

# Water Crisis – Regional & Local Research

REACH Initiative, June 2022







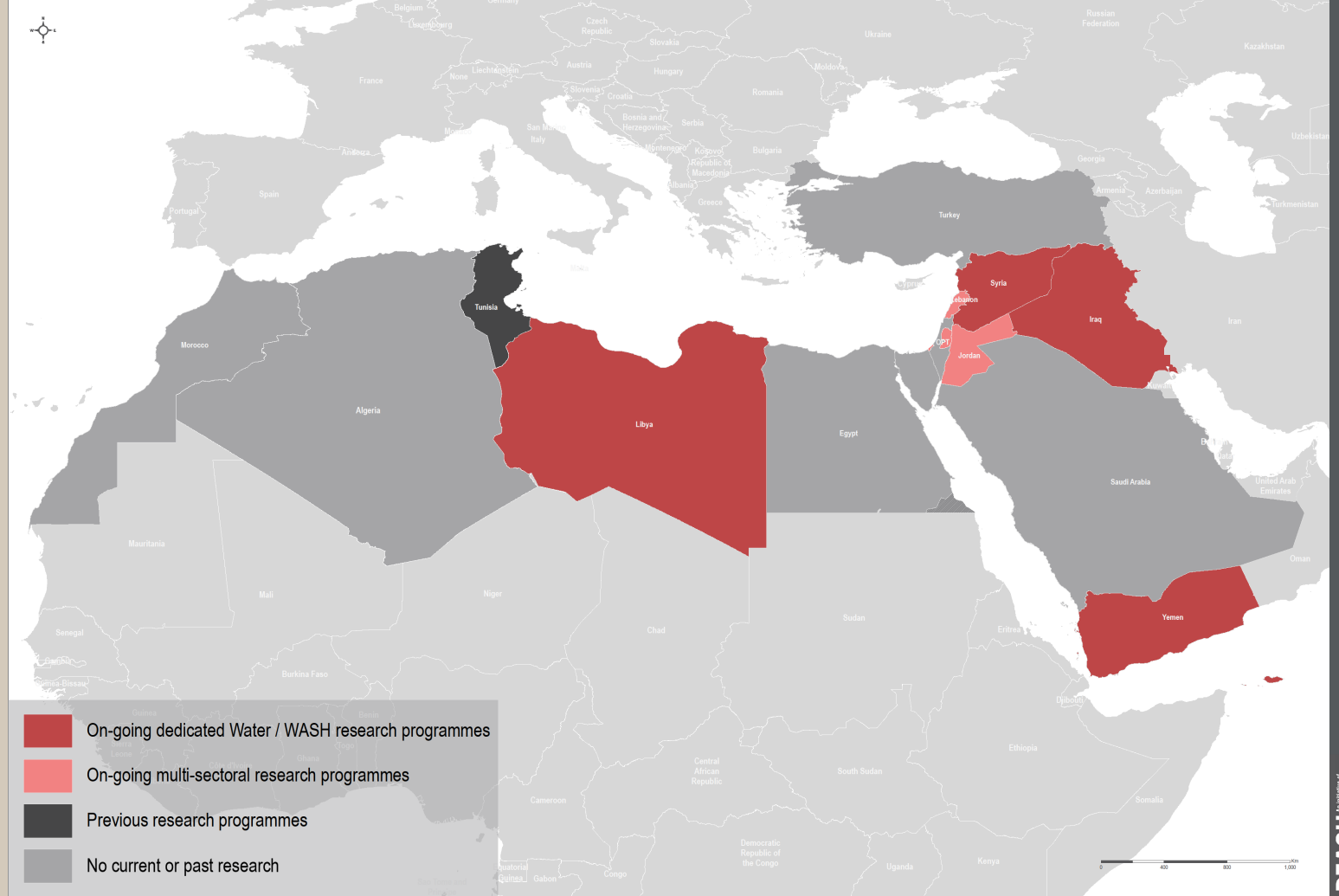
# Objectives

- **Overview of Water Crisis Research: Regional and Local**
- **Lessons Learned: Relevance for the Response**
- **Questions and Comments**





# Coverage & Approach







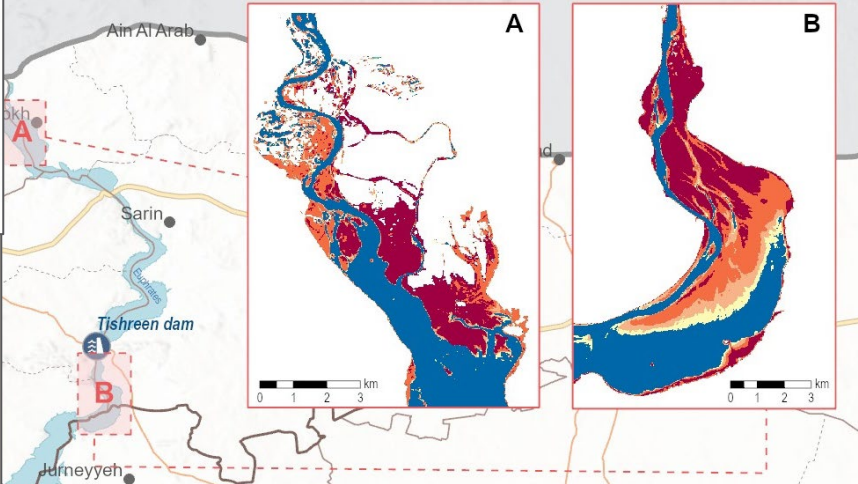
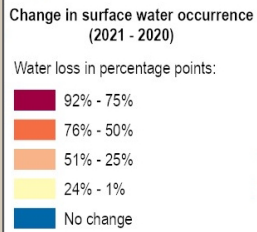
# Water Crisis (example SYR)

## Regional Drivers

- Precipitation Deficit
- Reservoir Surface Water Reduction
- Ground Water Reduction

