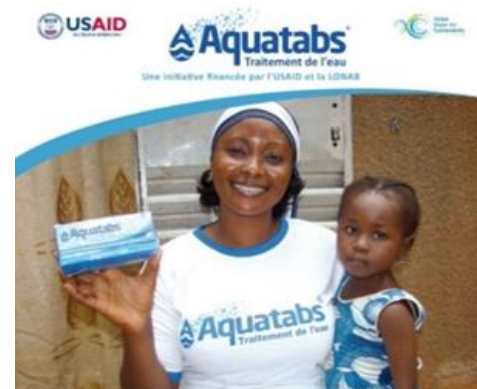


WATER MANAGEMENT BEST PRACTICES AND CHALLENGES IN WEST AFRICA



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Research Professor,
College of Engineering and Computing
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Miami, Florida

CERESCOR
Conakry, Guinea
August 26, 2019

SELF RESILIENCE LAND GRAB
DETERMINATION
FOOD SOVEREIGNTY FOOD JUSTICE
INTERNAL STRUCTURAL ADJUSTMENT PROGRAMS
MIGRATION BIO DIVERSITY COLONIAL RURAL FARMERS
WOMENS RIGHTS PRACTICE
HUMAN RIGHTS AGRICULTURE CARBON CREDIT
LAND GMOs
RIGHTS CLIMATE CHANGE
SMALL FARMERS ACCESS TO LAND
THE RIGHT TO FOOD
BIOMASS WATER NATURE
MALDEVELOPMENT
SEED POLITICS
NEOLIBERALISM
WTO

“Among the many things I learnt as a president, was the centrality of water in social, political and economic affairs of the country, the continent and the world.” (Nelson Mandela)

UN SUSTAINABLE DEVELOPMENT GOALS



UN SUSTAINABLE DEVELOPMENT GOAL #6

1. ***Achieve universal and equitable access to safe and affordable drinking water for all***
2. ***Achieve access to adequate and equitable sanitation and hygiene for all and end open defecation***, paying special attention to the needs of women and girls and those in vulnerable situations
3. Improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
4. Substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to Address water scarcity and substantially reduce the number of people suffering from water scarcity
5. Implement integrated water resources management at all levels, including through transboundary cooperation as appropriate
6. Protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes
7. **Expand international cooperation and capacity-building support** to developing countries in water- and sanitation-related activities and programs, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies
8. **Support and strengthen the participation of local communities** in improving water and sanitation management

SELECT FACTS AND NUMBER ABOUT AFRICA

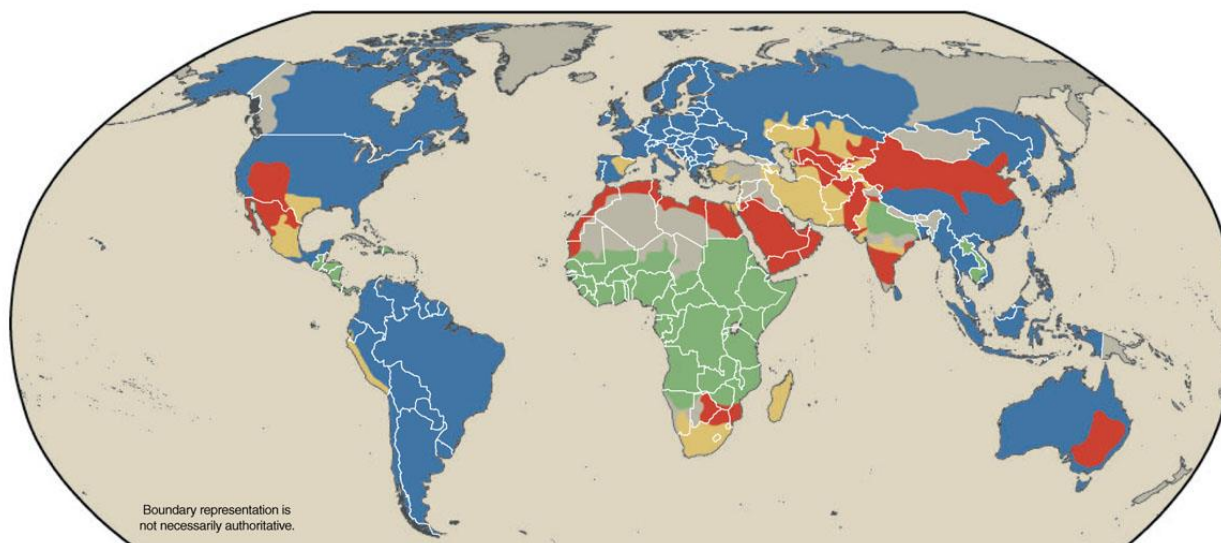
- Africa is the **world's second-driest continent** after Australia.
- About **66% of Africa is arid or semi-arid** and more than 300 of the 800 million people in sub-Saharan Africa live in a water-scarce environment – meaning that **they have less than 1,000 m³ per capita per year**.
- **115 people in Africa die every hour** from diseases linked to poor sanitation, poor hygiene and contaminated water.
- **35% of water and sanitation aid** commitment on MDG went to Africa with **Sub-Saharan receiving 27%** of the financial allocations.

SELECT FACTS AND NUMBER ABOUT AFRICA

- In Africa, especially sub-Saharan Africa, more than **a quarter of the population spends more than half an hour** per round trip to collect water.
- Africa's rising population is driving demand for water and accelerating the degradation of water resources. By **mid-2011**, **Africa's population was around 838 million** (excluding northernmost states) and its average natural rate of increase was 2.6% per year, compared to the world average of 1.2%. By one estimate its **population will grow to 1,2 billion by 2025 and to over 2 billion by 2050**.
- The **urban slum population** in sub-Saharan African countries is **expected to double to 400 million by 2020**.

2025 PROJECTED WATER SCARCITY

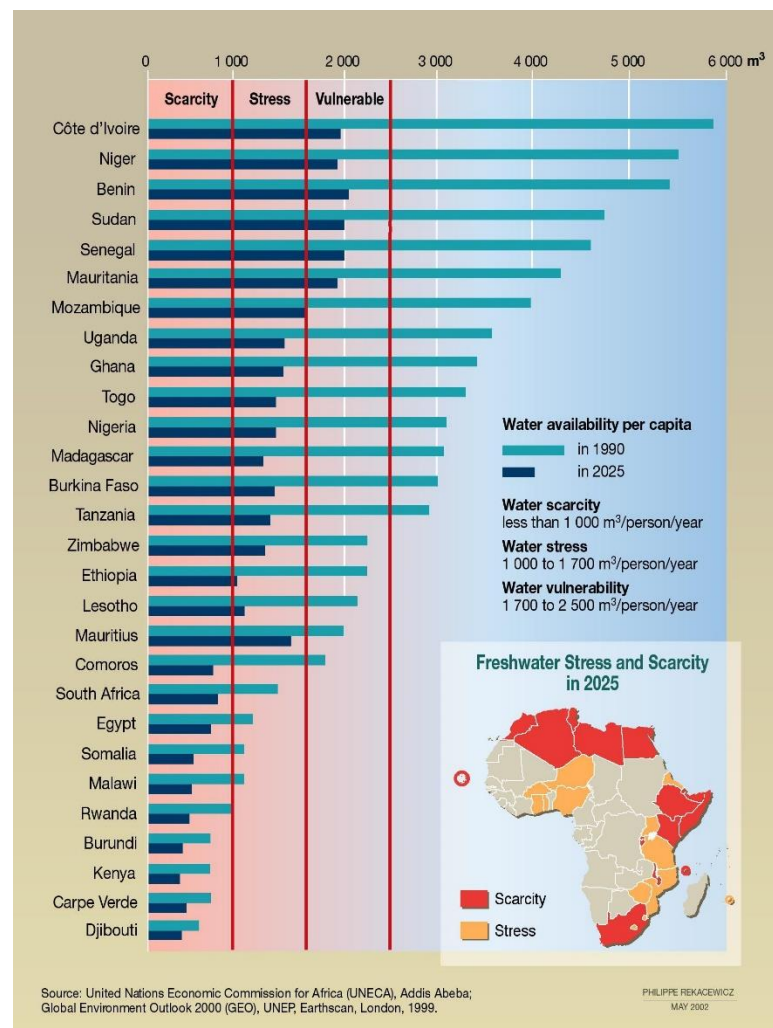
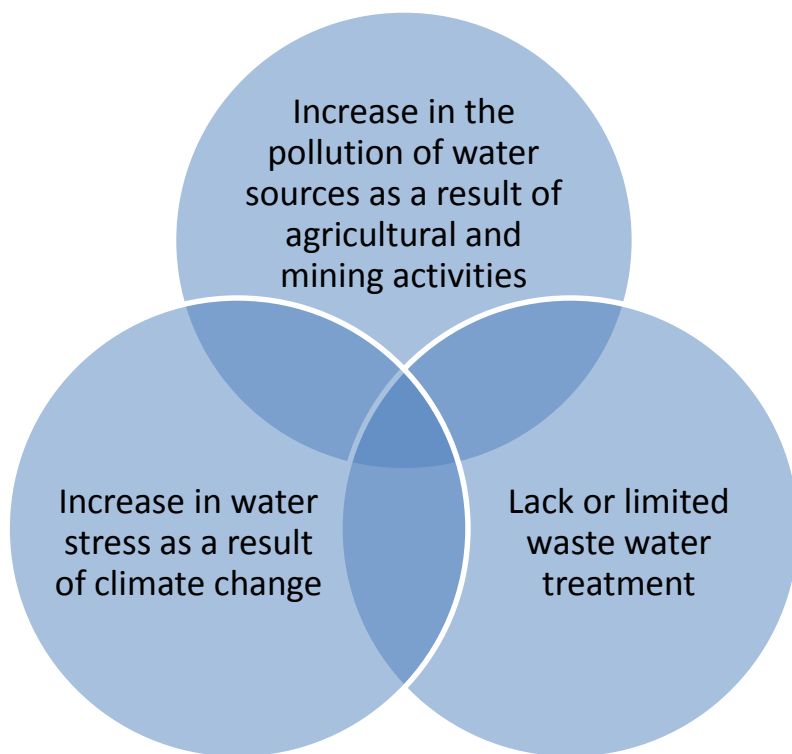
Projected Global Water Scarcity, 2025



