The African Science Academy Development Initiative

A Partnership Between
African Science Academies and
the U.S. National Academies

Overview

The American scientific community has a strong commitment to activities that will strengthen and support science in developing countries around the world. An initiative from the U.S. National Academies is directly engaging African academies of science in building their capacity to provide independent, evidence-based advice to their governments and countries on health-related matters. Supported by a ten-year grant from the Bill and Melinda Gates Foundation in 2004, the U.S. National Academies is partnering with science academies in Africa to conduct activities toward this end.

The African Science Academy Development Initiative is supporting a variety of activities at both national and regional levels. The science academies of Nigeria, South Africa, and Uganda—competitively chosen to participate in the program at the most intensive level—are receiving support and collaborative partnering in advisory activities. The objective is to strengthen each academy's capacity in infrastructure, methodology, and personnel, and to develop and sustain a relationship between the academy and its government and nation such that the academy is regarded as a trusted source of credible scientific advice. Additional funds have been set aside for the science academies of Cameroon, Ghana, Kenya, and Senegal, and for the African Academy of Sciences to help them craft specific academy-development strategies and foster the acquisition of additional donor and scientific program partners.

African science academies are in the preliminary stages of developing and testing models of advisory interactions with their host governments and other institutions of society. These include:

- *Convening activities*: Bringing together representatives of academia, government, industry, and others for ongoing discussions to illuminate critical health-related issues and potential solutions consistent with the society's priorities, values and resources.
- *Consensus activities*: Policy studies or other formal advisory activities to explore in-depth an issue of importance to the country and its government. Studies offer evidence-based guidance to national decision makers concerned with improving human health.

In addition to the partnerships at the national level, the project is involving the broader community of science academies from across the African continent in regional activities that will evolve over the life of the project. These include annual symposia, collaborative workshops, and information resources generated through the program.

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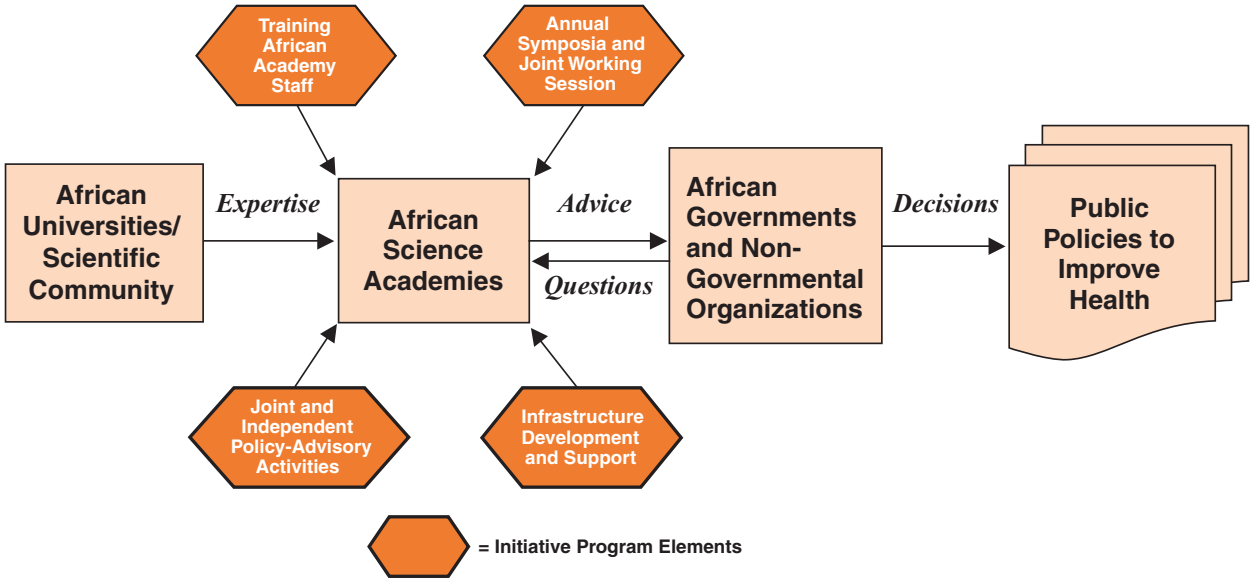