## Local Drivers

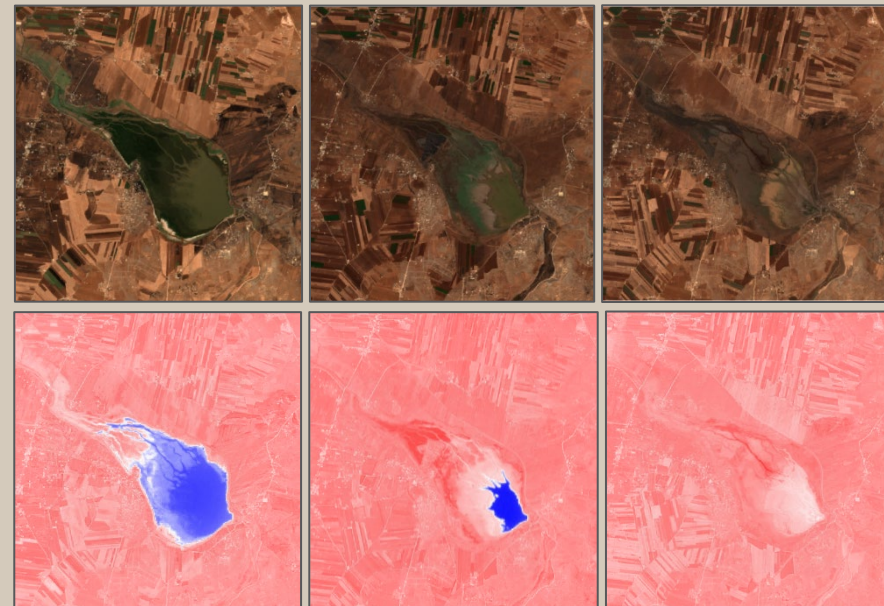
- Inefficient Water Management Structures
- Ill-functioning Water Stations



17th July 2019

14th July 2020

14th July 2021





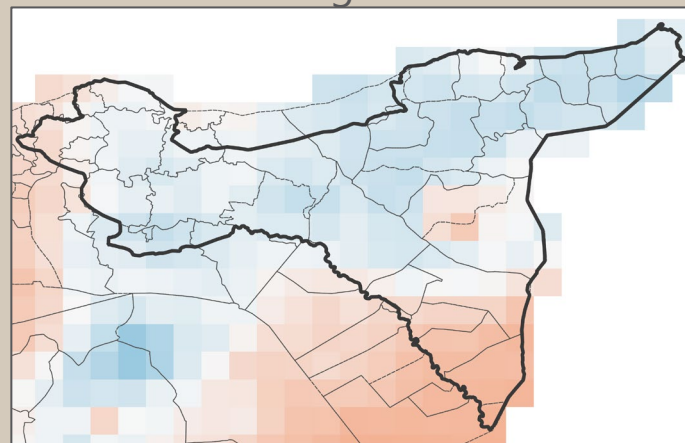


# Drought (example SYR)

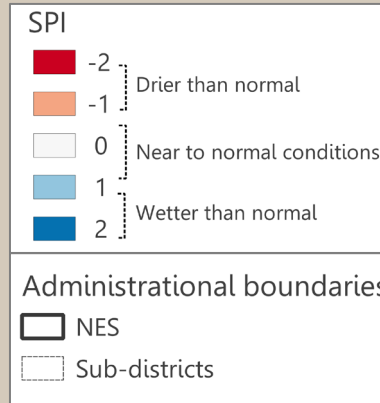
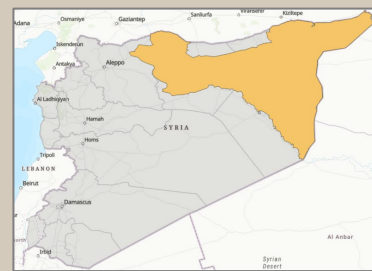
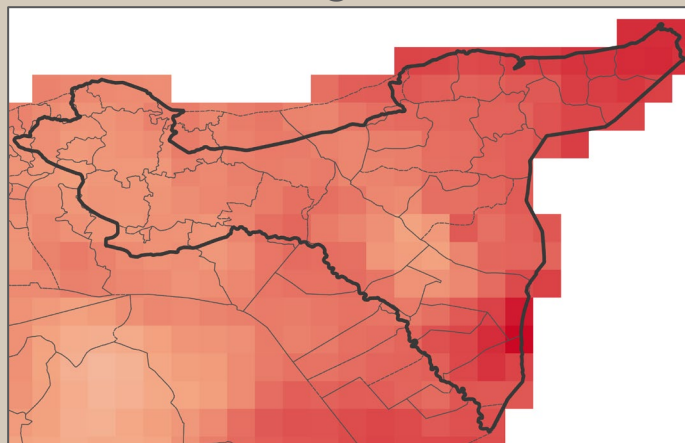
## Rainfall deficits

