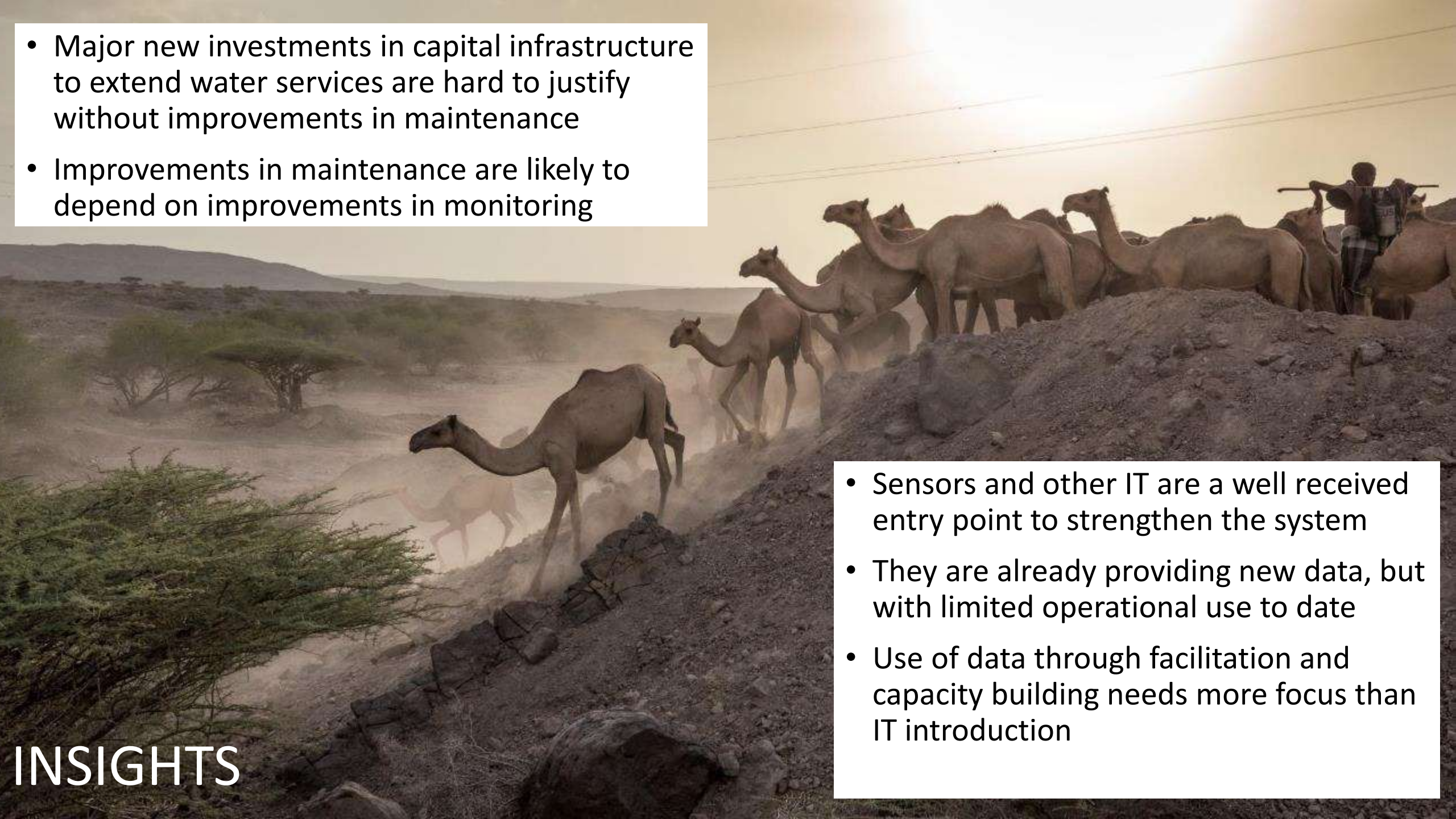




- Major new investments in capital infrastructure to extend water services are hard to justify without improvements in maintenance
- Improvements in maintenance are likely to depend on improvements in monitoring



- Sensors and other IT are a well received entry point to strengthen the system
- They are already providing new data, but with limited operational use to date
- Use of data through facilitation and capacity building needs more focus than IT introduction

