeded in **engaging policymakers as full participants, not just audiences for findings and reports**.

In retrospect, a more concerted effort on the part of Working Group members to help identify and engage appropriate members of the national and regional policymaking communities in these projects might well have helped lay the groundwork for enduring partnerships between academies and policymakers. This, in turn, would have increased the likelihood that over time policy recommendations based on scientific evidence would be taken seriously by the decision-makers in a position to implement them.

81. https://www.sayas.org.za/wp-content/uploads/2018/10/SAYAS-Food-Security-Final-Report.pdf

Any future scale-up of this initiative, in the form of follow-up grants for the four initial regional groupings or support for new collaborations, would be greatly strengthened by a longer time horizon from application to selection to implementation; a strategy for engaging policymakers from the outset so they are fully invested in the deliberations; and more emphasis on dissemination of results and on tracking uptake of recommendations. Future initiatives could also engage strong or like-minded academies outside Africa; those who have experience of working in Africa and with African partners, and/or proactive science-for-development programmes.[82]

African Academies Diaspora Fellows Programme (AADFP)

This pilot programme[83] provided support for African academies of science to invite academicians in the African diaspora to collaborate on policy initiatives or other activities designed to strengthen the host academies. Modelled on the well-regarded Carnegie African Diaspora Fellowship Program,[84] which emphasises capacity building in selected institutions of higher education, the AADFP focused on opportunities for science academies to develop their strategies, programmes and outreach. Fellowships were also expected to plant the seed for continuing collaboration.

An adjunct to the Harnessing SEM project, the AADFP received matching grant support from Carnegie Corporation to funds donated from around the world, by the Academy of Sciences of South Africa; German National Academy of Sciences, Leopoldina; Royal Society (UK); InterAcademy Partnership (Italy and US); and Working Group member Prof TJ Higgins (Australia). A total of USD 75,000 was awarded to seven grantees, selected through a competitive process.

The programme was **designed to harness the expertise of scientists in the African Diaspora to strengthen African academies**. Extensive desk research and a series of interviews, conducted over several months in 2017, confirmed interest on the part of African scientists in the diaspora in contributing their expertise; corresponding interest on the receiving side; and a dearth of organised programmes to match scientists with opportunities. Of the many organisations, databases, and other resources devoted to the African diaspora, the research found very few that were specific to science.

Officers of senior or young national academies were invited to apply for AADFP grants, and they were responsible for identifying the diaspora fellows and confirming their availability. Fellows were required to be full or foreign members of a senior or young national science academy anywhere in the world, or of TWAS or the GYA; and to be members of the African diaspora, as broadly defined by the African Union: "people of African origin living outside the continent, irrespective of their citizenship and nationality and who are willing to contribute to the development of the continent and the building of the African Union."

Over the course of one or two visits of a week or longer, diaspora fellows collaborated with their host academies on a variety of scientific, policy, strategic or development initiatives, in each case contributing specialised expertise and/or unique perspectives unavailable with the academy's own network. Consistent with the focus of the larger IAP project initiative, all AADFP projects were **designed to address aspects of one or more strategic frameworks: the host academy's own strategic plan, the NASAC Strategic Plan, STISA-2024, and/or the SDGs**.

82. Examples of academies outside Africa who have worked with NASAC, AAS and others include the Acadèmie des Sciences, the Leopoldina, the Royal Society, and the US NAS.

83. http://www.interacademies.org/Activities/Projects/44389.aspx

84. https://www.iie.org/programs/carnegie-african-diaspora-fellowship-program

Diaspora fellowships, which took place in the second half of 2018 and early 2019, are summarised below.

Burundi Council of Young Scientists (BCYS)

Diaspora Fellow **Emery Nibigira** of Blaise Pascal University in France, who also serves as Secretary of the Burundi Council of Young Scientists, worked alongside local organisers in planning a December 2018 workshop on *Using Science, Technology and Innovation to Improve Nutrition and Promote Sustainable Agriculture to Achieve Food Security*. The project was designed to involve young agri-entrepreneurs in sharing and disseminating new knowledge and best practices to ensure sustainable agriculture and food security in Burundi.

Dr Nibigira was primarily responsible for coordinating all aspects of the multi-stakeholder workshop. The project benefited from the fellow's organisational, resource mobilisation and reporting skills. In the course of workshop planning and execution, he helped to establish a strong and dynamic network of academic researchers and young entrepreneurs in agribusiness. Dr Nibigira observed that activities undertaken through his *fellowship contributed to the visibility of BCYS in Burundi and evoked the need of unifying our forces … encouraged secondary school learners to pursue their career in science, an important ingredient to improving living conditions in Burundi … and opened a mutual exchange of recent research and strategies used by both fellow and local institutes.*

Académie Nationale des Sciences et Techniques du Sénégal (ANSTS)

This project began with a plan to create a database of skills in the Senegalese diaspora, grew into a more comprehensive exploration of how to mobilise scientists from the diaspora for the development of Senegal, and resulted in recommendations to ANSTS for an operational strategy for mobilising the scientific diaspora.

Mahamadou Lamine Sagna, a sociologist who was on the faculty at the Schiller International University in France at the time of application and subsequently moved to the American University of Nigeria, was supported through the programme. Having worked at universities in several countries around the world, including France and the United States, Professor Sagna brought multiple diaspora perspectives, and he also contributed his expertise as a social scientist.

A pair of roundtable meetings took place in December 2018 on *Mobilizing Senegalese Scientists from the Diaspora for the Economic, Social and Cultural Development of Senegal*. The roundtable discussions were informed and enriched by a series of interviews with scientists in Senegal and in the diaspora about needs on the one side, and desire and availability to contribute on the other. This input was folded into the recommendations presented to ANSTS, which included strategies for developing and populating the database that had been the project's initial focus.

