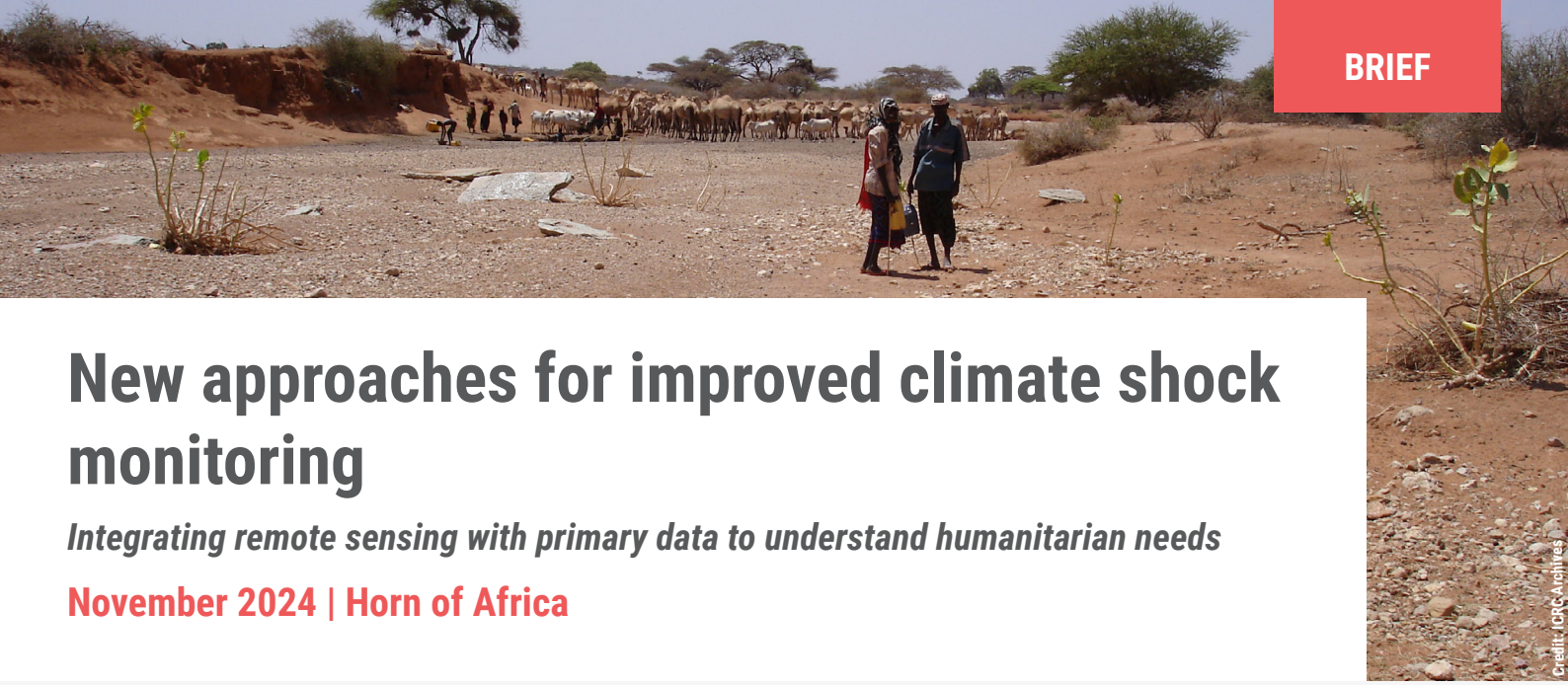

BRIEF

# New approaches for improved climate shock monitoring

***Integrating remote sensing with primary data to understand humanitarian needs***

**November 2024 | Horn of Africa**

## KEY TAKEAWAYS

- Climatic shocks are having increasingly severe impacts on vulnerable communities in fragile and conflict-affected states. According to REACH data in the Horn of Africa, climate shocks are often reportedly greater drivers of needs than conflict, **showing the importance of considering climate when prioritising and planning humanitarian assistance**. Targeted and regular assessments can help understand the impacts of changing climatic conditions on humanitarian needs across different communities to ensure no one is left behind.
- Due to similar seasonal climate patterns, climatic shocks, and potential impacts on affected communities, climatic and livelihood zones should be considered when conducting humanitarian assessments and programming. These rarely follow admin or country boundaries, **highlighting the need for regional approaches**.
- **Remote sensing should be employed proactively to understand and track climatic shocks**. This needs to be triangulated with primary data collected with the participation of affected communities to ensure a people-centred approach. The integration of both data sources can provide a clearer picture of the potential impacts of climatic shocks and related humanitarian needs, including in hard-to-reach areas, especially when climate and livelihood zones are considered in the analysis.