### 6-months Standard Precipitation Index (SPI)

March – August 2020

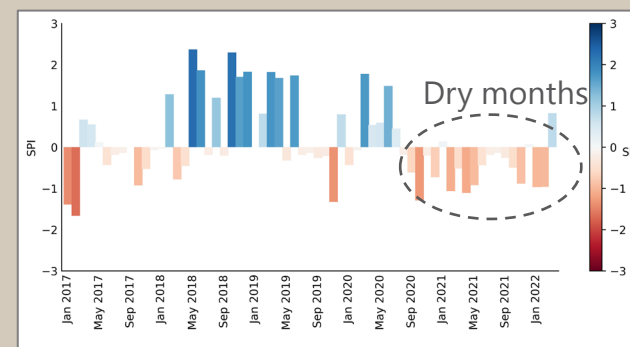


March – August 2021



### Monthly SPI

Jan 2017-March 2022



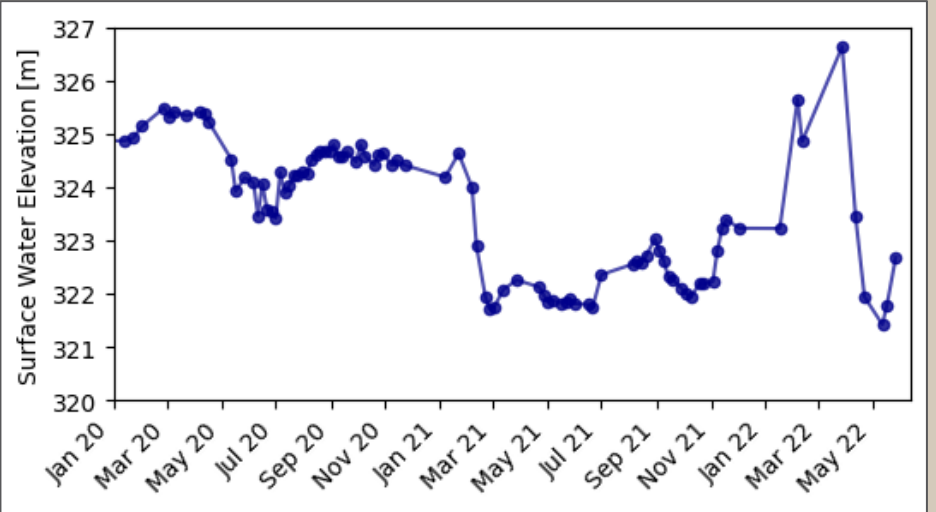
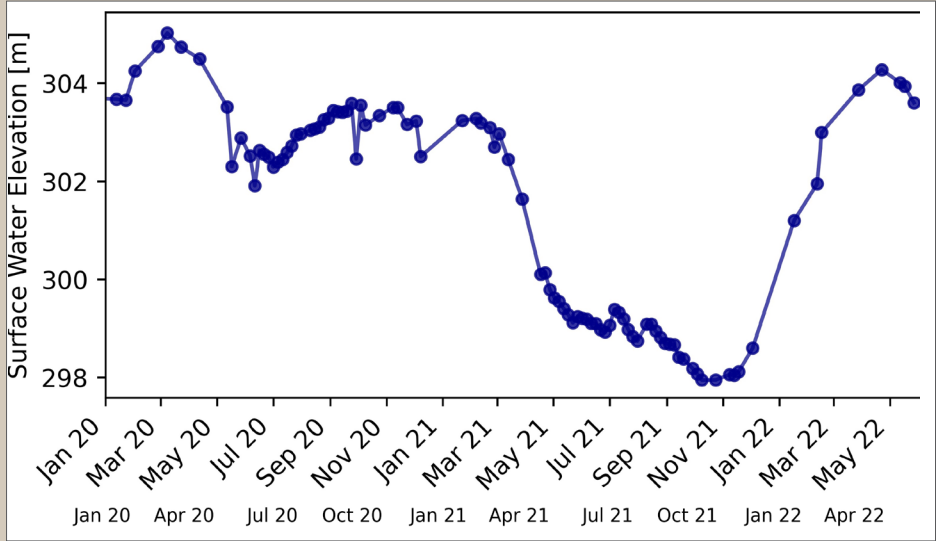
Data Source: Climate Hazards Group InfraRed Precipitation With Station Data, Version 2.0 Final (CHIRPS)





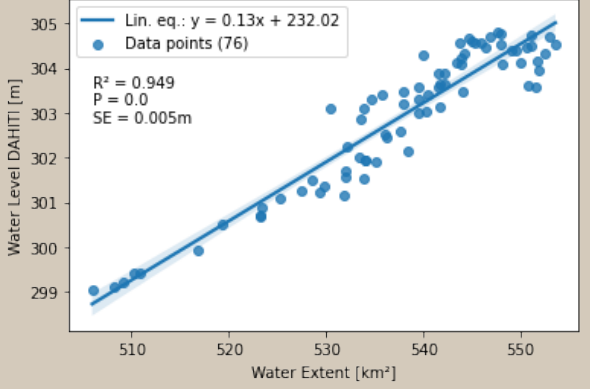
**Water scarcity (example)**

# Change in surface water level measurements



### Method: Linear modelling

- Surface water area (publicly available)
- Secondary historical water level data (publicly available)



Data Sources: Surface water data and historical water level data from DAHITI – Database for Hydrological Time Series of Inland Waters

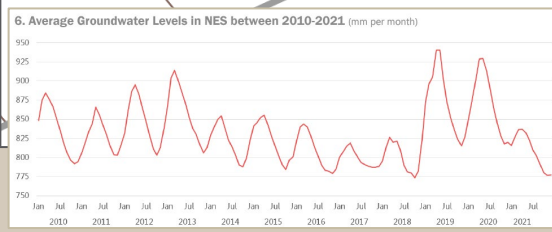
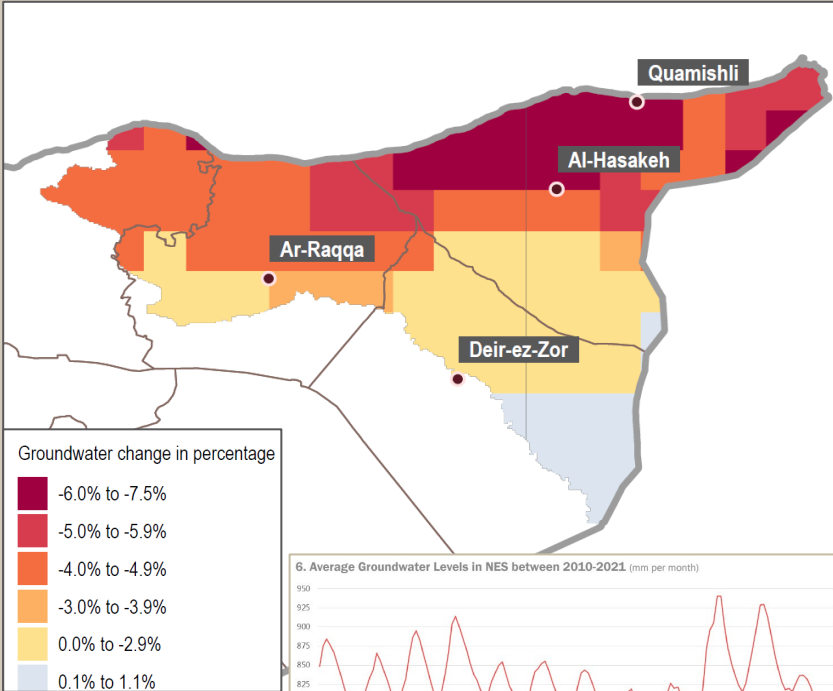