CONTEXT

New roads, railways,
towns and irrigation
schemes

Mobile
pastoralist
communities

Conflicts
over scarce
resources

Very little private
sector presence

Harsh climate:
frequent drought

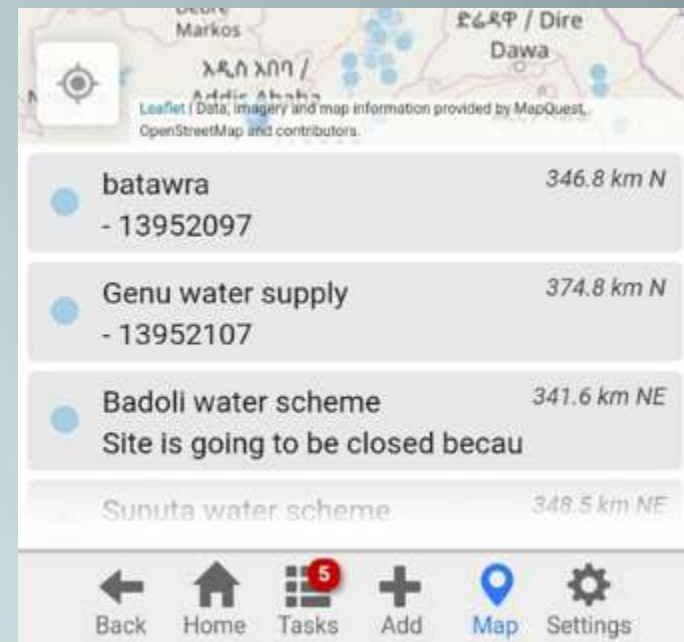
Human right
to water





SYSTEM

- New monitoring technologies provide an opportunity to strengthen the system
 - mobile-based data collection
 - asset inventory supported with flow rate and quality measurement
 - Sensors for near real-time updating
- Key objectives are prioritization of maintenance and asset management, and related financing
- Consistent with governments flagship Climate Resilient WASH initiative

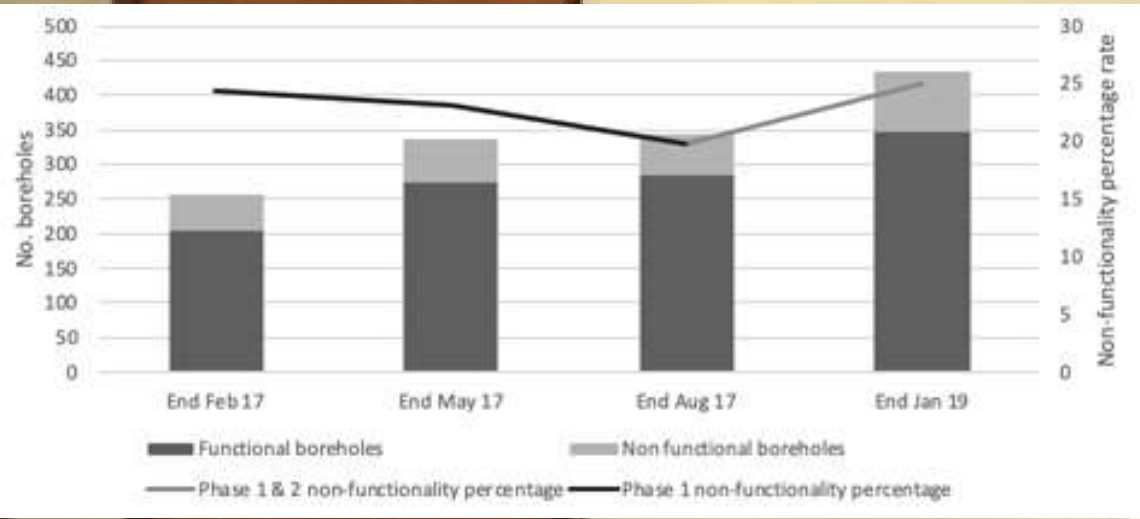


INNOVATION

In Somali region, UNICEF has supported the regional water bureau to develop the Somali Functionality Inventory – a response to the 2016/17 drought - which now includes 424 motorized boreholes

