

# Baseline Study for the Weather and Climate Service (WCS) project



*Final Kenya Baseline Report*

Expanded Version: 6 FFOs and 350 participants

February 2026



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1. **Executive summary**
2. **Project background and context**
3. **Scope and methodology**
4. **Key findings and insights**
5. **Farmer segmentation**



# Agenda

## *Executive Summary*

**Background and Context**

**Objective and Scope**

**Approach, Methodology and Deliverables**

**Key Findings, Results and Discussion**

**National and Regional Benchmarks**

**Segmentation of Farmer Profiles/Persona**

## Executive Summary (1/2)

***The WCS Baseline shows demand and impact for weather information are high, but weak localization, irregular delivery, and low clarity undermine trust and usage holding back the full potential of WCI to improve farmer outcomes***

- **Weather information is widely known but shallowly understood and mixed trust.**
  - 79% of farmers received WCI in last 3 years, yet ~25% cannot identify the source and 25% misinterpret probability forecasts highlighting a communication clarity gap.
  - Non-DWAS users mainly receive WCI from public sources (42%) but show lower full trust (12%), while DWAS users mostly access private channels with higher trust levels (31%); although understanding appears stronger among non-DWAS users (85% reporting no misunderstanding vs 69% among DWAS users), DWAS users are more likely to rate WCI as *very useful*.
- **Farmers receive information irregularly and seasonally despite strong demand for frequent updates.**
  - 51% of farmers access forecasts monthly or less frequency versus 70% who want weekly/biweekly and 72% wanting year-round updates signaling a major supply-consistency gap.
- **Localization, timeliness, and accuracy are the dominant pain points for farmers.**
  - 62% find WCI not timely, with only 51% finding it accurate; mismatches tied to micro-climates weaken trust and usage even when relevance is high (80%).
- **Strong behavioral adoption: farmers integrate WCI into critical decisions.**
  - 92% act on forecasts with women applying WCI to practice slightly faster than men. 85% use WCI for deciding when/what to plant; 83% for land preparation, 57% for input application demonstrating high practical value when information is trusted and timely.
- **WCI already drives measurable agronomic and economic benefits.**
  - 74% report yield increases, 67% reduced crop losses, and 31% better input use clear evidence of economic return from improved WCS.

## Executive Summary (2/2)

*Access and comprehension gaps, especially for women and older farmers, combined with conditional WTP and uneven county readiness underline the need for a structured PPP where KMD provides authoritative data and FFOs deliver localized, trusted, and scalable WCI solutions*

- **Women and elderly farmers face access and comprehension gaps.**
  - Women rely more on shared radios and basic phones, and older farmers are more prone to misunderstanding requiring inclusive, multi-channel delivery and simplified messaging.
- **Willingness to pay is low but highly conditional; not an outright “no.”**
  - Only 31% directly willing to pay, but this jumps to 52% under conditions like accuracy, seasonal payment, or bundled services pointing to viability for embedded revenue models.
- **Nakuru stands out as a high readiness county; Narok & Nyandarua as low willingness to pay (WTP) zones.**
  - Exposure to FFOs strongly predicts trust, use, and WTP reinforcing the value of coordinated delivery partnerships.
- **KMD and FFOs each bring strengths but lack a structured partnership model.**
  - KMD shows strong technical expertise but faces understaffing, limited financing for dissemination and data localization constraints; FFOs demonstrate strong last-mile reach but require consistent authoritative data.
- **A tailored PPP model is essential for scaling, sustainability, and impact.**
  - The baseline reveals a clear pathway: KMD anchors credibility → FFOs localize and deliver → pilots validate accuracy, frequency, and business models → bundled/indirect payment models ensure sustainability.

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# Kenya’s agriculture is predominantly rain-fed making it vulnerable to climate change, with ASALs being the most affected

## Kenya weather and climate overview and negative impact



Kenya’s diverse geography and climate significantly impact its agricultural sector. The country’s agriculture is mostly rain-fed, and highly dependent on rainfall patterns, making farmers vulnerable to weather variability and climate change impacts.

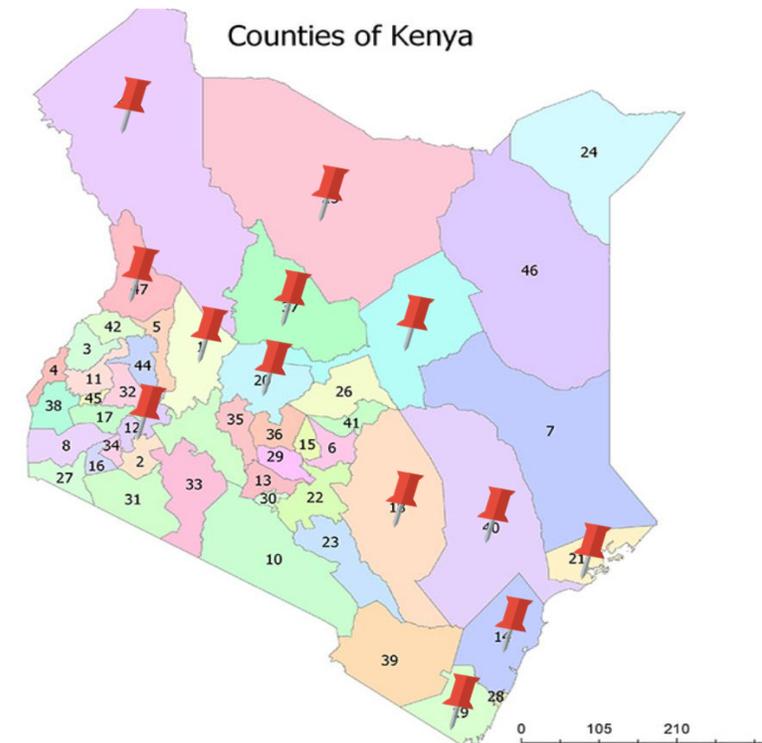


### Impacts of Climate Change

- ⇒ **Decline in crop production** – In ASALs 2021, crop production was estimated to be **70% below-average**, marking the third consecutive below-average season.
  - ⇒ According to the World Bank, climate change will likely have major implications for maize production in Kenya, with losses estimated at **US\$100–200 million** annually by 2050.
- ⇒ **Food security crisis** – The food security situation in Kenya’s Arid and Semi-Arid Lands (ASALs) counties deteriorated sharply due to the poor performance of the October-December 2021 short rains season, leaving an estimated 2.8 million people in Crisis.
- ⇒ **Livestock deaths** – Livestock deaths due to the drought are reported to have surpassed **1.4 million** in 2021
- ⇒ **Reduced agricultural income** – The poor rains also significantly reduced agricultural wage labor income for poor households, constraining access to food.

## Arid and semi-arid areas are the most vulnerable to climate-related risks

- ASALs make up over 80% of the country’s land mass. These counties are highly vulnerable to climate change facing floods and prolonged droughts.
- 24 counties are considered prone to drought, according to Kenya’s National Drought Management Authority (NDMA).



# The WCS program aims to enhance farmers' climate resilience in Kenya and Senegal through designing innovative PPP interventions and implementing pilots to improve access to climate services for better agricultural decisions

## The public sector in Sub-Saharan Africa faces significant challenges in providing effective weather and climate services (WCS) for the ag sector:

- ↗ **Sustainability issues** - Meteorological and hydrological service (NMHS) budgets are constrained, and donor-funded projects are short-term.
- ↗ **Difficulties meeting diverse user needs** - The WCS products do not always align well with the specific needs of different agricultural stakeholders like farmers, agribusinesses, and policymakers.
- ↗ **Underutilization of private sector capabilities** - Private sector actors are increasingly stepping in to provide value-added WCS, but the long-term viability of their business models is uncertain, especially in reaching small-scale producers.

Similarly, examples from Kenya and Senegal further illustrate the opportunities and challenges in leveraging PPPs/PPEs to improve weather and climate service (WCS) delivery.

- In Kenya, the KMD is motivated to pursue greater private-sector collaboration but lacks the experience and structured policies to do so effectively.
- Senegal's national meteorological agency (ANACIM) has a good track record of private sector engagement, but still faces barriers like resource constraints, increasing user demand, and limited willingness to pay.

These cases demonstrate the potential benefits of PPPs/PPEs, as well as the persistent institutional, capacity, and market challenges that need to be addressed to make PPPs successful and sustainable in delivering user-oriented WCS.

## AgriFin's WCS program aims to strengthen smallholder resilience in Kenya and Senegal by piloting innovative PPP models to improve access to climate services

### Program Overview



This two-year program operates in Kenya and Senegal, aiming to develop and pilot innovative public-private partnership (PPP/PPE) models that deliver effective, sustainable weather and climate services (WCS) to improve agricultural decision-making for small-scale producers.

### Ultimate Goal



Increase the resilience of smallholder farmers to climate variability and change by improving access to and uptake of climate services that inform better agricultural choices.



# Country Level ToC / Results framework and rationale for the baseline

Problem Statement

Demand is growing for reliable, tailored, and sustainable WCS to support adaptation. However, supply is not keeping pace. NHMS budgets are tight and declining, donor projects start and stop, WCS products are not always tailored to meet users' needs, new technologies are not harnessed enough to deliver tailored WCS, and the private sector capabilities are underutilized

Impact

Enhanced resilience of small-scale producers in arid and semi-arid regions to the impacts of climate variability and change

Outcome

Increased demand for and use of accurate, reliable weather and climate forecasts by small-scale producers

Sustainable and scalable business model for weather and climate forecast services

Immediate Outcome

Improved access to tailored weather and climate information for farmers and pastoralists

Increased awareness and understanding of farmers and pastoralists in interpreting and applying forecast data

Strengthened and integrated collaboration between public and private institutions on developing and distribution of climate information services

Increased affordability of weather and climate services for farmers and pastoralists, ensuring inclusive access

Outputs

- Localized weather and climate forecast information disseminated through user friendly channels in relevant languages and formats

- Digital materials designed for meso-level organisations, farmers and pastoralists to build an understanding of climate data and its implications

- Co-developed tailored, data-driven weather and climate forecasting systems and services featuring design elements like feedback loops, bundling, and leveraging extension

- Strategic PPP/PPE for weather and climate forecasting (including intermediary meso-level organisations, signed MoU (i.e., public partners) with defined roles and responsibilities)

- Innovative, financially viable, and inclusive conceptual business model that delivers value to public and private stakeholders and supports affordable access to sustainable weather and climate forecasts for smallholder farmers – *Integration of both financial and non-financial sustainability elements*

- Evidence generated and shared via cross country active learning network to inform scale-up of pilots and wider uptake of pilot approaches

Key Indicators Mapped

As the program moves into the pilot implementation phase, establishing a strong baseline is critical

The baseline serves three core purposes:

- Measurement:** Establish reference values for all key performance indicators (KPIs) against which pilot outcomes will be measured during midline and endline evaluations.
- Learning:** Generate insights into the behavioral, systemic, and operational enablers or barriers affecting WCS adoption.
- Design refinement:** Inform implementers and policymakers on how to tailor future service delivery models by county, gender, and farmer typology for maximum impact.

The study was conducted at the onset of the pilot to ensure that all subsequent monitoring builds upon robust, evidence-based benchmarks.

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***Objective and Scope***

**Approach, Methodology and Deliverables**

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# Objectives of the baseline are linked to the programmatic learning questions

## Objectives of the Baseline

- Assess the market demand (usage, cost perception), and supply dynamics, reliability, sustainability, and scalability of weather and climate forecasts, and effectiveness of current delivery business models
- Provide a foundation for evaluating how digital weather services tailored and expanded for the benefit of smallholder farmers, with a focus on women/youth
- Identify barriers, gaps, and opportunities for scaling impactful weather services for smallholders

## The objectives of the baseline will be linked to the following programmatic learning questions:

- *How accessible and reliable are the digital weather services?*
- *Which weather services are preferred by farmers?*
- *What are the most effective ways to unlock investment in digital solutions, platforms, and tech innovators targeting smallholder farmers, especially women and youth?*
- *What role does partnering with government and public institutions play in enhancing the provision of digital services to smallholder farmers, especially women?*
- *How can digital service providers' platforms effectively partner with other organizations with similar interests to reach smallholder farmers, especially women, and improve their livelihoods?*
- *How can partnerships be improved for effective and improved delivery of services and products to smallholder farmers, especially women and youth?*

# Demographic and geographical scope

## Target Population / Stakeholders



DWAS users



Non-DWAS users

Amtech



FreshCrop



## Geographical Scope

The baseline covered **six counties** representing Kenya's major agro-ecological and climatic zones.

The selection was guided by three criteria:

- **Agro-climatic diversity (relative vulnerability to climate change):** Counties representing both high-rainfall and semi-arid conditions to capture variability in climate risks and WCS needs.
- **Institutional presence:** Counties where KMD maintains operational county offices and where selected FFOs have established networks for farmer engagement.
- **Relevance to pilot interventions:** Areas with significant smallholder crop and livestock production, making them directly sensitive to weather variability and relevant to pilot PPP interventions.

Selected Counties*	Climate Vulnerability
Busia	High Risk
Kisumu	High Risk
Nakuru	Medium-Low Risk
Narok	Medium Risk
Bungoma	Medium
Nyandarua	Low Risk

\*Selection Detail on Annex II

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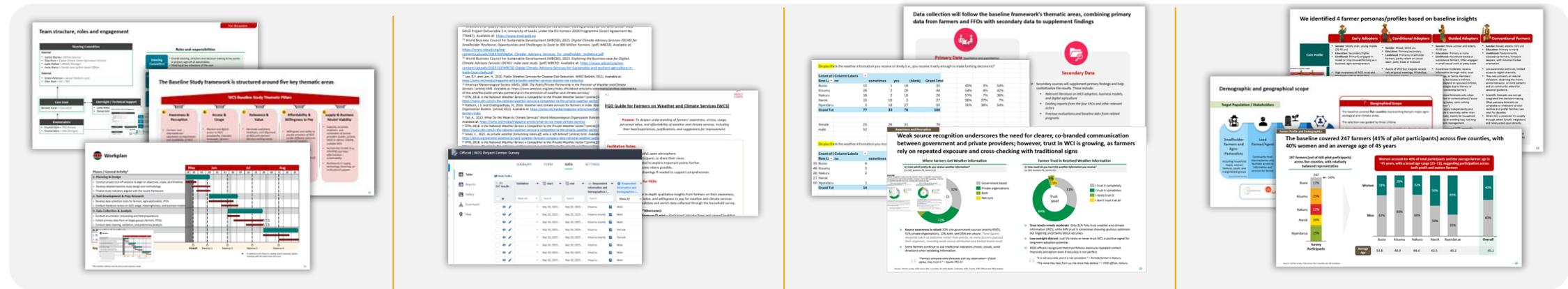
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# In terms of approach, the engagement followed four key workstreams



Key Outputs

- Conducted project kick-off sessions to align on objectives, scope, deliverables and timelines
- Developed study indicators aligned with the results framework
- Developed detailed baseline study design and methodology – inception report
- Developed data collection tools for farmers, agro-pastoralists, FFOs, and public stakeholders
- Developed online Kobo Toolbox for farmer survey, fully configured with skip logic, data-quality guardrails, and device-friendly deployment
- Conducted literature review on WCS usage, meaningfulness, and business models
- Conducted enumerator onboarding and field preparations
- Collected primary data from all target groups (farmers, FFOs, KMD)
- Conducted data cleaning, validation, and preliminary analysis
- Synthesized stakeholder perspectives (KMD, FFOs, intermediaries) into thematic insights
- Consolidated farmer survey, FGD, and KII data into an integrated evidence base.
- Developed final baseline reports

# The study design followed a mixed-methods with stratified sampling across five counties to capture representative quantitative and qualitative insights

Study Design included quantitative and qualitative approaches to capture measurable indicators and unpack contextual drivers

	Primary Data			Secondary Data
Type of data	Qualitative and Quantitative			Documentary, Administrative
Source	Smallholder Farmers, Agro-Pastoralists		FFOs, KMD	Literature, publications, reports
Instrument	Structured Survey	FGD	KII	Desk review
Tool used	Kobo Toolbox (tablet-based structured questionnaire)	Semi-structured FGD guide	Semi-structured KII guide	Document review using structured extraction templates and thematic synthesis

## Sampling Strategy

- **Sampling Frame:** Farmers drawn from six target counties selected to represent diverse agro-ecological zones, information ecosystems, and gender participation levels.
- **Quantitative Sample:** 247 out of 600 pilot farmers proportionately distributed across counties using stratified random sampling to ensure gender, age, and livelihood balance. In addition, 103 farmers were selected from 2 FFOs to capture insight from non-DWAS users.
- **Qualitative Sample:** 7 FGD (at least 1 per county and considering gender and age lens) and 7 KIIs with KMD and FFOs to capture institutional perspectives.

## Data Quality and Validation

- Enumerator training and piloting of survey tools.
- Gender and inclusion safeguards embedded in selection and facilitation.
- Real-time digital data collection (Kobo) and consistency checks to enhance reliability.

# The Baseline Study framework is structured around five key thematic areas

## WCS Baseline Study Thematic Pillars

**A**

### Awareness & Perception

- *Farmers' and intermediaries' awareness of importance and availability of WCS (sources, platforms, services)*
- *Perceived trust, and credibility of WCS*
- *Misconceptions, gaps in understanding, and informational barriers*

**B**

### Access & Usage

- *Physical and digital access to WCS (availability, channels, languages, devices, connectivity)*
- *Actual use patterns (frequency, seasonality, by whom in the household or organization)*
- *Inclusivity: gender, youth, marginalized groups*

**C**

### Relevance & Value

- *Perceived usefulness, timeliness, and alignment of WCS with farmers' decision-making needs*
- *Preferred types of services (e.g., early warnings, seasonal forecasts, pest/disease alerts)*
- *Observable outcomes or benefits from using WCS*

**D**

### Affordability & Willingness to Pay

- *Willingness and ability to pay for provision of WCS (under different scenarios or service models)*
- *Perceived return on investment from paid services*
- *Current cost structures (if any) for farmers and intermediaries*

**E**

### Supply & PPP Model Viability

- *Capacity, accuracy, readiness, and constraints of service providers (public, private, NGO) to deliver reliable, scalable WCS*
- *Partnership models (e.g., PPP/PPE) and their effectiveness – sustainability*
- *Bottlenecks in supply, technology, financing, or institutional support*

Farmers / end-user Focused

# The data analysis framework used a mixed-methods integrating farmer survey, FGD, and KII data to provide a triangulated, evidence-based understanding of baseline conditions across the five thematic pillars

## Analytical approach and dimensions – Mixed-Methods Integration

Components	Quantitative Component	Qualitative Component
Analytical Approach	Statistical analysis of farmer survey	Thematic analysis of FGDs and KIIs
Analysis	<p>→ <b>Descriptive Analysis</b> was used to summarize patterns in the data through measures such as means, medians, frequencies, and percentages.</p> <p>→ <b>Inferential Analysis</b> was then applied to test relationships and differences across groups.</p>	<p>→ <b>Deductive Coding</b> applied predefined themes based on the research questions to structure the analysis.</p> <p>→ <b>Inductive Coding</b> identified emergent themes that added depth to the findings.</p>

### Analytical Tools & Outputs

- Descriptive statistics, cross-tabulations, coding matrices, dashboards, and composite indices
- County dashboards and persona profiles to visualize insight clusters

→ Cross-verification across counties, gender, livelihood type, and information channels to strengthen validity and explain outliers.

