

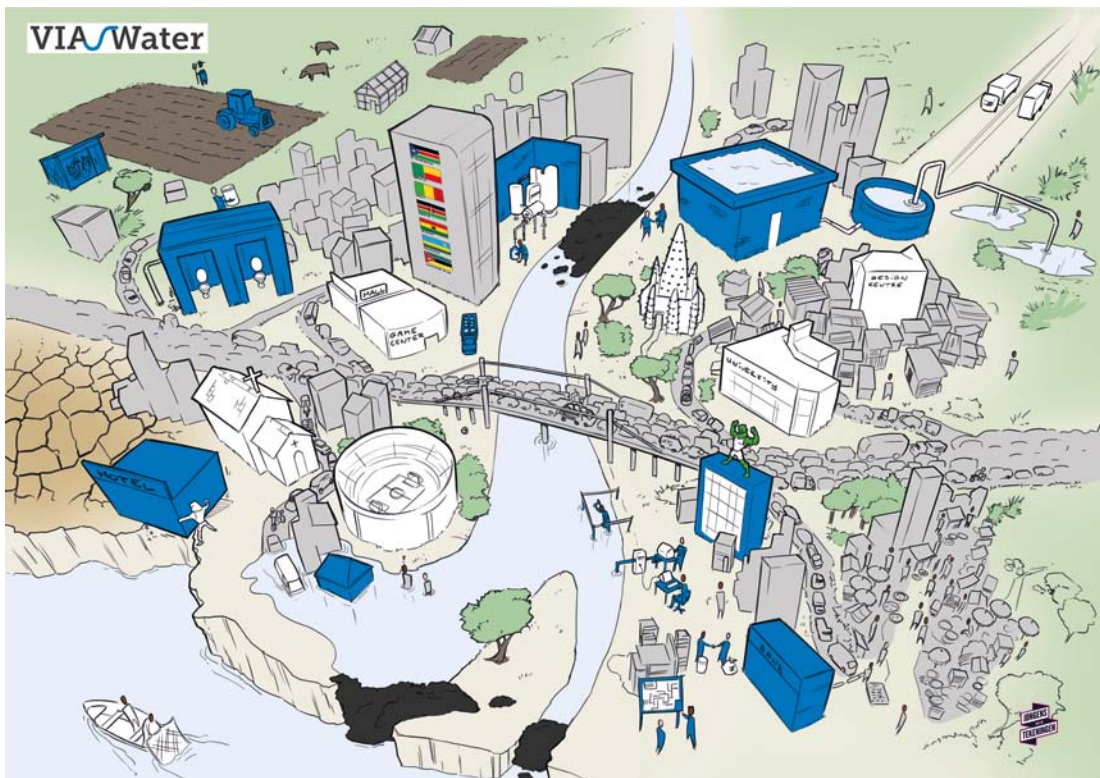
VIA Water

Pressing water needs in African Cities

in Benin, Ghana, Kenya, Mali, Mozambique, Rwanda and South Sudan

Background document on why VIA Water focuses on 'cities'

Final version: 7th of October 2014



'We can't solve problems by using the same kind of thinking we used when we created them'
Albert Einstein

'A green future begins in the city'
Dirk Sijmons (curator of the International Architecture Biennale Rotterdam)

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INTRODUCTION

VIA Water is a programme to support water innovation in cities in Benin, Ghana, Kenya, Mali, Mozambique, Rwanda, and South Sudan and their river basins. VIA Water is where policy, knowledge institutions, business and industry and NGOs come together to develop communities that culminate in innovative and sustainable solutions for water issues. It aims to share the knowledge and sustain the lessons learnt from the projects about those innovations with the wider water community.

This programme is initiated and funded by the Dutch Ministry of Foreign Affairs and is hosted by UNESCO-IHE. The Steering Committee (with the members: Jacqueline Barendse, WASTE, Managing Director; Petra Hellegers, WUR, Professor and Chair of Water Resources Management Group at Environmental Sciences Group; Willem Mak, Ministry of Infrastructure and the Environment, Deputy Programme Director for Top Sector Water & Water International; Michel Rentenaar, Ministry of Foreign Affairs, Deputy Director for Climate, Energy, Environment and Water (Chair); Sybe Schaap, NWP, Chair of the Board) advised in June 2014 a thematic focus into the programme. The programme runs till 2018 and will have funding available to support small-scale water innovations in the seven focus countries in Africa.

This background document explains why VIA Water proposes to focus on 'Cities in Africa'. It explains the analysis executed to come to that conclusion; we analysed the outcomes of more than 200 received surveys, we had numerous discussions with experts, we analysed two extensive desk study reports, and we asked in a workshop setting students coming from the focus countries.

We are proud to present you the focus and approach of VIA Water.

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And with the considerable help of many colleagues both in the Netherlands and our focus countries.



But mostly, a warm thanks to the members of the Reference Committee, who kept us on track during the analysing process:

Dick Bouman - Aqua for All
Ton Dietz - African Studies Centre, Leiden
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METHOD

In order to be able to select the topics on which to focus the VIA Water programme and its community, a set of different sources were analysed. Therefore a process was entered involving as much as possible professionals and experts from the focus countries. The selection process took place between June and September 2014.

SOURCES

Sources which VIA Water used:

- 'Defining Pressing Needs for the Water Sector' (Ter Horst and Duker, 2014)
 - This report analyses reports from the VIA Water focus countries, the Netherlands, and from international organisations to define the most pressing needs in the VIA Water countries.
- 'Country Reports' (African Studies Centre, 2014)
 - The country reports provide insight in the contexts of water dynamics in the seven African VIA water countries. Building on this context, several needs are defined. The authors of the country reports are: Ton Dietz, Marcel Rutten, Germa Seuren and Fenneken Veldkamp.
 - Literature list of the seven African VIA Water countries ("water web documents").
- VIA Water Survey (VIA Water, 2014)
 - More than 200 people (49% Netherlands, 51 % other countries) filled in the VIA water survey. We asked them to share their thoughts and insights as to which areas are the ones they feel change can and should happen.
- Workshop (Tertium, August 14th, 2014)
 - 28 students from the 7 focus countries and studying at UNESCO-IHE and Wageningen University took part in a workshop which culminated in a timeline depicting the most needed and expected innovations, a list with their pressing needs and an advert about what kind of people VIA Water wants to attract.
- Reference Committee (September 18th, 2014):
 - Dick Bouman - Aqua for All
 - Ton Dietz - African Studies Centre, Leiden
 - Petra Hellegers - University of Wageningen
 - Victor Langenberg - Deltares

An analysis was made of all these sources, comparing the similarities and differences. Based on these sources, 12 pressing needs have been defined, combined in figure 2. Each pressing need is explained in detail in the last chapter.

A nice side effect of all of the above is a list of inspirational websites and remarks coming from the respondents. For more information, please consult annex 1.