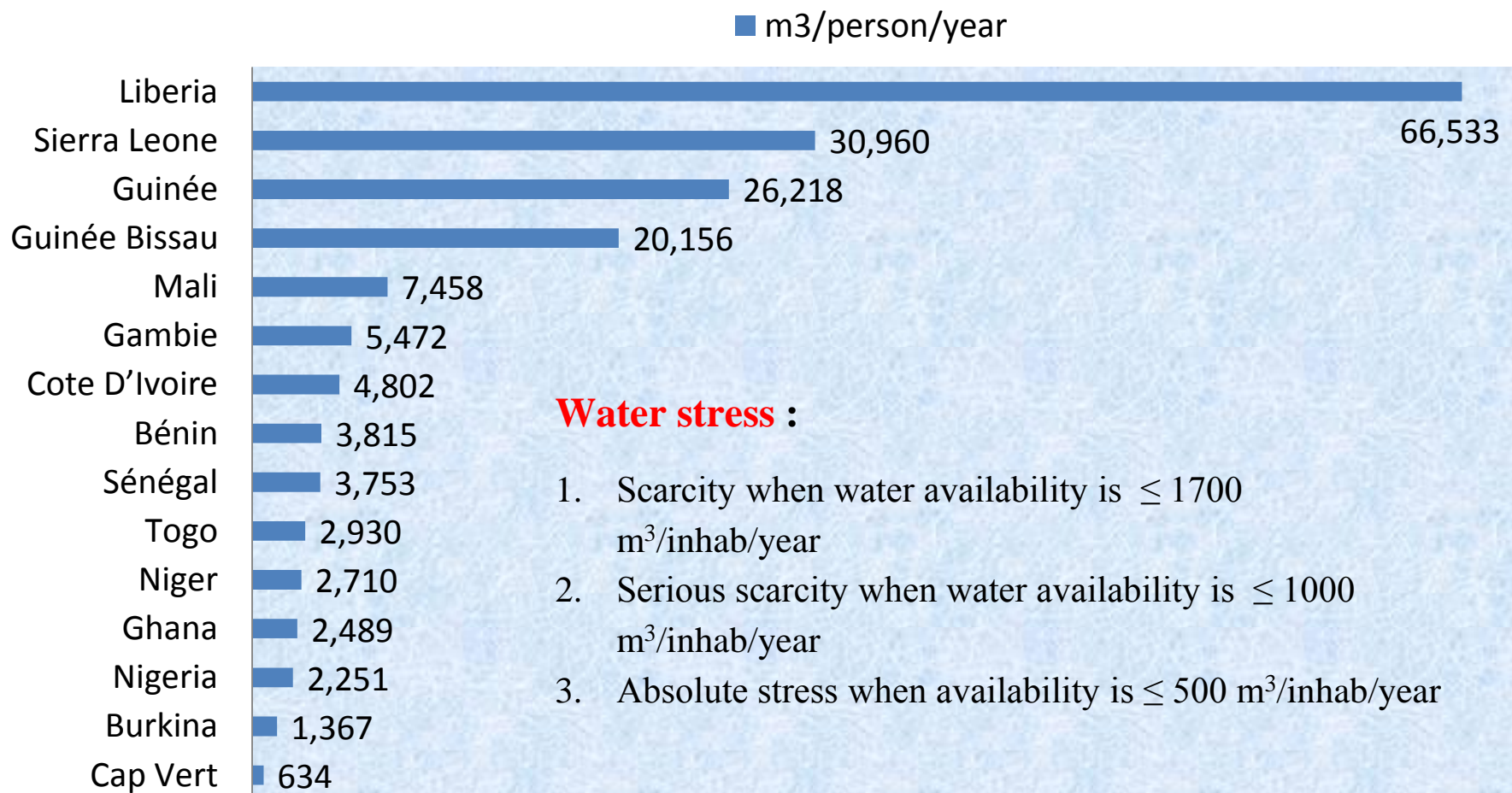
- **Physical water scarcity:** More than 75% of river flows are allocated to agriculture, industries, or domestic purposes. This definition of scarcity — relating water availability to water demand — implies that dry areas are not necessarily water-scarce.
- **Approaching physical water scarcity:** More than 60% of river flows are allocated. These basins will experience physical water scarcity in the near future.
- **Economic water scarcity:** Water resources are abundant relative to water use, with less than 25% of water from rivers withdrawn for human purposes, but malnutrition exists.
- **Little or no water scarcity:** Abundant water resources relative to use. Less than 25% of water from rivers is withdrawn for human purposes.
- **Not estimated**

Source: International Water Management Institute.

WATER RESOURCES AVAILABILITY IN WEST AFRICA



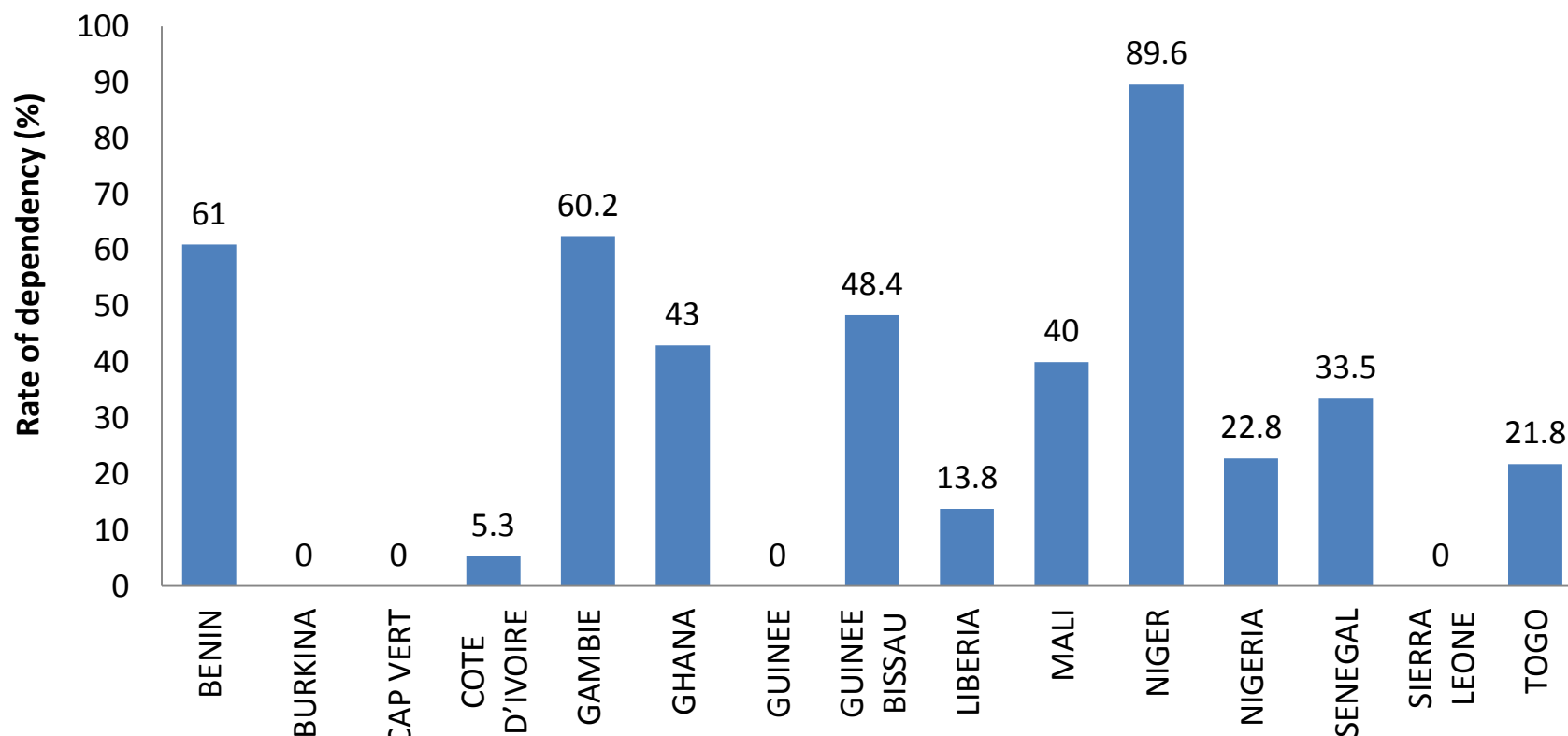
WATER RESOURCES AVAILABILITY IN WEST AFRICA



WATER DEPENDENCY IN WEST AFRICA



The dependency index represents the percentage of renewable water resources produced outside the country boundary