## CONTEXT & RATIONALE

This brief is based on a research focused on the Horn of Africa region, much of which has faced extreme climatic variability in the past few years, negatively affecting water access, as well as food security and livelihoods. This research focused specifically on the transboundary arid zones, which make up the majority of Somalia, northern Kenya and eastern Ethiopia, and share many similarities in environment, climate and livelihoods. **Using both remote sensing analysis and recent primary data from REACH's assessments conducted across the region**, the original report aimed to analyse climatic trends and impacts of climatic shocks.

This analysis is a first attempt to show the utility of integrating remote sensing to identify how **we need to adjust our research programmes to enable more consistent identification and inclusion of climate vulnerable populations** in the humanitarian planning and prioritization processes.

From a concrete situation and testing in the Horn of Africa, global recommendations can be formulated for the future of climate assessments – to improve our humanitarian response to affected communities.

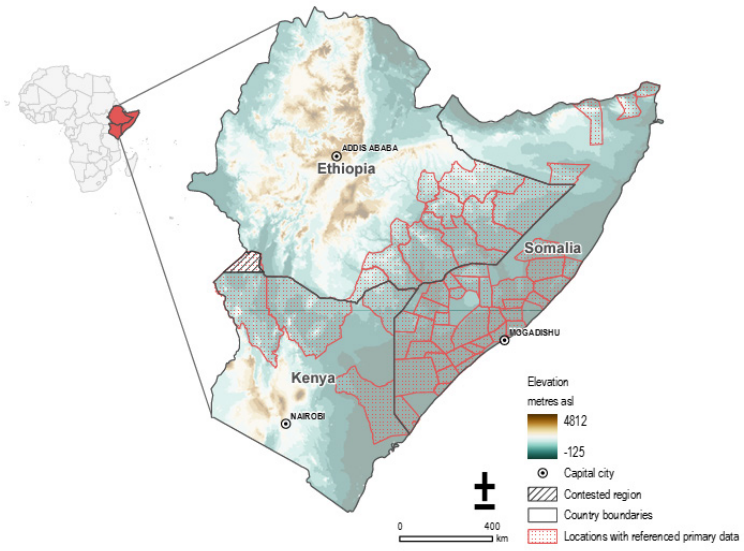


Fig. 1: Horn of Africa region, and locations where primary data referenced in the research was collected.

REACH Informing more effective humanitarian action

# Increasing impacts of climatic shocks on vulnerable communities in fragile regions

Climate-related shocks are increasingly impacting communities around the world, particularly in fragile and conflict-affected states[2]. **The rising frequency and severity of phenomena such as flooding, drought and extreme heat, intensified by climate change, are further undermining coping capacities of already vulnerable communities.** This indicates the need for humanitarian assessments and programming to better understand and mitigate climatic risks.

The arid zone of the Horn of Africa is a prime example, where in recent years, extreme climatic variability resulted in a shift from severe drought between late 2020 and early 2023 to extreme rainfall and flooding in late 2023. Now, the latest forecasts suggest below average rainfall across the region during the October-December 2024 rainy season. The cyclic nature of these shocks is having long-term compounding impacts on the environment, leading to land degradation and putting additional strain on water resources.

This is negatively affecting food security and livelihoods as well as water access, whilst limiting any recovery period and further increasing vulnerability for affected communities. This highlights **the importance of real-time monitoring to understand the evolving impacts that shocks are having on communities.**