Ghana Young Academy (GhYA)

Diaspora Fellow **Alice Matimba**, a Global Young Academy member originally from Ghana and now working at the Wellcome Genome Campus in the UK, paid two visits to Accra to work with the Executive Committee of the three-year-old Ghana Young Academy on the development and subsequent launch of the academy's first five-year strategic plan. From her experience in a range of project development work, and especially through her role as an active member of the Global Young Academy, Dr Matimba brought valuable perspectives to the discussions.

With Dr Matimba, the Ghana Young Academy created a comprehensive plan for achieving five strategic objectives: 1) increase membership base with active member participation; 2) promote networking and collaboration locally and internationally; 3) contribute to development and promotion of national and regional policies; 4) promote excellence and the culture of science in Ghana; and 5) identify, prioritise and advocate solutions targeting key areas for community development.

Dr Matimba wrote: *My role was to guide the process in developing a 5-year strategic plan based on a thorough assessment of strengths and opportunities for young scientists in Ghana … I am pleased to be able to continue to collaborate with GhYA in realizing their strategy and happy to contribute to future development of activities for as long as my input as a GYA fellow is of value.*

Nigerian Academy of Science (NAS)

Diaspora Fellow **Sunny Ohia**, a professor of pharmacology at the Texas Southern University in the US and a Fellow of the Nigerian Academy of Science (NAS), was the keynote speaker for a public lecture organised by the NAS on Combatting Drug Abuse and Antibiotic Resistance. The lecture was broadcast live by the University of Lagos radio station to educate a wider audience on the issues. With Professor Mosto Onuoha, the president of NAS, Professor Ohia also participated in a radio interview, creating further awareness of the issues and increasing the visibility of the Academy.

Professor Ohia's visit led to the creation of the NAS Diaspora Strategic Initiative (NDSI) to drive collaborations, with Professor Ohia volunteering to serve as the focal person to help drive the initiative overseas. In particular, he wrote about his *intention to develop a forum/network of Fellows in US diaspora that will serve as a resource to the Academy for future collaborative academic and research collaborations and will also increase the visibility of this distinguished body outside Nigeria.*

Nigerian Young Academy (NYA)

The Nigerian Young Academy's 8th Conference and General Assembly took place in Ondo, Nigeria, in August 2018. Diaspora Fellow **David Mba**, Pro Vice-Chancellor and Dean of the Faculty of Technology at De Monfort University in the UK, and a Fellow of the Nigerian Academy of Sciences, delivered the keynote address, on *Multidisciplinary Research: A Cornerstone for Sustainable Development*. In his presentation Professor Mba cited a project at his home university as an example to drive home the importance of multidisciplinary research in achieving the SDGs.

During his visit, Professor Mba worked closely with NYA leadership on developing a strategy for future engagement with the SDGs. He counseled them to narrow their efforts to specific goals. The NYA had already identified SDG-4 (ensure inclusive and equitable quality education and promote lifelong learning opportunities for all) as a priority, working to create awareness of the detrimental consequences of plagiarism and other unethical academic practices. In collaboration with Professor Mba, NYA leadership also embraced SDG-16 (promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels), in part because Professor Mba's home university is a UN SDG-16 hub and this focus would facilitate future collaboration. In that connection, Professor Mba accompanied NYA members on visits to internally displaced person camps in Abuja, leading to plans for the NYA to implement a "massive media campaign" to draw attention to the plight of the large population of internally displaced persons in Nigeria.

In summarizing his experience, Professor Mba wrote: *I never had any prior contact or interaction with a young academy prior to this … I believe the project embarked upon by the NYA is important not just for the members but also for the Nigerian society at large. Our collaboration will definitely continue, as I believe in the vision of the NYA.*

South Africa Young Academy of Sciences (SAYAS)

Picking up on a need identified by a previous executive committee, the current leadership of the South Africa Young Academy of Sciences (SAYAS) convened a capacity-building workshop for its members. They were motivated in part by the opportunity to involve a senior academy member with broad experience; Professor **Saleem Badat**, Program Director for International Higher Education & Strategic Projects at the Andrew W. Mellon Foundation, a SAYAS board member and a member of its senior counterpart, the Academy of Science of South Africa (ASSAf), was the project's Diaspora Fellow. The workshop brought together SAYAS members with senior academicians in an effort to develop an ongoing mentoring relationship.

Whilst SAYAS greatly benefited from the input of a senior academician, in the final analysis it was Professor Badat's role as a member of the senior Academy of Science of South Africa (ASSAf), rather than a member of the diaspora, that made him a valuable resource for this project. Collaboration will continue, but the diaspora element is unlikely to be a meaningful part of it; Professor Badat wrote that *I have transitioned back to South Africa… I am committed to collaborating with SAYAS in the coming years as a Board member, in order to strengthen its organizational capacities and the capabilities of its leadership and members to deal effectively and creatively with a range of scholarly, policy, and institutional issues.*

Sudanese National Academy of Sciences (SNAS)

With the active involvement of several members of the Sudanese diaspora, the Sudanese National Academy of Sciences embarked on an ambitious project to build education and research capacities in nanoscience and nanotechnology in Sudanese universities. The programme supported visits by Professor **Osama Awadelkarim** of Pennsylvania State University in the US and Professor **Omer Nour** of Linköping University in Sweden, with the participation of two additional diaspora members who were coincidentally visiting Sudan concurrently. The project aimed to strengthen the role of SNAS to promote scientific excellence and develop skills for the use of modern technologies for the benefit of Sudanese society toward sustainable development.

