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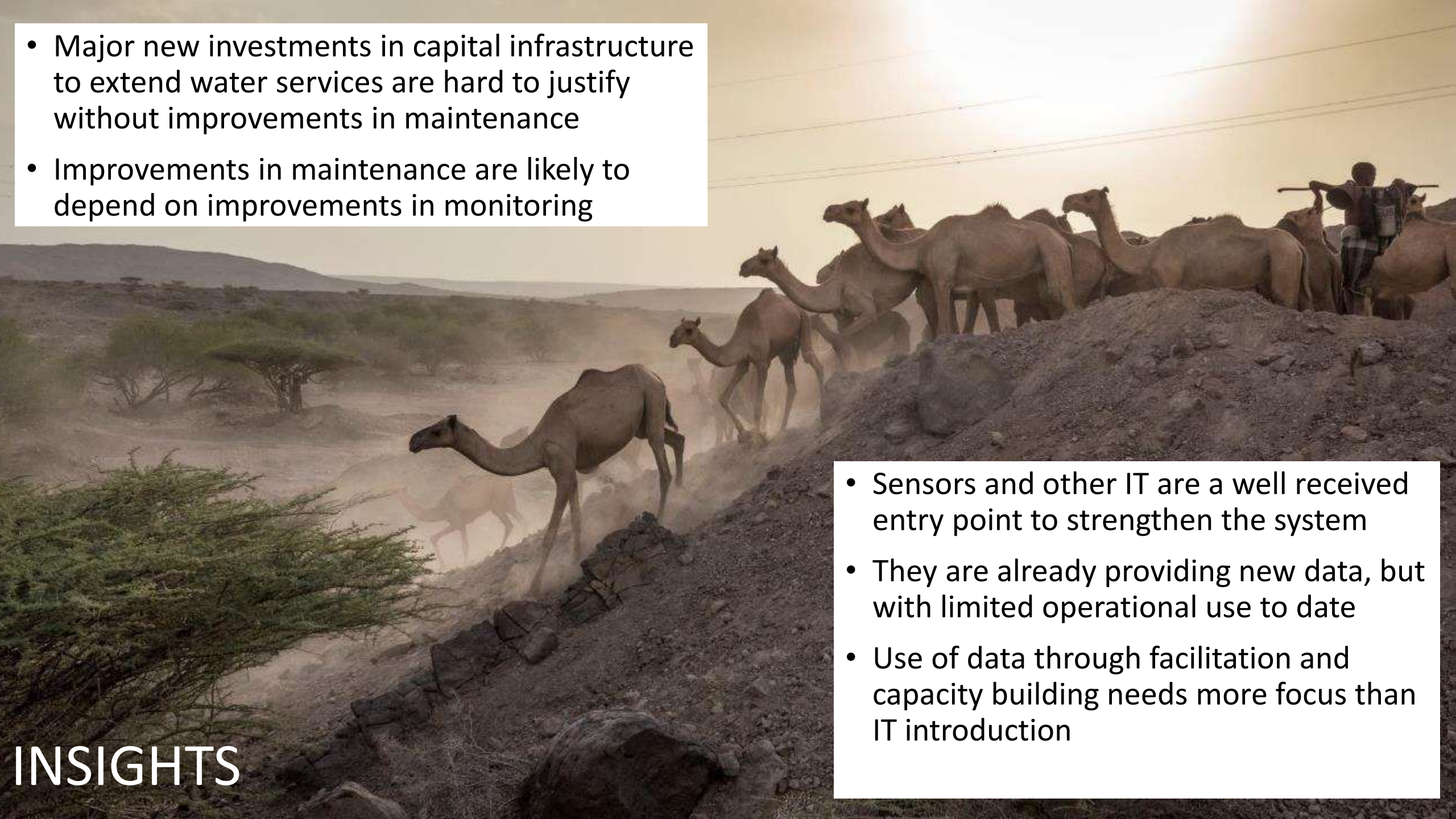


- Major new investments in capital infrastructure to extend water services are hard to justify without improvements in maintenance
- Improvements in maintenance are likely to depend on improvements in monitoring

