

Innovation Policy for the African Water Sector

INTRODUCTION

Under current predictions, Africa will be significantly affected by climate change. The continent is generally expected to experience an increase in temperature level above the world average and a decrease in precipitation and groundwater recharge levels, with a wide range of direct and indirect impacts on human societies, livelihoods, development and ecosystems. African policy makers must urgently address these issues.

Conventional approaches to solving these complex issues have largely had limited effect, so innovative solutions for tackling water and climate change-related challenges must be embraced. Yet there is a range of issues currently restricting innovation in the water sector in Africa, notably a lack of financial resources, a lack of interaction between innovators and weak innovation systems for water and climate. The mainstreaming of innovation policy is vital to provide direction and to mobilise the necessary resources for effective identification and implementation of water and climate change innovation in Africa.

However, the adoption of innovation policy across the continent has been slow. Breaking down the silos, supporting innovation to scale and mainstreaming innovation to address water and climate challenges requires an understanding of and agreement on what innovation is, how it relates to water and climate challenges, and how the innovation process can be strengthened via legislative and regulatory frameworks. This policy brief proposes 12 specific recommendations for innovation policy for the water sector in Africa as well as 12 guiding principles for the process of developing such policy.

WHAT - Recommendations for Actions by African Policy makers: content of Innovation Policy

1. Enhance the innovation capacity of water innovators (e.g., providing them with technical, financial and business services through incubators and accelerators)
2. Strengthen the regulatory framework for water and climate innovation (e.g., reforming laws and rules to allow easy development and/ or uptake of innovation)
3. Strengthen the water and climate research and development base through increased investment in education, science, and innovation related to water and climate change
4. Stimulate (interactive) learning
5. Raise awareness about water and climate change
6. Promote context-sensitive water innovation (e.g., low cost innovations that use re-sources economically across the whole innovation value chain, are environmentally sound, of high quality and affordable to resource-constrained customers)
7. Establish financial systems for water and climate innovation
8. Foster entrepreneurship (mentality) in the water sector
9. Create water and climate "innovation ecosystems"
10. Encourage innovation partnerships
11. Promote and support grassroots water innovation
12. Set up mechanisms to monitor and evaluate innovation policy

KEY MESSAGES

Many countries in Africa address climate change and water in their national policy. However, a range of issues is currently restricting innovation in the water sector in Africa. Sound innovation policy can provide direction and mobilise the necessary resources for effective identification and implementation of water and climate change innovations in Africa.

1. African Policy makers need to consider mainstreaming innovation to address water and climate challenges. AfriAlliance offers concrete recommendations on **what** actions African policy makers can take via innovation policy for the African water sector.
2. African Policy makers need to pay careful attention to the process of developing innovation policy. AfriAlliance offers guiding principles **how** to formulate Innovation Policy for the water sector in African contexts.



WHAT - Recommendations for Actions by African policy makers

AfriAlliance proposes 12 key policy recommendations for African policy makers to support innovation in water and climate:

Enhance the innovation capacity of water innovators

As key actors in water innovation in Africa, small scale organisations (such as SMEs and CSOs) require support to enhance their innovation capabilities. While the needs of these innovators must first be understood before support is given, policy instruments can assist with technical, commercial and financial services. This support can be ensured through a variety of instruments, including innovation incubators and accelerators.

Strengthen the regulatory framework for water and climate innovation

Appropriate regulation is vital to create an enabling environment for water and climate innovation. In order to best promote innovation in water and climate, regulation reform should consider preventing innovation market monopolies, reducing bureaucratic hurdles for innovators and creating incentives to invest in climate change innovation.

Strengthen the water and climate research and development (R&D) base

An urgent need to strengthen the water and climate R&D base in Africa exists, which has significant knowledge base deficits. To address these deficits, investment in education, science, and innovation related to water and climate change must be increased. Not only would this increase scientific personnel and upgrade research infrastructure, but it would also break down silos and allow for the understanding of existing knowledge and technology.