This initiative aims both to strengthen communication between African decision makers in government and the scientific, engineering, and medical communities, and to generate an increased appreciation for the benefits of objective, evidence-based advice in decision making. The project is also assisting African science academy staff to develop stronger skills in establishing relationships with government agencies and other organizations, planning and implementing projects, managing finances, writing proposals and reports, and fundraising. Ultimately, the project will mobilize local scientific talent such that health policies may benefit from the experience and scientific rigor of the best minds in each country.

The initiative is overseen by a U.S. National Academies-appointed board, of rotating membership, with expertise in science-academy processes, African issues, and public health.

The National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council—collectively the U.S. National Academies—are private, non-profit institutions that provide science, technology, and health-policy advice under a U.S. congressional charter.

How Can Science Inform Decision Making?

Scientific advice has the potential to have profound impact on decision making, which can in turn improve people's lives. Science academies—and the scientific, engineering, and medical communities they represent—can be a trusted source of independent advice to government decision makers on scientific and technological matters.

The United States government, for example, frequently turns to the U.S. National Academies for independent advice on such questions as: What is the human toxicity of particular levels of arsenic in drinking water? What are the environmental effects of oil and gas exploration? What are the most effective methods for containing the emergence of drug resistance? What are the environmental and human-health effects of genetically engineered crops? The U.S. National Academies have responded to such requests for advice with written reports reflecting the consensus reached by independent, expert study committees on the science and technology that underlie a particular set of decisions confronting policy makers. The impacts of policy-advisory work have been far reaching, including: influencing legislation, influencing local-level or national-level policies and regulations, establishing or reorganizing government programs or entire agencies, enabling new research, and serving as widely used reference material.

What is Evidence-Based Science Advice and How is it Used?

Evidence-based science advice is a conclusion or recommendation about a particular subject based upon the investigative assessment of existing evidence from relevant fields of inquiry and the application of the laws of scientific reason. Although experimental evidence generated using the scientific method is a key input to science advice, the process of scientific advising is not itself an experimental or observational process but one that is based on the review, synthesis, and analysis of experimental or observational processes. Those individuals who conduct such an assessment collectively

represent scientific disciplines relevant to the subject of investigation. Given that the personal and cultural beliefs may influence perceptions and interpretations of evidence and may impair the objectivity of investigators, those conducting the assessment are carefully screened to minimize political and ideological influence or biases and financial and other forms of conflict of interest. The product of the investigation is subjected to an independent external review to verify that the conclusions drawn are valid and relevant.

Evidence-based scientific advice is beneficial for optimizing the effectiveness of decisions—including laws, regulations, programs, and policies—and for assuring that finite assets (often from the national treasury) available are optimally used. Evidence-based scientific advice reinforces impartial, effective, efficient, accountable, and transparent decision formulation and implementation—what is also known as "good" governance.

Government representatives with decision making authority stand to gain from the advice provided by a neutral, diverse, apolitical committee of experts who have gone through the rigorous process described above. Policymakers in the executive branch, legislative branch, and policymakers at the state- or municipal levels can benefit from academy advice. All elements of society can also benefit from evidence-based scientific advice from an academy. While typically advice is sought from an academy with respect to a nation's most serious or urgent policy challenges, academies also serve the general public, industry, the educational community, non-governmental organizations, and donor groups, in addition to government. An academy that releases its advice to not only to the requesting government agency but also to the general public fosters democratic processes through providing information important to public debate. This advice is guided not by personal opinions or gains but by the scientific merit of the available research.

Why Science Academies?