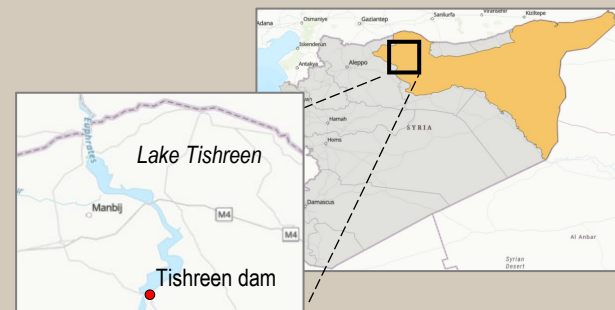
**Water scarcity (example SYR)**

### Change in ground water storage

Difference betwen 2021 and 10-years average over 2011-2020



Data Source: NASA's Gravity and Climate Experiment (GRACE)

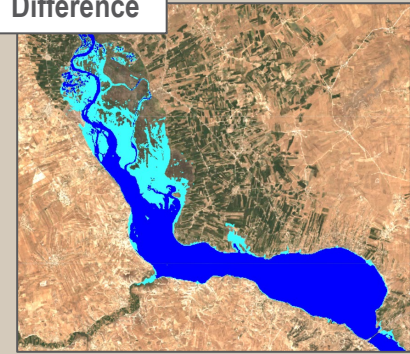


### Change in surface water area

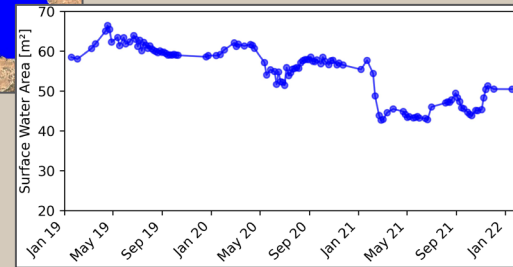
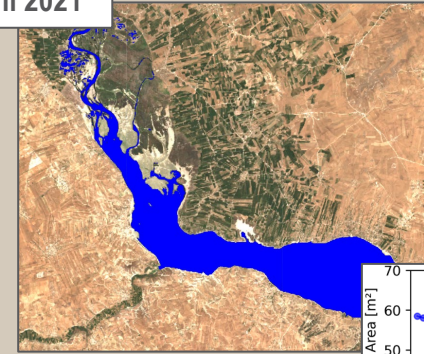
April 2020



Difference



April 2021



Data Sources: Sentinel-2, Sentinel-1, USRG SRTM (DEM), Merit Hydro (HAND) and Global Land Analysis and Discovery (GLAD) Surface Water

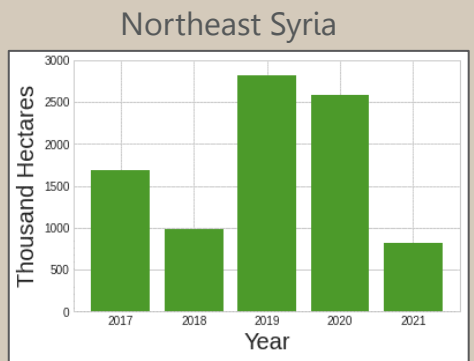
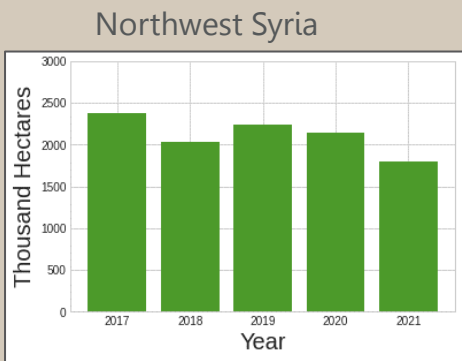