INSIGHTS

- 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

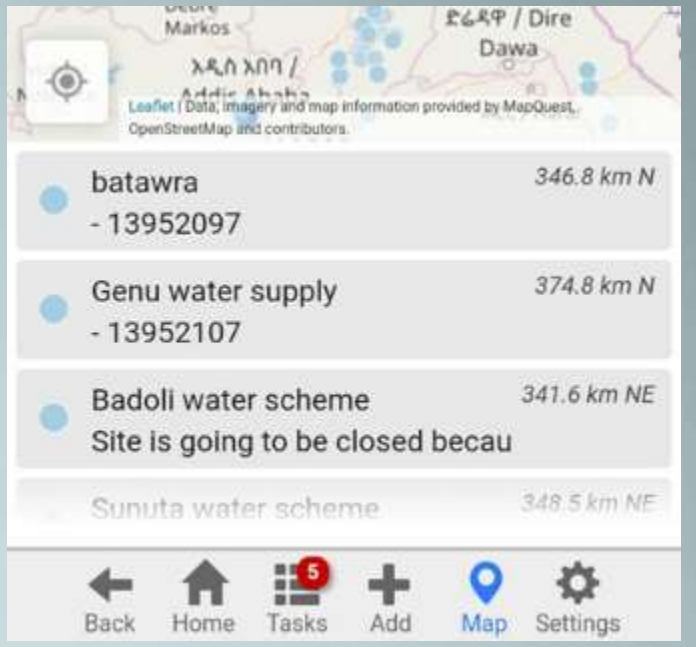
Very little private sector presence

Harsh climate: frequent drought

Human right to water


SYSTEM

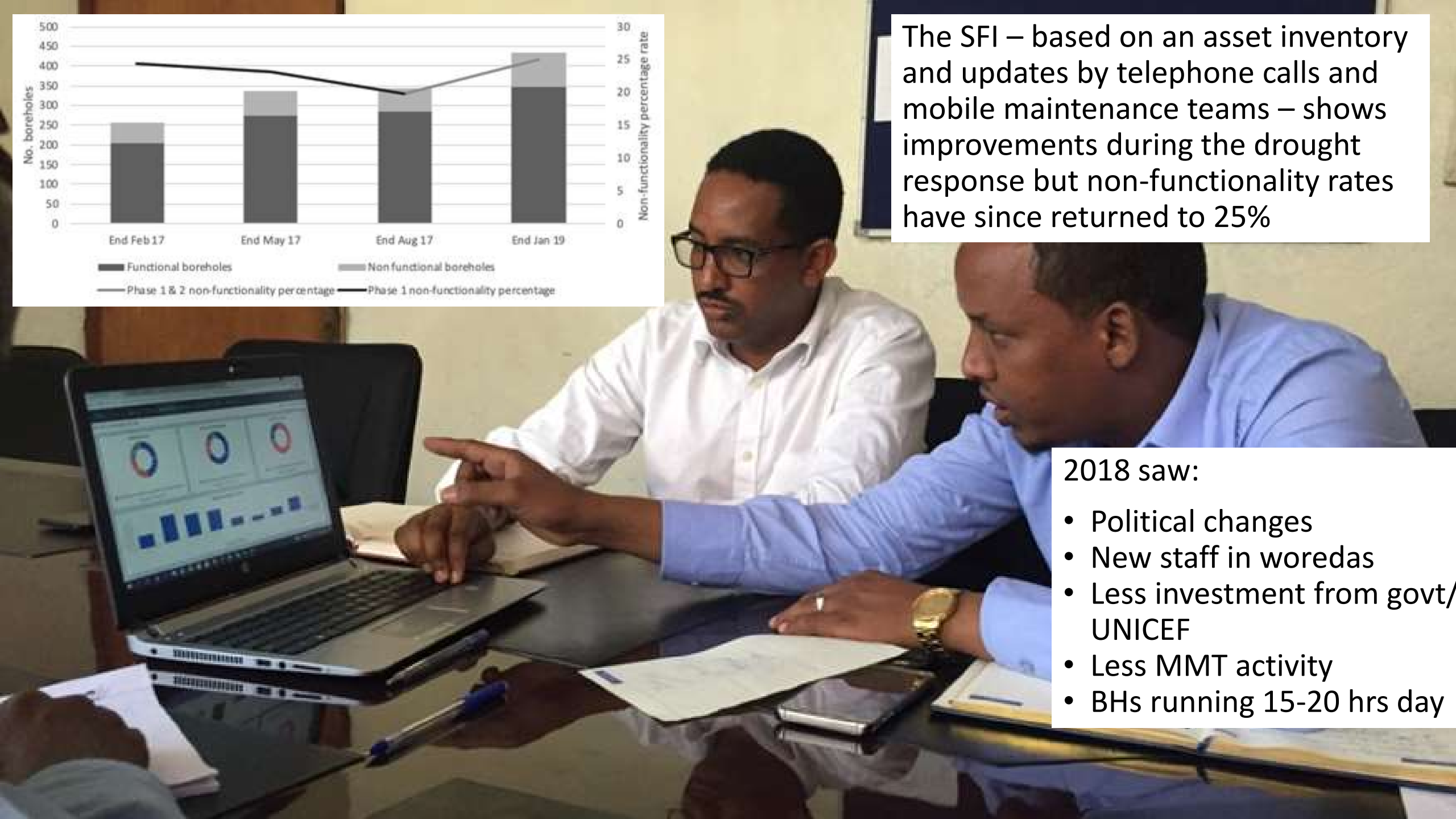
- New monitoring technologies provide an opportunity to strengthen the system
  - ➢mobile-based data collection
  - ➢asset inventory supported with flow rate and quality measurement
  - ➢Sensors for near real-time updating
- Key objectives are prioritization of maintenance and asset management, and related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



