

ENSURING SAFE WATER AND SANITATION FOR ALL; A SOLUTION BY SCIENCE, TECHNOLOGY AND INNOVATION



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CEO, WASHMATA INITIATIVES
President
Network of Nigerian Female
Professionals in WASH
26TH OCTOBER, 2022



PRESENTATION LAYOUT



01

THE CONSTRUCT



02

**THE AFRICAN
CHALLENGE**



03

**STI
CONTRIBUTIONS**



04

**STAKEHOLDER
SURVEY**



05

RECOMMENDATIONS

THE WASH CHALLENGE

3.6
BILLION **SAFELY**
MANAGED
SANITATION



2.0
BILLION **SAFELY**
MANAGED
WATER



44% **DOMESTIC**
UNTREATED
WATER



20% **CHANGING**
WORLD'S
BASINS,
SURFACE
WATER
COVERAGE



494
MILLION 

122
MILLION **DRINK**
SURFACE
WATER

2.3
BILLION **LIVE**
WATER
STRESSED
COUNTRIES

107 **SUSTAINABLE**
WATER
RESOURCES
COUNTRIES

Source: JMP, 2021

Source: (UN-Water, 2015,
2021)

STI-WASH CHALLENGE

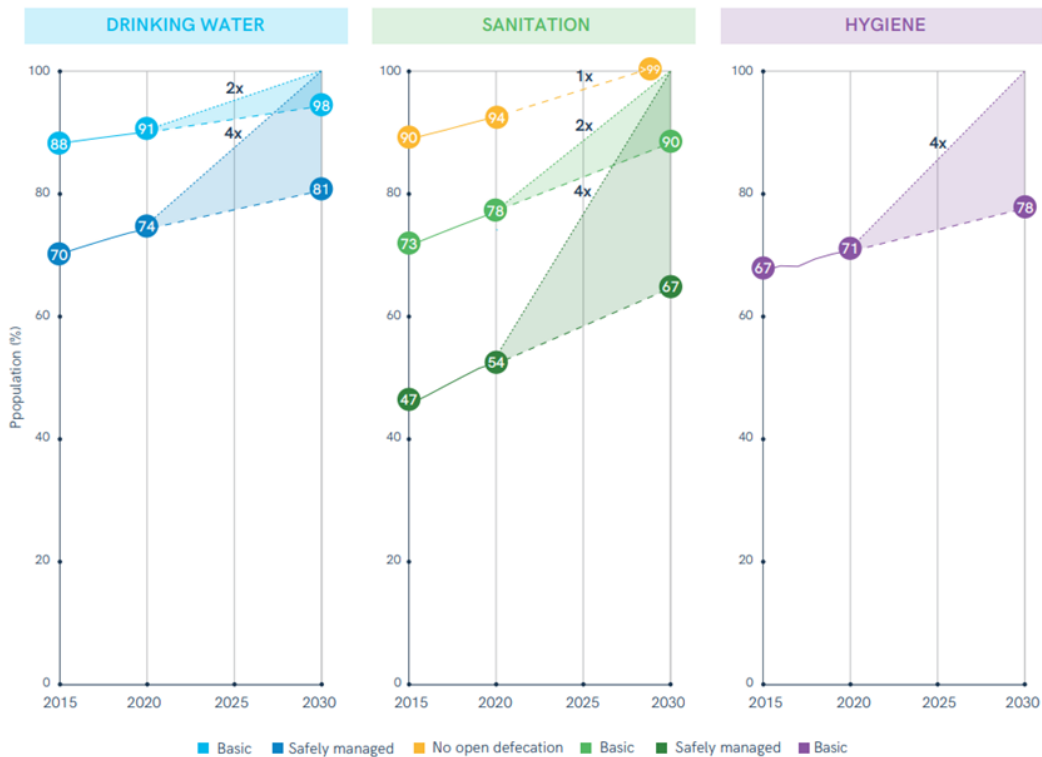
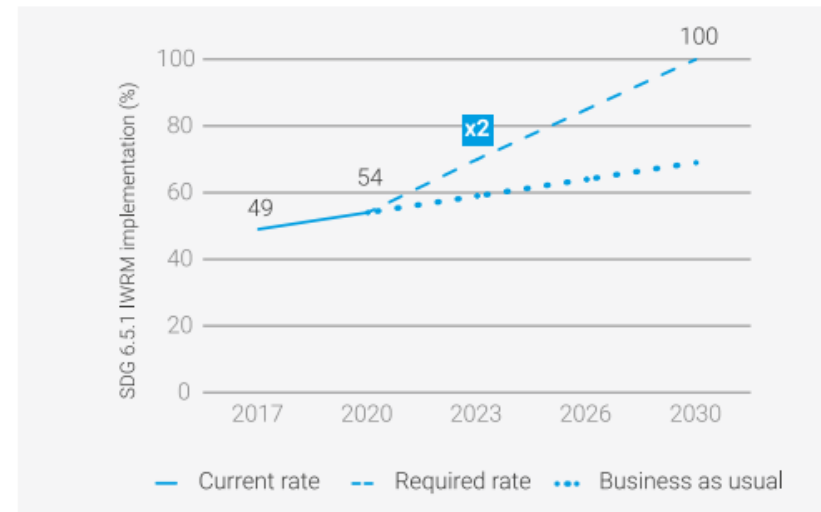


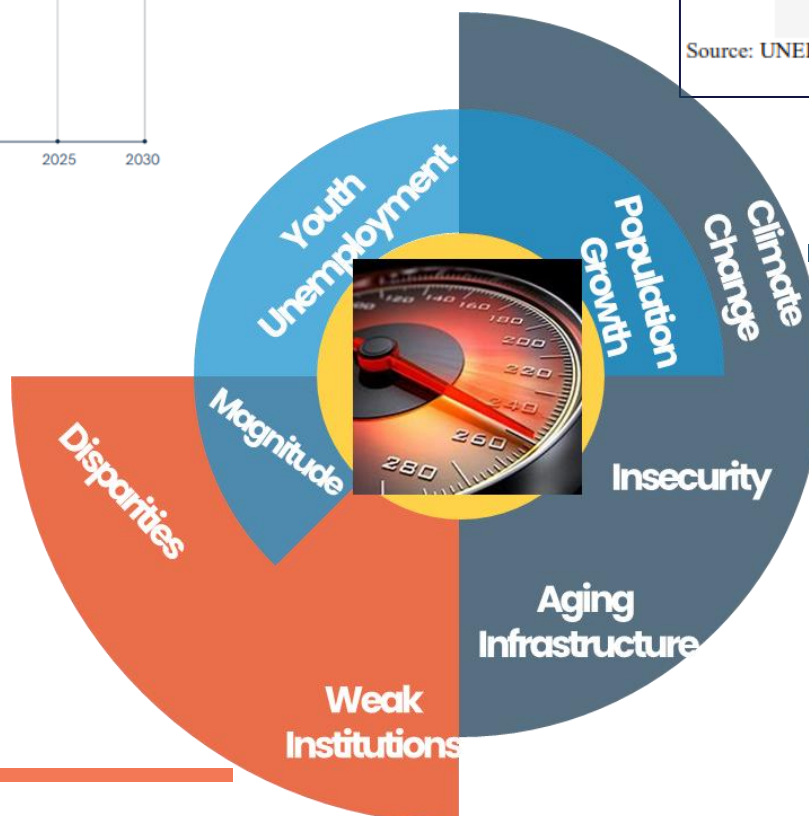
Figure 2: Current and required global IWRM implementation rate



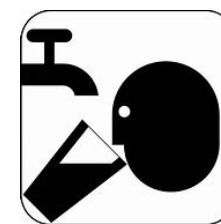
Source: UNEP, 2021

- i. Regions
- ii. Within country
- iii. Urban-Rural
- iv. Socio-economic
- v. Vulnerable