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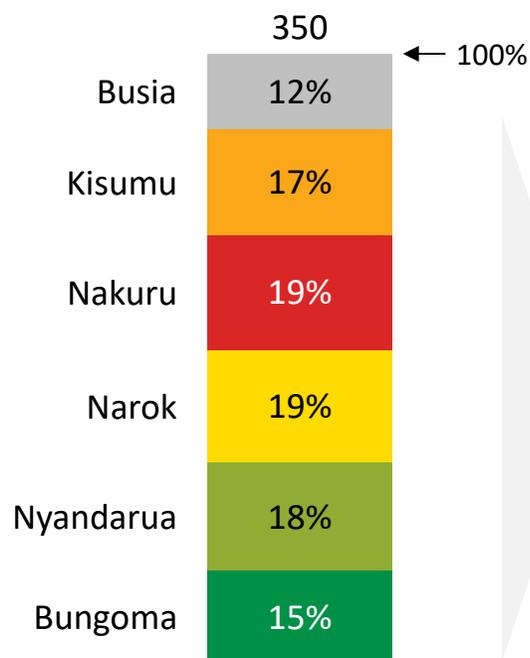
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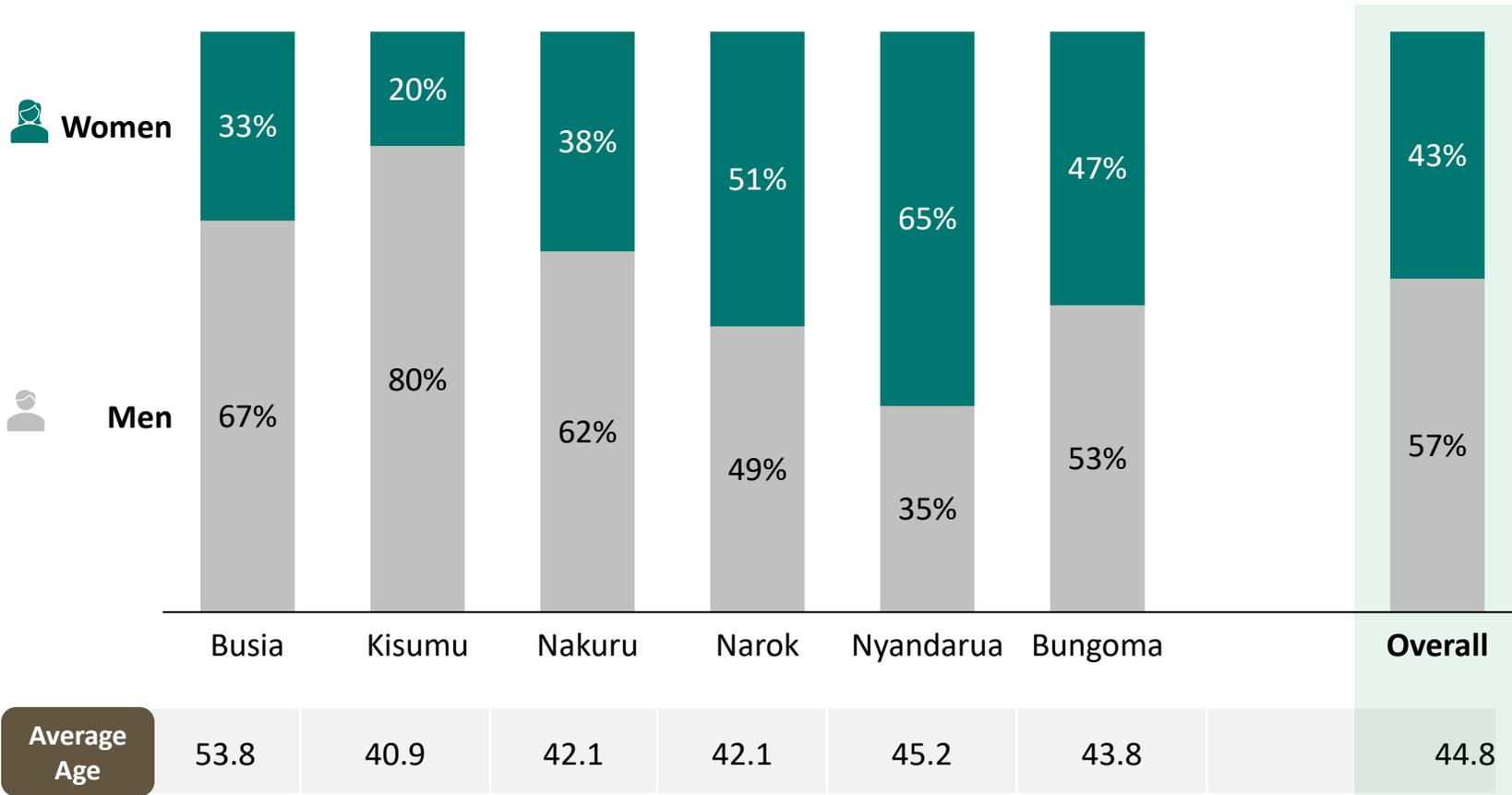
# The baseline covered 350 farmers (2/3 with previous access to DWAS via Sprout) across six counties, with 43% women and an average age of 45 years

350 farmers across six counties, with relatively balanced representation



Survey Participants

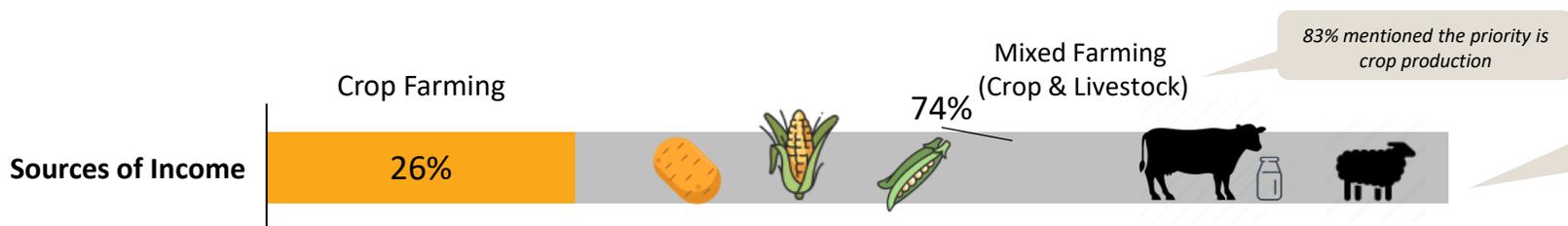
Women account for 43% of total participants and the average farmer age is ~45 years, with a broad age range (21–72), suggesting participation across both youth and mature farmers



Out of the 350 survey participant farmers, 247 have previous access to DWAS via Sprout.

# 74% of farmers practice mixed farming of which 83% primarily engage in crop production, relying heavily on weather-dependent livelihoods; with an average landholding of 3.9 acres and 14.2 years of farming experience

About 74% of farmers practice mixed farming and 83% (mixed and solely) engage in crop production, underscoring how closely their livelihoods and food security depend on weather conditions



*Farmers also earn from small businesses and wage jobs such as agrovets, retail shops, and boda boda transport reflecting diverse livelihoods and the growing role of off-farm income in household resilience.*



**Avg Farmer Land Size**  
**3.9 acres**

- Women own an average of 3 acres, compared to 4.7 acres for men though in Busia and Bungoma, women hold slightly larger plots.
- Older farmers tend to own larger land parcels, reflecting generational accumulation and inheritance patterns.
- Younger farming populations in Kisumu and Nyandarua correspond with smaller average landholdings, reflecting fragmentation and limited access to inherited land.
- The target farmers range from **small to medium-scale producers** (mainly in Narok and Nakuru), with land sizes spanning **0.1 to 35 acres** respectively.



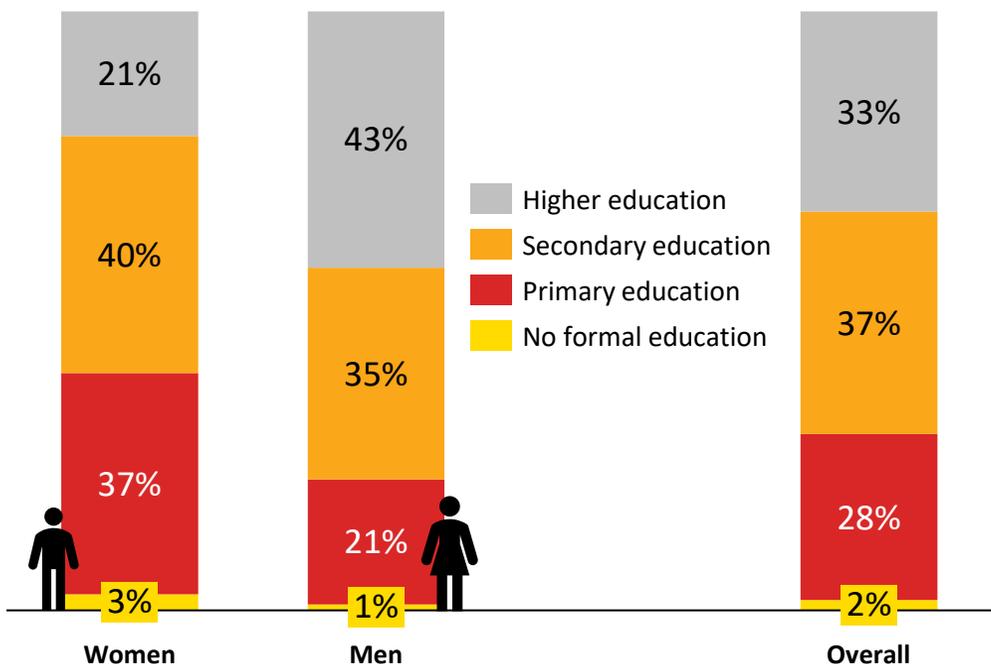
**Avg Farmer Experience**  
**14.2 years**

- Women's avg experience (14.5 years) is comparable to men's (13.8 years), showing active female involvement despite smaller landholdings.
- Experience increases with age, with older farmers especially in Busia and Nakuru reporting over 16 years on average.
- The pattern suggests that land size and age move together, with older, established farmers holding more land and influence, while younger farmers operate smaller plots.

# About 70% of farmers have secondary or higher education, and an equal share own smartphones, reflecting strong digital potential: though women show lower levels in both

Education levels stands at 28% primary, 37% secondary, and 33% higher education, with women showing lower tertiary attainment compared to men

n=350, women=149, men=201

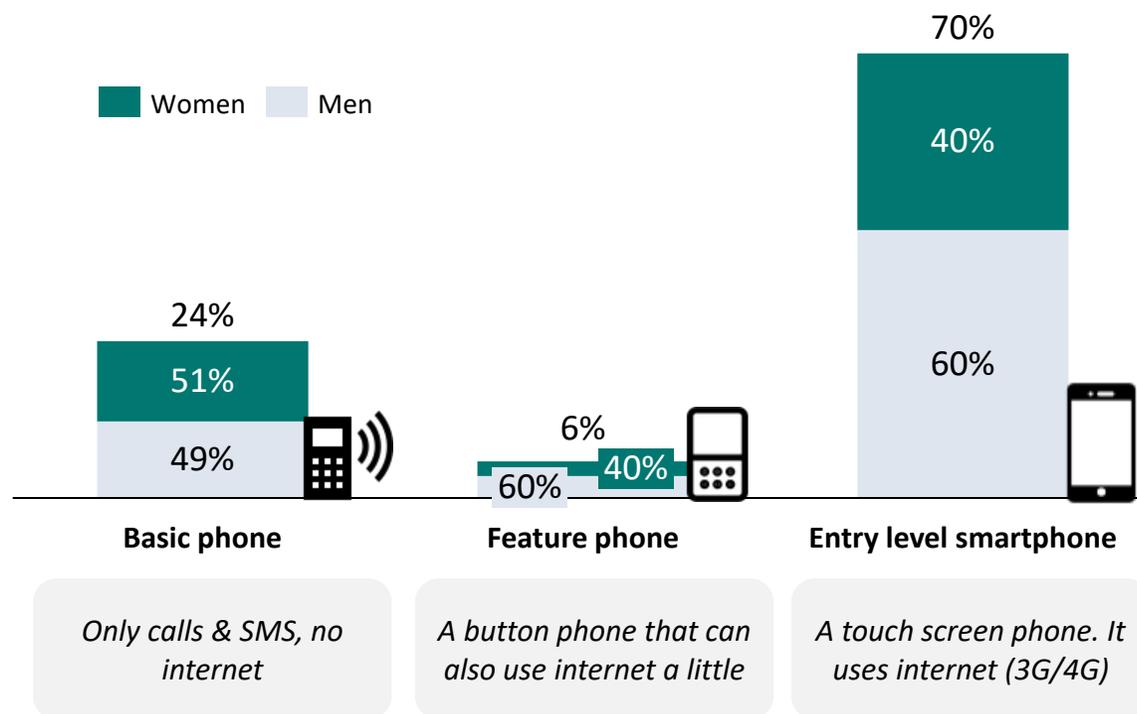


**Education and digital access reinforce each other:** Counties with higher education levels (i.e., Nyandarua, Kisumu, Bungoma) also show higher smartphone penetration, enhancing readiness for digital WCS dissemination.

Source: Farmer survey and MCA analysis

70% of farmers own entry-level smartphones and 24% basic phones showing strong potential for digital information delivery

n=350, women=149, men=201



**Gender gap in device ownership:** Women are more likely to own a single basic or low-end smartphone, while men often own multiple smartphones particularly in Kisumu and Nyandarua.

# Theme 01 | Awareness and Perception

This thematic area examines the extent to which smallholder farmers are aware of, understand, and trust weather and climate information (WCI) and related advisories.

It explores how perceptions of accuracy, timeliness, and usefulness shape farmers' engagement with WCS, and how these differ by gender, age, and geography.

Awareness is a critical entry point for effective climate risk management without it, even high-quality forecasts remain underutilized.

The analysis under this theme focuses on:

- overall reach of WCI
- sources of WCS and level of trust
- perceived reliability, and clarity of forecasts

By assessing awareness and perception, this section establishes the baseline for designing demand-generation and communication strategies that can build trust, promote regular use, and strengthen behavioral change toward climate-informed decision-making.

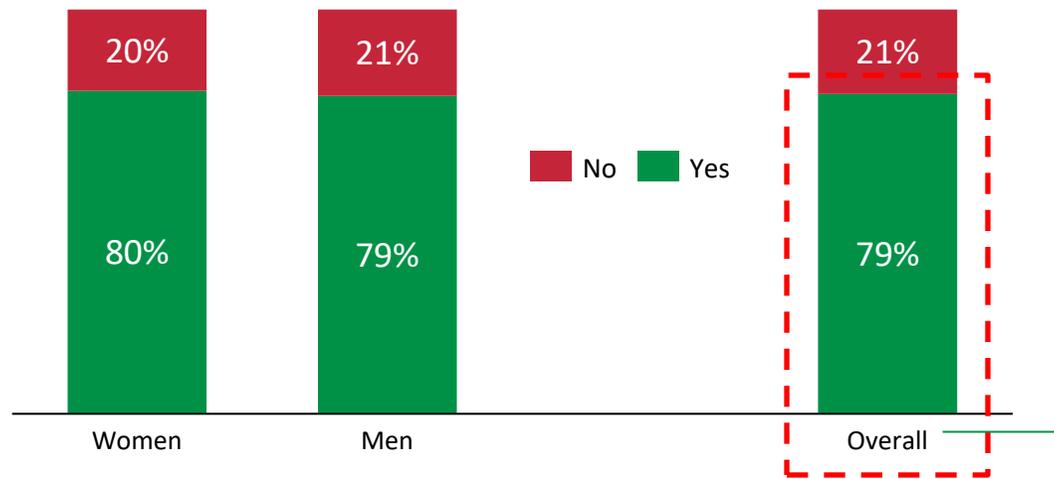
# Awareness of WCI is nearly universal among farmers, with four in five having received weather information in the past three years, and about 94% accessing it within the last six months; indicating strong recent outreach

## Farmer Exposure to WCI in the Past Three Years

Q: In the past 3 year, have you ever received weather related information?