INNOVATION

NEW W OF WORKING

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

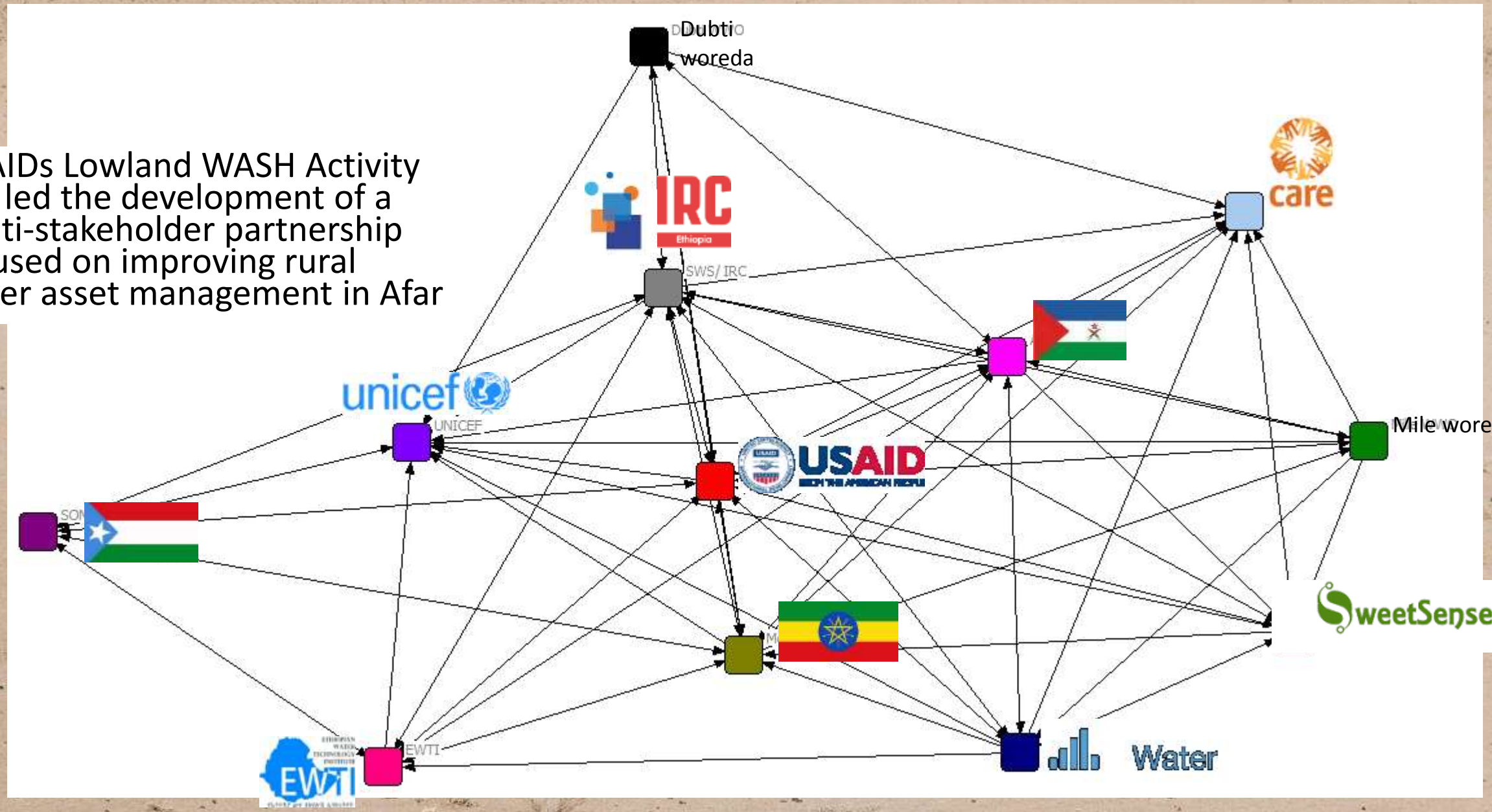


The SFI – based on an asset inventory and updates by telephone calls and mobile maintenance teams – shows improvements during the drought response but non-functionality rates have since returned to 25%

2018 saw:

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

USAIDs 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

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 split 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	Standardised reports as per requirements
Help	Provides help and support how to use this platform and the related phone app

273	183	152	100
Water systems	Asset surveys	Sweetsense sensors active	Pump 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 ministries and institutions.

In line with the overall objectives of the OWNP, 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

mWater

SweetSense

care

IRC Supporting water sanitation and hygiene services for life

AECOM

The training materials can be found on the following location:

Any suggestion for improvement, please mail:

Afar Maintenance

This dashboards shows the issues that have been reported and if they have been resolved 51% of issues are open

