

29 September - 01 October 2026 ESA-ESRIN | Frascati | Italy

# Environmental Crimes joint workshop with ESA-JRC-UNODC



## War as a Driver of Environmental Damages: Insights from the Sudan Conflict



ENVIRONMENTAL CRIMES 2026 WORKSHOP

# War as a Driver of Environmental Damages: Insights from the Sudan Conflict



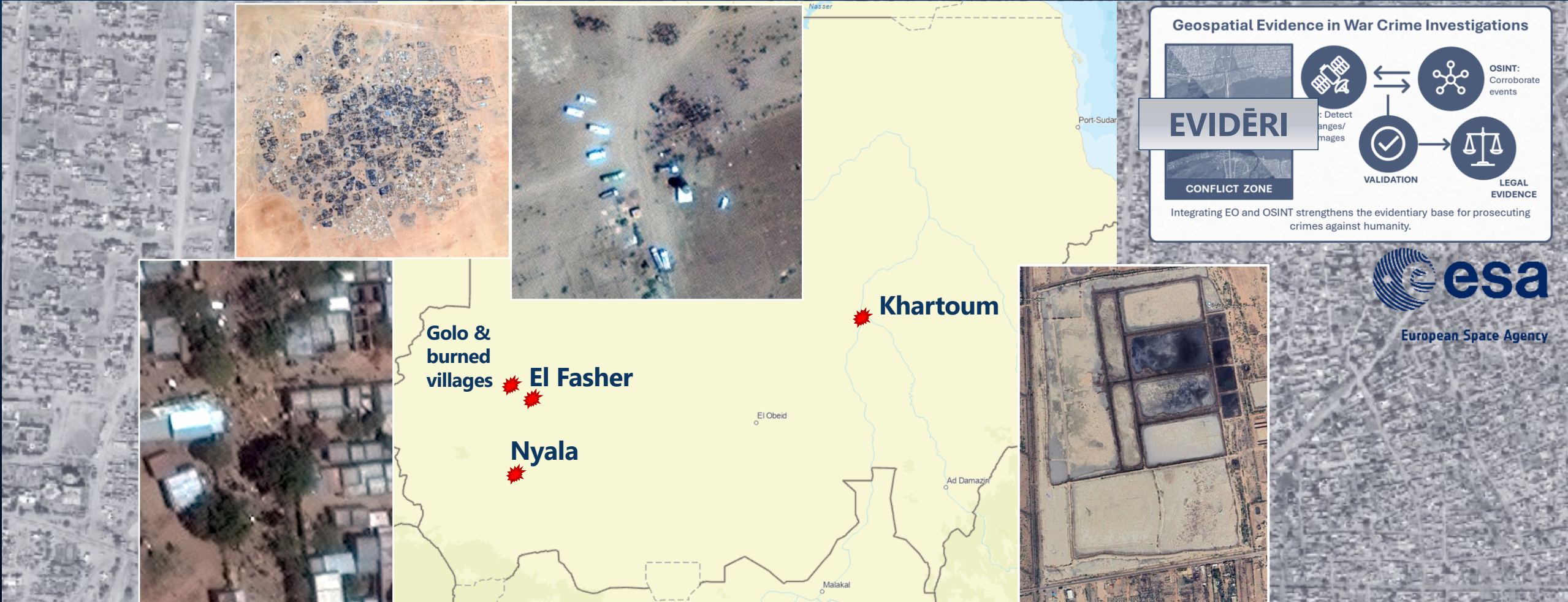
# War as a Driver of Environmental Damages – Background

Environmental damage isn't just an indirect side effect of wars; it is increasingly becoming part of the dynamics of conflict.