Evidence-based policy advice can be offered by anyone competent in the scientific method and laws of reasoning, but it is most powerful when developed in a consensus manner that draws upon the special competencies of people trained in a range of disciplines relevant to the subject of investigation. Many matters of policy can not be adequately understood from the perspective of a single scientific discipline. While many elements within a nation can produce scientific advice, a science academy can do so with a unique level of credibility due to its independence from non-scientific influences, the degree of access to leading experts and scientific literature, and the use of rigorous consensus and external review methods.

Science academies can provide an exceptionally powerful approach to supporting policymakers. They represent the best scientific minds of the land and have a rare power to convene them and other leading scientists for the purposes of national service. Science academies also can employ an uncommon multidisciplinary approach and can conduct their advisory work in a fashion that makes the work independent of government and private sector influences and other forms of bias and conflict of interest. The rigor of academy processes and authority of their findings assure them one of the most critical roles in the civil society of a modern nation.

Science Advice in Support of Health Policymaking

How might science support health-related decision making in the African context? The following examples illustrate health-policy questions that might be informed by scientific input.

Health Economics

- What economic methods should be used to establish disease-control priorities?
- What are the fiscal and health consequences of certain taxes and subsidies?
- What are the most cost-effective approaches for ensuring patient adherence to HIV/AIDS treatment?
- How should national health-care finances be managed?

Research and Development

- How should health research and development priorities be established?
- How should health-related research training capacity be strengthened?
- Which new pharmaceutical products should the nation start developing on its own?
- How should biotechnology and its applications be used to increase food security?

Strengthening Public Health Services

- How can the nation better prepare for the threat of pandemic influenza?
- Do current surveillance programs provide adequate

monitoring of risk factors to minimize future outbreaks of disease?

- How should disaster-mitigation and relief-system policies be established and prioritized?
- What health-care strategies are needed to limit the occurrence of drug-resistant HIV?
- How could health systems be made more effective in serving urban and rural populations?

Capacity Strengthening and Management Reform

- Are new capacity-strengthening models—such as that of physician extenders—being adequately integrated into health-care delivery systems?
- What incentive structures can be used to retain valued public-sector health workers?
- What human-resources systems need to be in place for effective HIV/AIDS prevention and treatment?

Disease Intervention and Preventive Health

- How should a system-wide HIV/AIDS education program be implemented?
- What are the most effective approaches for preventing maternal-to-child transmission of HIV?
- What mix of interventions, including DDT indoor residual spraying and insecticide-treated bed nets, is appropriate for controlling malaria?
- What non-vaccine interventions, such as isolation and quarantine, might be implemented effectively to control disease outbreaks?
- What are the most effective strategies for:
  - Preventing road-traffic injuries and deaths?
  - Providing the best life-saving intervention treatments for pregnant women?
  - Preventing sexual violence?
  - Ensuring a safe blood supply?
  - Reducing stigma as an obstacle to HIV control?
  - Developing more-effective sanitation facilities and programs?

Pollution and Other Risk Factors

- What strategies can be used to increase the nation's clean water supply and improve water-delivery systems?
- How should indoor-air pollution be minimized in order to reduce the risk of respiratory diseases?
- What are effective strategies for treating air and water pollution?
- What are the most cost-effective and sustainable approaches to reducing child malnutrition?
- How do we ensure that vaccines are safe?

Elements of the Program

The African Science Academy Development Initiative is supporting a variety of activities at both national and regional levels. Regional programs include annual networking symposia and collaborative learning workshops in which all African science academies can participate. At the national level, the initiative is undertaking particularly intense capacity-building efforts with a subset of three science academies—in Nigeria, South

Annual International Symposia of the African Science Academy Development Initiative

The first annual networking symposium—*Improving Public Policy to Achieve the Millennium Development Goals in Africa: Harnessing Science and Technology Capacity*—was held in Nairobi, Kenya in November 2005. The goal of this meeting was to explore a potentially deeper role for science academies to assist African governments in fulfilling their commitments to the United Nations Millennium Development Goals.

