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## Integrating Africa: Prospects and Promise for Science Diplomacy

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Africa's patchwork of nation-states is uniquely positioned to take advantage of the world's abundant scientific and engineering expertise in order to address its myriad economic, environmental, and social challenges. A recent World Bank report illustrated the opportunities ahead: "Vertiginous changes brought about by the digital revolution in the past 20 years make leapfrogging (skipping steps, charting new paths) in Africa not only a possibility but a necessity."<sup>1</sup>

Yet the current reality is that many African countries are small and poor. Fifteen out of fifty-five are landlocked, with weakly developed national connections across borders. The continental fragmentation and small domestic markets translate into a lack of economic scale in the production and distribution of goods and services. With a few notable exceptions, African states have not yet developed the robust, efficient, and lasting scientific and technological capability and culture required for economic and social progress. As a result, only 2.3 percent of the world research community comes from Africa, and the continent contributes only up to 2 percent of the global scientific publications.<sup>2</sup> This situation is unlikely to improve unless the uneven support to science and technology is comprehensively and systematically addressed. Transnational cooperation constitutes the most rational way to develop

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adequate solutions to the increasingly acute and complex challenges facing the continent.

African political leaders have recognized, albeit only recently, that science and technology should be a top development priority and have endorsed a funding target of 1 percent of each country's GDP on research and development.<sup>3</sup> Today, almost every national, regional, and continental policy document and strategic development plan has science, technology, and innovation (STI) as a high priority. The most emblematic of these include:

- "Science, Technology and Innovation Strategy for Africa 2024" (African Union)<sup>4</sup>
- "Support to Higher Education, Science and Technology" (African Development Bank)<sup>5</sup>
- Next Einstein Initiative (African Institute for Mathematical Sciences).<sup>6</sup>

These new commitments, however, have not yet been translated into tangible increases in R&D funding. Only a handful of countries have met the 1 percent GDP funding target for STI. So far, most regional partnerships in science have been driven by scientists and academics from the continent and their international counterparts, and have focused mostly on the development, transfer, and diffusion of new technologies as well as innovations to address specific developmental issues. Recent attempts have been made to involve ultimate beneficiaries, policy makers, the private sector, and civil society toward enhancing the use of research results, and influencing and improving R&D policies.

## **Why Science Diplomacy Is Important for Africa**

The interface between science and diplomacy, which goes well beyond the building of bilateral or multilateral scientific relationships, and speaks to broader foreign policy objectives,<sup>7</sup> has not yet been fully explored in Africa. The continent needs effective application of science in and science for diplomacy because of its political and economic fragmentation, its conflict-prone status, and its vulnerability to negative geopolitical trends. Additionally, the African continent needs to develop endogenous science-led diplomacy, supported by sound and fair international cooperation, which not only will help African countries build their STI capacity through stronger regional partnerships, but also can be used to identify, address, defuse, and ultimately solve cross-border or trans-boundary problems facing the continent.

These shared challenges include, among others:

- Managing shared natural resources, protecting the environment, and addressing climate change;
- Coping with adverse impacts of climate change while promoting climate-compatible development and achieving the UN Sustainable Development Goals, known as Agenda 2030;
- Resisting and repelling international terrorism and addressing its cohort of humanitarian issues;
- Preventing, controlling, and eradicating human and animal pandemics;
- Promoting democratic principles and institutions, popular participation, and good governance;
- Establishing and fostering sound academic and scientific foundations;
- Achieving economic, trade, social, and political collaboration, coordination, and convergence.

Even as few successes in science diplomacy have been recorded, and the documented successes are mostly in the health sector—namely, control of infectious diseases such as river blindness and leprosy, and vaccine-preventable diseases such as polio—a host of obstacles stands in the way of broader applications of the field. Various deficits associated with fluid and conflicting political and economic agendas, cultural sensitivities, and endemic mistrust often hamper science diplomacy processes. The situation is exacerbated by a lack of qualified practitioners, weak research-to-policy interfaces, and the marginal role played by research institutions, universities, and civil society.

## **Opportunities and Challenges**

The steady rise of regional and global issues—relating, notably, to the environment, health, and security—has brought to the forefront the importance of interconnecting more systematically science and technology with geopolitics and diplomatic processes in Africa. Despite the absence of a well-defined Africa-wide science diplomacy approach and strategy, the core principles of science diplomacy (attraction, cooperation, and influence) have already been folded into the African Union’s Agenda 2063 strategic framework for the socioeconomic transformation of the continent.<sup>8</sup>

The most promising issues to consider for applying science diplomacy in Africa include:

**Management of transboundary water resources**, including to enhance international water laws and regional cooperation. Africa has approximately

one-third of the world's major international water basins, with about eighty international river and lake basins and fifty trans-boundary aquifers. Virtually all countries share at least one international water basin, and certain countries serve as the cradles of several international rivers (e.g., Guinea, an extreme case, has twelve such rivers).<sup>9</sup> The continent likewise has huge potential for energy production through hydropower, for food production, and for environmental rehabilitation, with the link between water and energy increasingly important to recognize.

