*Picture credit: A data collector interviewing a respondent during an endline survey in Al Ginina/West Darfur, November.2025. Photo by Ghada Omer Saeed, SUDTT.*

# DARAJA Impact Results Year 1 Sudan

January 2026

Transforming Urban WCIS in the East Africa Region through DARAJA

# Outline

1. Objectives
2. Description of the settlement
3. Methods
4. Key findings
5. Summary

**Suggested Citation:** Resurgence, SUDTT & SMA (2025) *Sudan Endline Report – The DARAJA Sudan Emergency Weather and Early Warning Service*.

**In-Text Citation:** (Resurgence, SUDTT & SMA, 2025)

# List of Acronyms

| | |
|---|---|
| DARAJA | Developing Risk Awareness through Joint Action |
| FGD | Focus Group Discussions |
| KII | Key Informant Interview |
| SMA | Sudan Meteorological Authority |
| SUDTT | Sudan Urban Development Think-Tank |
| WCI | Weather and Climate Information |
| US$ | United States Dollars |

# Objectives

To understand the effect of weather and climate hazards, and impact of DARAJA project on accessibility and usage of WCI or early warning for severe weather events in the targeted communities

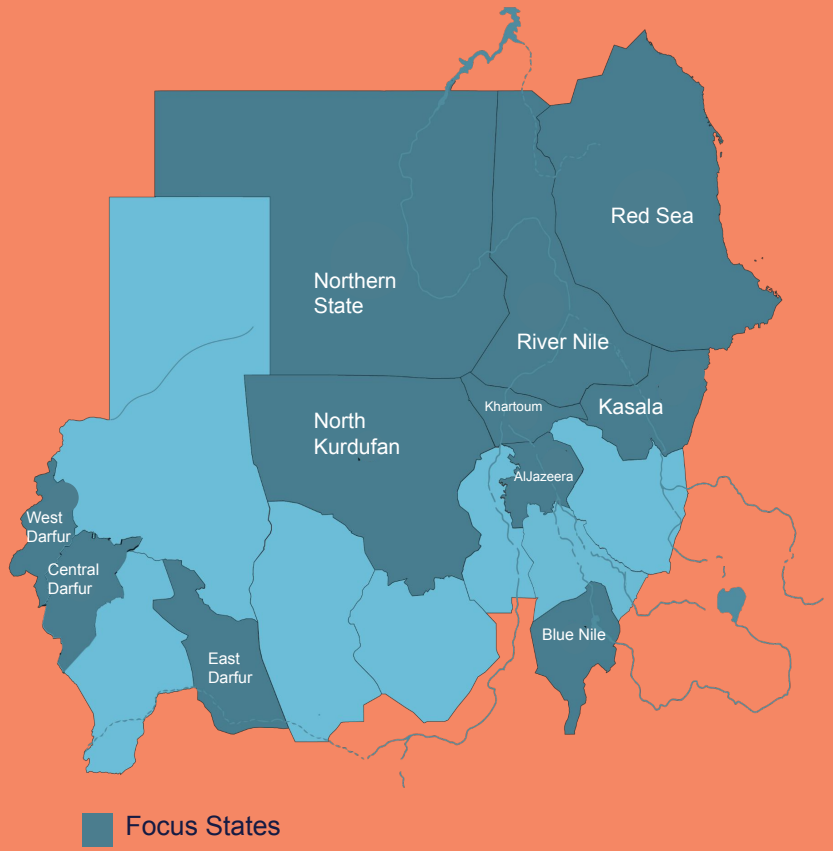
1. To understand the climate hazards or risks faced by the target communities

2. To assess the impact of DARAJA project on access, understanding and use of WCI or early warning messages for severe weather events in target communities

# Settlements

**Data were collected from over 12 states across Sudan:**

- ➔ These states are: Khartoum, Aljazeera, Northern State, North Kurdufan, River Nile, Kasala, Blue Nile, Red Sea, North Darfur, West Darfur and Central Darfur
- ➔ The 11 states were selected based on a combination of factors that highlight their vulnerability to climate and weather-related hazards, conflict impacts, and socioeconomic challenges,. These factors include:
  - History of frequent displacement due to weather and climate-related disasters.
  - Regions hosting large populations of internally displaced persons (IDPs).
  - Reliance on agriculture and pastoralism sensitive to climate impacts.
  - Conflict-affected regions experiencing instability and reduced resilience.
- ➔ Data was also collected from the states outside the focus area remotely, these states are: Gadarif, South Darfur, White Nile, Sennar, Port Sudan, East Darfur, West Kordofan, South Kordofan



# Settlements

**Data were collected from at least 12 states across Sudan:**

- These states are: Khartoum, Aljazeera, Northern State, North Kurdufan, River Nile, Kasala, Blue Nile, Red Sea, North Darfur, West Darfur and Central Darfur

Khartoum:

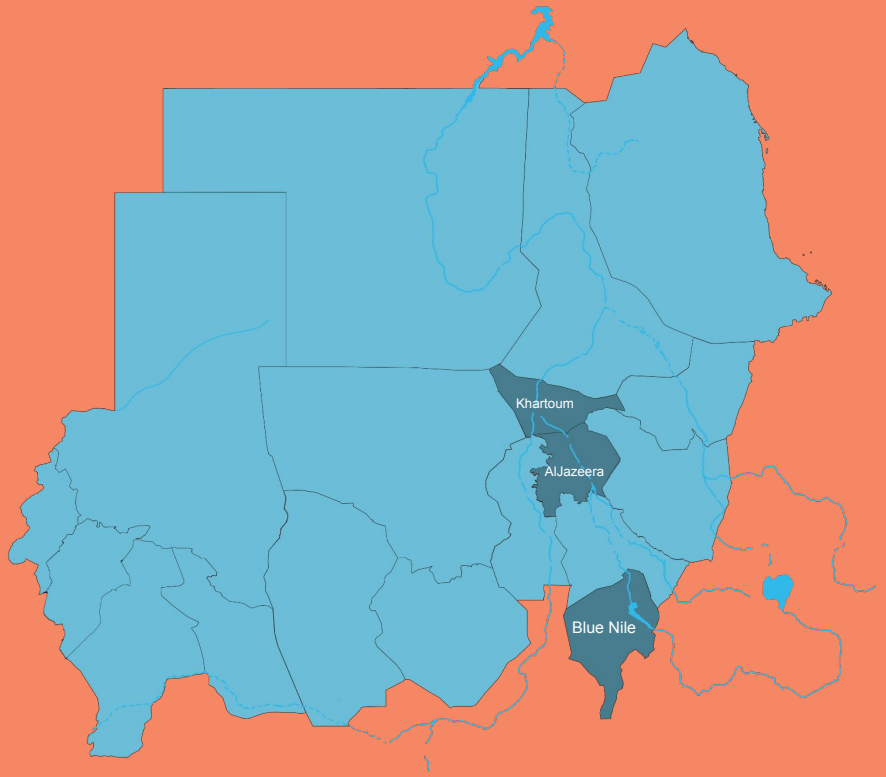
- As the capital city, Khartoum faces risks from flash floods due to heavy seasonal rains, exacerbated by poor drainage systems. Rising temperatures also intensify climate stress in this densely populated region.

Aljazeera

- Known for its agricultural productivity, Aljazeera is vulnerable to erratic rainfall and prolonged droughts, which threaten farming activities.

Blue Nile

- The Blue Nile state faces risks from heavy rains leading to floods and soil erosion. Deforestation and climate-induced changes in river flow patterns affect agriculture and water availability.



# Settlements

Northern State:

➔ This arid region faces desertification and extreme heat, making it susceptible to water scarcity and food insecurity risks.

North Kurdufan:

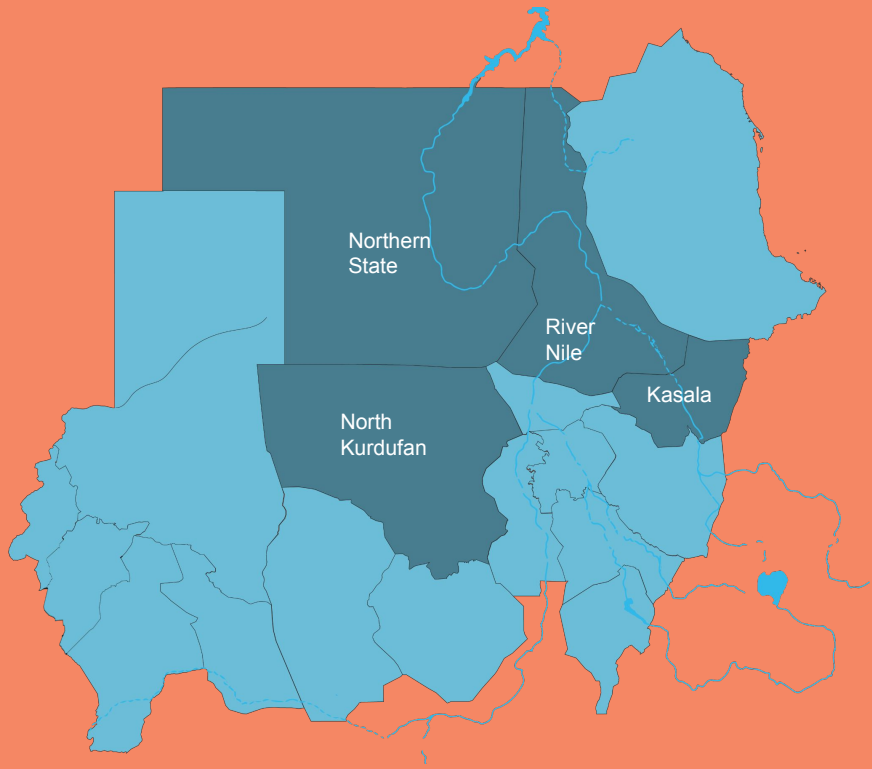
➔ North Kurdufan experiences severe droughts and land degradation due to overgrazing and deforestation. These factors, combined with rising temperatures, have led to reduced agricultural yields and water shortages.

River Nile:

➔ The River Nile state is prone to seasonal flooding from the Nile River, affecting settlements and agricultural land.

Kasala:

➔ Kasala is highly vulnerable to flash floods during the rainy season. Recurrent droughts and desertification also threaten livelihoods.



# Settlements

Red Sea:

➔ The coastal Red Sea state is highly vulnerable to rising sea levels, storm surges, and saline intrusion into freshwater sources. These risks threaten marine ecosystems and the livelihoods of fishing communities.

West Darfur:

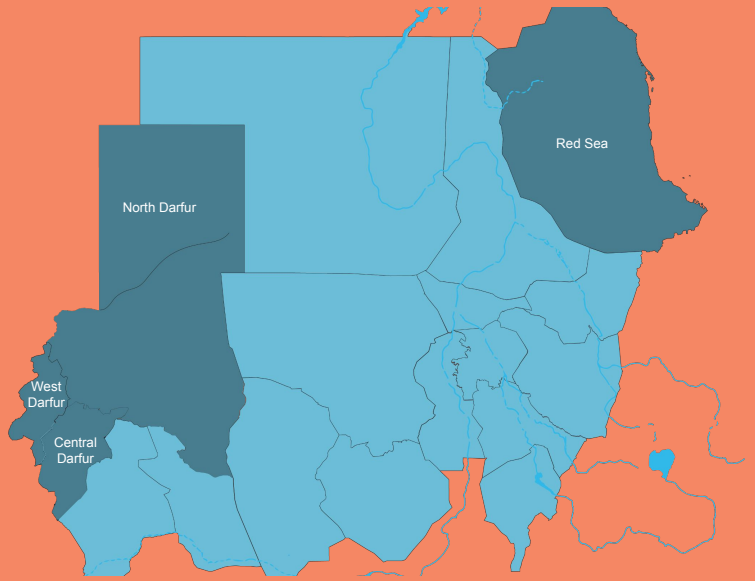
➔ West Darfur faces severe droughts and erratic rainfall, contributing to land degradation and resource conflicts. Seasonal floods also impact low-lying areas, damaging infrastructure and displacing communities.

North Darfur:

➔ This region is characterised by recurring droughts, desertification, and water scarcity, which exacerbate conflicts over resources. Increased temperatures and erratic rainfall further challenge agricultural practices.

Central Darfur:

➔ Central Darfur is prone to prolonged droughts and unpredictable rainfall, undermining subsistence farming and pastoral activities. Deforestation and overgrazing accelerate land degradation in this region.



# Data collection and analysis methods

Sample distribution (%)

| State | Baseline | Endline |
|---|---|---|
| Khartoum | 15 | 21 |
| River Nile | 11 | 18 |
| Blue Nile | 15 | 15 |
| West Darfur | 10 | 11 |
| Northern State | 7 | 8 |
| Aljazeera | 7 | 4 |
| Kassala | 4 | 5 |
| Red Sea | 2 | 5 |
| Central Darfur | 9 | 3 |
| North Kurdufan | 6 | 1 |
| North Darfur | 2 | 2 |
| Other | 12 | 7 |

Other:

| Household Survey | Focus Group Discussions | Key Informant Interviews |
|---|---|---|
| **1834 respondents** from over 12 states of Sudan | **16 participants** across 5 groups (9 female and 7 male participants) | **4 key informants** (1 female and 3 male participants) |
| Male, Female, 18 yrs+, and People with disabilities | Journalists, Media (Radio and TV), NGOs, INGOs, Telecommnication | DRR Authorities, Decision makers and Related Agencies |

## Quantitative data analysis

Descriptive statistics,
Probit regression model

## Qualitative data analysis

Thematic analysis

# Key variables

## % Climate risks

Which key climate hazards and risks are faced by communities?

## % Access

In what ways do people regularly access/ receive weather & climate information (e.g. weather forecasts or warnings)

## % Preference

Which channels do respondents prefer to receive weather & climate information?

## % Understanding

How well the respondents can understand the weather forecast? *(technical details, impacts)*

## % Use

How do people use the information they get through different channels? (e.g which are the most common preparatory/anticipatory actions taken?)

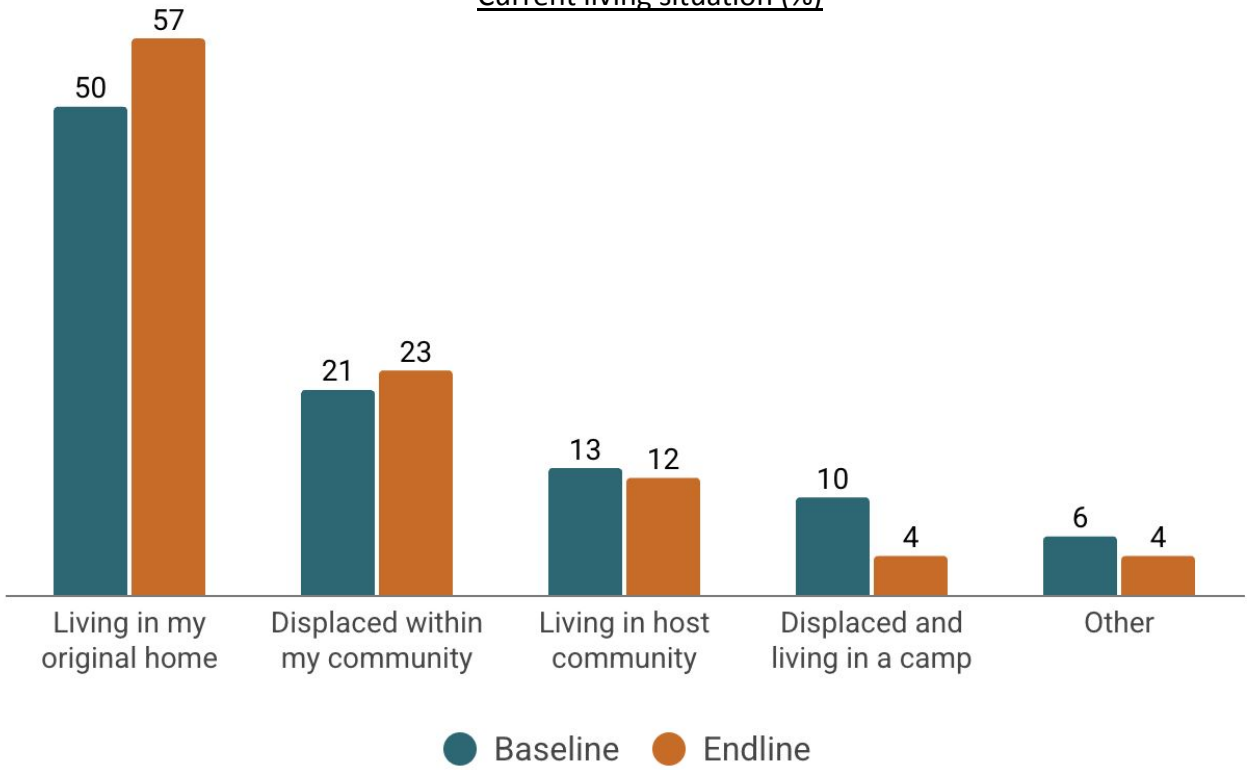
# Key Findings

# Demographic characteristics of respondents

- Female respondents made up 56% of the sample (up from 48% at baseline), while male respondents accounted for 44% (down from 51% at baseline).
- 93% of respondents had at least primary education (up from 83% at baseline), and 62% had completed technical college or university (up from 53%), indicating generally high literacy levels among survey participants.
- 72% of respondents reported no disability (75% at baseline), while 25% had some difficulties and 3% had a lot of difficulties, compared with 21% and 4% at baseline, respectively.
- Most respondents were aged 18–30 years (38%, same as baseline), followed by 31–40 years (27%, vs 26% at baseline), 41–50 years (21% vs 19% at baseline), 51–60 years (10% vs 11%), and 60+ years (4% vs 6%).
- Most respondents derive their incomes from salaried employment (22% vs 23% at baseline), casual labour (22% vs 15%), support from family abroad (18% vs 17%), farming & livestock production (8% vs 16%) and humanitarian aid (7% vs 5%).

