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# WATER SECURITY IN IRAQ

United Nations Innovation Cell x Element 84

Element 84



# OBJECTIVE

Monitor trends in water scarcity and conflict throughout Iraq to enable data-driven, multilateral decision-making



# BUILDING BRIDGES

## Element 84

NASA Subcontractor

## DPO Middle East Division

United Nations Department of Political Operations Middle East Division

## UN DPPA

United Nations Department of Political and Peacebuilding Affairs

## UNAMI

United Nations Assistance Mission for Iraq

## CSM

United Nations Climate Security Mechanism

## UNEP

United Nations Environmental Programme

## UN GSC

United Nations Global Services Center

## UNDP

United Nations Development Programme

## UN GIS

Geospatial Information System





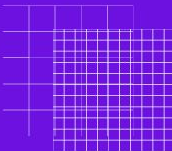
10 INDICATORS  
19 GOVERNORATES  
25 SATELLITES  
120 DISTRICTS  
>500K DATAPOINTS

# PROCESS



## ACQUISITION

Half a million datapoints  
from 25 Satellites



## NORMALIZATION

Variance from historical  
average calculated for  
each month



## AGGREGATION

Values averaged for each  
district and governorate  
level polygon

# INDICATORS



## Soil Moisture

Source: SMAP

Temporal Availability: 2015-present



## Precipitation

Source: CMORPH

Temporal Availability: 1998-present



## Vegetation

Source: NDVI

Temporal Availability: 1981-present



## Population

Source: WorldPop

Temporal Availability: 2000-2020



## Administrative Districts

Last updated: 2018



## Groundwater Change

Source: GRACE

Temporal Availability: 2002-present



## Surface Water Change

Source: GRACE

Temporal Availability: 2002-present



## Total Water Change

Source: GRACE

Temporal Availability: 2002-present



## Surface Water Extent

Source: GLAD

Temporal Availability: 1999-present



## Conflict

Source: Uppsala Conflict Data Program

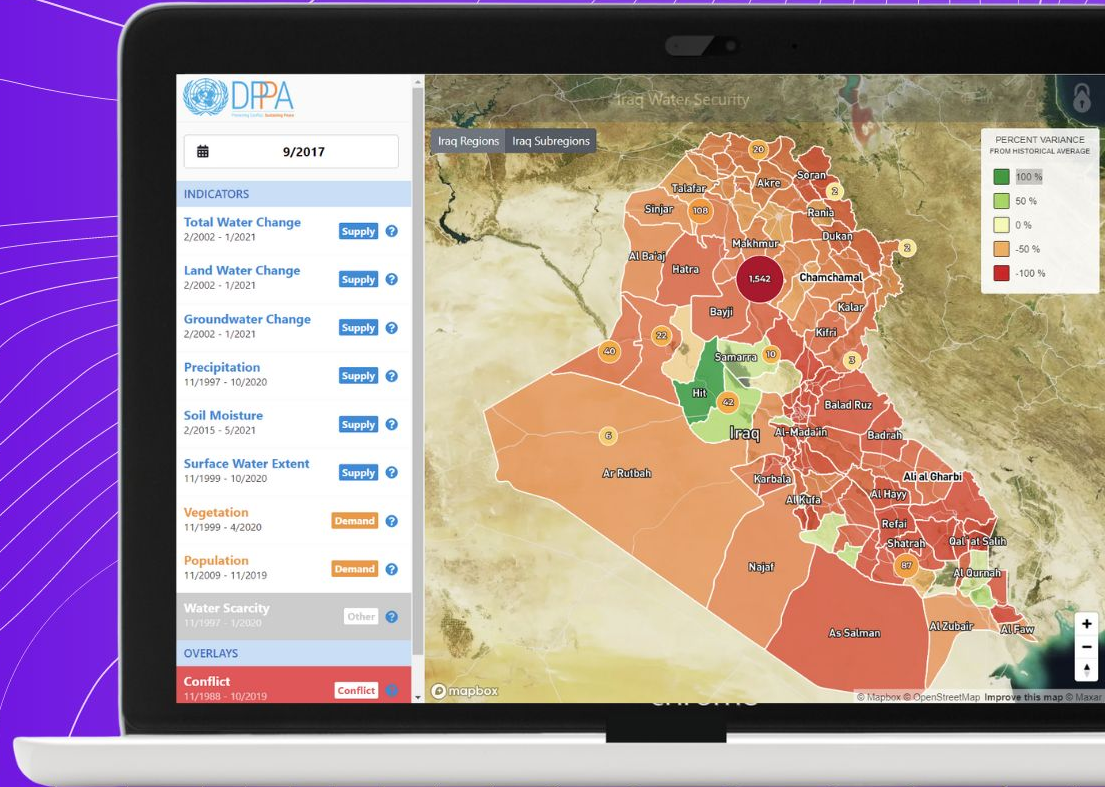
Temporal Availability: 1975-present



## Water Scarcity Score

(Aggregation of all indicators)

