



# SEEDS - Long-term Impacts of a Complex Agricultural Intervention on Welfare, Behaviour and Stability in Syria

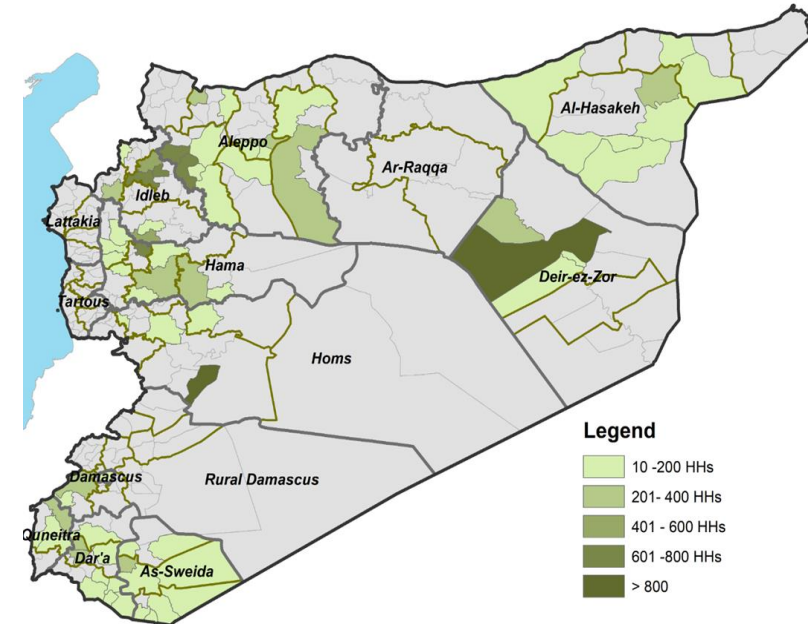
French – Lebanese Summer School on Remote Sensing  
30 May 2022

Hadi Jaafar  
Lara Sujud



# Background

- Funded by the FCDO, FAO Syria implemented an agricultural intervention across Syria addressing both “emergency” and “recovery” needs to support farmers.
- The intervention aims to build resilience in the agricultural sector and increase food production through providing farmers with **agricultural inputs** and **enhancing access to irrigation water** through the rehabilitation of irrigation network systems.

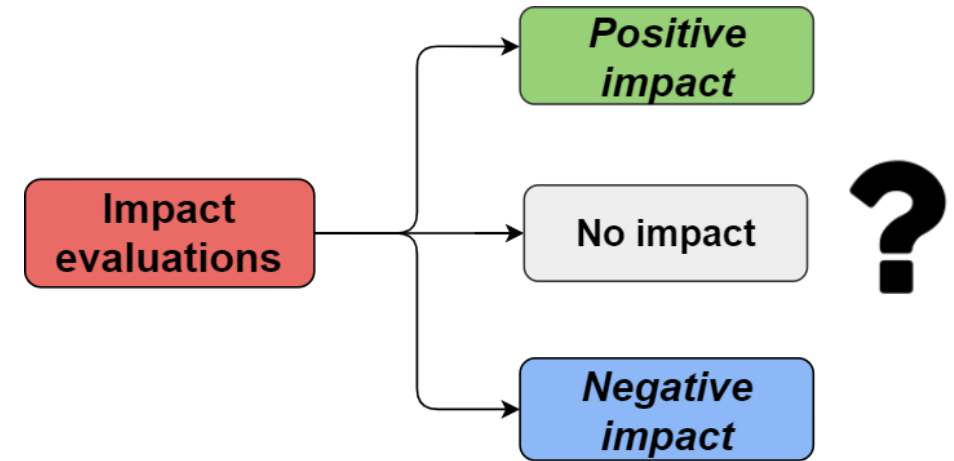


16,432 Households  
98,592 Beneficiaries

Activity Type	House holds
BeeKeeping	500
Capacity Development	19
Nurseries	500
poultry Package	3200
Seed Multiplication	97
Sprouts Production Units	200
Vegetable Packages	7384
Water Management	4340

# Research gaps

- Increased interest in developing new methods to measure the impact of interventions to guide policy decisions.
- Little research has been done on the potential use of remote sensing for impact evaluation of agricultural interventions in a conflict- setting.
- Lack of data due to security reasons
- Policy makers lack guidance on how interventions can best support people's welfare particularly in conflict-settings.



