afrialliance socialinnovation

Monitoring « drinking water » quality for improved health in Africa

DESCRIPTION

■ **Access to safe and clean drinking-water** is a basic human right, as declared during the United Nations (UN) General Assembly in 2010. Moreover, an indicator and target on safe drinking-water was included in the UN Sustainable Development Goals, in 2015.

■ **Climate change is recognised to have "both direct and indirect impact on human health"** (ClimDev-Africa, 2013; UNECA, 2011). This social innovation factsheet focuses on the link between climate (change) impact and water availability that endangers population health as "many of Africa's current health problems are a result of frequent contact with contaminated water and open sewerage" (ClimDev-Africa, 2013; UNECA, 2011). Outbreaks of diseases transmitted by water have a major impact on human health through diseases such as cholera, typhoid, hepatitis A and many types of diarrhoea. Water quality monitoring is as a major concern for society. In terms of water quality and its related impacts on health, two main sources of pollution can be distinguished: chemical and (micro)biological. As the chemical source is generally chronic and of long term impact (except for accidental pollution), monitoring the microbiological quality of water is of higher priority.

■ **The quality of water depending on the living area - urban or rural -** varies a lot according to its source (rainwater, surface water or groundwater) as the water supplies' treat-ment cost. Generally, groundwater sources are of better quality and may only require source protection and disinfection, whereas surface water is often contaminated and requires treatment before use.

SOCIETAL CHALLENGES IN AFRICA DUE TO CLIMATE CHANGE

• Given the manifestations of Climate Change and the constraints of ecosystems as well as socio-economic systems, the societal challenges in Africa are to:

– ensure food security, water security and energy security and the balance among them (short term),

– transform into a low carbon, resilient and sustainable society (long term).
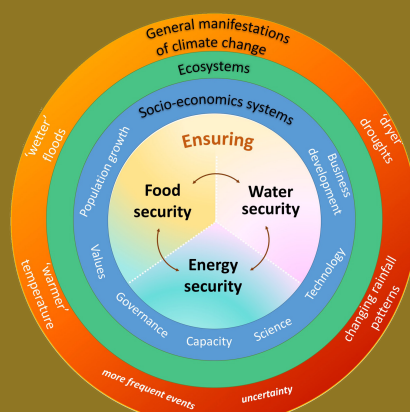
■ The overall objective of the AfriAlliance Social Innovation Factsheets (SIF) is to highlight innovation opportunities that scientists, NGOs, managers and SMEs can act upon, in order to foster short-term improvements in the preparedness of African stakeholders for water and climate change challenges.

■ Over the duration of AfriAlliance (2016-2021), four sets of SIFs will be delivered. Each set will cover one main theme and explore it across five Social Innovation Factsheets. Monitoring is the main theme of this first series of SIFs, covering the following five sub-themes:

1 Monitoring « drinking water » quality for improved health in Africa (this SIF).

2 Monitoring of water availability in terms of quality and quantity for food security.

3 Monitoring climate for early warning systems to prepare for extreme weather events.

4 Monitoring groundwater quantity to ensure sustainable use and avoid water conflicts.

5 Monitoring water pollution by industries and urban areas to protect human health and ecosystems.

■ As detailed below, social innovation combines four dimensions: technological, governance, capacity development and business road map. Each is described in a specific section of this thematic Social Innovation Factsheet.

SOCIAL INNOVATION

• In AfriAlliance, social innovation means tackling societal, water-related challenges arising from Climate Change by combining the technological & non-technological dimensions of innovation.

• Social innovation refers to those processes and outcomes focussed on addressing societal goals, unsatisfied collective needs or societal – as opposed to mere economic – returns. It is particularly salient in the context of the complex and cross-cutting challenges that need to be addressed in the field of water and Climate Change – and which will not be met by relying on market signals alone.