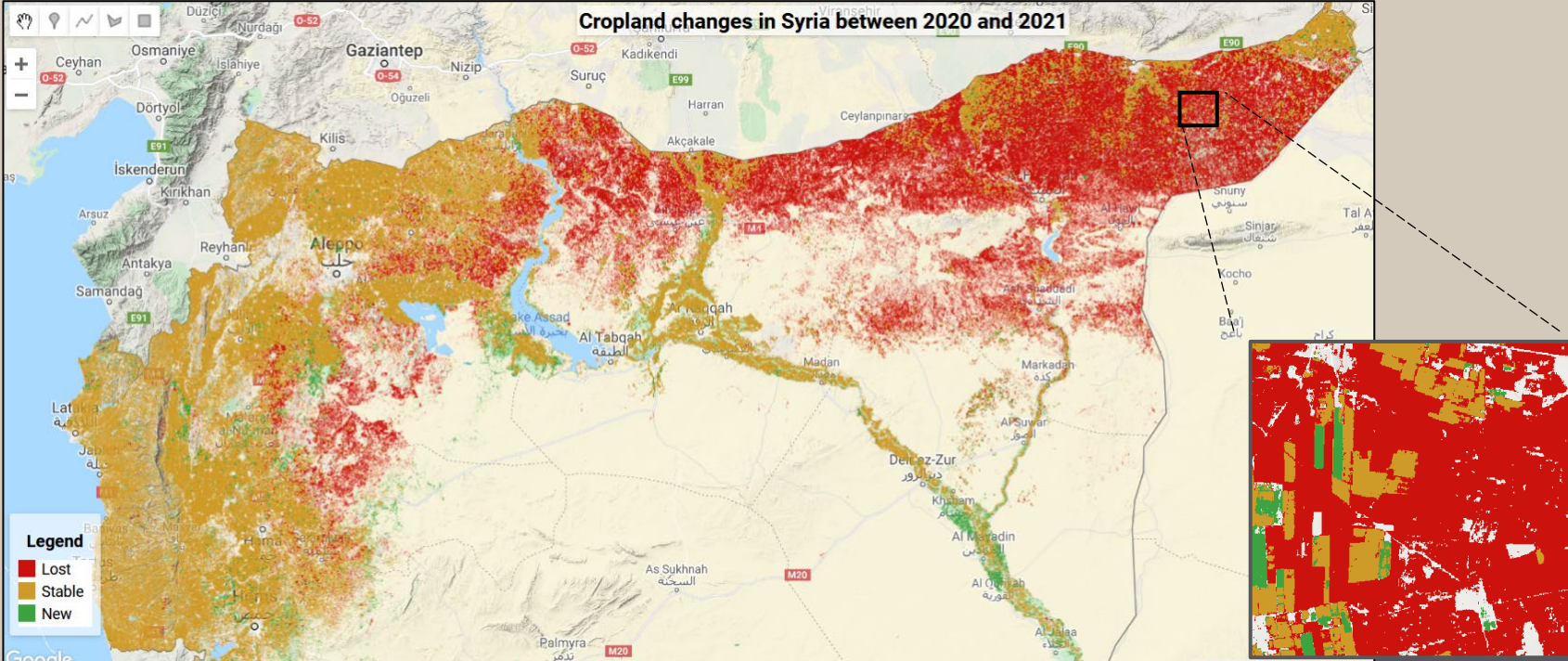
**Crisis  
impact  
(example SYR)**

# Cropland abandonment

## Cropland area 2017 - 2021



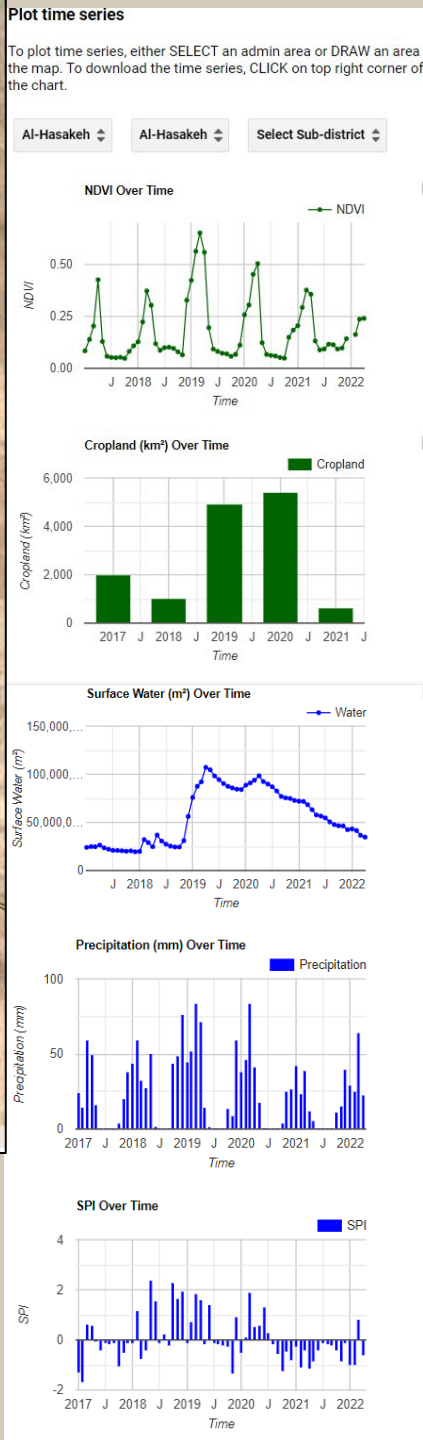
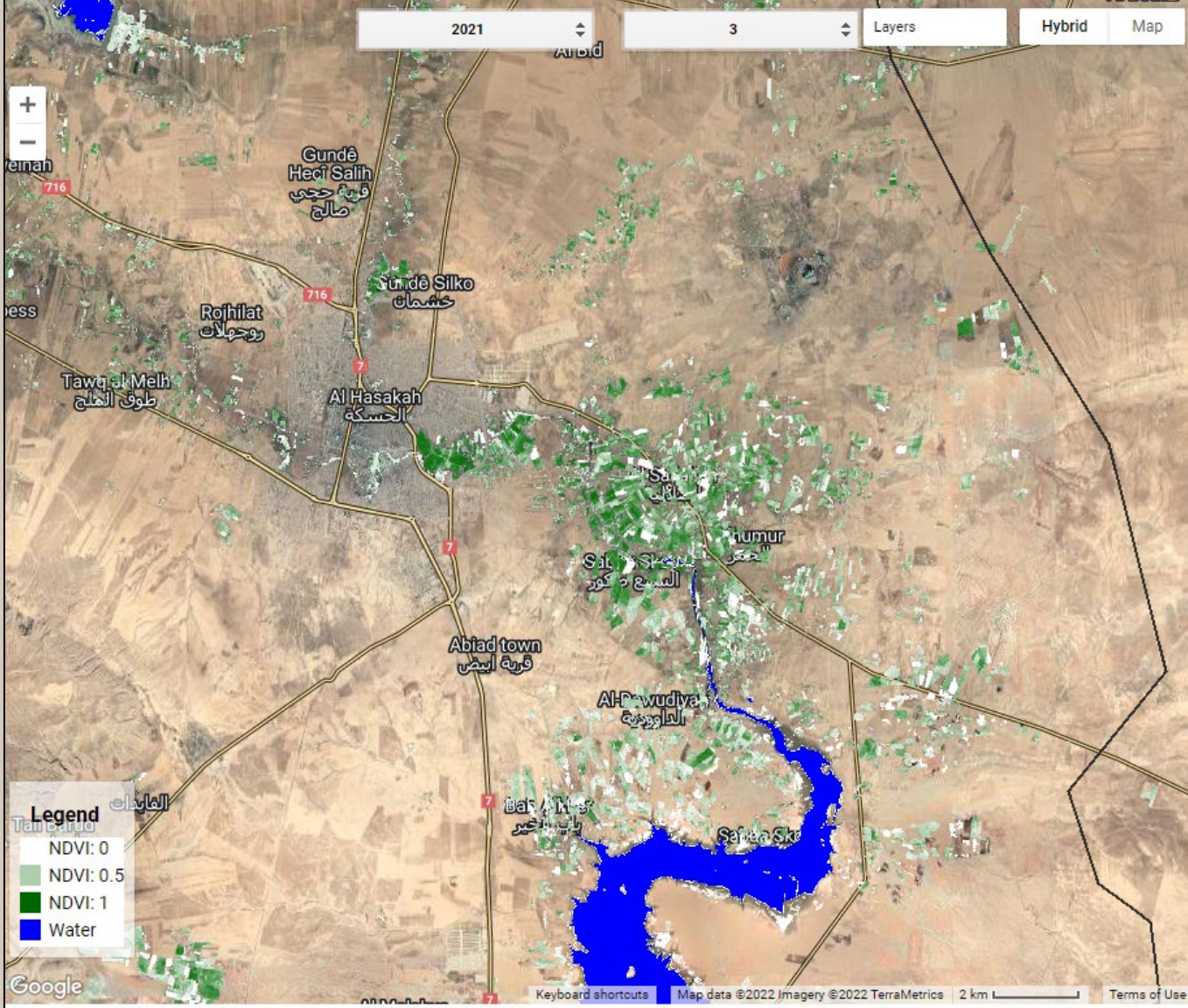
## Changes in cropland area between 2020 and 2021