# Current living situation

Current living situation (%)



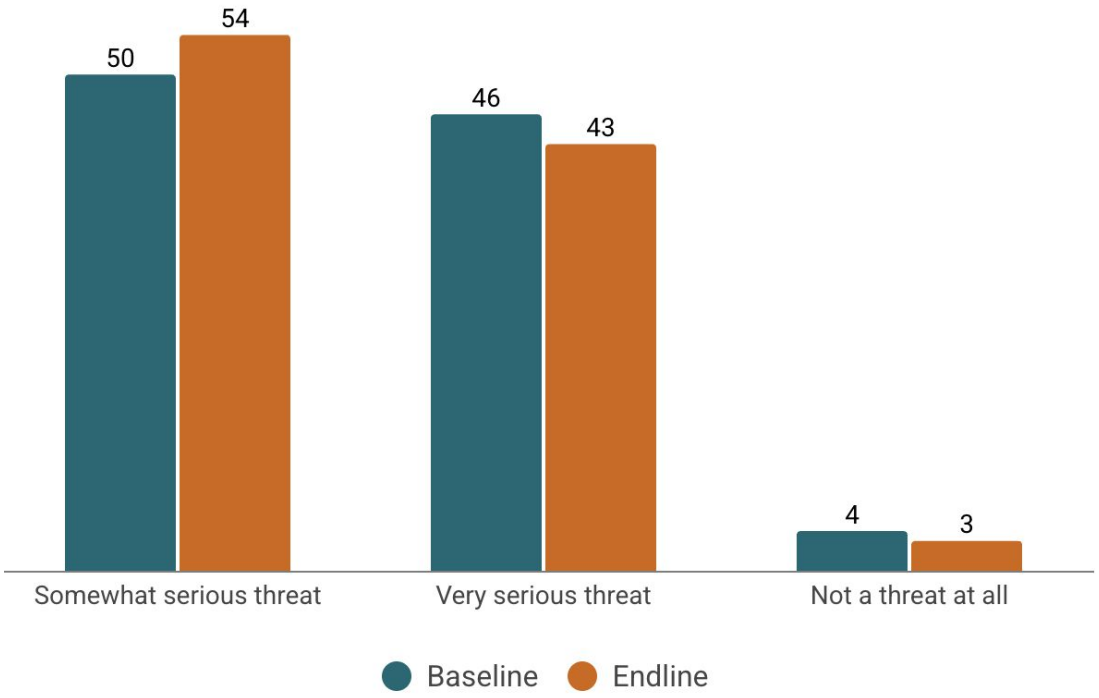

- Most respondents currently reside in their original homes (57% vs 50% at baseline), while the proportion of displaced individuals dropped to 39% from 44%, including a decline from 10% to 4% for those living in camps or temporary shelters.

Endline (Dec 2025): % of total respondents **[1834]**
Baseline (Dec 2024): % of total respondents **[2289]**

# Perception of climate change

The majority of respondents (97% up from 96% at baseline) perceived climate change as a serious threat, with 43% viewing it as very serious and 54% considering it somewhat serious.

Climate change perception (%)





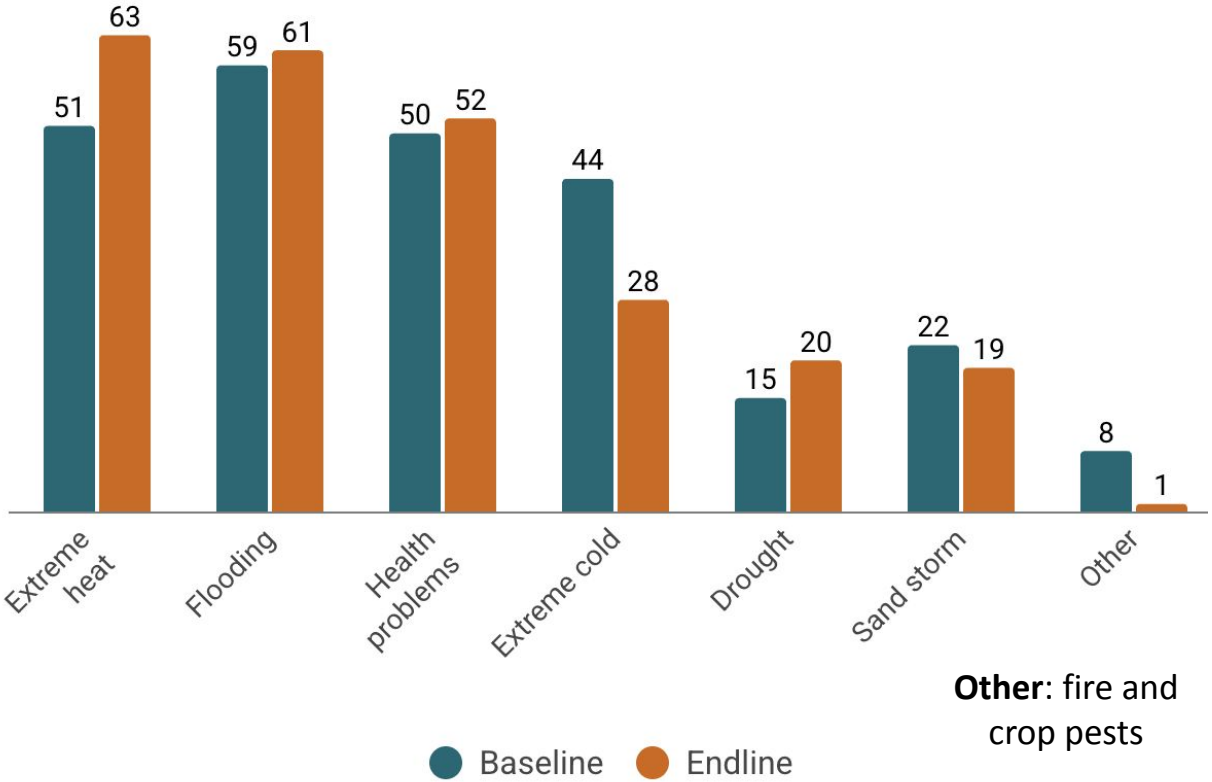

Endline (Dec 2025): % of total respondents **[1834]**
Baseline (Dec 2024): % of total respondents **[2289]**

# Hazards

Most respondents (69% vs 67% at baseline) reported being affected by climate-related disasters in the 12 months preceding the survey.

There was a shift in key hazards, with extreme heat emerging as the primary concern, followed by flooding, which had been the major hazard at baseline. Health-related problems also surfaced as an important hazard.

Weather and climate hazards (%)




**Other**: fire and crop pests



Endline (Dec 2025): % of total respondents **[1834]**
Baseline (Dec 2024): % of total respondents **[2289]**

# Impacts of flooding

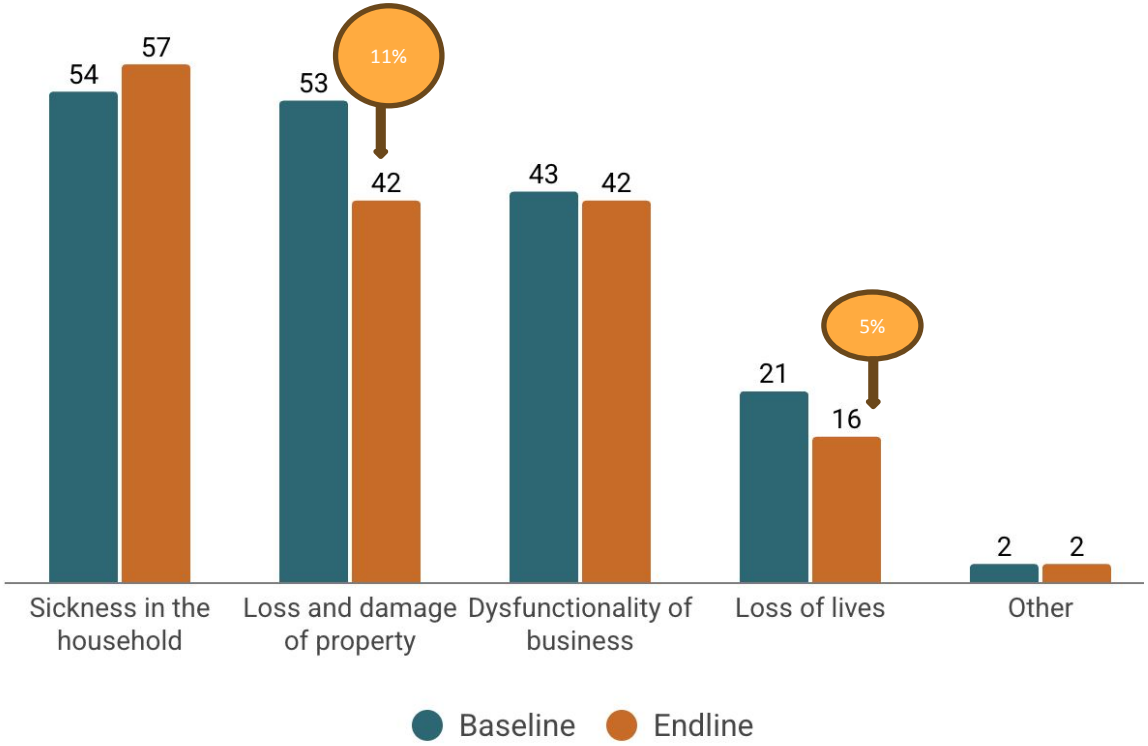
- Notable reduction in households experiencing loss or damage of property, suggesting improvements in preparedness

- Reports of loss of lives also declined, indicating a positive shift—possibly due to better early warning systems and evacuation procedures

Among them, 35% (compared to 30% at baseline) received support to cope with flooding, primarily from:

- International NGO (67% vs 46%)
- Individuals (46% vs 47%)
- Local communities (30% vs 25%)
- Local NGO (22% vs 47%)
- Government (10%, unchanged)
- Other (1% vs 2%)

Impact of flooding (%)




Other:



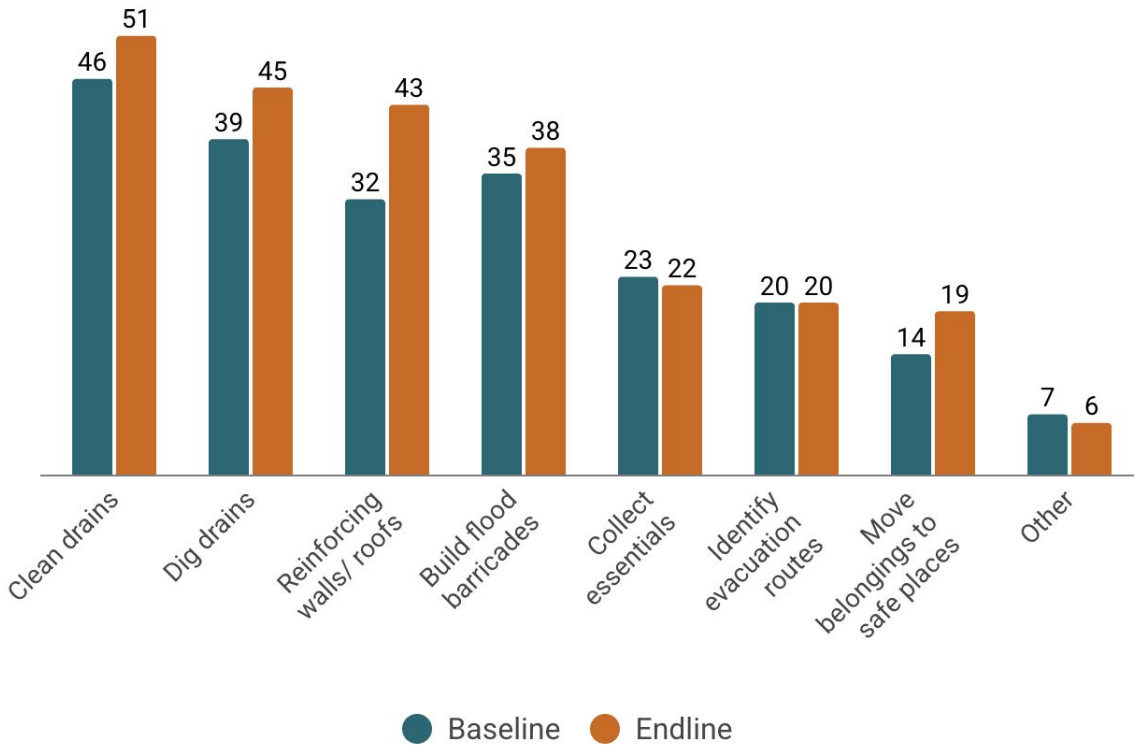
Endline (Dec 2025): % of total respondents **[1264]**
Baseline (Dec 2024): % of total respondents **[1530]**

# Flooding coping strategies

**Most implemented strategies**

1. clean drainage channels
2. dig drainage channels
3. reinforcing walls and roofs to prevent water leakages into the house
4. build flood barricades, i.e. with sandbags to prevent water from coming into the house

Flooding coping strategies (%)




Other: Avoid direct exposure to sunlight, planting trees, storing medicines, use solar energy and relocating to safe places



Endline (Dec 2025): % of total respondents **[1834]**
Baseline (Dec 2024): % of total respondents **[2289]**

# Access to WCI or early warning messages

Access to weather and climate information and early warning systems improved significantly, rising from 39% at baseline to 60% at endline

Among those with access, 71% (vs 68% at baseline) know the source of WCI:

- The Sudan Meteorological Authority 62% of vs 67% at baseline
- Private weather agencies 31% vs 21% at baseline
- Other (such as the weather.com and google) 7% vs 12% at baseline

*All the FGD participants were aware of the DARAJA Early Warning Service. "Yes, we have been following and appreciating the early warnings shared through the WhatsApp group."* [FGD participant – Local NGOs]

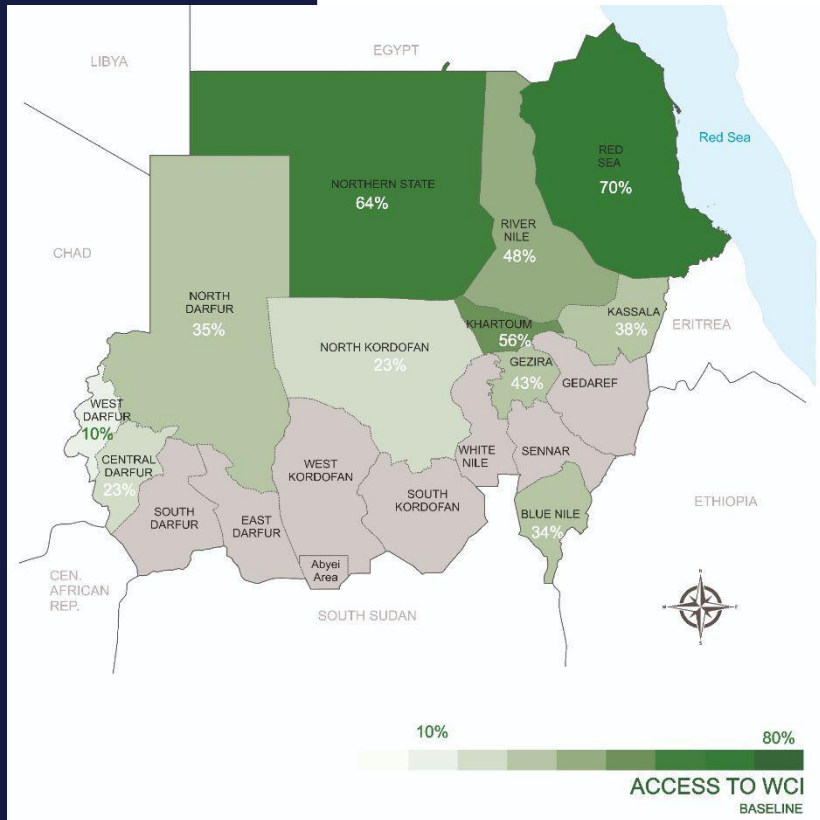
Access to weather and climate information (WCI) %