# Objectives

- To better understand the short-, medium-, and long-term impact of a complex agricultural intervention in a protracted humanitarian crises on household behavior.
- To adapt existing approaches and to test novel approaches (including machine learning) for conducting evidence-based impact evaluations of agricultural interventions in conflict settings.

# Theory of change



## Short term

Direct asset transfer  
→ increase food  
production and  
availability



## Medium term

Increased access to  
productive assets  
through improved value  
chains; strengthen  
resilience against  
recurrent shocks



## Long-term

Enhance food  
security, nutrition,  
health and stability

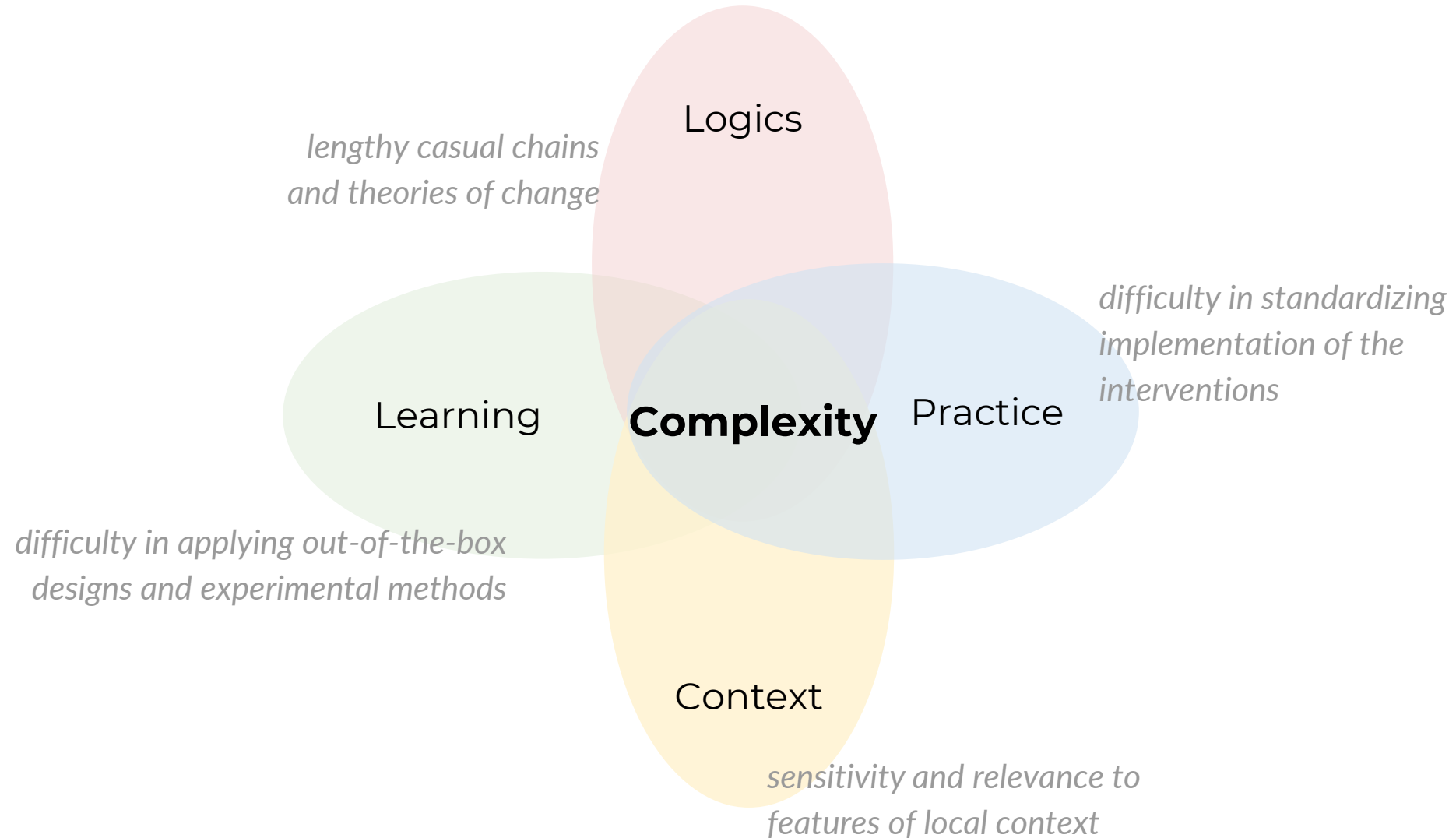


# Hypotheses

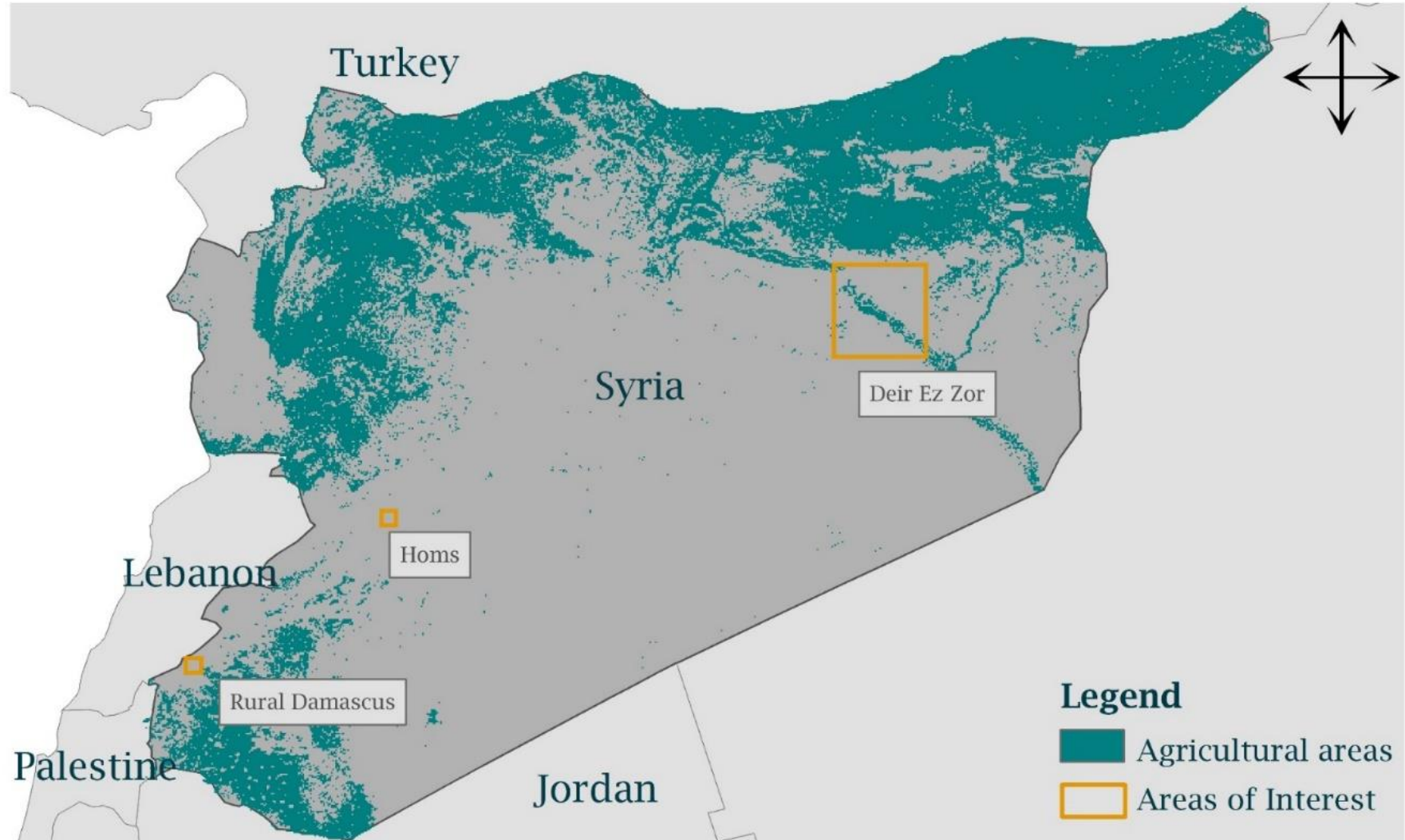
- **Short-term:** Irrigation rehabilitation *increases access to water and hence agricultural and livestock production at the village level.*
- **Medium term:** Irrigation rehabilitation *increases agricultural productivity and decreases vulnerability to recurrent shocks.*
- **Long-term:** Irrigation rehabilitation *strengthens political stability at the village level.*