- i. NRW
- ii. OCC
- iii. Water Coverage



- I. Floods
- II. Drought
- III. Water stresses



81%

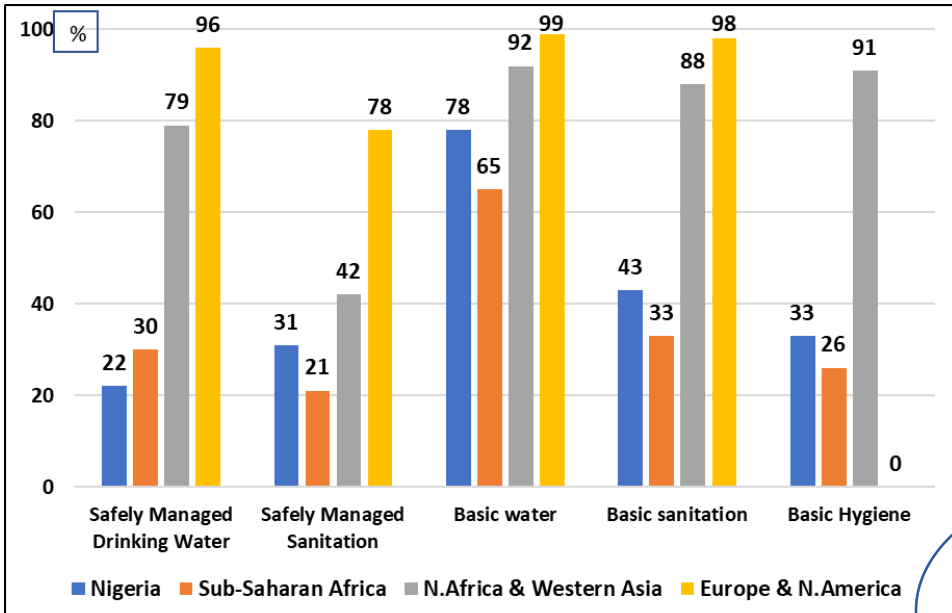


67%



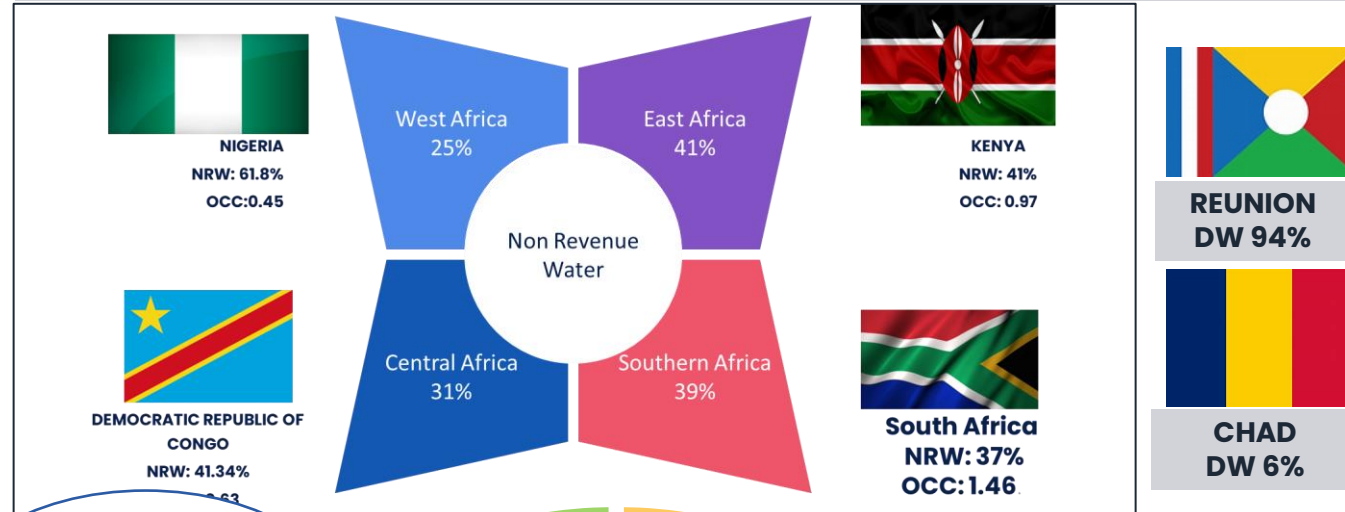
STI-WASH AFRICAN CHALLENGE

WEAK INSTITUTIONS

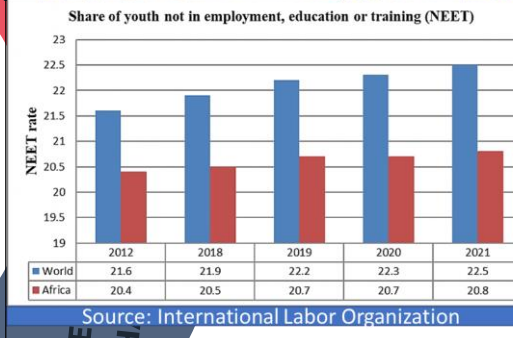


Source: Joint Monitoring Report, 2021

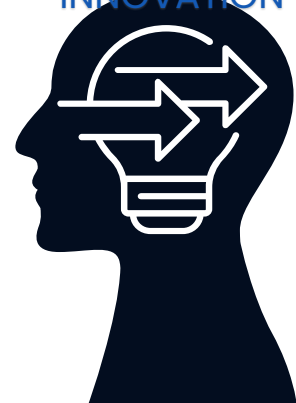
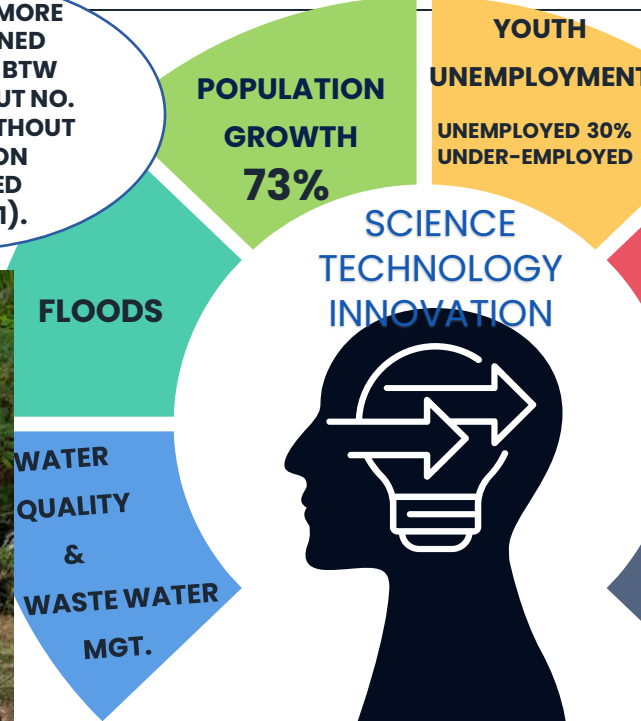
DISPARITIES



290 MILLION MORE PEOPLE GAINED SANITATION BTW 2015 - 2020 BUT NO. OF PEOPLE WITHOUT SANITATION INCREASED (JMP, 2021).



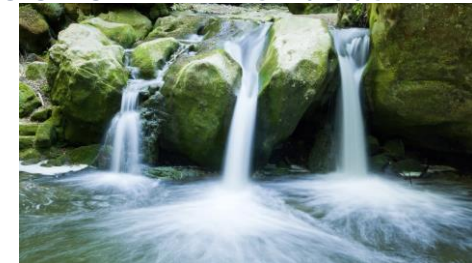
Source: International Labor Organization



SCIENCE, TECHNOLOGY, INNOVATION VALUE CHAIN

TARGET 6-1 SAFE AND AFFORDABLE DRINKING WATER	TARGET 6-2 END OPEN DEFECATION AND PROVIDE ACCESS TO SANITATION AND HYGIENE	TARGET 6-3 IMPROVE WATER QUALITY, WASTEWATER TREATMENT AND SAFE REUSE
TARGET 6-4 INCREASE WATER-USE EFFICIENCY AND ENSURE FRESHWATER SUPPLIES	TARGET 6-5 IMPLEMENT INTEGRATED WATER RESOURCES MANAGEMENT	TARGET 6-6 PROTECT AND RESTORE WATER-RELATED ECOSYSTEMS