NEW WAY OF WORKING



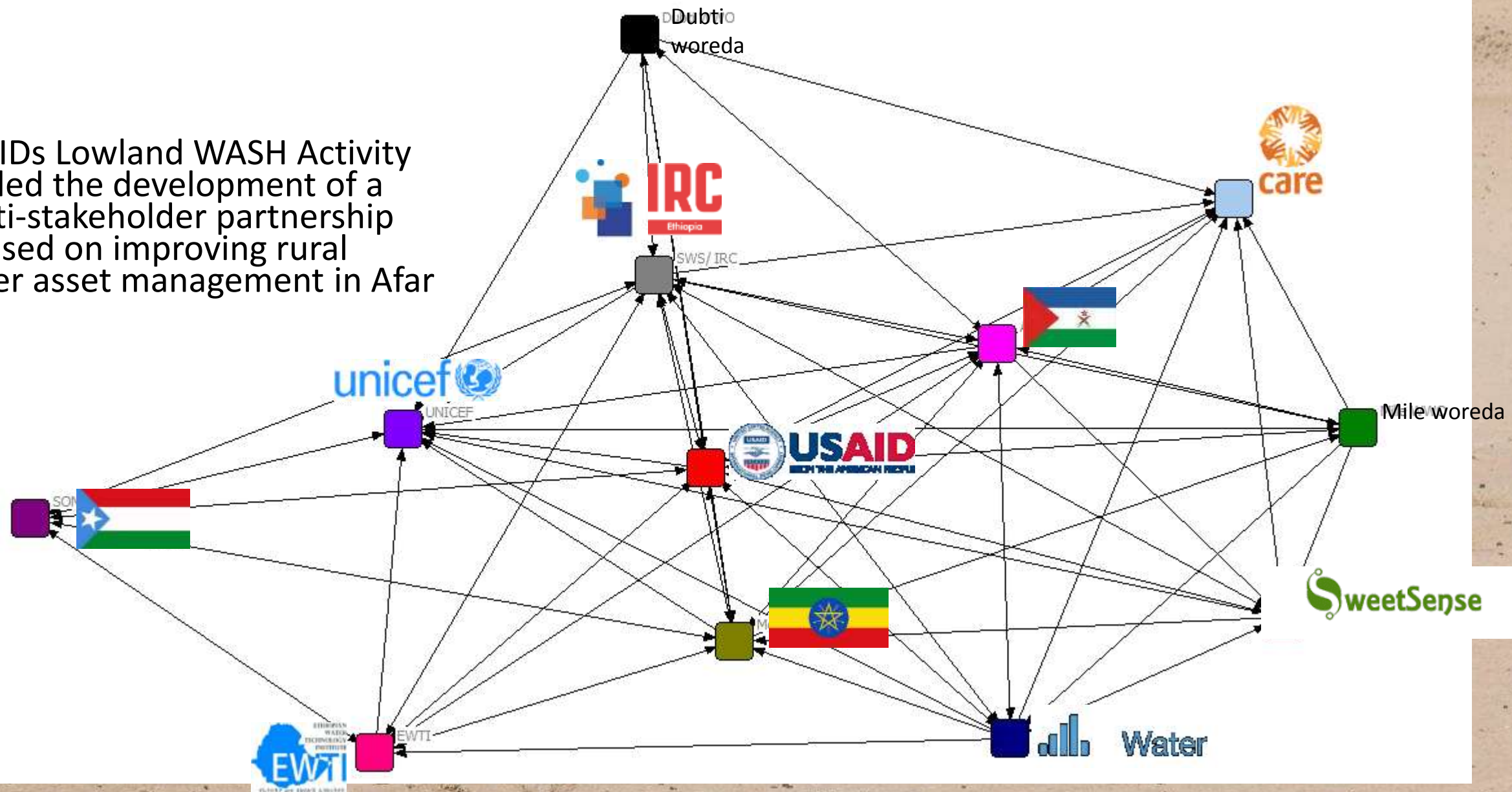


The SFI – based on an asset inventory and updates by telephone calls and mobile maintenance teams – shows improvements during the drought response but non-functionality rates have since returned to 25%



- 2018 saw:
- Political changes
 - New staff in woredas
 - Less investment from govt/ UNICEF
 - Less MMT activity
 - BHs running 15-20 hrs day

USAID's Lowland WASH Activity has led the development of a multi-stakeholder partnership focused on improving rural water asset management in Afar



ASSET MANAGEMENT



Afar Regional Water Bureau
Water Service
Asset Management System



Afar Maintenance

This dashboard shows the issues that have been reported and if they have been resolved 55% of issues are open.

This management system allows Afar Regional Water Bureau and partners to manage the functionality and condition of the water system assets in the region.

Functionality Reported functionality and automatic per sensor apt by zone, woreda, and system; shown as dashboard, map and table

Assets Which type of assets are where, and what is their condition

Coverage How many people are served and where they are

Maintenance Which maintenance issues are outstanding and which have been resolved

Sensors Details on the automatic SweetSense sensors installed

Reports Standardized reports as per requirements

Help Provides help and support how to use this platform and the related phone app