# Complexity in a humanitarian setting

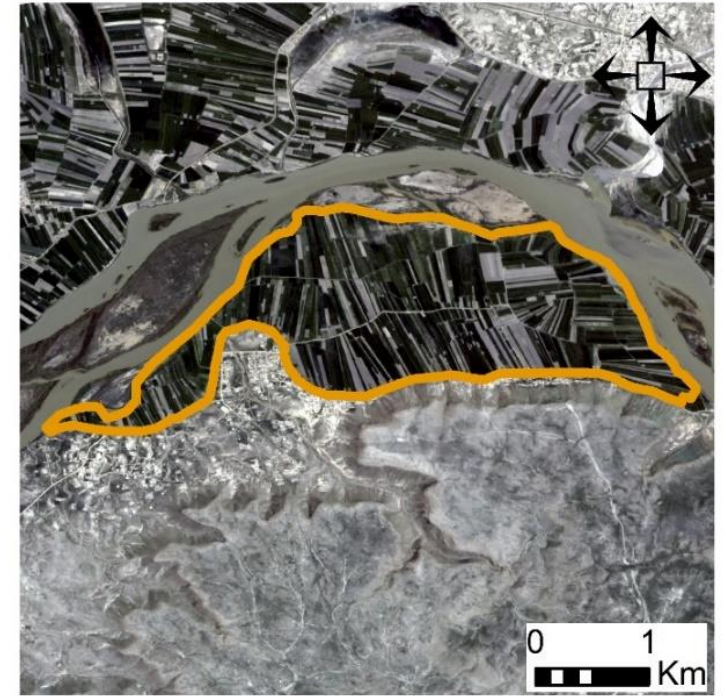
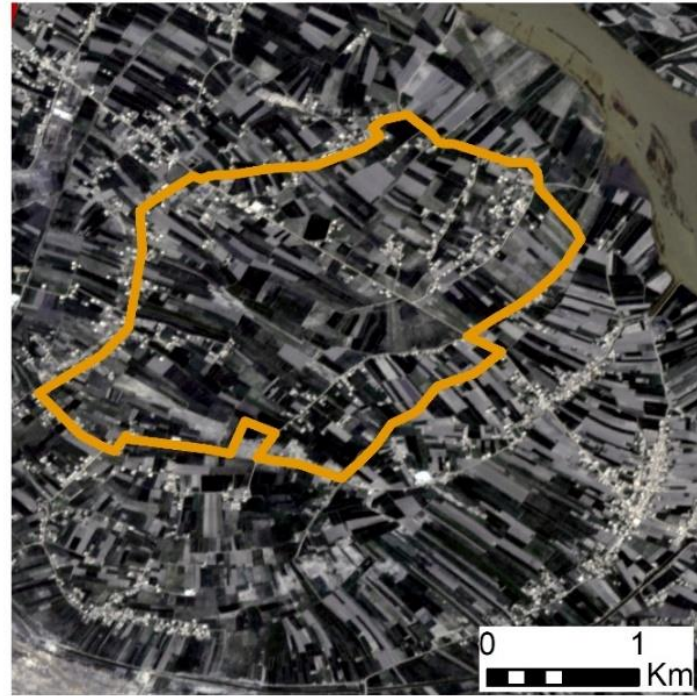
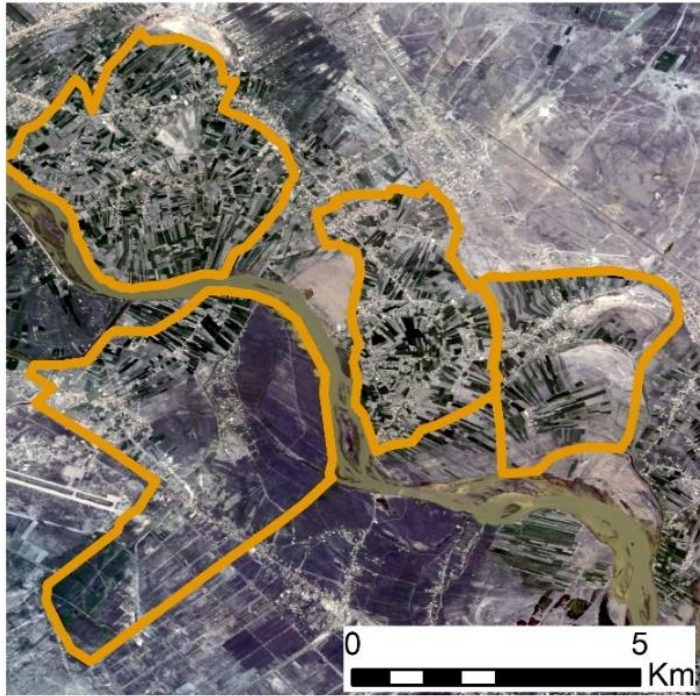