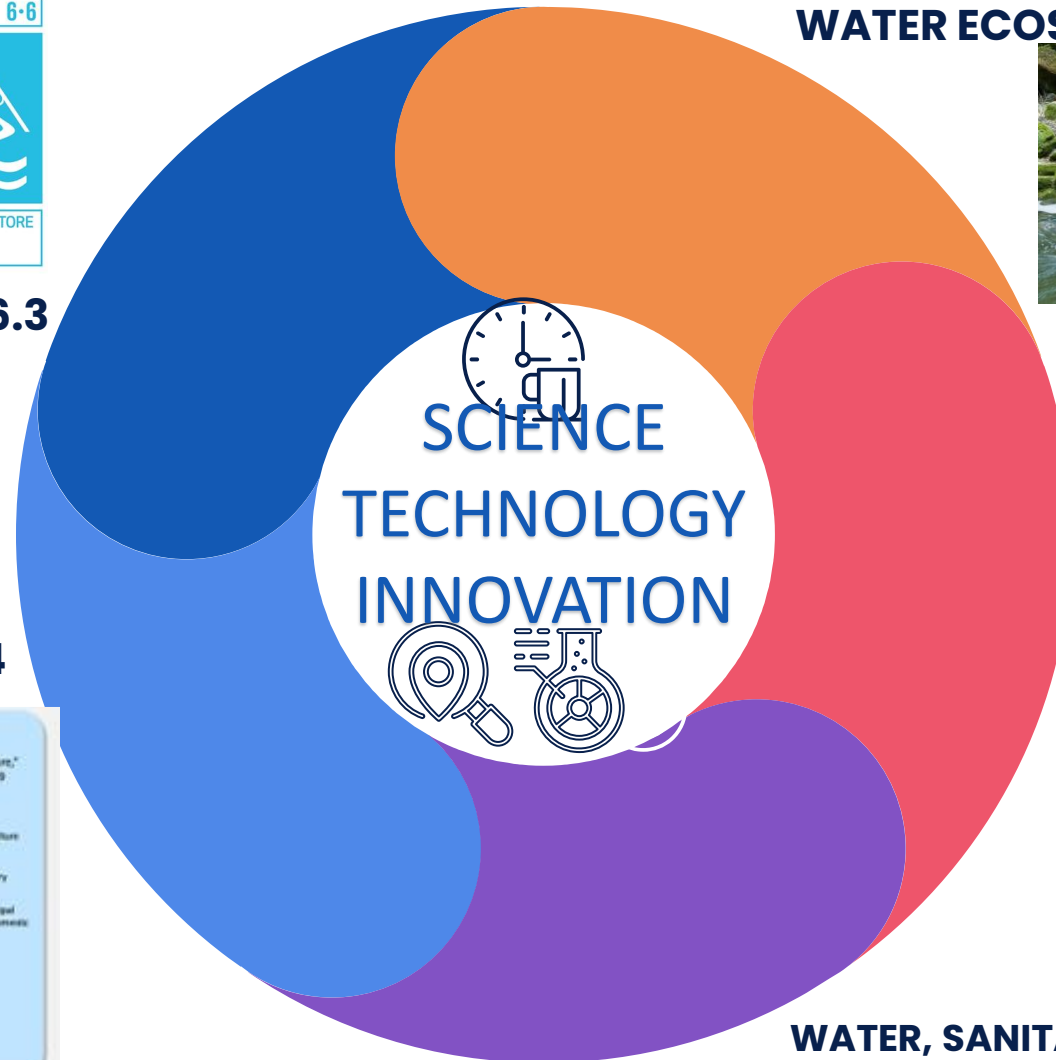
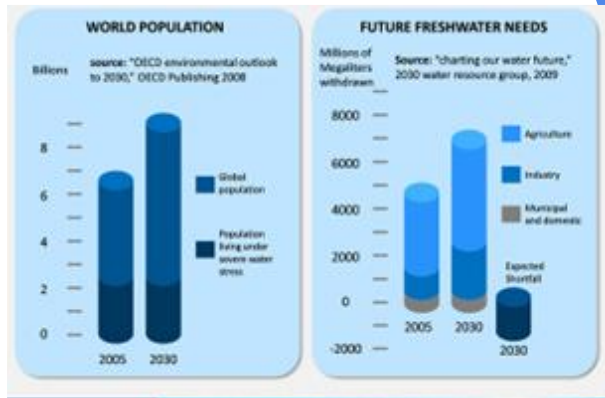
WATER ECOSYSTEM MGT. 6.6



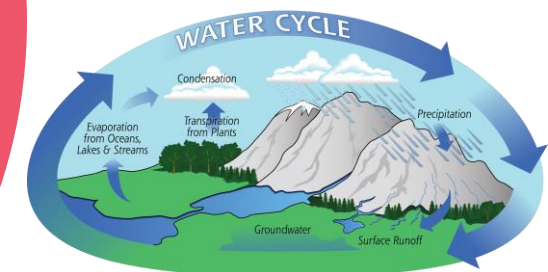
WASTE WATER MGT. 6.3



WATER USE & DEMAND MGT. 6.4



WATER ABSTRACTION 6.5



WATER, SANITATION & HYGIENE DELIVERY 6.1, 6.2

Source: Adapted from CSTD Issue Paper, 2022



SOUTH AFRICA

EASTERN CAPE

REACH: SWARKOPS & BLOUKRANS RIVERS

PROJECT DURATION: 3 YEARS

RESEARCH INSTITUTE LED



WATER RESEARCH INSTITUTE, RHODES UNIVERSITY, SOUTH AFRICA
CONTACT: Dr Chika Felicitas Nnadozie
c.nnadozie@ru.ac.za

SOURCE WATER TESTING

7

PROJECT JUSTIFICATION



QMRA



1%

- HEAVY POLLUTION OF SOURCE WATERS USED FOR DRINKING WATER ABSTRACTION
- RESERVOIRS OF ANTIBIOTIC RESISTANCE BACTERIA
- HUMAN AND FRESHWATER HEALTH RISKS

INTERVENTION



TECHNICAL PROCESS:

- ENVIRONMENTAL SAMPLING
- SHOTGUN METAGENIC SEQUENCE DATA
- MACHINE LEARNING ALGORITHMS
- DETERMINE HEALTH RISK
- TRACE SOURCE OF POLLUTION

CONTRIBUTIONS



1. PRACTICAL KNOWLEDGE OF ANTIBIOTIC RESISTANT BACTERIA CONTAMINATION
2. INFORM MANAGEMENT AND INTERVENTIONS STRATEGIES

SCALABILITY & SUSTAINABILITY



1. 5A'S OF TECHNOLOGY SUCCESS $\frac{1}{2}$
2. RENEWABLE ENERGY $\frac{1}{2}$
3. KEY PARTNERSHIPS
4. SERVICE DELIVERY MODEL
5. PRIORITY MATCH
6. ENABLING POLICY