All background documents listed above can be consulted as of mid October on the website www.viawater.nl.

SET OF CRITERIA

The process started with the underlying questions, on the basis of which VIA Water analysed the above mentioned sources.

*1. Which (future) **pressing needs** can be identified in the **cities** in the water sector in the focus countries of VIA water, to which **(social) innovative solutions** can positively contribute?*

2. Is it possible to find these **(social) innovations** within a **learning community** and e.g. by **co-creation** in an **integral** way, where people can enrich each other's ideas and learn from the lessons learnt (successful or not).

First it is important to define the most important terms, after the scope of VIA Water will be described by its criteria based on these terms.

Definition of a pressing need: a water challenge, which negatively affects the livelihoods of people and the environment. Action is needed now to prevent propagation and/or to diminish the problem and demands for innovative solutions.

Pressing need criteria for VIA Water:

- The need demands urgent attention and innovative solutions to prevent propagation.
- The issues affect a large part of the society, and have a clear and negative impact.
- The need has to be shared by more than three of the seven VIA Water focus countries.
- The need should be relevant in the future too (5 to 10 years-span).

Definition of a city: a city and its surroundings (urban fringe) which can vary in surface area, but is always relevant in relation to the pressing needs present in the city. Working in these urbanised areas on a VIA Water innovation should always have an (immediate) effect on the mitigation of a pressing need.

Definition of innovative solutions: An innovation is a new product, process or idea. An innovative solution provides a new way to meet an existing need, which can range from the need to create a new tool or technique, to the need to ensure the adoption.

Innovative solution criteria for VIA Water:

- Innovations are new and unique ideas, ranging from new tools to new ideas for up scaling or adoption of working items.
- Social innovations in the definition of changing a working process or regime are possible as well.
- Innovations can come from other sectors and adapted to the water sector.
- Innovations can be known from the water sector in other continents and newly adopted in Africa.
- Innovations can be adapting an existing water sector concept/device to a new application.
- Innovations can be known from the water sector in other African countries and adopted to reality in (one or more of) the seven focus countries in Africa.

Definition of integral: Having all the parts together that are necessary to be complete.

Definition of co-creation: A business strategy focusing on customer experience and interactive relationships. Co-creation allows and encourages a more active involvement from the customer to create a value rich experience.

Definition of social innovation: A novel solution to a social problem that is more effective, efficient, sustainable, or just than present solutions and for which the value created accrues primarily to society as a whole rather than private individuals.

Social innovation criteria for VIA Water:

- Define the role of game-changers and transformative discourses and paradigms in an innovative idea.

Definition of learning communities: a group of people who share common emotions, values or beliefs, are actively engaged in learning together from each other, and by habituation.

Learning community criteria for VIA Water:

- Appoint the key actors in and around an innovative idea by enhancing the learning and adaptive capacity to create a sector that learns, innovates and adapts to emerging changes.

Definition of third sector: the Multi-Actor Perspective distinguishes between different types of actors at three different levels of aggregation: 1) sectors, 2) organisations/groups and 3) individual roles. At the level of sectors

(see Figure 1), the state is characterised as non-profit, formal and public; the market as for-profit, formal and private; and the community as non-profit, informal and private. Finally, the Third Sector is conceptualised as an intermediary sector in between the three others. It includes the 'non-profit sector' but the Third Sector is also broader than that; it also includes many intermediary organisations that cross the boundaries between private and public, formal and informal, profit and non-profit. Examples of such intermediary organisations are 'not-for-profit' social enterprises, universities, cooperatives, and community networks.

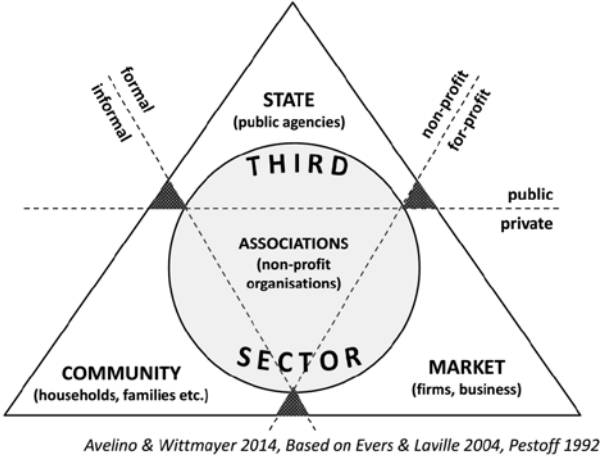


Figure 1: Multi-actor Perspective. Source: Avelino & Wittmayer 2014

RESULTS

TRENDS

First, VIA Water analyzed its sources and identified the following ongoing and future trends which play a major role in the definition and the direction of the pressing needs:

- Population growth (higher demand, increased pressure on the environment)
- Climate change (uncertainties in rainfall, heat stress, sea level rise)
- Urbanisation
- Rising demand due to a rise in welfare
- Devolution (a trend in four of the seven countries (ODI ,2011), demanding for easy to manage systems and knowledge exchange on how to maintain the system and payment structures.)

WHY CITIES AND ITS SURROUNDINGS?

As mentioned above, urbanisation is seen as an important trend in all of VIA Water countries. The pressure on the environment increases when the population density increases. Urban planning is mostly poorly developed. On the other hand, cities (i.e. urban and peri-urban areas) are seen as breeding grounds for innovation, the energy is flowing and the strength of social innovation can be found. Social hubs, business hubs, creativity hubs - they are all present in cities. It is hoped that connections between the urban and rural areas ensure a trickledown effect of innovations. There is also a special need for the development of 'second-tier cities'. They are not the capital and don't receive the same attention as the capital, but are often growing fast and are facing the same challenges.

“With more than half of the world’s population living in cities, it is safe to say that cities highly impact our world’s sustainability. Impacts can be felt in terms of resource consumption (e.g. energy, primary resources), decreasing food security, increasing levels of greenhouse gas emissions and environmental degradation. However, cities also offer the opportunity for decisive local action to address these issues – both in terms of policy and societal action. Alternatives can emerge and be nurtured – they can be inspiring to others, or be translated for implementation at higher levels of governance. Actions at urban level can thus have global impact and cities are seen as critical arenas for addressing sustainability issues.” (Governing Urban Sustainability Transitions – Inspiring examples, Wittmayer, 2014)

Furthermore, focusing on cities forms a coherent set of challenges on which VIA Water and its community can focus on (see figure 2). Sharing and exchanging knowledge from the innovation projects and sustaining the lessons learnt will find this needed breeding ground in cities to integrate the different actors and unusual suspects. Also VIA Water wants to focus on innovations at their very initial phase, when they are not yet translated into a proven concept, idea of technology. It is believed that such initiatives are more easily found amidst the young urban population.