90

Open issues

4

Update

1

Resolve

Open

Report and notify technician

Update

Diagnose the problem

Resolve

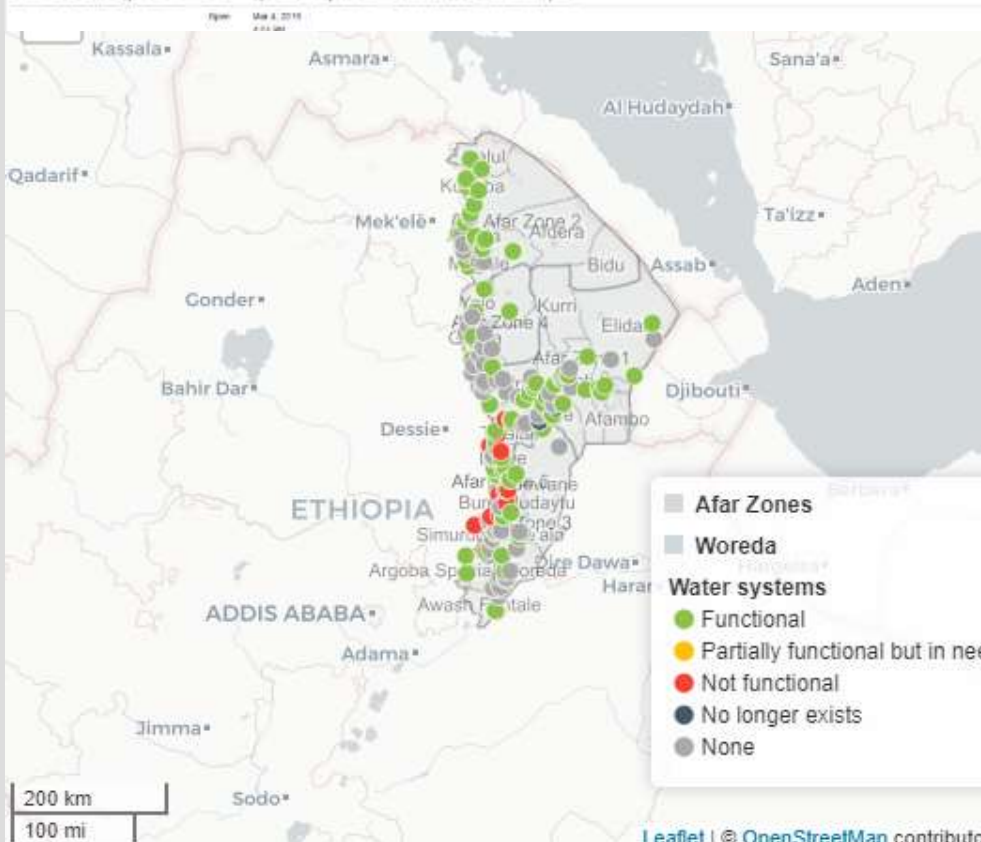
Repairs made

Close

Verify functions

| | |
|----------|---|
| Open | Issue opened by a colleague, or by SweetSense sensor, but yet allocated to technician |
| Update | It is confirmed and work has been allocated - it is in process |
| Resolved | Technician or responsible has visited and resolved the problem |
| Closed | Administrator recognizes that the issue has been addressed properly and closed |

| Location name | Water system name | State | Open date | Update date | Resolution date | Problem description |
|---------------|-------------------|-------|-----------|-------------|-----------------|---------------------|
|---------------|-------------------|-------|-----------|-------------|-----------------|---------------------|



273

Water systems

183

Asset surveys

152

SweetSense sensors active

100

Pumps in use (according to sensor)

Background
Lowland WASH is USAID's flagship WASH activity in the lowland areas of Ethiopia. It is a critical piece of the U.S. Government's contribution to the Government of Ethiopia's (GoE) One WASH National Program (OWNP)—a government-driven, sector-wide approach formed to address the WASH needs of rural, urban, and pastoralist communities, schools, and health posts in an integrated manner across sector initiatives and institutions.
In line with the overall objectives of the OWP, Lowland WASH accelerates access to improved, sustainable drinking water and sanitation, catalyzes enhanced hygiene behaviors, and expands sustainable water use for smallholder agriculture in the Somali, Afar, and Southern Nations, Nationalities and Peoples (SNNP) of Ethiopia. Lowland WASH has four major objectives: (1) increased access to improved drinking water supply sources on a sustainable basis; (2) increased adoption of key hygiene behaviors and increased access to improved, sustainable sanitation; (3) improved efficiency and sustainability of food production from irrigated and rain fed agricultural systems; and (4) improved water resource governance and data management.

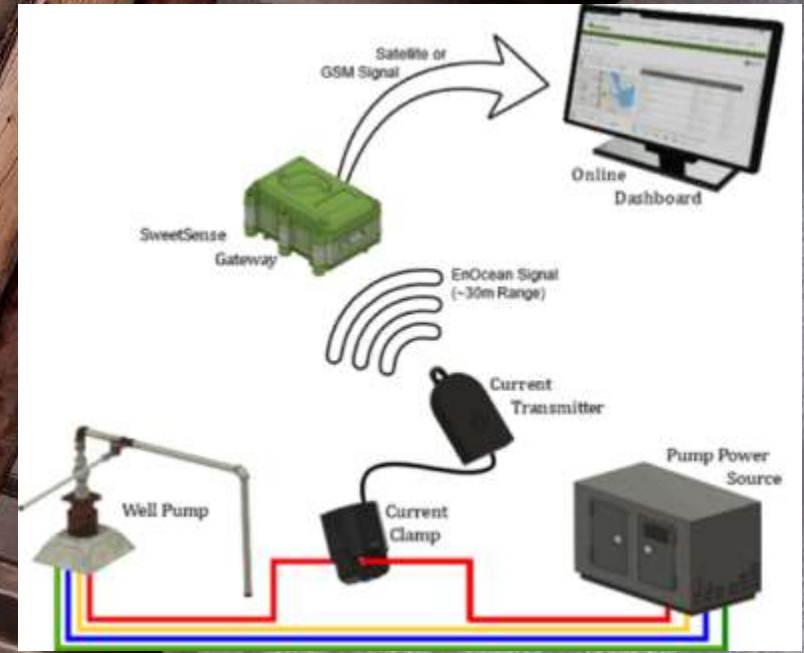
Partners



The training materials can be found on the following location:

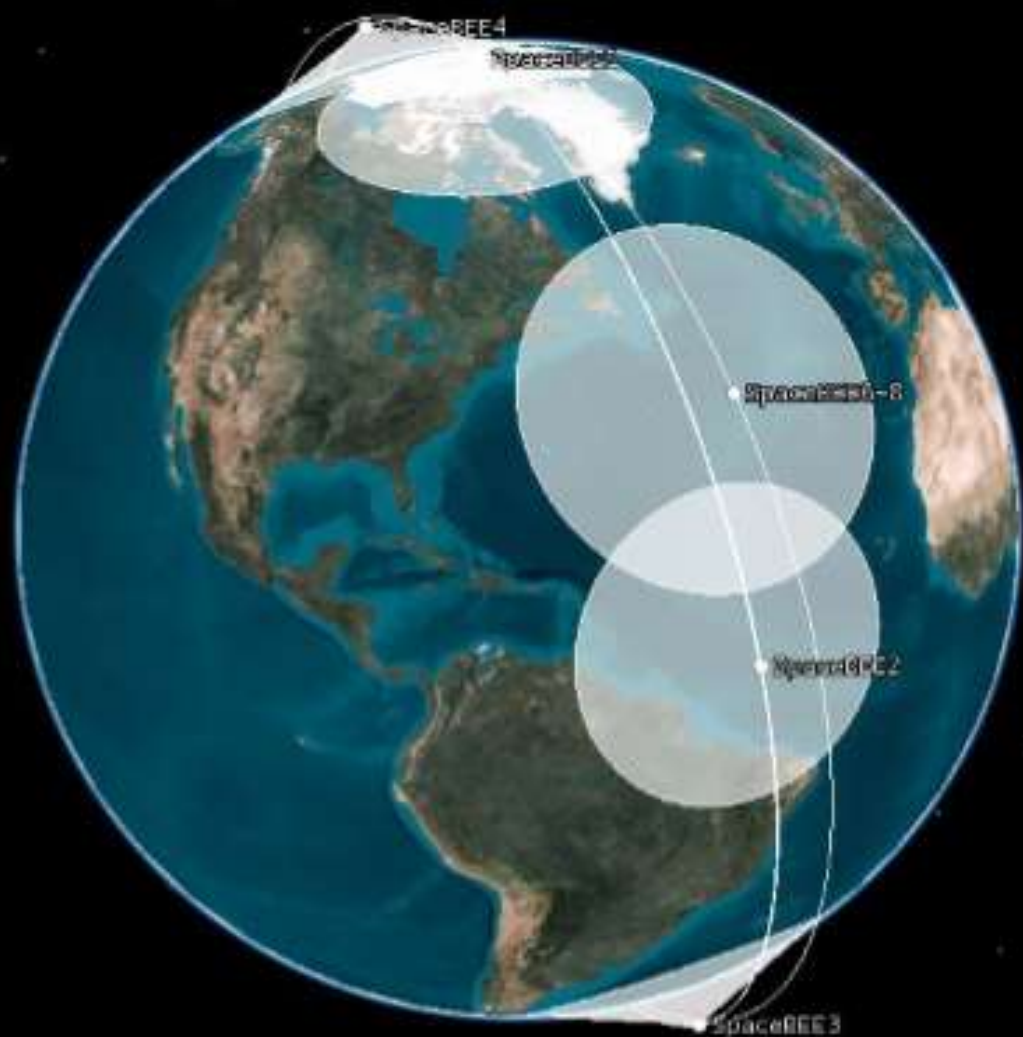
08:30:00 Afar
Any suggestions for improvement, please mail
Afar_water@mwater.co.jp
Afarwater@afarwater@comcast.net

- Deep motorised boreholes with pumps cost around USD 100,000 each on average
- A sensor adds 1% to costs
- Measures power to pump. Enables calculation of:
 - Runtime
 - Production (based on known power to flow rate relationship)
 - Potential failure
- Data transmitted by mobile phone network or satellite
- New low-bandwidth satellite communications becoming available