The second annual symposium—*Prioritizing Food Security Policies for Health and Development in Africa*—will be held November 15–16, 2006 in Yaoundé Cameroon. The principal objective of this meeting is to identify controversial public policies in the area of food security for which African science academies would be uniquely positioned to help identify evidence-based solutions. Roughly 150 international guests will participate, including representatives from African science academies, government officials from throughout Africa, representatives of university and research institutions, the donor and foundation communities, and the private sector. This meeting will also pilot an experimental session involving representatives from the African media to explore how more productive relationships might be established between the African scientific and media communities.

Mechanisms for Drawing on the Nation's Science and Health Expertise

Convening Activities: Coming Together to Talk

Convening activities bring scientists, government officials, representatives of industry, and others with interest in science-related matters together for structured, evidence-supported discussions of issues of importance to human health. These might include issues in infectious disease, nutrition and food security, or other topics. Such gatherings establish an in-country appreciation of the academy's ability to organize a scientifically grounded discussion of critical and timely issues to inform decisions both in government and society. Proceedings or summaries are often produced.

- The Nigerian Academy of Science has established an ongoing convening activity—a Forum on Evidence-based Policy Making in Nigeria. In February 2006, a multi-stakeholder planning meeting was held to take stock of the highest priority health issues that could potentially be addressed by an Academy-led Forum. A first Forum workshop on the topic of blood safety is planned for November 2006.
- The Uganda National Academy of Sciences has established a Forum on Health and Nutrition. A stakeholder workshop held in November 2005 explored the feasibility of establishing an ongoing evidence-based discussion forum in Uganda, and a first workshop, Malaria Control and Prevention: Strategies and Policy Issues, was held in September 2006.
- In order to publicize its work to build key relationships with policymakers, the Academy of Sciences of South Africa held a symposium in March 2006 on evidence-based advice to government. The event provided an opportunity to explore the Academy's role as an independent, provider of evidence-based advice on a broad range of topics and issues.

Consensus Activities: Weighing Evidence through Deliberation

Consensus-based policy studies may be conducted on subjects selected by the academy in consultation with the government. A balanced panel of experts—free from conflicts of interest—may be appointed to review research and offer policy guidance on timely and often controversial topics. These scientists typically would have diverse backgrounds and ideas and would work together to reach consensus. These activities demonstrate the capability of the academy to provide scientific advice on important and sensitive issues facing the government and the nation.

- The Academy of Science of South Africa has initiated a first consensus study in which a carefully selected committee is examining the evidence and making recommendations on the topic of nutritional influences on human immunity, with special reference to tuberculosis and HIV infections.
- At the request of the South African government's Department of Science and Technology (DST), the Academy will be undertaking a study on science-based approaches to the alleviation of poverty in South Africa. Poverty alleviation is one of five new national missions of the DST as outlined in the country's 2005 R&D Strategy. The Committee on Science for the Alleviation of Poverty held its first meeting in March 2006.

Africa, and Uganda—selected on the basis of their potential to develop an effective and sustained policy-advisory process, the receptivity of their governments to seeking advice from the scientific community, and the existence of a critical mass of scientific talent willing to serve as participants in policy-advisory activities. The initiative is also supporting a strategic planning process with the science academies of Ghana, Cameroon, Senegal, Kenya, and the African Academy of Sciences.

Regional Programs

Regional programs are open to all African science academies. This initiative supports:

Annual networking symposia

Hosted each year of the initiative by one of the African science academies, these symposia aim to foster greater understanding of evidence-based policy advice and to highlight current public policy challenges in which the rigor of an academy's advisory processes could add value for decision making. These symposia are also a forum for sharing progress and knowledge gained through current policy-advisory activities and strengthening relationships among representatives from African science academies and the African policymaking community. Summaries of these symposia are published and available to key stakeholders (See Box on page 4).