With the focus on cities the positioning of VIA Water is also consistent with the policy choices of the development strategy of the Dutch government. It aligns with other (financial) instruments to shift from aid to trade.

PRESSING NEEDS OF VIA WATER

The following pressing needs have been identified and are displayed in Figure 2.

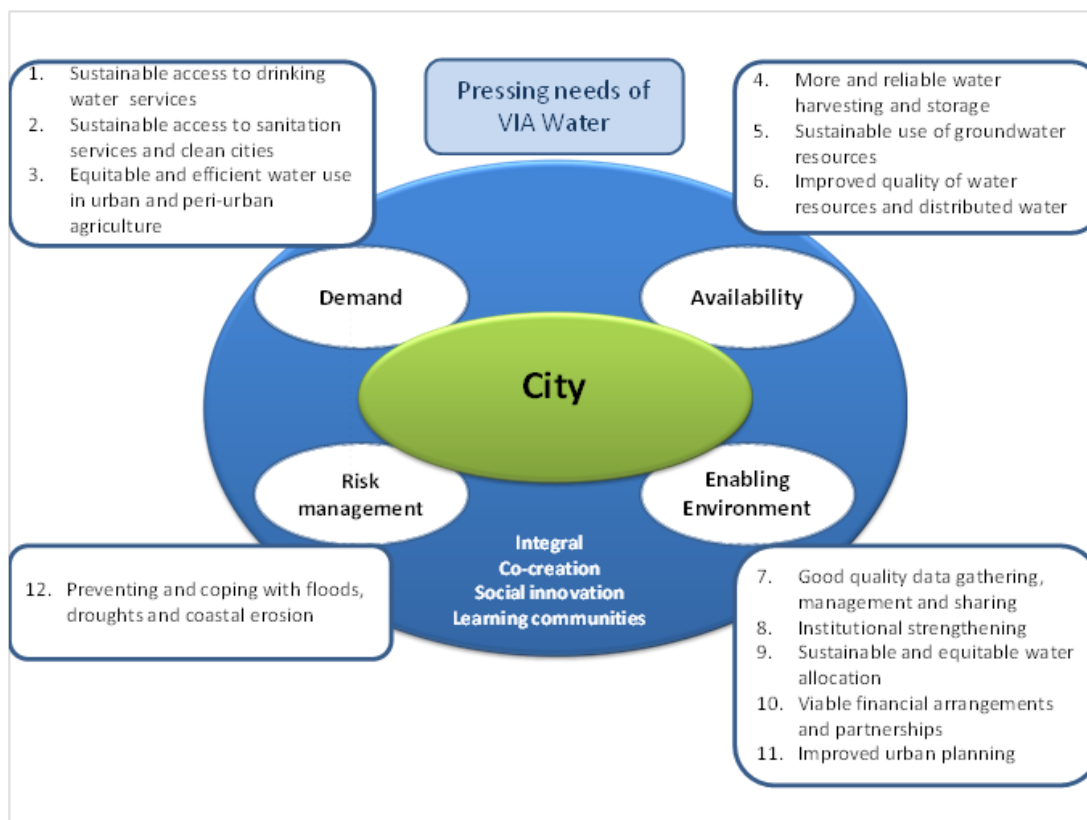


Figure 2: City - concept of pressing needs within the programme VIA Water

The cities are in the center and are surrounded by four different angles water plays an important role in our aim towards cities. Every angle includes a (number of) pressing needs; in total we defined 12 pressing needs. To find and to enrich the innovative ideas, we believe in an integral approach where co-creation leads to (social) innovation and where a learning community can spread the lessons learnt (four terms in blue oval).

VIA Water suggests introducing a wildcard for those ideas that do not directly hit Cities, but are so sensational and aiming for a systemic change that not supporting them would be a loss of opportunity. Those ideas come ideally from third sector associations (see Figure 3).

UNUSUAL SUSPECTS

VIA Water does not want to focus on the water sector only, on the contrary. VIA Water is looking for innovations by combining different sectors and by seeking inspiration from other sectors (third sector). All respondents of the survey were asked for their ideas on which sectors could give the innovative spur that is needed (see figure 3).

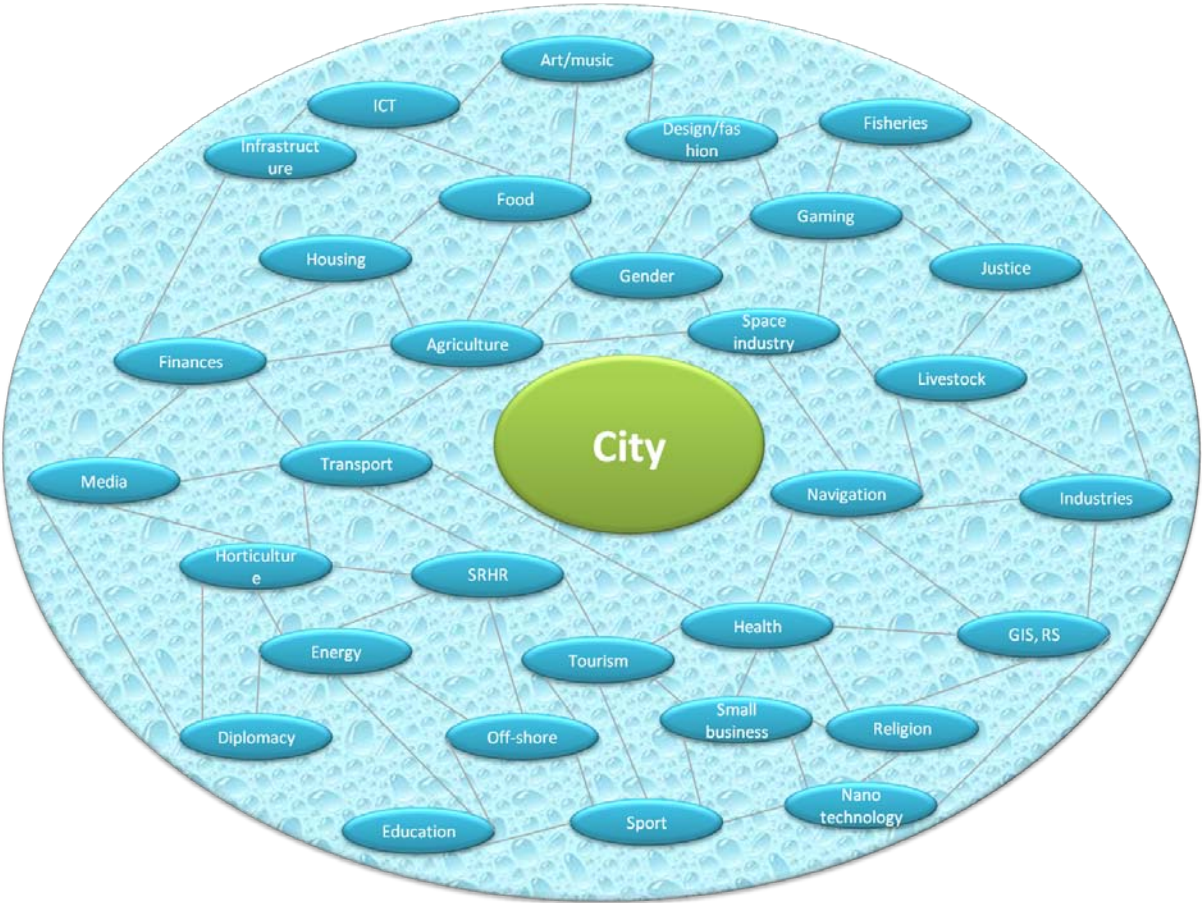


Figure 3: Unusual suspects which can cross pollinate with the water sector to diminish the pressing water needs