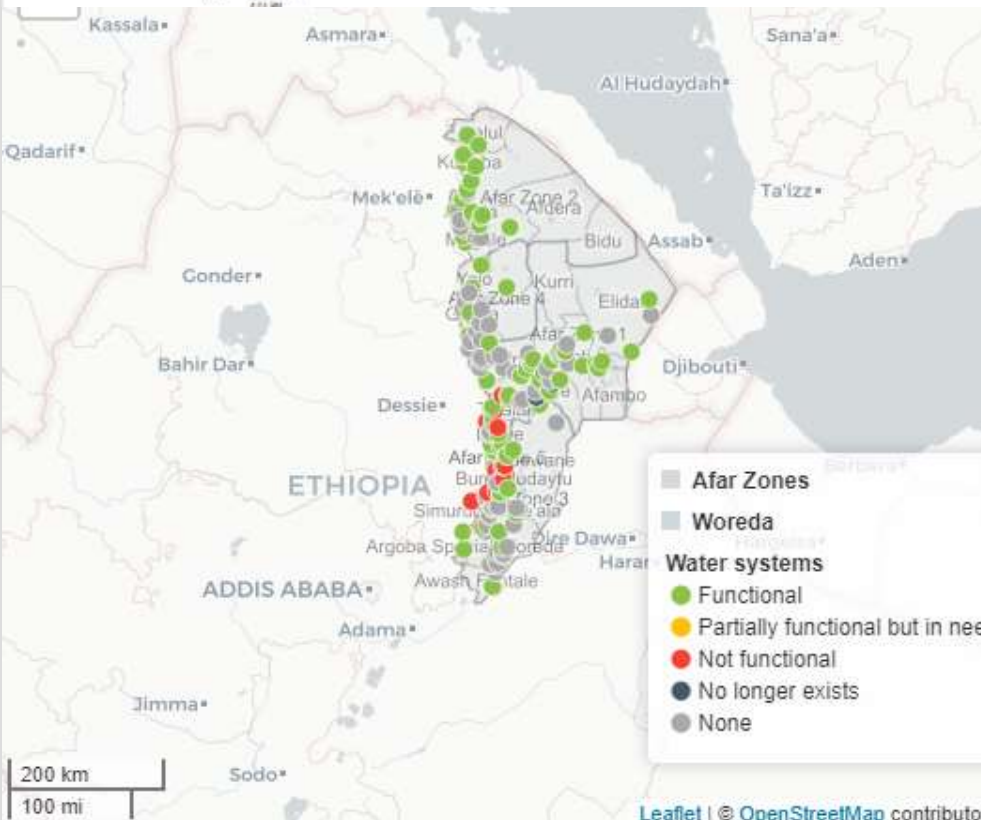
90	4	1
Open issues	Update	Resolve

Open Report and notify technician → **Update** Diagnose the problem → **Resolve** Repairs made → **Close** Verify functiona

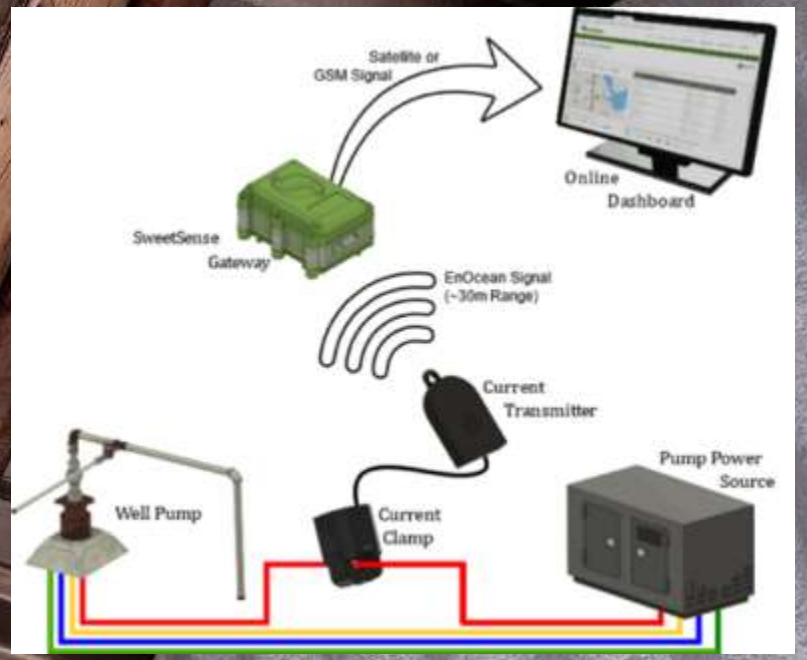
Open	Either opened by a colleague, or by Sweetsense sensor. Not yet allocated
Update	It is confirmed and work has been allocated - it is in process
Resolved	Technician or responsible has visited and resolved the problem
Closed	Administrator recognizes that the issue has been addressed properly and

Open Issues

Location name	Water system name	State	Open date	Update date	Resolution date	Problem description
		Open	Mar 4, 2019			