# War as a Driver of Environmental Damages – Area of Interest

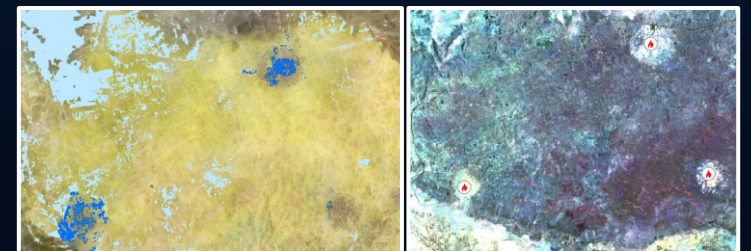
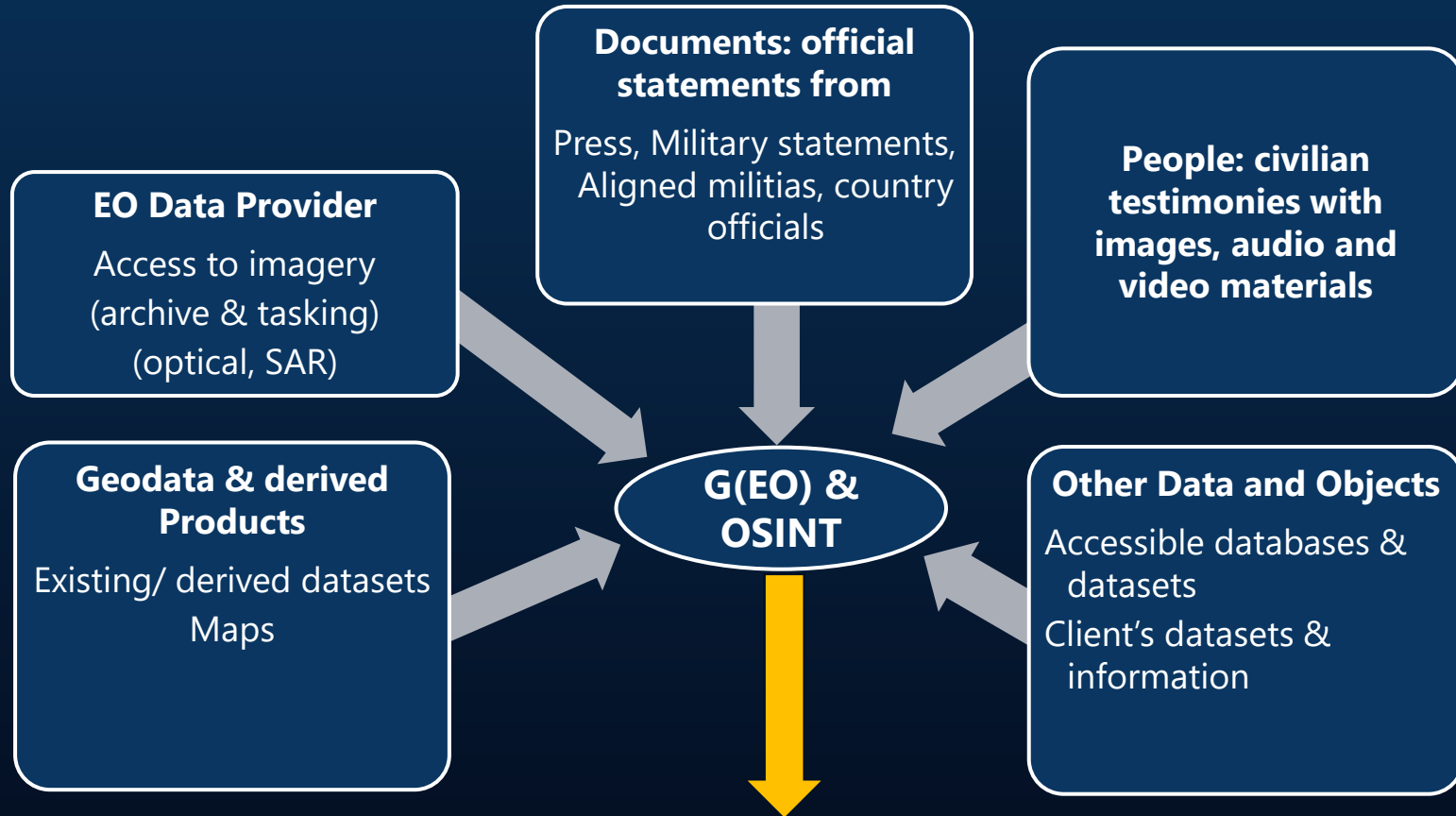
Relevant locations that were examined as examples due to the long-standing conflicts in the country.



EVIDERI (2023 – 2026) → ESA-funded project as baseline, but further studies were conducted

# War as a Driver of Environmental Damages - Approach

## G(EO) & OSINT - Information Sources



# War as a Driver of Environmental Damages – Combat Operations

Destruction in **urban** areas (by bombing, burning, shooting)

Destruction of settlements and livelihood



Crater or debris

- 04/01/2025
- 01/12/2024
- 14/05/2024

Damaged buildings

- 04/01/2025
- 01/12/2024
- 12/06/2024
- 14/05/2024

Facilities

- 🏫 School



Source: EVIDERI 2026

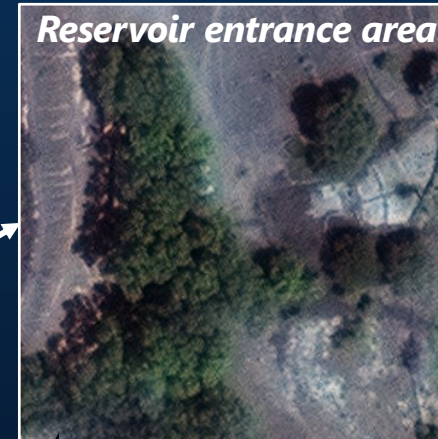
# War as a Driver of Environmental Damages – Combat Operations

Impact on **water infrastructure** in **rural** areas - Example: **Golo Water Reservoir** (near El Fasher)

Blockades or destruction  
of (critical) infrastructure



One of you go in there  
and shut off these valves!