The multi-faceted project involved interdisciplinary collaboration, public lectures, course development and training workshops. The contribution of both diaspora fellows was substantial. Professor Awadelkarim delivered two public lectures, conducted interviews at six Khartoum-area universities about their capacity to deliver courses in nanotechnology, and made recommendations for moving forward. Professor Nour led a weeklong nanotechnology capacity building workshop, with the participation of two local Sudanese faculty members who were provided with the materials necessary to replicate the workshop; and a follow-up training activity for five junior staff members working toward PhDs in topics related to nanotechnology.

Project implementation was complicated by the political upheaval in Sudan and the difficulty of gaining access to universities. Nonetheless, SNAS is working to position itself to have a leading role in advising and coordinating efforts of Sudanese academicians, both resident and in the diaspora, in the rehabilitation of higher education, science and research under the coming government; and support from the diaspora community is strong. The project led to an inquiry from a group of Sudanese academics in the US about how they could help in the rebuilding of Sudanese universities and research.

Analysis and recommendations

As manifest from the host academy summaries and their diaspora fellows' input, the programme was valuable in building capacity at the academies; in providing diaspora scientists with an opportunity to share their expertise and experience in a meaningful way on their home continent; and most importantly, in planting the seed for ongoing collaboration.

Whilst the academies that received support reported overwhelmingly positive results, the number of applications to the programme was small. It became clear in retrospect that the requirements were too restrictive; it proved challenging for host academies to identify fellows who met the criteria for participation. This resulted in a limited pool of applicants, and some would-be applicants who would have welcomed the opportunity to engage with members of their scientific diasporas but were unable to locate qualified fellows. Although the intention of the programme was to pair academicians in the African diaspora from around the world with academies on the continent, **the academies would have benefited equally from the expertise of scientists who were not academy members**. Moreover, a larger number of the substantial pool of scientists in the diaspora eager to bring their expertise to bear on development in their countries of origin would have had the opportunity to do so.

The programme also would have benefited from a more coordinated effort to broker partnerships between host academies and diaspora fellows. That was unfeasible in light of limited time and resources but would merit consideration in any future scale-up.

Building science leadership

Current efforts to build a robust and effective engaged science leadership in Africa have been multifaceted and transdisciplinary. Opportunities that foster broad science leadership development include the GYA's African Science Leadership Programme[85] and AAS's Affiliate Programme and Mentoring Scheme,[86] both of which build science capacity through a variety of career development and networking opportunities. The pilot programmes described here added to these existing opportunities a science policy focus.

There is a limited number of science policy training available in Africa, and opportunities for training are infrequent and highly competitive, with demand outstripping supply. For example, a 2016 science policy workshop hosted by INGSA and ASSAf attracted 500 applicants for 40 places.[87]

Science policy workshop for early career researchers

A science-advice-for-policy workshop (Figure 5.1), conceived as a complement to the University of Pretoria's African Science Leadership Programme (ASLP), took place in March 2019 at the university's new Future Africa[88] campus. The 35 workshop participants, hailing from 14 African countries, included members of the Global Young Academy[89] and National Young Academies; fellows of the African Science Leadership Programme;[90] African Academy of Sciences Affiliates;[91] and RISE graduates.[92]

Figure 5.1: Science-advice-for-policy workshop attendees, 27-28 March 2019

Workshop content and process were informed by responses to a survey of prospective participants, who expressed a desire to understand how to translate research into policy, both broadly and with respect to their own areas of scientific interest; to learn how to communicate more effectively with policymakers; and to engage in hands-on activities to help develop their understanding and skills.

About half of the participants had had some experience at the science-policy interface, through jobs, internships or workshops. Some had engaged in policy work with their National Young Academies, helped shape university policies or even influenced national bills. The workshop provided an opportunity to discuss good practice and lessons learned, and to provide guidance to those with less experience.

Through interactive, experiential sessions and presentations from practitioners, **participants learned about the broad landscape of science policy advice, communication skills for effective engagement with policymakers and how to translate knowledge for policy impact**. In preparation for the workshop, participants had been asked to outline or draft a policy brief about an issue related to their scientific interests. Throughout the workshop, they applied their learning to refine these written briefs; and they learned how to present them orally to maximum effect to a hypothetical audience of busy policymakers with competing demands and a limited grasp of the science underpinning the recommendations.

Post-workshop feedback was positive, with a common recognition that scientists have a responsibility to be proactive in taking their research to policymakers and influencers. Participants called for more opportunities to learn about and engage with science policy.

85. https://globalyoungacademy.net/activities/african-science-leadership-programme/
86. https://aasciences.ac.ke/mentorship-scheme
87. https://www.ingsa.org/events/training-workshops/anglophone-africa-south-africa-feb-2016/
88. https://www.futureafrica.science/
89. https://globalyoungacademy.net/
90. https://www.futureafrica.science/index.php/leadership-programmes/aslp
91. https://aasciences.ac.ke/affiliates-all
92. https://sig.ias.edu/rise/scientists

Science policy fellowships for early career researchers

Science-advice-for-policy fellowships were designed to provide emerging science leaders in Africa with opportunities to enrich their understanding of, and engagement with, science policy through immersive science policy training at policy-active organisations. Fellowship design was informed by the same survey used to plan the workshop. It became clear that there is a gap in opportunities for short, intensive exposure to policy-active organisations, yet this is a practical approach for busy early- to mid-career researchers, and complements longer-term placements provided by others, such as the 6-month fellowships offered by UNECA[93] and one year graduate internships at the AU.[94]

Core principles of the fellowships under this project were mutual learning and mutual benefit. Each fellowship was tailored to the personal interest and goals of the fellow and the needs and opportunities at the host organisation. These fellowships were ongoing at the time of writing, but it was already clear that fellows were gaining unique insight and experience, and that host organisations were benefitting from some of Africa's best young researchers devoting concentrated periods of time to critical issues.