(n=350, women=149, men=201)

\*the 3-year recall indicator accurately signals awareness reach not depth of access

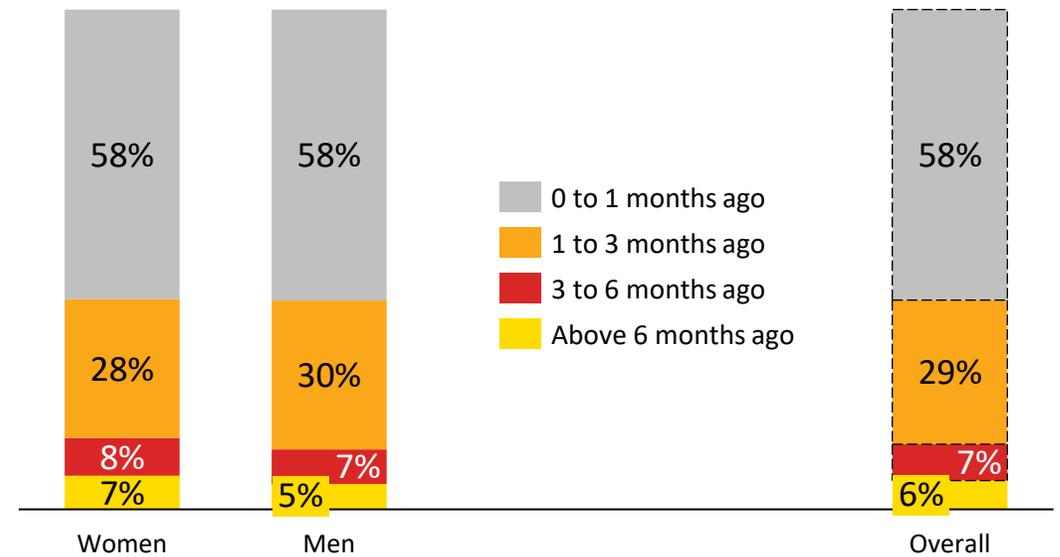


- FGDs across counties confirm that while 21% of farmers have not received WCI in the past three years, awareness of weather and climate information remains nearly universal.
- 79% of farmers have received weather-related information in the past three years, with no significant gender gap.
- 86% women and 89% of non-DWAS users received in the last 3 years vs 77% and 76% for DWAS
- Older farmers (40+) account for ~75% of those who never received information, highlighting an age-linked digital and outreach gap.

## Recent Exposure to Weather Information

When was the last time you received a weather-related information?

(n=277, women=119, men=158)



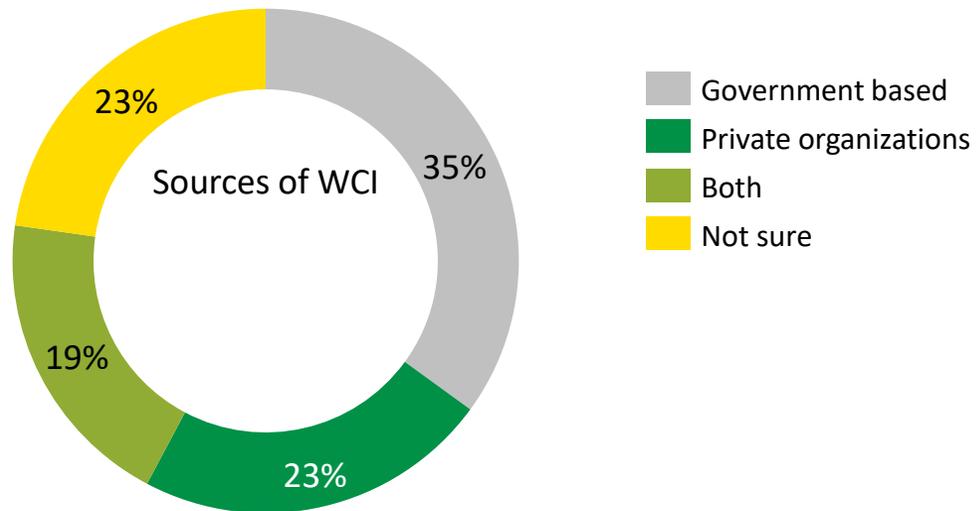
94% received updates within the last six months, signaling higher recency of access. Awareness distribution is consistent across counties, suggesting systemic rather than localized access barriers.

- 83% of non-DWAS participants reported receiving weather and climate information within the last six months.

# Weak source recognition underscores the need for clearer, co-branded communication between government and private providers; however, trust in WCI is growing, as farmers rely on repeated exposure and cross-checking with traditional signs

## Where Farmers Get Weather Information

Q: From which entity do you receive weather information?  
(n=277, women=119, men=158)

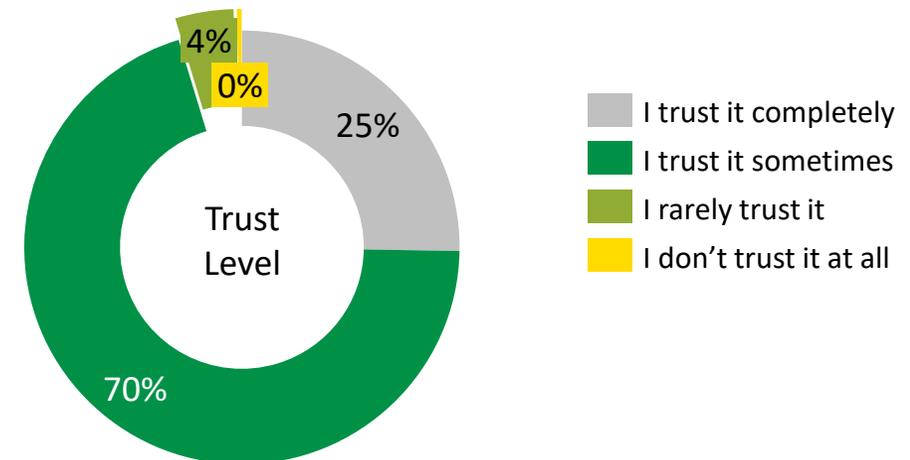


- **Source awareness is mixed:** 35% cite government sources (mainly KMD), 23% private organizations, 19% both, and 23% are unsure. *These figures should be taken as indicative rather than precise, as many farmers guessed their responses, revealing weak source attribution and limited brand recall.*
- Some farmers continue to use traditional indicators (moon, clouds, wind direction) when validating information.

“Farmers compare radio forecasts with sky observation—if both agree, they trust it.” – Apollo FFO KII

## Farmer Trust in Received Weather Information

Q: How much do you trust the weather information you receive?  
(n=277, women=119, men=158)



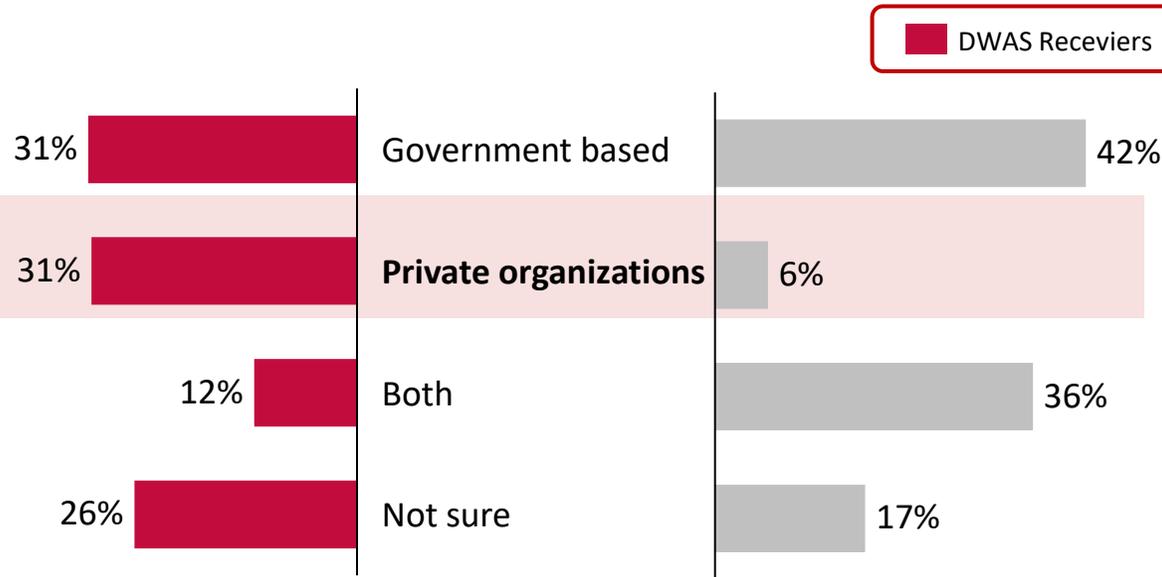
- **Trust levels remain moderate:** Only 25% fully trust weather and climate information (WCI), while 70% trust it sometimes showing cautious optimism but lingering uncertainty about accuracy.
- **Low outright distrust:** Just 4% rarely or never trust WCI, a positive signal for long-term adoption potential.
- KMD officers recognized that trust follows exposure repeated contact improves perception even if accuracy is not perfect.

“It is not accurate, and it is not consistent.” – Female farmer in Nakuru  
“The more they hear from us, the more they believe.” – KMD officer, Nakuru

# 42% of the non-DWAS receivers get WCI from public sources and only 12% trust it completely vs DWAS receivers get most from private and 31% trust it completely

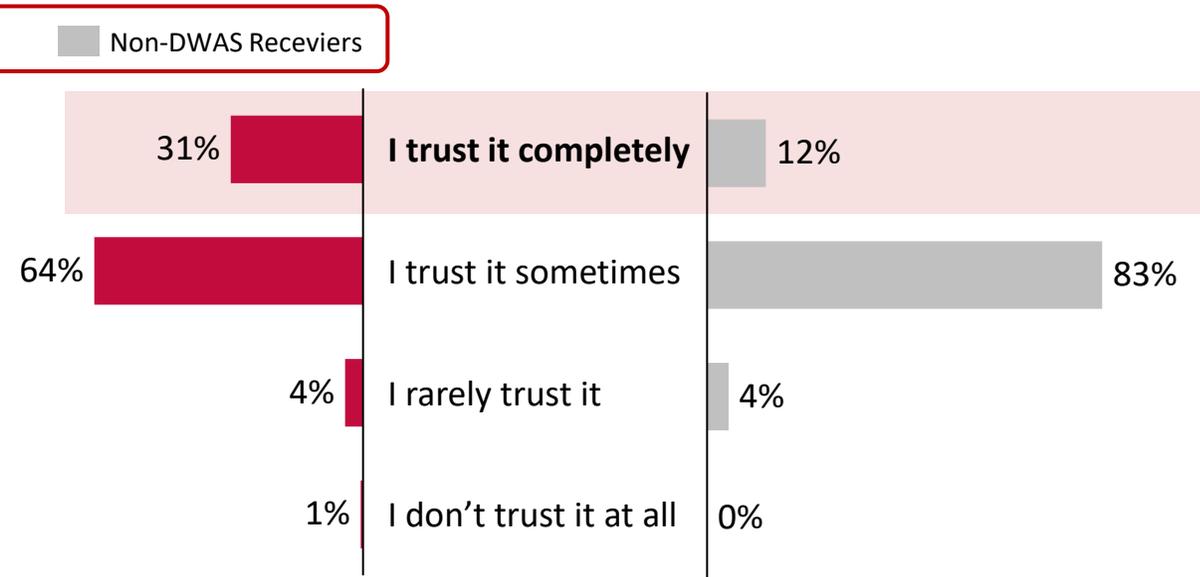
**Where Farmers Get Weather Information (DWAS vs Non-DWAS receivers)**

*Q: From which entity do you receive weather information?*  
 (n=188, women=76, men=112) (n=89, women=43, men=46)



**Farmer Trust in Received Weather Information (DWAS vs Non-DWAS receivers)**

*Q: How much do you trust the weather information you receive?*  
 (n=188, women=76, men=112) (n=89, women=43, men=46)



- On contrary to DWAS receivers, non DWAS receivers mostly (42%) depend on public sources for WCI rather than private; they have limited exposure to private focused WCI (6% vs 31%; 25% percentage points difference).
- Public or government based refers to KMD and KALRO.

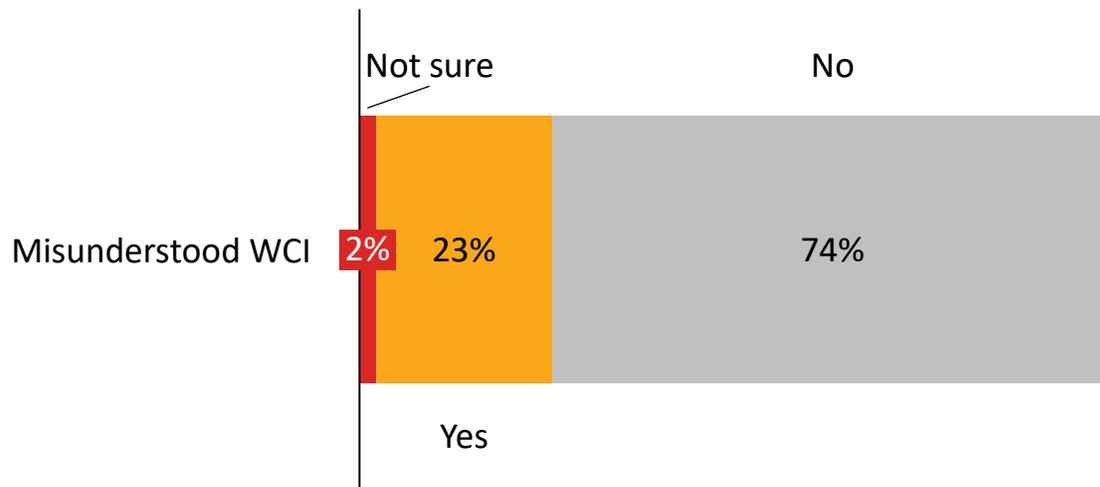
→ **Trust levels vary from DWAS vs non-DWAS:**

- In general, 95% of receivers trust it completely or sometimes, which shows cautious optimism.
- 31% DWAS vs 12% non-DWAS fully trust WCI, which shows a clear gap in trust for non-DWAS receivers.

# One in four farmers misinterprets weather information, yet nearly 85% still value it; however, older farmers remain more prone to misunderstanding, and trust in forecasts largely depends on past accuracy and clarity of communication

## Farmer Understanding of Weather Information

Q: Have you ever misunderstood a weather information you received?  
(n=277, women=119, men=158)



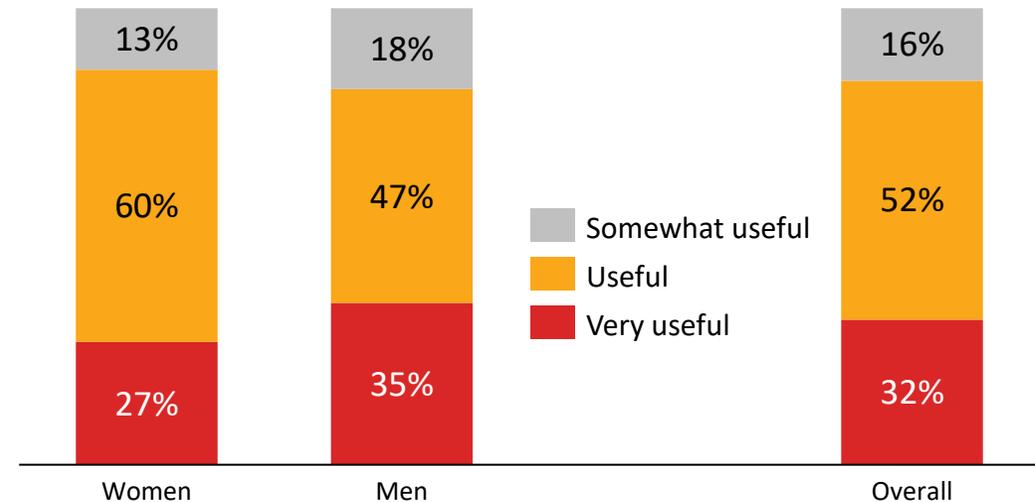
23% of farmers reported having misunderstood weather information, mostly among those above 40 years (75%).

- 72% and 81% of women and men believe they understand WI they receive, respectively

“Sometimes the weather information uses technical terms. It says 20 millimeters of rain, but I don’t know if that’s enough for my crop.” – Farmer, Nakuru

## Perceived Usefulness of Weather Information for Farming Decisions

Q: In your opinion, how useful is weather information for your farming decisions?  
(n=277, women=119, men=158)



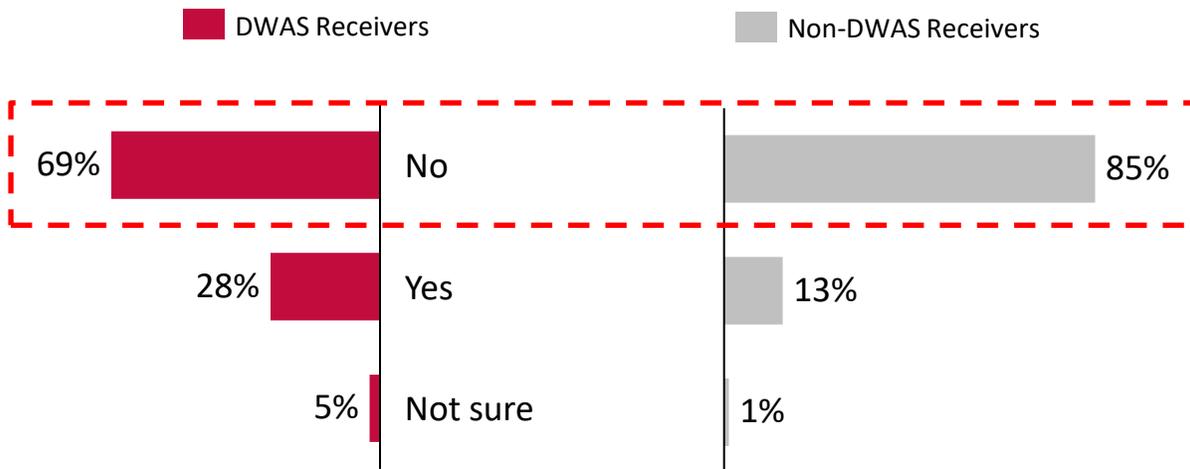
- **Older farmers face comprehension challenges:** Misunderstanding correlates with lower education and reliance on verbal/radio messages rather than written or digital formats.
- **Perceived value is high but conditional:** While WCI is seen as a modern, useful tool, doubts persist when past forecasts missed key events, affecting confidence in acting on future advisories.