• Social innovation consists of new combinations (or hybrids of existing and new) products, processes and services. In order to succeed, social innovation needs to pay attention to technological as well as non-technological dimensions : **1) technology, 2) capacity development, 3) governance structures and 4) business road map.** As such, these four dimensions of the social innovation process cut across organisational, sectoral and disciplinary boundaries and imply new patterns of stakeholder involvement and learning.

• The success of social innovation is reliant on the accountability of diverse stakeholders and across all government levels.

TECHNOLOGICAL SOLUTIONS

Access to safe drinking water to ensure health security implies a well-planned and implemented water quality monitoring scheme as well as technical solutions to test water quality in the field.

■ The technologies developed to monitor and test water quality low-cost and adapted to each area, urban or remote one. In fact, where there is no accessible laboratory or because of the high costs of transport and analysis, water quality monitoring should be done using on-site testing methods, relying on tablet reagents and portable equipment which do not need electricity. As a consequence, community's motivation to protect and improve their water supply can increase when being involved in the test.

■ Some technologies have been developed to allow water analyses in all situations. That is the case with the Wagtech project which has developed portable equipment to analyse water quality usable both in laboratories or in-situ with entirely equipped all-terrain vehicles. Some other solutions have been developed especially for remote areas, like Akvo Caddisfly.

■ It's also important to highlight that water quality monitoring not only needs to include water quality testing but also regular sanitary inspections of water supplies because potential contamination with pathogens (disease-causing micro-organisms) or chemical, can occur either at the source or during treatment and distribution. The WHO Guidelines (last version published in April 2017) is one of the primary sources of information to guide all the actors, with concrete explanations and tools, ready to use in the field.

■ Finally, when analyses have been done, the next crucial step to use this on water quality is to collect data, to analyse them and communicate the results via statistics, maps, indicators, etc. The mWater guide is a good example offering such possibilities to process data.

■ See QR code on page 4 to access details on mentioned technologies or click here :

http://afrialliance.org/SF1.1DEF.pdf

CAPACITY DEVELOPMENT

Capacity Development (CD) is conceived as the inherent responsibility of people, organisations and societies themselves in which support by external parties can play an important role (Vallejo and Wehn, 2015).

Institutions refers to organisations as well the « rules of the game » (North, 1990); institutional capacity therefore exists both, at the level of organisations as well as the enabling environment.

■ In order to strengthen the capacity to monitor drinking water, key aspects are:

a) Health education and communication are essential components for the success of any programme to promote hygiene and prevent diseases. Development of a Code of Good Hygiene Practices in each country, communicated to national and local authorities and explained to communities by NGOs to focus on:
— having and using excreta disposal facilities, such as latrines or toilets;
— regular handwashing, especially after defecation and before preparing food or eating;
— personal and domestic hygiene, etc.

b) Training observers from local communities, who based on standardised rules, can monitor water quality of springs and wells in remote areas. Results will thus be available immediately on the day of the test and will allow for prompt reaction in case of infection. Moreover, by carrying out some analyses themselves, local communities can become more involved and hygiene education messages will be reinforced.

c) In its guidelines, the WHO insists that people must be trained to do analyses themselves but also to understand the data and to maintain the technologies implemented in their community. To address this need, in 2000, they developed an online training pack, containing 23 different sessions in 6 groups, including presentations and practical exercises.

SOCIAL INNOVATION

GOVERNANCE STRUCTURES

"Governance is essentially the processes and institutions through which decisions are made » (Lautze et al., 2011).