# Dashboard (example SYR)



<https://projectsremotesensing.users.earthengine.app/view/agricultural-analysis> [not public]

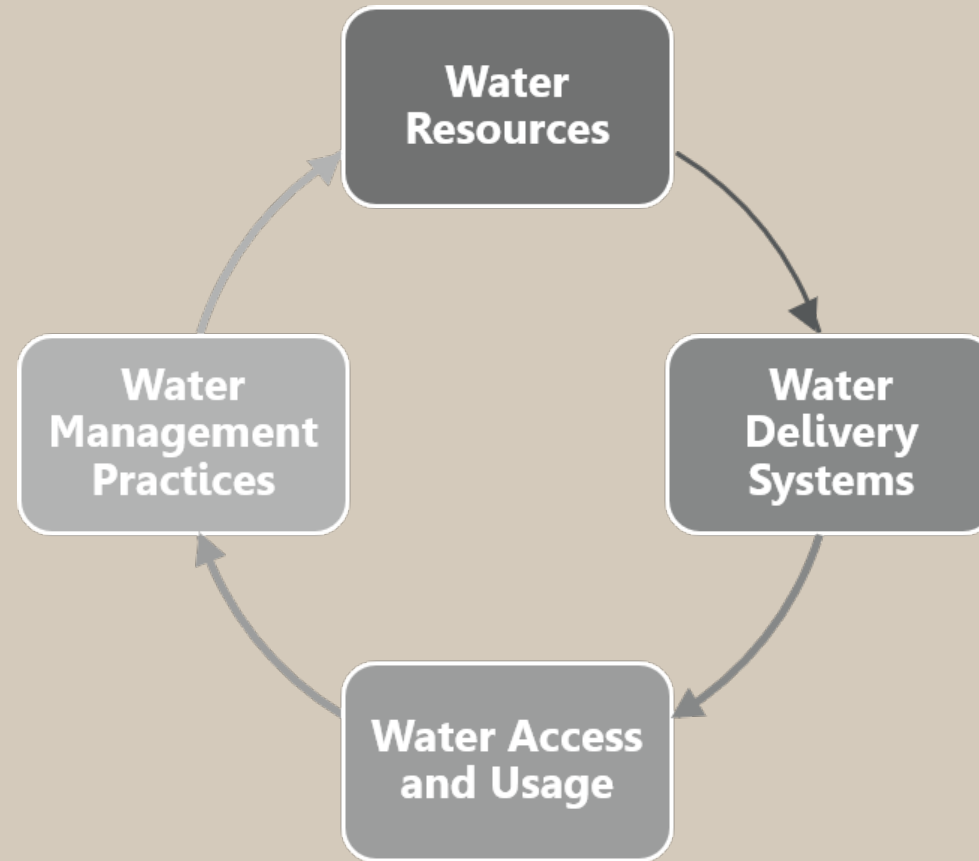




## Local Area-Based Approach (global example)

# Informing a sustainable response

Water management area-based assessments to understand local water resources, usage practices, and management structure and capacities