PARTNERS

WATER RESEARCH COMMISSION SOUTH AFRICA

EUROPEAN UNION AND FONDATION BOTNAR

RHODES UNIVERSITY, SA

WATER AND SANITATION DELIVERY

GIS & REMOTE SENSING TO ACCESS WATER IN DROUGHT PRONE AREAS



PROJECT JUSTIFICATION



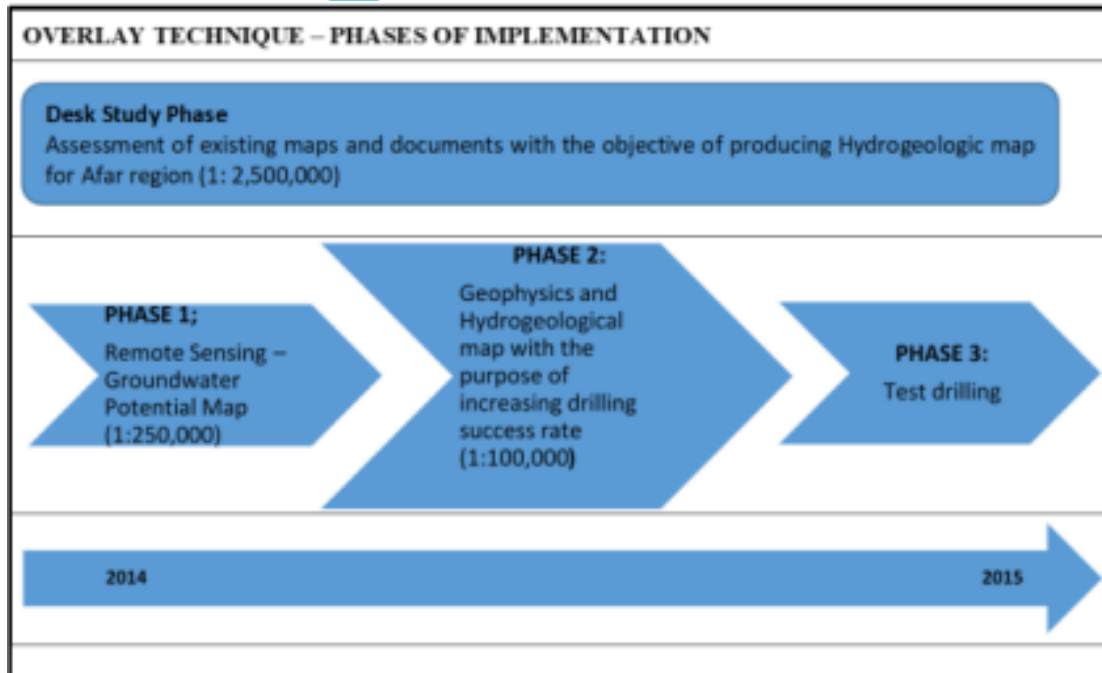
- Ethiopia and Madagascar : worst levels of water access globally, despite having plentiful groundwater sources. •
- Recurrent drought and water scarcity, exacerbated by climate change.
- Low drilling success rates due to hydrogeological complexity
- Huge resources required for large scale in-situ hydro-geological maps
- Low success rate of productive wells in arid regions

49%  61%

72 MILLION PEOPLE

METHODOLOGY

Fig 2: ETHIOPIA



Figures 1 & 2 UNICEF ESARO

RESULTS

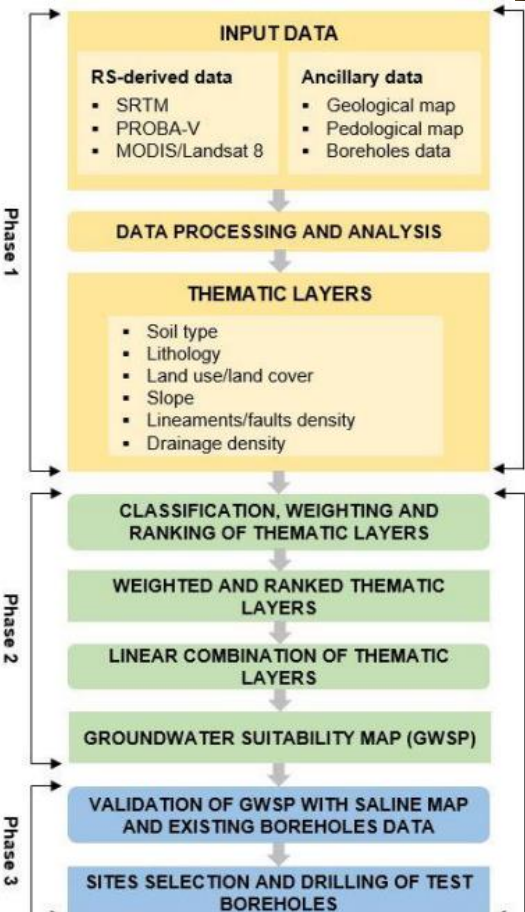


ETHIOPIA

1. SATELLITE DATA + HYDROGEOLOGICAL, METEROLOGICAL & GEOPHYSICAL DATA = 9 GW MAPS
2. IN-SITU WATER POINT INVENTORY, WATER QUALITY SURVEYS, GW RECHARGE ESTIMATION ETC
3. TEST DRILLING AT GROUNDWATER SUITABLE ZONES
4. IMPROVED PRODUCTIVITY – 50% → 92%
5. 42,000 PEOPLE ACCESS WATER IN MULTI-VILLAGE SCHEMES

MADAGASCAR

1. RS DATA DERIVED THEMATIC LAYERS OF GW OCCURRENCE ZONES
2. PUBLIC WEB MAPPING AND DATA SHARING TOOL
3. 7,000 PEOPLE WILL GAIN ACCESS
4. IMPROVED COMMUNITY RESILIENCE – LIVELIHOOD PROTECTION



WATER AND SANITATION DELIVERY

SOLAR POWERED WATER SUPPLY SYSTEMS

PROJECT JUSTIFICATION



- ENERGY CRISIS
- CLIMATE CHANGE ADAPTATION
- SCALING UP DRINKING WATER SUPPLY

ASSESSMENT

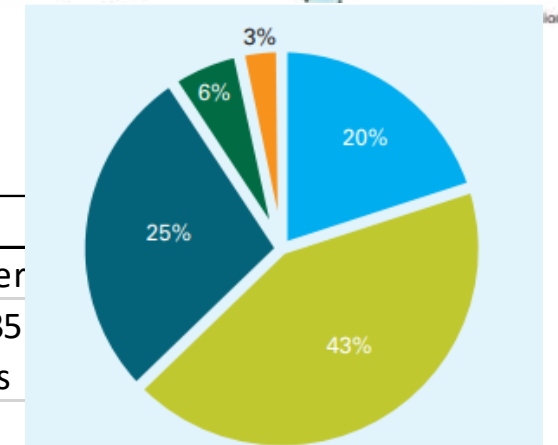
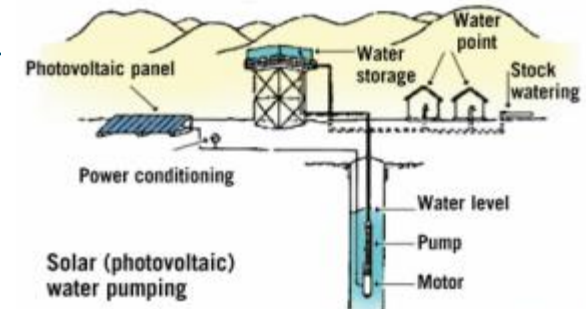


METHODOLOGY

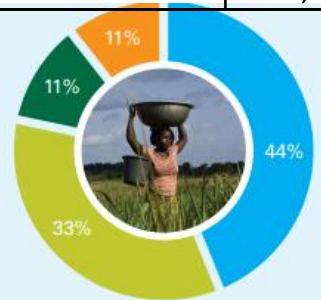
	Uganda	Nigeria	Mauritania	Myanmar	TOTAL
No. of SPW Systems installed since 2011	38	763	34	13	848
No. of SPW Systems Beneficiaries since 2011	105,468	1,907,500	7,000	11,105	2,031,073

Data Collection	
KII	300 stakeholder
Field Study	4 countries, 35 communities
UNICEF offices	35

Diagram of typical solar powered water supply system



- Borehole ran dry
- Issues with wiring/electrical components
- Motor issues (e.g. silting up)
- Vandalism/theft
- Lightening

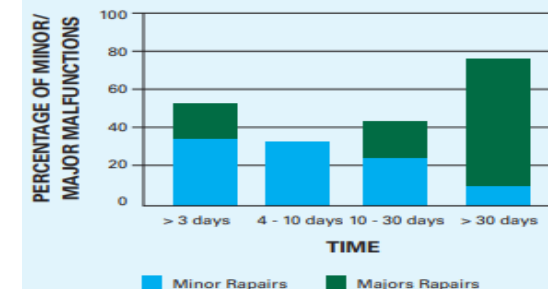


- They use an alternative unsafe source of water
- They are given free water
- They are given discounted water
- Other households donate their water

FINDINGS



1. 5A'S OF TECHNOLOGY SUCCESS ✓
2. SUSTAINABLE RENEWABLE ENERGY ✓
3. LOW DAY TO DAY RUNNING COSTS ✓
4. HIGH COSTS OF INSTALLATION AND REPAIR ✗
5. COLLECTION OF USER FEES A CHALLENGE ✗
6. ENABLING POLICY ✓