Source: Nwamaka Chigozie Odili, 2018

FINANCING OF WATER INVESTMENTS

1. **National WASH budgets are increasing but there are discrepancies between global aspirations and national realities** – 80% of the countries report insufficient financing to meet national WASH targets, let alone the higher levels of service that are the focus of SDGs.
2. **SDGs require greater ambitions for WASH** but there remains a **lack of financial sustainability** for reaching the unserved and maintaining services
3. **More and better data are available for informed decision-making - significant data gaps remain and existing data continue to be fragmented across different ministries and stakeholders.** Over two thirds of respondent countries indicate the existence of a financing plan/budget for water and sanitation, but only one third report that the financial plan has been defined, agreed and consistently followed.
4. Official development assistance (ODA) disbursements for water and sanitation are increasing, but **future investments are uncertain**
5. Extending WASH services to vulnerable groups is a policy priority, but **implementation is lagging behind**

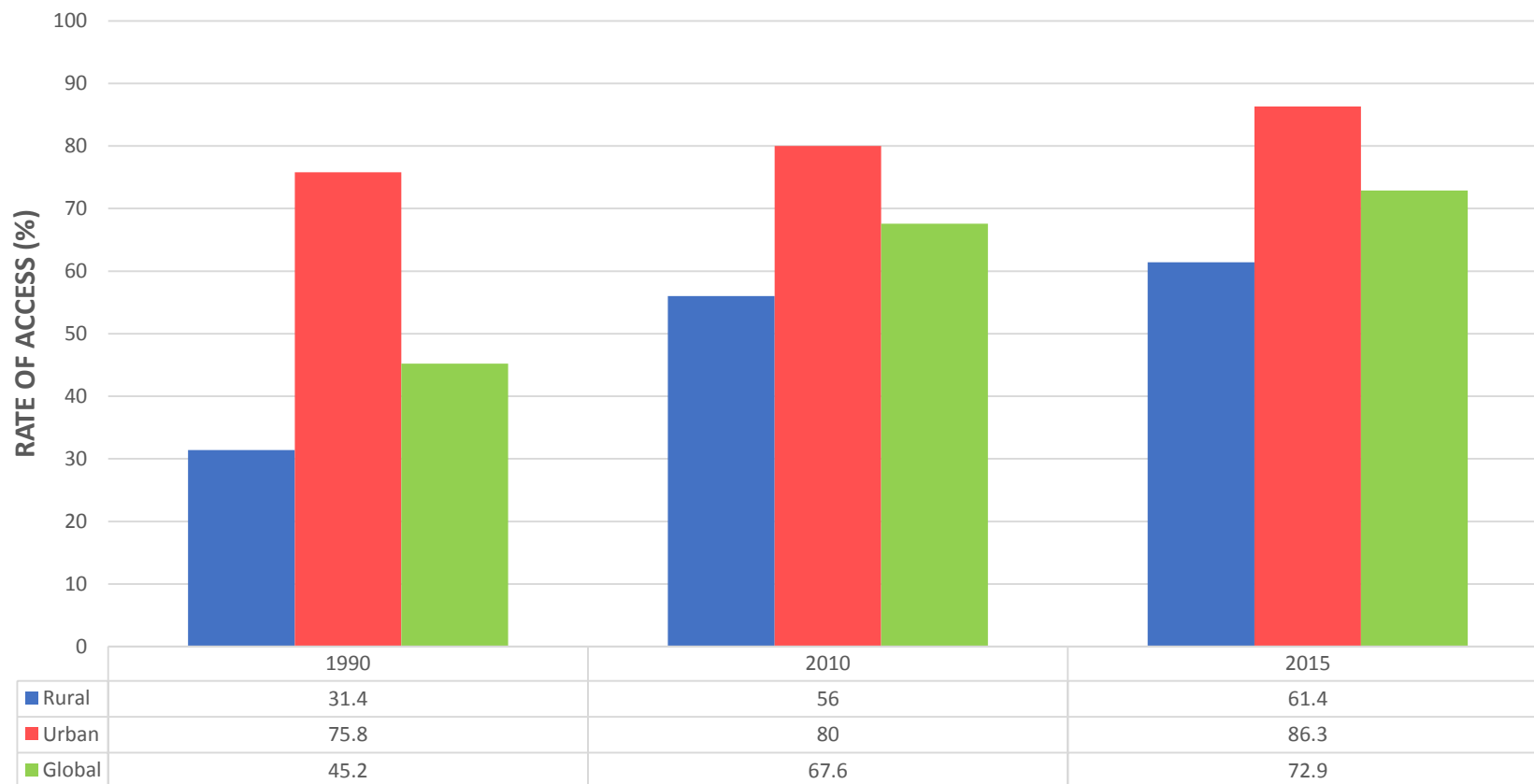
AFRICA WATER VISION 2025



The shared vision is for: “An Africa where there is an equitable and sustainable use and management of water resources for poverty alleviation, socio-economic development, regional cooperation, and the environment.”

Source: The Africa Water Vision for 2025: Equitable and Sustainable Use of Water for Socio-economic Development, World Bank/African Development Bank, Africa Economics Commission

PROGRESS ON ACCESS TO DRINKING WATER IN WEST AFRICA URBAN AND RURAL AREAS



AFRICAN WATER VISION 2025 CHALLENGES

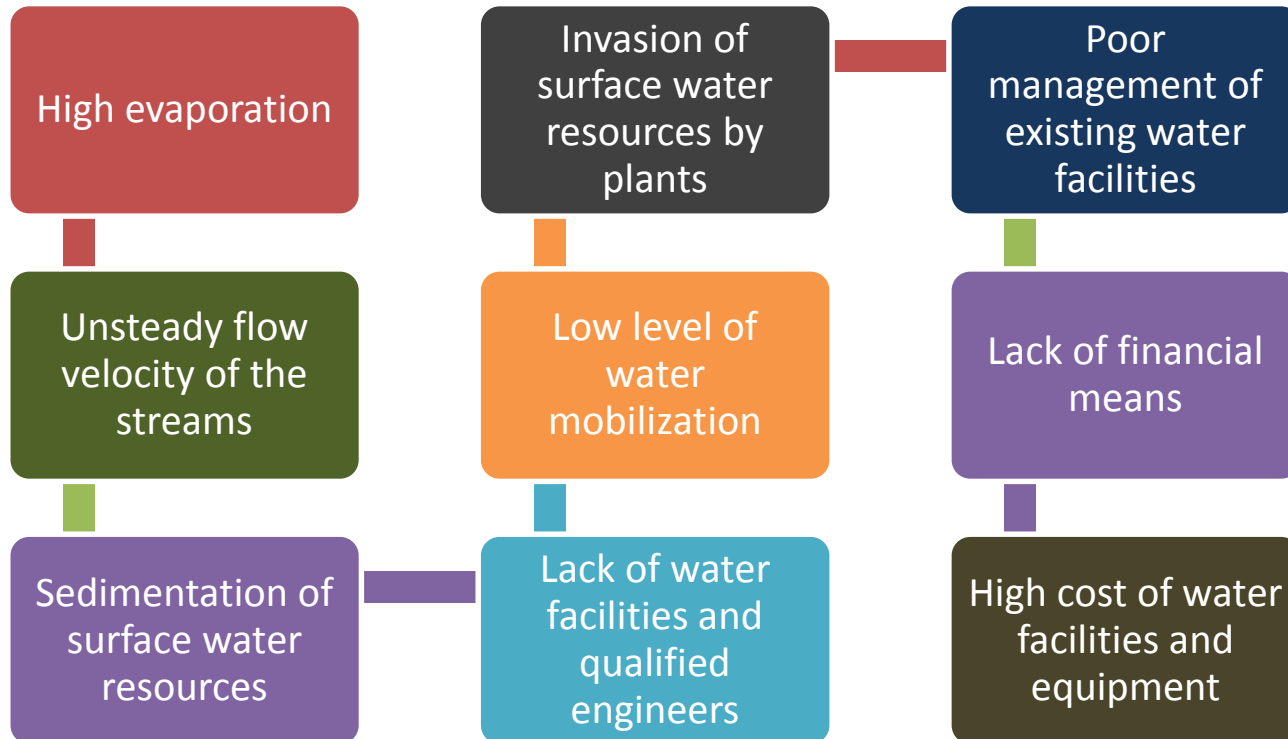
- ***High spatial and temporal variations in rainfall:*** Mean annual rainfall figures are comparable to those of other continents but evaporation rates are much higher in Africa and rainfall there is highly variable and unreliable.
- ***Growing water scarcity:*** 25 African countries will be water stressed by 2025 compared to 13 in 1995.
- ***Inadequate institutional and financing arrangements:*** There is an ongoing debate about the commercialization of water management and water as an economic good versus decentralized community management and water as a human right.
- ***Inadequate data and human capacity:*** The inadequate collection, analysis and dissemination of data on water resources for developing, planning and implementing projects is problematic.
- ***Inadequate development of water resources:*** Water scarcity in Africa is not due entirely to natural phenomena but also to low levels of development and exploitation of water resources. Only 3.8% of internal renewable resources are being withdrawn for the three major water uses, namely agriculture, community water supplies and industries.
- ***Depletion of water resources by human actions:*** The pollution of streams through industrial and agricultural activities, salinization due to over-pumping, the drying out of wetlands, the eutrophication of lakes and the proliferation of invasive aquatic plants are all contributing to water shortages.