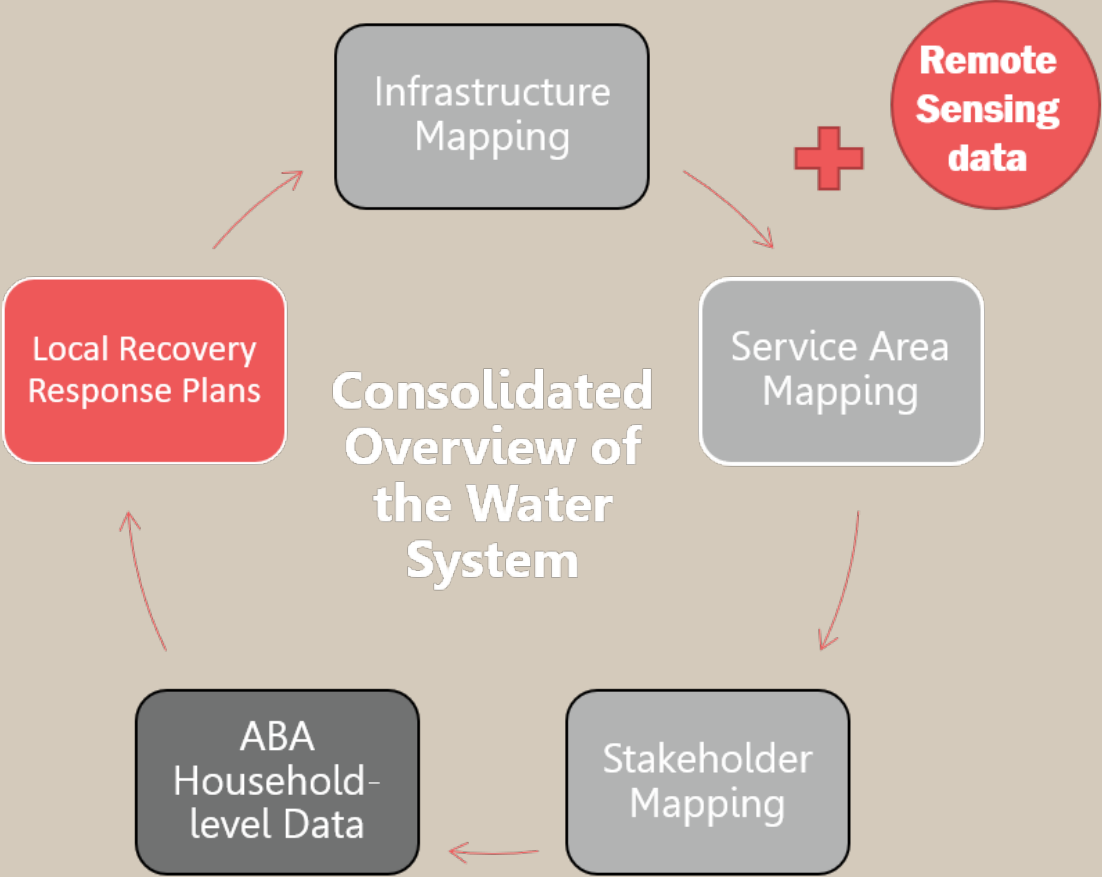
Exploring the root causes and impact of the crisis on each component of the water system



