



NILE BASIN INITIATIVE
INITIATIVE DU BASSIN DU NIL

Infrastructure, climate risk and human security

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International Centre for Water Cooperation (ICWC)

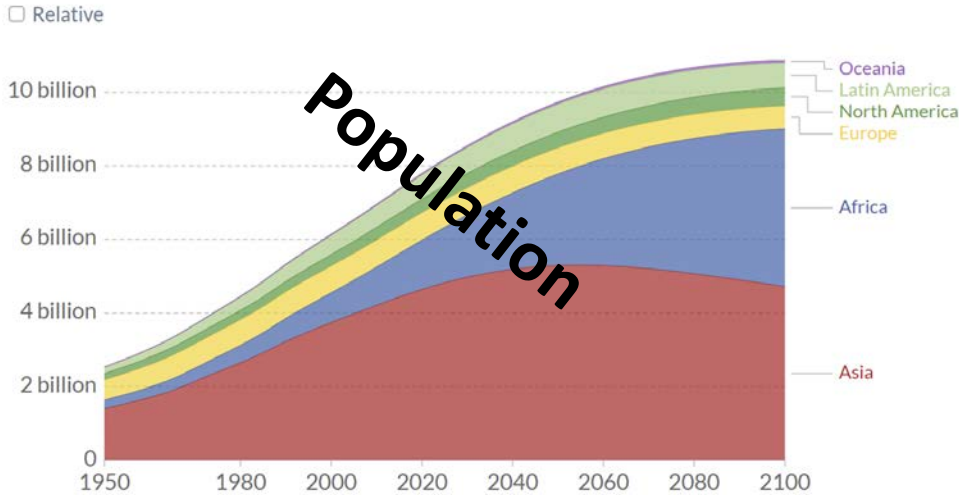
Key messages

- 1) Investment in infrastructure **resilience** is socio-economically **worthwhile!**
- 2) Infrastructure investments need to take increased climate **risk into consideration** in the planning stage (retrofitting of existing infrastructure might be necessary).
- 3) **Local communities** should be included in the planning stage.
- 4) Climate driven (water) hazards may have far-reaching **human security** implications.
- 5) Support **Nature based solutions** and conservation of environment.