# Study area





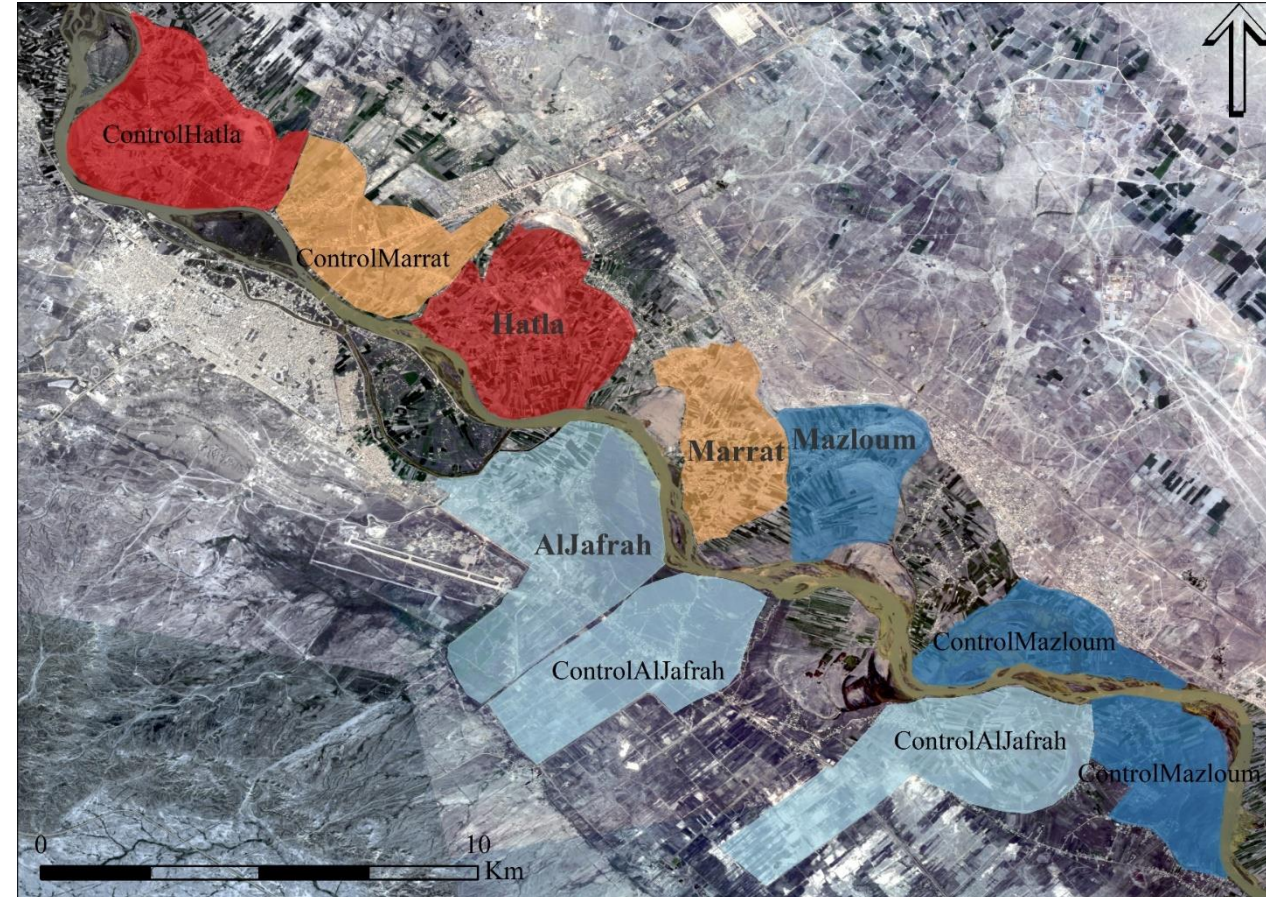
# Intervention villages



# Selection of control villages

To disentangle the effect of the FAO's interventions from that of other agro-ecological factors, we selected control villages (Jaafar et. al, 2015):

- Areas irrigated from Euphrates.
- Areas that will not benefit from intervention.
- Areas with same climatic zone and crop type pattern as intervention areas.