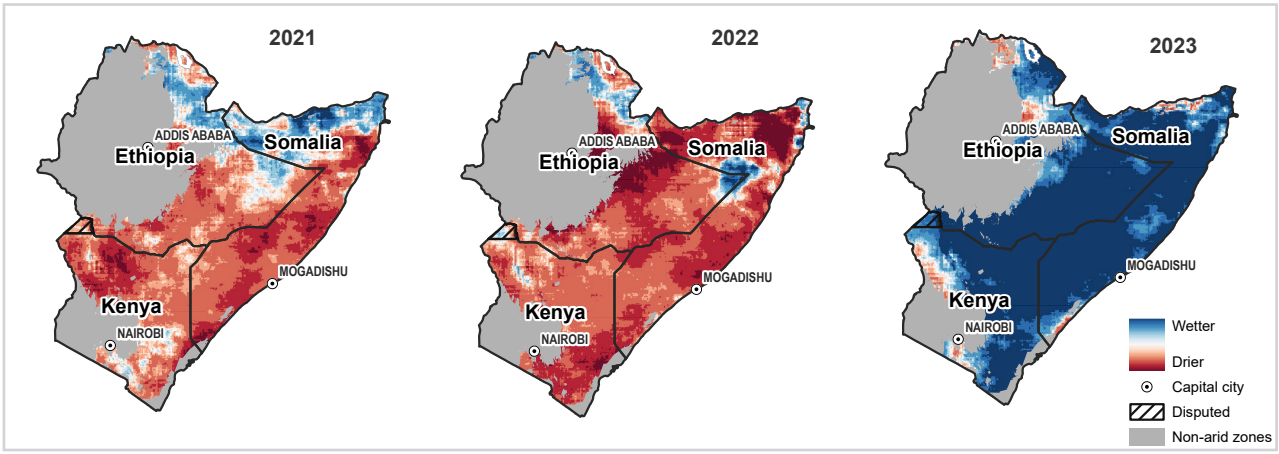


Fig. 2: SPI-12[1] in 2020, 2021 & 2023 across HoA arid zone. This index highlights the annual rainfall anomaly and clearly shows the dramatic shift from dry conditions in 2021-22 to excessively wet conditions in 2023.

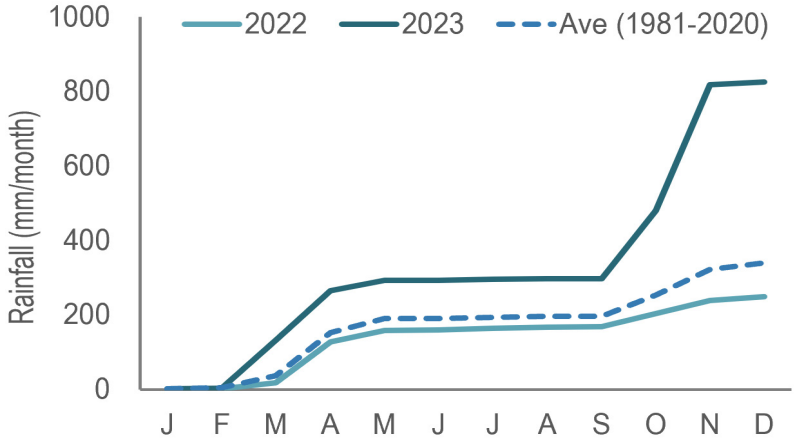


Fig. 3: Cumulative rainfall in Mandera County, Kenya, highlighting below-average rainfall in 2022 and excessive rainfall in 2023[3]. This trend was similar across much of the HoA arid zone.

Findings from recent assessments conducted by REACH across the HoA arid zone suggest that climatic shocks have often been the **most widely reported shock compared to other shocks such as conflict**, highlighting the substantial impact that climatic hazards are having on already vulnerable communities.

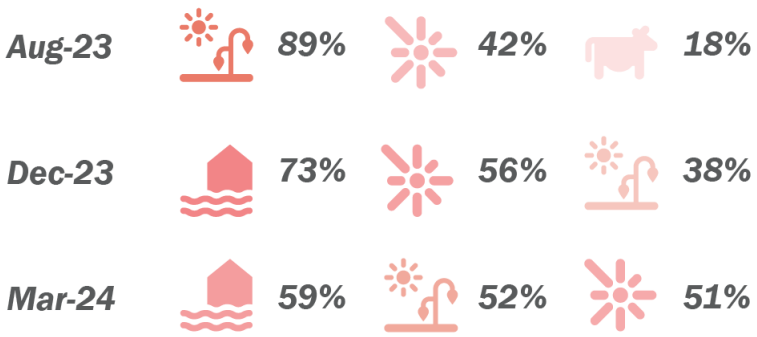


Fig. 4. Most common shocks reported by KIs in Somalia over the past year as of August 2023, December 2023 and March 2024, by % of assessed settlements, according to REACH Humanitarian Situation Monitoring (HSM) assessments.