“When the forecast was correct last season, everyone remembered and waited for the next update.” – KMD Officer, Nakuru

# Understanding of WCI is stronger among non-DWAS users, with 85% reporting no misunderstanding vs 69% of DWAS users; however, more DWAS users rate WCI as very useful (34% vs 27%)

## Farmer Understanding of Weather Information (DWAS vs Non-DWAS receivers)

Q: From which entity do you receive weather information?  
 (n=188, women=76, men=112) (n=89, women=43, men=46)

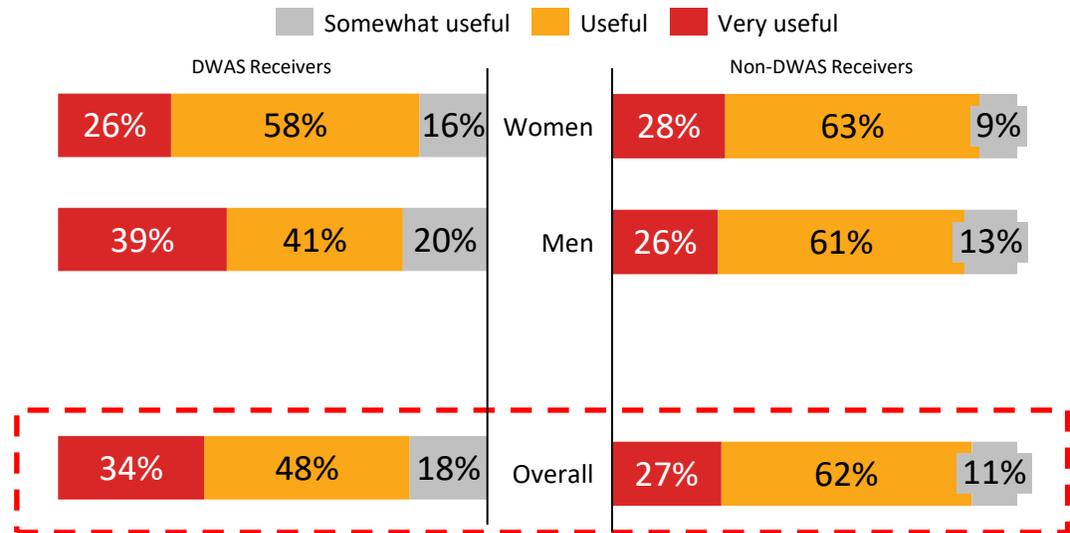


69% of farmers receiving DWAS reported no misunderstanding of the weather information received vs 85% for non-DWAS receivers.

- **DWAS:** 63% and 73% of women and men believe they understand WI they receive, respectively
- **Non-DWAS:** 80% and 88% of women and men believe they understand WI they receive, respectively

## Perceived Usefulness of Weather Information for Farming Decisions (DWAS vs Non-DWAS receivers)

Q: How much do you trust the weather information you receive?  
 (n=188, women=76, men=112) (n=89, women=43, men=46)



→ Perceived usefulness slightly varies from DWAS vs non-DWAS receivers:

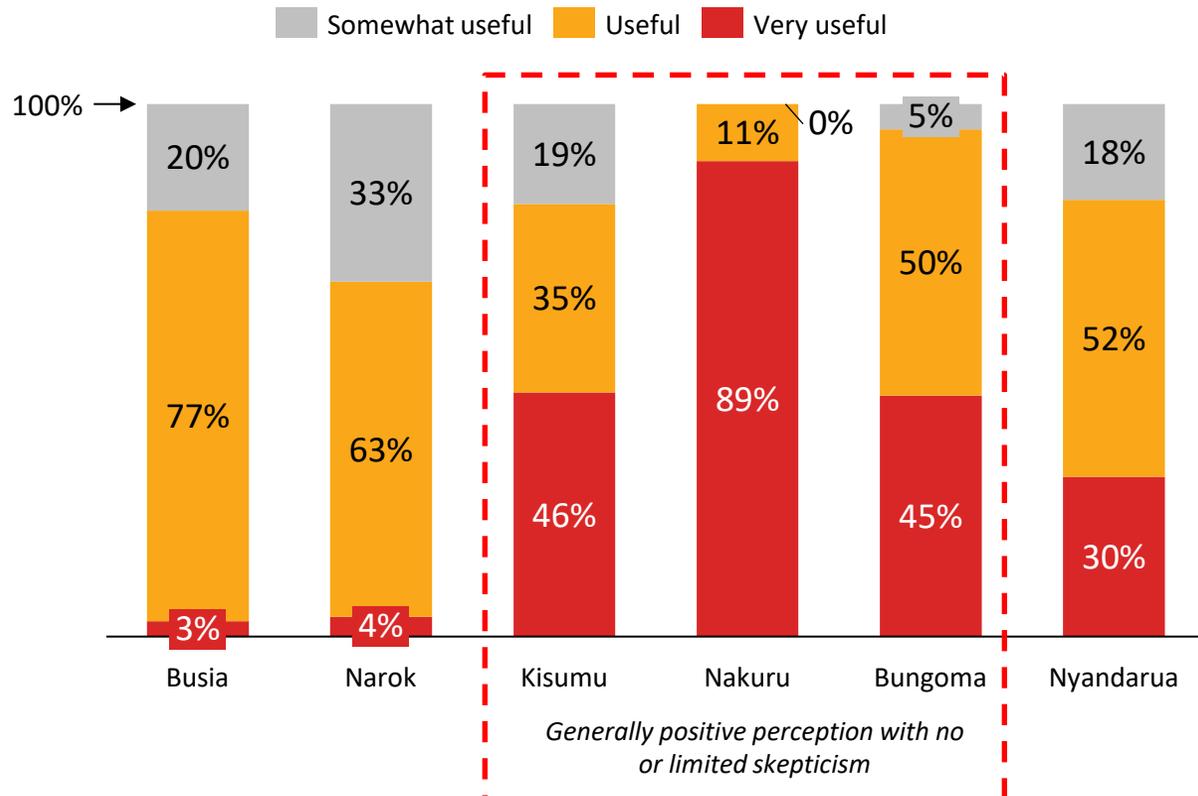
- 82% DWAS vs 89% non-DWAS receivers find WCI generally useful respectively
- That said, 34% DWAS vs 27% non-DWAS receivers find WCI "very useful" respectively which shows a slight gap in perceived usefulness across the user segments
- Men group from non-DWAS receivers have lower perceived usefulness at 26% relative to men DWAS users, 39%.

# The perceived usefulness of weather information differs cross counties, with Nakuru, Kisumu and Bungoma generally having positive perception with no or limited skepticism due to consistent exposure to FFOs and education level

## Perceived Usefulness of Weather Information

Q: In your opinion, how useful is weather information for your farming decisions?  
(n=277, women=119, men=158)

→ The tone of perception differs across counties, reflecting variations in partner engagement, exposure channels, and past accuracy experiences.



County	Key Observations
Nakuru	Consistent exposure through FFOs such as Apollo and Hello Tractor has normalized forecast use. Farmers associate messages with reliable decisions: planting, spraying, or tractor booking. <i>“Apollo messages come every week; we wait for them before planting.” – FGD, Nakuru</i>
Kisumu	Farmers often hear forecasts on radio or through community chatter but rarely from organized programs. They recognize their importance yet view them as distant and generalized. <i>“They talk of storms, but here it’s just normal rain.” – FGD, Kisumu</i>
Nyandarua	Farmers express high regard for forecasts, valuing CoAmana’s localized SMS in vernacular language and its relevance to planning. The tone here is one of <i>trust awaiting consistency</i> . <i>“We believe in the messages, but we wish they came more often.” – FGD, Nyandarua</i>
Narok	While many farmers acknowledge receiving information from KMD or FFOs (i.e., Apollo), inconsistent accuracy across sub-counties and micro-climates has somehow weakened confidence. <i>“They said it would be dry, but it rained heavily here.” – FGD, Narok</i> KMD officers confirmed that local variability and limited staff capacity hinder timely follow-up, reinforcing uneven perception.

# Sustained exposure and localized, clear communication build awareness and trust, whereas generic messages, unclear attribution, and gendered access barriers weaken both perception and recall of weather information

SN	Awareness Patterns and Drivers	Supporting Qualitative Observations
1	<p><b>Exposure drives structured awareness</b> Farmers directly engaged through FFO programs (Apollo, CoAmana, Hello Tractor) show the highest recall and expectation of forecasts, as consistent messaging (weekly or bi-weekly SMS) establishes predictable learning and trust cycles.</p>	<p><b>Apollo:</b> farmers receive weekly SMS, increasing forecast recall and expectation; <b>CoAmana:</b> 80% weekly/fortnightly SMS in local language; <b>Hello Tractor:</b> forecast embedded in booking app and field sensitization days.</p>
2	<p><b>Mass media expands reach but weakens attribution</b> Radio and TV create wide exposure, but most farmers cannot identify KMD as the source, reducing institutional attribution and trust.</p>	<p>FGDs across counties cited radio/TV as main exposure: <i>“We hear it during the evening news.”</i> <i>“We only know it’s from the radio, not who sends it.” – Female Farmer, Nakuru</i> KMD confirms reliance on radio dissemination and acknowledge limited visibility.</p>
3	<p><b>Localization and translation strengthen perception</b> Tailored, vernacular forecasts generate deeper cognitive recall and positive perception compared to generic regional messages.</p>	<p>CoAmana’s localized SMS (“Rain expected in Nyandarua West”) cited as clear and useful. In contrast, the few who associated radio with KMD raised localization concerns. <i>“I listen radio forecast at 9 p.m., but it’s for Kenya, not my farm.” – Male Farmer, Narok</i></p>
4	<p><b>Gender and literacy gaps limit direct exposure</b> Women and older farmers rely on shared or oral channels, often through male household members or group leaders, diluting clarity and recall.</p>	<p><i>“My husband listens when I’m at the market.” – Woman, Narok.</i> <i>KMD officer Narok: “Women and the elderly are least reached due to phone access and literacy.”</i> Clear pattern is seen that most women rely on shared or group-based listening; elderly depend on oral channels.</p>
5	<p><b>Accuracy and local fit shape sustained exposure</b> Farmers’ confidence depends on how well forecasts match local reality; credible micro-level accuracy improves memory, while mismatches cause disengagement.</p>	<p><i>“If it says rain and it rains, we remember ,if not, we forget.” – Farmer, Nyandarua.</i> KMD officers confirmed micro-climate variability undermines credibility.</p>

# Theme 02 | Access and Usage

This theme assesses how, how often, and through what channels farmers currently receive and use weather and climate information.

It explores the accessibility, inclusivity, and equity of dissemination mechanisms across different user groups such as women, youth, and the elderly and identifies the structural and behavioral factors shaping adoption.

The analysis under this theme focuses on:

- the type of WCI and accuracy linked to usage
- the frequency and channels of access as well as convenience and comprehensibility of delivery formats
- the extent to which information reaches last-mile users in a timely and actionable manner
- examines interpretation (i.e., probability & advisory literacy) and constraints that limit access, as well as innovative approaches piloted by FFOs and public partners

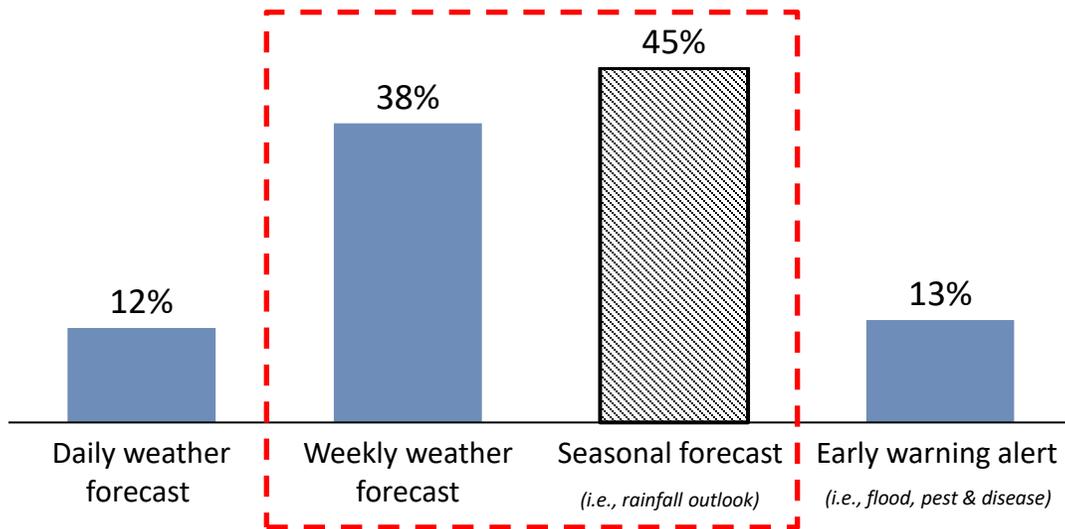
By assessing access and usage, this section provides insight into the enabling and inhibiting factors influencing farmers' ability to regularly access, interpret, and apply WCS which is a foundation for scaling tailored, user-centered delivery systems.

# Seasonal forecasts and weekly updates remain the main types of weather information farmers received, and nearly 5 in 10 farmers experience inconsistent reliability

## Types of Weather Information Received in the Past Three Years

**Q: In the past 3 years, what kind of weather information did you receive?**  
(n=277, women=119, men=158)

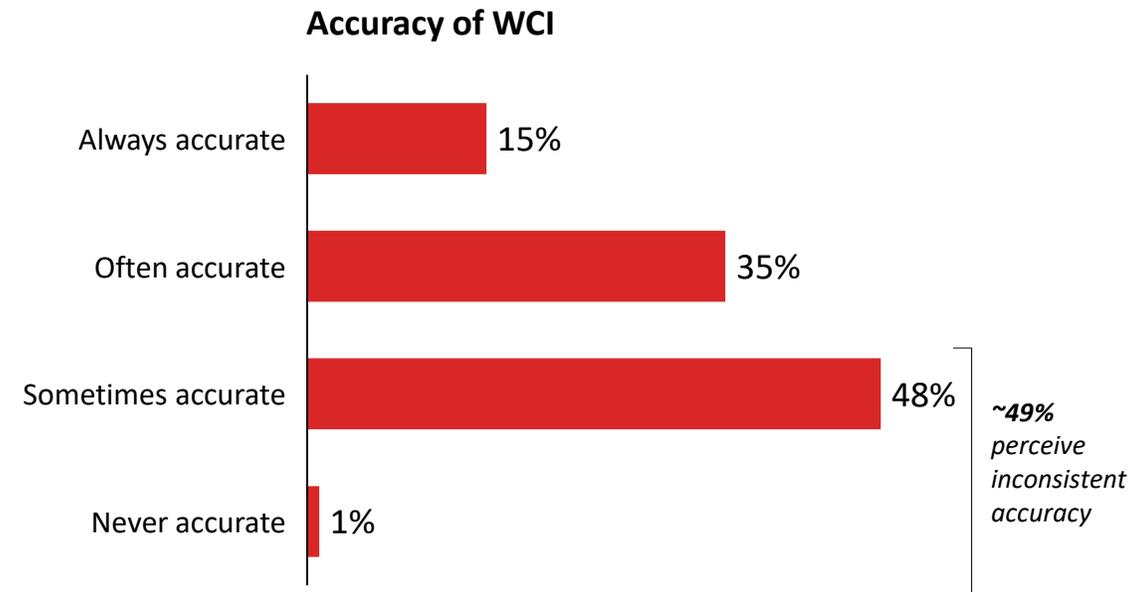
Seasonal forecasts and weekly updates are the most common types of weather information received, while daily forecasts and early warning alerts remain limited.



- Comparatively, 56% of DWAS users report receiving seasonal forecasts versus 33% of non-DWAS users, while non-DWAS users more frequently receive early warning alerts (17%) compared to DWAS users (9%).
- FGDs revealed that forecast type follows channel access: Farmers with access to digital platforms or SMS alerts receive more frequent and varied forecast types, while those relying on radio mainly hear seasonal summaries.
- A direct correlation is observed between larger land ownership and improved access to weather and climate information (WCI).

## Perceived Accuracy of Weather and Climate Information

**Q: When you compare the weather information such as forecast with the actual weather, how correct do you feel the information usually is? – Accuracy**  
(n=277, women=119, men=158)



- Non-DWAS farmers report higher concerns about forecast accuracy, with 67% indicating inconsistent accuracy, compared to 39% among DWAS farmers.
- Farmers in forest-adjacent and lake-basin areas particularly doubt accuracy due to localized weather variation not captured in generic forecasts.

“Sometimes it’s forecasted to be sunny, yet it rains here because we’re next to the forest.” – Narok FGD

# Farmers currently receive forecasts irregularly and mostly seasonally, yet the ~70% prefer weekly or biweekly tailored updates, revealing a clear supply gap. This demand also extends to current non-WCI receivers

## Current Frequency of Receiving Weather Forecasts

Q: How often do you receive weather forecasts?

(n=277, women=119, men=158)

→ Reported frequencies of receiving weather forecasts vary widely from multiple times a day to once per quarter, showing inconsistent delivery across channels.

**~51%** of farmers receive forecasts monthly or less frequently, reflecting low regularity despite high awareness.

→ **FGDs confirm this pattern:** most farmers access weather info seasonally or irregularly, largely dependent on radio timing, provider consistency, and when extension officers or groups push updates.

**FGDs confirmed that forecast frequency follows channel access:** Farmers with access to digital platforms or SMS alerts receive ~2X higher contact frequency, than farmers relying solely on radio.