There was high demand from the early career researcher communities surveyed. Of the 86 survey respondents, 27 were invited to apply for fellowships, and 21 applied. From an exceptionally strong pool of qualified applicants, 13 were selected, primarily based on fellow/host mutual project interest, compatibility and logistical practicality. The fellowship cohort included scientists from seven African countries and represented a broad range of academic disciplines. This diverse group of scientists are passionate about bridging the science-policy divide and are committed to sharing their experiences with peers in their home institutions and/or young academies.

The fellows and fellowship host organizations are listed in Table 5.1, and more details are provided on the IAP project webpage.[95]

93.   https://www.uneca.org/fellowship/pages/background
94.   https://au.int/en/internship/atAUC
95.   http://www.interacademies.org/49988/Science-Advice-for-Policy-SAP-Fellowship

Table 5.1: Science advice for policy fellowships, April-June 2019

Name	Home institution	Host institution	Project title
Abidemi Akindele	University of Lagos, Nigeria	Network of African Science Academies (NASAC), Kenya	Generating a Policy Brief on the NASAC Report "Opportunities and Challenges for Research on Food and Nutrition Security and Agriculture in Africa
Barbara Burmen	University of Cape Town, South Africa	Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), USA	How does US NIH-funded research on HIV-exposed uninfected children inform policy and/or change policy?
David Dodoo-Arhin	University of Ghana, Legon-Accra, Ghana	International Science Council (ISC)/International Network for Government Science Advice (INGSA), South Africa	The Role of Scientific Knowledge in Policymaking: Scientists/Researchers and Policymakers Perspectives
Abiodun Adeyemi Egbetokun	National Centre for Technology Management (NACETEM), Nigeria	Centre for Science, Technology and Innovation Indicators (CeSTII), South Africa	Connecting Research to Policy in Africa: An exploratory exercise on South Africa and Nigeria
Fridah Kanana Erastus	Kenyatta University, Kenya	Ifakara Health Institute (IHI), Tanzania	Evaluation of the Current Scientific Policy Engagement Process at the Ifakara Health Institute, Tanzania
Pierrette Mekongo Essama	University of Yaounde 2, Cameroon	Network of African Science Academies (NASAC), Kenya	Design of Science Policy Tools for Policymakers
Etinosa Igbinosa	University of Benin, Nigeria	Nigerian Academy of Sciences (NAS) (with INGSA-Africa), Nigeria	The Science Advisory Landscape in Africa: A consensus study
Deusdedith Ishengoma	National Institute for Medical Research, Tanzania	National Malaria Control Programme, Tanzania	Developing Skills and Knowledge to Translate Research Findings into Policy for Malaria Control and Elimination in Tanzania
Shaheen Motala-Timol	Tertiary Education Commission, Mauritius	African Institute for Mathematical Sciences (AIMS), Rwanda	Quality Assurance in Higher Education in Africa: Towards Development of Policies and Processes that Promote Harmonization of the Quality Standards at Different AIMS Centers
Daniel Murgor	University of Eldoret, Kenya	Academy of Science of South Africa (ASSAf), South Africa	Development of a Model that Describes the South African Landscape of Sustainable Development Goal 6 (Water and Sanitation)
Patience Mutopo	Chinhoyi University of Technology, Zimbabwe	Partnership for African Social and Governance Research (PASGR), Kenya	The Nexus between Theoretical and Practical Policy Application Processes in Natural Resource Governance in Zimbabwe
Emmanuel E. O. Odjadjare	Benson Idahosa University, Nigeria	Next Einstein Forum (NEF), Rwanda	Human Capital Development and Digital Economy in Africa
Gosaitse Tubatsi	Botswana International University of Science and Technology, Botswana	Ifakara Health Institute (IHI), Tanzania	Maternal Health Research and Policy Interface: The Case of Tanzania's Ministry of Health, Community Development, Elderly and Children; and Ifakara Health Institute (IHI)

Analysis and recommendations

There is clearly an appetite amongst Africa's emerging scientists to see their work have an impact on their leaders' policy decisions, and ultimately on the advancement of the continent. Science academies, both young and senior, have a responsibility to make this happen.

Science policy workshop participants were eager for more opportunities to develop their knowledge and skills in the science policy arena. Just as the ASLP brings together fellows from former and current cohorts for parallel and mutual learning, science policy workshops could offer a range of experiences tailored to participants with differing backgrounds and needs, with a strong focus on peer learning.

Whilst workshop participants were drawn largely from the membership of young science academies, a more concerted effort might be made in the future to involve individuals best positioned to take their learning back to their home academies, helping to spread a culture of, as well as skills for, cooperation at the science/policy interface. And academies could develop the capacity to offer interactive workshops for their own members and the broader community of scientists and policymakers.

The **science advice for policy fellowships** were ongoing at the time of writing, so it is premature to provide a full analysis. Initial feedback on the experience has been very positive, with fellows finding their placements professionally satisfying, and hosts impressed by the talents and passion of the fellows. The placement process – or fellow-host matching – was the most challenging part of the programme and required careful planning. In any future scale-up, the pool of host institutions would be expanded to ensure maximum inclusion and a wide diversity of experience.