In Somalia for example, key informant (KI) based surveys monitoring the humanitarian situation indicated that flooding and drought were reported by substantially more KIs than conflict or other shocks throughout late 2023 and early 2024.

These findings highlight the importance of placing a greater focus on climate risks and **climate shocks as drivers of humanitarian conditions when conducting assessments in crisis contexts**. In addition, the recurrent nature of climatic shocks and the compounding effects of climate change highlight the importance of Disaster Risk Reduction (DRR) programming where feasible.

## Importance of considering climatic and livelihood zones in assessments and programming

The Köppen climate zones divide climates into areas with similar seasonal precipitation and temperature patterns[4], and are often also associated with similar climatic shocks and specific livelihoods. This is clear in the Horn of Africa, where the arid zones, which form a contiguous area extending across several countries, experienced similar timing and severity of drought and high rainfall shocks in recent years. Furthermore, the maps show these zones broadly align to livelihood zones.

Pastoral livelihood zones in particular also extend across international boundaries in this region, whilst these communities may be forced to expand seasonal migrations further into neighbouring countries in the future due to increasing severity of climate shocks and compounding impacts of climate change[5].

These factors[6] indicate the importance of **regional approaches considering these zones**, which rarely follow admin or country boundaries, when conducting humanitarian assessments and programming. Assessments which sample across these zones can provide a better picture of the impacts of climatic shocks and are likely to better inform the response.

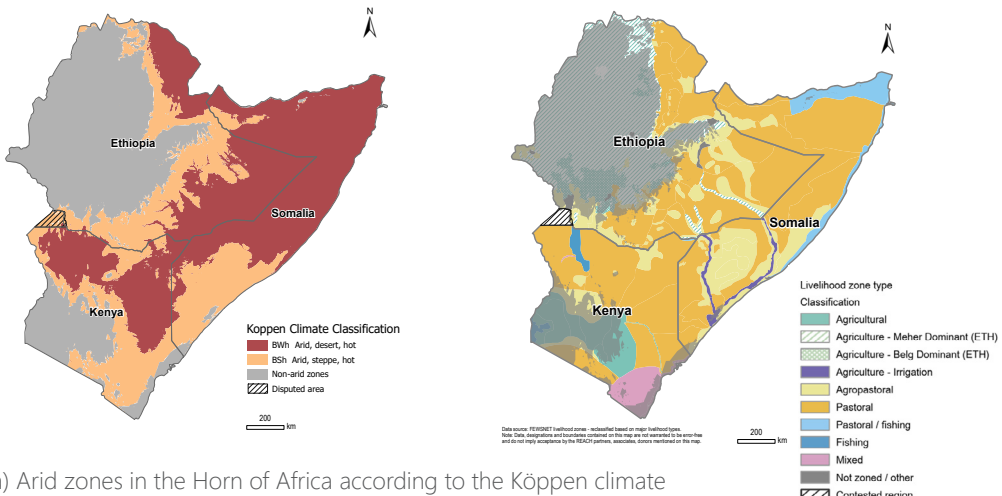


Fig. 5: (a) Arid zones in the Horn of Africa according to the Köppen climate classification, and (b) generalised map of major livelihood types. These maps highlight the transboundary nature of these zones, with the arid climate zones extending across much of the Horn of Africa, and broadly aligning to pastoral and agropastoral livelihood zones.

## Gaining a clearer picture of the humanitarian situation through integration of remote sensing with primary data

Assessment of climatic shocks and impacts on communities could be enhanced through **triangulation of both primary data and remote sensing**. In the study, REACH identified a number of correlations between some household indicators obtained from REACH's Multi-Sector Needs Assessment (MSNA) survey conducted in Kenya's arid zone in mid-2023, and remote sensing indexes. For example, poor food consumption score (FCS) was associated with lower median Vegetation Condition Index (VCI)[7] in the household vicinity, indicative of poorer vegetation condition likely due to the ongoing drought at this time.