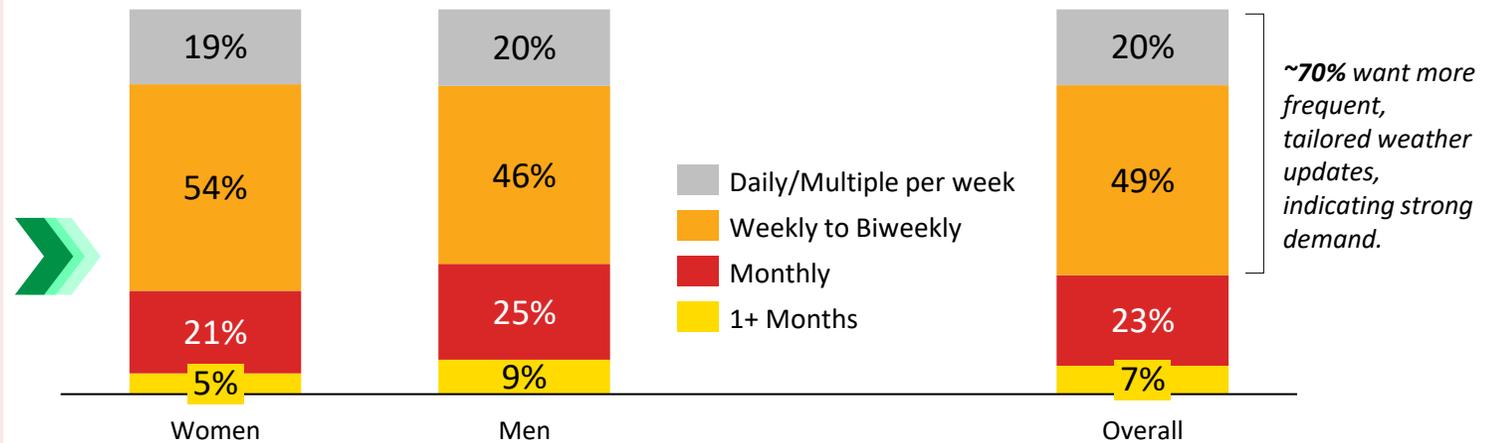
“Most farmers receive information only seasonally; those who want it more often have to go looking for it themselves.” – Narok FGD

“The radio message is general and sometimes we miss it, it depends on when you are listening.” – Nakuru FGD

## Preferred Frequency of Tailored Weather Information

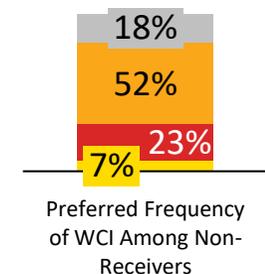
Q: How often do you WANT to receive tailored weather information?

(n=350, women=149, men=201)



→ The desire for weekly/biweekly tailored updates suggests farmers recognize the value of actionable, short-term information over broad seasonal summaries.

- **Even non-users want WCI**, reflected trust in the idea of forecasts despite gaps in experience.
- The **73 farmers** who never received WCI showed a similar preference pattern: they want weekly/biweekly information, proving latent demand across all user segments.

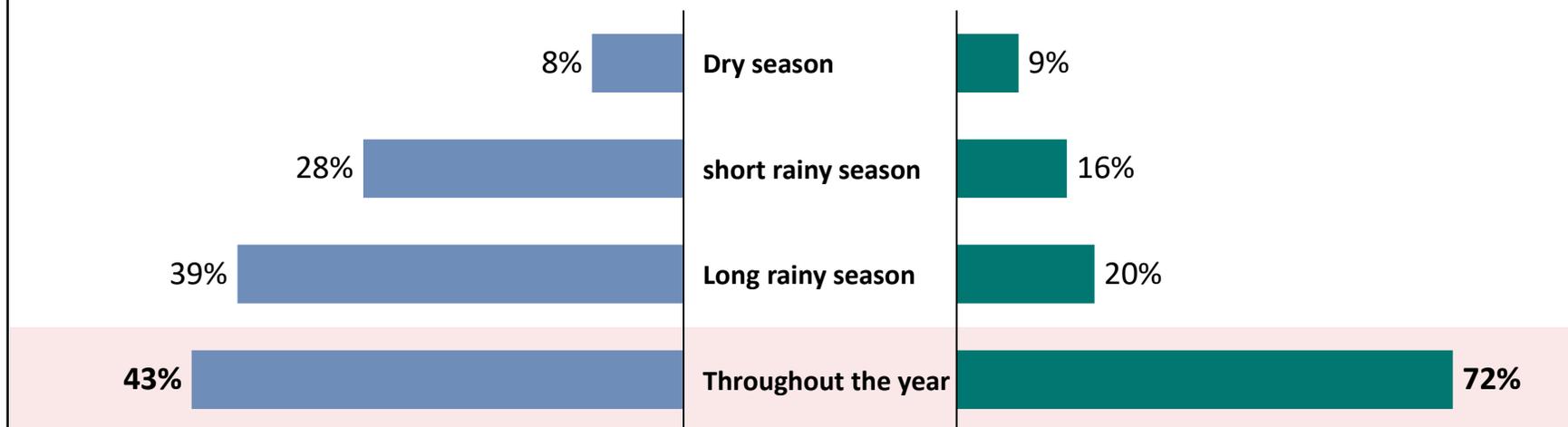


# Farmers currently receive weather information mainly during rainy seasons, yet 72% of farmers want year-round updates, revealing a significant unmet demand for season-agnostic WI delivery

## Current vs. Preferred Timing of Receiving Weather Information

Q: During which seasons do farmers **TYPICALLY** receive WI?  
(n=277, women=119, men=158)

Q: During which seasons do farmers **WANT** to receive WCI?  
(n=277, women=119, men=158)



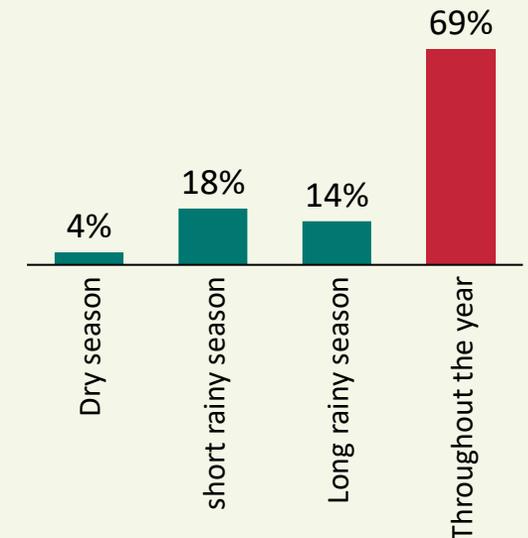
➤ 72% WANT weather information throughout the year a gap of +30% points compared to current access.

“We only hear it when the rains are about to start; the rest of the year we don’t get updates.” – Nakuru FGD

- The overwhelming preference for year-round WCI highlights that farmers perceive weather as affecting decisions beyond planting, including land prep, spraying, drying, storage, livestock, and market timing.
- Non-DWAS receivers relatively receive limited weather information on the dry seasons, and throughout the year. Their demand is high for WCI throughout the year but current supply for them is low by 22 percentage points.

### Latent demand even among non-receivers (n=73):

- Weather information non-receivers (for past 3 years) express almost identical preferences as active users, demonstrating that lack of access is structural not due to lack of interest.
- 69% want year-round forecasts, despite never receiving WCI previously.



# SMS leads as the preferred, reliable channel, while radio remains the essential fallback for women, older farmers, and those with limited digital access highlighting the need for multi-channel WCI delivery to reach all segments

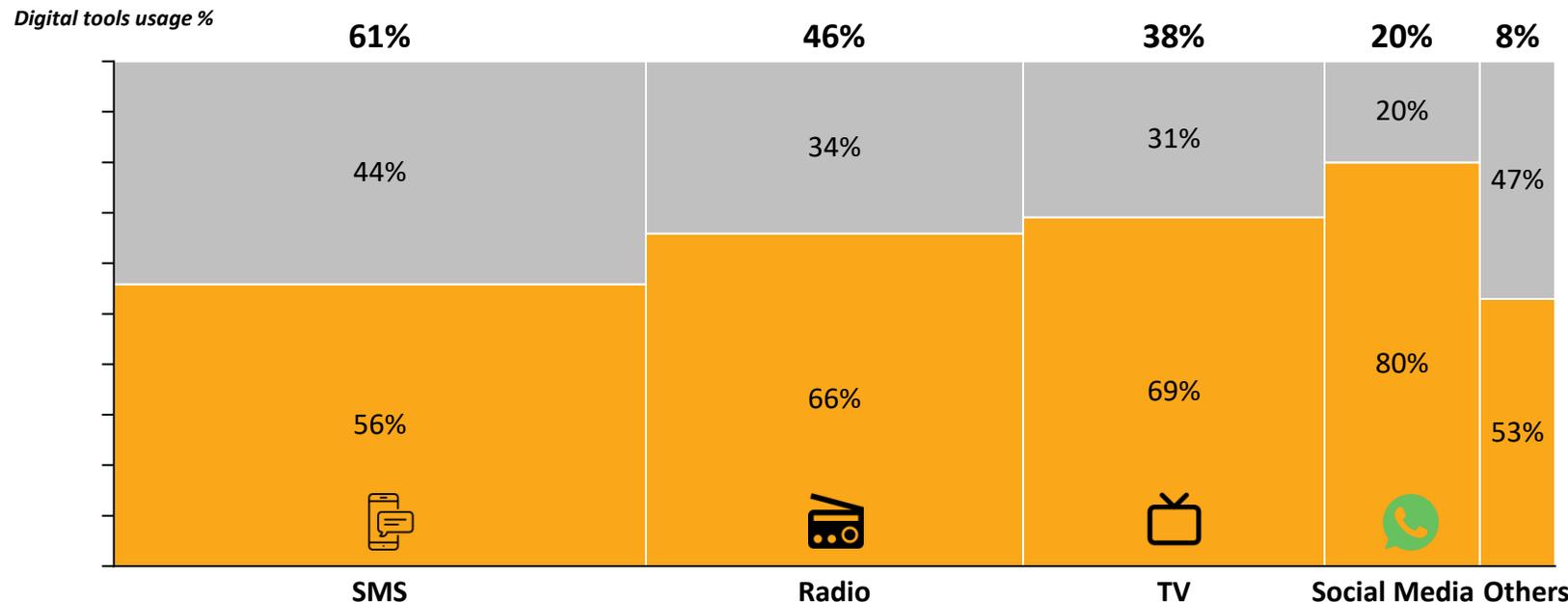
## Channels/tools Farmers Receive Weather Information

Q: Through which digital tools or platforms do you access weather forecasts?

(n=277, women=119, men=158)

Percentages exceed 100% because respondents selected multiple options

Women Men



\*Others: Application, Newspaper, Baraza, Phone calls, development agents, Website,

- For non-DWAS users, weather information is mainly accessed through TV and radio, with SMS also serving as an important channel, while DWAS users primarily receive updates via SMS, complemented by radio and TV.
- FGDs also highlighted the importance of using community gatherings such as meetings, churches, and political rallies as channels to disseminate weather and climate information.

Source: Farmer survey, FGDs across the 6 counties, KIIs with Apollo, CoAmana, Hello Tractor, KMD officers and MCA analysis

### Channel Convenience Drives Preference

Multiple channel use is common, confirming farmers blend digital, broadcast, and interpersonal sources to compensate for inconsistencies.

- **SMS** is consistently cited as the most desired channel due to permanence, privacy, and timeliness.

“SMS would work best; even if my phone is off, I can read later.” – Male Farmer, Narok

- Confirmed by FGDs **FM Radio** remains the fallback where literacy or device ownership is low. KMD officers across counties confirmed radio and WhatsApp remain their dominant dissemination channels.

- **Women** often depend on shared radios controlled by men; their access window is limited to off-farm hours.

“I don’t always hear the radio; my husband listens when I’m at the market.” – Female Farmer, Narok

“I prefer receiving weather updates via radio because I did not have access to any type of phone.” – Female farmer Nakuru

- **Social media (WhatsApp/Facebook)** appears only among youth and cooperative groups (i.e., highly mentioned in Nakuru and Nyandarua).

**Elderly** farmers, particularly in Narok and Kisumu, rely mainly on experience or neighbors for updates.

# Most weather information is delivered in English and Kiswahili, with local languages used in specific counties; comprehension is high overall, though slightly lower among women than men

## Current Language Used in Weather Information

Q: In which language(s) do you usually receive weather information?

(n=277, women=119, men=158)

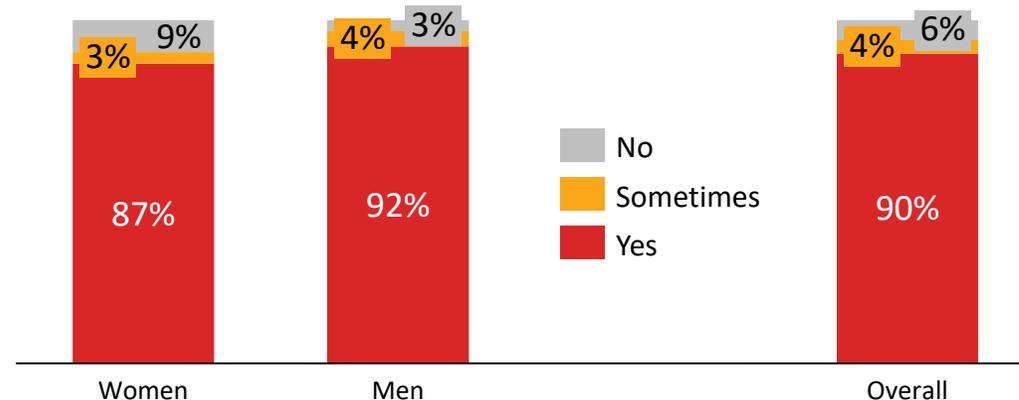
→ Language use varies by county. Kiswahili acts as the unifying language, bridging counties with high linguistic diversity such as Kisumu (Luo), Busia (Luhya), and Narok (Maasai).

County	Main Language	Key Observations
Busia & Bungoma	English, Kiswahili, Luhya	Most residents are bilingual, commonly using <b>Kiswahili and English</b> ; <b>Luhya</b> appears as a key local language.
Kisumu	English, Kiswahili, Luo	High linguistic diversity with frequent trilingual use ( <b>English, Kiswahili, Luo</b> ); <b>Luo</b> is dominant locally.
Nakuru	English, Kiswahili	Limited diversity compared to others; mainly <b>English and Kiswahili</b> as the main communication languages.
Narok	English, Kiswahili, Kikuyu, Maasai	<b>Kiswahili</b> widely spoken; <b>Maasai</b> and <b>Kikuyu</b> appear as key community languages
Nyandarua	English, Kiswahili, Kikuyu	<b>Kikuyu</b> is dominant alongside national languages; many speak English and Kiswahili as second languages.

## Clarity of Weather Information Language

Q: Is the language easy to understand?

(n=277, women=119, men=158)



- Comprehension is very high across genders: 90% overall say the language used is easy to understand.
- Men report slightly higher comprehension (92%) than women (87%). Gender differences in comprehension may stem from women’s:
  - higher reliance on shared radios (timing + clarity issues)
  - lower personal device access, reducing opportunities to re-read or replay information
- The high comprehension levels indicate that language is not a major barrier to weather information uptake unlike access, frequency, or localization.

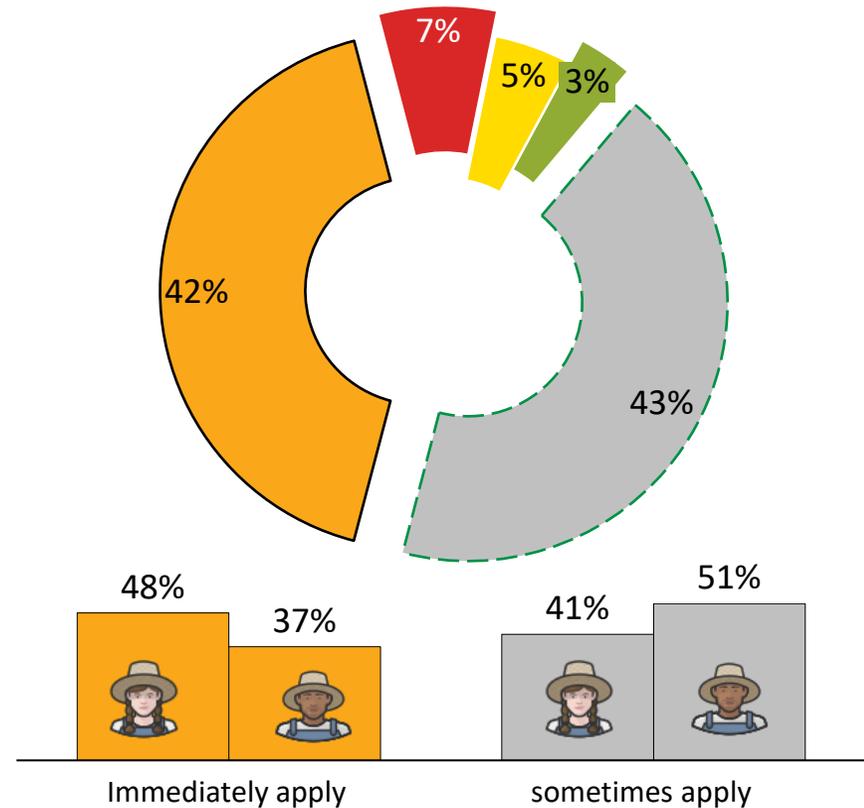


“...having an option to choose the language when subscribing to weather services would be good”– Nakuru FGD

# 92% of farmers act on weather information, relying on either immediate adjustments or peer validation, and women respond faster than men; showing strong willingness to use

## How Farmers Apply Weather Information in Practice

Q: When you receive weather information, how do you use it?  
(n=277, women=119, men=158)



- I sometimes adjust my farming plans, depending on whether I trust the information
- I immediately adjust my farming plans (e.g., delay planting, harvesting, spraying)
- I discuss it with other farmers or extension agents before deciding what to do
- I receive the information but rarely change my plans
- I don't act on the information at all

### Key Insights

- Farmers use weather information as risk management, adjusting when confidence is high and hedging (sometimes adjust) when trust is partial.
  - 85% take at least some action based on WCI, with most making moderate to strong adjustments.
  - 7% discuss the information with peers or extension agents before acting which shows social validation remains important, especially when forecasts conflict with traditional signs.
  - 5% say they rarely changes their plans or 3% do not act on the information at all. Low non-use (3%) indicates strong openness to integrating WCI into practice; the challenge is reliability and localization, not willingness.
- Women are more likely to act immediately on weather information (48% vs 37%), while men are more likely to delay decisions and validate (51% vs 41%), showing differing risk responses and trust dynamics.