African science academies can build on these projects in a number of ways, such as providing an enabling environment for members who have participated in science policy workshops or undertaken fellowships to share their learning amongst the broader membership; supporting national or regional analogues of the programmes; or hosting policy fellows.

Chapter 6: Recommendations

Summary

Realisation of the SDGs and STISA-2024 will require cooperation at many levels, and a better understanding and appreciation of context. There are many opportunities for scientists and policymakers to work together, with academies having a vital role in championing science on the continent.

Recommended actions are directed to the AU, UN and their agencies; IAP, NASAC and the GYA; and senior and young national academies. Broadly:

- *For the UN, AU and their agencies: to provide more opportunities for bringing together policymaking and science communities, creating a greater appreciation of, and demand for, evidence.*

- *For IAP, NASAC and the GYA: to build mutual capacity by placing open and inclusive collaboration with each other and with other stakeholders at the heart of their work; to be stronger advocates for evidence-informed policymaking and the value of independent academies on the continent; and to build on the policy connections and opportunities presented here.*

- *For senior and young academies in Africa: to be more open, inclusive and diverse in their membership and activities; to be more effective advocates for science **and science funding**, drawing on each other's respective strengths; and to align their activities with STISA and the SDGs.*

Harnessing SEM to address Africa's challenges has explored how African science academies can better support policymaking at continental, regional and national levels. It has focused on the national science academies, both senior and young, because (1) policy design, implementation and review typically happen at the national level; (2) academies can play vital roles in their national science systems, as champions of evidence-informed policymaking and advocates for investment in SEM/STI, as well as conduits to their respective research communities; and (3) academies provide a rich source of high quality scientists from a wide range of disciplines who can bring diverse, inclusive and interdisciplinary perspectives to help address societal challenges.

This report has explored different parts of the science-policy interface in Africa and experimented with ways to strengthen the science community's ability to engage more systemically. Working closely with IAP's regional network, NASAC, and other regional science players, academies have been given an opportunity to engage directly with UN and AU processes; work with different stakeholders in policy-focused workshops; work with and learn from members of the African science diaspora; and build science policy literacy and leadership amongst early career researchers.

Recommendations

1. For the UN, the AU and their agencies

1.1 Provide more opportunities to bring together policymakers and scientists in Africa, using these to create a greater appreciation of, and demand for, evidence, and to support the different elements of SDGs and STISA implementation and their integration. This could be especially effective at the regional level, working with the RECs.

1.2 Create mutually beneficial fellowships and secondment opportunities, or adapt existing schemes, in AU and UN agencies for early- to mid-career researchers wishing to gain science policy experience and apply their research to policy.

1.3 Communicate funding and internship opportunities, as well as open consultations, to the NASAC secretariat, who can then disseminate to academies all over Africa.

1.4 For UNECA, look to the academies for scientific input to the regional annual fora on sustainable development.

1.5 For AAS, as a strategic and implementing partner to the AU, to engage NASAC and its members more systemically to strengthen the African voice for science in AU deliberations and STI engagement at the national level.

2. For IAP, NASAC and the GYA

2.1 Invest in / seek funding for capacity development of young and senior academies by

- putting open and inclusive collaboration at the heart of any grant funding requirements;
- supporting mutual learning between senior (experience, connections) and young (social media, multidisciplinary, energy) academies;
- engaging African science diaspora to help build institutional capacity (strategic planning, mentoring, teaching, fundraising);
- providing more training opportunities for bringing science to society and integrating this skillset into existing African science leadership programmes;
- strengthening and empowering the NASAC secretariat and building senior and young academy secretariats (shared if practicable) and providing opportunities for academy secretariats to learn from each other and from more established academies outside Africa, e.g. through exchange programmes;
- creating a focal point(s) for researching and communicating to the academies funding opportunities and internship programmes offered by UNECA, AU HRST and other agencies;
- more readily engaging with governments, NGOs and civil society, and the private sector.

2.2 Be stronger advocates for evidence-informed policymaking and the value of independent science academies. Continue to stimulate the creation of new national academies in countries where they presently do not exist (c.50% of African nations) and where there is a critical mass of scientists; using IAP, NASAC and neighbouring academies to share good practice.

2.3 Strengthen, support and expand National Young Academies in Africa and African GYA membership by

- establishing a shared secretariat for the African NYAs network and GYA members, with a liaison point within the NASAC secretariat;
- integrating young scientists meaningfully into senior academy initiatives;
- working with senior academies in countries without young academies to consider ways of supporting their young scientists, whether by establishing a NYA or integrating them more effectively into their own work;
- drawing on the experience and good practice of senior and young academies outside Africa.

2.4 Build stronger links with UNECA by

- engaging with its annual regional forum on sustainable development where national and regional policymakers share good practice and review progress on implementation;
- helping to shape and inform the annual African STI Multi-stakeholder Forum, being driven by UNECA and DST South Africa;
- reviewing UNECA's formal report to the UN on Africa's implementation of the SDGs;
- encouraging members to assist their governments with their Voluntary National Reviews, which report on national progress.

2.5 Support the African Academy of Sciences (AAS) in its strategic partnership role to the AU (as a think tank, adviser and technology forecaster), so that it can draw on a wider pool of research expertise on the continent and help translate policy recommendations at the national level.

2.6 Use the new African Science, Research and Innovation Council (ASRIC) – to which five academy presidents have been appointed – to help identify research priorities, strengthen evidence-informed policymaking and build stronger links with the AU policy nexus and the biennial meeting of Africa STI Ministers it serves.