AFRICA WATER CHALLENGES

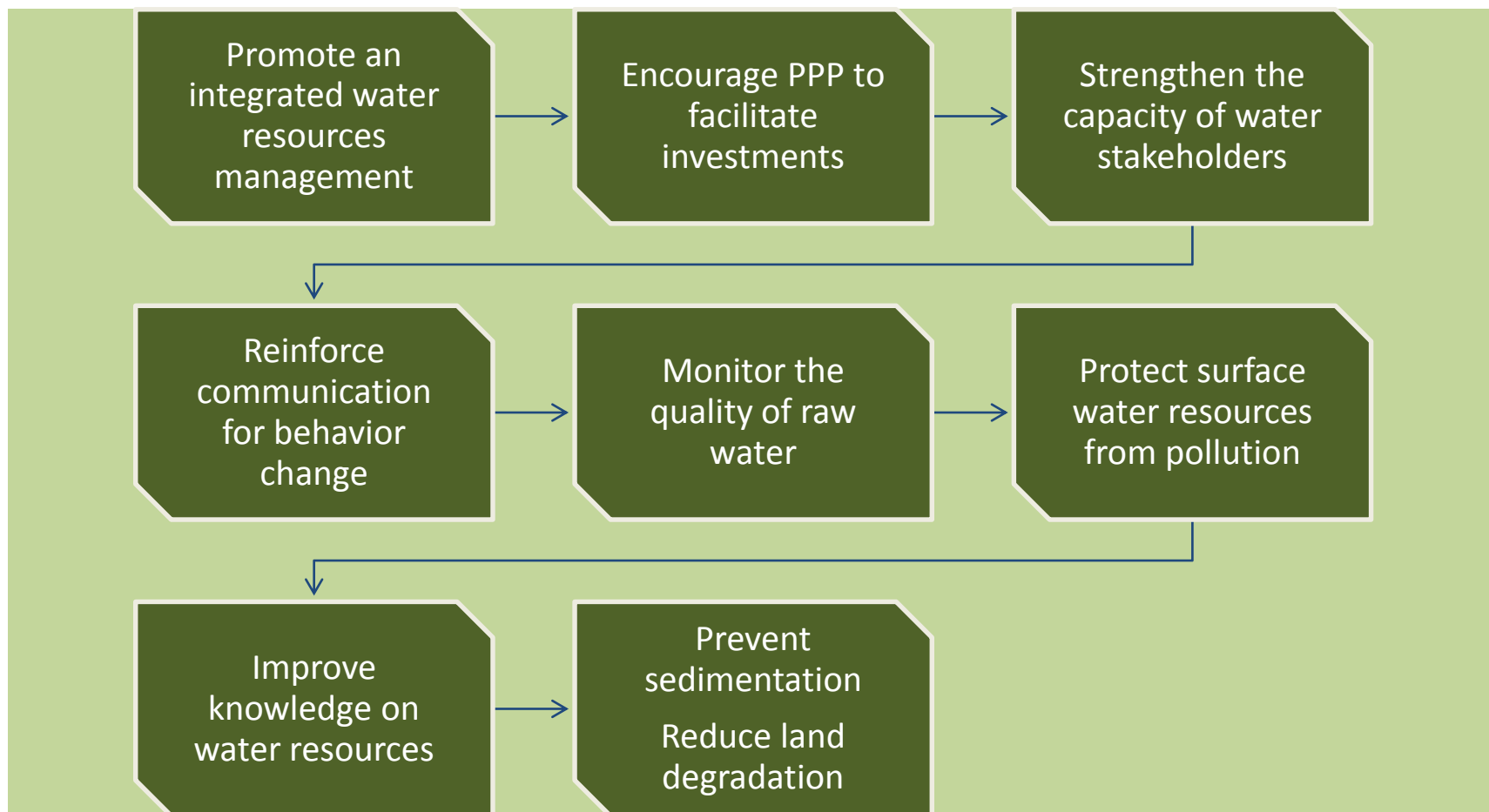
1. Provide safe drinking water
2. Ensure access to adequate sanitation
3. Promote cooperation in transboundary water basins
4. Provide water for agriculture to ensure food security
5. Develop hydropower to enhance energy security
6. Prevent land degradation
7. Prevent water pollution
8. Meet growing water demand in the face of population growth
9. Manage water effectively given the threat of climate change
10. Enhance human capacity of the water sector stakeholders
11. Enhance the governance of the water sector
12. Develop effective institutional and financial capacity

There are tremendous opportunities for Africa to overcome these and other water-related challenges. One of them is the huge opportunity to develop its untapped water resources.

CHALLENGES TO WATER RESOURCES MANAGEMENT



POTENTIAL SOLUTIONS

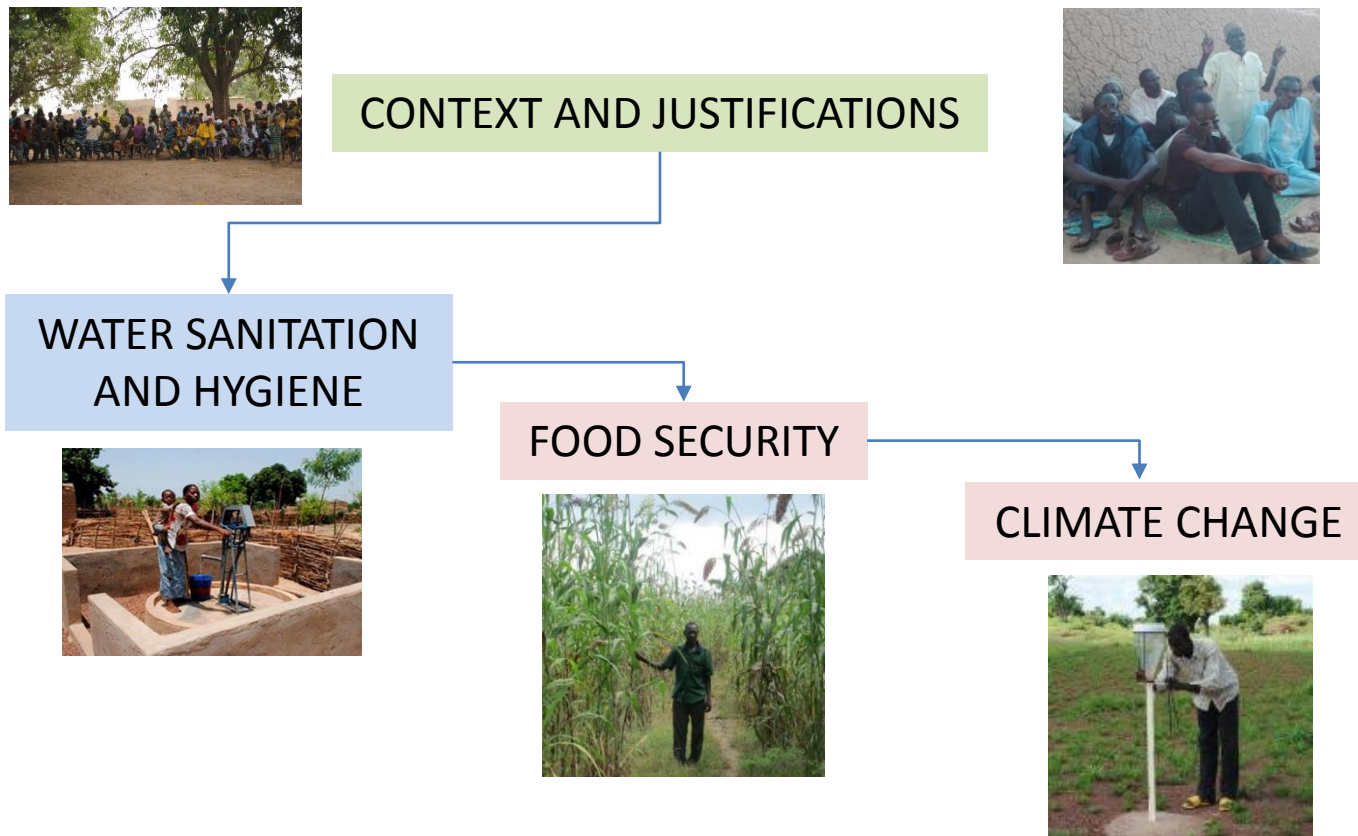




**WATER SANITATION AND HYGIENE (WA-WASH)
WATER QUALITY STUDY PHASE I
WATER QUALITY CHECK PHASE II
SUSTAINABILITY OF WATER INVESTMENTS**