World population by region, 1950 to 2100

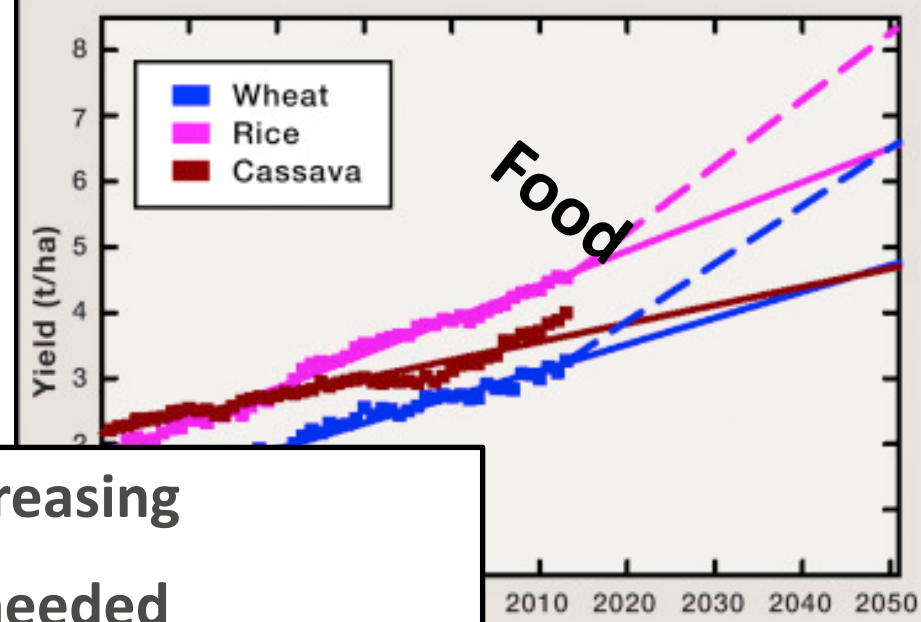
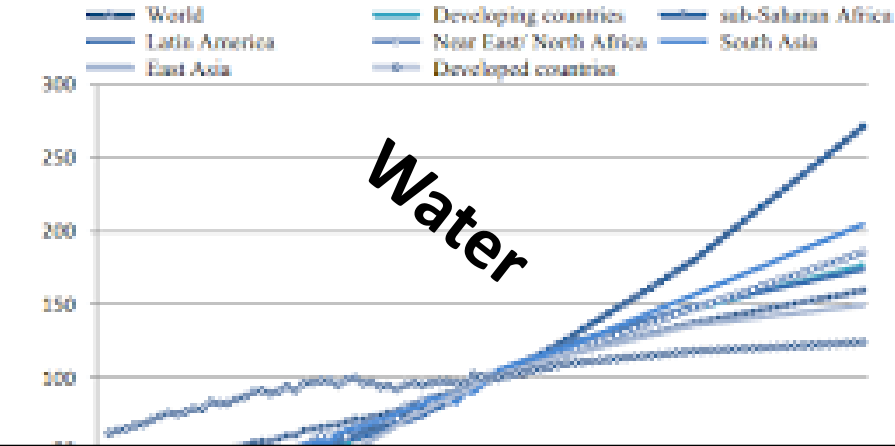
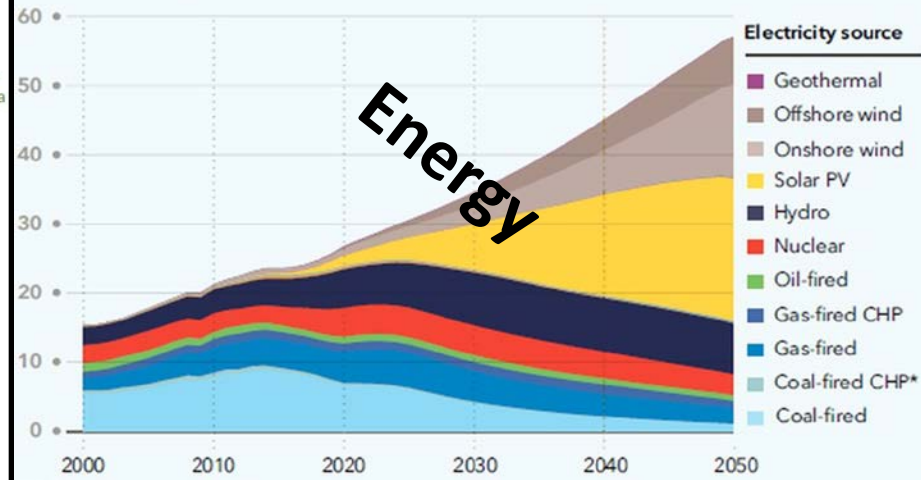
Projected population to 2100 is based on the UN's medium population scenario.

Our World in Data



WORLD ELECTRICITY GENERATION BY SOURCE

Units: PWh/yr



Demand on natural resources is increasing

Infrastructure investment is much needed

Particularly in low- and middle-income countries

Looking at risk and resilience:

**Chamoli disaster, Uttarakhand,
India, 7 Feb 2021:
Loss of two hydropower
stations in a debris flow**

**200+ people dead or missing
224 million USD direct loss
250 million USD annual loss
from power production**

A World Bank report estimates:

18 billion USD costs annually

The cost of direct damages from “natural” hazard disasters to power generation and transport infrastructure in low- and middle-income countries

390-650 billion USD annually

The wider cost of infrastructure disruptions on households and firms in low- and middle-income countries

4 USD in benefit for every 1 USD

spent on infrastructure resilience in low- and middle-income countries

Hallegatte et al. 2019. “Lifelines: The Resilient Infrastructure Opportunity.” World Bank

Key message No 1

Chitral District, NW Pakistan

Schools are built here!



"A river always remembers its path"
(Chitrali Proverb)

Why are infrastructure not constructed in a climate resilient manner?

- Political reasons
- Land Tenure reasons
- Economic reasons
- Traditional reasons

Science – Policy dialogues
much needed!!

Extremely challenging areas for infrastructure development

Local Knowledge is not adhered to



Women, children and elderly are most vulnerable!