Stimulate (interactive) learning

As a factor that decisively determines innovation, interactive learning must be stimulated in the water sector in Africa. Opportunities for interactive learning can be generated by creating innovation bridging institutions at the water sector level, such as innovation alliances that bring together innovation providers and users and enable reflection on innovation experiences.

Raise awareness about water and climate change

There is still need for awareness raising concerning water and climate change across all segments of society in Africa, in order for a collective understanding of the urgency to address water and climate change-related problems. In collaboration with learning institutes, policy makers need to initiate education and training programmes that improve the knowledge, skills and attitudes vis-à-vis water and climate change issues.

Promote context sensitive water innovation

Due to economic challenges in place across Africa, policy makers should encourage frugal innovations, i.e. innovations that use resources economically across the whole innovation value chain; are environmentally sound; of high quality; and affordable to resource-constrained customers^{5,6}. For example, this could take the form of the use of "frugal" decentralized water and wastewater treatment technologies which not only offer opportunities for resource recovery and re-use, but are also less capital intensive.

Establish financial systems for water and climate innovation
Policy makers must establish appropriate and focused country or continent level financial systems for the up-scaling of innovations. With significant financial constraints hindering many innovators in Africa, these systems should be patient and willing to bear high risks, taking into account the long-term nature of water and climate innovation. As even currently available funds are often too large to be absorbed by small scale innovators, innovation intermediaries (e.g. incubators) should be established in order to ensure support for all categories of innovators.

Foster entrepreneurship (mentality) in the water sector

The African water sector must be more entrepreneurial, which can be achieved notably by enhancing mechanisms that enable the sector workforce to embrace experimental approaches to solving problems, as well as adaptive management practices to fit the sector's changing environment. Furthermore, appropriate incentives should be developed for potential entrepreneurs in the public and private sectors to stimulate water and climate change innovation ideas in the market.

Create water and climate "innovation ecosystems"

The development of innovation hubs and organisational networks (such as Silicon Valley in the USA) provides essential tangible and intangible inputs for innovation processes, and facilitates networking and learning for innovation. Learning from past developments in Africa^{7,8}, these "innovation ecosystems" should benefit from financing packages, adequate integration in other development programmes, and focus on defined visions.

Encourage innovation partnerships

Due to resource constraints facing many African countries and innovators, policy makers should encourage international innovation partnerships, especially between small and large water and climate change innovators. Programmes such as VIA Water could inspire future initiatives on how to foster partnerships for water and climate change innovation projects in Africa.

Promote grassroots water innovation

Often operating informally, African grassroots innovators have the potential to address some key water and climate change challenges. These actors can often provide simple and cost-effective solutions to water and climate-related challenges. To utilise this knowledge, innovation from grassroots innovators can be encouraged and promoted through the creation of formal links between informal innovators and universities and industry, or through the identification and further exploitation of the specific knowledge possessed by informal innovators.

Set up mechanisms to monitor and evaluate innovation policy

In order to learn from and assess past innovation policy, national and/or regional monitoring institutions (with adequate human capacity) should be enhanced. So as to avoid conflicts of interests with existing institutions, proper division of labour between the old and new innovation bodies needs to be ensured, with the latter not acting as mere implementers of policy.

HOW - Guiding Principles for formulating Innovation Policy for the African water sector

The process of developing innovation policy¹ needs to ensure inclusion of all relevant stakeholders and all available ideas:

1. Open up the innovation policy process, ensuring active participation of all relevant actors
2. Create an enabling environment for water and climate change innovation
3. Widen the scope of water and climate change innovation, e.g., by considering technological and non-technological innovations, science-based innovations and those that are not
4. Embrace the innovation system approach
5. Tap into globally available knowledge and innovative water and climate solutions
6. Strengthen absorptive capacity for water and climate innovations; i.e., the ability of African innovators and countries to identify, attract and use existing knowledge and innovations
7. Promote and support open innovation
8. Expand the role of government beyond facilitation, particularly by taking the lead and making investments across the entire innovation chain (ideation, development and diffusion)
9. Promote locally-embedded innovation processes
10. Conceive policy implementation as a gradual learning process
11. Consider individual country and water sector requirements
12. Develop a vision and long term strategy for water and climate innovation