UNICEF, 2016
CONTACT:
EBALFOUR@UNICEF.ORG

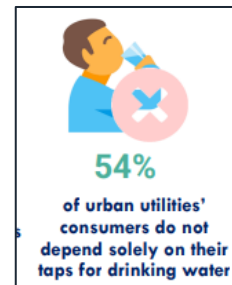


DRINKING WATER TREATMENT

PROJECT JUSTIFICATION

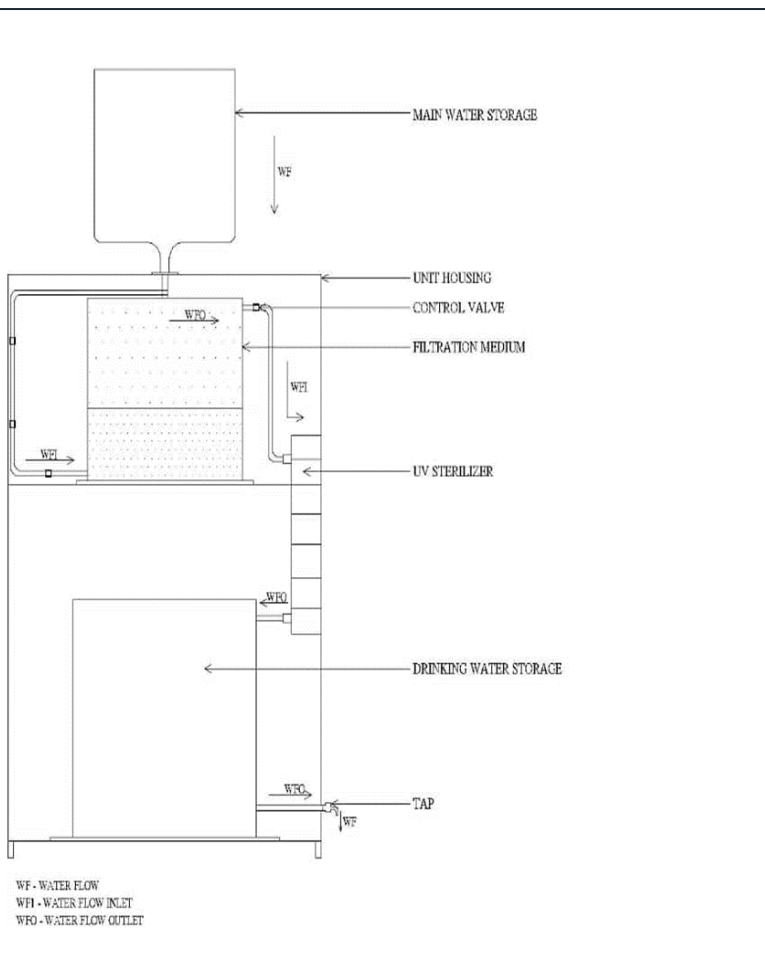


• NIGERIA: 78%



Design And Development of Household Ultraviolet Water Treatment Unit incorporating a Sand-Biochar Medium

10



INTERVENTION



TECHNICAL PROCESS:

- Sand - Biochar Filtration
- Ultra violet Radiation

CONTRIBUTIONS



1. SAFELY MANAGED DRINKING WATER ON PREMISES
2. ALTERNATIVE ENERGY SOURCE
3. CONVENIENCE

SCALABILITY & SUSTAINABILITY



1. 5A'S OF TECHNOLOGY
2. RENEWABLE ENERGY
3. KEY PARTNERSHIPS
4. SERVICE DELIVERY MODEL
5. PRIORITY MATCH
6. ENABLING POLICY



WATER AND SANITATION DELIVERY

SOLAR POWERED WASH IN PUBLIC PLACE

NIGERIA,
KATSINA

1 IN 24 LGAS

REACH:
200,000
PEOPLE

TIME: 5
YEARS

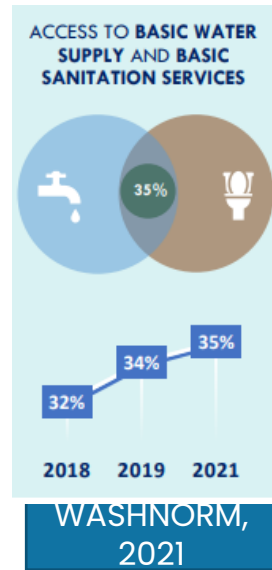
LEAD

UNICEF/GOVT.
WASH AGENCY

PROJECT JUSTIFICATION



- Nigeria: Highest no. of people practicing open defecation globally.
- Public places: markets & motor parks a challenge (4% have WASH facilities, WASHNORM, 2021)



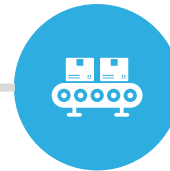
11

INTERVENTION



PPP Public toilet & Solar Powered Borehole Initiative

RESULTS



1. EMPLOYMENT & INCOME GENERATION
2. OPEN DEFECTION FREE ACHIEVEMENT

IMPLEMENTING PARTNER: KATSINA STATE RURAL
WATER SUPPLY & SANITATION AGENCY
CONTACT : ENG. AMINU DAYYABU
Aminudayyabu69@gmail.com

SCALABILITY & SUSTAINABILITY



1. 5A'S OF TECHNOLOGY SUCCESS
2. RENEWABLE ENERGY
3. KEY PARTNERSHIPS
4. SERVICE DELIVERY MODEL
5. PRIORITY MATCH
6. ENABLING POLICY



NIGERIA,
LAGOS

REACH:
200,000
PEOPLE

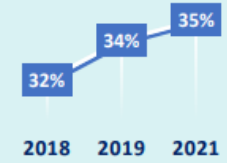
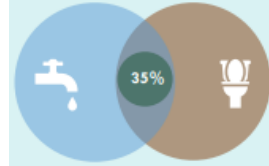
OPERATIONAL: 5
YEARS

WATER AND SANITATION DELIVERY

SOLAR POWERED AUTOMATED PUBLIC TOILET IN MOTOR PARK

ACCESS TO BASIC WATER
SUPPLY AND BASIC
SANITATION SERVICES

12



PROJECT JUSTIFICATION



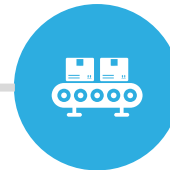
- Nigeria: Highest no. of people practicing open defecation globally.
- Public places: markets & motor parks a challenge (4% have WASH facilities, WASHNORM, 2021)

INTERVENTION



Automated retrofitted Public toilet
Solar powered & electricity options
Gender friendly

RESULTS



1. OPEN DEFECCATION FREE ACHIEVEMENT



IMPLEMENTING PARTNER: LAGOS STATE MINISTRY OF
ENVIRONMENT & WATER RESOURCES
MRS FALAYE ADEREMI
CONTACT: REMFAL@YAHOO.CO.UK

SCALABILITY & SUSTAINABILITY



1. 5A'S OF TECHNOLOGY SUCCESS
2. RENEWABLE ENERGY
3. KEY PARTNERSHIPS
4. SERVICE DELIVERY MODEL
5. PRIORITY MATCH
6. ENABLING POLICY



WASTE WATER MGT. AND REUSE

“Water should not be judged by its history, but by its quality”
 Dr Lucas van Vuuren , one of the pioneers of the Windhoek water reclamation system.