NEAR REAL-TIME MONITORING

December 2018
7 satellites



December 2019
150 satellites

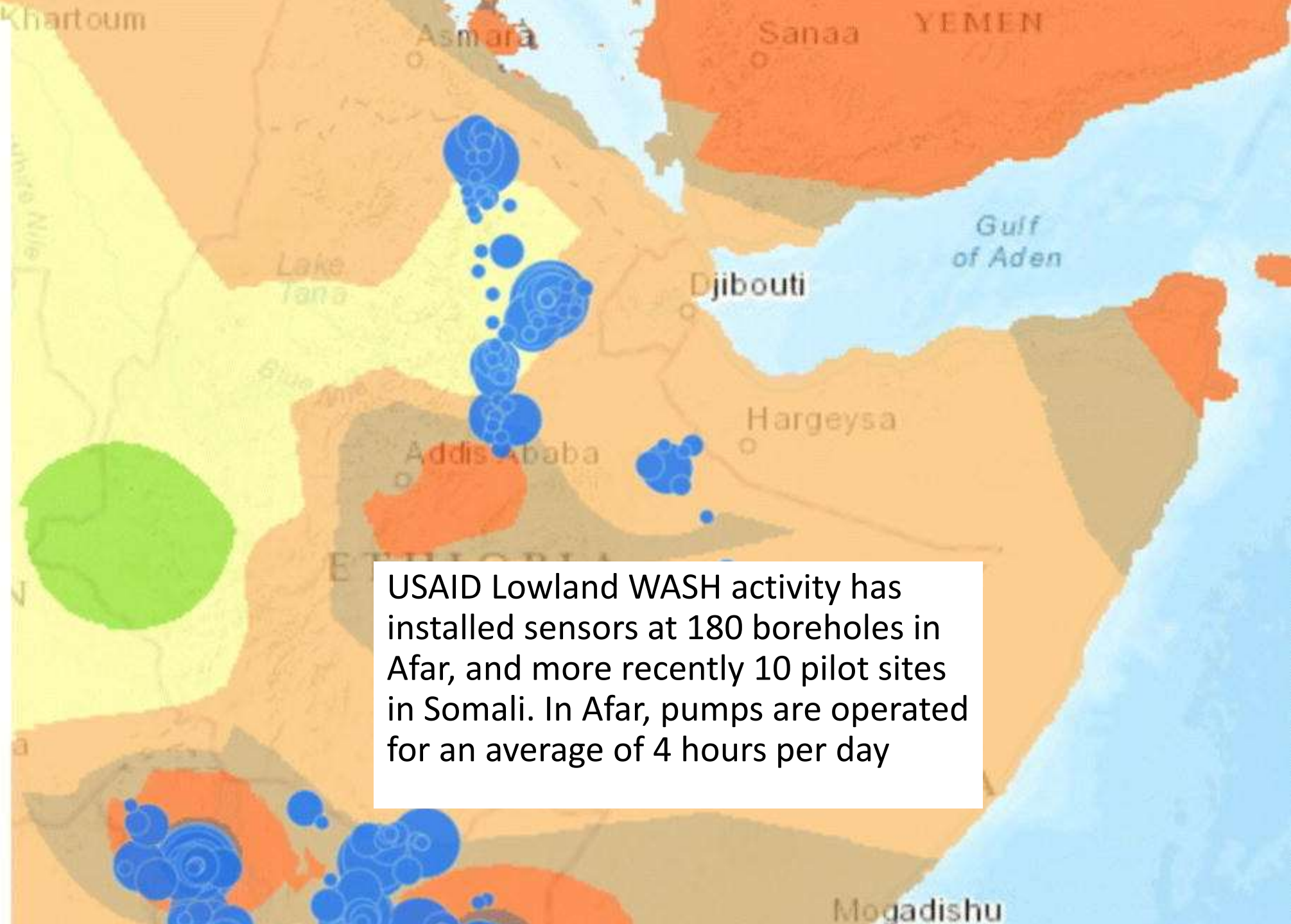


Daily Borehole Runtime (hours)