2.7 Engage with the African Open Science Platform[96] (AOSP), a multinational African initiative that aims to build expertise and infrastructure in curation of data and its open access. The dearth of data and metrics for the SDGs and STISA-2024 severely compromises effective monitoring and evaluation. NASAC can work with the AOSP on behalf of African academies to develop systems aimed at more effective data collection, curation and use.

2.8 Explore opportunities to work with, inform and learn from other leading sources of science policy advice in Africa, e.g. AOSTI, UNECA Economic Reports, UNESCO Institute for Statistics, country and region-specific reports. This could include helping to develop poorly defined or non-existent data for the SDGs and STISA; and clearer accounting for the direct impact of STI (or return on investment) for achieving policy goals.

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96. http://africanopenscience.org.za/?page_id=51

2.9 Explore training opportunities for African scientists to develop impact assessment skills to help demonstrate the societal and/or economic benefit of research, to plug a gap in this skillset on the continent and to offer a service to the policymaking community. Identify and advertise opportunities for training in data analysis, monitoring and evaluation, and impact assessment.

2.10 Encourage academy members to be stronger advocates for African science by, for example, more readily engaging with politicians and writing articles in popular journals e.g. Conversation Africa. As one AU practitioner put it, "be visible, be present, be accessible and have a unity of purpose".

2.11 Develop new funding proposals for expanding the (1) African diaspora fellowship programme, either a new project or weaving a science component into already established schemes; (2) grants programme on regional cooperation; and (3) science policy fellowships.

2.12 For NASAC, to develop good practice guidelines on core issues, such as project design, implementation, outreach and dissemination, and senior-young academy cooperation.

3. For African senior and young national academies

3.1 Develop a stronger advocacy role for the imperative for increasing investment in science on the continent, especially at the national level. This could include advocating for the establishment of grant-making bodies both at national level and for an AU-equivalent to the European Research Council.

3.2 Strengthen and diversify membership of senior academies through more open and transparent (but still rigorous) election procedures, to help widen membership demographics and ensure representation of the very best science in-country and across the continent. Female membership is especially critical in most academies.

3.3 Be more inclusive: tap into strong voices outside the academies to effect a stronger collective, coherent voice for science within Africa; bridge the gap between academy members and non-academy scientists.

3.4 Utilise the strengths NYAs have in schools and universities outreach, as well as public engagement and use of social media.

3.5 To enhance their capacity to make a meaningful contribution to the implementation of the SDGs and STISA, academies are encouraged to
- better integrate their efforts with like-minded institutions and networks including NASAC, AAS, ICS ROA, TWAS-SAREP/AREP;
- strengthen their communications and outreach so that (1) academy outputs are more intelligible and accessible and (2) academies can be proactive catalysts for change and advocates for the SDGs and STISA and their integration;
- (re)orientate and align existing and new work around the SDGs and STISA (e.g. establishing academy focal points, engaging with Voluntary National Reviews, accounting for the timing of UN and AU policy cycles/processes);
- work more openly and inclusively; be more amenable to working in partnership with each other and with different sectors (government, private, NGOs and civil society);
- address the dearth of available and robust data on the continent;
- recognise, reward and incentivise scientists whose SDGs/STISA-focused work is impactful and more effectively share good practice with one another.

Appendix 1: Guest practitioners at Working Group meetings and project initiatives

Working Group meeting, Kenya, September 2016
- **Professsor Jacqueline McGlade**, Chief Scientist and Director of Early Warning and Assessment Division, United Nations Environment Programme (UNEP)
- **Michael Stanley Jones,** *Programme Management Officer, UNEP*
- **Dr Caroline Wangari Ngugi**, *Jomo Kenyatta University of Agriculture and Technology, Kenya*
- **Jackie Olang-Kado,** *Executive Director, NASAC*

Working Group meeting, Addis Ababa, February 2017
- **Dr Chux Daniels**, *Member of AU Commission's Monitoring and Evaluation Committee of STISA 2024*
- **Dr Evelyn Namubiru-Mwaura**, *Strategy and Policy Manager, African Academy of Sciences (AAS)*
- **Jackie Olang-Kado,** *Executive Director, Network of African Science Academies (NASAC)*
- **Dr Mahama Ouedraogo,** *Head of Division, Human Resources, Science and Technology Department, AU*
- **Professor Bernard Slippers,** *GYA African Science Leadership Programme*
- **Representatives of Ethiopian Academy of Sciences** *(Professors Zenebework Tadesse, Masresha Fetene, Sileshi Lulseged; and Meti Bekele)*

Working Group meeting, Abuja, November 2017
- **Professor Daya Reddy,** *IAP-Policy Co-Chair*
- **Professor Mostapha Bousmina,** *President, Network of African Science Academies (NASAC)*
- **Professor Ahmed Hamdy,** *Executive Director, AU Scientific Technical Research Commission*
- **Dr Almamy Konte,** *Senior Expert, Innovation Policy, African Union Observatory for STI (AOSTI), AU Commission*
- **Dr Evelyn Namubiru-Mwaura,** *Strategy and Policy Manager, AAS*
- **Jackie Olang-Kado**, *Executive Director, NASAC*
- **Professor Tope Olomola,** *President, Nigerian Young Academy*
- **Representatives of Nigerian Academy of Science** *(Professors Mosto Onuoha, Ekanem Braide, and Dr Doyin Odubanjo)*

Working Group meeting, Cotonou, November 2018
- **Ruth Cooper,** *Senior Policy Adviser, The Royal Society, UK (as Professor Catlow's deputy)*
- **Dr Victorien Dougnon,** *Chair, Benin Young Academy*
- **Professor Romain Glele Kakai,** *alumnus, Global Young Academy*
- **Dr Doyin Odubanjo,** *Executive Secretary, Nigerian Academy of Science*
- **Jackie Olang-Kado,** *Executive Director, NASAC*