OUTLINE OF THE PRESSING NEEDS

In the following section, every pressing need is described. Each pressing need starts with a description of the need as analyzed from the different sources. Then a number of possible directions for innovations are listed. These are also based on the sources used and give a first indication. Next, specifications of some of the country reports from the African Studies Centre (ASC) are mentioned and specific remarks that the respondents of the survey gave. When a respondent mentioned a specific country, the country is given.

PRESSING NEEDS RELATED TO THE DEMAND FOR WATER



1) THE PRESSING NEED FOR SUSTAINABLE ACCESS TO DRINKING WATER SERVICES

Description

In all of the VIA Water focus countries, the supply of clean drinking water is still an issue. Although usually more people are connected to a distribution network in urban areas as compared to rural areas, challenges concerning leakages, unreliability of the system, limited access in peri-urban fringe and water quality are prominent. Water providers face low or absent payments and accountability is often low. Also, the difference between the connectivity and quality of the system between different parts of the cities are high. Slum areas are often not or poorly connected due to various political and infrastructural reasons, and its poor population often pays more for water than the rich connected population. The efficiency of the system in general is very low.

Possible directions for innovation

- Expansion of distribution systems to peri-urban areas (with a positive effect on the revenue base), potential for investment is present.
- Adapting utilities, or enabling utilities to flexibly cope with the challenges of population growth, rising demand and densely populated areas.
- Decrease the large difference in development between rich and poor areas, by developing smart ways to connect slums to infrastructure or make them self-sustaining.
- Attention to cost-recovery options for services to the very poor.
- Reducing water losses in water supply; improved efficiency and rehabilitation.
- Opportunities for the re-use of water; use of gray water.
- Implementation of water metering and payments (vandal proof).
- Rehabilitation, non revenue water reduction and upgrading of services.
- New service models for the urban poor (inclusive decentral systems)
- Water saving methods
- Data and quality monitoring

Justification

Both the African Studies Centre (ASC) report and Ter Horst and Duker (2014) showed that maintenance, limitations to expansion, metering and payment were identified as major concerns in the literature. Sustainability of the systems is therefore at risk. The survey pointed at access to drinking water (and sanitation) as the major challenge to be addressed within the WASH sector. Although drinking water has been mentioned as a field of many challenges, various sources, especially in the survey advised not to focus too much on WASH as there are already so many initiatives. "Leave it to water companies (Benin)", "Heavily covered by donors (Mozambique)". However, water supply was also one of the pressing needs that were identified in the student workshop.

Specific country remarks (ASC)

- Benin: drinking water target MDG reached, but more attention to quality and fairer distribution required: who profits?
- Ghana: 50% leakage, privatisation of drinking water sector is in development, lack of trust and willingness to pay.
- Kenya: A large number of informal settlements around the cities make drinking water supply and sanitation challenging. 18% of urban population has no access to improved water sources, this number is growing. Need for incentive structure that is supportive for low-cost technology.
- Rwanda: More efficient water use needed, water saving, innovative reforms.
- South Sudan: 50 % leakage, improvement of old distribution systems needed. Connection rate is 67%, but actual access is only 14% (due to dysfunctional and unreliable service).

Suggestions from survey:

Look at the informal sector, shift from just supplying water to more quality and community improvement, development of private sector, installation of prepaid water points, use of Morenga tree for pre-purification.

2) THE PRESSING NEED FOR SUSTAINABLE ACCESS TO SANITATION SERVICES AND CLEAN CITIES

Description

In all of the focus countries but Rwanda, the MDG on improved sanitation facilities will not be met (mdgtrack.org, August 2014). Hence, challenges exist in increasing the coverage of improved sanitation. Although the issue has been a focus point of the sector for many years, the problems are not solved. Few urban areas are fully connected to proper sewerage systems, leading to environmental degradation and posing health risks. Slums are facing a particular problem due to a lack of formal rights, high population density, and a lack of city planning. They also fail strong social cohesion which leads to a polluted environment. There is hardly space to accommodate new sewerage systems and water supply networks. The rate of urbanisation in all countries is high, and smart ways to deal with sanitation in slums is clearly a current and future need.

Possible directions for innovations

- Toilets, personal hygiene and laundry facilities
- Opportunities to re-use water and human waste
- Smart solutions for renewing or expanding treatment and sewerage, systems or on-site treatment technologies, such as energy-saving treatment and pre-sedimentation technologies to reduce operational costs
- Implementation of a payment-system to improve the sustainability
- Suggestion to look at the informal sector (survey)
- Mini-grids and separated systems
- Governance and funding of sanitation services

Justification

Both the African Studies Centre (ASC) report and Ter Horst and Duker (2014) showed that access to sanitation is lagging behind. Availability of space, pollution, maintenance are identified as major concerns in the literature.

The survey pointed at access to sanitation (and drinking water) as the major challenge to be addressed within the WASH sector. Although sanitation has been mentioned as a field of many challenges, various sources, especially in the survey advised not to focus too much on WASH as there are already so many players in the field. "No WASH in Ghana, happens too much already, but needed in South Sudan".

Specific country remarks (ASC)

- Benin: Need for waste water treatment (underdeveloped) and for improved sanitation.
- Ghana: 80% of urban population are using unimproved or public sanitation facilities
- Kenya: A large number of informal settlements around the cities make drinking water supply and sanitation challenging.
- South Sudan: Sanitation has low priority on the development agenda. Behavioral change is difficult.

Suggestions from survey:

Training on proper use of sanitation (Kenya), many innovations happen in WASH, adequate governance system for water supply and sanitation also after investment, long-term education to 12-year old girls on WatSan in religious circles (Ghana, Kenya, Mozambique).

3) THE PRESSING NEED FOR EQUITABLE AND EFFICIENT WATER USE IN URBAN AND PERI-URBAN AGRICULTURE

Description

Urban and peri-urban agriculture play an important role in providing the city with food and in sustaining people's livelihoods. A recent study in the city of Kumasi (Ghana) showed that 95% of fresh milk, 90% of lettuce and spring onions, and 15% of poultry were produced within Kumasi city. In the city of Accra, similar studies have shown that in total 46 to 75 % of the fresh produce (including eggs, live poultry birds, green leafy vegetables and okra) sold at city markets in Accra is grown in the city itself.