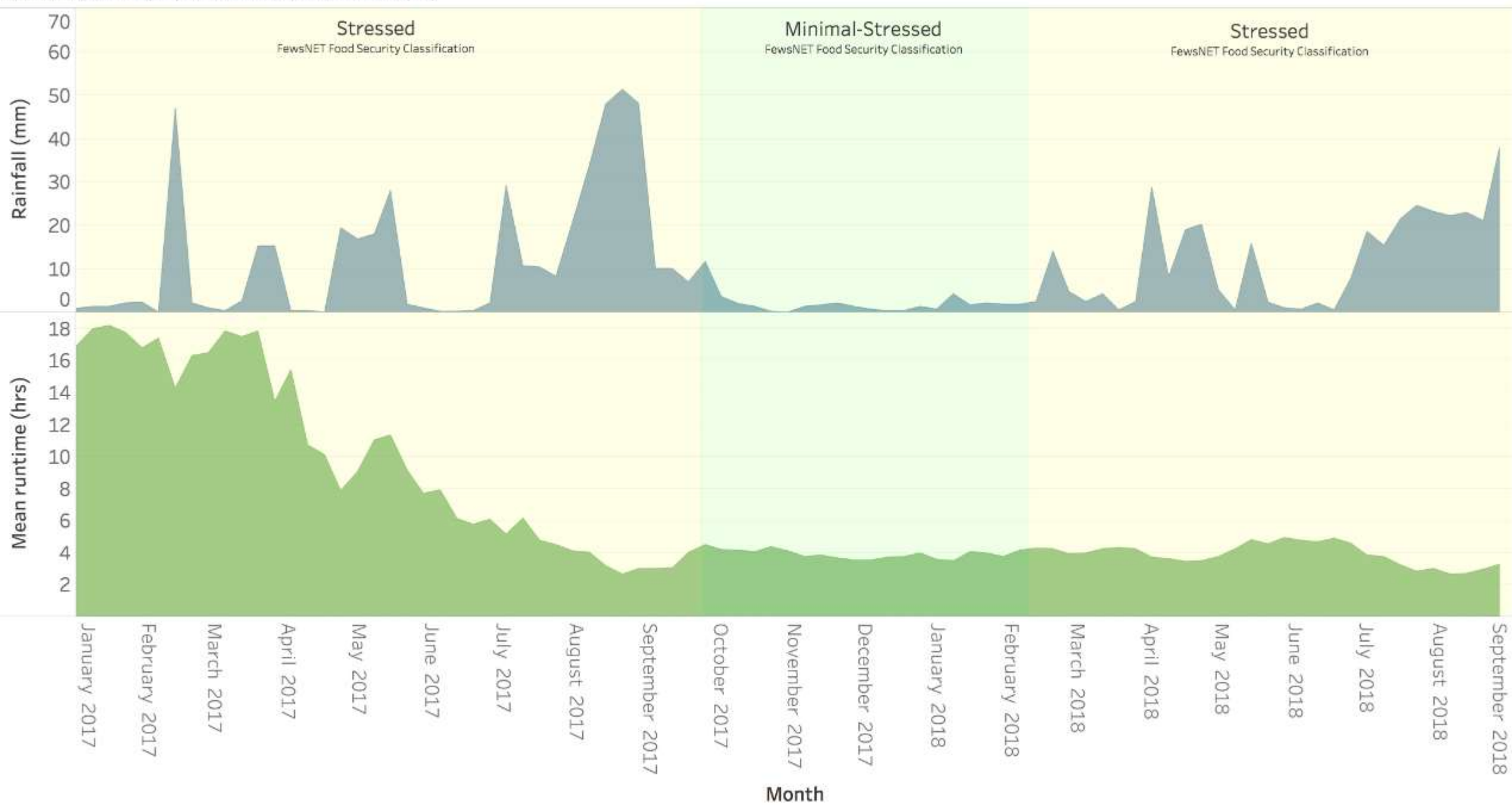
Hours



Monthly Rainfall (mm)



USAID Lowland WASH activity has installed sensors at 180 boreholes in Afar, and more recently 10 pilot sites in Somali. In Afar, pumps are operated for an average of 4 hours per day



Impact evaluation in Afar based on implementation science framework

Advocacy based on data to reduce non-functionality

Potential to roll out a common asset management platform in Somali region (and elsewhere).

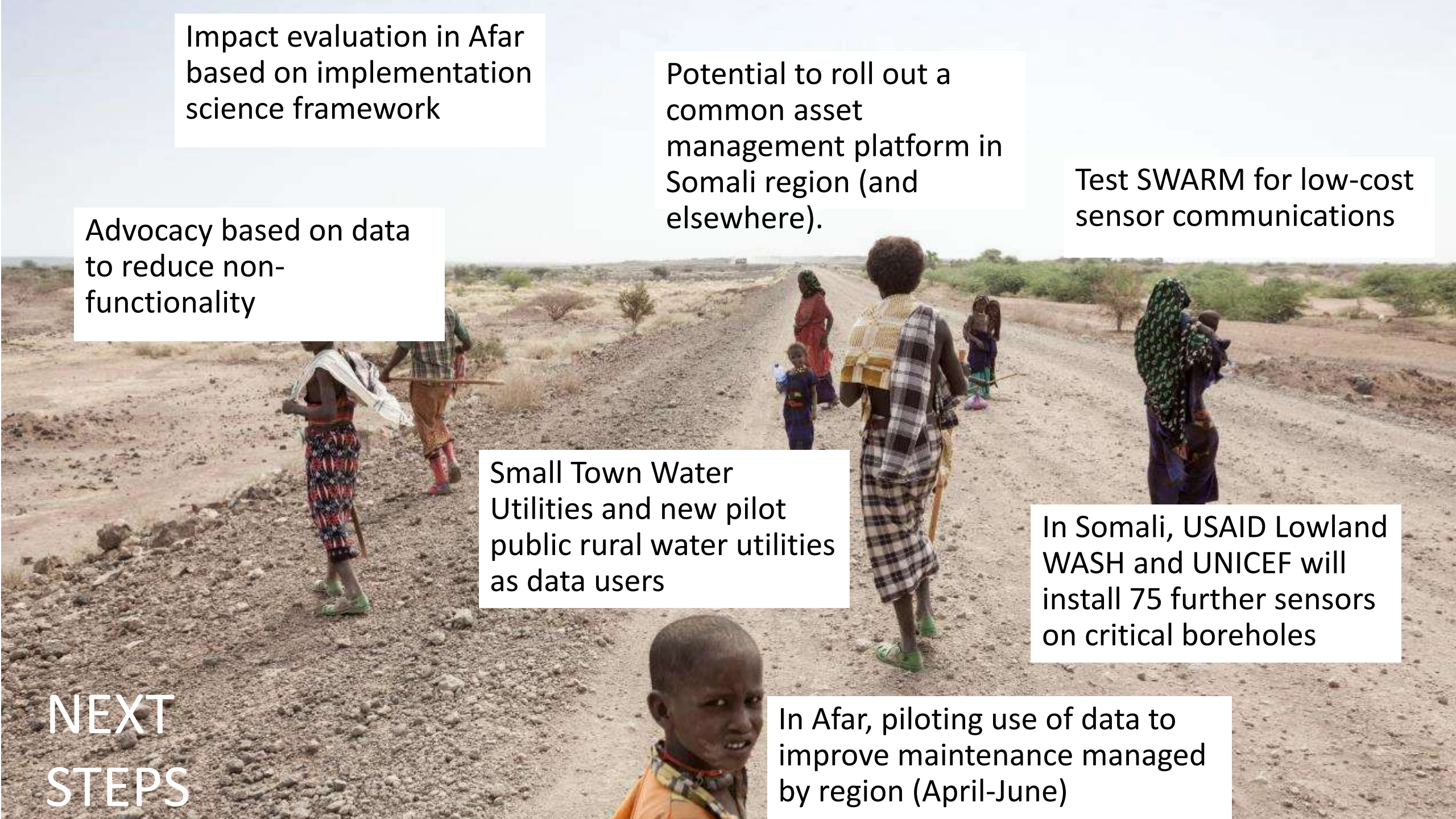
Test SWARM for low-cost sensor communications

Small Town Water Utilities and new pilot public rural water utilities as data users

In Somali, USAID Lowland WASH and UNICEF will install 75 further sensors on critical boreholes

In Afar, piloting use of data to improve maintenance managed by region (April-June)

NEXT
STEPS



Can we continue to rely on (unsupported) community management and WASHCOs for maintenance of such schemes?