WV-02, 25.4.2024  
Day of RSF attack



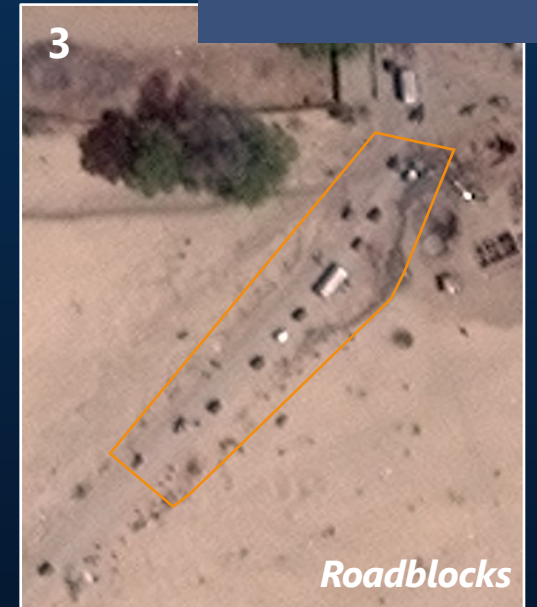
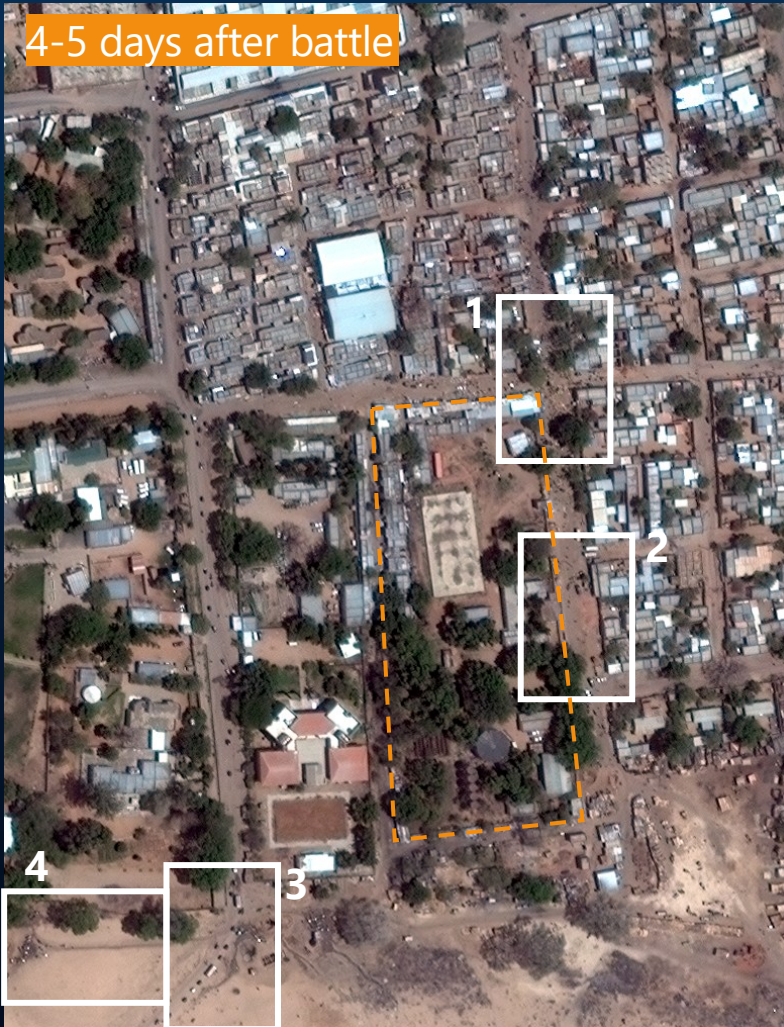
WV-02, 28.4.2024  
Vehicle activity



# War as a Driver of Environmental Damages – Combat Operations

Destruction of **water infrastructure** – Example: **Nyala Main Water Station** (South Darfur)

Blockades or destruction of (critical) infrastructure



WorldView-02, 20 Apr 2023

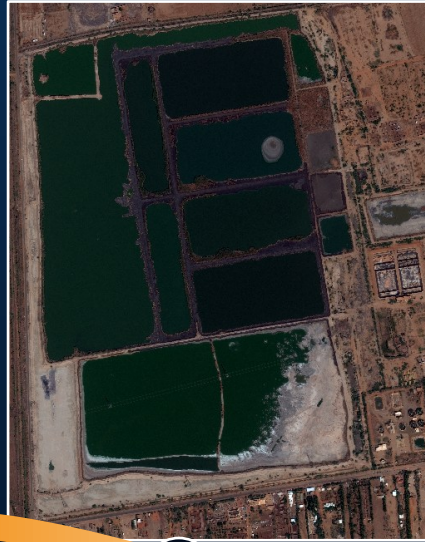
# War as a Driver of Environmental Damages – (Critical) infrastructure

Water Supply Destruction - Example: Water reservoirs at **Wad Dafia'** water treatment plant (North Khartoum)