LINK BETWEEN THE THEMATIC AREAS



GENDER MAINSTREAMING

INTEGRATION OF CAPACITY BUILDING,
KNOWLEDGE MANAGEMENT AND INFORMATION
SHARING

Increased income leads to better health,
better education, better livelihood

PROGRAM IMPLEMENTATION CONTEXT

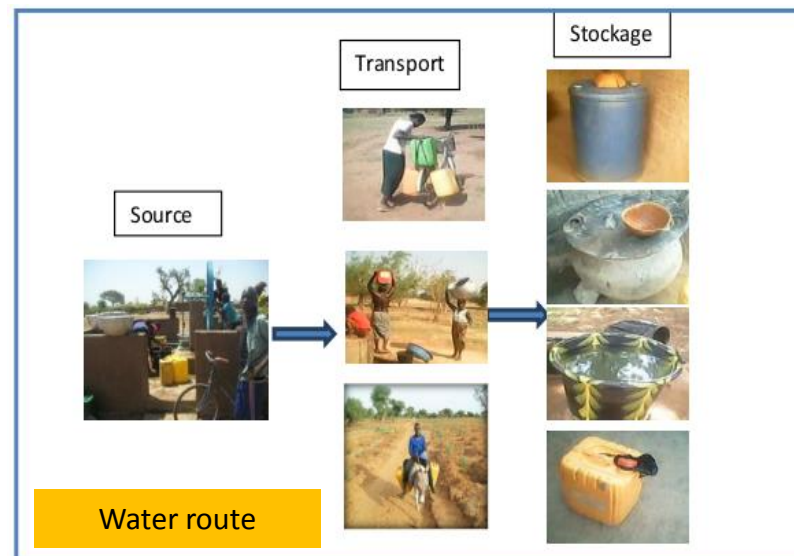


WATER QUALITY STUDY OBJECTIVES

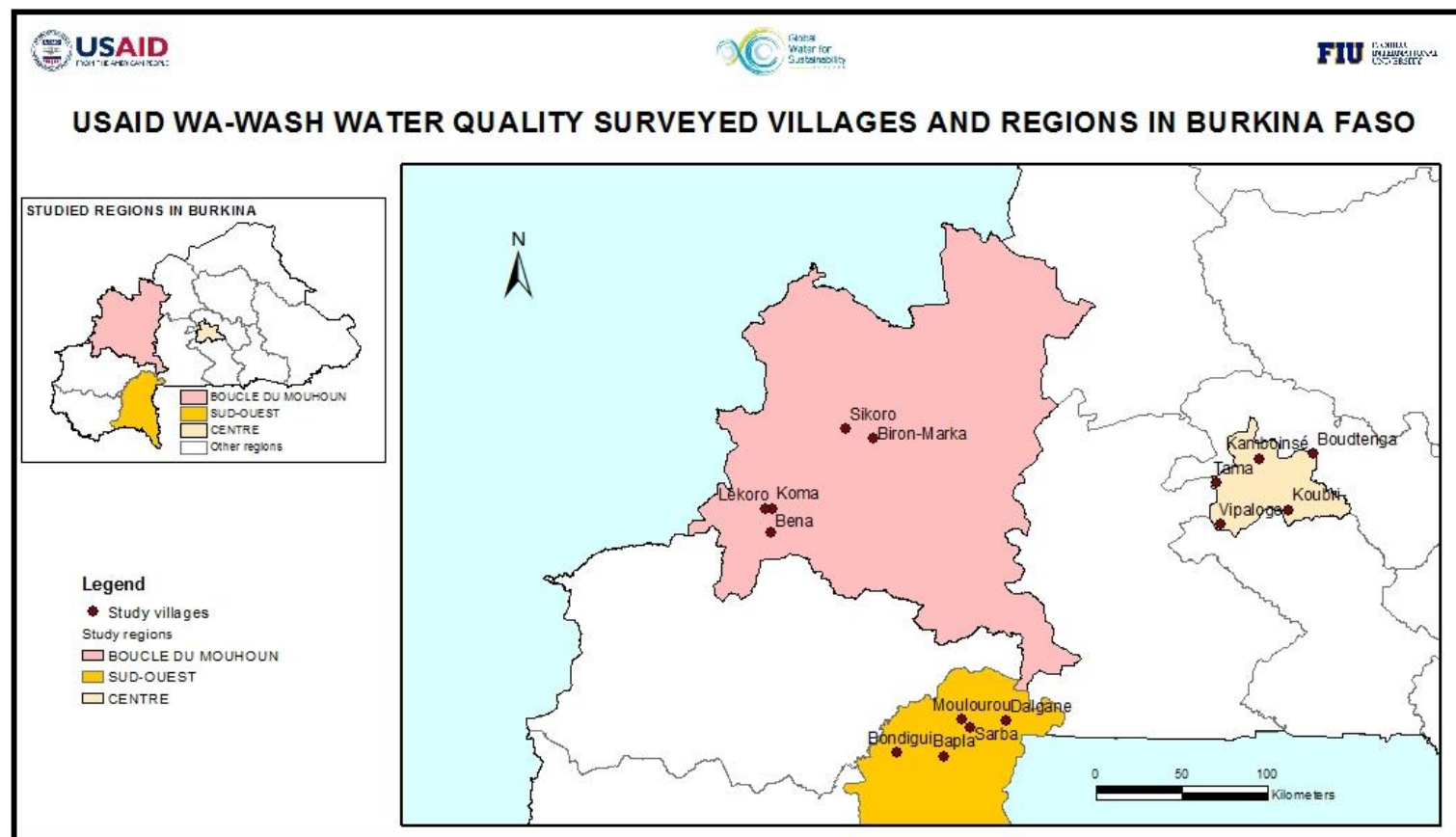
To understand the environmental and behavioural factors which could result in water quality degradation through out the water distribution chain (from the source, the transport, to the point of use) in 15 villages of three regions (Boucle du Mouhoun, Sud-Ouest and Centre) of Burkina Faso.

Specifically, the objectives were to:

- Determine the water quality of water consumed by households at three different points (source, transport, and point of use)
- Study hygiene conditions in the households with respect to water quality protection
- Pinpoint the steps along the water distribution chain which can be improved



WATER QUALITY STUDY VILLAGES-CENTRE, CENTRE OUEST, AND BOUCLE DU MOUHOUN



MICROBIOLOGICAL PARAMETRES

The WHO standard is zero fecal contamination in a 100 ml drinking water sample

Boreholes

- 60% are free of microbiological contamination
- 40% are contaminated

Wells

- 3% are free of contamination
- 97% are contaminated

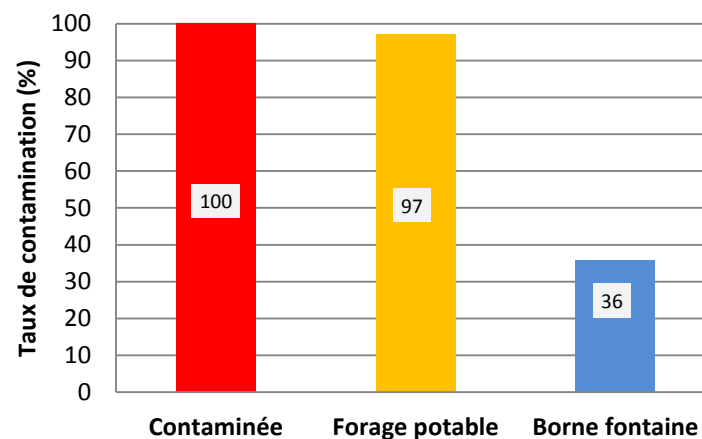


FURTHER CONTAMINATION OF WATER DURING TRANSPORT AND STORAGE

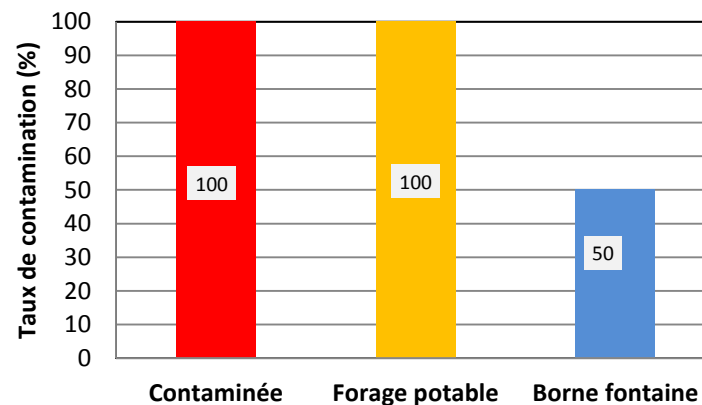
considering the initial level of contamination, lab analyses of the samples obtained from 210 households revealed that:

- Water from a contaminated source remains polluted during transport and storage
- Drinking water from boreholes becomes contaminated in 97% of cases during transport and 100 % of cases during storage
- Water from standpipes treated with chlorine from the source becomes contaminated in 36% and 50% of all cases during transport and storage, respectively