IAP/NASAC workshop, September 2018
- **Hambani Masheleni,** *Head of S&T Division, HRST, AU Commission*
- **Kasirim Nwuke**, *Chief, New Technologies and Innovation, UN Economic Commission for Africa (UNECA)*
- **Dr Nonhlanhla Mkhize,** *Chief Director, Innovation for Inclusive Development, Department of Science and Technology (DST) South Africa*
- **Dr Daniel Nganganyura,** *Head of International Science Council (ISC, formerly ICSU) Regional Office for Africa (ROA)*
- **Dr Bill Colglazier,** *Past Co-Chair of the 10 Member Group of the Technology Facilitation Mechanism (2016-2017), former S&T Adviser to the US Secretary of State (2011-2014)*
- **Jackie Olang-Kado**, *NASAC Executive Director, NASAC*
- **Kabura Ciugu,** *Strategy and Evaluation Officer, African Academy of Sciences (AAS)*
- **Dr Connie Nshemereirwe,** *Co-Chair, Global Young Academy and member of the Ugandan Young Academy*
- **Professor Willem Fourie,** *University of Pretoria, South Africa*

Informal reviewers
- **Jackie Olang-Kado,** *Executive Director, NASAC*
- **Hambani Masheleni,** *AU (Chapter 3 only)*

Appendix 2: Voluntary action plan developed at IAP/NASAC workshop on STISA-2024 and the SDGs

Level of action	SHORT-TERM; 0-12 months	MID-TERM; 1-3 years	LONG-TERM; To 2030
REGIONAL *What can NASAC do at the regional level?*	• Engage with the UNECA and its annual regional fora on sustainable development. • Engage with the ongoing development of an annual African STI Multistakeholder Forum. • Maximise opportunities at AMASA meetings. • Develop a session on African NYA coordination at SDGs @Vietnam Worldwide Meeting of Young Academies (Aug 2019). • Create a young scientist standing secretariat at NASAC to coordinate with GYA, African NYAs, AAS. • Identify critical players on the continent (e.g. NASAC, AAS, TWAS, AU, UNECA, Governments, Universities, RECs), and develop a strategy for engaging with them. • Strengthen senior-young academy cooperation: o Develop a joint structured plan between senior and young academies for training young academies on an annual basis; o involve young scientists in the work of senior academies, and vice-versa; o set up a mentorship programme for young scientists.	• Focus on SDG goals that will be discussed by High Level Political Forum (HLPF) and national governments each year. • Establish regional communication platforms, including info on funding, expertise, projects, etc. • Establish relationships with science desks in AUDA-NEPAD, UNECA etc. • Establish a AAS-young scientist funding program specific to SDGs. • African senior and young academies work together to develop joint funding proposal on SDG-related project they choose. • Engage the World Bank, African Development Bank donors on SDGs dissemination and outreach. • Engage with media on the SDGs to increase public outreach and understanding. • Rotating positions for c.4 African countries (West, East, North, South) to coordinate 1 SDG-focused activity per year.	• Establish more Young Academies on the continent. • Challenge AU to put 1% of R&D to science development and be more open about its science policy engagement process. • Work with journals to establish/ensure open access. • Influence university policies to ensure/ incorporate support for scientists to do policy work as part of their workload beyond teaching, research & publications.
NATIONAL *What can my academy do at the national level?*	• Identify national science focal points for the SDGs and build partnerships around them. • Nominate SDG-active scientists for national award(s). • Identify / map national SDG/STISA actors, e.g. with research workshops etc. • Be more aware of the Voluntary National Review (VNR) process and get involved. • Academies convene/bring together different in-country parties to address challenges.	• Build a better awareness amongst all national players of local in-country knowledge and capacity. • Clarify the unique, added-value role of academies within this national community, and create demand for their work. • Play a strong advocacy role in STI for the SDGs. • Package information in digestible ways for policymakers. • Develop more expertise within the science community in policy advice, science diplomacy, science communication – through training programmes, internships etc • Build strong relationships with focal / lead ministries.	• Encourage universities to review their curricula to factor in SDGs. • Work to influence university policies to incorporate support for scientists to do policy work as part of their workload beyond teaching, research & publications. • Advocate for policy engagement to be equally weighted in career progression along with publications and teaching.