**16.4.2023**  
(WV-02)  
1 day after  
start of  
combat  
operations



**28.11.2023**  
(WV-02),  
7 month after  
start of combat  
operations



Shortage of basic supplies

**16.02.2025**  
(GE),  
after event  
*not fully recovered  
anymore*

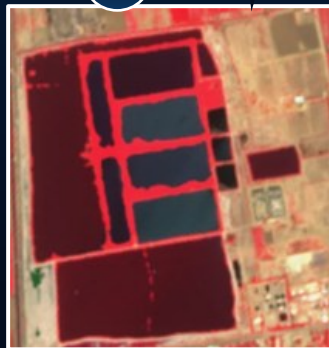


2023

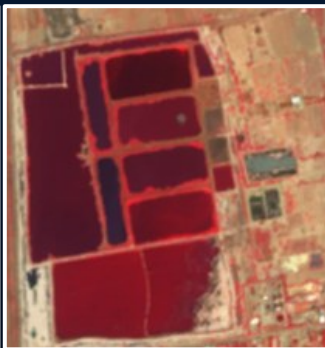
2024

2025

2026



S2, 17.4.2023



S2, 29.10.2023



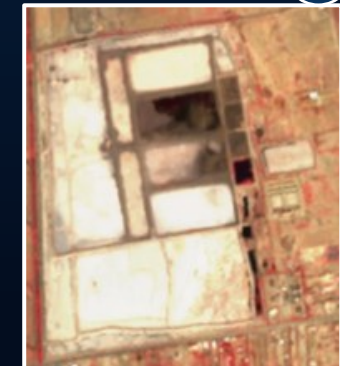
S2, 01.05.2024



S2, 28.10.2024



S2, 06.05.2025



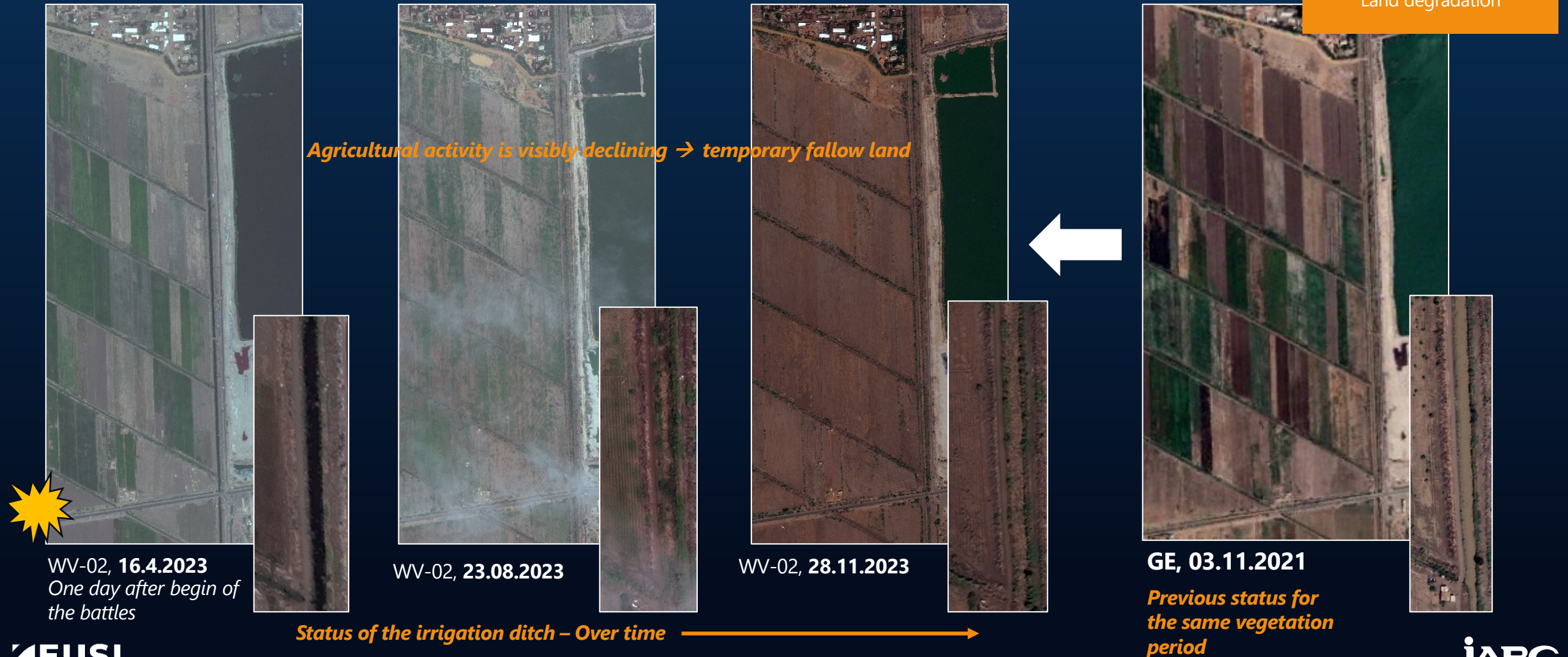
S2, 6 Jan 2026

S2- time  
series

# War as a Driver of Environmental Damages – Impacts on Agriculture

Water Supply Destruction leads to lack of water and has recognizable impact on agriculture and food supply

Water reservoirs at Wad Dafia' water treatment plant (North **Khartoum**)



# War as a Driver of Environmental Damages – Water shortage

The water supply for field irrigation/ poultry farming and for the local population has been disrupted.