Such comparisons could provide insights into the potential impacts of climatic shocks on humanitarian conditions and needs across wider areas, including in areas where primary data collection is not possible due to security constraints or lack of roads. Due to the specific characteristics of different climatic and livelihood zones as mentioned previously, the findings highlight the importance of considering these zones when making comparisons between remote sensing and primary data related to climatic shocks. This further highlights why these zones are important in assessment sampling and wider programming.

However, it is important to note that this is still in the stage of proof of concept and further research should be conducted in this field, including analysis of data from different regions. Additional compounding factors such as humanitarian aid provision should also be further considered in future research to reduce noise in the data.

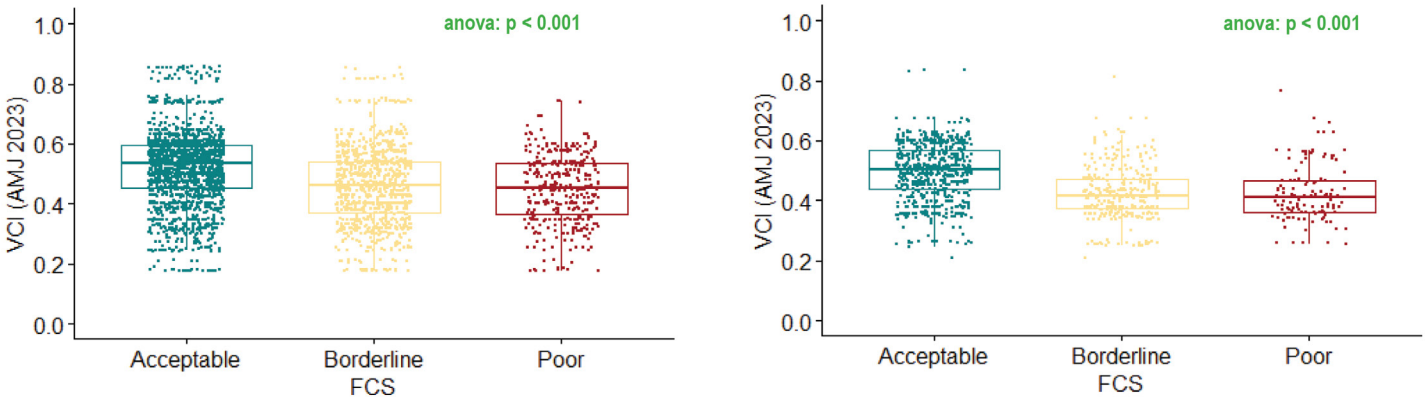


Fig. 6: Food consumption Score (FCS) by household from REACH MSNA in May/June 2023, categorised into Acceptable, Borderline and Poor, vs average Vegetation Condition Index (VCI) in the 5km vicinity of the household in April-June 2023, for (a) pastoral and (b) agropastoral households. The graphs show that poor FCS was associated with lower median VCI, indicative of poorer vegetation condition likely due to drought.

### Endnotes

1. SPI stands for Standardised Precipitation Index. SPI calculates the rainfall anomaly for a specified period (usually 1, 2, 3, 6, 12 or 24 months) from a long-term average baseline for the same period. Calculated from CHIRPS data based on UNSPIDER methodology.
2. https://www.imf.org/en/Blogs/Articles/2023/08/30/africas-fragile-states-are-greatest-climate-change-casualties
   https://link.springer.com/content/pdf/10.1007/s43621-021-00052-9.pdf
3. Source: CHIRPS rainfall.
4. https://www.metoffice.gov.uk/weather/climate/climate-explained/climate-zones
5. https://www.iied.org/sites/default/files/pdfs/migrate/G02497.pdf
6. https://link.springer.com/article/10.1007/s10584-023-03509-0
7. VCI highlights impacts of meteorological drought on vegetation condition through comparing vegetation greenness (from the Normalised Difference Vegetation Index, NDVI) in a specified time period (e.g. a month/season) with the average long-term value for that time period in that location. The formula categorises areas into levels of drought severity between light and extreme.

## ABOUT REACH

REACH Initiative facilitates the development of information tools and products that enhance the capacity of aid actors to make evidence-based decisions in emergency, recovery and development contexts. The methodologies used by REACH include primary data collection and in-depth analysis, and all activities are conducted through inter-agency aid coordination mechanisms. REACH is a joint initiative of IMPACT Initiatives, ACTED and the United Nations Institute for Training and Research - Operational Satellite Applications Programme (UNITAR-UNOSAT).