Après le transport



Au stockage

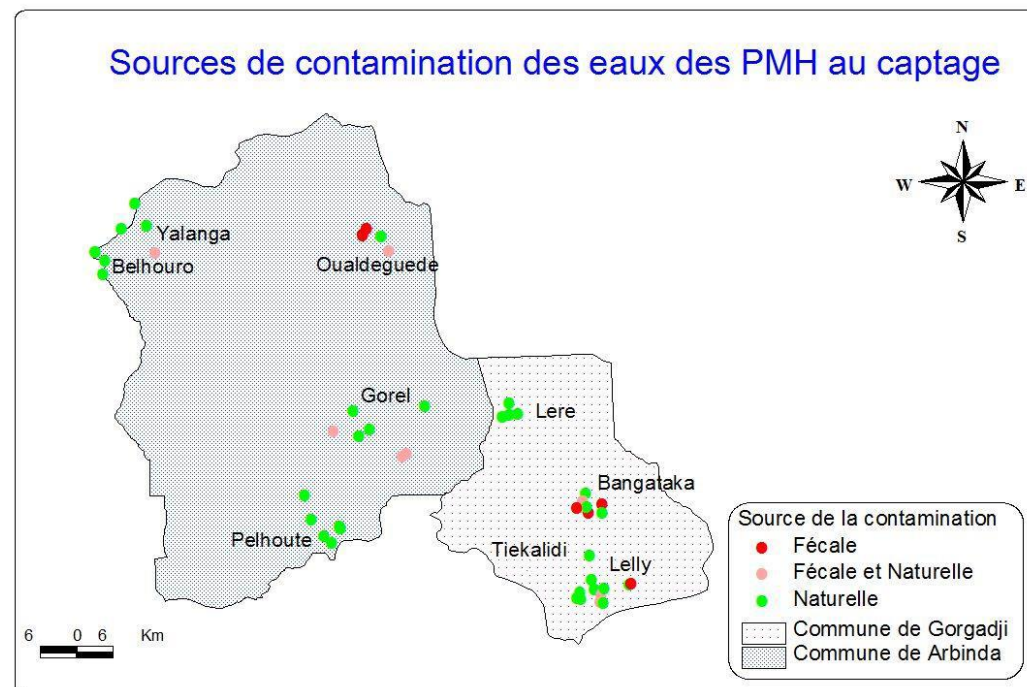


WATER QUALITY STUDY IN THE SAHEL



Water quality has been analysed in 9 villages in the municipalities of Gorgadji and Arbinda.

- Water from 58 human operated pumps and 8 traditional wells was analysed in terms of its physico-chemical and bacteriological parameters
- 98% of the water from the human operated pumps tested in the 2 municipalities was contaminated:
 - 71% from natural contamination (sedimentation, degradation of organic matter, and interaction between water and rocks)
 - 39% from fecal contamination



Sources: IRC/Triple-S WA-WASH

Réalisation: IRC BF

Juillet 2014



The study reveals that 96% of the water was contaminated before consumption in the households

WATER QUALITY OF NEWLY CONSTRUCTED WELLS BEFORE CONSUMPTION



LABORATOIRE AÏNA Suarl

Laboratoire d'analyse des eaux : - Analyses physico-chimiques et bactériologiques - Etude sur l'eau, l'assainissement et la santé.

Société de vente : - Produits et appareils de laboratoire - Instrument, matériel et consommable de laboratoire - Produits chimiques industriels

Fabrication et de vente de produits d'entretiens : - Eau déminéralisée.

01 BP 558 Ouagadougou 01 Tél bureau : (226) 50 35 74 40 FAX : (226) 50 35 74 39 RC N° 8F OUA 2009 M 1622

www.laboratoire-aina.com

e-mail : labo.aina@fasonet.bf

Compte BIB siège n° 012421109451020131

IFU N°00021261V

Division fiscale: DME du centre

Situé sur la rue Boalboala Secteur 24 Ouagadougou

Ouagadougou le

03/07/2014

RESULTATS DE L'EXAMEN MICROBIOLOGIQUE D'EAU

Analyse n° : 2089/2014

Date de prélèvement : 01/07/2014

Lieu : **Com.** : KOUDOUGOU VII : Doudou Qt : Ambroise Bazemo/ Puits Forage N° 1

Date de réception : 01/07/2014

Identité du préleveur : **Laboratoire AÏNA**

Identité du demandeur : **WA - WASH**

PARAMETRES	Température et temps d'incubation	Technique et milieu de culture	RESULTATS /100 ml	Valeur inférieure ou égale REC.OMS
° Recherche et dénombrement des Coliformes totaux	37°C 24h	Filtration sur membrane Chromocult agar Coliformes	0	0/100 ml
° Recherche et dénombrement des Coliformes fécaux	37°C 24h	Filtration sur membrane Chromocult agar Coliformes	0	0/100 ml
° Recherche et dénombrement des Streptocoques fécaux	37°C 24h.	Filtration sur membrane Chromocult Entérocoques-agar	0	0/100 ml

Conclusion : Eau conforme aux normes sur le plan bactériologique pour les paramètres analysés.

LE CHEF DU LABORATOIRE



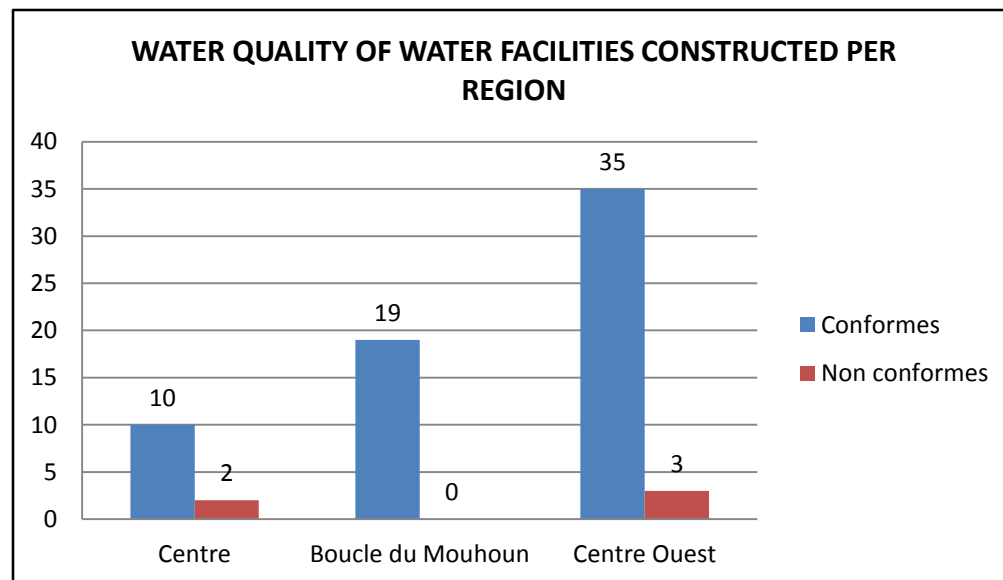
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WATER QUALITY OF WELLS CONSTRUCTED BY USAID WA-WASH IN BURKINA FASO

93% of the water from the wells constructed met WHO's standards

7% did not meet the standards (turbidity and bacteria)

Treatment of contaminated wells followed by a new test before consumption



STRATEGIES OF USAID WA-WASH IN WASH SERVICES DELIVERY

Increase directly or indirectly the number of people with access to drinking water for household and production needs. Increase access to sanitation services and the number of households which adopted point of use treatment of water

Take into consideration development, implementation, and replication of approaches which favor low cost WASH services and focuss on demand and supply for rural and peri-urban areas

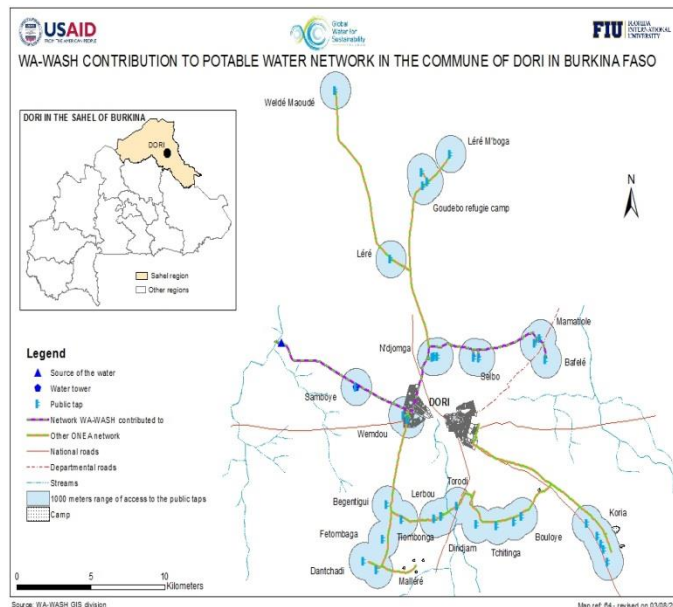
Ensure water from wells is of good quality before use



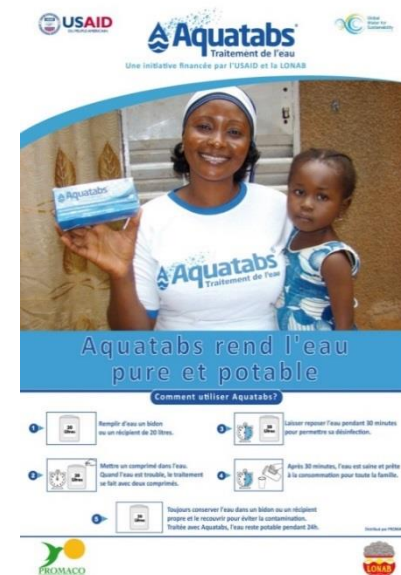
SOLUTIONS OFFERED BY USAID WA-WASH



Low cost water facility close to households



Extension of water distribution network in rural area



Establishment of a distribution network of water treatment tablets at the point of use

Capacity building through training, granting of scholarships, and internship opportunities

SOLUTIONS OFFERED BY USAID WA-WASH

At the source level

- Establish water points management committees and reinforce their capacity;
- Establish a capitalization system of boreholes in order to ensure its permanent running and maintenance;
- Involve women in decisions making, running, supervision, maintenance, and evaluation of water supply projects.