Damaged infrastructure
Lost livelihoods
Displaced people
Climate refugees
Recruitment basis for terror organisations

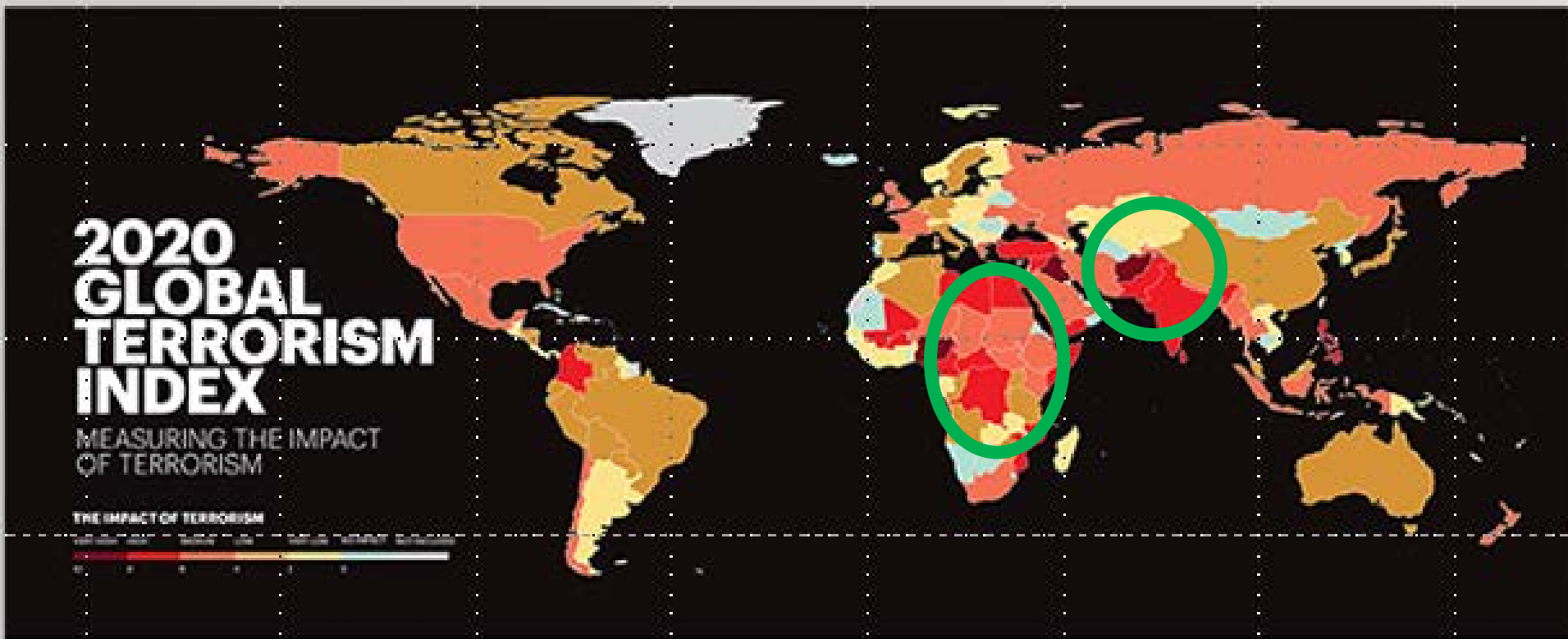
Nepal: disasters – human security



Nepal 2015 Earthquakes:
9000 people died
> 600,000 houses destroyed
3 million people homeless
= household economies shattered

Every year:
20,000 girls trafficked outside Nepal
Worldwide:
600,000 - 800,000 people trafficked
80% women and girls