Despite this relative abundance, water scarcity is a rising concern in many parts of the continent and the cause of political tensions that can sometimes escalate toward war. Water-related conflicts have occurred throughout the continent, from its dry to its fertile regions.<sup>10</sup> These have revolved mainly around equitable access, benefits sharing, and governance issues. The recurrent heated tensions between Nile River riparian countries and between riparian countries drawing from Lake Edward (Uganda, Democratic Republic of the Congo) and Lake Victoria (Kenya, Uganda) best exemplify the acuteness of the problem.<sup>11</sup>

In such cases, science diplomacy can help: (1) develop a mutually agreed understanding of the spatial and temporal scales of the conflicts; (2) craft integrated and inclusive management plans for sustainable and equitable use of water resources on national, regional, or continental scales; (3) draw up a wide array of coping strategies and tools (including effective communication mechanisms and efficient institutional and legislative frameworks); and (4) derive workable protocols for mitigating and preventing water-based conflicts.<sup>12</sup>

Two related areas that call for judicious science diplomacy-led collaboration are:

- Cross-boundary water-transfer projects, from abundant reservoirs to those in less-endowed regions, that distribute water more efficiently and cost-effectively (Congo basin-Lake Chad water transfer project; Lesotho Highlands water-transfer project).<sup>13</sup> Science can and should play a critical role in providing informed decision making and options that ensure the associated diplomatic process is objective and inclusive.
- The proliferation of cross-boundary invasive species (plants and animals) affecting both the ecology and societies and their respective economies. A typical example is the fast-growing infestation of most major continental rivers and lakes by a free-floating weed (water hyacinth), which is restricting water flow, affecting aquatic animal and plant lives, and interfering with navigation, irrigation, power generation, and fisheries.

**Management of oceans and coastal environments**, including the growing ecological and socioeconomic importance of this task for riparian fishing

communities, the coastal tourism sector, and offshore mining of minerals and other nonrenewable resources. The alarming and unruly pressure on African marine ecosystems—through overfishing, coastal pollution, population growth, habitat destruction—has prompted concerned countries, in collaboration with international organizations (e.g., UNESCO Intergovernmental Oceanographic Commission, Food and Agriculture Organization), to move toward creating a coordinated science-based management and monitoring system covering all physical, chemical, and biological components. Special efforts are being made by African coastal countries to rehabilitate and protect their marine biodiversity and control illegal fishing. Marine insecurity has also become a major threat to Africa and the global community mainly due to weak law enforcement, porous borders and transnational trafficking, environmental degradation, and border disputes. Science diplomacy could help in establishing coordinated ocean governance mechanisms, supported by joint ocean and coastal research, observations and services, and capacity building in marine security.

**Management of communicable diseases and noncommunicable diseases (NCDs)** through (1) cost-effective transnational policy and governance interventions; (2) buildup of regional research centers of excellence; (3) development of medical products, technologies, and processes; and (4) establishment of a shared information system. In particular, continuous research and development is needed on HIV/AIDS, tuberculosis, and malaria, which constitute the continent's biggest infectious disease burdens, to find cutting-edge solutions—e.g., updated vaccines for malaria and HIV/AIDS—as well as for many other diseases prone to becoming epidemics.<sup>14</sup>

On this front, the recurrence of the Ebola pandemic is a clear call for a regionally coordinated, knowledge-based transnational program for rapid diagnosis, isolation, and treatment of infected individuals. The absence of such a coordinated strategic approach, analysis has shown, was responsible for the large death toll in the 2014 Ebola outbreak in West Africa.<sup>15</sup> A comprehensive bottom-up intervention-chain approach is required to integrate, coordinate, and monitor the activities of the different agencies on the ground, with support from a unified central command in each national government and internationally. A prerequisite to these measures is the building of trust at the community level and between countries, supported by a solid information system.<sup>16</sup> Similar attention must be given to the rapidly growing threat of NCDs in all African countries, often overshadowed by the enormous burden of infectious diseases.<sup>17</sup>

**Maintenance of peace and security**, in light of the continued obstacles posed by violent conflicts to development in several parts of the continent. Insecurity and instability, to be sure, underlie the failure of some sovereign continental countries

to maintain social and political order. The situation is fueled by poor governance, rampant corruption (mostly among those associated with the illegal exploitation of natural resources), deep-seated racial, ethnic, and religious divides, abuse of human rights, geopolitical interferences, youth unemployment, unequal distribution of wealth, and endemic poverty. These problems have laid a foundation for the rise of political violence (coups and regional rebel movements), sponsored by external as well as local forces. But most corresponding peace-resolution processes—driven by regional organizations and the international community—have yielded little lasting success, because they have been mainly based on political and economic arrangements, with military support, and have not encompassed other elements necessary for long-term stability. Science diplomacy efforts could therefore help examine existing political, social, and economic conditions and identify areas that have not been incorporated (participation, social justice, equality, eradication of poverty, and divisive ideologies) to maintain durable peace.<sup>18</sup>

## **Conclusion**

Science diplomacy in Africa is in its infancy and has a long way to go. Even though the continent has made significant progress toward meeting some of its ambitious objectives for development and political integration, the need remains for further progress achievable through a smart, systematic application of science interacting with diplomacy. Science diplomacy should, therefore, be recognized as a priority in shaping continental as well as national policy and development agendas. Many challenges, of course, await. The primary one is how to build up the needed science diplomacy capabilities through educational curricula, training, and experiences that reflect norms and values directly relevant to Africa's development aspirations.<sup>19</sup> The second challenge is how Africa can devise a "code of conduct" for science diplomacy that takes into account its legal, cultural, and political specificities as well as the ambiguities, tradeoffs, and competing interests at play in conflicts. The third main challenge is how to facilitate cooperation and trust among scientists and diplomats, supported by the communication and empathy essential to conducting broad negotiations.

To harvest the many potential benefits that science diplomacy could produce, African governments must collaborate with credible international partners to strengthen local research capacity, establish an appropriate regulatory environment and policies, and support the current drive toward regional integration. Cross-border cooperation can then favor the advent of an integrated African scientific community. The recent successes in cross-border initiatives in pandemic control, peacekeeping, and information and communication technology have created rich soil in which science diplomacy can take firm root and grow.

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