Do we need to look at the private sector and guaranteed service delivery models elsewhere (e.g. in Uganda and Kenya)?

Can we turn around the incentives for maintenance?

Do we need to recognise that rural water supply maintenance may need (large) subsidies and new financing mechanisms?



SUSTAINING RURAL WATER: MAINTENANCE SERVICE PROVISION MODELS FOR COMMUNITY-MANAGED SCHEMES



5. Maintenance model case studies.....
 - 5.1 Government-led maintenance service (Ethiopia).....
 - 5.2 Handpump Mechanics Association (Uganda)
 - 5.3 Water for Good circuit rider programme (Central African Republic).....
 - 5.4 Private local service providers (Tigray).....
 - 5.5 Wahis-Mai programme (Ethiopia).....
 - 5.6 Whave guaranteed service (Uganda)
 - 5.7 Fundi-Fix guaranteed service (Kenya).....
6. Findings.....



USAID Lowland WASH Activity and USAID Sustainable WASH Systems Learning Partnership Funding 30th REAL-TIME MONITORING FOR IMPROVED WATER SERVICES IN THE ETHIOPIAN LOWLANDS

September 2018

This report provides a checklist on the use of satellite and other geospatial systems for the monitoring and evaluation of water services in Ethiopia. It is a practical guide for policy and programmatic teams to monitor and evaluate water services in Ethiopia using satellite and other geospatial data.

The lowlands saw a government's priority

The wet, drought-prone and mostly pastoral lowlands of Ethiopia have long been a priority for the federal and regional governments. The lowlands are also the focus of major development efforts that seek to improve emergency humanitarian assistance through improved livelihoods. The government's High Growth Economic Reform, Resilient and Equitable Growth (HREG) initiative includes providing services to these lowlands and more inclusive rural water infrastructure to help improve rural living standards. With a commitment from the national level to 700 million USD per year, and additional funds from regional governments, this is the largest investment in water services in the region that includes both rural and urban populations.

A gap in real-time

However, the water sector in general has not implemented tools to be integrated on the operations in a fully digital and data-driven manner. A lack of information services for data challenges monitoring and service collection, financial transparency, and program growth, not to mention the impact of climate change.

The ability to manage and maintain water supply facilities in the lowlands is crucial for health and safety, especially in the context of climate change. To ensure long-term sustainability, the operations and maintenance of rural water systems in these lowlands must be supported by a community-based approach that is supported by the government and the private sector. The government has supported the operations and maintenance of rural water systems in the lowlands but typically the government works in support of the private sector. However, the government's capacity comes from the regional level and might not be sufficient.



Identifying incremental groundwater demand from pastoralists in the East African Rift Valley

David A. Howell¹, Joseph Ngetich², David Brown³, John H. Aronson⁴, David J. Mook⁵, Wenshan Chen⁶, Steve D'Amico⁷, Todd D. Miller⁸, Subhankar Dasgupta⁹, Joseph Njiru¹⁰

DISCUSSION

1. We used a distributed hydrological model to estimate groundwater demand from pastoralists in the East African Rift Valley (EARV) region of Ethiopia.

2. We used a distributed hydrological model to estimate groundwater demand from pastoralists in the EARV region of Ethiopia.

3. We used a distributed hydrological model to estimate groundwater demand from pastoralists in the EARV region of Ethiopia.

4. We used a distributed hydrological model to estimate groundwater demand from pastoralists in the EARV region of Ethiopia.

5. We used a distributed hydrological model to estimate groundwater demand from pastoralists in the EARV region of Ethiopia.

6. We used a distributed hydrological model to estimate groundwater demand from pastoralists in the EARV region of Ethiopia.

7. We used a distributed hydrological model to estimate groundwater demand from pastoralists in the EARV region of Ethiopia.

8. We used a distributed hydrological model to estimate groundwater demand from pastoralists in the EARV region of Ethiopia.

9. We used a distributed hydrological model to estimate groundwater demand from pastoralists in the EARV region of Ethiopia.

10. We used a distributed hydrological model to estimate groundwater demand from pastoralists in the EARV region of Ethiopia.

ABSTRACT

Water is a critical resource for pastoralists in the East African Rift Valley (EARV) region of Ethiopia. However, the demand for water is increasing due to population growth and climate change. This study uses a distributed hydrological model to estimate groundwater demand from pastoralists in the EARV region of Ethiopia. The model is based on a combination of satellite data and ground-based measurements. The results show that groundwater demand is highest in the lowlands and is increasing over time. This study provides a practical approach for estimating groundwater demand from pastoralists in the EARV region of Ethiopia.