REACH: 40,000

TIME: 11 YEARS

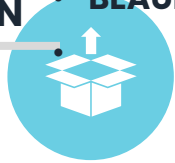
RESEARCH INSTITUTE/PUBLIC ENTITY LED



FUNDED BY WATER RESEARCH COMMISSION, SA.
 CONTACT: Jayb@WRC.CO.ZA

PROJECT JUSTIFICATION

- SOUTH AFRICA: WATER SCARCE COUNTRY
- BEAUFORT –WEST: DRIEST PART OF SA



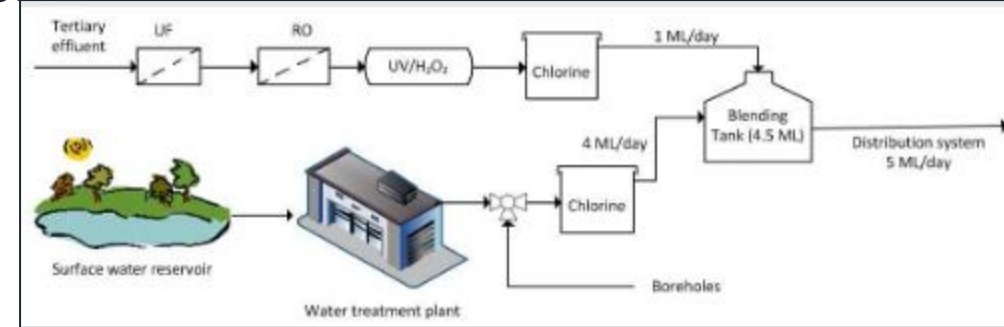
INTERVENTION



CONTRIBUTIONS



SCALABILITY & SUSTAINABILITY



TECHNICAL PROCESS:

- PHOSPHATE REMOVAL
- SETTLING
- SAND FILTRATION
- RO
- ADVANCE OXIDATION (H2O2;UV)
- FINAL CHLORINATION

1. DRINKING WATER SUPPLY
2. WATER USE EFFICIENCY

1. 5A'S OF TECHNOLOGY SUCCESS
2. RENEWABLE ENERGY
3. KEY PARTNERSHIPS
4. SERVICE DELIVERY MODEL
5. PRIORITY MATCH
6. ENABLING POLICY



Reaching the Hard to Reach Vulnerable Communities with Water Supply, Sanitation and Hygiene in FCT, Nigeria

Supported by

WASHMATA INITIATIVES & Bank of Industry

Contact: Dr Boluwaji Onabolu
bonabolu@washmata.org or
bonabolu2001@yahoo.com
www.washmata.org



PROCESS OF VULNERABILITY RISK ASSESSMENT (VRA)

1. Vulnerability risk indicators were identified and weighted.
2. The VR tool was implemented
3. Most vulnerable communities were selected for intervention.

VULNERABILITY INDICATOR	WEIGHTING	Max Risk = 10
 Improved Water Source	Available & functional = 0 Available & non-functional = 2 None at all = 3	3
 Open Defecation Status	Not triggered = 1 Triggered = 2 ODF claimed = 3	3
 Population	Below 500 & >5000 = 0 >500 to 2500 = 1 >2500 to 5000 = 2	2
 Geology	Sedimentary = 1 Basement = 2	2



POST INTERVENTION



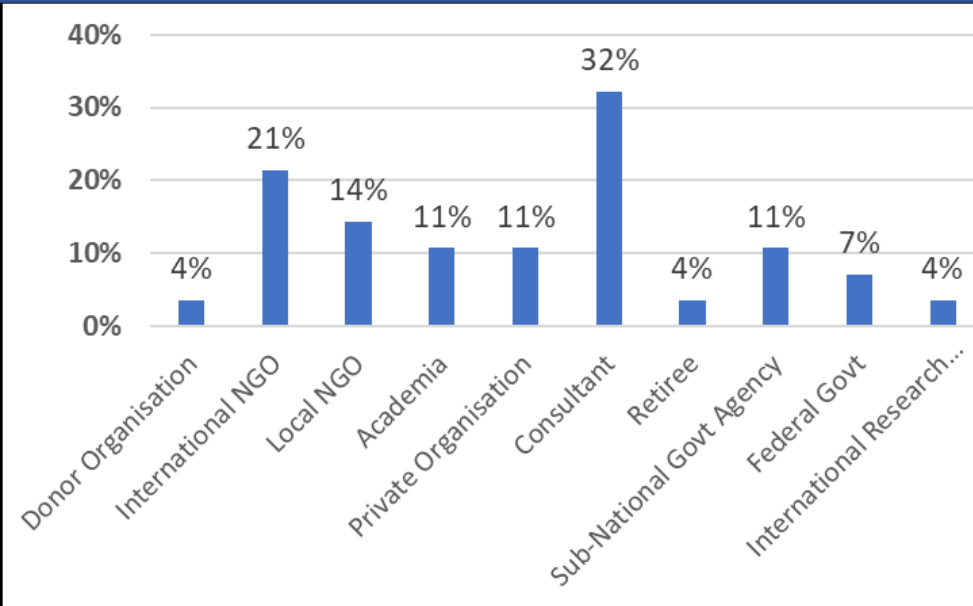
Access to improved water supply and safe drinking water increased