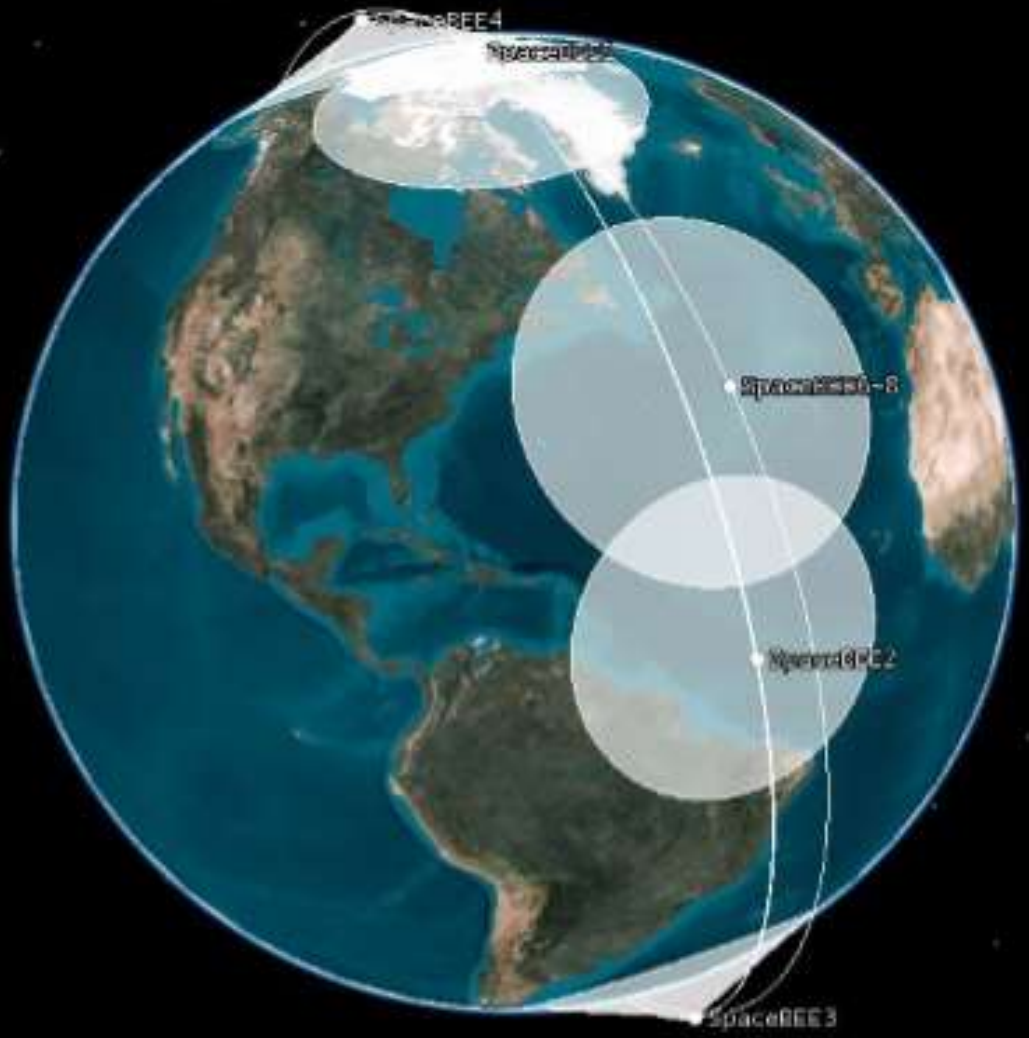


- Deep motorised boreholes with pumps cost around USD 100,000 each on average
- A sensor adds 1% to costs
- Measures power to pump. Enables calculation of:
  - Runtime
  - Production (based on known power to flow rate relationship)
  - Potential failure
- Data transmitted by mobile phone network or satellite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