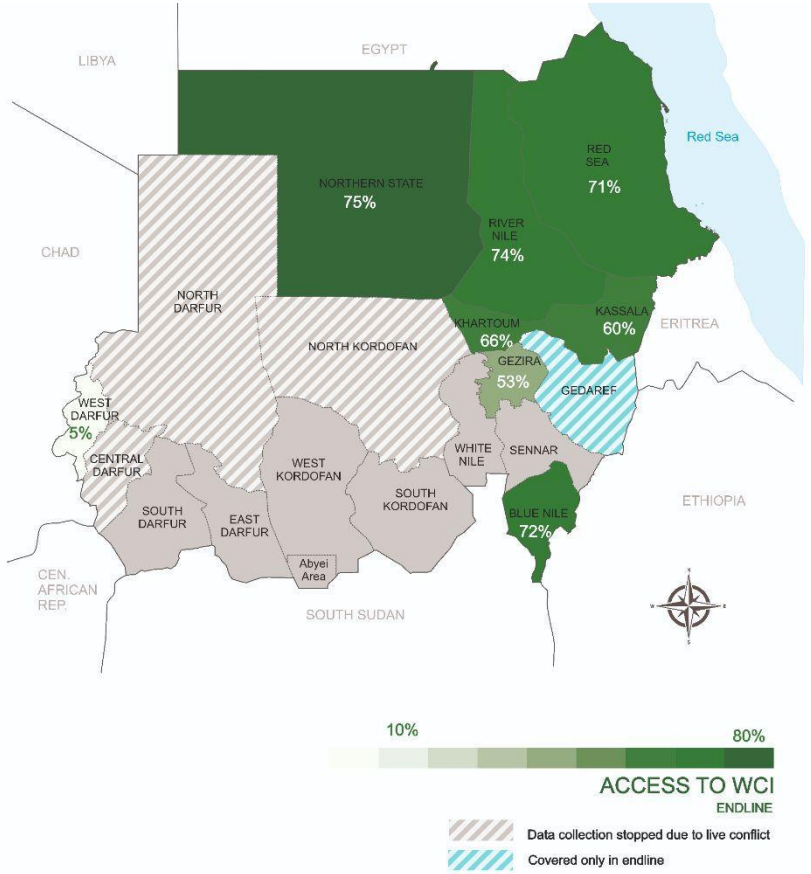
| Percentage of respondents who: | Baseline | Endline |
|---|---|---|
| **Access WCI** | 39% | 60% |
| If access: **type of weather forecasts received** | | |
| a. **Daily** | 42% | 36% |
| b. **Weekly** | 20% | 19% |
| c. **Monthly** | 7% | 8% |
| d. **Seasonal** | 15% | 25% |
| e. **For extreme weather events** | 13% | 40% |
| **Other** | 3% | 3% |
| Access: **if engaged in farming and livestock production** | 28% | 66% |



Endline (Dec 2025): % of total respondents **[1834]**
Baseline (Dec 2024): % of total respondents **[2289]**

# Access to WCI or early warning messages %






Endline (Dec 2025): % of total respondents **[1834]**
Baseline (Dec 2024): % of total respondents **[2289]**

# Access:
## Gender, age and disability

All the key informants confirm accessing DARAJA services. For example, the Ministry of Agriculture has this to say: "*We access rainfall, temperature, daily and seasonal weather forecasts, and forecasts, and we use this for agriculture and crop production forecasts.*" Ministry of Agriculture key informant.

Access to WCI by gender, age and disability status

- While access to weather and climate information (WCI) improved for both genders, male respondents reported slightly higher access (63%) than female respondents (59%) at endline, up from 39% for both groups at baseline
- Access to WCI increased across all age groups. Moderate gains were observed among younger respondents aged 18–30 (from 46% at baseline to 53% at endline) and 31–40 (from 40% to 56%), while older age groups, 41–50 (60% vs. 32%), 51–60 (57% vs. 31%), and 60+ (52% vs. 21%), recorded larger increases, reflecting substantial improvements from lower baseline access levels.
- Access to WCI increased across all disability groups, from 43% to 66% among respondents with no difficulties, 28% to 49% among those with some difficulties, and 14% to 32% among respondents with a lot of difficulties, highlighting persistent but narrowing access gaps by disability status.



Endline (Dec 2025): % of total respondents **[1834]**
Baseline (Dec 2024): % of total respondents **[2289]**

# Access:
## Factors affecting access to WCI

Female respondents are **4%** less likely to access WCI compared to their male counterparts.

Surprisingly, displaced respondents—whether living in camps, host communities, or within their communities are **5%** more likely to access WCI compared to those residing in their original communities.

The respondents with secondary education or higher are **7%** more likely to have access to WCI than those with primary or no education.

The respondents aged 31-40 years, and individuals with some or a lot of difficulties in seeing or hearing have less access to WCI compared to youth and those without disabilities

Factors affecting access to WCI or early warnings

| Independent variables | Marginal effects | Robust Standard Errors |
|---|---|---|
| Engaged in farming (1-yes, 0 otherwise) | 0.06 | 0.04 |
| **Displaced (1-yes, 0 otherwise)** | **0.05*** | **0.02** |
| **Gender (1-female, 0 otherwise)** | **-0.04*** | **0.02** |
| **Secondary education level and above (1-yes, 0-otherwise)** | **0.07***** | **0.02** |
| **Aged 31–40 years (1-yes, 0- 18-30 years)** | **-0.07**** | **0.03** |
| Aged 41–50 years (1-yes, 0- 18-30 years) | -0.02 | 0.03 |
| Aged 51–60 years (1-yes, 0- 18-30 years) | -0.02 | 0.04 |
| Aged Above 60 years (1-yes, 0- 18-30 years) | -0.03 | 0.06 |
| **Having some difficulties seeing, hearing, physical or mental activities (1-yes, 0- no difficulty)** | **-0.17***** | **0.03** |
| **Having a lot of difficulties hearing or seeing (1-yes, 0- no difficulty)** | **-0.32***** | **0.06** |
| Constant | 0.36*** | 0.08 |

| | | | |
|---|---|---|---|
| Mean dependent variable | 0.603 | SD dependent variable | 0.489 |
| Pseudo r-squared | 0.037 | Number of observations | 1834 |
| Chi-square | 87.579 | Prob > chi2 | 0.00 |
| Akaike crit. (AIC) | 2393.867 | Bayesian crit. (BIC) | 2454.523 |

*Survey Data Results-2025*

*** p<0.01, ** p<0.05, * p<0.1

# Access:
## Channels for WCI

Social media (i.e. WhatsApp & Facebook) remains the most popular channel to access WCI

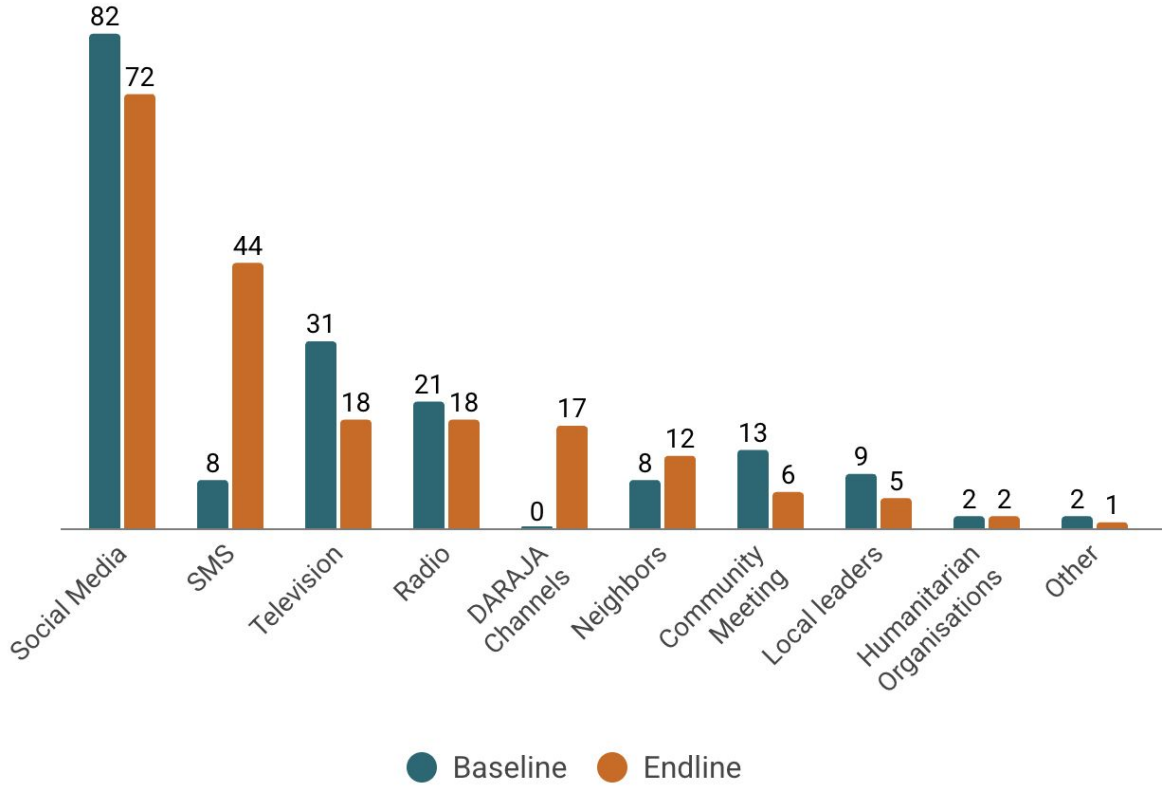
Social Media **72%**

SMS **44%**

Television **18%**

All FGD participants reported receiving weather forecasts through the DARAJA WhatsApp platform, and 70% also reported receiving them via SMS. *"We mostly received daily forecasts and early warning messages through DARAJA WhatsApp group"* [FGD participant—International NGOs]

Sources of WCI (%)




*The dissemination occurs through telecom operators via SMS, primarily for red alert warnings."* [Key informant – Telecommunications and Post Regulatory Authority]



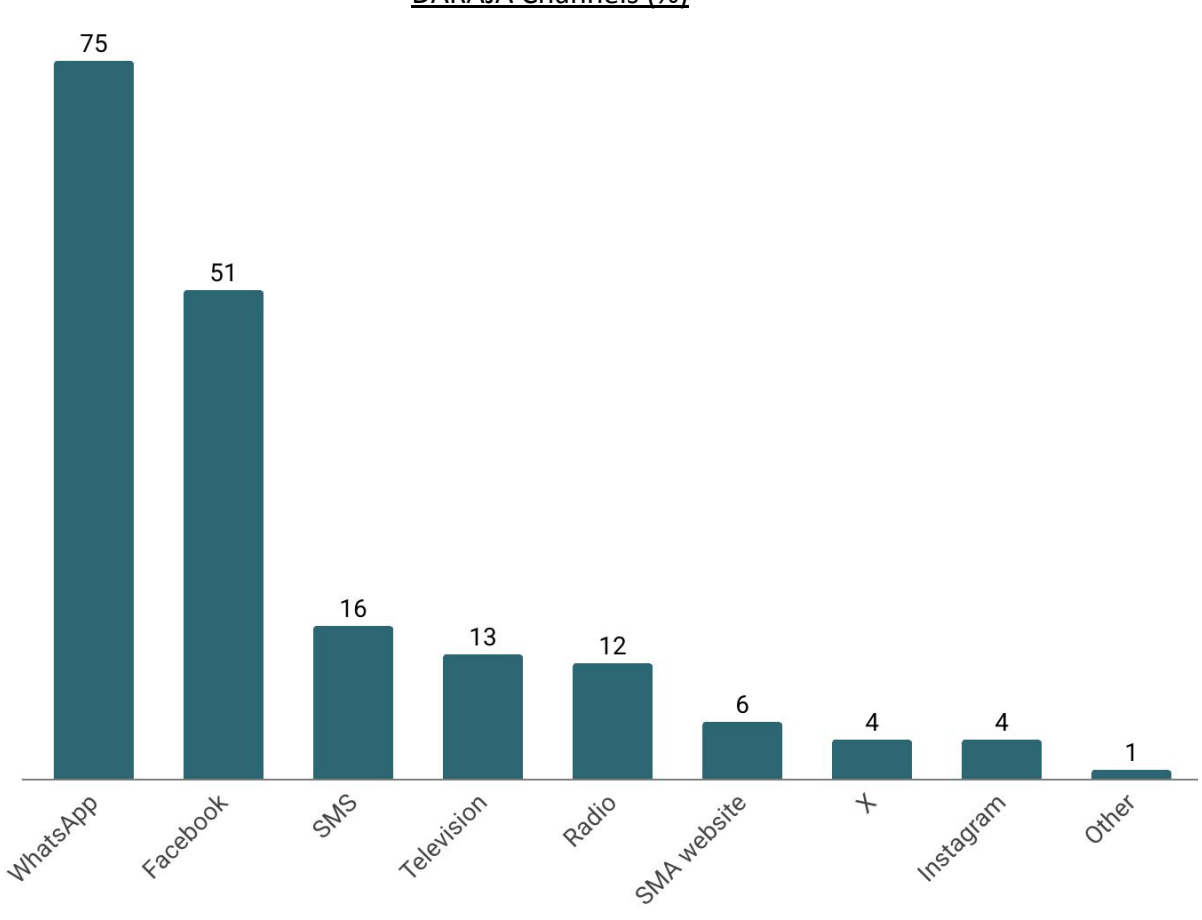
Endline (Dec 2025): % of total respondents **[1106]**
Baseline (Dec 2024): % of total respondents **[890]**

# Access:
## DARAJA Channels

WhatsApp, Facebook & SMS are the most popular DARAJA channels to access WCI

All the key informants indicated reliance on WhatsApp to receive early warning information. "*We receive early warnings through the DARAJA service WhatsApp group that I am one of its members*." [Key informant - NCCD]

"*The SMS system was effective because it was the fastest way to reach the largest segment of the audience*." [FGD participant – Telecommunication Companies]




% of total respondents who access WCI **[187 respondents]**

# User preferences

**Most preferred channels**

1. Social media (WhatsApp)
2. TV
3. Local leaders

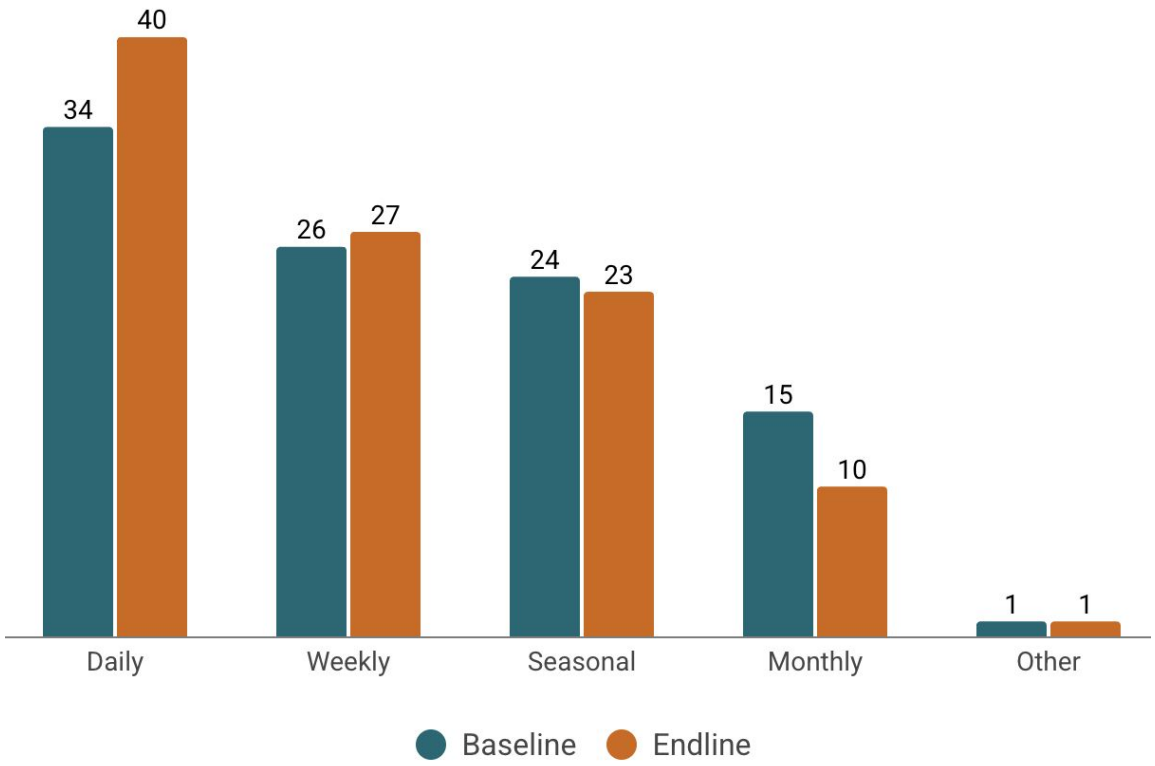
**Preferred forecast type**

1. Daily
2. Weekly
3. Seasonal

*"We were unable to receive information via email during the war, so WhatsApp is preferred."* [Key informant – Ministry of Agriculture]

*"Using the SMS system was very effective given power outages and poor internet."* [FGD participant—Telecommunication companies]