Missing land management  
Land degradation



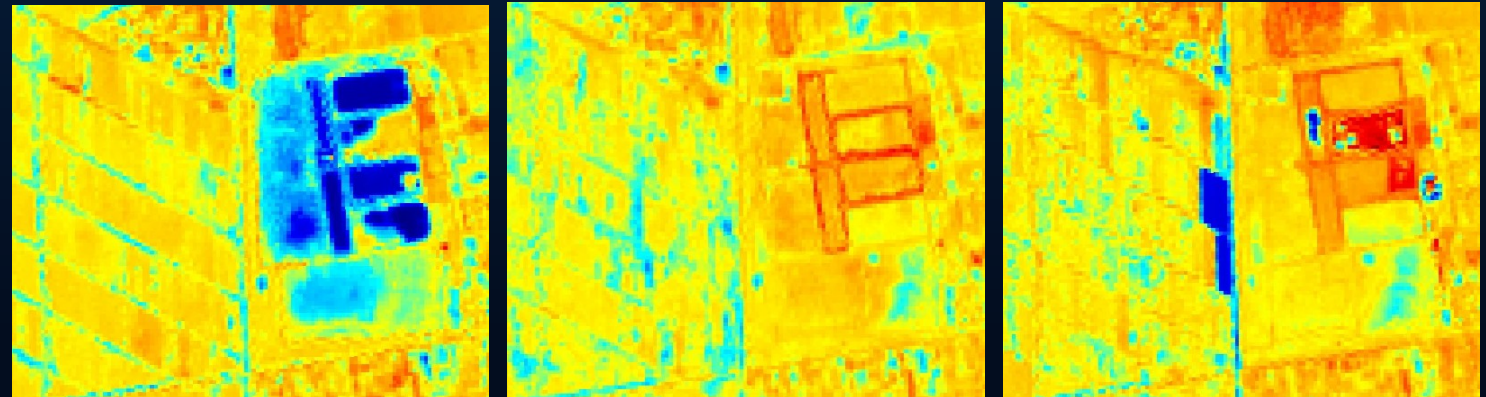
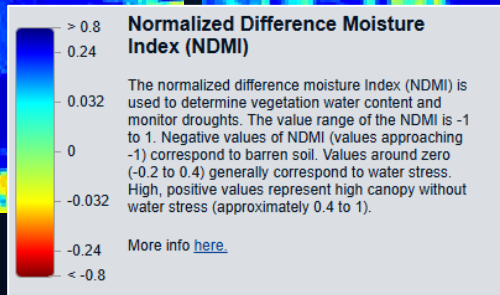
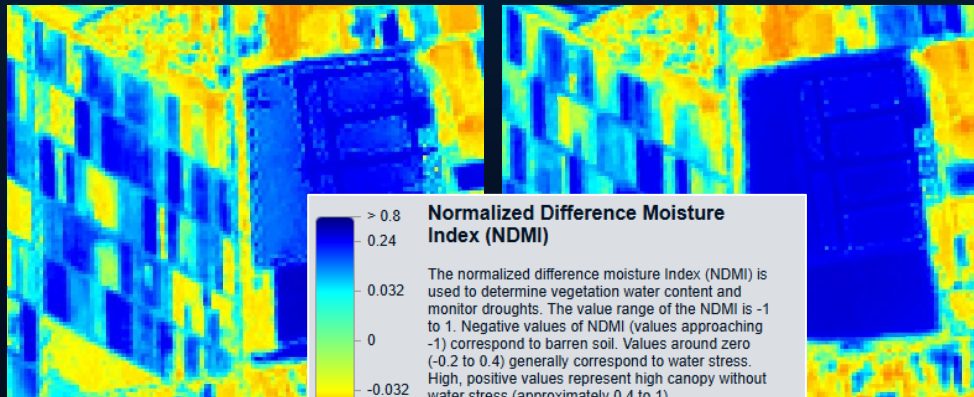
17 April 2022  
pre-conflict