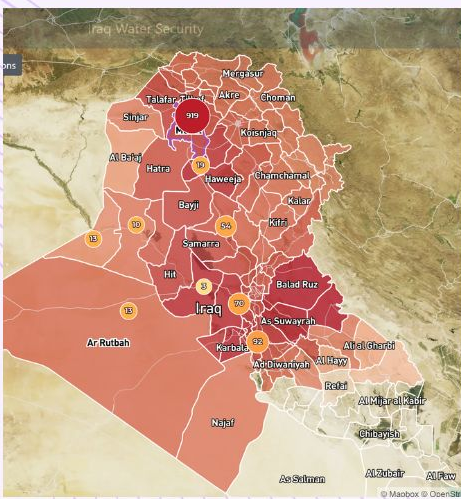
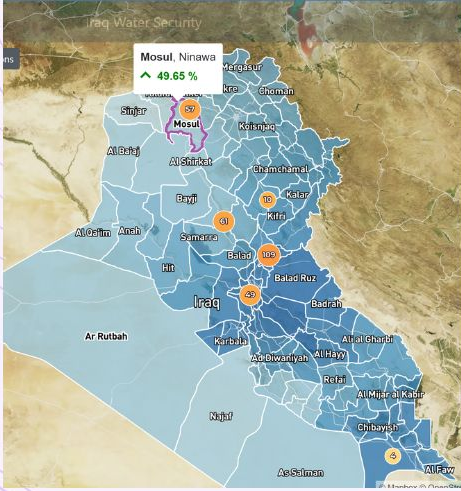
# OUR PRODUCT