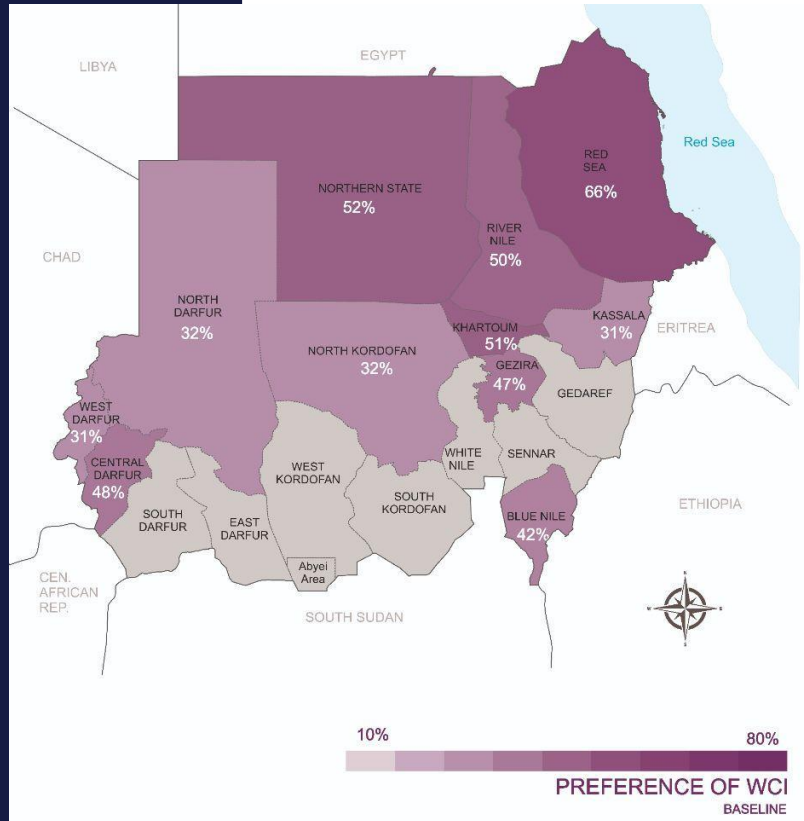
Preferred type of forecasts (%)

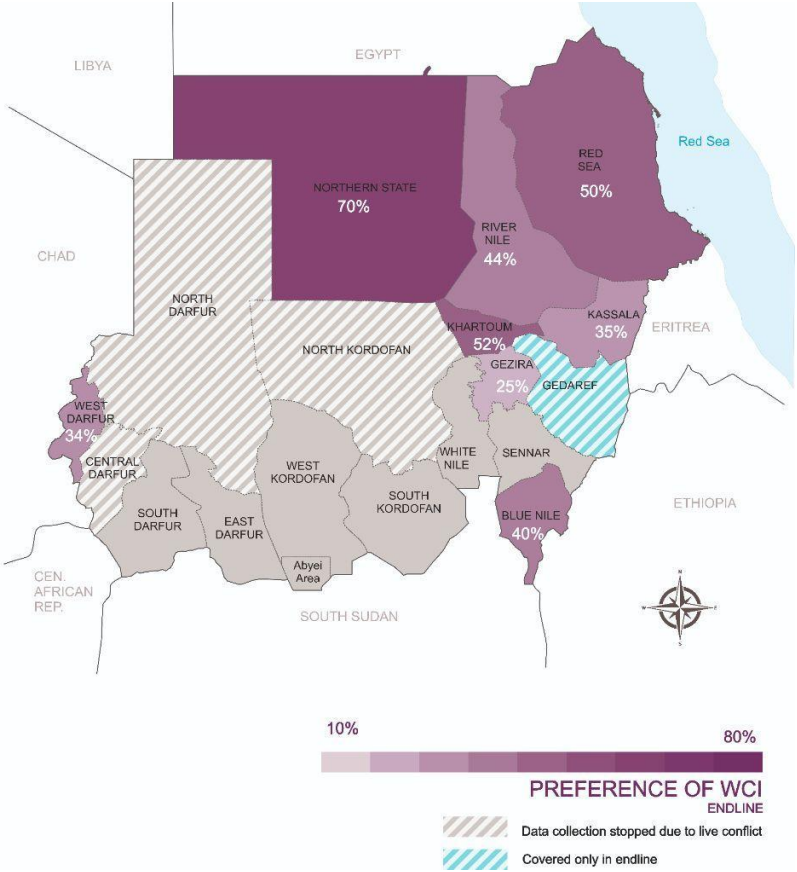



50% of KIIs explicitly highlight daily forecasts as the most operationally useful

Endline (Dec 2025): % of total respondents **[1834]**
Baseline (Dec 2024): % of total respondents **[2289]**

# User preferences: Social media



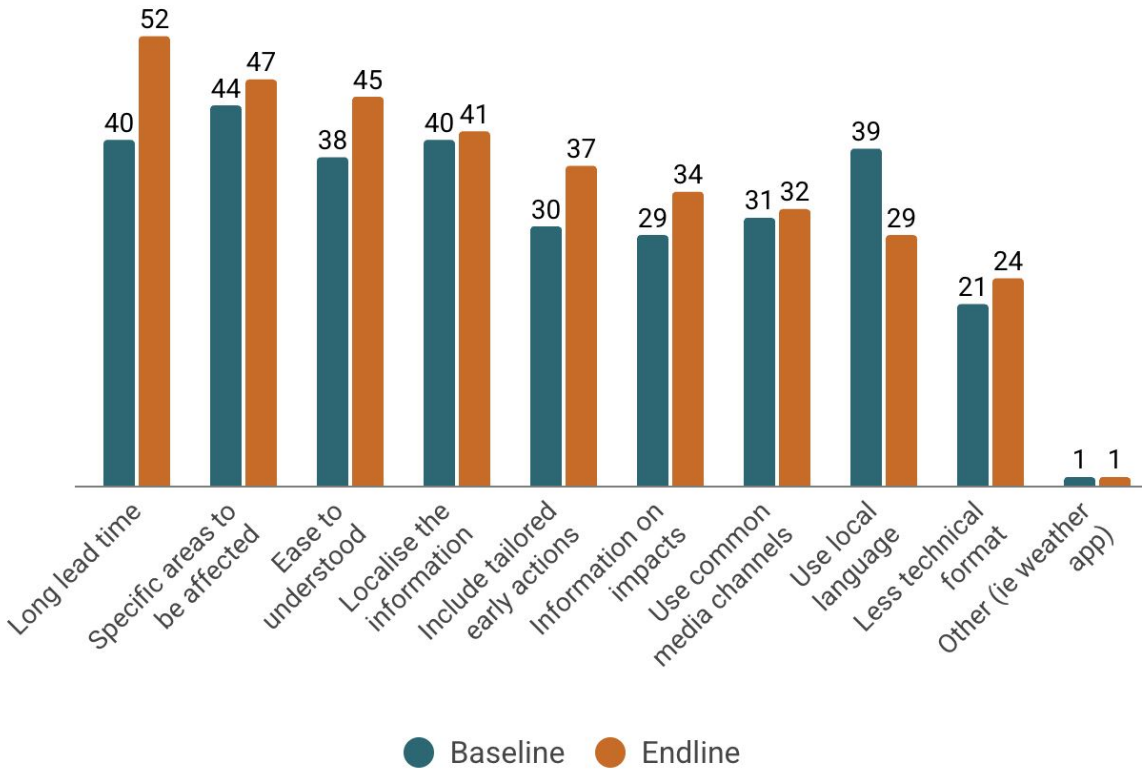

Endline (Dec 2025): % of total respondents **[1834]**
Baseline (Dec 2024): % of total respondents **[2289]**

# User preferences

**Suggested improvements to forecasts**

1. Long lead time
2. Indicate specific areas to be affected
3. Use formats that are ease to understand

Suggested improvements (%)



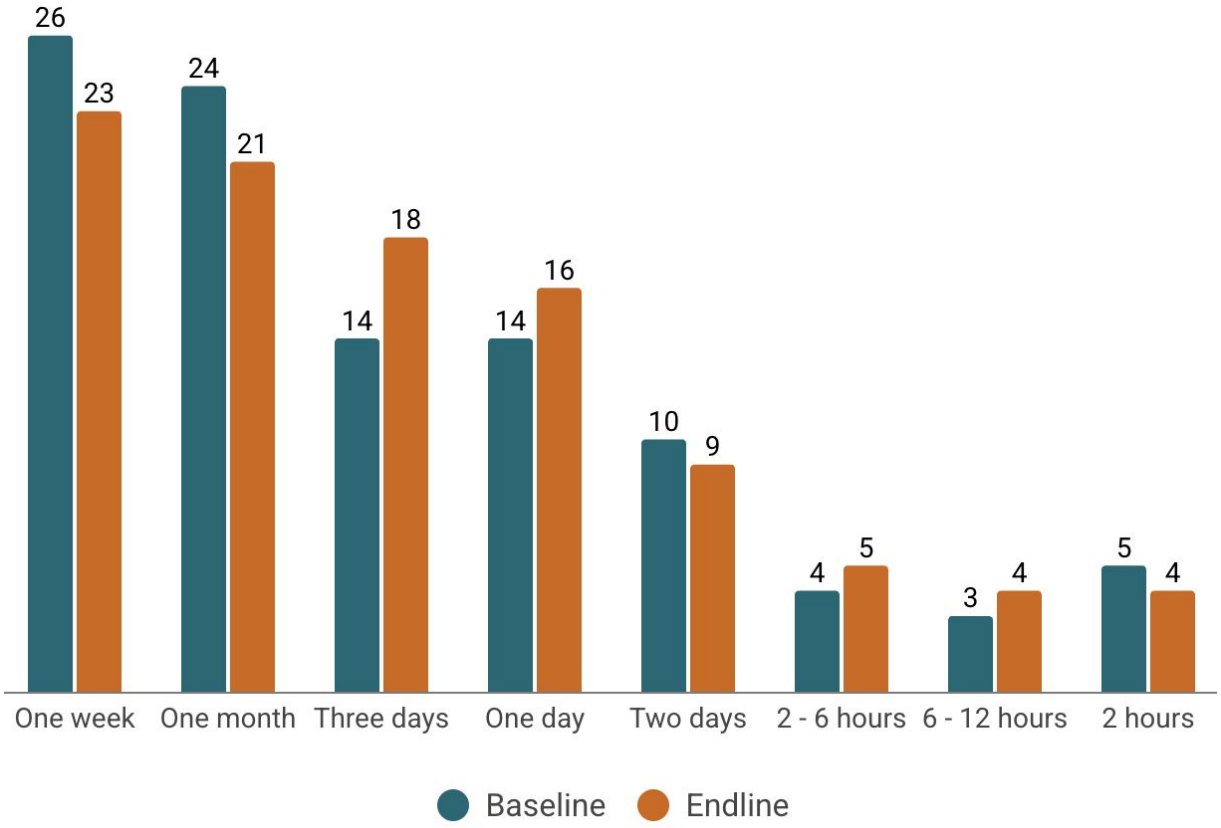

Endline (Dec 2025): % of total respondents **[1834]**
Baseline (Dec 2024): % of total respondents **[2289]**

# User preferences

**Flooding lead time**

- One week

Flooding lead time



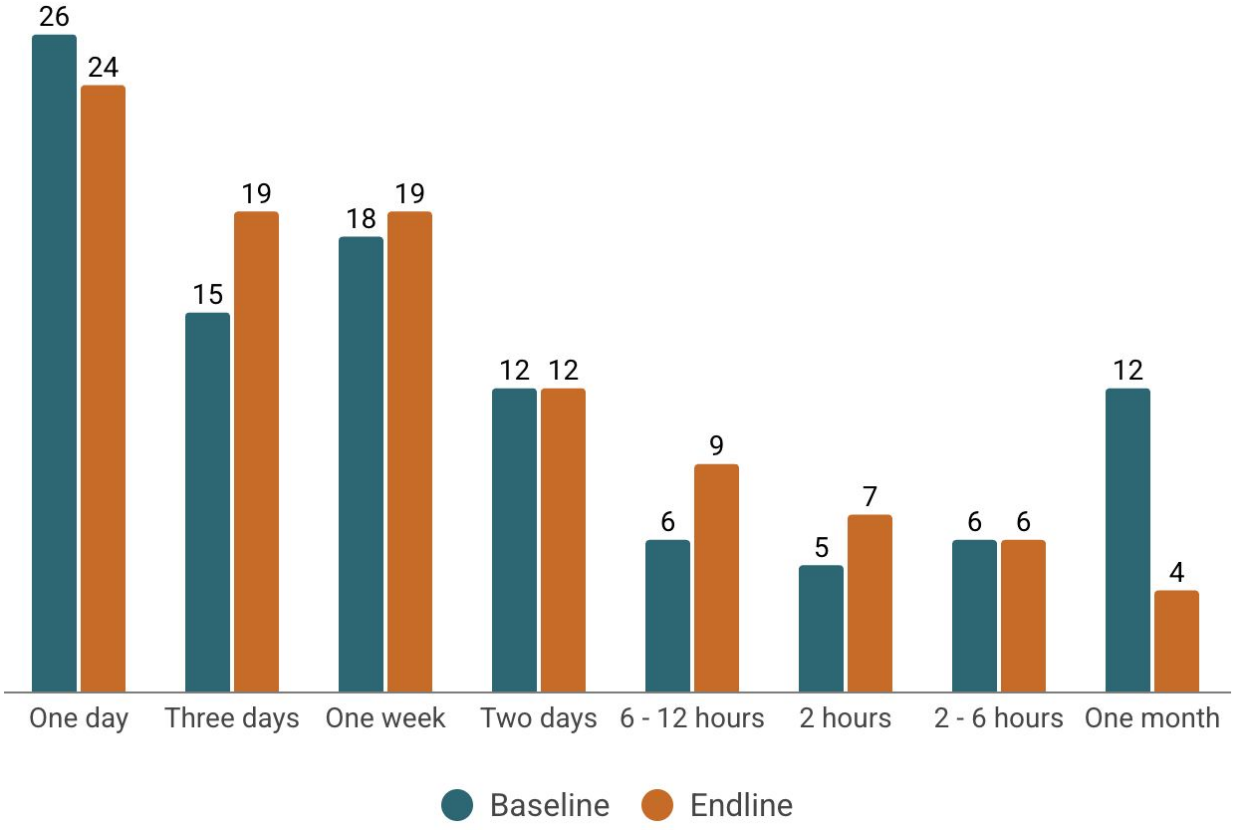

Endline (Dec 2025): % of total respondents **[1834]**
Baseline (Dec 2024): % of total respondents **[2289]**

# User preferences

**Extreme heat lead time**

- One day

Extreme heat lead time



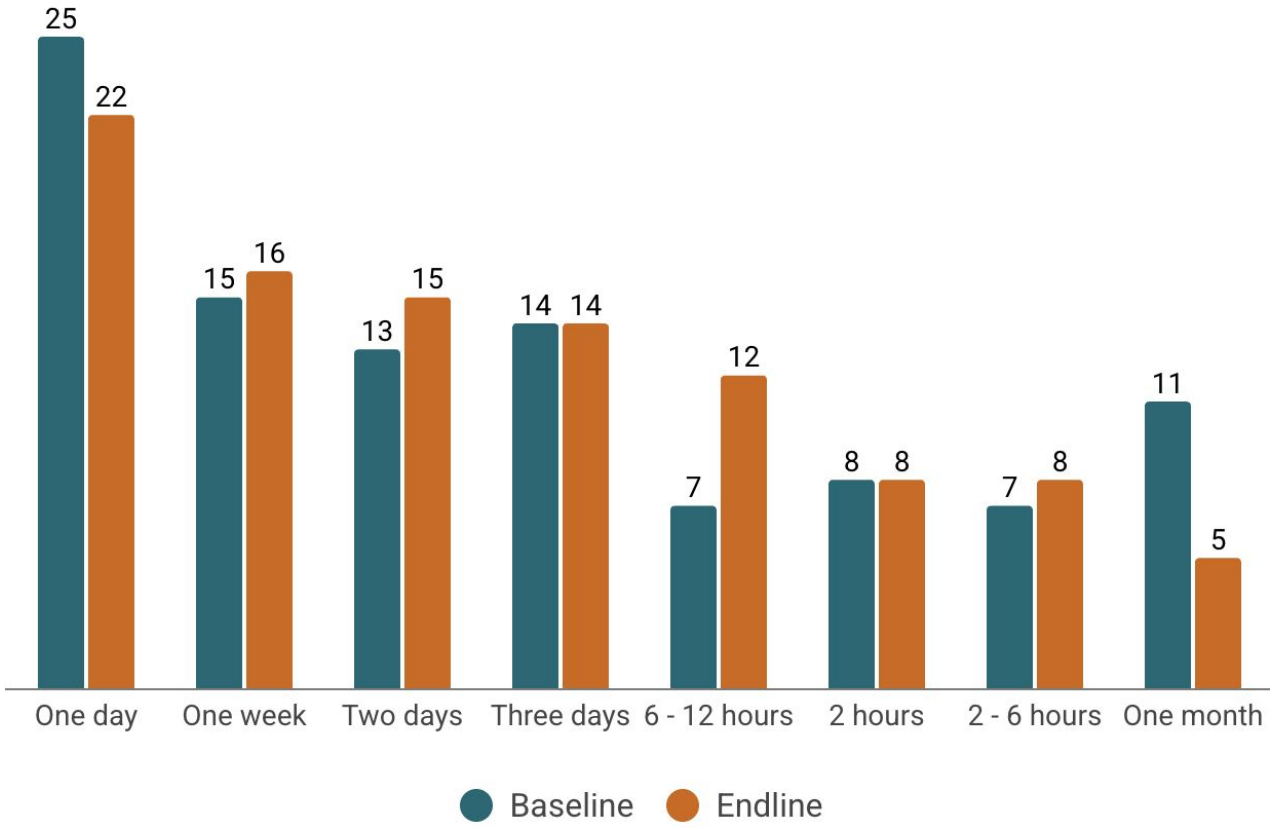

Endline (Dec 2025): % of total respondents **[1834]**
Baseline (Dec 2024): % of total respondents **[2289]**