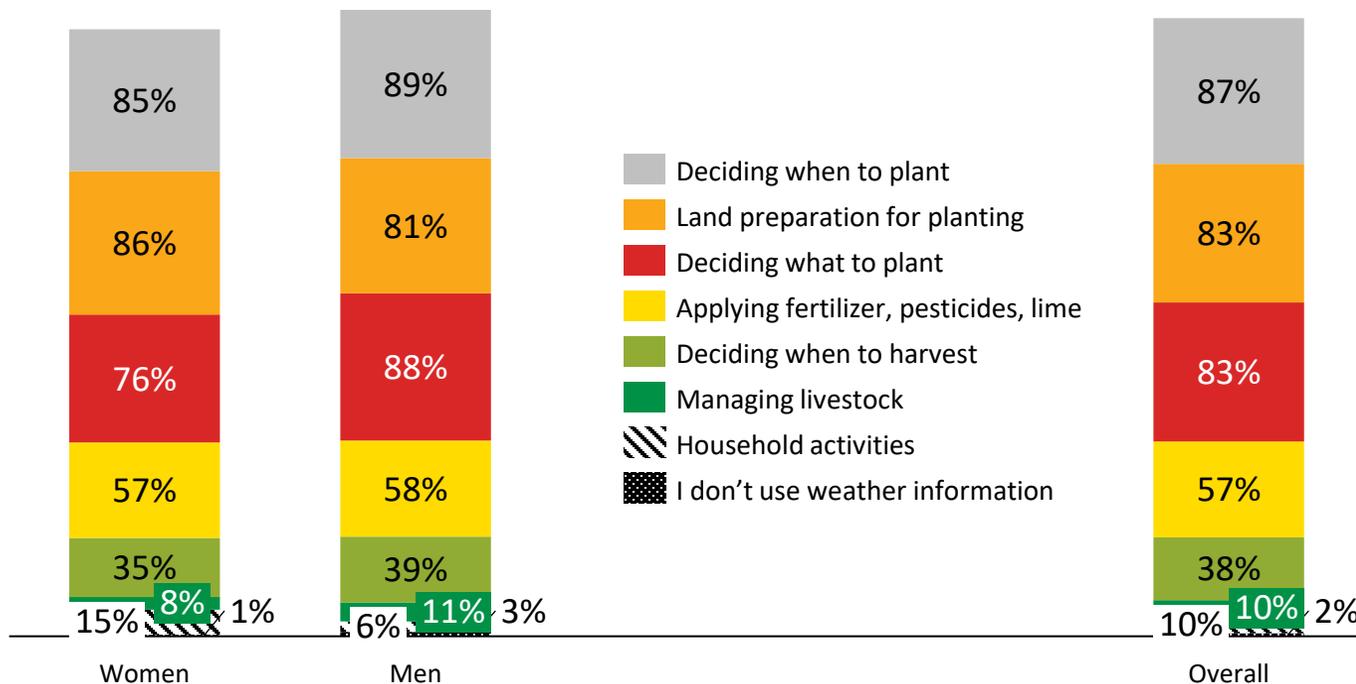
“Sometimes it's true, sometimes it's not; we check and decide.” – Narok FGD

# Most farmers actively use weather information to shape core production decisions especially planting, input application (57%) and harvesting (38%)

## Usage of Weather Information Across Farming Activities

Q: For which activities do you usually use weather information?  
(n=277, women=119, men=158)

Percentages exceed 100% because respondents selected multiple options



“When they say rain is coming, we prepare the land early.” – Nyandarua FGD

“If they say heavy rain, we move the animals to the upper side.” – Narok FGD

### Key Insights

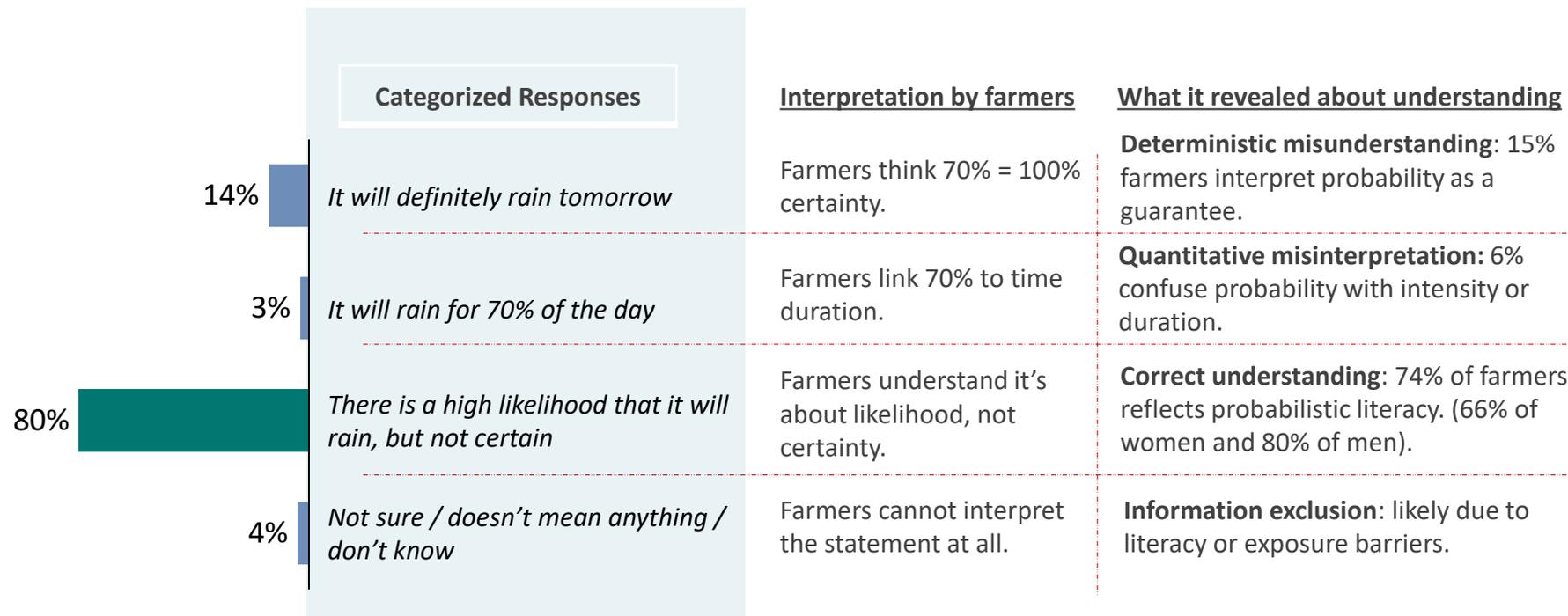
- WCI directly informs high-stakes decisions: planting, land preparation, and spraying rely heavily on timing, making even basic forecasts useful.
- Planting decisions dominate:**
  - Men show slightly higher usage for “what to plant” (88% vs 76%) and “when to plant” (89% vs 85%).
  - 87% use WCI to decide when to plant.
  - 83% use it for land preparation.
  - 83% for deciding what to plant.
- Input application** is significant:
  - 57% apply fertilizer/pesticides based on WCI.
- Harvesting** decisions rely on weather information for 38% of farmers
- Women show higher uptake in tasks aligned with routine household-level planning (e.g., drying, storing water) with 15% women vs 6% men.
- Livestock farmers are increasingly using WCI to decide on movement, sheltering, and feeding showing relevance across mixed systems.

# Despite a strong baseline forecast literacy (80%), one in five farmers still misinterpret or cannot interpret probability-based messages

**Q: Imagine the weather forecast says: “There is a 70% chance of rain tomorrow.” What does this mean to you?**

(n=277, women=119, men=158)

Measuring Dimensions	What it measures and why it matters
<b>Comprehension of probability-based forecasts</b>	Assesses whether farmers understand likelihood, not certainty. Misinterpretation leads to poor decisions (e.g., delaying planting unnecessarily or ignoring warnings).
<b>Effectiveness of current WCS communication</b>	Indicates where translation, simplification, or localization is needed. Whether existing WCS providers (KMD, Apollo, CoAmana, Hello Tractor etc.) communicate forecasts clearly enough.



## Key Insights

- The question assessed “forecast literacy,” which is a key barrier to effective use and monetization of weather information.
- 80% Indicates readiness to use and act on digital WCS messages; these farmers can be early adopters or community interpreters.
- 17% farmers still interpret forecasts deterministically or temporally
- Global WMO, FAO, and IIED guidance recommends avoiding raw percentages for non-technical users and instead using plain-language likelihood terms such as “high chance of rain”, “low likelihood of showers”, “rain is likely” or analogies (i.e., 7 out of 10 times) to avoid misinterpretation.

# 65% of farmers understood and would act on the advisory message, showing strong trust and responsiveness to WI, while a third prefer to balance with experience

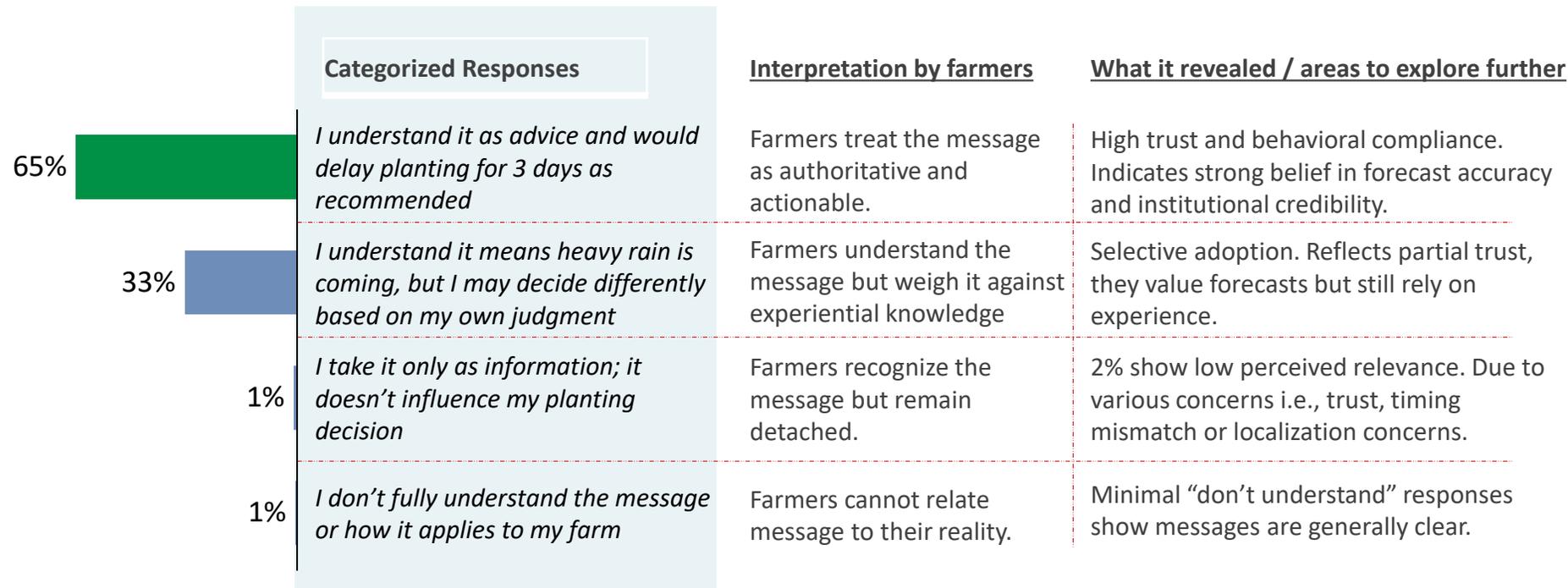
**Q: A message says: “Farmers are recommended to delay planting for 3 days due to forecasted heavy rain.” What does this mean to you?**

(n=277, women=119, men=158)

Measuring Dimensions	What it measures and why it matters
<b>Interpretive application</b>	Determines if forecasts are <i>operationally useful</i> or just informational. Whether farmers can link the message to a practical action (e.g., delaying planting)
<b>Trust and Decision autonomy</b>	Whether farmers follow expert guidance vs. rely on personal judgment

## Key Insights

- The question assessed how farmers act on forecasts, not just whether they receive or understand them.
- 65% correctly interpret and would act on the recommendation.
- 33% show partial trust, applying advice selectively indicating a transitional group that needs more localized evidence and consistent evidence to change practice.
- KMD officers confirmed that clear, time-bound messages (“delay for 3 days”) drive higher uptake than abstract probabilities.
- FFOs (Apollo, CoAmana, Hello Tractor) noted that farmers follow recommendations more reliably when messages are bundled with agronomic context (e.g., “delay planting 3 days and apply fertilizer after first light rains”).



# Qualitative insights from FGDs and KIIs compliments quantitative data by revealing deeper pattern in how farmers access and use weather information

Access Patterns Across Various Segments

Segment	Access (relative)	Underlying Explanation
Men	High	Control household radios and mobile phones; attend community meetings more often.
Women	Low	Depend on husbands, neighbors, or group leaders for updates. Some heard info indirectly during group savings meetings.
Youth	Moderate – High	Digitally connected (WhatsApp/SMS) but less engaged in applying forecasts.
Elderly	Low	Rely on traditional signs; often miss broadcasts or cannot interpret text-based messages.

## Usage Patterns and Behavioral Insights

- **Reactive, not routine usage:** Most farmers act on forecasts when timing aligns with planting or harvest windows, rather than using them for continuous risk management.
- **Complementary to experience:** Forecasts validate rather than replace indigenous knowledge. Typical sentiment: *“I check what the sky says too.”*
- **High demand for timely alerts:** Farmers value warnings that can save costs e.g., postponing labor or fertilizer application before rain.
  - “If I get the message early, I can delay spraying and save money.” – FGD, Nyandarua | as applying during heavy rainfall leads to runoff and wastage
- **Limited application diversity:** Usage is concentrated in planting decisions; few apply forecasts for irrigation scheduling, pest management, or market timing.
- **Information sharing:** FGDs consistently describe farmers sharing weather information with each other, especially via family phones, neighbors, and WhatsApp groups.

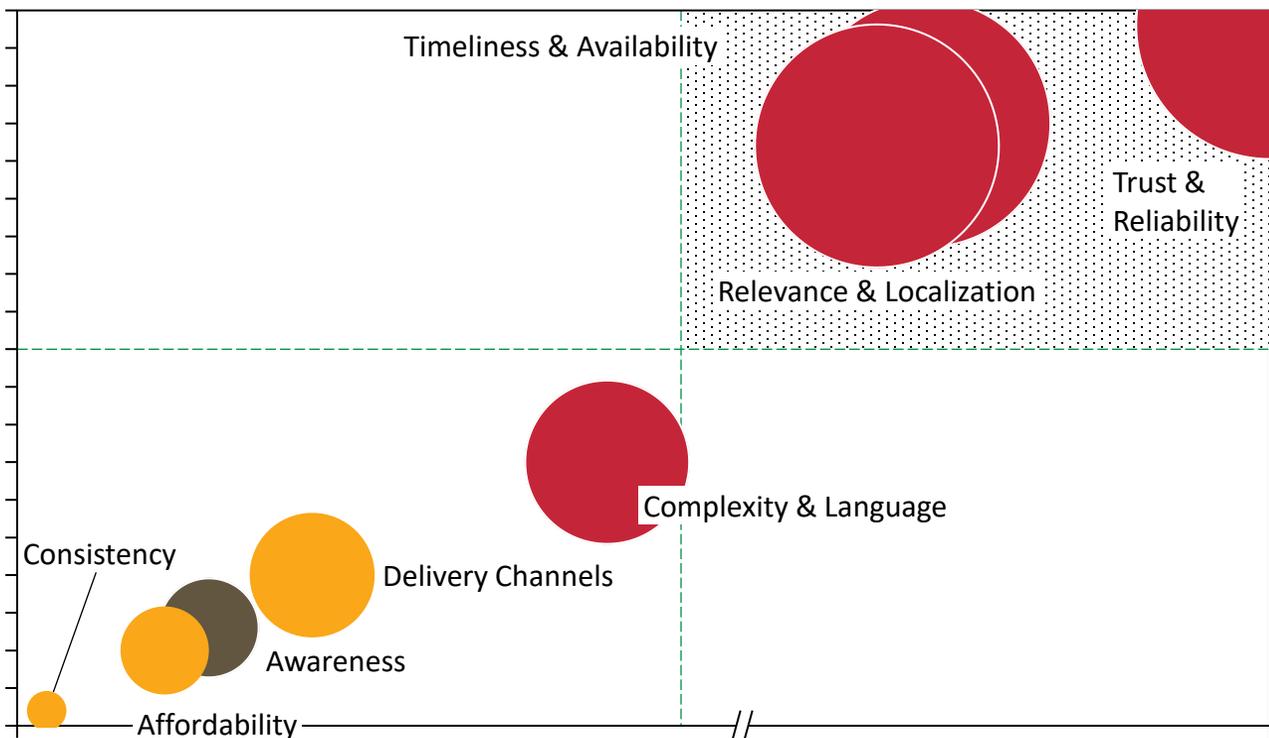
# Farmers' primary access barriers to weather information are reliability concerns, late arrival of forecasts, and limited localization

## Challenges Categories

● Information Quality & Fit   ● Access & Delivery Systems   ● User Capability & Engagement

(n=277, women=119, men=158)

### Frequency



Severity was proxied using the frequency of mentions, challenges raised more often by farmers reflect greater practical barriers, higher perceived pain, and broader impact on access to WCI (Severity = (Frequency / Highest Frequency) × 5)

Severity

Major Challenges		Sample Statements
<b>Ranked</b>		
1	<b>Trust &amp; Reliability</b>	"I'm not sure if it is accurate", "Sometimes not true", "Sometimes it was not accurate", "At first did not trust the information"
2	<b>Timeliness and Availability</b>	"I receive it too late to be useful", "Information arrives too late", "If i get information late, i view it late"
3	<b>Relevance &amp; Localization</b>	"Information doesn't match my farm location", "Not specific to my location", "Doesn't match my crops"
4	<b>Complexity &amp; Language</b>	"Language/format is hard to understand", "Too technical or hard to understand", "Not available in local language"

“In August, we received a forecast saying heavy rains would continue from September to November, so I planted maize expecting good rainfall. But the dry season started early in November, and my crop failed, leading to losses.” – Bungoma FGD

# Theme 03 | Relevance and Value

This thematic area explores the degree to which WCS aligns with farmers' practical needs and contributes tangible value to farm-level decisions.

It looks beyond awareness and access to measure how farmers internalize and act on forecasts from land preparation and planting to harvesting and input management.