Within the city borders, mainly smallholder farms are operating in staple crop cultivation, but also (and mainly) in horticulture, animal husbandry (including chicken and eggs), agro-forestry, and fisheries (or in combination). Challenges are manifold; access to enough and good quality water for irrigation, efficient water use, limited space, and uncertainty in investment as urban farms are often illegal and not permanent. With many small users and sources, efficiency in water use becomes challenging. In smallholder systems priority is not always given to proper drainage, resulting in salinisation of the soil and pollution of water sources by agro-chemicals. Rain-fed agriculture makes crop production vulnerable to weather variability. By improving access and secure storage of water and efficient irrigation methods farmers have tools for realising a more secure harvest. The need for expanding agriculture under irrigation is evident in all countries. For large-scale farmers, working in areas close to major cities for making better use of infrastructure and available markets, challenges have been found in using water more efficiently and reducing pollution of surface and groundwater. In many countries irrigation systems have lost their initial potential and some have even fallen in disuse. Rehabilitating and upgrading opens up new ways for efficient water use. Pollution by agro-chemicals can threaten groundwater and surface water, for example in the horticultural sector. In animal husbandry bad water quality may threaten animal and people's health. Animal (and human) waste can be used more effectively and with less danger for animal and human hygiene.

Possible directions for innovation

- Smart mobile storage and irrigation facilities for small-holders in cities.
- Innovative methods for waste water irrigation, or multiple re-use of water.
- Reducing water losses in water supply; improved efficiency through new technologies, smart allocation and rationing of water, and rehabilitation of large irrigation systems, rationalization mechanisms, incentives and disincentives for individuals to use water more efficiently.
- Development of area under irrigation and rehabilitation of current systems.
- Developing smart irrigation methods which are easy to maintain, and have little impact on the soils.
- Smart solutions for animal water provisioning and waste use.
- Spreading of daily water use (reduce peaks; use surplus at night).
- Upstream lands that may work as buffers or result in peak flows (with land degradation).
- Spatial planning for green lungs in the city.

Justification

Agricultural needs have been very prominent in both studies (ASC and Ter Horst and Duker) and the survey. As agriculture is the largest consumer of water in all the countries, it is seen as an important need. The emphasis on and specific challenges for urban agriculture has not been made very clear, but developed during the discussions on the material. It became clear that often a large portion of the food for cities is produced in, or in the direct vicinity of the city. In the workshops the link between sanitation and agriculture was seen as one of the major needs. This topic is strongly linked to the activities of the Knowledge Platform on Food and Business. Attention should be given to the opportunities between the two.

Specific country remarks (ASC)

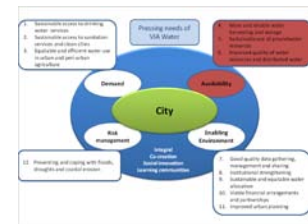
- Benin: Room for expansion of irrigation, but leads to competing uses, especially in the north. Room for adaptation by farmers to climate change; they change their cropping patterns to more cash crops.
- Ghana: 66% of water used by agriculture, need for more irrigation, so new sources required (groundwater, water harvesting).
- Kenya: Small scale farmers using non-optimal crops and irrigation schemes; a lot of recent attention for (peri-) urban agriculture. Also planned large-scale low cash crops (e.g., sugar cane) will pressure limiting water resources more.

- Mozambique: 80% of people are subsistence farmers.
- Rwanda: Reformation of water resources management in agriculture; lack of technical innovation and yields too low.

Suggestions from survey:

Invest in agri-business (process of agricultural products), avoid irrigation from rivers, harvest rainwater and use drip irrigation, over-dependence on rain-fed crop production, empower the youth for water development through sustainable small scale irrigation projects.

PRESSING NEEDS RELATED TO THE AVAILABILITY OF WATER



4) THE PRESSING NEED FOR MORE AND RELIABLE WATER HARVESTING AND STORAGE

Description

Availability is the first priority in enabling different water uses. Water availability varies enormously within the selected countries both due to geographical causes as well as different water uses. Water stress is present in certain catchments. By optimising water availability, and more specifically, by making water available during times that it is needed the most, more flexibility is created. The current water storage capacities are not sufficient to allow people to compensate for hydrological changes.

(Rain, river and ground) water can be harvested at different scales: by individual households and farmers and other water users such as industries, or collectively by communities, companies or municipalities. The methods, use and mode of organisation differ greatly, from catching rainwater to re-using water. The innovations will need to be adapted per focus group. The impacts of water harvesting on other (downstream) actors and the environment need to be taken into account. Some form of regulation may be necessary.

Possible directions for innovation

- Improve and increase surface and sub-surface water storage facilities for climate resilience and maximum water use.
- Opportunities for the low-cost production and collecting of water.
- Develop the potential of e.g. large surface water storage.
- Optimisation of groundwater storage (including recharge) and soil-moisture in the root zone.
- Optimisation of use (meteo based management tools/models)
- Use of infrastructure/buildings and streets
- Use of spatial planning (cities)

Justification

The need for more storage came out as a relatively big need in both studies (ASC and Ter Horst and Duker), as a coping mechanism for droughts and increased irregular rainfall, as well as answering to the increased need for water due to population growth. Rainwater harvesting was specifically mentioned in the survey and fully debated in the student workshop. Nevertheless it did not make it to the final pressing needs list.

Specific country remarks (ASC)

- Ghana: Large dependency on surface water. Rainfall is erratic or decreasing, so the need for alternative sources is growing (e.g. groundwater)
- South Sudan: Increase / make better use of internal water sources (only 20% of total available water from rainfall, 80% from international rivers). Invest in storage.

Suggestions from surveys:

Focus on rainwater harvesting in combination with trees for better water management. Re-use of water is also an important element of water harvesting.

5) THE PRESSING NEED FOR SUSTAINABLE USE OF GROUNDWATER RESOURCES

Description

In all selected countries groundwater is already widely used as a source for agriculture, livestock and domestic consumption, especially in urban areas. Challenges arise with accessing both shallow and deep groundwater, water quality and management of the resources. Limited qualitative and quantitative data is available making allocation, regulation and management of this resource difficult.

Groundwater is a relatively reliable resource, and is often assumed to be under-developed. However, it is a source which is difficult to monitor, and for which over-abstraction can have irreversible long-term negative effects. Groundwater can be accessed by wells and pumps, varying in depth. Techniques vary greatly from hand-dug wells to highly advanced drilled installations. Knowledge, finances, and clear agreements on the amount to be abstracted are key in accessing deep groundwater. In urban areas, nitrate levels (leaking sewers and septic tanks) and other pollutions require special attention.