# Area Water Profiles

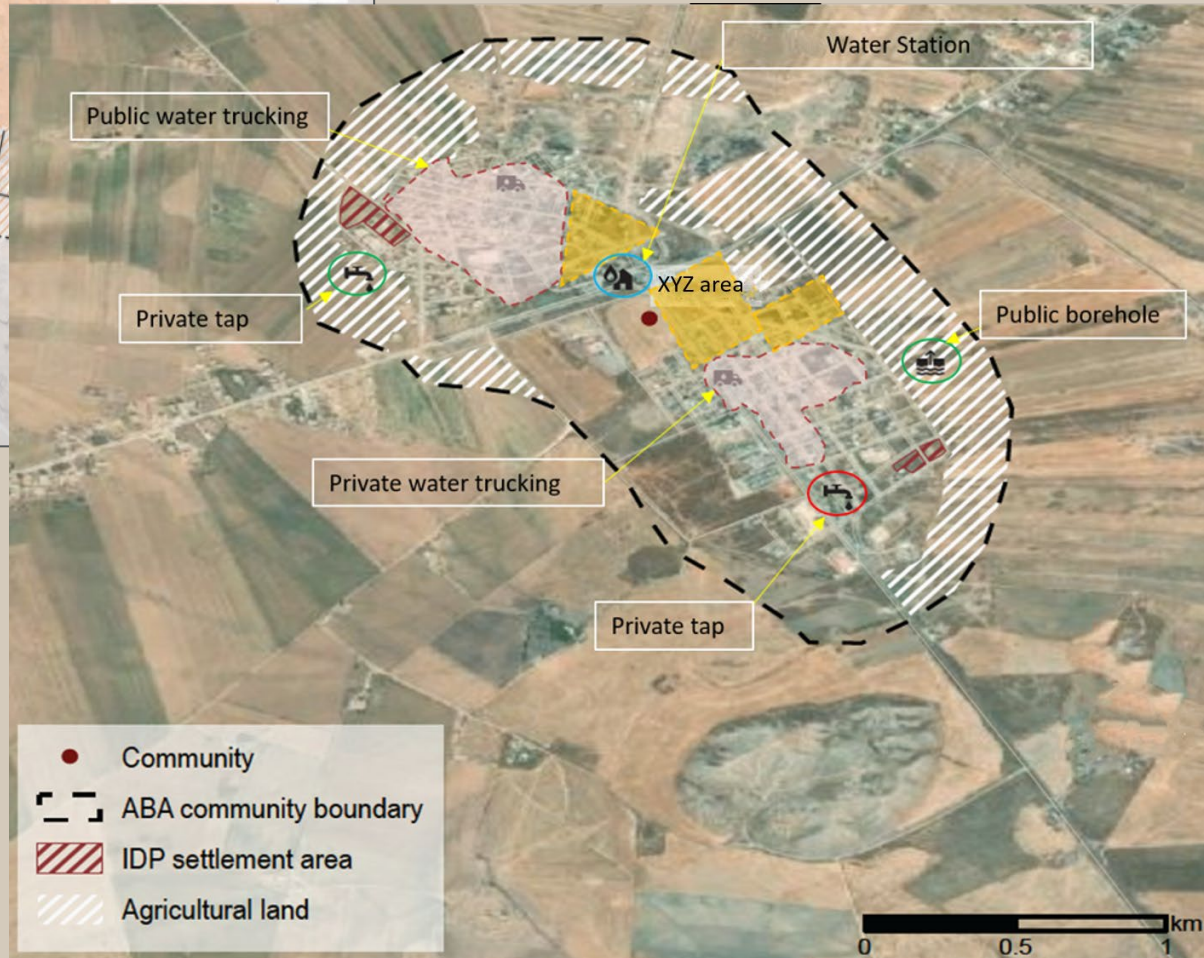
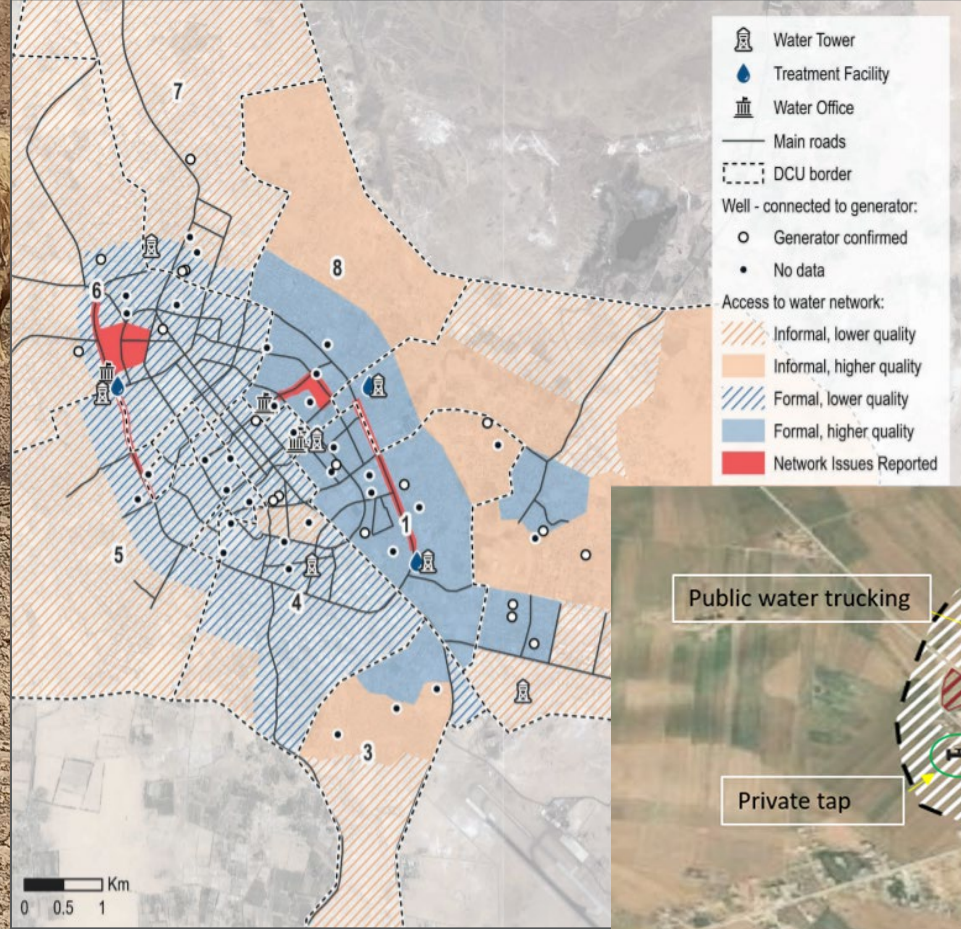
In-depth qualitative, quantitative and spatial analysis of the needs, capacities, governance dynamics and structural development issues

**Providing Comprehensive Information**





# Infrastructure and Service Mapping (global examples)





# Understanding stakeholders' expertise, mandates and capacities

## Stakeholder Mapping (global tool)



Local systems, knowledge and relationships bring nuanced understanding of the practical issues and approaches

Empowering local stakeholders generates a more sustainable response

Assessing water resilience - risks and capacities

<https://www.impact-initiatives.org/what-we-do/news/the-settlements-approach-where-boundaries-and-action-merge/>



# Exploring actionable intervention strategies with local stakeholders and communities

## Participatory Response Plans (global example)

| WATER  |   |   |  |   |
|--|---|---|--|---|
| LACK OF ACCESS TO SUFFICIENT QUANTITIES OF QUALITY WATER   |   |   |  |   |
| WHAT   | WHEN  | WHO   | WHERE  | WHO BENEFITS  |
| <i>What is the solution in terms of type of projects or interventions?</i>   | <i>Is it a solution oriented towards short-term Relief, mid-term Recovery, or long-term Resilience?</i> | <i>Which actors will be involved in implementation of the intervention?</i> | <i>Where are the related assets/ infrastructure located?</i> | <i>Who are the planned beneficiaries (household vs community level) and what are the selection criteria if household?</i> |
| Water trucking for increased access to sufficient quantities of water  | Relief  | (I)NGOs, Local authorities  | XYZ community  | Household level<br>(Based on vulnerability)   |
| Provision of inputs to existing water purification and detoxification stations, including items such as reverse osmosis filters and sterilisation materials for XYZ's existing reverse osmosis station | Recovery  | (I)NGOs, Local authorities, Water Department                                | XYZ community  | Community level   |
| Installation of an additional reverse osmosis station (with a potential focus on public water stations currently used for livestock and/or irrigation)   | Resilience  | (I)NGOs, Local authorities, Water Department                                | XYZ community  | Community level   |