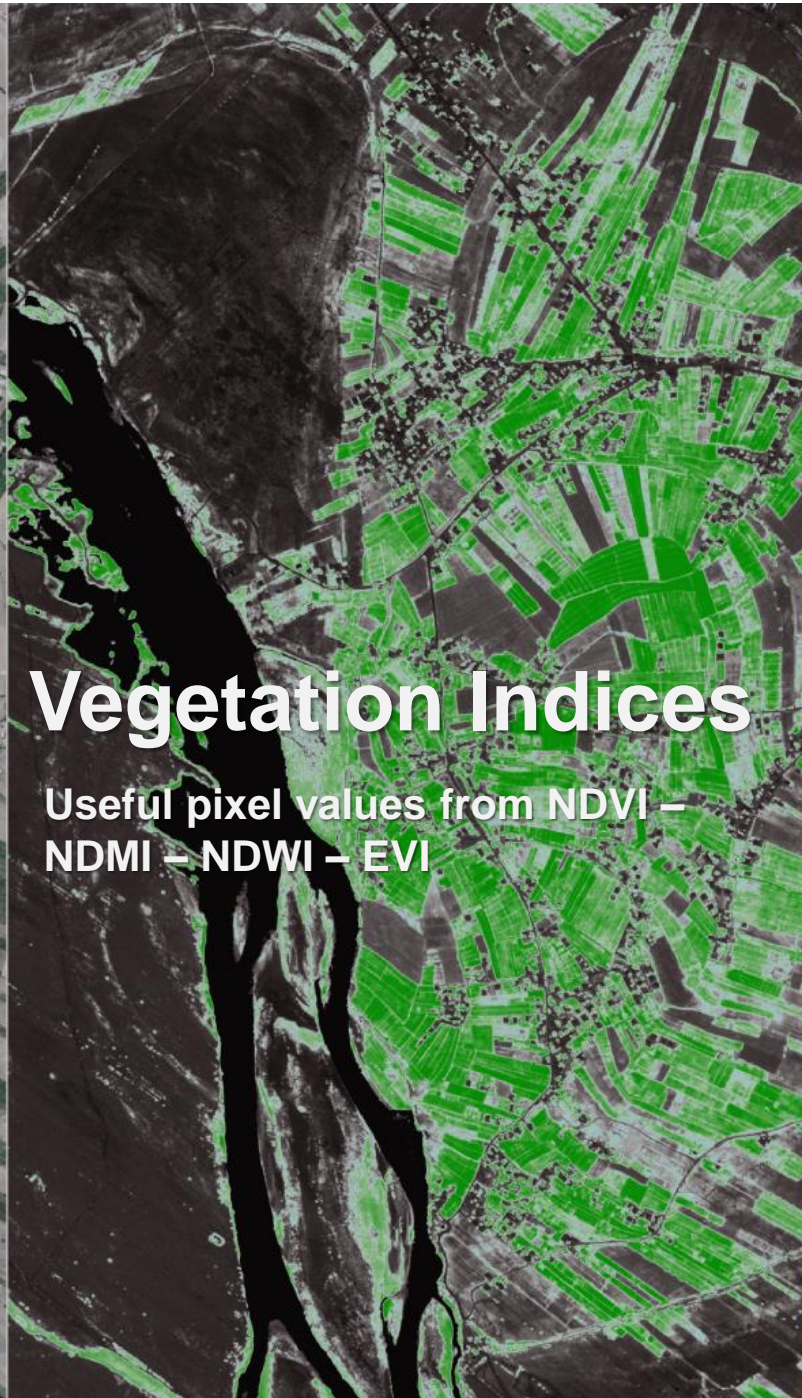
## Data sources

- Landsat 5,7,8
- Sentinel-2
- CHIRPS
- WorldView 2,3
- Rapid-Eye (6.5 m resample to 5 m)
- PlanetScope Scene product from Planet Labs