Annual joint working sessions

Annual joint working sessions are intended to gather a support network of African and U.S. science academy staff and experts involved in policy-advisory activities. These meetings focus on collaborative problem solving, the exchange of best practices for program design and implementation, strategic planning, and training of African staff.

National Capacity-Development Programs

The initiative is supporting three nationally based programs for the science academies of South Africa, Nigeria, and Uganda. The principal elements of these programs include infrastructure and staff development, training, and policy-advisory activities.

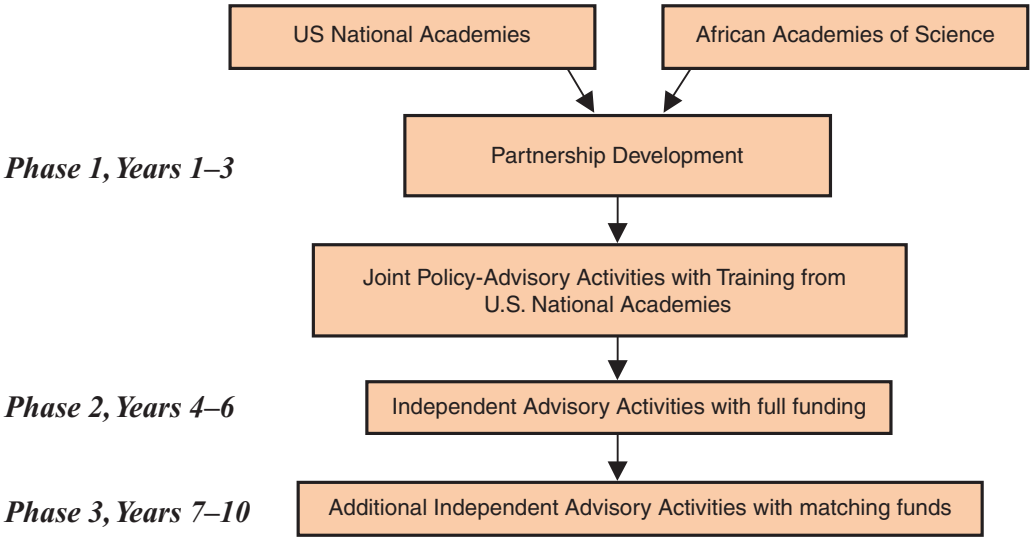
Infrastructure and Staff Development

The program is contributing to the development of information-technology infrastructure and hiring of staff (several full-time equivalents for each academy, including managerial, program, financial, and administrative staff).

Training

Staff from the U.S. National Academies, including a board director, a financial officer, three program officers, and two full-time research staff, are working closely with African staff in developing the skills to support the policy-advisory process, including:

- Development and maintenance of government and sponsor relations
- Fundraising
- Meeting preparation and schedule development
- Budget development
- Meeting management
- Financial management
- Report writing and coordination
- Expert identification and recruitment



- Preparation of literature reviews
- Staff supervision
- Report dissemination
- Proposal preparation
- Communication with the media and the public

Policy-Advisory Activities

The science academies of Nigeria, South Africa, and Uganda are implementing an array of activities for policy guidance, including convening activities and consensus-based activities (See Box on page 5) on topics related to improving human health in Africa.

A Decade of Commitment to African Academies of Science

Launched in 2004, the African Science Academy Development Initiative will unfold over the next decade. Grants have been provided to support staff, develop communication resources, and initiate a process of collaboration with U.S. National Academies' staff and volunteers. Early activities have included training for the academy staff, establishing contacts with appropriate government agencies and other organizations, and developing an ongoing convening activity (e.g., a forum or roundtable). Subsequent steps will support a series of consensus studies on subjects selected by the academy in consultation with the government.

Each country's program and the regional collaborations will move in an adaptive way in response to country experience and preferences. The objective is long-term sustainability, and the strategy will be modified as necessary to reach that target. The operating assumptions require:

- Adapting advisory processes to match each country's needs, resources, culture, and challenges;
- Cultivating enduring relationships based on mutual respect and good communication;
- Building advisory models that can be increasingly supported by locally obtained resources;
- Providing training and skill development to support the academies' programs after the grant period has ended; and
- Demonstrating the value of the model in order to support potential expansion of the program.