In urban areas many people make use of (private) boreholes as surface water is not often available. Mapping and monitoring these sources is crucial in being able to avoid over-abstraction and pollution of groundwater and soils (problem is that most of these boreholes are illegal).

Possible directions for innovation

- Increase the knowledge base of groundwater resources: need for data gathering, interpretation and sharing - what is available, what are the depletion levels, pollution, what are the downstream effects, what is the interaction with surface water, etc.
- Develop and implement smart tools for mapping wells and boreholes (difficult in relation to illegal status of many boreholes).
- Implement methods for regulation and management and recharge of groundwater to avoid depletion of the resource.
- Identify potential for recharge of groundwater (natural and man-made), which can form an important option for water supply. (Managed Aquifer Recharge (MAR) is amongst the most significant adaptation options seeking to reduce vulnerability to climate change and hydrological variability (Kenya Water Scan 2011).
- Methods to introduce wells, pumps and groundwater use in a sustainable way.
- Data management.
- New use of groundwater for cooling of buildings

Justification

The need for more attention to groundwater came out as a need in both studies (ASC and Ter Horst and Duker). It was not specifically mentioned in the results of the student workshop, and mentioned as a source under threat by pollution in the survey.

Specific country remarks (ASC)

- Benin: High level of groundwater extraction leading to saltwater intrusion in coastal areas (Cotonou). Groundwater recharge needed in the north: scarcity because of diminishing small and shallow groundwater reserves, combined with diminishing rainfall.
- Kenya: Amount of illegal boreholes around Lake Naivasha is high.
- Mozambique: Commercial agriculture might become a risk to the availability of groundwater.
- South Sudan: Determine distribution and potential for groundwater and springs. Coordination policy needed as there is a high number of private wells in urban areas (provide for 56% of population, against 35% in other African cities).

Suggestions from survey:

Groundwater received limited comments from the survey. It is thought that groundwater is a less visible resource and therefore less mentioned.

6) THE PRESSING NEED FOR IMPROVED QUALITY OF WATER RESOURCES AND DISTRIBUTED WATER

Description

In urban areas, where population density is high and economic and industrial developments are taking place, water quality is at risk of deterioration. This concerns both surface water and groundwater. Low water quality has effects on all users. It has the most visible or direct effects on humans through drinking water, health and agriculture. In return, all uses of water can also negatively affect the water quality. Pollution from farming was indicated as a problem in the focus countries, as well as pollution from sanitation facilities. Mining, oil extraction, industries or saltwater intrusion are other potential sources for polluting water resources. In urban areas, waste water and solid waste management are crucial to create a sustainable and liveable city. In coastal cities land subsidence, over-abstraction of groundwater, diminishing river water and sea-level rise contribute to increased salinisation of groundwater. To satisfy the many different interests, sound urban planning is necessary.

Possible directions for innovation

- Reduction in pollution from agriculture through pesticides, livestock, horticulture and farming.
- Reduction in pollution of surface water from various sources, liquid and solid; coming for instance from mining, industries, sewerage and seepage through pit latrines, or a failing waste management system.
- Reduction of salt water intrusion at crowding deltas and coasts (especially where salt water meets fresh water).
- Knowledge and infrastructure needed to set up or improve water treatment plants (small & large scale), either at source or general.
- Systems that guarantee water quality at point of use.

Justification

The need for more attention to water pollution was not very prominent in the study of Ter Horst and Duker. It was mentioned more in the ASC study and highlighted as a major constraint in the survey. It was specifically mentioned as one of the pressing needs in the results of the student workshop.

Specific country remarks (ASC)

- Kenya: pollution of (perennial) streams in floriculture regions in Southern Kenya.
- Kenya and Benin: Pollution of surface water quality of lakes and delta's (e.g. Oueme delta and Lake Victoria).
- Mali: The groundwater around Bamako is highly contaminated due to various sources.
- Rwanda: The groundwater pollution by industrial activities (in wetland Nyambugogo).
- South Sudan: Salinity levels of groundwater are too high for drinking (Jonglei and Unity State). Groundwater pollution around oil exploration sites in Unity state and groundwater pollution from effluent around Juba.

Suggestions from survey:

Illegal small scale mining leads to water pollution, large open-cast mining leads to pollution. Sea/salt water intrusion and geochemical issues are an environmental problem

PRESSINGS NEEDS RELATED TO THE ENABLING ENVIRONMENT



7) THE PRESSING NEED FOR GOOD QUALITY DATA GATHERING, MANAGEMENT AND SHARING

Description

Data gathering and sharing is necessary to contribute to a large need of all stakeholders. Knowledge is power. Governments need reliable information to base their policies and local water management plans on. Local stakeholders need reliable information to make individual choices at farm or household level, influence decision-makers and resolve disputes over water. Investors need information to decide on their next investment. Donors need information to decide where to support the partner. Reliable information is needed for all water sector stakeholders, at any level.

Specific needs have been mentioned on meteorological and hydrological data, water use and water demand, groundwater resources and the potential, understanding the interaction between groundwater and surface water, soil quality and degradation, amounts of untreated waste water, mapping and tracking of water provision, and monitoring water use. The need is both qualitative and quantitative. Moreover, the need to manage data and information has been stressed to be able to make it better available and applicable. Sharing and transparency of information is currently very poor due to a.o. institutional, socio-economic and practical constraints.

Possible directions for innovation

- Tools and methods for quality collection, storage, access and development, and management of data.
- Tools and methods for information sharing and transparency (make free online data access possible).
- Opportunities for good data and information to market or to be traded with other things.

Justification

The need for better data was prominent in both studies (ASC, and Ter Horst and Duker). The survey did not mention data directly so it did not come out that much. Knowledge sharing was included in one of the pressing needs in the results of the student workshop.

Specific country remarks (ASC)

- Benin: Need for spatial data infrastructure for sharing and reducing costs of data generation. Project is set up by National Water Institute.
- Ghana: flow of data disconnected and slow (example Volta)
- Kenya: first African country with online, interactive sharing platform (with 400 datasets). Mobile apps for herders to pay for water and pasture or for flood risk warning.
- Mozambique: Improvement of availability and usage of data. There is no basic data set.
- South Sudan: Better data on climate change and wetland management needed

Suggestions from survey:

No harmonised data collection and databases (Mali), cross-sectoral approach such as spatial data infrastructure needed, integrate remote sensing, GIS, and modelling to help decision-making. Sector performance information and access to it, transparency of information, lack of data transparency and inadequate feedback on implementation, there is no memory.