Behaviour change through out the water distribution chain

- Hold sensitization campaigns for behavioural change when handling water
- Encourage people to clean the containers used to fetch, transport, and store water
- Promote water treatment at the point of use

WATER QUALITY M&E FINDINGS



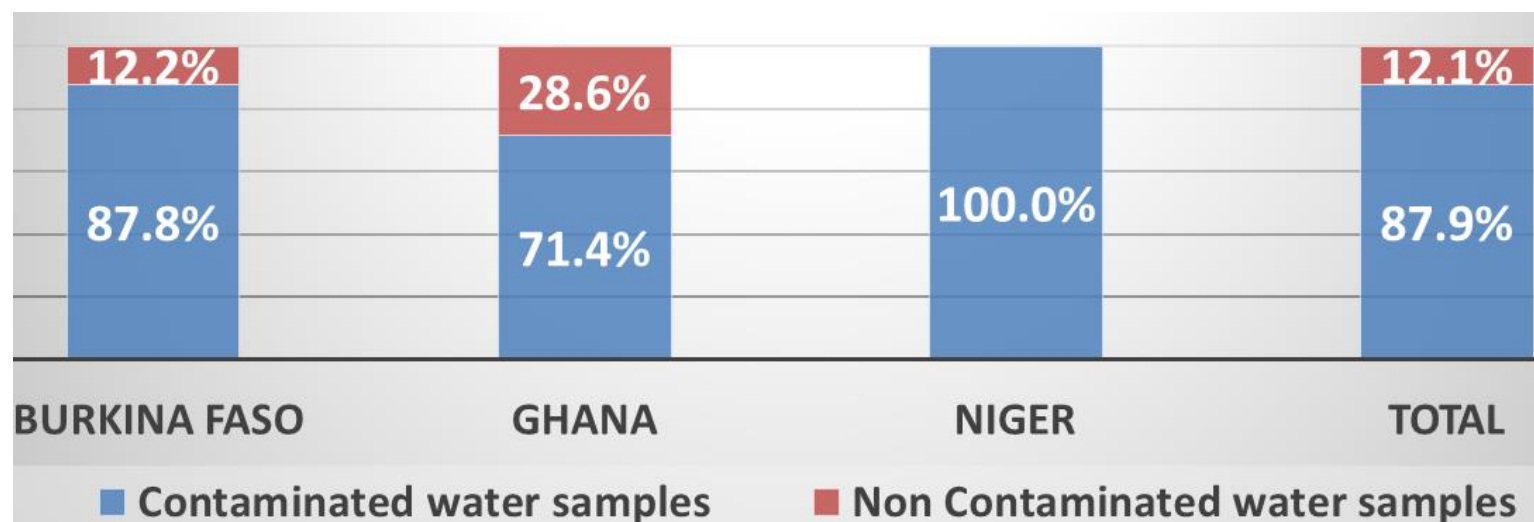
Contamination often occurs during the rainy season and the causes include:

- Lack of sanitation in some communities
- Discharges of waste water close to the water points,
- Presence of animals around the water points
- Falling of objects into the well
- Use of inadequate containers to fetch water
- Storage of water in inappropriate containers
- Inadequate handling of water at home

WATER SAMPLES COLLECTED AND ANALYZED

<div>Countries</div> <div>Samples</div>	Burkina Faso	Ghana	Niger	Total
	41	28	38	107

Water quality from June to November 2016



REMEDIAL MEASURES

The Program developed an action plan to treat drinking water and ensure good quality in a sustainable manner. The action plan includes:

Focus group
with municipal
authorities to
get their
involvement

Training of
water point
repairers in
chlorination

Promotion of
Aquatabs at
the PoU

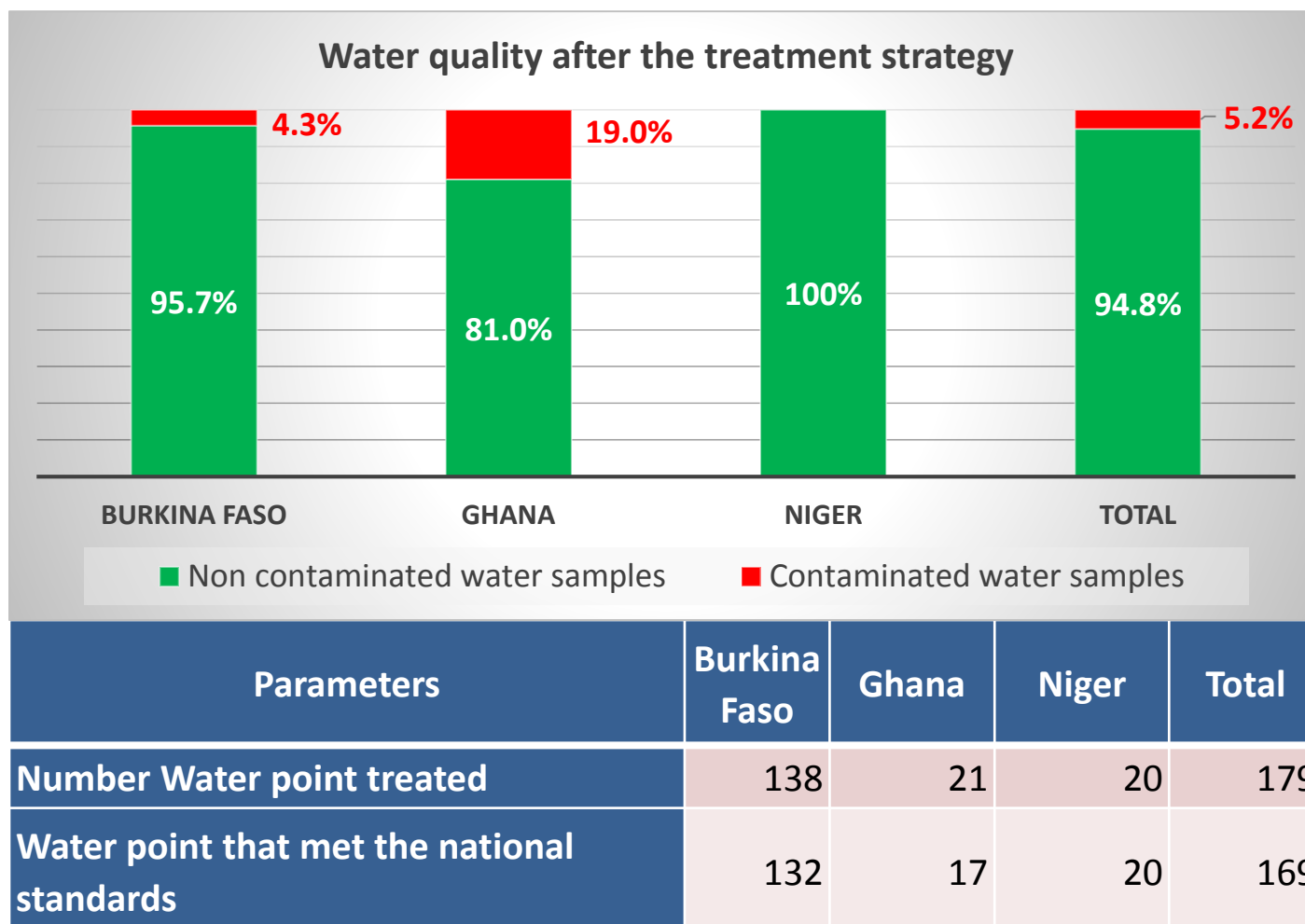
Well
treatment
using chlorine

ACTIONS FOR IMPROVEMENT

Parameters	Burkina Faso	Ghana	Niger	Total
Number of repairers trained/refreshed	15	27	26	68
Number Water point treated	138	21	20	179
Chlorine (liters)	510	80	156	746
Number of Aquatabs Tablets	-	-	338,662	338,662
Number of beneficiaries	58,500	6,384	22,214	87,098
Total cost of chlorine (FCFA) *	637,500	100,000	302,400	1,039,900
Cost of chlorine per person (FCFA) *	10.89	15.66	13.61	11.94
Total cost of Aquatabs (FCFA) *			1,044,960	
Cost of Aquatabs/person (FCFA) *			47.04	
Total cost of water treatment per person (FCFA) *	10.89	15.66	60.65	