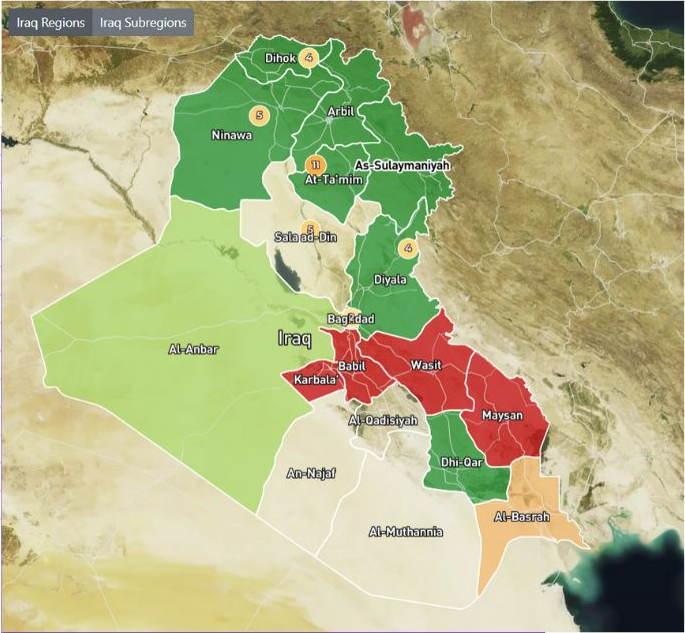


# A TOOL FOR UNDERSTANDING WATER-CONFLICT RELATIONSHIPS

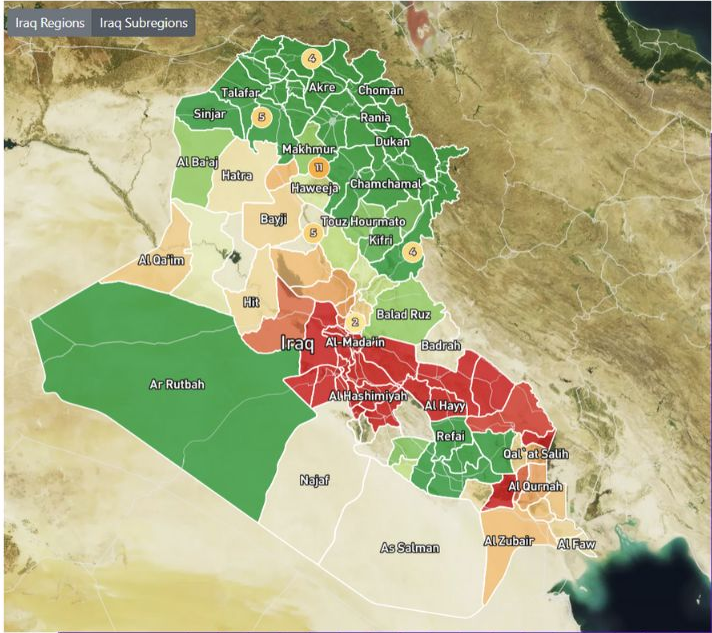
Across time and space



# Governorates



# Districts



A TOOL FOR MULTILATERAL DECISION MAKING

**DPPA**  
Data Platform for Policy and Planning

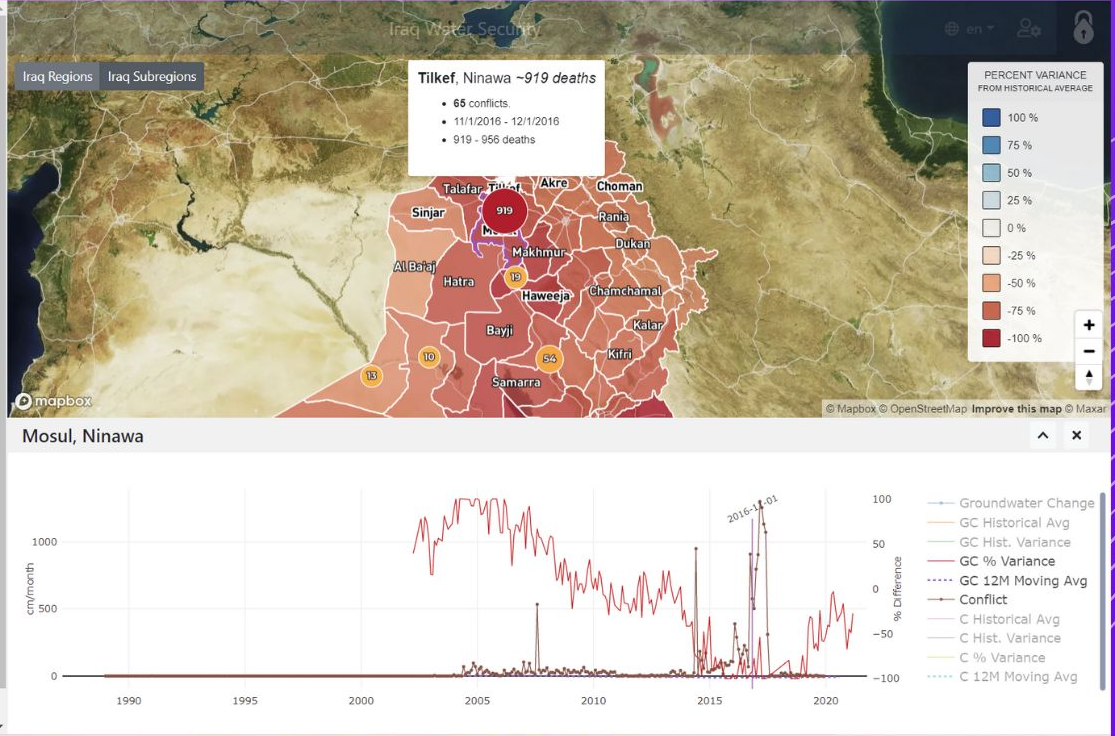
11/2016

**INDICATORS**

- Total Water Change**  
2/2002 - 1/2021 Supply ?
- Land Water Change**  
2/2002 - 1/2021 Supply ?
- Groundwater Change**  
2/2002 - 1/2021 Supply ?
- Precipitation**  
11/1997 - 10/2020 Supply ?
- Soil Moisture**  
2/2015 - 5/2021 Supply ?
- Surface Water Extent**  
11/1999 - 10/2020 Supply ?
- Vegetation**  
11/1999 - 4/2020 Demand ?
- Population**  
11/2009 - 11/2019 Demand ?
- Water Scarcity**  
11/1997 - 1/2020 Other ?

**OVERLAYS**

- Conflict**  
11/1988 - 10/2019 Conflict ?



# HISTORICAL TRENDS

# WHAT'S NEXT?

- Automated data processing
- Dynamic indicator aggregation
- Scaling to other regions
- Incorporating agricultural suitability and migration