Climate driven hazards may have far-reaching consequences on human security



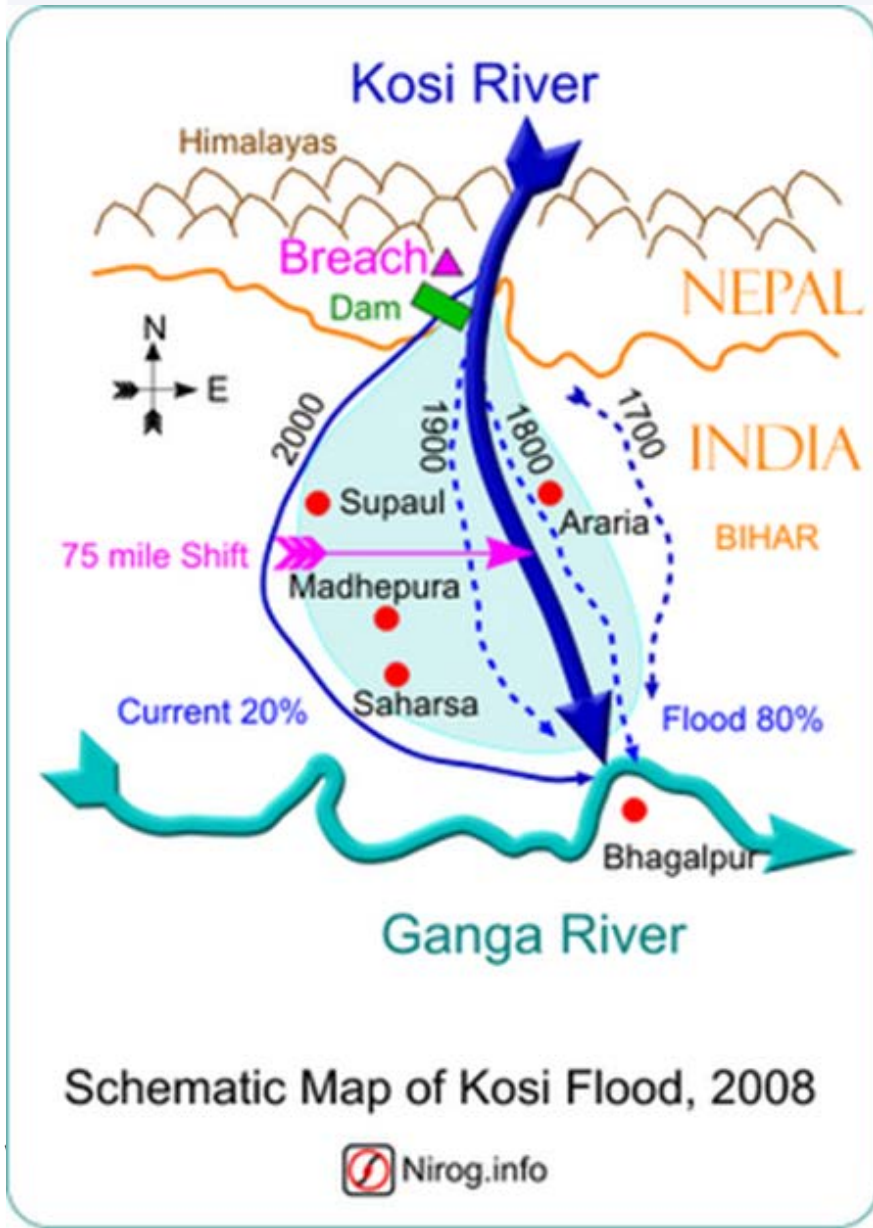
Asia and Africa are high in terrorist ranking