17 April 2023  
Start of the conflict

11 April 2024  
1 year later

16 April 2025  
2 years later

16 April 2026  
3 years later



S2- time series (NIR and NDMI)\*

\*Source: CDSE

# War as a Driver of Environmental Damages – Fire Events

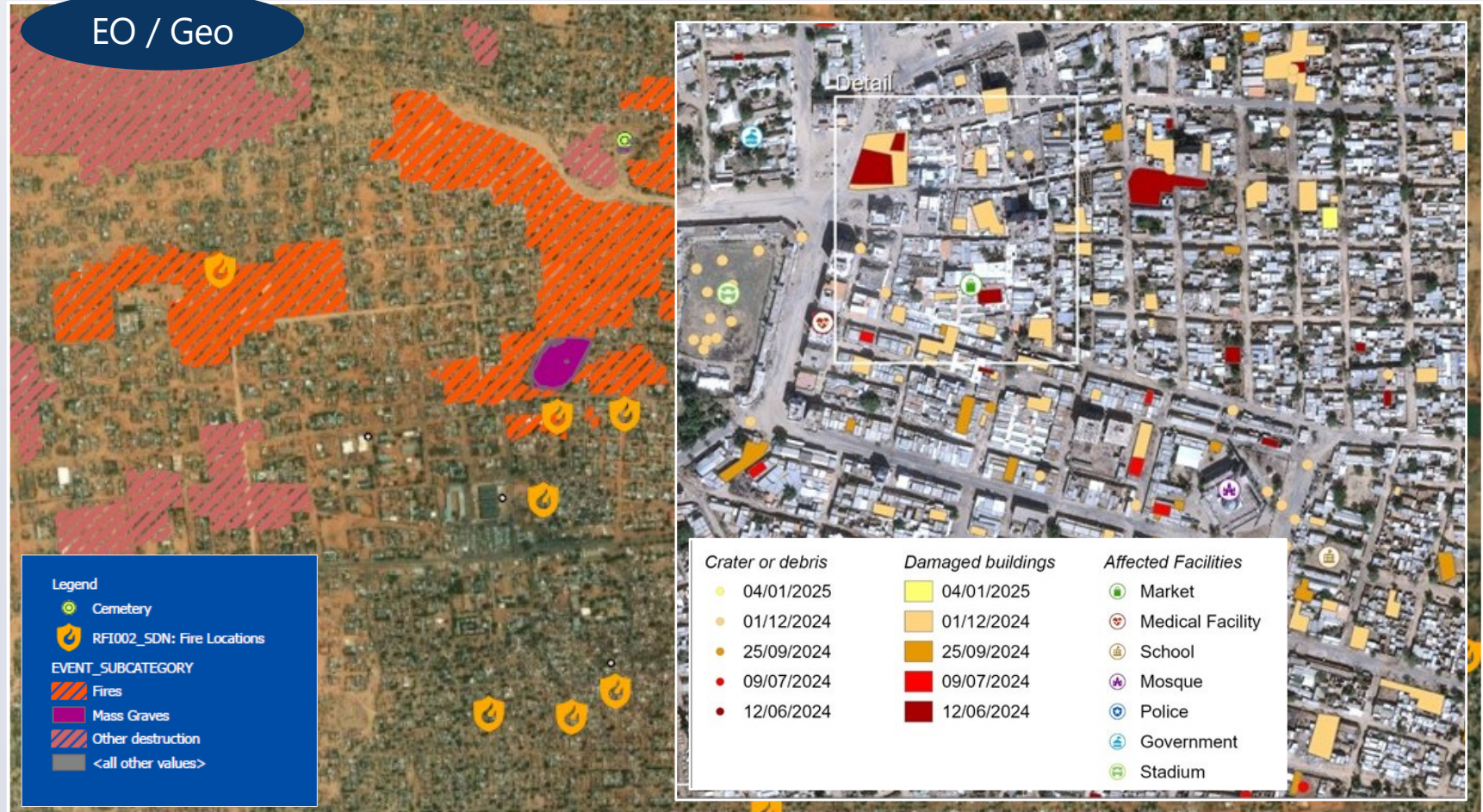
Fires – with significant impacts on settlement areas and the population

Fire events

OSINT



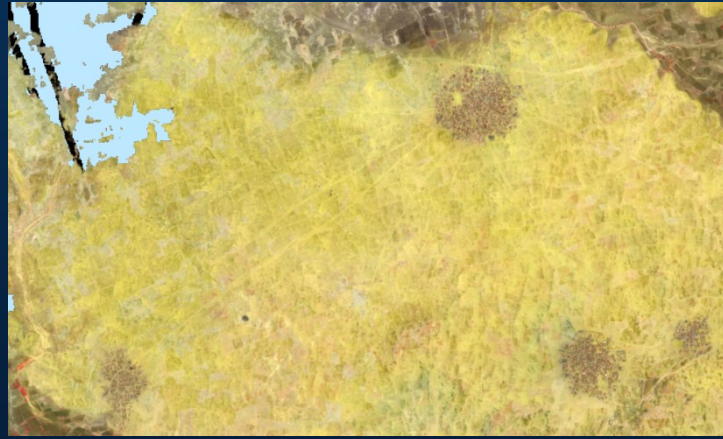
EO / Geo



# War as a Driver of Environmental Damages – Fire Events

Fires - in rural areas and in the villages that appear to have been affected (here: west of El Fasher)