BOX 1

Identifying Innovation Policy Guidelines and Recommendations for African contexts

The innovation policy recommendations and guiding principles presented in this Policy Brief were developed in a detailed AfriAlliance report⁹, which drew on four detailed studies, each focusing on particular aspects of water (and climate) innovation in Africa. Three of these studies were conducted within the framework of the AfriAlliance project¹⁰. The fourth study was conducted on the determinants of water innovation in African cities, undertaken jointly by the IHE Delft Institute for Water Education and the Centre for Frugal Innovation in Africa (CFIA). All four studies made efforts to obtain "an African perspective" on water innovation. For example, the AfriAlliance studies gave priority to obtaining insights from policy makers, experts and professionals living on the African continent. Similarly, the IHE Delft-CFIA study interviewed innovators and policy makers operating in African cities.



Way forward

The role of innovation policy is to provide direction and mobilise the necessary resources for effective identification and implementation of water and climate change innovations in Africa. The advice provided in this Policy Brief is not a blueprint that policy makers must follow to the letter. It is up to the policy making community in each African country to decide what best fits their specific conditions, undertake carefully selected initiatives and continuously adapt their innovation policies to the changing environment. AfriAlliance hopes that this advice can guide this collective process.



AfriAlliance is a five year project funded by the European Union's Horizon 2020 research and innovation programme. AfriAlliance facilitates the collaboration of African and European stakeholders in the areas of water and climate innovation, research, policy and capacity development by supporting knowledge sharing and technology transfer. Rather than creating new networks, the 16 European and African partners in this project consolidate existing ones. The ultimate objective is to strengthen African preparedness for future Climate Change challenges. AfriAlliance is coordinated by the IHE Delft Institute for Water Education (Project Director: Dr. Uta Wehn) and runs from 2016 to 2021.

Website: afrialliance.org

PRODUCTION

Authors: Uta Wehn (IHE Delft) and Silas Mvulirwenande (Universalia)

Contributors: Bettina Genthe (CSIR), Tarryn Quayle (ICLEI Africa), Luke Somerwill (IHE Delft)

REFERENCES

1. Mvulirwenande, S. and Wehn, U. (2019). Innovation Policy for the African Water Sector. AfriAlliance, Deliverable D2.6. Available at <https://afrialliance.org/knowledge-hub/scientific-papers-and-reports/report-innovation-policy-african-water-sector>.
2. Wehn, U., Mendoza-Sammet, A. and Amorsi, N. (2018). Initial Demand-Driven Research and Innovation Outlook, AfriAlliance Deliverable D2.2. Available at <https://afrialliance.org/knowledge-hub/papers/report-demand-driven-research-innovation-outlook-analysis-local-needs-related>.
3. Amorsi, N., Jacquin, N., and Siauve, S. (2018). Report on matching needs and knowledge. AfriAlliance, Deliverable D2.3.
4. Seijger, C. and Wehn, U., (2019). Draft Research & Innovation Agenda "Strategic Knowledge and Innovation Advice", AfriAlliance Deliverable D2.4.
5. Bhatti, Y. (2012). What is Frugal, What is Innovation? Towards a Theory of Frugal Innovation." Working Paper Said Business School, Oxford University.
6. Radjou, N. and J. Prabhu (2015). Frugal Innovation: How to Do More with Less. The Economist Books, London.
7. Bright, J. and Hruby, A. (2015). The Next Africa: An Emerging Continent Becomes a Global Powerhouse. St.Martin's Press. New York.
8. USAID (2016). Kigali Innovation City. Project profile. Available at https://d3n8a8pro7vnm.cloudfront.net/etradehub/pages/2478/attachments/original/1470045106/Kigali_Innovation.pdf?1470045106



AfriAlliance has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 689162.

✉ afrialliance@un-ihe.org 🌐 www.afrialliance.org