■ Water quality monitoring is a public health-focused activity and it will only be effective and efficient if it is properly planned and implemented, i.e. by being embedded in appropriate governance structures. It is important that each country, at national, regional and local level, develops routine surveillance programmes in order to reduce uncertainty.
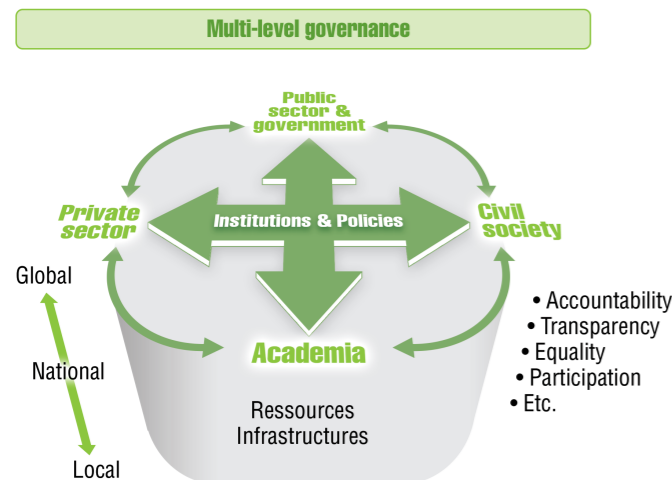
■ These programmes should stipulate water quality monitoring standards, the number of water supply systems covered, the number of samples, the types of analyses, the frequency of inspection, etc. Moreover, these programmes should remain flexible to allow modification in response to evolving water quality priorities.

■ The WHO guidelines are recognized as representing the position of the UN system on issues of drinking water quality and health by "UN-Water", the body that coordinates the 24 UN agencies and programmes concerned with water issues. These guidelines can help water and health regulators, policy-makers and their advisors to develop national policies and regulation, providing practical information about effective management approaches.

■ Technological innovations for water quality monitoring need to be considered within the context of such governance structures to be aligned with the decision making processes. For example:
— Plan water quality monitoring: institutions to be involved (roles and responsibilities), number and location of samples (depending on the number of people served), localisation of a laboratory for analysis, in-situ testing, costs of sampling, transport and analysis, adaptation of this plan in case of an epidemic, etc.
— Develop quality check indicators for water quality monitoring.
— Set official detailed guidelines for undertaking sanitary inspections and provide examples of inspection forms.

BUSINESS ROAD MAP

Social innovation relies on means other than market mechanisms in order to link the demand and supply sides.

■ Stakeholders from both sides (solution providers and potential users) need to interact during the different stages of the innovation process to create a common ground for the co-production of the required knowledge: from the comprehension of the need to the design, implementation and use of innovative solutions.

■ The scheme highlights the key business opportunities that exist at the different stages, indicating key activities and their socio-environmental values for co-creators.