# User preferences

**Sandstorms lead time**

- One day

Sandstorms lead time




*Survey Data Results-2025*

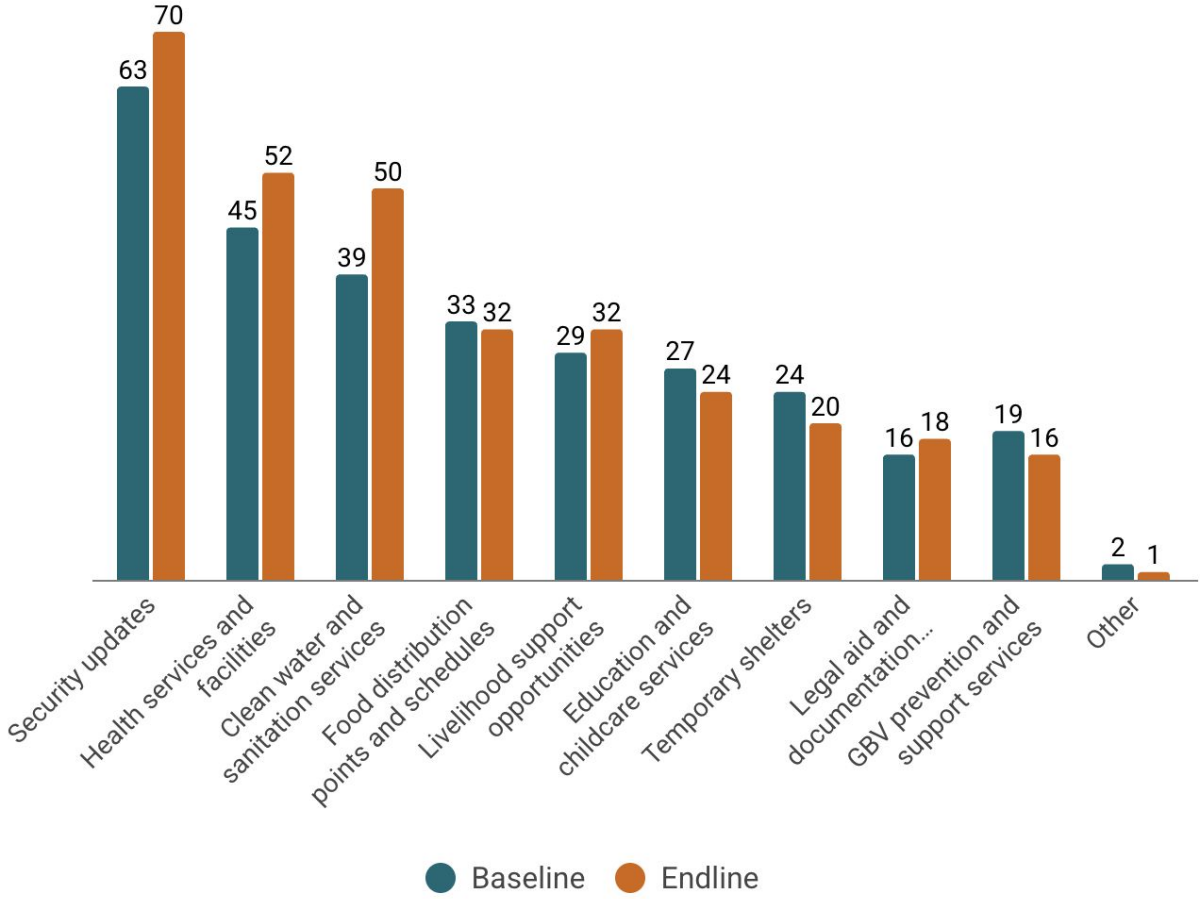
Endline (Dec 2025): % of total respondents **[1834]**
Baseline (Dec 2024): % of total respondents **[2289]**

# Other preferences

**Other information communities want**

- Security updates
- Access to health services and facilities
- Availability of clean water and sanitation services
- Food distribution points and schedules
- Livelihood support opportunities such as trainings

Other type of information communities want (%)




Endline (Dec 2025): % of total respondents **[1834]**
Baseline (Dec 2024): % of total respondents **[2289]**

# Understanding (1/2)

Among the respondents with access, **96%** of them indicated that they have some understanding of the WCI compared to 94% at baseline.

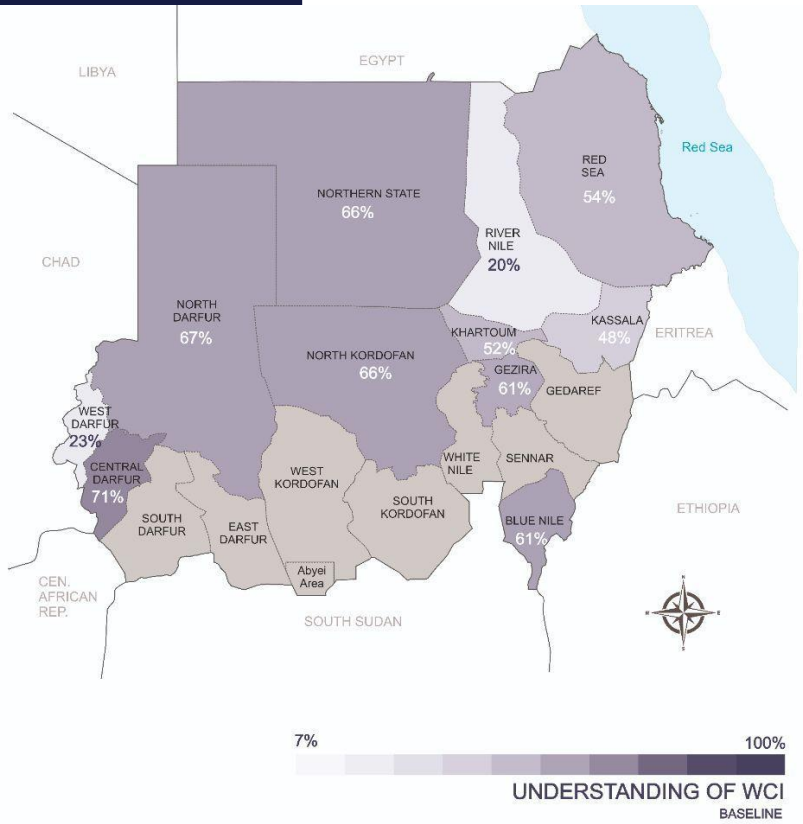
% understanding WCI

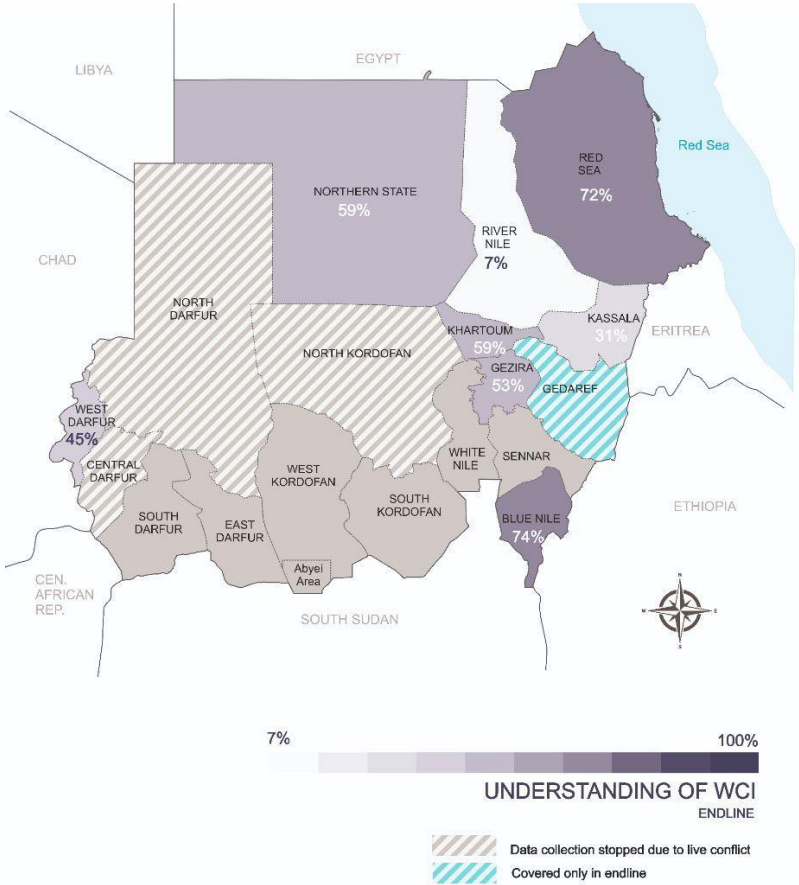
| Percentage of respondents who: | Baseline | Endline |
|---|---|---|
| If access, **understand the weather information** | 94% | 96% |
| If understand: understanding the **WCI very well** | 51% | 53% |
| If understand: understanding **only parts of the information** | 43% | 43% |



Endline (Dec 2025): % of total respondents **[1106]**
Baseline (Dec 2024): % of total respondents **[890]**

# Understanding




*Survey Data Results-2025*

Endline (Dec 2025): % of total respondents **[1106]**
Baseline (Dec 2024): % of total respondents **[890]**

# Understanding (2/2)

Generally, 80% of FGD participants rated DARAJA information as clear for institutional users.

Nevertheless, 60% also noted the need for simplification of formats for communities.

"*The bulletin is clear and understandable, but weather information must be presented in several ways*." [FGD participant—Media Companies].

What did FGD participants say about WCI understanding?

- SMS messages were clear despite character limits [FGD participant—Telecommunication companies].
- Language is clear, advice is helpful; probability and technical explanations need improvement [FGD participant—International NGOs].
- Bulletins are understandable but must be adapted into multiple formats and local dialects [FGD participant—Media Companies].
- Understanding is good among trained staff; communities require translation and contextualisation [FGD participant—local NGOs].



Endline (Dec 2025): % of total respondents **[1106]**
Baseline (Dec 2024): % of total respondents **[890]**

# Understanding:
## Potential impacts

Among the respondents with WCI access, **94%** of them indicated that they have some understanding of the potential impacts, showing a modest increase from the baseline level of 92%.

Understood potential impact (%)

| Percentage of respondents who: | Baseline | Endline |
|---|---|---|
| If access, **understand the potential impact** | 92% | 94% |
| If understand: understanding the **potential impact very well** | 53% | 51% |
| If understand: understanding **only parts of the potential impact** | 39% | 43% |

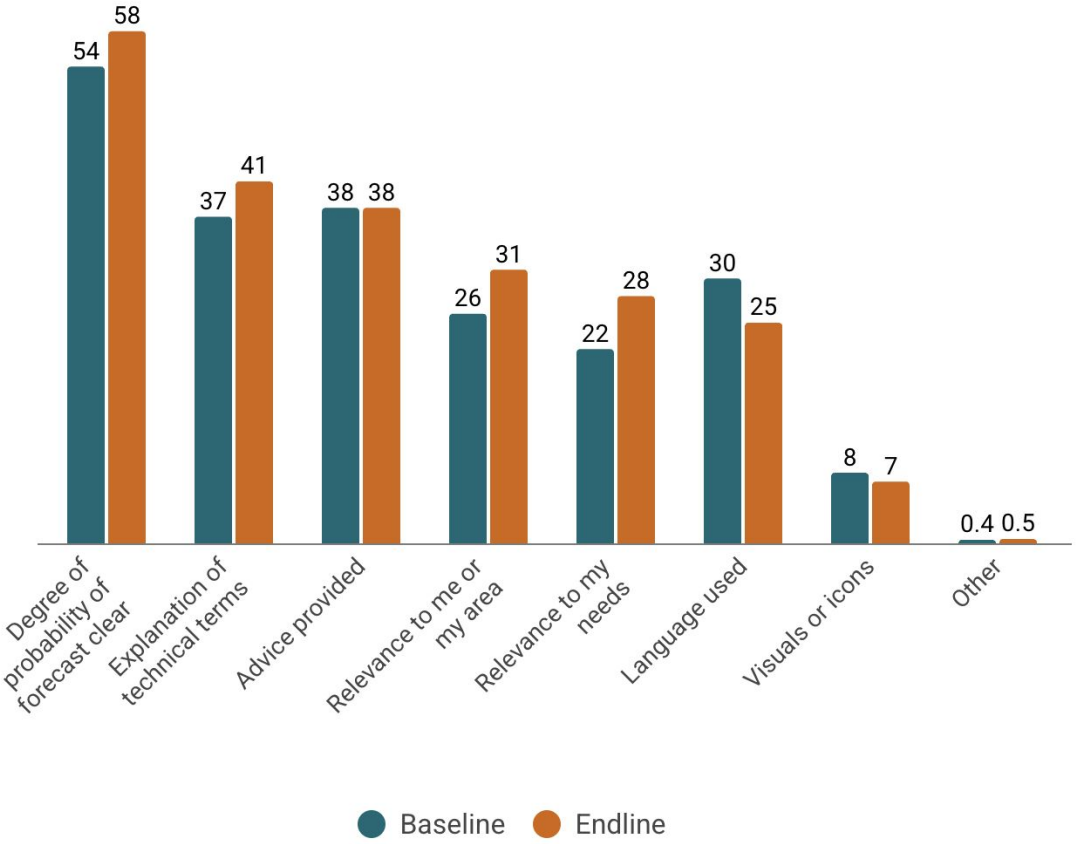
*Survey Data Results-2025*

Endline (Dec 2025): % of total respondents **[1106]**
Baseline (Dec 2024): % of total respondents **[890]**

# Key enablers to understanding the information

1. Degree of probability of weather forecast expressed clearly
2. Explanation of technical terms
3. Advice provided
4. Relevant to the residence's area

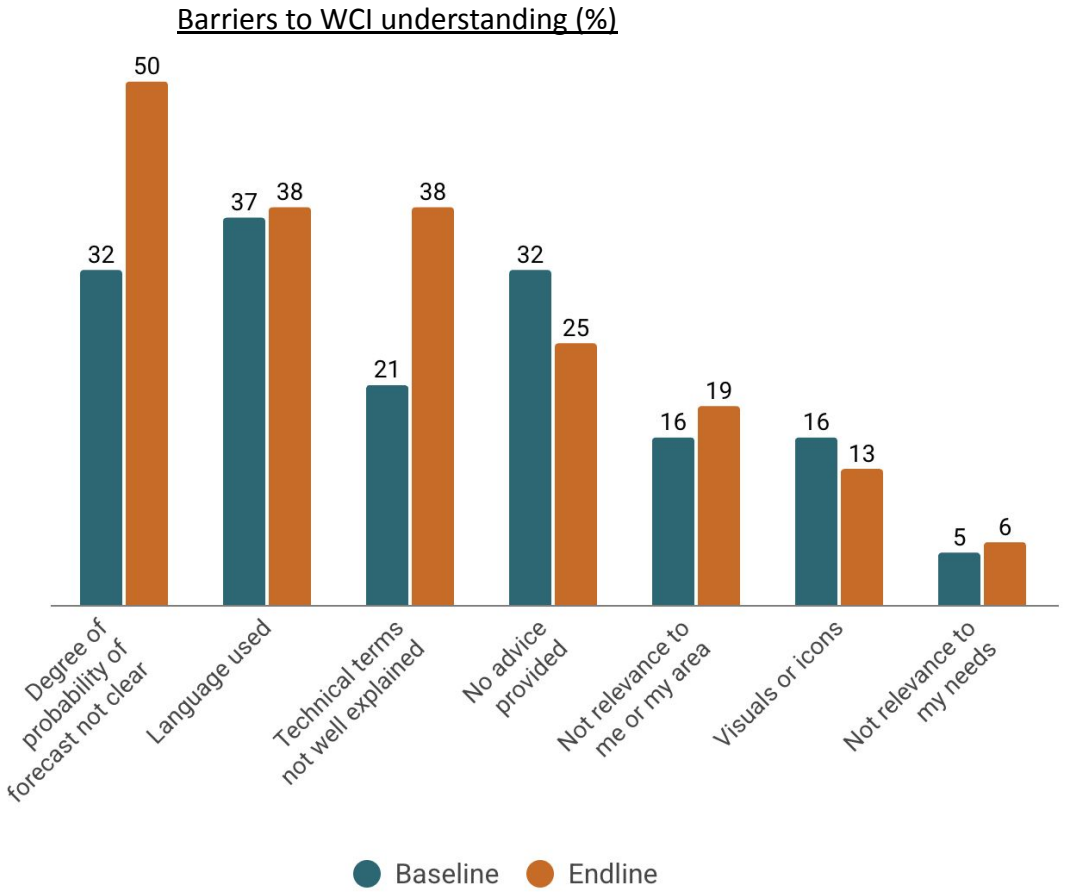
What made WCI easy to understand (%)