8) THE PRESSING NEED FOR INSTITUTIONAL STRENGTHENING

Description

The focus countries of VIA water face governance challenges, including a low efficiency and corruption. Many great ideas on how to deal with water challenges exist, but we see too many being hampered by institutional hick-ups and poor adaptation to local circumstances. It is seen as the major reason why the (long-term) impact of many projects is low. A lack of secure land or water rights, low accountability of government institutions and water service providers, poor (local) enforcement of policies, limited management of water resources at basin level, and limited involvement and ownership of local communities are a few of the problems mentioned in the reports, survey and workshop. Devolution plays a major role in institutional strengthening; it can be an opportunity and at the same time a risk for increased competition over resources.

Additionally, some countries are dealing with (civil) war, violence, and (internally) displaced people, making priority setting and sustaining results a complex issue. Supporting the development of institutions is therefore seen as one of the biggest needs for projects to succeed.

Discussions have been ongoing on which innovations can be seen and how to deal with the black box of 'institutions, capacity building, water resources management, and community involvement'.

The needs 8 till 11 are closely tied to this need and are specifications that have specifically popped up during analysis and discussion.

Possible directions for innovation

- Innovative tools for stakeholder co-creation and management of resources
- Application of new and existing tools such as gaming, ICT, GIS, theatre for incentives for individual and community involvement and accountability.
- Combine capacity building projects with community participation (from the workshop)

Justification

Good governance and institutions together with poor (local) enforcement of policies received the most remarks in all of the sources. It is seen as one of the most important pre-conditions for a project to succeed. In the discussions the need and opportunity was stressed for VIA Water to attract projects for new ideas on strengthening an enabling environment. The students' workshop pointed capacity building and community participation as one of the pressing needs.

Specific country remarks (ASC)

- The African Studies Centre has a large focus on water governance for all countries. It sees the need for increased international water cooperation. On the national level, it sees the need for good governance and strong institutions, especially municipalities who have to deal with an increased responsibility because of devolution.

Suggestions from survey:

Focus on interaction with consumers and beneficiaries

9) THE PRESSING NEED FOR SUSTAINABLE AND EQUITABLE WATER ALLOCATION

Description

Water scarcity demands water resource management. In urban areas users are highly competitive. Competition over the resource emphasizes social, cultural, political and economic relations and interests in a political negotiation process. The outcome is beneficial to those who have more control over water by e.g. paying more. Equitable water allocation and water rights are crucial in realising sustainable distribution and securing access to water for competing users. The urban poor are a group which is often not connected to the main water grid due to the high costs, high risks for investment and low revenue involved. Industries and agriculture in (peri-)urban areas are large water users and often strongly engaged in water resources management.

This need is closely linked to good governance and the water availability. If less water is available, it will become more difficult to divide the water.

Possible directions for innovation

- Link water resources planning with spatial planning
- Adopt smart tools for negotiations over water such as smart games.

Justification

The division of water between users is a pressing need which derives from all sources and came out strongly in the survey.

Specific country remarks (ASC)

- Kenya: A decrease in river flows and an increase in water demand feeds local water conflicts.

Suggestions from survey:

The division of water between different users should be monitored. Especially industries use water excessively. It is a cross-sectoral problem, where agriculture, spatial planning, textile industries, small businesses and religion have a say and need. This is still a pressing needs as there are often no plans to accommodate for the high water use of agriculture, energy, urbanisation and mining.

Water division is often unequal and unfair.

10) THE PRESSING NEED FOR VIABLE FINANCIAL ARRANGEMENTS AND PARTNERSHIPS

Description

Money makes the world go round, and good ideas and plans need funding for implementation and operation. In the past years, the Dutch government tries to stimulate new funding bases for development, thereby hoping to achieve less dependency on donor money in the long term. More attention is given to building public-private partnerships, especially by large donors as the World Bank. Many donor driven projects have seen a major challenge after the initial phases in generating sufficient financial means to sustain the project. An important development is devolution of services that is going on in most focus countries; this calls for searching for new and lasting financial plans, executed by stakeholders who have to adapt to the new situation. Making smart use of the finances available is an important aspect of making development sustainable. This pressing need is focused on combining different scales and regions in finding financial resources on the short and long term, and making smart choices and use of the resources available. How can the money best be used, and can funds from the national and international private sector be used to develop public utilities?

Possible directions for innovation

- Creating lasting public private partnerships, intraspecific trust, and respect based on lasting natural capital (ecosystem services) use. Cooperation based on commitment, then agreeing on funding the costs to create continuity and adaptation of long-term targets.
- Public-private partnerships: finding alternative financing and make use of innovation potential for investing in infrastructure, and human and natural capital. Make use of the strengths of each actor.
- Contribute to accountable and commercially viable water utilities; improved commercial competences for water utilities.
- Develop smart tools and ways to support the lifecycle approach and lifecycle costing.
- Commercialise the maintenance and operation of more advanced water systems if communities and water services boards are unable to do so (lack of manpower, funding and transport)
- Reduce the disconnection between water institutions and the market by developing guidelines and best practices, and improving data availability.

Justification

The need for innovative financial arrangements was very prominent in the study of Ter Horst and Duker as the resources used in this study are often originating from a business perspective or interest. It was mentioned not that much in the ASC study although maintenance and operation difficulties are acknowledged. Financial constraints were mentioned in the survey as one of the most important governance issues. It was not mentioned as one of the pressing needs in the results of the student workshop. The discussion was raised on whether specific financial constructions as PPP's should be the focus of VIA Water, as large actors as the World Bank and UN are focusing on this.

Specific country remarks (ASC)

- Ghana: water sector reforms have led to increased private participation. Acceptance of their involvement, and the willingness to pay is low.
- Kenya: a large water company has combined mobile payments to smart metering methods, increasing its revenue and contributing to a financial sound and sustainable organisation.
- Kenya: After devolution and partial privatisation a lot of confusion and unclear governance arrangements in cities.

Suggestions from survey:

Finance received a lot of attention in the survey. There were some who indicated a lack of financing as a problem; a severe shortfall in emergency funding, a lack of long-term financial support to solve water scarcity to a lack of sufficient and trustworthy financial system were mentioned as issues. Many solutions, or directions for innovation were provided too; from a search for new business concepts and microfinancing, to attention to banks and micro financiers, involvement of private sector and financial sector, an increase in the role of the private sector especially in post-construction support for water supply, the introduction of the lifecycle approach, and the introduction of PPP's for addressing water related challenges.

11) THE PRESSING NEED FOR IMPROVED URBAN PLANNING

Description

Urban planning is of crucial importance to all functions within and around the cities and for the peri-urban surroundings. Housing, agriculture and industries highly influence the availability, quality of water resources and the risk of floods and droughts, and vice versa. Building on riparian lands or along the coast makes functions for example vulnerable for floods and sea level rise, and generates challenges with pollution and saline groundwater. Slums give other dimensions to planning as these are usually built on illegal grounds with less room for long term investments.

Urban planning and improved regulated planning of urban and peri-urban areas are therefore seen as basis for the different pressing needs identified. Also because poor urban planning is a key uncertainty in African cities.