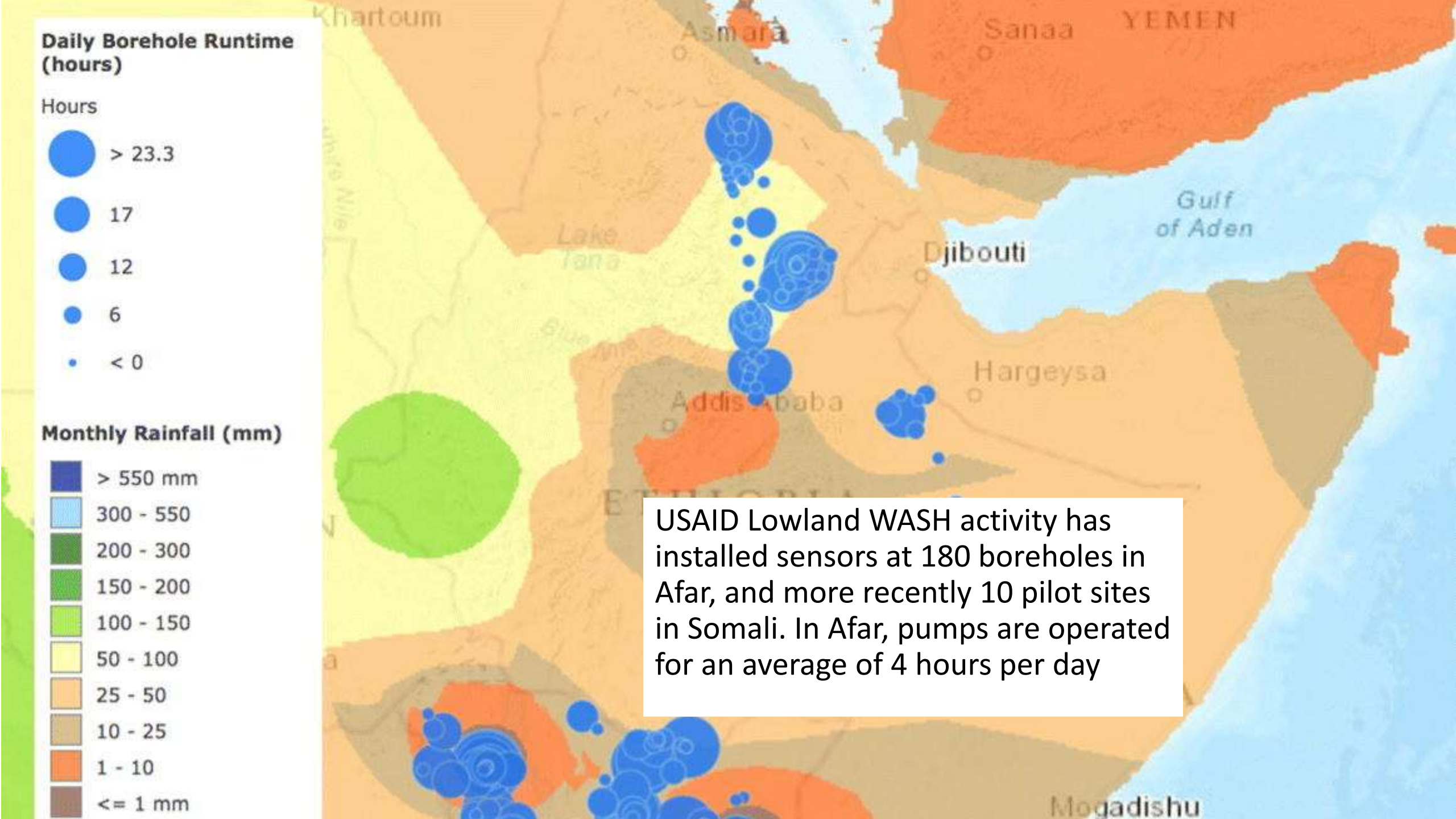
NEAR REAL-TIME MONITORING

December 2018
7 satellites



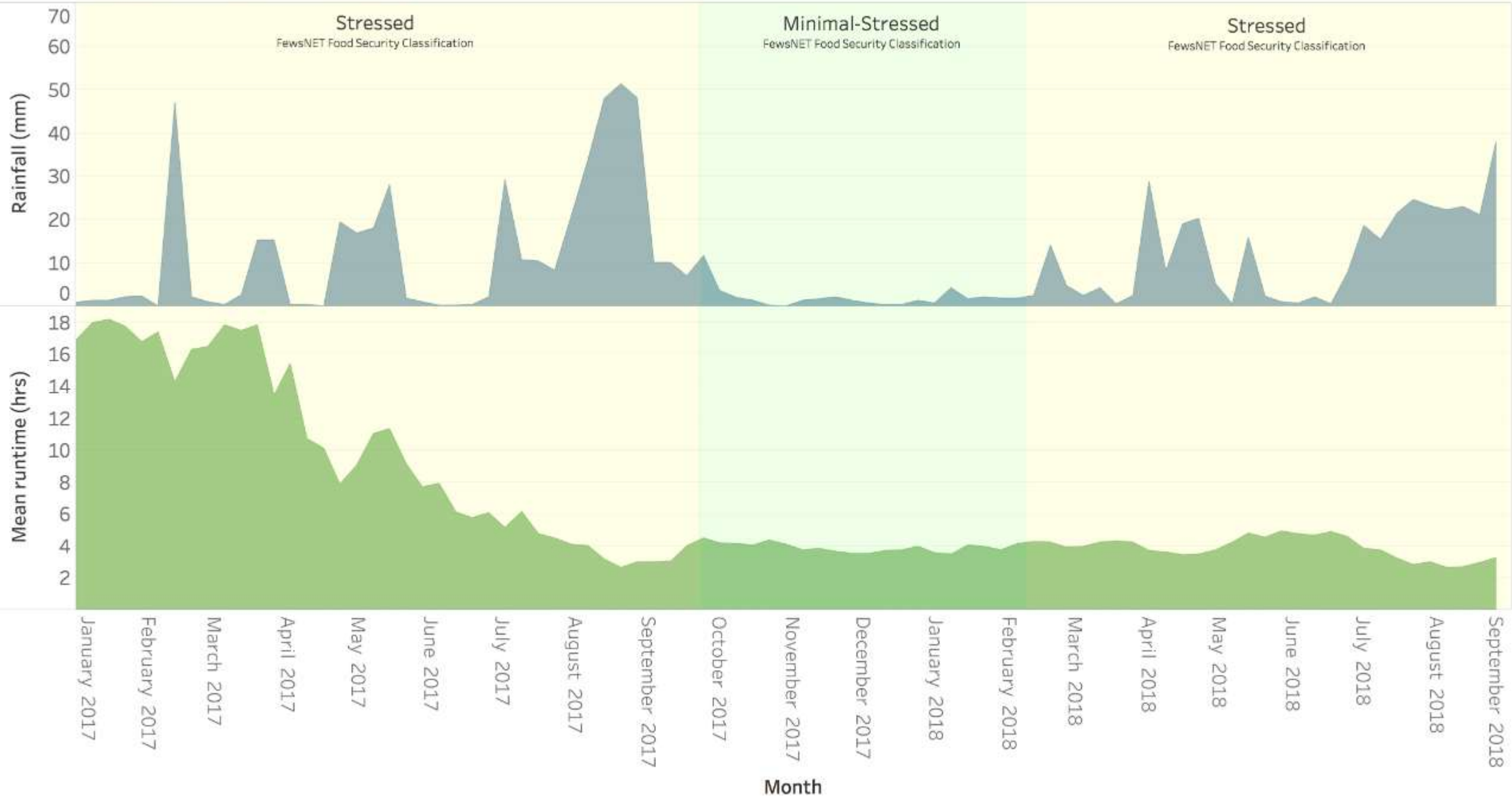
December 2019
150 satellites

www.swarm.space


Daily Borehole Runtime (hours)
Hours
> 23.3
17
12
6
< 0
Monthly Rainfall (mm)
> 550 mm
300 - 550
200 - 300
150 - 200
100 - 150
50 - 100
25 - 50
10 - 25
1 - 10
<= 1 mm
Khartoum
Asmara
Sanaa
YEMEN
Gulf of Aden
Djibouti
Lake Tana
Addis Ababa
Hargeysa
Mogadishu
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

Afar, Ethiopia

Total Weekly Rainfall (mm) vs. Mean Daily Borehole Runtime (hrs)



NEXT STEPS

Impact evaluation in Afar based on implementation science framework

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

Test SWARM for low-cost sensor communications

Advocacy based on data to reduce non-functionality

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)

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


USAID

REAL-TIME MONITORING FOR IMPROVED WATER SERVICES IN THE ETHIOPIAN LOWLANDS

Prepared by USAID Lowland WASH Activity, USAID Sustainable WASH Systems Learning Partnership, UNICEF and SweetSense