Endline (Dec 2025): % of respondents **[583] who understood WCI very well**
Baseline (Dec 2024): % of respondents **[454] who understood WCI very well**

# Barriers to WCI understanding

1. The degree of probability of weather forecast not expressed clearly
2. Language used
3. Technical terms not well explained




*Survey Data Results-2025*

Endline (Dec 2025): % of respondents **[16] who did not understand WCI at all**
Baseline (Dec 2024): % of respondents **[19] who did not understand WCI at all**

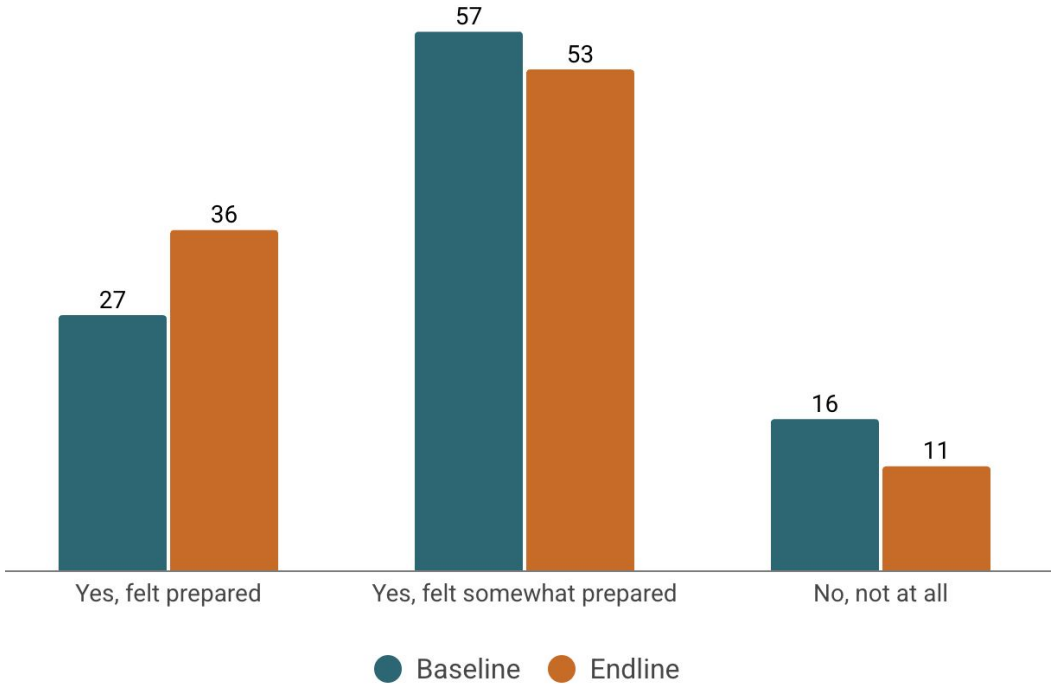
# Level of preparedness

Among those with access to WCI, the proportion who **felt prepared** to deal with future disasters increased from 84% at baseline to **89%** at endline

Among all respondents, the proportion of people with a disaster preparedness **plan** (e.g., for flooding or extreme heat) increased from 22% at baseline to **27%** at endline

These disaster preparedness plans are predominantly household-level plans (**64%**, unchanged from baseline), followed by community-level plans (**33%**, up from 31% at baseline), while government-owned plans remain limited (**3%**, down from 5% at baseline)

Feel prepared to deal with future disasters (%)





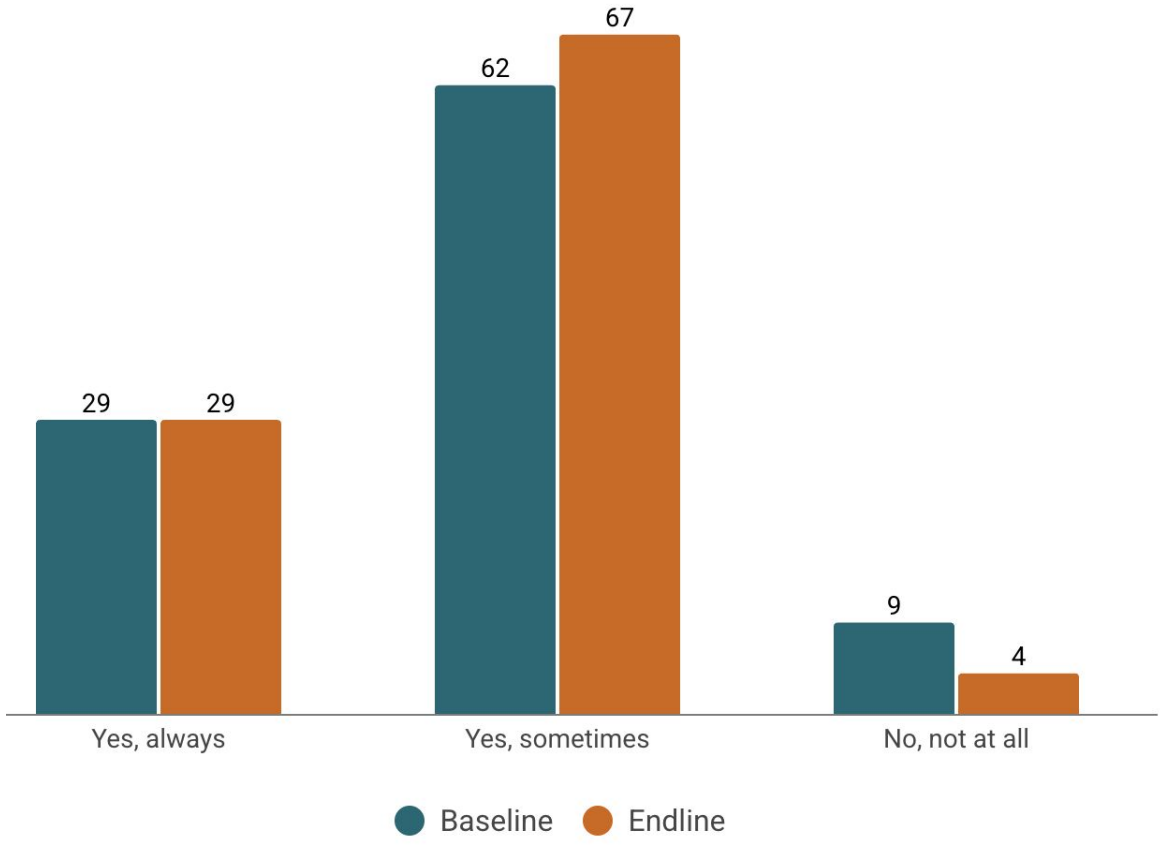

Endline (Dec 2025): % of total respondents **[1106]**
Baseline (Dec 2024): % of total respondents **[890]**

# Use

Uptake of WCI for early action implementation increased from 91% at baseline to **96%** at endline

All the key informants explicitly confirm using DARAJA services for preparedness activities. For example, NCCD has this to say: *"The council uses weather and climate information issued by the SMA Early Warning Center and also benefits from the DARAJA service."* [Key informant - NCCD]

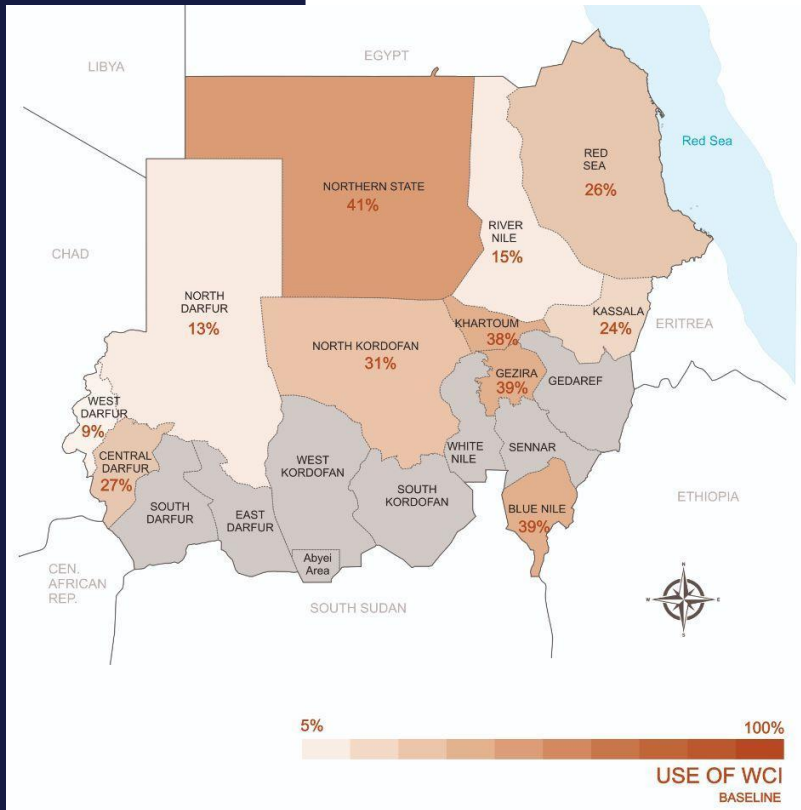
Use WCI to take early actions (%)

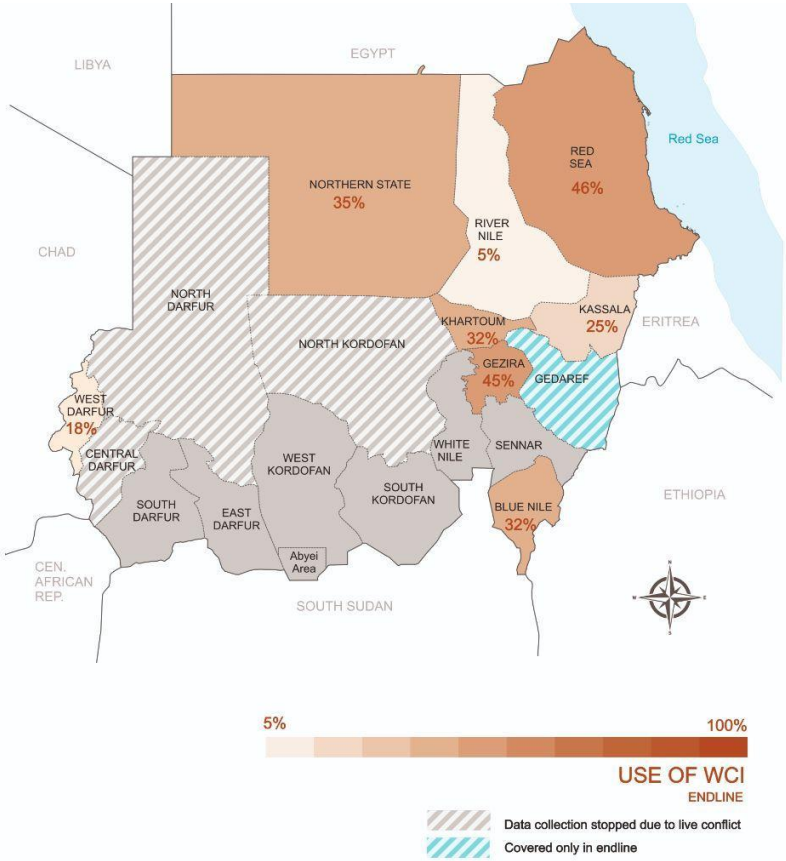



*Survey Data Results-2025*

Endline (Dec 2025): % of total respondents **[1106]**
Baseline (Dec 2024): % of total respondents **[890]**

# Use




*Survey Data Results-2025*

Endline (Dec 2025): % of total respondents **[1106]**
Baseline (Dec 2024): % of total respondents **[890]**

# Use:
## Gender, age and disability

The key challenges to the use of forecast information identified by key informants include insufficient forecast frequency, variable accuracy, network coverage limitations affecting dissemination, and inactive standard operating procedures.

% use of WCI by gender, age and disability status

- While use of WCI to take early actions increased among both male and female respondents, male respondents continued to report marginally higher usage (96% vs 93%) than female respondents (95% vs 90%), reflecting a narrow but persistent gender gap relative to the baseline
- At endline, a higher proportion of respondents aged 41–50 (97%) and 31–40 (96%) reported using WCI compared to other age groups. This represents a shift from baseline, where WCI use was highest among respondents aged 51–60 (93%) and 18–30 and 31–40 (91% each), indicating a change in the age profile of WCI users over time
- While WCI usage increased across all disability groups, it remained highest among respondents with no difficulties (96%, up from 91% at baseline), followed by those with some difficulties (95%, up from 93%), and lowest among respondents with significant difficulties (90%, up from 86% at baseline).



Endline (Dec 2025): % of total respondents **[1106]**
Baseline (Dec 2024): % of total respondents **[890]**

# Use:
## Most common early actions taken (1/2)

Common actions taken

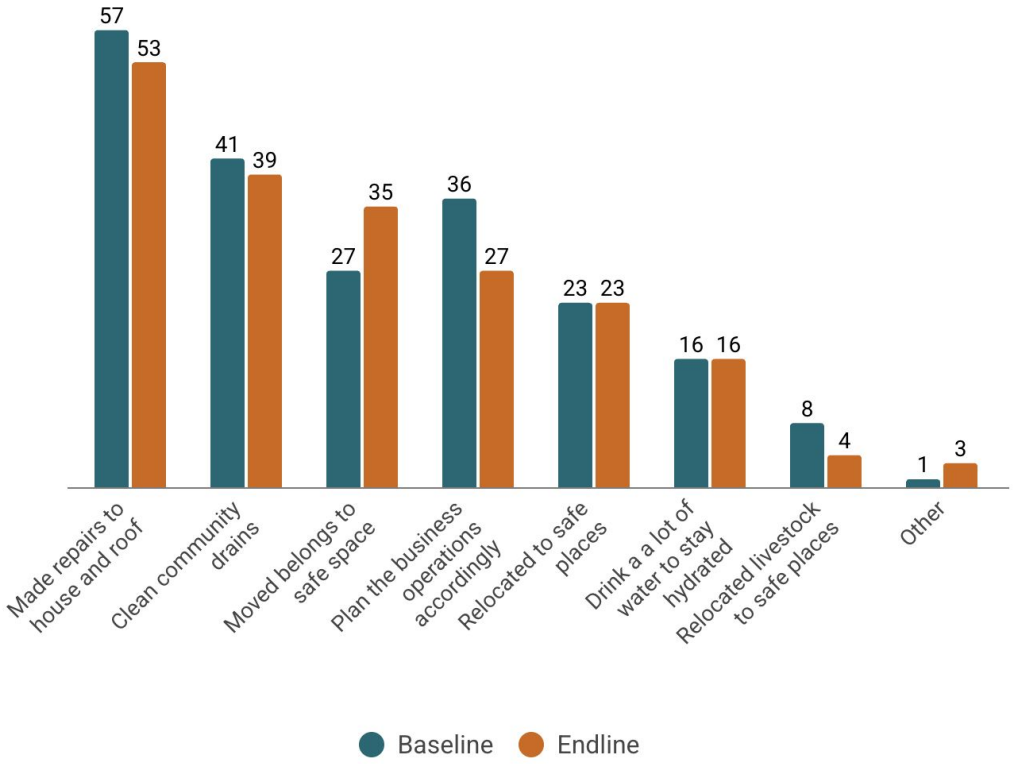
**For flooding**

1. Made repairs to house and roof (slight decrease: 57% → 53%)
2. Clean community channels (slight decrease: 41% → 39%)
3. Moved belongings to safe place (increased notably: 27% → 35%)

**For extreme heat**

1. Drink a lot of water to stay hydrated as at baseline

Common early actions implemented (%)




**Other actions**:
Building strong bridges, purchasing air conditioners, planning school attendance and scheduling farming activities

Endline (Dec 2025): % of respondents **[317] among those always use WCI**
Baseline (Dec 2024): % of respondents **[256] among those always use WCI**

# Use:
## Most common early actions taken (2/2)

The DARAJA Early Warning Service enabled institutional stakeholders, particularly NGOs, to shift from reactive responses to more anticipatory approaches in both operational decision-making and strategic planning

"*In the past, we used to act only after incidents occurred. Now we believe we can act earlier.*" [FGD participant—Local NGOs].

What did FGD participants say about the use of WCI?

- Used to guide timing and targeting of SMS alerts and awareness content [FGD participant—Telecommunication companies].
- Integrated into daily planning, logistics, staff safety, and program scheduling [FGD participant—International NGOs].
- Used for news prioritisation, awareness programmes, and emergency broadcasting [FGD participant—Media Companies].
- Increasingly used for anticipatory action, winter preparedness, shelter, food planning, and donor justification [FGD participant—Local NGOs].



Endline (Dec 2025): % of total respondents **[1106]**
Baseline (Dec 2024): % of total respondents **[890]**

## Use:
## Challenges in accessing and using early warnings

About 75% of FGD participants identified connectivity and coverage as the main constraints to accessing early warnings. To address this gap, community radio was consistently cited as the most effective channel for reaching remote and vulnerable populations

"*Community radio stations are an effective way to reach vulnerable communities*." [FGD participant—Media Companies].