The analysis under this theme focuses on:

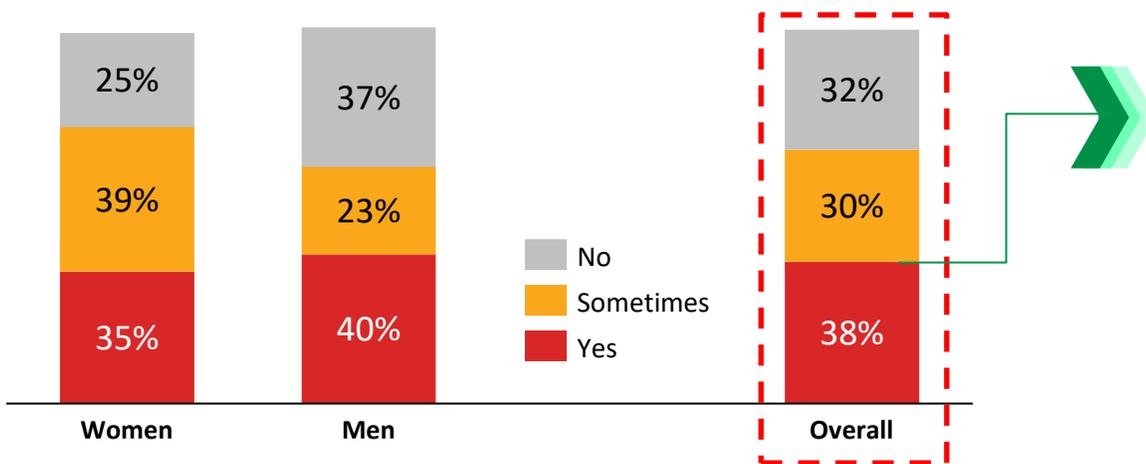
- the specific types of information that farmers consider most useful (e.g., rainfall onset, intensity, duration, and temperature)
- how the perceived accuracy and timeliness of forecasts influence behavioral change
- It also documents the economic and livelihood benefits farmers attribute to WCS use.

By grounding WCS in the realities of farmers' production systems, this section underscores the strategic importance of making climate information not only available, but relevant, trusted, and directly linked to productivity outcomes.

# Only 38% of farmers say they receive weather information in time to act, with Narok showing the lowest and Nyandarua showing the strongest perceived timeliness for WCI

## Timeliness of Received Weather Information

Q: Do you think the weather information you receive is timely (early enough to make farming decisions)?  
(n=277, women=119, men=158)

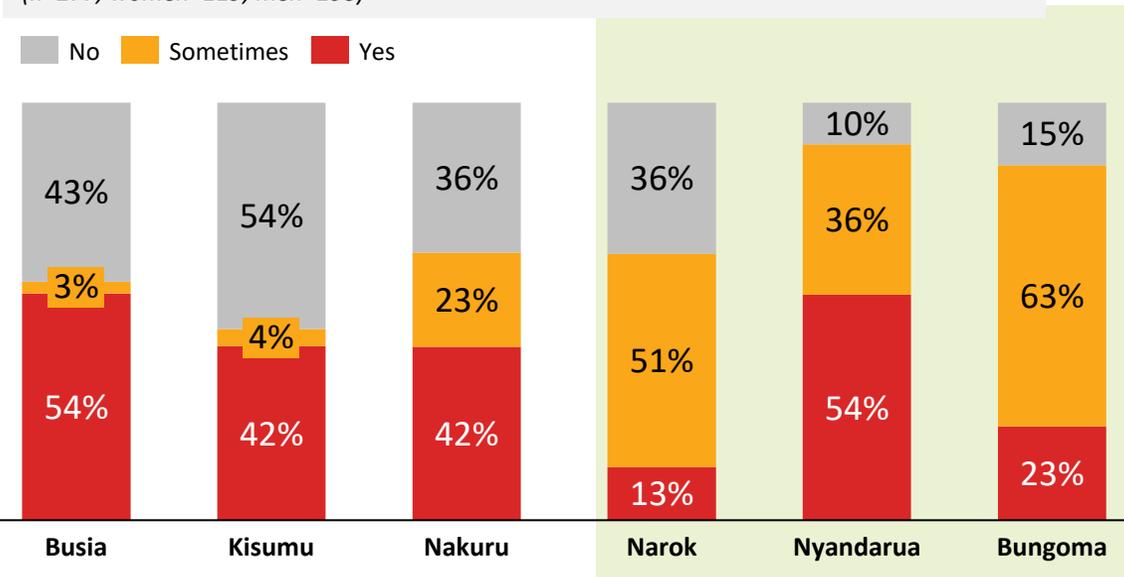


- **62%** said they don't receive on time or only "Sometimes," signaling major timeliness challenges.
- Non-DWAS receivers report lower timeliness in accessing WCI, with 69% indicating they receive information either late or only sometimes on time, compared to 59% among DWAS receivers.
- KIIs with KMD representatives in both Narok and Nakuru cited poor network coverage and under-staffing as structural bottlenecks, resulting in delayed dissemination.

“Network coverage and limited staff affect dissemination timing.” – KMD KII

## Timeliness County Level Insight

Q: Do you think the weather information you receive is timely (early enough to make farming decisions)?  
(n=277, women=119, men=158)



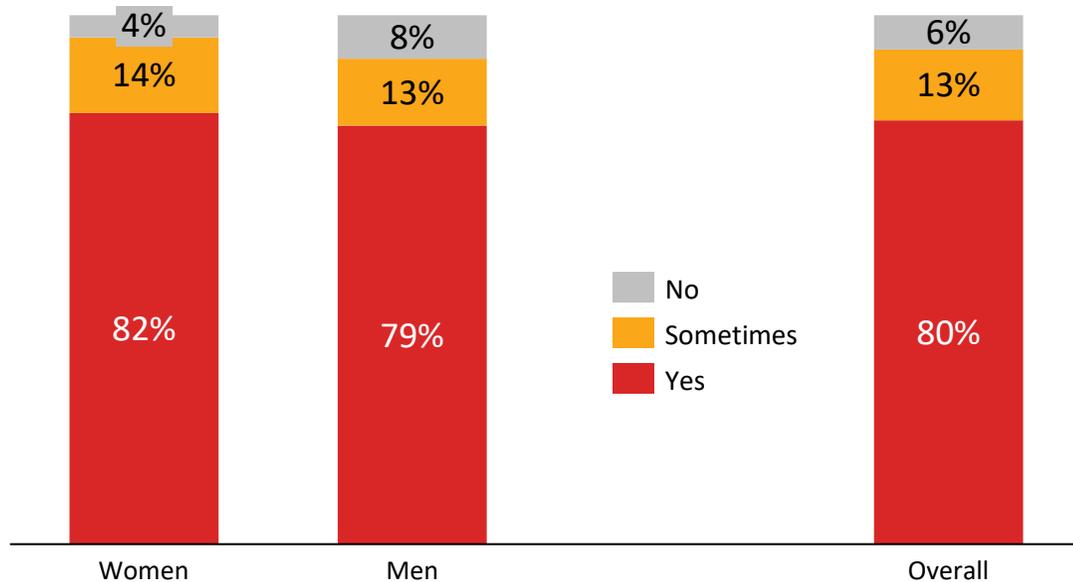
- Narok shows the weakest perceived timeliness, with 87% saying "No" or "Sometimes," and only 13% reporting timely forecasts; the lowest across all counties followed by Bungoma.
- Nyandarua performs best, with only 10% saying "No," though a sizable share still say "Sometimes," indicating timeliness remains uneven even in stronger counties.

“Sometimes it comes late, and by the time we hear it, the work is already done.” – Bungoma FGD

# On the contrary to timeliness concerns, majority of farmers (80%) perceived the weather information they received to be relevant to their farming needs but only 47% are satisfied with received WI

## Relevancy of Received Weather Information

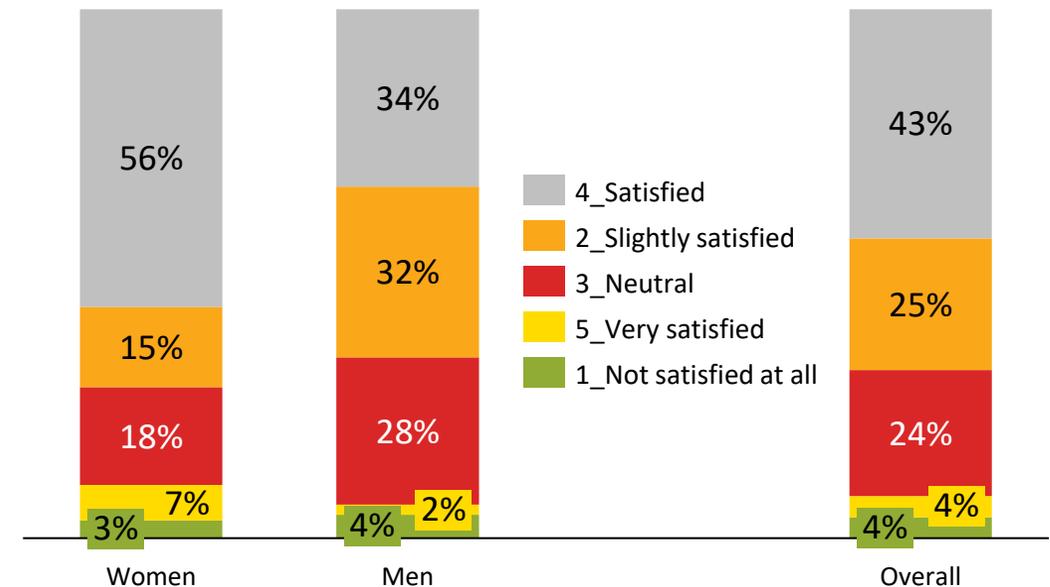
Q: Do you think the weather information you receive is relevant to your farming needs?  
(n=277, women=119, men=158)



- 80% of farmers said the weather information they receive is relevant to their farming needs. Women report slightly higher relevance (82%) than men (79%).
- Non-DWAS receivers are more likely to perceive WCI as less relevant to their farming needs (38%), compared to only 11% among DWAS receivers.
- County-level patterns are consistent; across the board relevance perception is high everywhere, even in counties where timeliness is low.

## Farmer Satisfaction of Received Weather Information

Q: How satisfied are you with the weather and climate information you currently receive?  
(n=277, women=119, men=158)



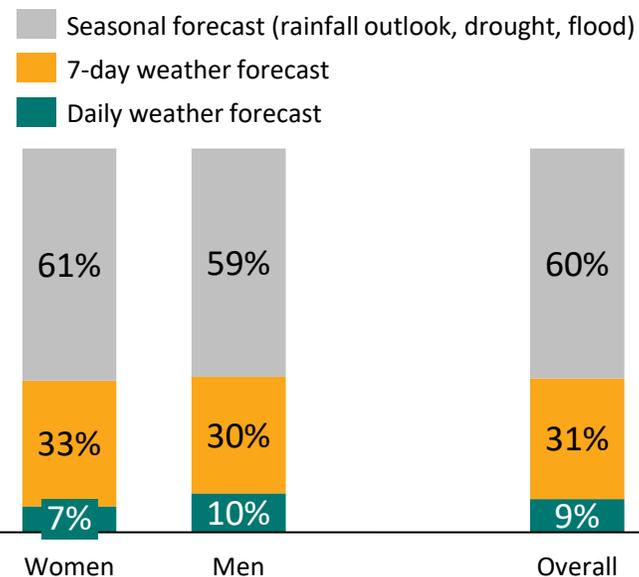
- Although 80% say WCI is relevant, only 47% say they are satisfied. Men are less satisfied (36%) compared to women (63%).
- This gap reflects issues with timeliness (delayed delivery), localization (generic regional forecasts), and accuracy (mismatch with micro-climates), not the thematic usefulness of the information.
- No significant difference on satisfaction rate among non-DWAS and DWAS receivers.

# Seasonal type of forecasts are the most valued and widely used, with 6 out of 10 farmers especially women changing key planting, crop, and input decisions based on WI

## Type of Forecast Farmers Deem Useful

Q: Which type of forecast is the most useful for your farming decisions?

(n=277, women=119, men=158)

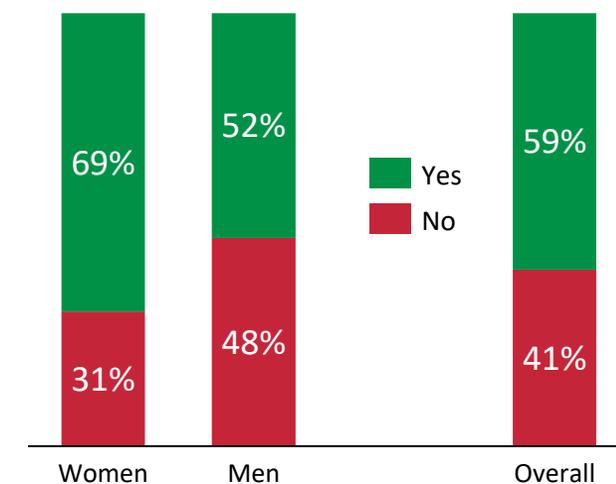


- Farmers prioritize seasonal forecasts because these inform their biggest decisions such as when to plant, what to plant, and how to allocate labor and inputs.
- DWAS receivers primarily value seasonal weather outlooks (66%), followed by 7-day forecasts (26%), while non-DWAS users show a more even preference, with 44% valuing seasonal forecasts and 43% preferring 7-day forecasts.

## Experience in Changing Farming Practices

Q: Have you ever changed your farming practices directly based on weather information

(n=277, women=119, men=158)



- High behavior change (59%) shows farmers are not passive receivers they're actively integrating WCI into their decision-making, especially when information is clear and actionable.
- Women have higher rate of adopting WCI-driven changes (69%).

“We want messages that tell us what to do, not just that it will rain.” – Bungoma FGD

## Ranking Farming Decisions Made

Q: What kind of changes / decisions did you make?

Ranking based on frequency of mentions

Ranking	Mentioned changes
1 <b>Timing of Planting and Farm Operations</b>	“Changed planting time,” “delayed planting,” “planted earlier,” “land preparation,” “postponed planting due to heavy rains,”
2 <b>Crop and Variety Selection</b>	“Changing crops to plant” “choosing drought-resistant varieties,” “Crop rotation.” “switching crop type depending on rainfall projection,”
3 <b>Input Application and Crop Management</b>	“spraying delayed,” “applied pesticide during cold season,” “adjusted fertilizer application date.”
4 <b>Risk Mitigation and General Farm Planning</b>	“postponed weeding,” “stopped planting during projected cold season,” “planned farm work on time,” “delayed planting and prepared for runoff.”

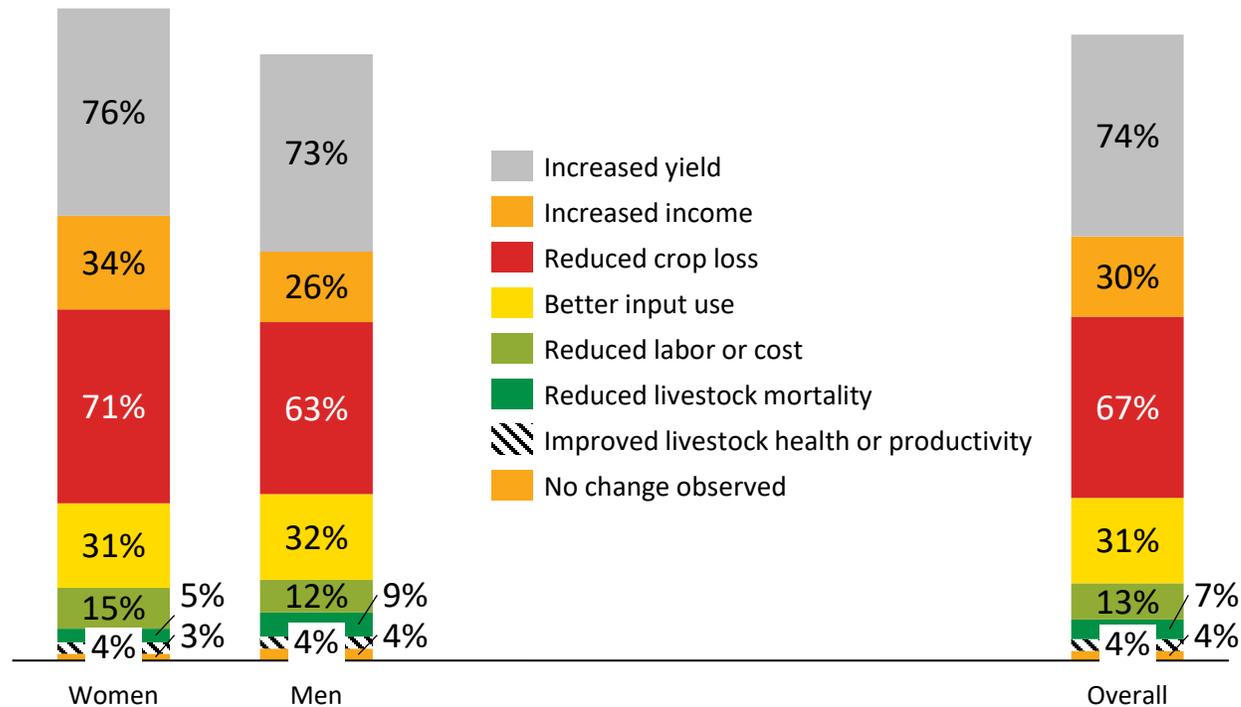
# Weather and climate information is already driving tangible improvements among farmers: higher yields (74%), reduced crop losses (67%), better input use (31%), and income gains (30%)

## Positive Changes Observed By Farmers By Using Weather Information

Q: Have you observed any positive results from using weather forecasts?

(n=277, women=119, men=158)

Percentages exceed 100% because respondents mentioned multiple responses



“Farmers rely on rainfall forecasts to decide planting times.” — Apollo KII



“When messages are clear and timely, they act on them.” — KMD Nakuru

## Key Insights

- Weather information is delivering real agronomic value; yield increase (74%) and reduced crop loss (67%) are the top outcomes. These outcomes align with FGDs and KIIs, which confirms yield gains and reduced pest losses among weather-informed farmers.
- Income gains (30%) are strongly linked to better timing and reduced loss.
- Better input use (31%) shows growing efficiency: farmers are optimizing fertilizer, pesticide, and labour costs.
- Livestock benefits (mortality reduction, improved health) remain low (4-10%) but still meaningful.
- Mostly observed in mixed-farming counties (Narok, Nyandarua): Avoiding cold-season stress, Adjusting grazing during heavy rainfall, Planning fodder drying. These reinforce the relevance of WCI beyond crops.
- Very few farmers see “no impact,” indicating strong demand and perceived usefulness despite mentioned challenges with accuracy/timeliness.