From zero to 100% coverage in all project communities



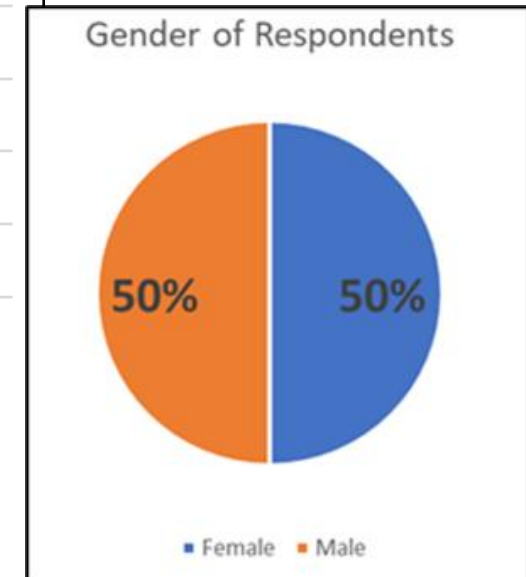
WASH SECTOR PROFESSIONALS STI IN WASH RAPID ASSESSMENT n=28

WORK AFFILIATION OF RESPONDENTS

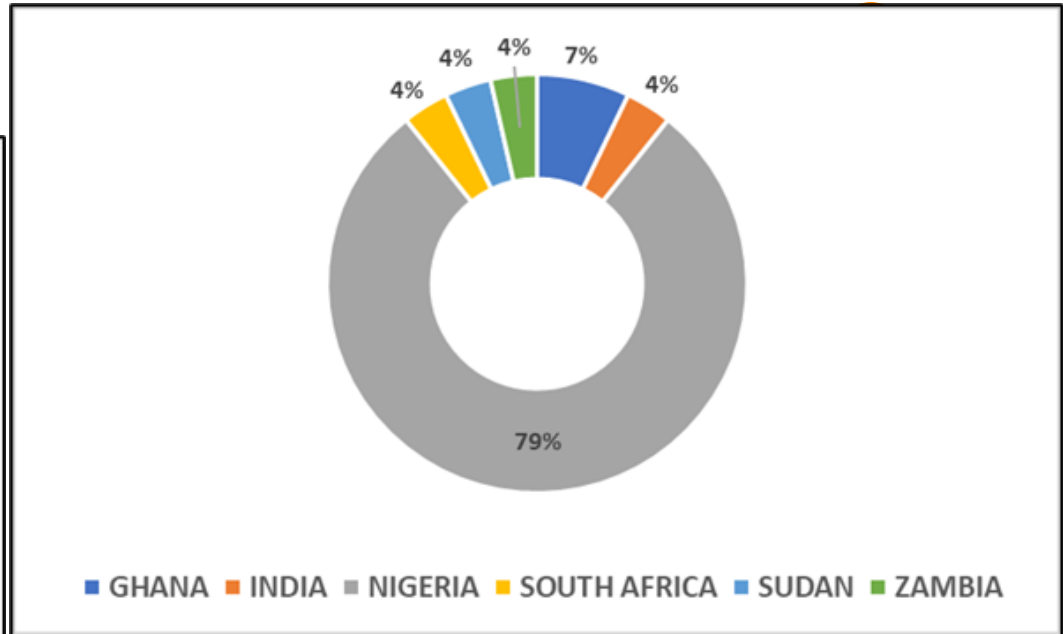


SECTOR EXPERIENCE

1. Range :3 ->40 yrs
2. 1 in 5 = 20 yrs

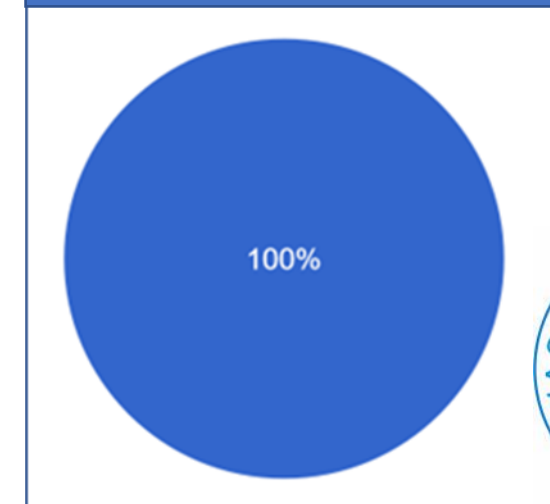


COUNTRY OF RESIDENCE OF RESPONDENTS

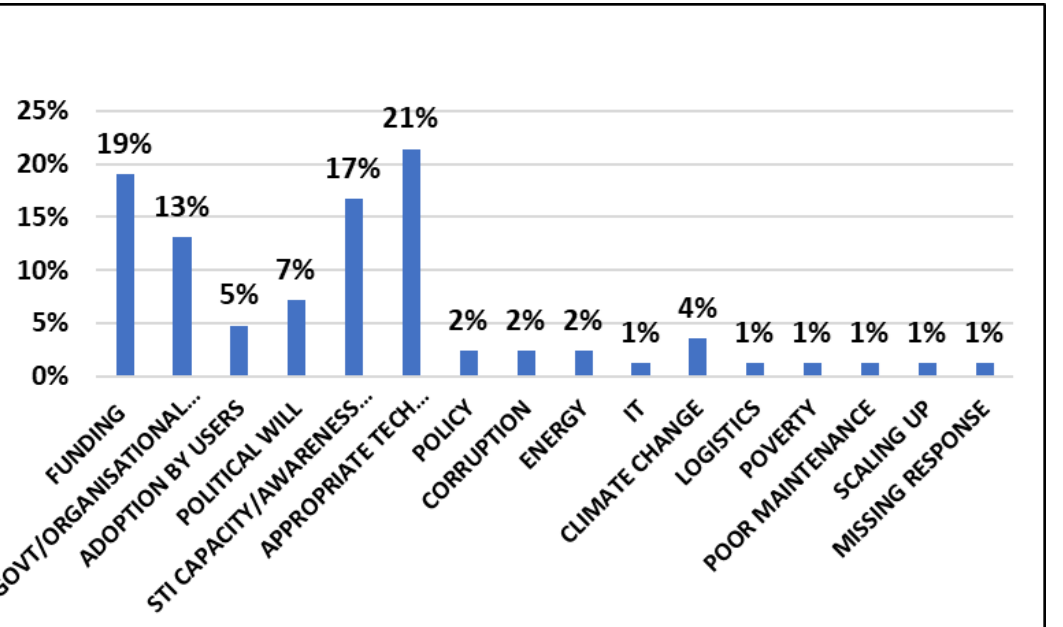
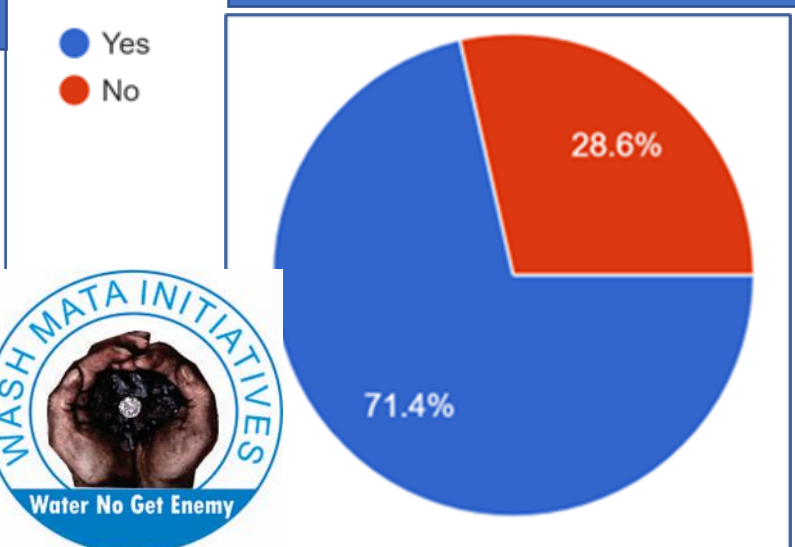


KEY CHALLENGES AS SEEN BY WASH PROFESSIONALS

STI RELEVANT TO WASH?

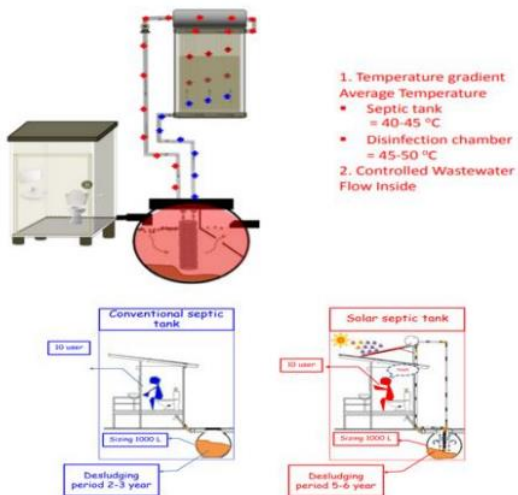


STI PLAYING EXPECTED ROLE IN WASH?



Range of Off-grid Technologies Being Scaled in the SASTEP Technology Accelerator Programme – BEST PRACTICE

• SOLAR SEPTIC



• LOW FLUSH TOILETS



INCINERATION / HTC TOILETS



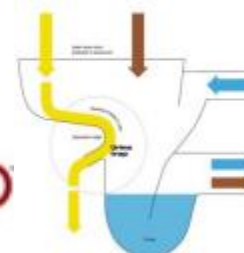
FULL RECYCLE TOILETS



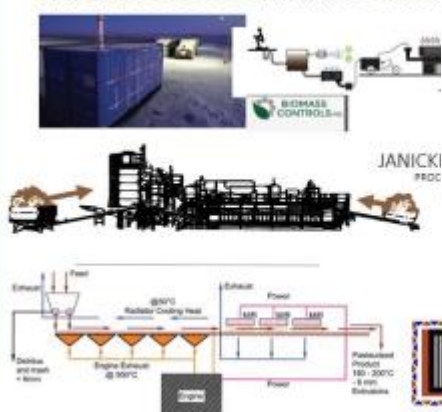
• DRY TOILETS



• URINE DIVERSI



• FAECAL SLUDGE MANAGEMENT



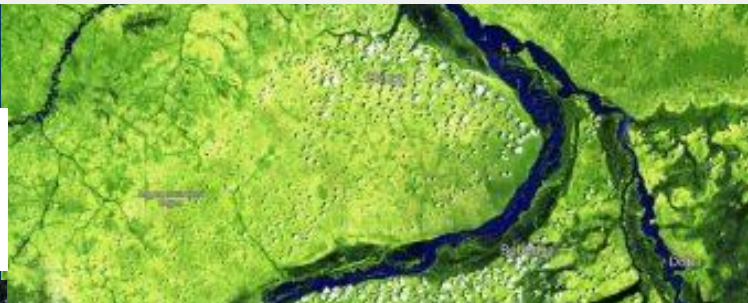
- Department of Water and Sanitation (DWS)
- Water Research Commission (WRC)
- Department of Trade and Industry (dti)
- South African Bureau of Standards (SABS)
- Department of Science and Innovation (DSI)
- National Regulator for Compulsory Specifications (NRCS)
- Trade & Industrial Policy Strategies (TIPS)
- Municipalities and waterboards.