* Cost is for a three month period

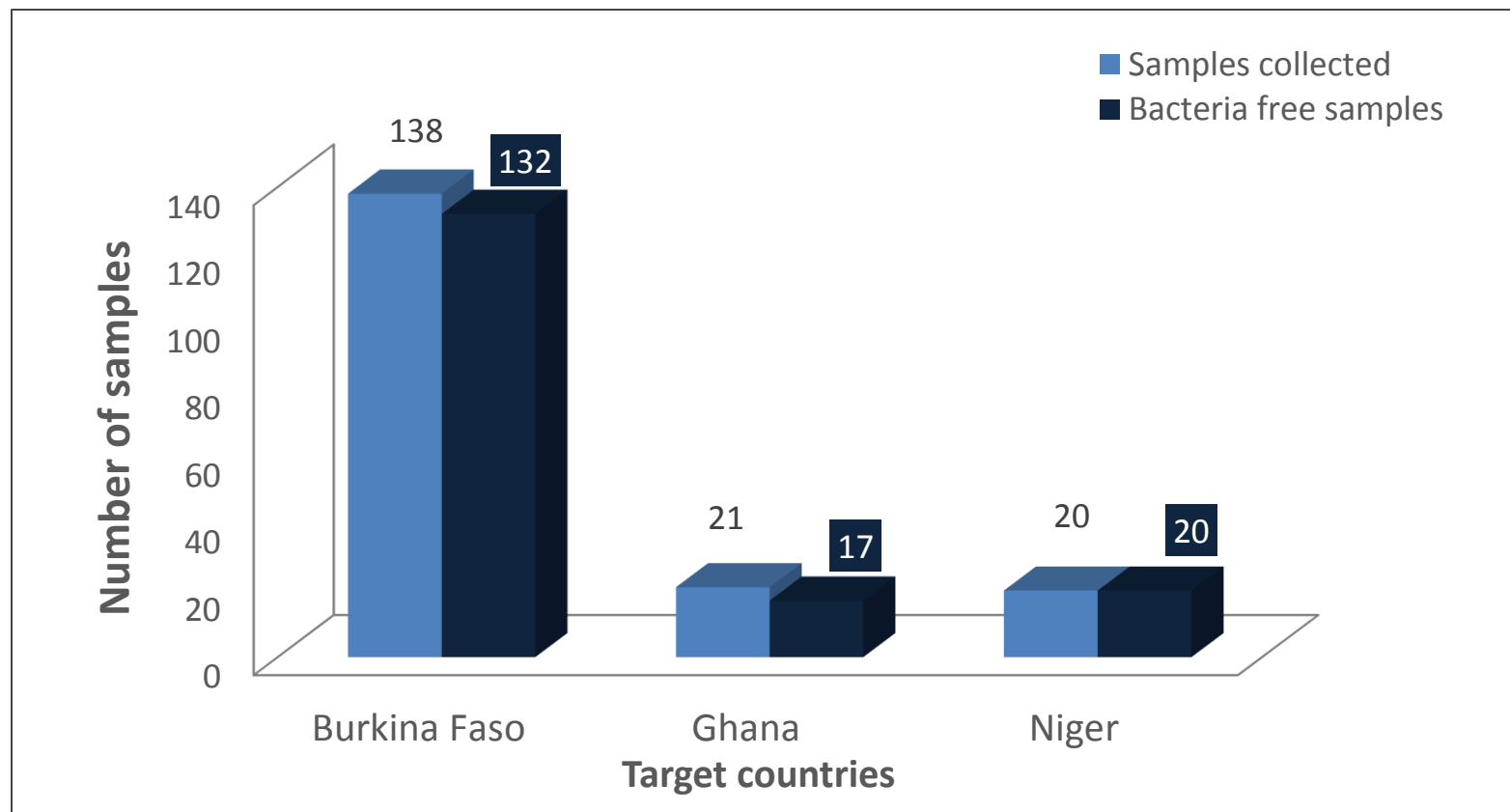
ACTIONS IMPACTS



REMEDIAL MEASURES IMPACTS

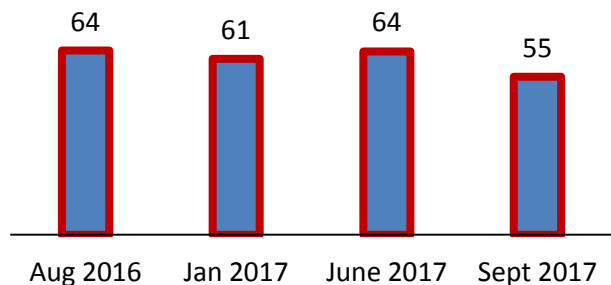


The approach adopted by the Program paid off. Between February and April 2017, the monitoring activities showed that:

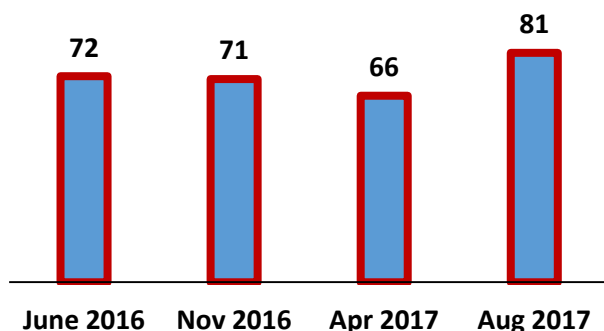
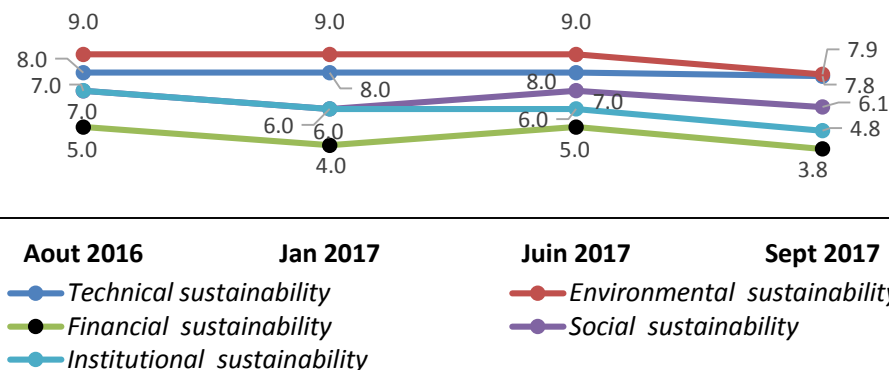


SUSTAINABILITY OF WATER INVESTMENTS IN THREE COUNTRIES

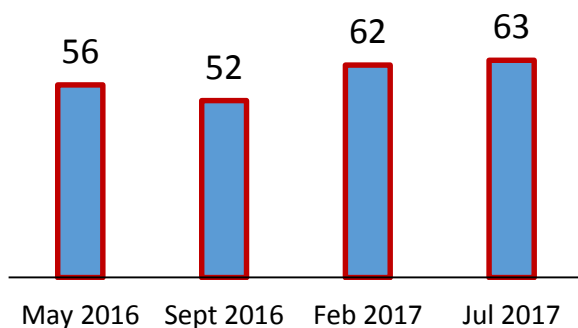
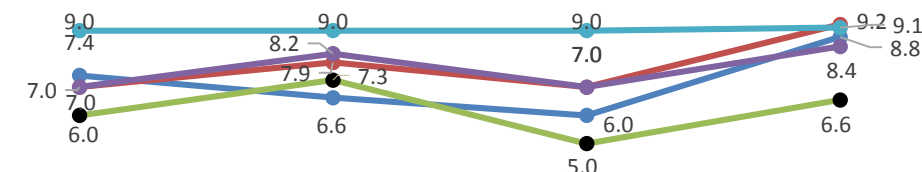
Sustainability Score (%)



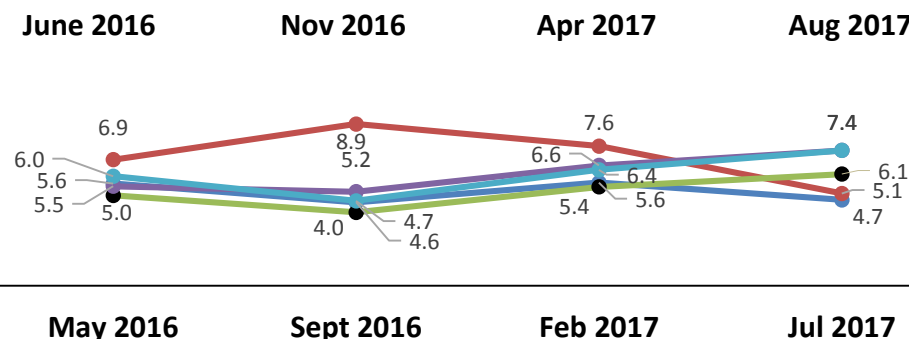
Burkina



Ghana



Niger



THANK YOU

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