<u>What did FGD participants identify as key challenges in accessing and using early warning information?</u>

- Limited network coverage and electricity outages.
- Difficulty reaching conflict-affected and remote areas.
- Lack of location-specific forecasts.
- Delays due to short alert lead times and approval chains.
- Risk of message distortion when forwarded on WhatsApp.



Endline (Dec 2025): % of total respondents **[1106]**
Baseline (Dec 2024): % of total respondents **[890]**

# Costs and money saved

Most respondents (**97%**, up from 91% at baseline) reported that taking early actions guided by the WCI helped protect household money and assets.

The share reporting higher savings (≥US$501) exceeds the share reporting higher costs (≥US$501) at both baseline (38% vs. 14%) and endline (42% vs. 13%).

The savings distribution shifts modestly upward (more respondents in ≥US$1001 at endline: 21% → 26%), while high-cost shares remain low and stable, suggesting a **net positive returns** from early action

% of costs incurred to implement early actions

| Cost of early action | Baseline | Endline |
|---|---|---|
| Less than US$50 | 35% | 25% |
| US$51-200 | 35% | 27% |
| US$201-500 | 16% | 11% |
| US$501 to 1000 | 10% | 8% |
| Above US$1000 | 4% | 5% |
| Do not know | 0 | 24% |

% of money saved by taking early actions

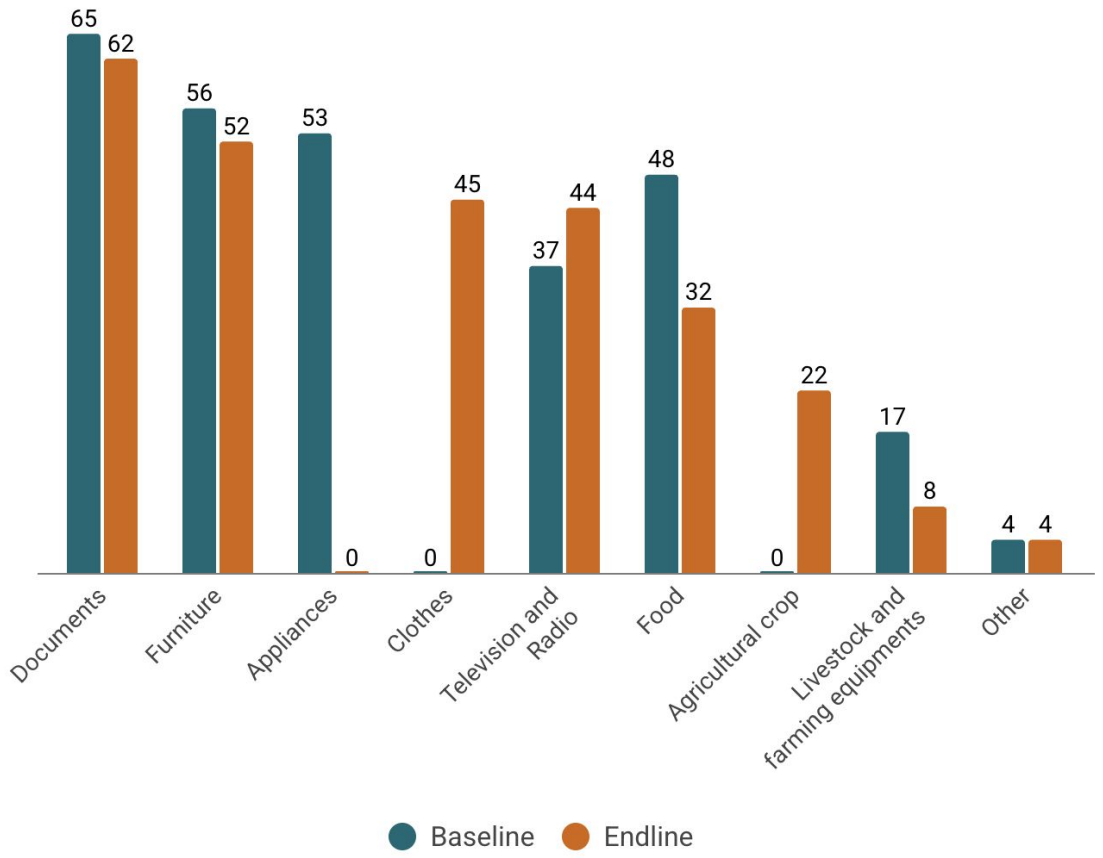
| Money saved by taking early action | Baseline | Endline |
|---|---|---|
| Less than US$100 | 31% | 29% |
| US$101-500 | 30% | 28% |
| US$501-1000 | 17% | 16% |
| US$1001-3000 | 11% | 16% |
| US$3001-5000 | 4% | 4% |
| Above US$5000 | 6% | 7% |

Endline (Dec 2025): % of total respondents **[307] those always use WCI**
Baseline (Dec 2024): % of total respondents **[256] those always use WCI**

# Assets saved by taking early action ahead of flooding

Priorities shifted away from bulky, high-value household assets (appliances, furniture, food) toward portable essentials and livelihood items (clothes, TV/radio, agricultural crops), while documents remained the top priority

Assets saved by taking early actions (%)




*Survey Data Results-2025*

Endline (Dec 2025): % of total respondents **[307] those always use WCI**
Baseline (Dec 2024): % of total respondents **[256] those always use WCI**

# Usefulness and use of WCI among farmers

**57%** of those engaged in farming and livestock production have access to WCI compared to 28% at baseline.

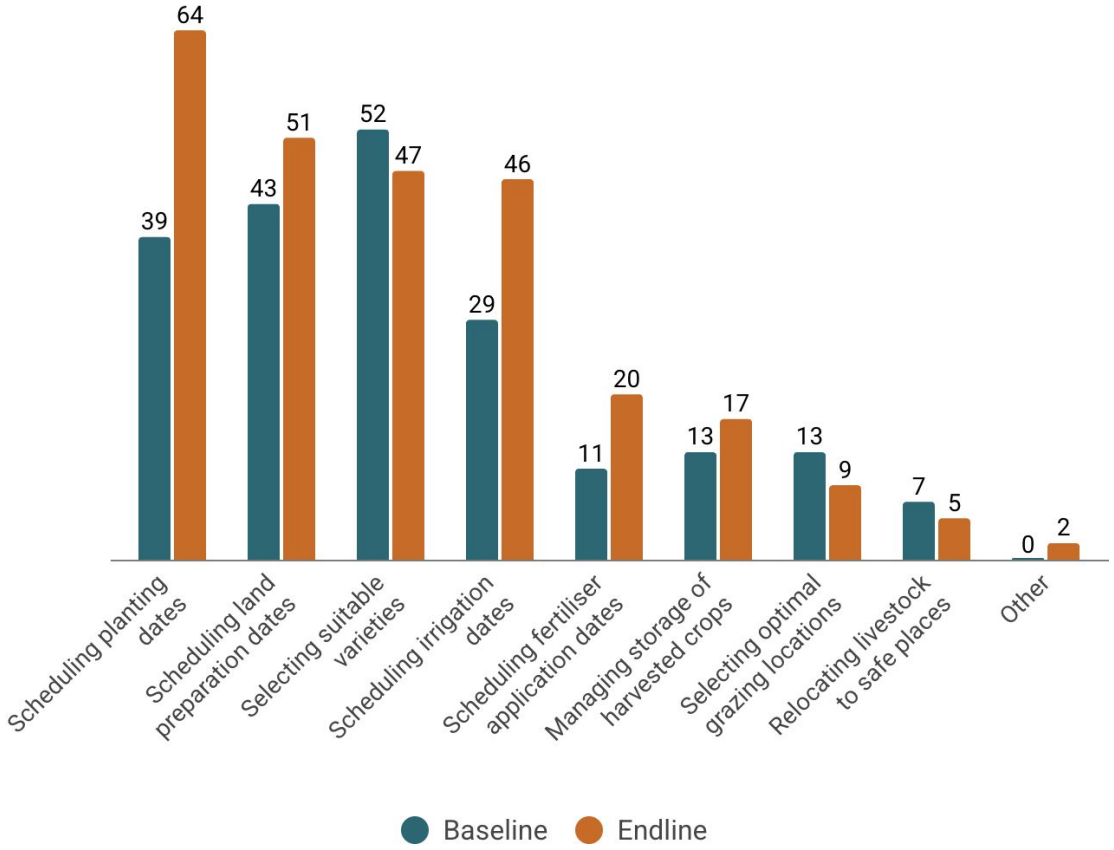
Among them, **57%** use WCI to inform their farming activities, drop from 96% at baseline

Among them, **59%** perceive that the WCI they received is useful in their farming activities, an increase from 53% at baseline

## Early actions implemented among farmers

Use of WCI among farmers has shifted strongly toward proactive, crop-management scheduling (planting, land prep, irrigation, fertilizer & chemical application), while livestock-related actions and varietal selection show modest declines

Early actions implemented by those engaged in farming activities (%)




Endline (Dec 2025): % of total respondents **[129] engaged in farming**
Baseline (Dec 2024): % of total respondents **[357] engaged in farming**

# WCI needed by farmers

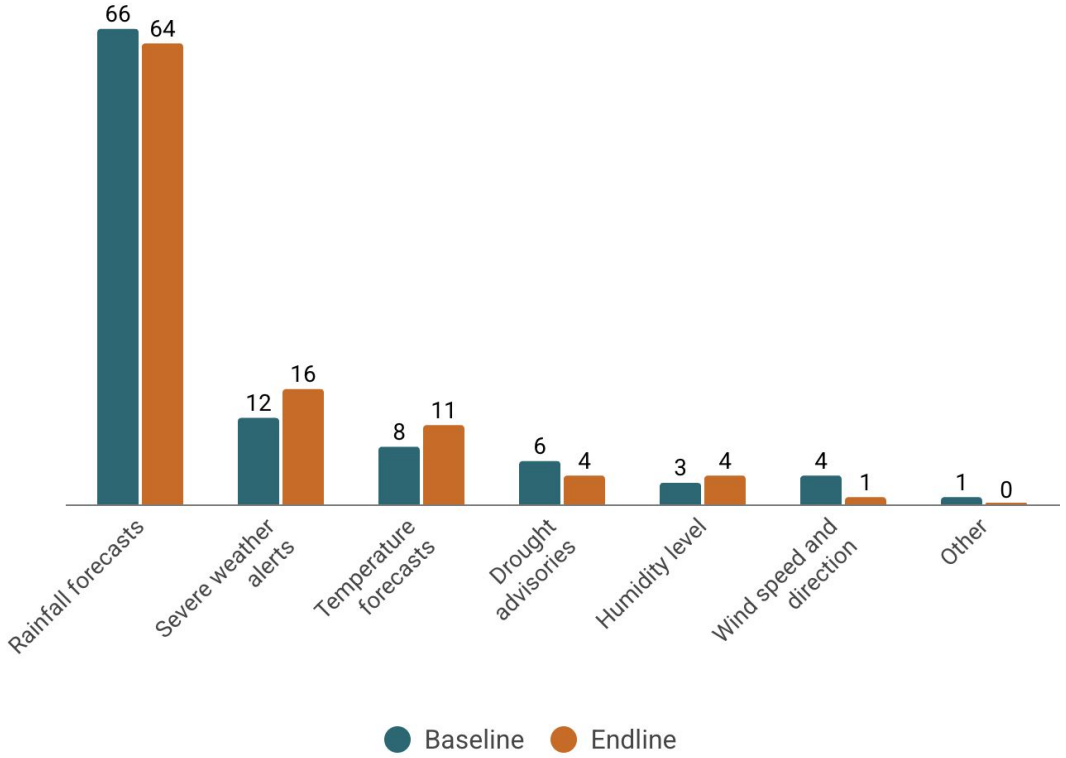
## Type of WCI needed by farmers

1. Rainfall forecasts
2. Severe weather alerts
3. Temperature forecasts

## At what time of the year do you need WCI?

1. Pre-planting season (57% vs 62%)
2. Planting season (38% vs 31%)
3. Harvesting season (35% vs 7%)
4. All year-round (34% vs 28%)
5. Growing season (29% vs 18%)
6. Post-harvest season (14% vs 10%)

Type of WCI needed by farmers (%)




**39%** of farmers were aware of trainings on using weather information to manage their farming operations compared to 11% at baseline

Endline (Dec 2025): % of total respondents **[129] engaged in farming**
Baseline (Dec 2024): % of total respondents **[357] engaged in farming**

# Cross-Cutting Insights and Opportunities

FGD participants reported that the DARAJA Early Warning Service significantly improved access to weather and early warning information across Sudan, mainly through WhatsApp and SMS. However, its effectiveness at community level still depends on addressing connectivity gaps, improving localisation and format diversity, strengthening intermediaries, and sustaining multi-channel dissemination

"*The focus should be on creating different formats for weather forecasts so that they are not limited to smartphones as a means of dissemination but are also recorded in local dialects so that they reach all segments and forms of society.*" [FGD participant—Media Companies].

Key cros-cutting insights and opportunities identified by FGD participants

## Key insights

- WhatsApp has become the backbone of institutional early warning exchange.
- SMS and community radio remain indispensable for last-metre delivery.
- There is strong demand for localised, seasonal, early warning and impact-based forecasts

## Opportunities

- Formalise WhatsApp use with clear protocols.
- Accelerate cell broadcast systems.
- Invest in multi-format products (audio, video, infographics, and local languages).
- Strengthen training for NGOs, media, and frontline workers.

# Key Findings Disaggregated by State

# Hazards: Location

**States with most respondents perceiving climate change to be a serious threat**

1. West Darfur (with flooding being the major risk)
2. North Darfur
3. Red Sea

Climate hazards disaggregation by State [Endline vs Baseline (%)]

| State | Perceiving climate change as threat | | Climate hazards and risks | | |
|---|---|---|---|---|---|
| | Very serious threat | Somewhat a threat | Flooding | Heat | Health problems |
| Kassala | 45 vs 77 | 46 vs 23 | 75 vs 66 | 81 vs 31 | 25 vs 29 |
| West Darfur | 97 vs 72 | 3 vs 28 | 99 vs 99 | 44 vs 6 | 29 vs 25 |
| Aljazeera | 36 vs 67 | 59 vs 30 | 43 vs 88 | 37 vs 59 | 45 vs 61 |
| North Kordofan | 24 vs 61 | 65 vs 35 | 53 vs 53 | 29 vs 70 | 53 vs 46 |
| Red sea | 58 vs 56 | 38 vs 42 | 60 vs 44 | 78 vs 80 | 45 vs 48 |
| Central Darfur | 36 vs 55 | 58 vs 40 | 85 vs 78 | 32 vs 28 | 75 vs 39 |
| Northern State | 40 vs 46 | 53 vs 52 | 70 vs 61 | 68 vs 52 | 31 vs 38 |
| Khartoum | 36 vs 43 | 59 vs 51 | 63 vs 60 | 50 vs 47 | 46 vs 48 |
| River Nile | 9 vs 16 | 90 vs 82 | 17 vs 40 | 97 vs 90 | 90 vs 88 |
| North Darfur | 66 vs 49 | 31 vs 49 | 46 vs 35 | 40 vs 32 | 66 vs 44 |
| Blue Nile | 43 vs 45 | 55 vs 50 | 72 vs 41 | 71 vs 59 | 60 vs 50 |
| Other | 39 vs 35 | 56 vs 59 | 46 vs 51 | 40 vs 46 | 43 vs 47 |

# Access, understanding and use of WCI: Location

**States with most respondents accessing WCI**

1. Northern State
2. River Nile
3. Blue Nile
4. Red sea

Access, understanding and use of WCI disaggregated by State [Endline vs Baseline (%)]

| State | WCI acces | WCI understanding | | Use of WCI | |
|---|---|---|---|---|---|
| | | Understand very well | Understood partly | Yes, always | Yes, sometimes |
| Red sea | 71 vs 70 | 72 vs 54 | 25 vs 43 | 46 vs 26 | 49 vs 66 |
| Northern State | 75 vs 64 | 59 vs 66 | 36 vs 28 | 35 vs 41 | 59 vs 48 |
| Khartoum | 66 vs 56 | 59 vs 52 | 34 vs 43 | 32 vs 38 | 62 vs 55 |
| River Nile | 74 vs 48 | 7 vs 20 | 91 vs 70 | 5 vs 15 | 94 vs 78 |
| Aljazeera | 53 vs 43 | 53 vs 61 | 38 vs 33 | 45 vs 39 | 48 vs 51 |
| Kassala | 60 vs 38 | 31 vs 48 | 63 vs 30 | 25 vs 24 | 73 vs 45 |
| North Darfur | 40 vs 35 | 93 vs 67 | 7 vs 33 | 8 vs 13 | 86 vs 87 |
| Blue Nile | 72 vs 34 | 74 vs 61 | 25 vs 35 | 32 vs 39 | 62 vs 76 |
| North Kurdufan | 65 vs 23 | 27 vs 66 | 64 vs 24 | 18 vs 31 | 64 vs 45 |
| Central Darfur | 38 vs 23 | 85 vs 71 | 10 vs 29 | 10 vs 27 | 85 vs 73 |
| West Darfur | 5 vs 10 | 45 vs 23 | 45 vs 68 | 18 vs 9 | 82 vs 86 |
| Other | 66 vs 31 | 67 vs 63 | 32 vs 33 | 48 vs 39 | 49 vs 58 |