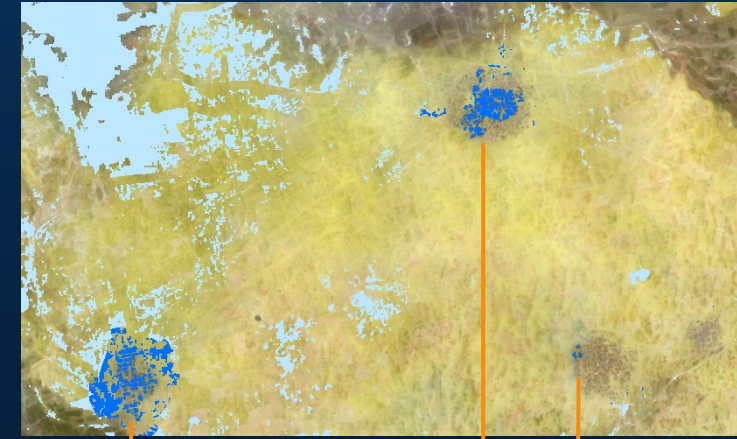
Fire events



05 April 2024



30 April 2024



30 May 2024

■ Burned settlement  
■ Other burned areas



**Rapid Support  
Forces intentionally  
targeted agricultural  
communities to  
starve people in El-  
Fasher\***



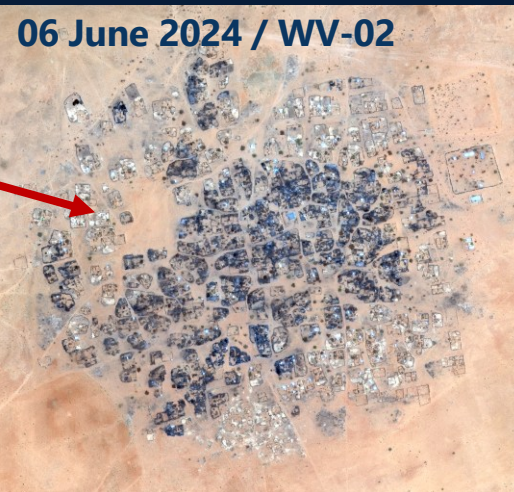
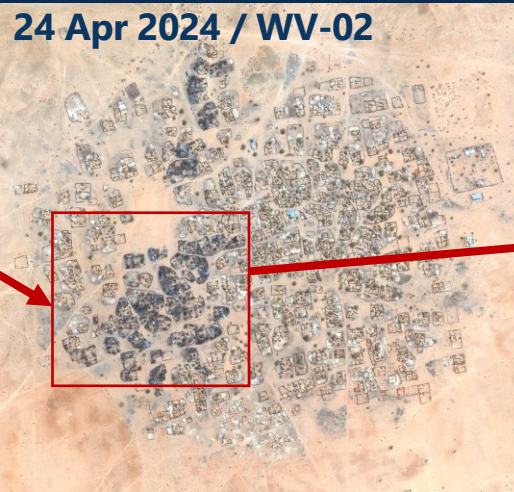
\*Yale School of Public Health / 2026

Source: **IABG Fire Service** Tool to identify burned villages:  
Indication of the probability of burned areas are settlements compared to other burned areas

# War as a Driver of Environmental Damages – Destroyed settlements

Fires in **rural** area - three communities, partially burned down, located in predominantly agricultural areas

Fire events

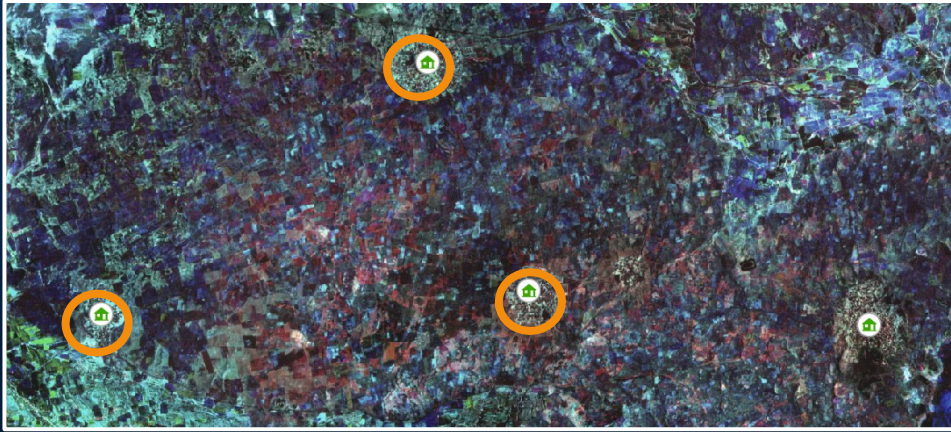


Source OSINT: <https://www.nytimes.com/video/world/africa/100000009893408/sudan-war-crimes-rsf.html> (video screenshot)

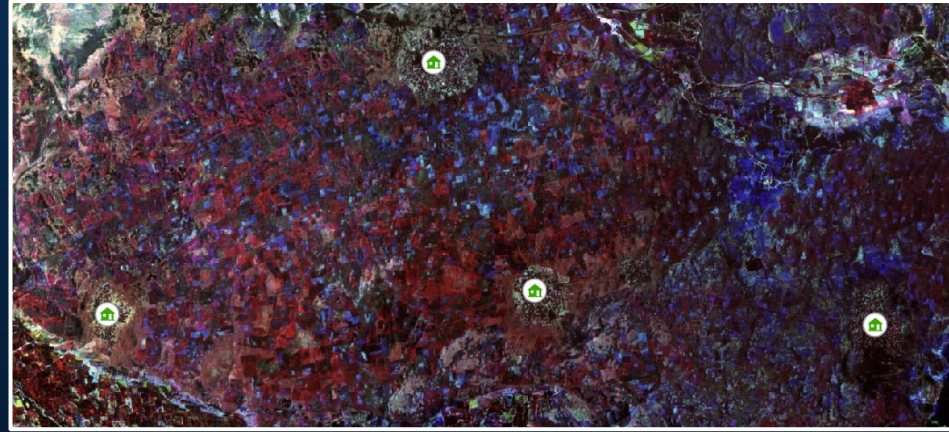
# War as a Driver of Environmental Damages – Land degradation