SOUTH AFRICAN SANITATION TECHNOLOGY ENTERPRISE PROGRAM
PROGRAM MANAGER: AKIN AKINSETER
AKINA@WRC.CO.ZA



West and Central Africa – Over 125,000 Displaced by Floods Across 17 Countries

30 AUGUST, 2022




Niger – 168 Dead, 227,000 Affected as Flooding Continues

Chad – Floods Affect Almost 1 Million as Damage to Crops Increases Food Insecurity

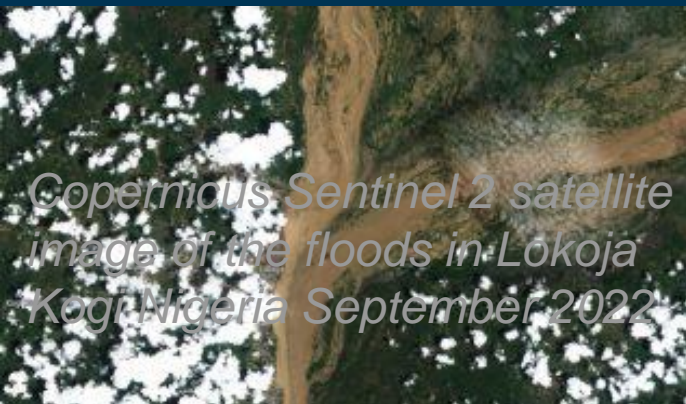
Mali – Hundreds of Homes Destroyed by Floods in Mopti Region

27 SEPTEMBER, 2022



South Africa – Death Toll in KwaZulu-Natal Floods Over 300

14 APRIL 2022



Copernicus Sentinel 2 satellite image of the floods in Lokoja Kogi Nigeria September 2022

South Sudan – Floods Affect Over 900,000 Says UN

12 OCTOBER, 2022

South Africa – Evacuations After More Flooding in KwaZulu-Natal

Nigeria – Almost 800,000 Displaced, 500 Dead as Floods Worsen

12 OCTOBER, 2022

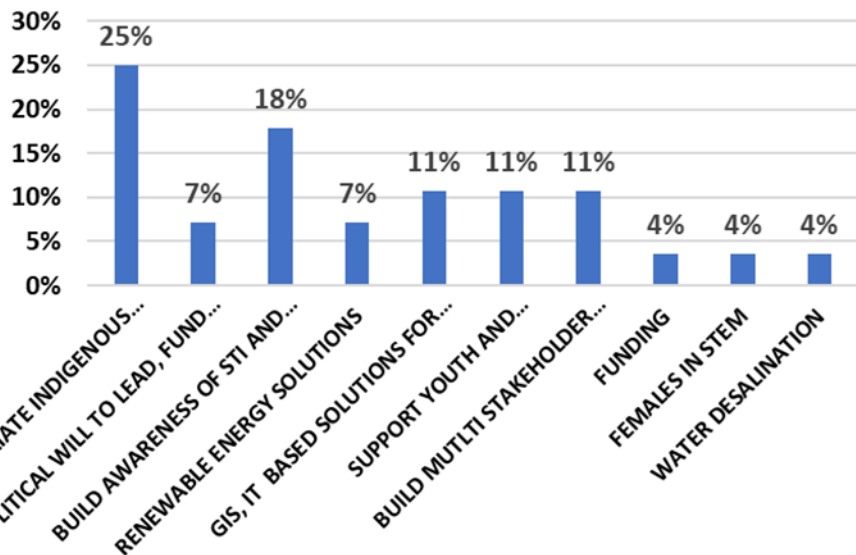


Democratic Republic of the Congo – More Deadly Floods and Landslides in Eastern Provinces

Ivory Coast – Deadly Floods and Landslides in Abidjan After 160mm of Rain in 12 Hours



PRIMARY RECOMMENDATION OF STAKEHOLDERS



RECOMMENDATIONS

LESSONS LEARNT

1. POLITICAL PRIORITY MATCH

FOSTERS SCALABILITY

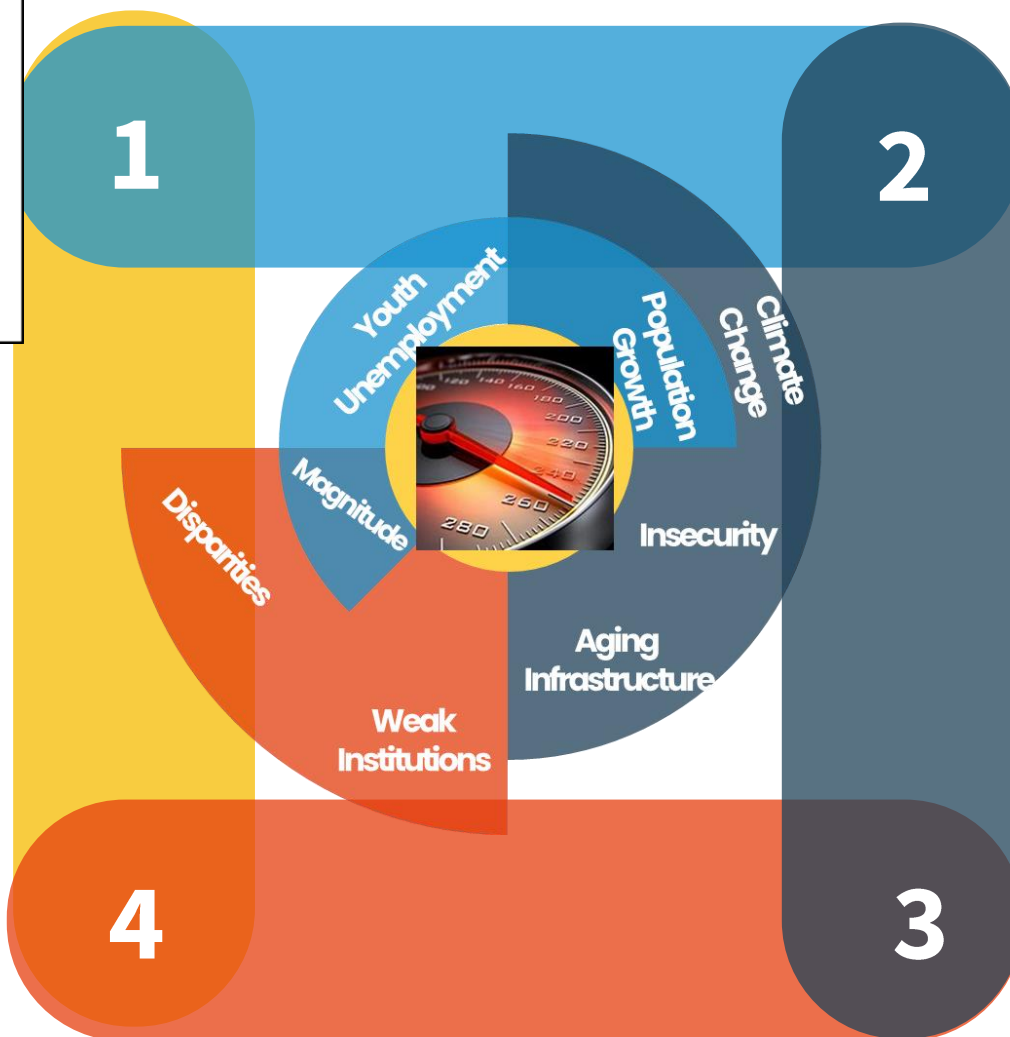
- YOUTH EMPLOYMENT
- ENERGY
- EARLY WARNING SYSTEMS
- CARBON FOOT PRINT REDUCTION
- DATA FOR DECISION MAKING

3. IDENTIFY, INCUBATE, INTEGRATE

A HIGH PROPORTION OF BRILLIANT STI NEVER REACH THE SECTOR OR MARKET.

IDENTIFICATION, INCUBATION AND SCALING UP MECHANISMS

VITAL; WITH YOUTH & GENDER INCLUSION



2. INDIGENOUS KNOWLEDGE INCLUSIVE & CONTEXT APPROPRIATE STI

BUILDING BACK BETTER, FOSTERS OWNERSHIP, RELEVANCE & SUSTAINABILITY

4. COORDINATED PARTNERSHIPS

FORUM FOR INTER- SECTORAL AND MULTI STAKEHOLDER PARTNERSHIPS: (IN COUNTRY, SOUTH TO SOUTH, NORTH TO SOUTH) VITAL FOR TAKE UP AND SCALABILITY



THANK YOU



https://drive.google.com/file/d/1oISV4YFd8oRsSUaLwvN_kmLtj-MyxIII/view?usp=sharing

Thank You