The schematic below outlines the steps in the process and the approximate schedule for their execution.

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*Current as of October 2006.

About The U.S. National Academies

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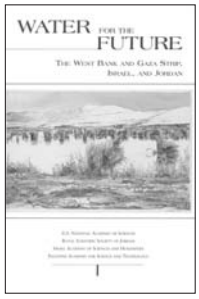
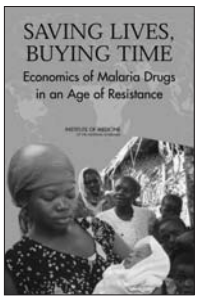
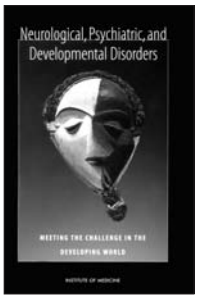
The U.S. National Academies have a strong commitment to assist developing countries in meeting their needs and have undertaken a number of activities in partnership with counterpart science academies to assist them in providing evidence-based advice to their governments. For example, The Royal Scientific Society of Jordan, the Israel Academy of Sciences and Humanities, and the Palestine Academy for Science and Technology cooperated in a joint research effort led by the U.S. National Academies, *Water for the Future: The West Bank and Gaza Strip, Israel, and Jordan* (1999), to study opportunities for enhancement of water supply and avoidance of overexploitation of water resources in the Middle East. The study led to a greater role for the Palestine Academy of Science and Technology and enabled discussion and critical analysis of shared regional challenges.



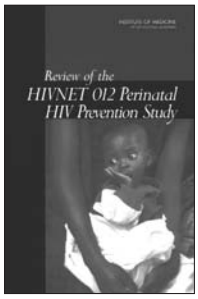
Many of the U.S. National Academies' reports address health-related issues and topics relevant to Africa. For example,



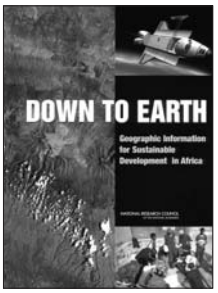
Saving Lives, Buying Time: The Economics of Anti-Malarial Drugs in an Age of Resistance (2004) provides recommendations on maximizing the impact of both new and established antimalarial drugs while postponing the development of drug resistance. The study addresses the issues of drug affordability and improved adherence to drug regimens.



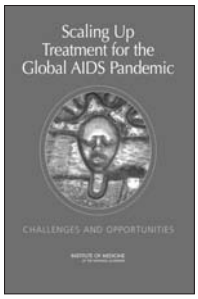
Neurological, Psychiatric, and Developmental Disorders: Meeting the Challenge in the Developing World (2001) proposes strategies toward reducing overall burden of brain disorders in the developing world, with detailed recommendations of ways to reduce the toll exacted by developmental disabilities, epilepsy, schizophrenia, bipolar disorder, depression, and stroke.



Review of the HIVNET 012 Perinatal HIV Prevention Study (2005) provides an independent review and assessment of the scientific validity of the HIVNET 012 clinical trial, which was conducted in Uganda between 1997 and 1999 to evaluate the efficacy and safety of regimens to prevent mother-to-child transmission of HIV infection.



Down to Earth: Geographical Information for Sustainable Development in Africa (2002) summarizes the importance and applicability of geographic data for sustainable development and examines how future sources and applications of geographic data could provide reliable support to decision makers.



Scaling Up Treatment for the Global AIDS Pandemic: Challenges and Opportunities (2005) provides an independent review and assessment of rapid scale-up anti-retroviral therapy programs. This report informs the multiple efforts underway to deploy antiretroviral drugs in resource-poor settings and identifies the components of effective implementation programs.

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