## RGB Image

High resolution image from  
WorldView 2 acquired on 21/07/2018



## Vegetation Indices

Useful pixel values from NDVI –  
NDMI – NDWI – EVI

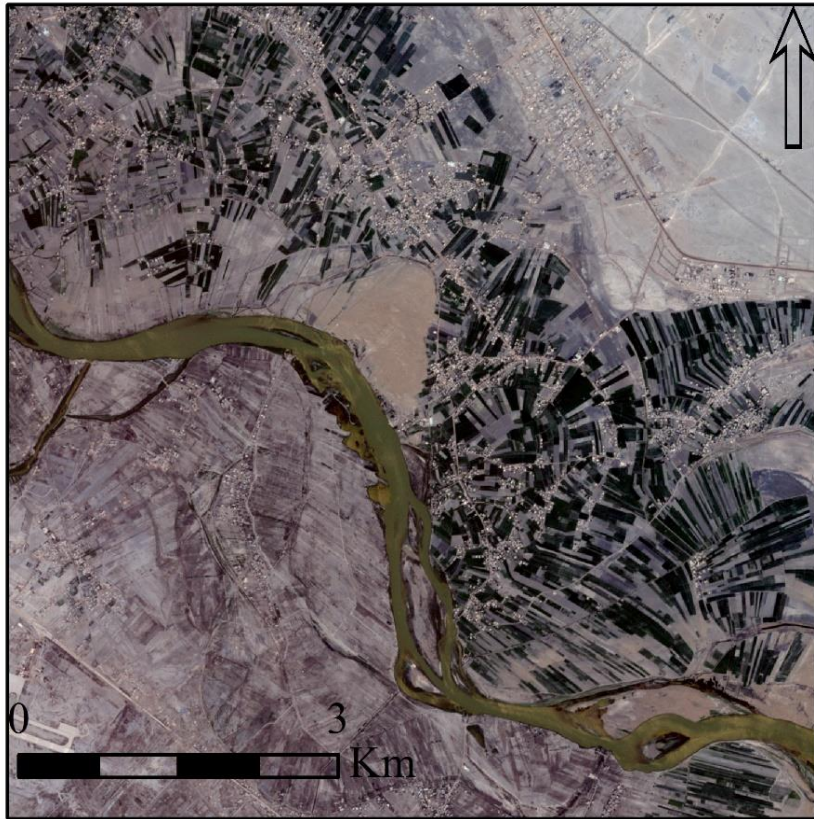


## Classification

K-means unsupervised clustering

# Unsupervised deep learning change detection

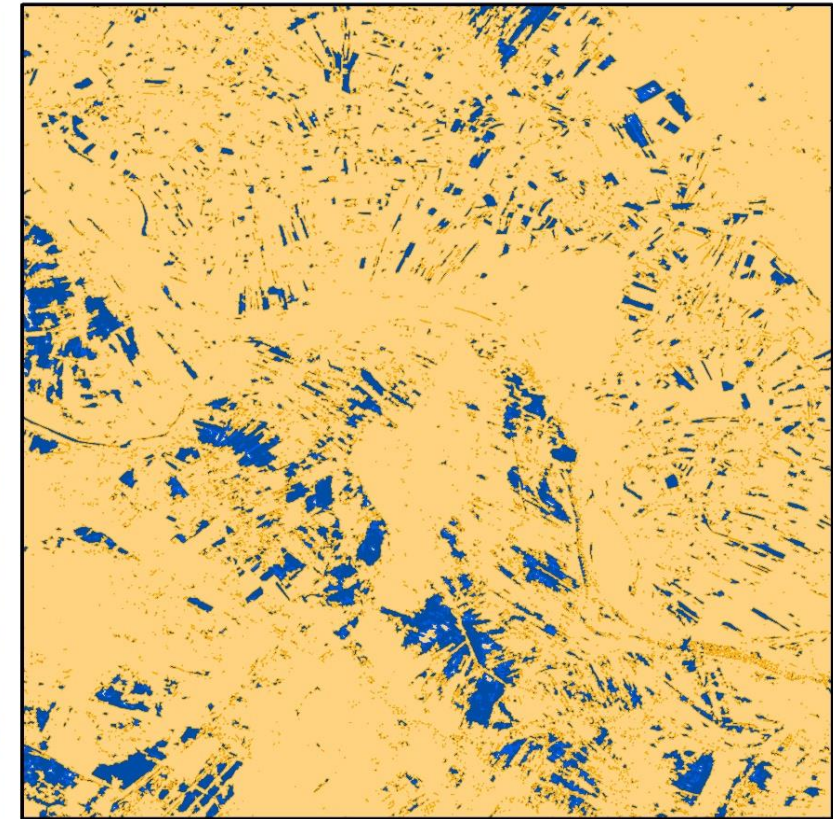
Deep Slow Feature Analysis Network - DFSANet model



2016



2021



 No change  Change

# Conclusion

- Quantifying the changes in agricultural production, using remote sensing techniques, in relation to conflicts is an important measure towards food security monitoring schemes necessary in food-insecure regions of the world.