Level of action	SHORT-TERM; 0-12 months	MID-TERM; 1-3 years	LONG-TERM; To 2030
INSTITUTIONAL *What can my academy do at the institutional level?*	• Produce a strong narrative around the value add of academies (objectivity, independence, quality, expertise, credibility, reputation). • Map existing programmes and products onto SDGs, and/or reframe and/or relaunch where appropriate. • Identify focal points for the SDGs and use them to monitor developments, identify opportunities, engage with other players. • Organise workshops, publish on SDGs etc. • Offer services to national government for VNR process. • Deep dive on issues where academies have expertise (while considering impacts on other goals). • Senior-young academies collaborate on (and institutionalise) o social media dissemination of reports/activities; o project working groups; o policy briefs on recent / upcoming reports; o mentoring, coaching and shadowing programmes e.g. a young scientist joining a senior scientist's meeting with a minister. • Mobilise resources at academy level to attract and retain key staff/functional secretariats • Respond to government requests for advice, and better understand their needs and priorities, whilst being objective and independent. • Champion open access journals.	• Bring in additional expertise/ perspectives when needed on academy studies. • Create awards for policy-relevant work. • Make academies' advice more comprehensive/intelligible. • Add success criteria for policy engagement to academy programmes. • Develop trust of academy and its advice through quality, relevant and timely work. • Use existing academy events for SDGs-messaging. • Ensure academy work complements the national agenda/development plan. • Discuss reports on the SDGs produced by GYA/NASAC/NYAS - policy briefs, -summary briefs, translations – and engage with local media. • Senior academies advocate for the importance of role of young academies in the country. • Experienced academies can mentor younger ones; younger ones can learn from more experienced ones. • Specific to NYAs: o develop age-appropriate education modules on SDGs to deliver at local schools; o incorporate a focus on the SDGs at the NYAs level in order to institutionalise this; o devise a deliberate policy to recruit women into young academies.	• Help establish more national young academies. • All academies must encourage women – in terms of membership and participation in its activities. • Academies need strong links to government so some must secure act of parliament as a pre-requisite for academy advice. • Get better at measuring impact and evaluation of academy work; involve current/former GYA members in the process of assessing the impact of NYAs on SDGs.
INDIVIDUAL *What can I do? I will.....*	• Rally behind the SDGs and become a champion for them within my own academy and within my own research community. • Conceptualise my work in terms of the SDGs in all my presentations at conferences, etc. • Communicate the outcome of this workshop to my academy and my peers.	• Become an SDG champion/ambassador and undertake related activities within immediaite science community. • Encourage my academy to recognise policy engagement as a criterion for entry and ongoing membership. • Contact local VNR point-of-contact to ask how I/ my university/ my academy can help. • Apply for TWAS prize for SDG-specific work.	• Become an individual expert reviewer for my country's VNR. • Recruit external "critical friends" (e.g. GYA members and others) to conduct evaluations of my academy's impact.

Appendix 3: List of acronyms

- AADFP: African Academies Diaspora Fellows Programme
- AAESA: Alliance for Accelerating Excellence in Science in Africa
- AAS: African Academy of Sciences
- AfDB: African Development Bank
- AIMS: African Institute for Mathematical Sciences
- AMASA: Annual Meeting of African Science Academies
- ANSTS: Académie Nationale des Sciences et Techniques du Sénégal
- AOSTI: African Observatory for STI
- ARFSD: Annual Regional Forum on Sustainable Development
- ASADI: African Science Academy Development Initiative
- ASLP: African Science Leadership Programme
- ASRIC: African Science, Research and Innovation Council
- ASSAf: Academy of Science of South Africa
- AU: African Union
- AUC: African Union Commission
- AUDA: African Union Development Agency
- BCYS: Burundi Council of Young Scientists
- C-10: Committee of Ten Heads of State and Government on Education, Science and Technology in Africa
- CEN–SAD: Community of Sahel–Saharan States
- CeSTII: Centre for Science, Technology and Innovation Indicators
- COMESA: Common Market for Eastern and Southern Africa
- DST: Department for Science and Technology
- EAC: East African Community
- EASAC: European Academies Science Advisory Council
- ECA: Economic Commission for Africa
- ECCAS: Economic Community of Central African States
- ECOWAS: Economic Community of West African States
- G8: Group of Eight
- GhYA: Ghana Young Academy
- GYA: Global Young Academy
- HRST: Human Resources for S&T
- IAP: InterAcademy Partnership
- IAS: Institute for Advanced Study
- ICSU: International Council for Science (formerly International Council of Scientific Unions)
- IGAD: Intergovernmental Authority on Development
- IHI: Ifakara Health Institute
- INGSA: International Network for Government Science Advice
- ISC: International Science Council
- ISC ROA: International Science Council Regional Office for Africa
- KNAW: Royal Netherlands Academy of Arts and Sciences

- LIRA 2030: Leading Integrated Research for Agenda 2030
- M&E: Monitoring and Evaluation
- MOU: Memorandum of Understanding
- NAS: Nigerian Academy of Science
- NASAC: Network of African Science Academies
- NEF: Next Einstein Forum
- NEPAD: New Partnership for Africa's Development
- NICHD: National Institute of Child Health and Human Development (US National Institute of Health Structure)
- NPCA: New Partnership for Africa's Development (NEPAD) Planning and Coordinating Agency Planning and Coordinating Agency
- NYA: National Young Academy
- NYA: Nigerian Young Academy
- OWSD: Organization for Women in Science in the Developing World
- PASGR: Partnership for African Social and Governance Research
- REC: Regional Economic Community
- RISE: Regional Initiative in Science and Education
- SADC: Southern African Development Community
- SAP: Science Advice for Policy
- SAYAS: South African Young Academy of Science
- SDG: Sustainable Development Goal
- SEM: Science, Engineering and Medicine
- SIDA: Swedish International Development Cooperation Agency
- SNAS: Sudanese National Academy of Sciences
- STC-EST: Specialized Technical Committee on Education, Science and Technology
- STI: Science, Technology and Innovation
- STISA: Science, Technology and Innovation Strategy for Africa
- STRC: Scientific, Technical and Research Commission
- TWAS: The World Academy of Sciences
- TWAS-AREP: The World Academy of Sciences Arab Regional Partner
- TWAS-SAREP: The World Academy of Sciences Sub-Saharan Africa Regional Partner
- UMA: Arab Maghreb Union
- UN: United Nations
- UNECA: UN Economic Commission for Africa
- UNEP: United Nations Environment Programme
- UNESCO: United Nations Educational, Scientific and Cultural Organization
- USP: Unique Selling Proposition
- VNR: Voluntary National Review
- WG: Working Group
- YA: Young Academy