Presentation of
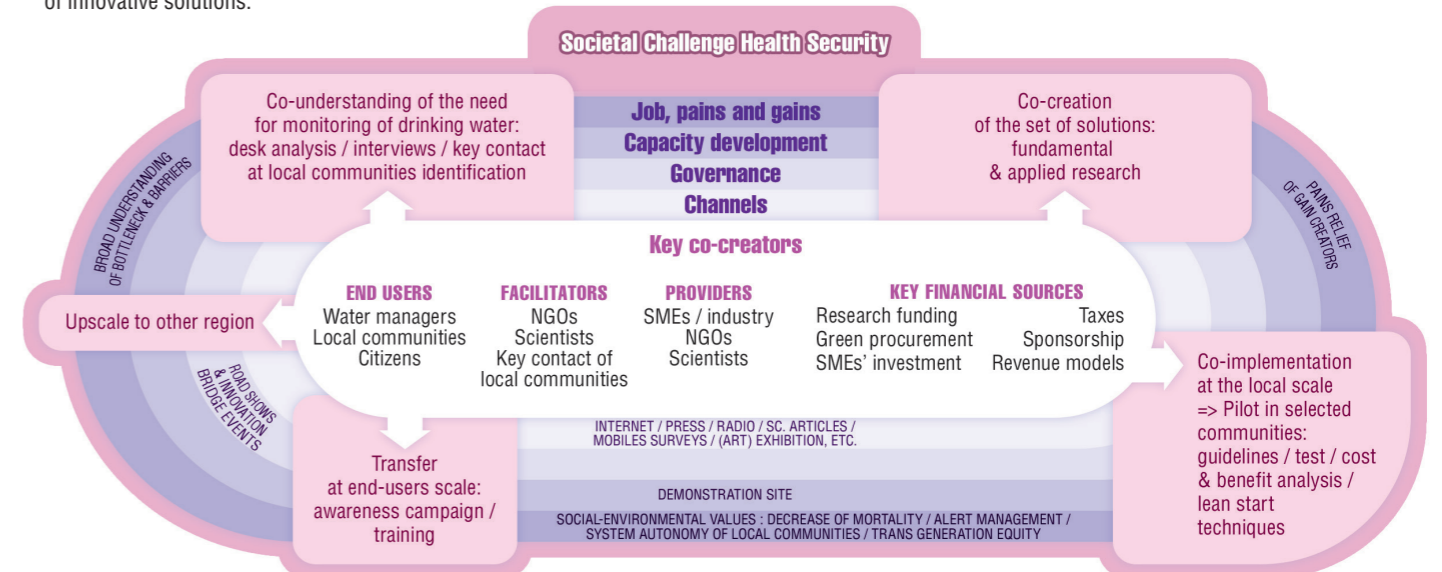
References

◼ DESCRIPTION

● African Climate Policy Center (2013), Policy brief n°12, Climate change and health in Africa: Issues and options, ClimDev-Africa Programme.

● United Nations Economic Commission for Africa, African Climate Policy Centre (2011), Climate change and health across Africa: issues and options, working paper 20.

◼ TECHNICAL SOLUTIONS

● Akvo database on projects about all stages of water, sanitation and hygiene projects (available online freely here).

● United Nations General Assembly, Sixty-fourth session - Agenda item 48, Resolution adopted by the General Assembly on 28 July 2010, 64/292. The human right to water and sanitation.

● World Health Organization (2017), Guidelines for Drinking-Water quality : Fourth edition incorporating the first addendum, 24th April.

● World Health Organization (no date), Factsheets on environmental sanitation, prepared by the Robens Institute, University of Surrey, UK (available online here).

◼ CAPACITY DEVELOPMENT

● Vallejo, B. and Wehn, U. (2016) Capacity Development Evaluation: The Challenge of the Results Agenda and Measuring Return on Investment in Capacity Development in the Global South, World Development, Vol. 79, pp.1-13, doi:10.1016/j.worlddev.2015.10.044.

● Wehn, U. (2015) The Global Context: National Capacity Development Strategies, Tailor Made Training for contact points of Uganda's National Water and Environment Capacity Development Strategy, in collaboration with the Ministry for Water and Environment (Uganda), Kampala, Uganda, 10-11 November.

● North, D. (1990) Institutions, institutional change and economic performance. Cambridge University Press, Cambridge.

◼ GOVERNANCE STRUCTURES

● Lautze J., de Silva S., Giordano M., Sanford L., (2011), Putting the cart before the horse: Water governance and IWRM, Natural Resources Forum, 35, 1-8.

● Wehn, U. (2017) Digital transformations and the governance of human societies, presentation at EC Joint Research Centre, ISPRA, Italy, 7 April.

◼ LIST OF ACRONYMS

● CD : Capacity development.
● SIF : Social Innovation Factsheet.
● WHO : World Health Organization.

◼ MORE INFORMATION

AfriAlliance

◼ **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 led by the IHE Delft Institute for Water Education (Project Director: Dr. Uta Wehn) and runs from 2016 to 2021.

AfriAlliance activities

◼ **Africa-EU cooperation is taken to a practical level by identifying (non-) technological innovation and solutions** for local needs and challenges. AfriAlliance also identifies constraints and develops strategic advice for improving collaboration within Africa and between Africa and the EU.

◼ **To help improve water and climate Monitoring & Forecasting in Africa,** AfriAlliance is developping a triple sensor approach, whereby water and climate data from three independent sources are geo-spatially collocated: space-based (satellites), in-situ hydro-meteorological station observation networks and data collected by citizens.

◼ **Sharing of knowledge is facilitated** through a series of events and through an innovative online platform. Demand-driven AfriAlliance 'Action Groups' bring together African and European peers with relevant knowledge and expertise to work jointly towards solutions.

Realisation