# nablers of WCI understanding: Location

ates with most spondents indicating vice provided as key abler of understanding

1. West Darfur
2. Central Darfur
3. Kassala

Enablers of WCI understanding disaggregated by State [Endline vs Baseline

| State | What made it easy to understand | | | |
|---|---|---|---|---|
| | Degree of probability of weather forecast clear | Advice provided | Explanation of technical terms | Language used |
| Aljazeera | 48 vs 71 | 29 vs 71 | 57 vs 37 | 5 vs 27 |
| Red sea | 64 vs 74 | 36 vs 53 | 41 vs 26 | 16 vs 32 |
| Central Darfur | 47 vs 62 | 59 vs 53 | 41 vs 71 | 47 vs 65 |
| Kassala | 75 vs 44 | 50 vs 50 | 38 vs 50 | 25 vs 38 |
| Blue Nile | 51 vs 33 | 43 vs 41 | 43 vs 48 | 14 vs 22 |
| West Darfur | 100 vs 60 | 60 vs 40 | 60 vs 20 | 20 vs 40 |
| River Nile | 86 vs 48 | 36 vs 33 | 43 vs 36 | 43 vs 33 |
| Northern State | 59 vs 45 | 45 vs 32 | 47 vs 35 | 32 vs 31 |
| Khartoum | 64 vs 59 | 31 vs 31 | 39 vs 29 | 38 vs 25 |
| North Darfur | 15 vs 50 | 23 vs 20 | 31 vs 10 | 38 vs 30 |
| North Kordofan | 67 vs 63 | 0 vs 16 | 0 vs 11 | 66 vs 5 |
| Other | 59 vs 56 | 32 vs 22 | 34 vs 34 | 17 vs 30 |

# WCI Channels: Location

ates with most spondents preferring cial media

1. Central Darfur
2. Kassala
3. Northern State

WCI channels disaggregation by State [Endline vs Baseline (%)]

| State | WCI channels | | | Preferred WCI channels | |
|---|---|---|---|---|---|
| | Social media | SMS | TV | Social media | TV |
| Red sea | 69 vs 100 | 10 vs 6 | 16 vs 9 | 50 vs 66 | 28 vs 20 |
| Central Darfur | 95 vs 90 | 0 vs 6 | 0 vs 25 | 70 vs 52 | 9 vs 17 |
| Northern State | 82 vs 88 | 17 vs 4 | 10 vs 15 | 52 vs 51 | 28 vs 27 |
| Khartoum | 73 vs 85 | 30 vs 8 | 20 vs 19 | 44 vs 50 | 33 vs 33 |
| River Nile | 84 vs 94 | 82 vs 9 | 1 vs 39 | 25 vs 47 | 13 vs 26 |
| Aljazeera | 53 vs 73 | 30 vs 9 | 5 vs 67 | 35 vs 31 | 20 vs 37 |
| Kassala | 92 vs 70 | 2 vs 30 | 6 vs 21 | 49 vs 32 | 14 vs 31 |
| North Darfur | 57 vs 80 | 14 vs 7 | 7 vs 27 | 40 vs 42 | 11 vs 28 |
| Blue Nile | 61 vs 74 | 68 vs 3 | 40 vs 37 | 32 vs 32 | 26 vs 31 |
| North Kordofan | 82 vs 69 | 0 vs 10 | 27 vs 14 | 53 vs 48 | 35 vs 54 |
| West Darfur | 18 vs 9 | 9 vs 5 | 9 vs 45 | 34 vs 31 | 11 vs 14 |
| Other | 68 vs 73 | 28 vs 5 | 19 vs 38 | 45 vs 37 | 29 vs 29 |

# Preferred Information: Location

ates with most spondents preferring curity updates

1. West Darfur
2. Blue Nile
3. Red sea
4. River Nile

Preferred information disaggregation by State [Endline vs Baseline (%)]

| State | Preferred forecast type | | | | Other most preferred information | |
|---|---|---|---|---|---|---|
| | Daily | Weekly | Monthly | Seasonal | Security updates | Health services |
| Red sea | 40 vs 50 | 41 vs 32 | 9 vs 16 | 10 vs 2 | 72 vs 74 | 55 vs 50 |
| Northern State | 56 vs 55 | 23 vs 27 | 4 vs 7 | 17 vs 9 | 72 vs 73 | 46 vs 47 |
| Khartoum | 48 vs 47 | 26 vs 27 | 10 vs 11 | 16 vs 15 | 61 vs 73 | 41 vs 53 |
| River Nile | 7 vs 47 | 14 vs 18 | 22 vs 20 | 58 vs 14 | 60 vs 57 | 51 vs 54 |
| Aljazeera | 39 vs 20 | 32 vs 16 | 17 vs 41 | 11 vs 24 | 49 vs 55 | 29 vs 66 |
| Kassala | 73 vs 45 | 14 vs 23 | 5 vs 15 | 8 vs 17 | 81 vs 89 | 44 vs 25 |
| North Darfur | 29 vs 21 | 40 vs 30 | 6 vs 16 | 17 vs 33 | 71 vs 56 | 20 vs 30 |
| Blue Nile | 46 vs 24 | 32 vs 14 | 5 vs 15 | 17 vs 46 | 76 vs 70 | 58 vs 36 |
| North Kordofan | 59 vs 43 | 24 vs 33 | 12 vs 10 | 6 vs 10 | 53 vs 24 | 41 vs 39 |
| Central Darfur | 42 vs 6 | 38 vs 60 | 13 vs 10 | 8 vs 23 | 45 vs 39 | 42 vs 30 |
| West Darfur | 22 vs 24 | 37 vs 24 | 2 vs 7 | 38 vs 43 | 98 vs 71 | 93 vs 50 |
| Other | 62 vs 30 | 17 vs 20 | 9 vs 14 | 11 vs 36 | 68 | 47 vs 40 |

# Early Action Implemented: Location

**States with most respondents relocated to safe place ahead of flooding**

1. Aljazeera
2. River Nile
3. Red Sea

Early actions implemented disaggregated by State [Endline vs Baseline (%)]

| State | Early Action implemented | | | | |
|---|---|---|---|---|---|
| | Repairs to house | Clean community drains | Plan business operations | Move belongings to safe place | Relocated |
| Kassala | 38 vs 75 | 23 vs 50 | 23 vs 63 | 15 vs 38 | 23 vs 75 |
| Blue Nile | 43 vs 74 | 53 vs 45 | 43 vs 55 | 42 vs 0 | 19 vs 9 |
| Northern State | 62 vs 64 | 21 vs 34 | 18 vs 23 | 28 vs 45 | 23 vs 23 |
| River Nile | 82 vs 58 | 36 vs 35 | 45 vs 35 | 45 vs 4 | 36 vs 15 |
| Khartoum | 57 vs 56 | 40 vs 43 | 26 vs 35 | 32 vs 23 | 22 vs 21 |
| Aljazeera | 28 vs 50 | 28 vs 42 | 11 vs 27 | 22 vs 46 | 44 vs 23 |
| North Darfur | 100 vs 50 | 0 vs 50 | 0 vs 100 | 0 vs 0 | 0 vs 0 |
| Red sea | 46 vs 44 | 36 vs 33 | 21 vs 33 | 32 vs 44 | 32 vs 33 |
| Central Darfur | 50 vs 38 | 0 vs 38 | 50 vs 69 | 0 vs 54 | 0 vs 46 |
| North Kordofan | 50 vs 33 | 0 vs 22 | 0 vs 33 | 0 vs 11 | 0 vs 33 |
| West Darfur | 50 vs 0 | 0 vs 50 | 0 vs 0 | 50 vs 50 | 0 vs 0 |
| Other | 69 vs 74 | 40 vs 52 | 14 vs 39 | 48 vs 10 | 31 vs 13 |

# Summary of Findings

# Summary

- Respondent sample snapshot:
  - Gender - 56% F, 44% M
  - Ability - 72% no difficulty, 25% some difficulties, 3% a lot of difficulties
  - Age – Majority 18-30 yrs, followed by 31-40 yrs as at baseline
  - Displaced status- 57% currently reside in their original homes compared 50% at baseline, while 39% (vs 44%) are displaced and 4% stated other
- Climate change perception – 97% (up from 96%) regard climate change as a serious threat
  - 69% (up from 67% at baseline) have been affected by climate disasters during the past 12 months prior to the survey
- There was a shift in key hazards, with **extreme heat** emerging as the primary concern, followed by **flooding**, which had been the major hazard at baseline
  - Health problem was also identified as a key hazard
- Flooding resulted mainly in sickness (57% vs 54%), loss of property (42% vs 53%) and disruption of business/livelihood activities (42% vs 43%)
  - Main coping strategies: cleaning drains, dig drains and reinforcing walls & roofs

# Summary

- ➔ 60% of respondents have access to WCI or early warnings vs 39% at baseline
  - ◆ Female respondents are 4% less likely to access WCI compared to their male counterparts
  - ◆ Surprisingly, the likelihood of accessing WCI increases by 5% among displaced population
  - ◆ The respondents with secondary education or higher are 7% more likely to have access to WCI than those with primary or no education
  - ◆ The respondents aged 31-40 years and individuals with some or a lot of difficulties have less access to WCI compared to youth and those without disabilities
  - ◆ Northern State, River Nile & Blue Nile have the highest WCI access levels among all states
- ➔ WCI access channels
  - ◆ Social media ( i.e. WhatsApp) is the most popular channel to access WCI (72% vs 82%)
  - ◆ Other key channels: SMS (44% vs 8%) and Television (18% vs 31%)
- ➔ Preferences:
  - ◆ Channels: Social media, television & local leaders were the top ranked preferred channels
  - ◆ Improvements: long lead time (52% vs 40%) and location-specific forecasts (47% vs 44%)
  - ◆ Forecast type: daily forecast
  - ◆ Lead time – Flooding: one-week, extreme heat: one day & sandstorms: one day

# Summary

- ➔ 96% (up from 94%) of respondents (out of 60% who access) have some understanding of the WCI
- ➔ Enablers of better understanding
  - ◆ Clear probabilistic of weather forecasts
  - ◆ Explanation of technical terms
  - ◆ Advice provided
- ➔ 96% (up from 91%) of respondents (out of 60% who access) use the information to take early actions
- ➔ Most common early actions for flooding
  - ◆ making repairs to the house and roof (slight decrease: 57% → 53%)
  - ◆ cleaning community drains (slight decrease: 41% → 39%)
  - ◆ Moved belongings to safe place (increased notably: 27% → 35%)
- ➔ Most common actions for extreme heat
  - ◆ drinking a lot of water to stay hydrated

# Summary

- Level of preparedness
  - Among those with access to WCI, the proportion who felt prepared to deal with future disasters increased from 84% at baseline to 89% at endline
  - The proportion of people with a disaster preparedness plan (e.g., for flooding or extreme heat) increased from 22% at baseline to 27% at endline
  - Most respondents (97%, up from 91% at baseline) reported that taking early actions guided by the WCI helped protect household money and assets such as clothes and documents
- WCI access, use and preference among farmers
  - Access: 57% (up from 28% at baseline) of farmers have access to WCI
  - Use: 57% ( a drop from 96% at baseline) among them use WCI to inform farming activities
  - Main actions: scheduling land preparation & planting dates and selecting suitable varieties
  - Type of forecasts preferred: rainfall forecasts and severe weather alerts, as at baseline
  - Preferred time to receive the forecasts: pre-planting and during the planting season

# Summary

- Access by State:
  - The Northern State (75% vs 64%), River Nile (74% vs 48%), Blue Nile (72% vs 34%) and Red Sea (71% vs 70%) have the highest proportion of respondents with access to WCI compared to all other states, while West Darfur (5% vs 10%) and Central Darfur (38% vs 23%) report the lowest levels of WCI access.
- Understanding by State:
  - Blue Nile (74% vs 61%) have the highest proportion of respondents understanding WCI very well, while River Nile (7% vs 20%) report the lowest levels of WCI understanding.
- Use by State:
  - Red Sea (46% vs 26%), Aljazeera (45% vs 39%), and Northern State (35% vs 41%), have the highest proportion of respondents always using WCI to inform daily and farming decisions, while River Nile (5% vs 15%), report the lowest levels of WCI use.

# Summary

➔ Main actions by State:

- River Nile stands out across multiple aspects—repairs to houses: 82% (↑ from 58%), planning business operations: 45% (↑ from 35%), moving belongings: 45% (↑ from 4%), and relocation: 36% (↑ from 15%)—indicating broad integration of forecasts into both household and livelihood decisions.

- Aljazeera shows high relocation—44% (↑ from 23%)—marking a shift toward proactive movement guided by forecasts, alongside moderate use for moving belongings (22% vs 46%, a decline) and repairs (28% vs 50%, also down)

- West Darfur maintains a consistently high share for moving belongings—50% (same as baseline)—indicating stable reliance on forecasts for evacuation logistics, even though other actions remain negligible

# Summary

➔ Type of forecasts preferred by State:

- Demand for daily forecasts is strongest in Kassala (73% ↑ from 45%) with notable uptake in North Kordofan (59% ↑ from 43%), and Blue Nile (46% ↑ from 24%) and Northern State (56% ↑ from 55%)—consistent with day-to-day decision-making
- Weekly forecasts gain traction in Red Sea (41% ↑ from 32%), West Darfur (37% ↑ from 24%), and Aljazeera (32% ↑ from 16%), indicating a preference for short planning windows (e.g., land prep, irrigation scheduling).
- Monthly forecasts decline across most states, for example sharp drops in Aljazeera (17% ↓ from 41%), Blue Nile (5% ↓ from 15%), and Kassala (5% ↓ from 15%)—suggesting households are shifting away from mid-range horizons toward either short-term forecasts
- Seasonal forecasts surge in River Nile (58% ↑ from 14%), decline elsewhere, while West Darfur (38% ↓ from 43%) remains high despite a dip. In contrast, Blue Nile (17% ↓ from 46%) move away from seasonal toward shorter horizons

# Annexes

Annex A – Questionnaire design and deployment

The survey questionnaire was co-designed with local implementing partners to ensure that all the questions are customised to local context. The questionnaire included variables designed to collect both individual-level data and household information. This approach was necessary due to mobility patterns and widespread displacements, which made it impractical to rely exclusively on household-level data collection. The volatile situation in Sudan, characterized by ongoing conflict, displacement, and limited access to stable communities, required a more flexible data collection strategy.

To ensure comprehension among respondents, the questionnaire was translated into Arabic, the primary language spoken in Sudan. This translation facilitated effective communication, reduced cognitive burden, and improved the accuracy of the responses. Additionally, the questionnaire was deployed using Kobo Collect, a mobile data collection platform that proved essential for efficiently capturing data in remote or resource-constrained areas. Kobo Collect's offline capabilities and user-friendly interface made it particularly suitable for use in regions with unreliable internet connectivity, ensuring seamless data collection despite the challenging circumstances.

# Annexes

Annex B – Sampling and data collection methods

The data were primarily collected using a convenience sampling method, given the circumstances in Sudan. Four main approaches were utilised to gather data from respondents: face-to-face interviews, online surveys, phone calls, and paper-based methods. The choice of method was determined by the specific context of each area, the enumerators' capabilities, and the availability of resources such as internet and electricity.

Face-to-face interviews were employed in areas where in-person interactions were feasible, allowing enumerators to build trust and gather detailed responses. Online surveys were used in states with reliable internet access, offering a cost-effective and time-efficient way to reach respondents. Phone calls provided an alternative in areas with limited mobility or safety concerns, ensuring data collection could continue remotely. Finally, paper-based methods were adopted in locations with no access to digital tools, ensuring inclusivity and accommodating all respondents regardless of technological limitations.

Note: The sample size for North Kurdufan, North Darfur and South Darfur states is small since these States is witnessing escalated fighting, locals are fleeing or remain under vulnerable conditions. Our teams tried to collect data there, but had to stop eventually, as the enumerators themselves had to flee the area.

# Annexes

Annex C - Training of data collectors

The data collection team was comprised of 57 enumerators (29 male and 28 female). These were volunteers engaged by SUDTT. Before the data collection all the enumerators and volunteers were introduced to DARAJA project in Sudan and the endline survey objectives, and trained in data collection skills , including the use of Kobo on smartphones. The enumerator training was conducted during a period of 4 days to ensure that all the enumerators have full understanding of the survey tools and procedures in data collection, including the ethical issues such as informed consent, voluntary participation, confidentiality and personal safety. Preview of household data collection tool programmed on Kobo Collect was done to ensure that any prevailing inconsistencies and skip logics in the questionnaire were identified and rectified prior to actual data collection and that all the questions are customised to Sudan context including translation in Arabic.

# Contact Us

RESURGENCE.

esraa@resurgence.io

https://m.facebook.com/Resurgencetrust/?locale=hi_IN

https://uk.linkedin.com/company/the-resurgence-urban-resilience-trust

https://www.resurgence.io/

تنمية عمرانية

m.bushra@sudtt.org

https://www.facebook.com/groups/2351158991630466

https://www.linkedin.com/company/sudan-sudtt/

https://sudtt.org/

DARAJA درجة

RESURGENCE. تنمية عمرانية

IGAD ICPAC

german humanitarian assistance