Rural area & villages – pre/after fire events: displaced/killed people and impacts on land management

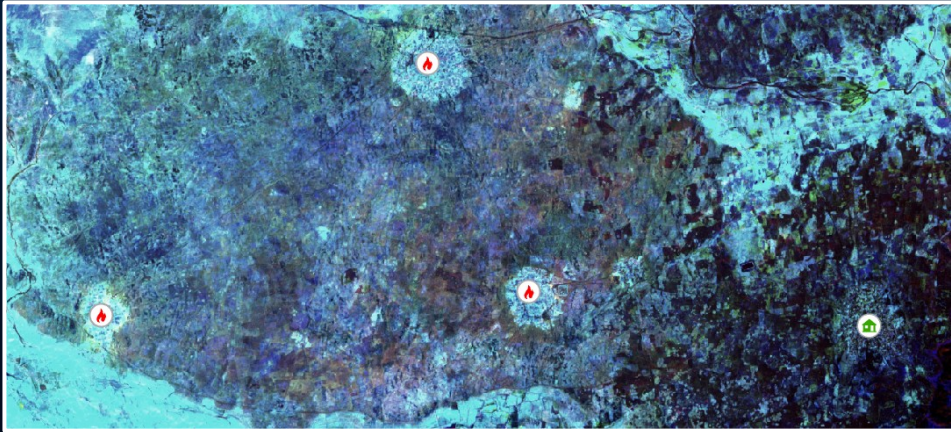
2022 (pre-conflict)



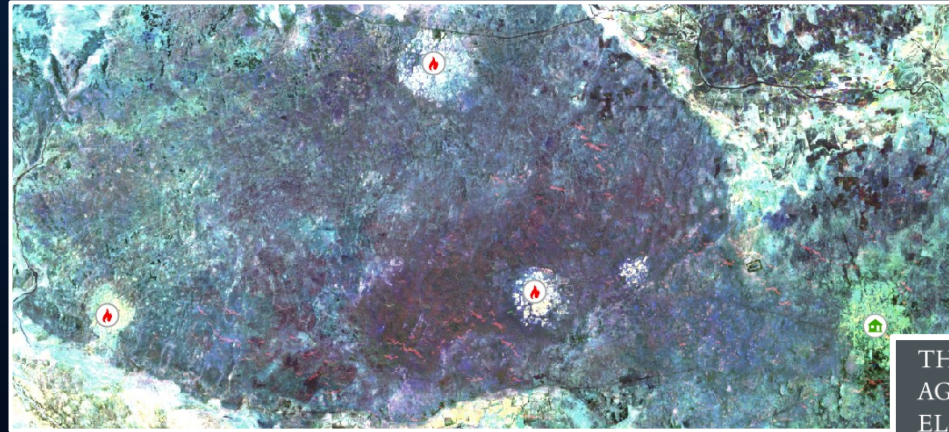
2023 (pre-conflict)



NDVI composites for each year → agricultural activity around the burned-down villages has declined significantly.



2024 (conflict year)



2025 (after conflict)

Missing land management  
Land degradation



Intensive  
cultivation



Signs of  
decrease



Fallow

THE IMPACT OF SYSTEMATIC RAZING OF  
AGRICULTURAL COMMUNITIES AROUND  
EL-FASHER: A REMOTE SENSING STUDY

\*Yale School of Public Health / 2026

# War as a Driver of Environmental Damages – Summary

- **Combat operations** and acts of violence
- Deliberately set **fires** and the blocking of **infrastructure** such as water and energy supplies
- **Destruction** and **displacement**
- **Shortages** in water and energy
  - Significantly impact the population's livelihoods and agricultural activities
  - Lack of land management and weak governance
  - Increase of **soil degradation** and **environmental damage**



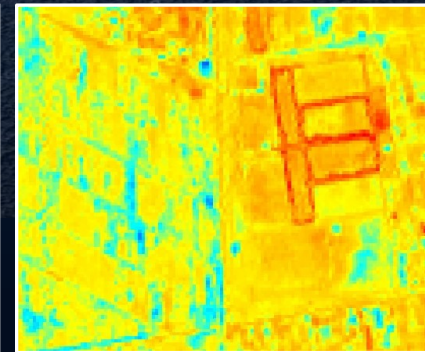
Source: Sudan Tribune, 27 May 2024



Source: Sudan Tribune, August 2024



Source: EUSI, WV2, Jun 2024



Source: CDSE (NIR/NDMI), Apr 2025



# Contacts

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Thank you  
for your attention !