Key message No 4

Example: Koshi Basin, Nepal/India



River breach finding old channels



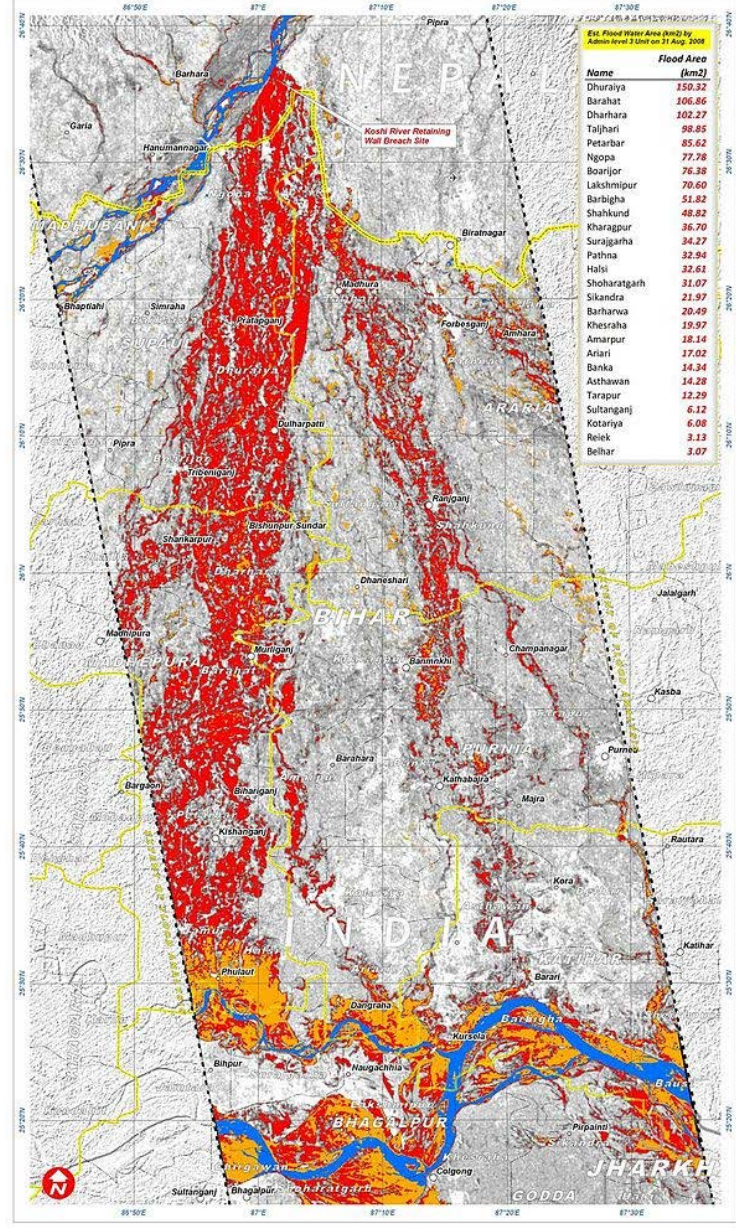
FLOOD WATERS IN BIHAR STATE - AS OF 31 AUGUST 2008

FLOOD ANALYSIS WITH ENVISAT-ASAR (MM) RADAR DATA RECORDED ON 22 JUNE, 27 JULY & 31 AUGUST 2008



Disaster coverage by the International Charter 'Space and Major Disasters'. For more information on the Charter and how to request satellite data, visit www.spaceanddisasters.org

Heavy Rainfall & Flooding 1 September 2008
Version 1.0
Glide No: FL-2008-001145-IND



Koshi disaster: poor infrastructure

- 7000 people dead
- 3,650,000 displaced
- Breach have happened 8 times since 1954!

Key message No 5



Sandra Postel, 2021 Stockholm Water Prize Laurate

Consider nature based solutions to flood control:

- ***“Work with nature – not against!”***
- ***“Reconnect rivers to their flood plains instead of raising levées!”***



Risk zones also needs to be taken into account in the Nile!

Red areas show inundated areas in Sudan during the 2020 year floods

Possibly 500,000 people exposed to floods

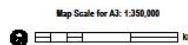


Satellite detected water as of 30 August 2020 in Khartoum, Aj Jazirah and White Nile states of Sudan

This map illustrates satellite-detected surface waters over Khartoum, Aj-Jazirah and White Nile states in Sudan as observed from Sentinel-2 image acquired on 30 Aug 2020. Within the analyzed area of about 10,000 km², a total of about 500 km² of lands appear to be flooded. Based on Worldpop population data and the detected surface waters, about 500,000 people are potentially exposed or living close to flooded areas. This is a preliminary analysis and has not yet been validated in the field. Please send ground feedback to UNITAR-UNOSAT.