Possible directions for innovation

- How to sustainably plan and manage functions on and under the ground.
- Better adoption of ideas on closed (water and nutrient) cycles in urban areas.
- Better use of water as a solution for urban planning challenges
- Combining water for users with solutions for climate change challenges in cities, such as heat stress.
- Better land-use planning and address infrastructure deficiencies
- Improve the use of water/land planning frameworks

Justification

The need for improved spatial planning was not prominent in the study of Ter Horst and Duker. It was mentioned mainly indirectly in the ASC study. The survey was the main source for including urban planning as a pressing need. It was not mentioned as one of the pressing needs in the results of the student workshop.

Specific country remarks (ASC)

- Ghana: Urban planning needed; slums are sometimes built on waterways leading to floods, there is no policy due to vested political interests.
- Kenya: rapid urbanisation and cities developing out of refugee camps.
- Rwanda: Land scarcity is enormous. Measures to create balanced regulations and policies with respect to land rights.

Suggestions from survey:

Urban planning (Kenya), huge urbanisation but little planning, increasing awareness for solutions for slums, increasing use of spatial planning as solution for water issues, role of small businesses, destruction of riparian zones in urban areas, agriculture and urbanisation are the two most fundamental land use processes, unregulated urban development. Need for the coordination of the dredging of ports, and the environmental needs of the coasts (Ghana).



12) THE PRESSING NEED FOR PREVENTING AND COPING WITH FLOODS, DROUGHTS AND COASTAL EROSION

Description

This need concerns drought and flood events and coastal erosion. Droughts are an apparent issue in all VIA water countries, which is aggravated by the trend of climate change. The droughts become more unpredictable and frequent, the temperature will rise and therefore land use will change. In urban areas droughts affect people in a complex manner because space is limited. There are less alternative water resources for drinking water; the escape routes for most users are limited. Urban dwellers are in general not subsistence farming and are buying their food in markets or supermarkets. Drought can have a serious impact on hygiene and health. At the same time, the countries are identified as flood hotspots and especially in eastern Africa there will be more rainfall, because of climate change. After famine, floods affect many people in the whole continent. In cities, the infrastructure is generally not equipped or maintained to reduce the impact of floods both from rivers and from seas. A lack of urban planning, and building on riparian lands and the obstruction of waterways by housing or solid waste create floods. Four focus countries have major cities on the coast where human activities and storms trigger coastal degradation, and where sea-level rise will be a growing concern in the future.

Possible directions for innovation (Droughts)

- Water harvesting and storage methods.
- Investments in rain and drought forecasting, prevention and mitigation plans, community-based disaster plans.
- Emergency plans for food delivery from other parts of the country.
- Innovative solutions for (small-scale) food processing and storage.
- Better land-use planning and focus on maintaining biodiversity.

Possible directions for innovation (Floods)

- Water storage and conservation in urban areas where space is limited.
- Investments in rain and flood forecasting and warning systems, evacuation plans, flood mitigation plan, flood hazard map, community-based disaster management
- Better land-use planning and address infrastructure deficiencies
- Innovative smart solutions to deal with existing buildings on riparian lands and shores.
- Infrastructural measures (dams, basins, buffers and dykes) in densely populated areas
- Make use of natural retarding systems (pastures, paddies and dry fields)
- Continued water supply services during inundations
- Sanitation design for high water tables and flooding

Possible directions for innovation (Coastal erosion)

- Early warning system, also for swell events (west-coast of Africa)
- Investments in urban planning
- Housing design for high sea water levels and flooding
- Infrastructural measures (dams, basins, buffers and dykes) in densely populated areas

Justification

Especially the country reports of the African Studies Centre shows that droughts and floods appear in all the VIA water focus countries. Erratic rainfall and the increase of extreme events renders many of the small-holder and subsistence based farmers in the countries vulnerable. The report of Ter Horst and Duker (2014) points out that a lack of stock or storage space aggravates the problem.

Floods also afflict the VIA water countries. However, the remarks about floods in the literature are general, and little distinction is made between the urban and rural situation.

Specific country remarks (ASC)

- In general, the VIA water countries all face the challenges linked to a changing climate.
- Rwanda, Benin, Mozambique: need to strengthen the resilience of farmers against droughts.
- South-Sudan: a clear lack of storage structures to retain water.
- Kenya and Benin: sea level rise is current problem. Floods and coastal degradation due to storms have a negative impact on the livelihood of people.

Suggestions from survey:

Focus both on pluvial floods, floods from rivers, and floods from the sea, better land-use planning can be a solution, when focusing on maintaining biodiversity, Kenya's coastal zones has two major delta's harbouring unsustainable practices, being industry and agriculture, Benin (Grand Popo) people change their profession from fisherman to gardeners.

ANNEX 1. INSPIRING WEBSITES, ORGANIZATIONS AND REMARKS FROM THE SURVEY

INTERESTING, PROVOKING OR INSPIRING REMARKS FROM THE SURVEYS:

- Pollution in urban areas is at toxic levels (Kenya)
- No WASH (too many are working on this)
- Be creative and flexible, look beyond boundaries
- Let's do it!
- There is no silver bullet to solving the WASH sector problems
- Competition should be encouraged
- The water sector is very conservative, there is a need to look outside of the box

INSPIRING WEB PAGES:

Afri-can.org (Afripads, menstrual hygiene products for poor women)	www.thegreenbeltmovement.org (tree planting and community action, Kenya)
basicwaterneeds.com (Ghana)	www.unece.org (PPP section)
http://countryportal.ascleiden.nl	www.washgis.com
eaglo.net (Great lakes Observatory, Victor Langenberg)	waste.nl (valorisation of waste)
http://ecdpm.org/multimedia/video-transboundary-cooperation-agricultural-water-management-sadc/ www.farming-gods-way.org	waterforever.com
www.ircwash.org	waterforpeople.org
www.mobilewatermanagement.com	waterlex.org
www.oursus.org (urban sustainability website International Geographical Union, managed from China)	waterservicesthatlast.org (system to scale up innovations, IRC WASH)
www.ppiaf.org (WB PPIAF on public, private infrastructure advisory facility)	worldagroforestry.org
www.rcbr-water.com/index_e.htm (waste water treatment)	www.wstf.go.ke (water services trust fund Kenya)
saltfarmtexel.com	www.wwf.panda.org
sanergy.com	ziltproefbedrijf.nl
www.seeaonline.org (Secretariat for environmental assessment in central Africa)	<u>Inspiring people or organisations:</u>
spark_online.org	Water Exploratorium
Tjebok health care - facebook (female hygiene, water and sanitation)	Wetskills/WetsNext
	UNIFEM
	Pilot in Ghana on new financial options for clean drinking water
	Pilot for sustainable delta areas (in Zambezi delta)