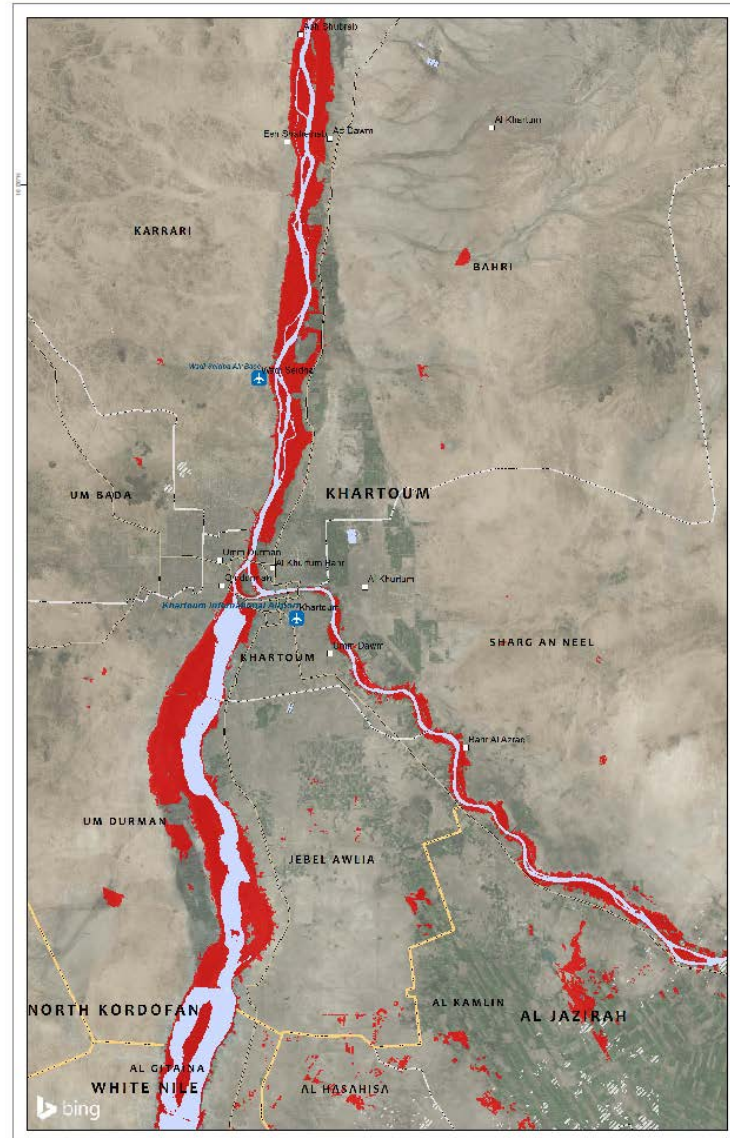
- Legend**
-  Town/Village
 -  Airport
 -  Primary road
 -  State boundary
 -  District boundary
 -  Cloudmask
 -  Reference water
 -  Satellite detected water [30 Aug 2020]

Area	Area (km ²)	Population (2019)	Population Density (per km ²)
White Nile State	10,000	1,000,000	100
Aj-Jazirah State	10,000	1,000,000	100
Khartoum State	10,000	1,000,000	100
Total	30,000	3,000,000	100



Analysis conducted with: ArcGIS v10.7

Coordinate System: WGS 1984 UTM Zone 38N
 Projection: Transverse Mercator
 Datum: WGS 1984
 Units: Meter



Satellite Data (Pre): Sentinel-2
 Imagery Date: 18 July 2020
 Resolution: 10m
 Copyright: Contains modified Copernicus
 Sentinel data (2020)
 Source: ESA

Satellite Data (Post): Sentinel-2
 Imagery Date: 30 August 2020
 Resolution: 10m
 Copyright: Contains modified Copernicus
 Sentinel data (2020)
 Source: ESA

Attributive boundaries: OCHA, ROSSA, HDX
 Population data: WorldPop (2020)
 Analysis: UNITAR-UNOSAT
 Product: UNITAR-UNOSAT

The depiction and use of boundaries, geographic names and related data shown here are not warranted to be error-free, nor do they imply official endorsement or acceptance by the United Nations. UNOSAT is a program of the United Nations Institute for Training and Research (UNITAR), providing satellite imagery and related geographic information, research and analysis to UN humanitarian and development agencies & their implementing partners. This work by UNITAR-UNOSAT is licensed under a CC BY-NC 3.0.

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THANK YOU!

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