# Qualitative findings highlighted that farmers value WI when it is local, timely, and actionable: especially when forecasts translate into economic benefits such as avoided losses, optimized input use, and better scheduling

## Qualitative Insights

### Utility is Anchored in Rainfall Predictability

- Across all FGDs, rainfall onset and distribution dominate as the key driver of WI relevance.
- Farmers equate “weather information” with “rainfall forecast.” This narrow framing stems from the historical linkage between rain-fed agriculture and livelihood security.

As KMD Nakuru put it, “Farmers are not interested in temperature or humidity – they only ask, ‘Will it rain?’”.

### Actionable Guidance Outperforms Technical Precision

- The usability of a forecast largely depends on whether it translates into clear, immediate actions: delay planting, adjust spraying, move harvest, etc.
- FGDs show strong preference for directive, localized phrasing (e.g., “Expect rain tomorrow morning”).
- KIIs (KMD, Apollo, Hello Tractor, CoAmana) confirm that technical probability terms (“70% chance”) lower farmer confidence and adoption.

### Economic Linkage Drives Perceived Value

- Farmers assess WCS value retrospectively; when a forecast prevents a loss or increases income, not based on scientific accuracy.
- CoAmana and Apollo observed that farmers who experienced fewer losses/ high gains due to timely WI are the ones most likely to pay or demand continuity.

### Localized Relevance is the Strongest Driver of Adoption

- When forecasts align with hyper-local conditions, trust and perceived value rise sharply.
- CoAmana’s location-specific SMSs (“rain expected in Nyandarua West”) are cited as “believable and useful” by farmers who otherwise distrust broad regional forecasts.

## Institutional Perspective (KMD and FFOs)



- KMD officers across counties emphasize that forecasts are scientifically accurate but underutilized due to weak contextualization and translation gaps.
- Rising demand for sector-specific bulletins (agriculture, transport, water) shows that WCS value is expanding beyond farming.
- Narok KMD stressed that timeliness and clarity determine whether forecasts are used or ignored—more than accuracy alone.



- Tailored SMS and radio advisories improve planting timing and reduce losses; 40–60% of farmers change behavior based on their advisories.



- Weather-informed tractor scheduling leads to higher deployment efficiency and reduced idle time.



- Localized weather guidance improves market coordination, especially for traders who time transport around rainfall.

# Theme 04 | Affordability and Willingness to Pay

This section examines farmers' attitudes toward paying for WCS which is a key determinant of long-term sustainability and private-sector participation in climate information services.

It analyzes the current cost structures, perceived value for money, preferred payment mechanisms, and conditions under which farmers would be willing to contribute financially.

The analysis under this theme considers:

- Insights are drawn from both farmers and service providers,
- affordability across income groups, and gender,
- lessons from pilot pricing models tested by farmer-facing organizations.

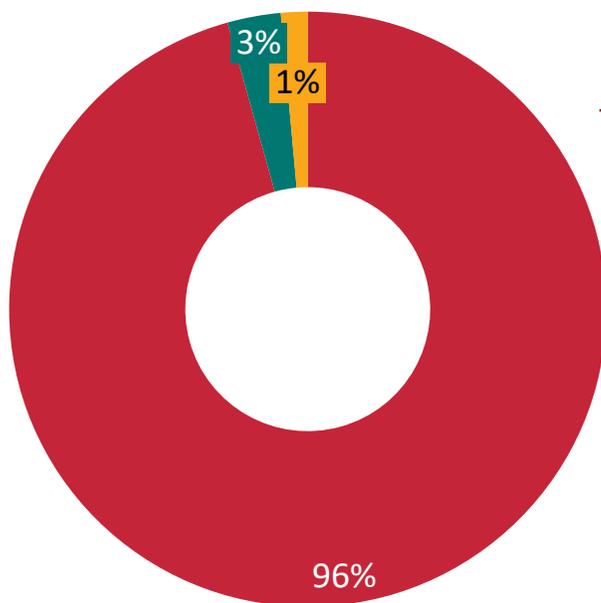
This theme provides the economic perspective necessary for designing viable business models and public-private partnership mechanisms that balance inclusivity with financial sustainability.

# 96% of farmers don't pay directly for weather information and among the very few who pay, spending varies widely from 20Ksh to 150KSh monthly

## Current Status on Payment for Weather Information

Q: Do you currently pay for weather information services you receive?  
(n=277, women=119, men=158)

No Yes I am not sure



→ Across all FGDs, farmers consistently described radio, neighbours, and free SMS/WhatsApp groups as their main channels.

→ Generally, farmers do not see weather information as something they must pay for, because:

- It is historically a public-good service through KMD, KALRO.
- They access it indirectly (radio, neighbours, NGOs, cooperatives).
- Most are not accustomed to subscription-based information services.

“I can pay KSh 50 per month, but it has to be a timely and reliable service.” — FGD, Nakuru

“Farmers rarely pay directly; they expect weather information through radio or from our announcements.” — KMD Officer Busia KII

## Monthly Payment For Weather Forecasts

Q: On average, how much have you paid monthly?  
(n=8)

→ Payment happens indirectly, not as a standalone WCI subscription. The small group who pays **spends small, irregular amounts**

Average Payment

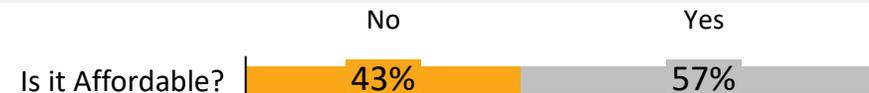
**124 KSh/month**

- Women pay 20–50 KSh/month
- Men pay 50–150 KSh/month

→ FGDs align with this: no one reported paying more than a small airtime-like fee, and none described consistent monthly payments.

## Affordability of Received Weather Forecasts

Q: Are weather information services currently affordable for you? (n=8)



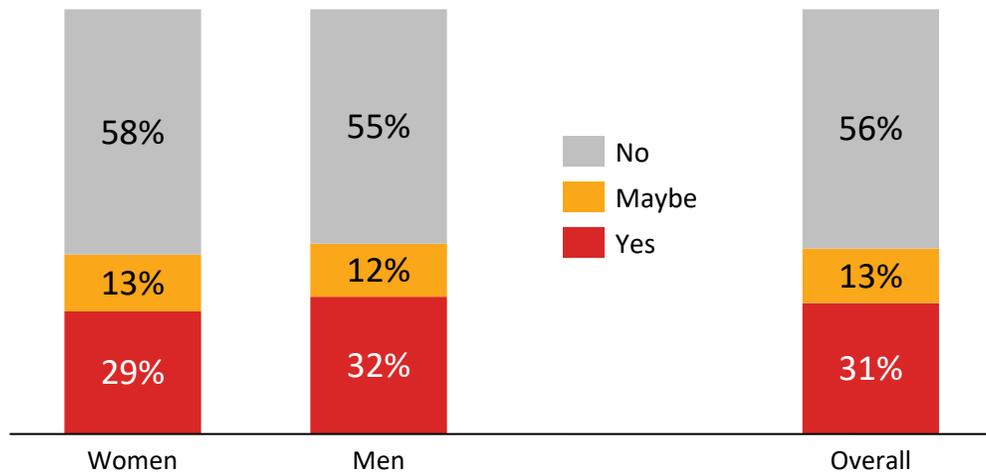
» Though group is small, perceived affordability is mixed but mainly tied to value. FGDs consistently show that farmers could afford small fees if value is proven:

“If it is accurate and on time, we can pay something small.” — Nyandarua FGD  
“It must help us avoid losses, otherwise we cannot pay.” — Nakuru FGD

# Only 31% of farmers are directly willing to pay for weather forecasts (avg. 30-70 Ksh/month), with sharp county differences; Nakuru showed high WTP at 78%, while Narok and Nyandarua are the lowest (8%)

## WTP for Timely and Relevant Weather Information

Q: Would you be willing to pay for timely and reliable weather forecasts in the future?  
(n=350, women=149, men=201)



→ 56% farmers indicated they aren't willing to pay for weather forecasts even if its timely and relevant. (similar trend among DWAS and non-DWAS users)

If a reliable and timely weather service were available (daily/7-day), how much would you be willing to pay per month to support your farming decisions?

(n=63)

Average WTP amount range:

**~30 – 70 KSh/month**

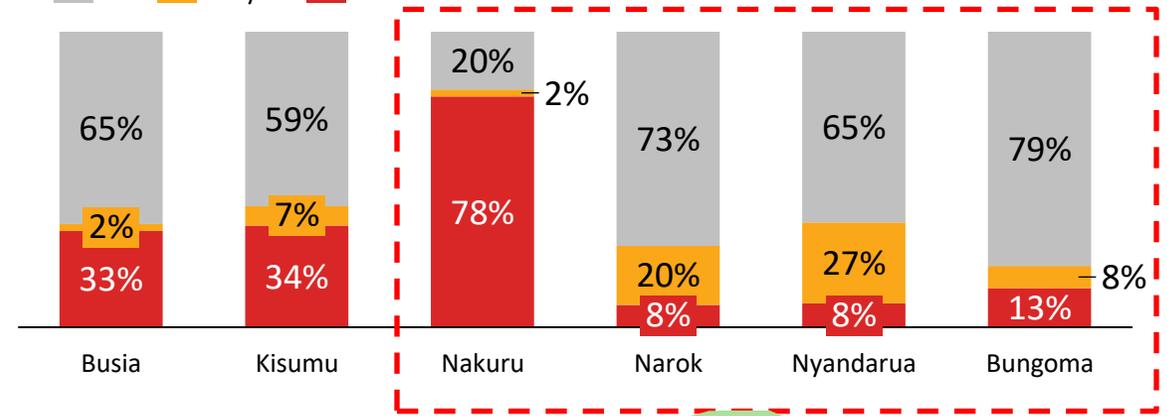
Min 10 Ksh & Max 150 Ksh

Farmers in FGDs suggested Ksh 0.5 – 1 per SMS

## WTP County Level Insight

Q: Would you be willing to pay for timely and reliable weather forecasts in the future?  
(n=350, women=149, men=201)

Legend: No (Grey), Maybe (Yellow), Yes (Red)



**Nakuru**

- ★ Nakuru has the highest WTP (78%), indicating a segment of farmers who see clear value in WI.
- ★ FGDs frequently emphasized that “timeliness helps us avoid losses” and that they would pay a small amount for information that prevents missteps in planting or spraying.

**Nyandarua**

- ★ Bungoma, Narok and Nyandarua show the lowest WTP, with **only less than 13%** willing to pay

**Narok & Bungoma**

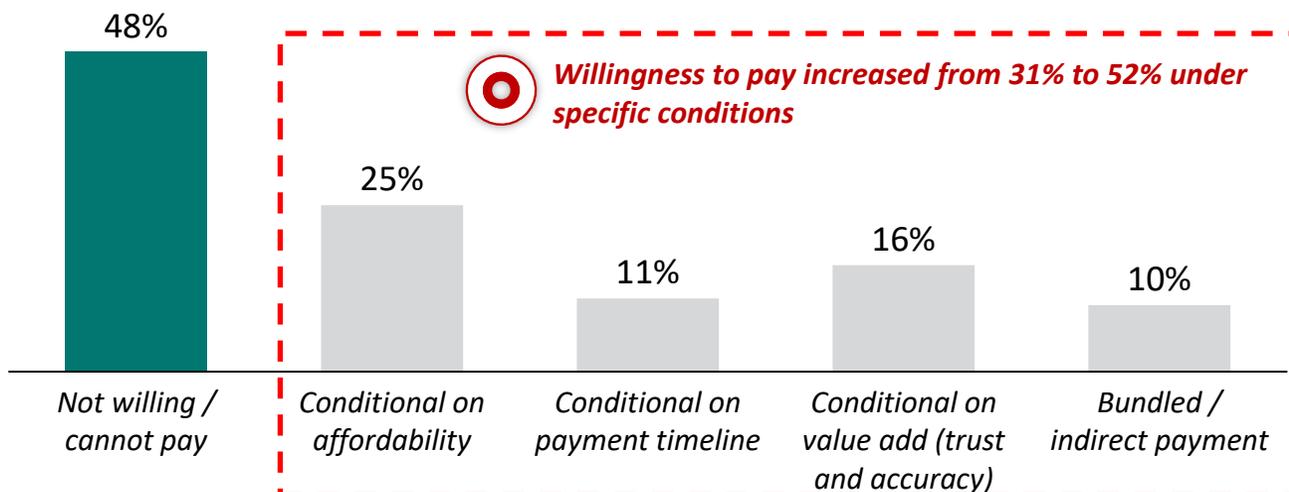
- ★ Narok FGD repeatedly noted mismatched forecasts (“rain predicted but sun came,” or vice versa), leading to low perceived value.
- ★ Nyandarua farmers rely heavily on group/extension channels and feel WI should remain public-good information, reducing WTP.

# Lowering the cost alone will not convert non-payers; farmers emphasized the need for seasonal payment options, clear tangible value, and bundled services

## Conditions That Would Increase WTP for Weather Information

Q: Under which conditions would you be more likely to pay for these services?

(n=350, women=149, men=201)



<b>Farmer phrasing</b>	"Cannot pay," "No money," "Not willing to pay"	"If cheap," "If affordable," "Depends on price"	"If payment is seasonal (3-4 months)"	"If accurate," "If reliable," "If beneficial to farming" "improved income"	Through data bundle," "Input bundles," "Annual fee with services"
<b>Key Insights</b>	Reflects low income, uncertain returns, and risk aversion.	Suggests price sensitivity rather than total refusal.	Suggests payment timeline sensitivity rather than total refusal.	Indicates that payment is tied to perceived value and credibility.	Prefers integrated or invisible cost mechanisms.

### Key Insights

- 1. Low effective willingness to pay (WTP):** Roughly two-thirds explicitly say they cannot or will not pay, underscoring that current income levels and perceived value of WI as public-good.
- 2. Price and liquidity constraints dominate:** The recurring language "cheap," "affordable," "depends on amount" reveals price sensitivity issues more than complete rejection. Seasonal or post-harvest payment options resonate: 11% choosing payment timeline.
- 3. Trust and demonstrable benefit as pre-conditions:** Several farmers said they would pay "if accurate" or "if beneficial." This reflects a credibility gap rather than a value gap: farmers need proof that forecasts tangibly reduce loss or increase yield.
- 4. Preference for embedded or subsidized models:** Mentions of paying via *data bundles*, *input packages* show latent acceptance of *indirect payment channels*, consistent with findings from FFOs (Apollo and CoAmana) who saw higher uptake when WI was bundled with insurance or inputs.

➤ Larger size landholders demonstrate a stronger WTP for WCI

“...weather information helps me more when it also tells me which crop varieties to plant and how to manage pests and diseases on our farms..” — FGD, Bungoma

# Qualitative insights complement the quantitative findings; explaining why WTP is low and identifying the behavioral anchors that shape reluctance

## The “Why” Behind Low Willingness to Pay

### Perceived Public Good Mentality (Strongly validated by KIIs with KMD)

- Across FGDs, farmers repeatedly described weather information as “a government responsibility” similar to public road alerts or health advisories.
- KMD officers across Nakuru, Busia, Bungoma, and Narok confirmed this:
  - “Farmers expect it free because it concerns everyone’s safety.” – KMD Officer Nakuru.
- This mindset severely undermines standalone monetization unless weather is linked to private-sector products or bundled services.

### Trust-Linked Payment Behavior (validated by FGDs + KII with FFOs)

- Farmers repeatedly stressed in FGDs that WTP is conditional, not absolute:
  - “We will pay only if it proves accurate every time.” – Nyandarua FGD
- Even one inaccurate forecast “resets trust,” creating a trust-performance loop where farmers judge payment value based on recent performance.
- CoAmana and Apollo KIIs note that accuracy and hyper-localization directly influence retention:
  - “When forecasts missed twice, sign-ups dropped sharply.” – Apollo representative

### Bundled Services Increase WTP Dramatically

- Apollo reported that its standalone SMS subscription model (KSh 150–200/season) had poor uptake, but when weather was bundled with insurance or input financing, adoption soared.
  - “Our farmers paid more easily when weather came with inputs they saw the link.” – Apollo representative

### Affordability Is Relative to Value, Not Cost

- Farmers across Bungoma, Busia, and Nyandarua said they can afford “small amounts” (KSh 20–50/month). This matches the quantitative average of ~KSh 124/month among who previously paid. Beyond this threshold, skepticism increases exponentially.
- FGDs show affordability is not about poverty but about believing weather can prevent real loss.

### Behavioral Anchors of Reluctance



**Risk aversion:** Fear of “paying and still losing” is universal across FGDs, especially in Narok and Kisumu.



**Social norming:** Nobody around them pays, so payment feels unnecessary.



**Short-term thinking:** Most farmers see WCI benefits as irregular or seasonal, not continuous. This reinforces preference for seasonal or event-triggered payments instead of subscriptions.

“Narok FGD: “Rain comes in seasons; I don’t need messages every month.”

# KMD's public mandate limits monetization echoed by FFOs who reported low uptake when charging farmers directly for weather information

## Institutional Perspective (KMD and FFOs)



- Recognizes the challenge of monetization given its public mandate: Officers highlighted that KMD is a public service, and its role is to provide national safety information, not to sell forecasts.
- Viable models require co-investment with private actors, cooperatives, or insurance schemes.



*"Payment isn't realistic unless linked with private value—maybe through cooperatives or insurance."  
KMD officer Nakuru*



- Shifted from direct billing due to poor uptake; bundling with input loans or insurance dramatically increased adoption.



- Does not charge; views weather insights as a value-add for mechanization scheduling, not a stand-alone paid product.



- Does not charge farmers but is exploring "freemium" models (basic SMS free, advanced market + forecast bundle at a fee).

# Theme 05 | Supply-Side Readiness and PPP

## Model Viability

The fifth thematic area focuses on the institutional landscape underpinning WCS particularly the readiness of the Kenya Meteorological Department (KMD) and farmer-facing organizations (FFOs) to produce, tailor, and disseminate reliable, localized forecasts.

It assesses capabilities across the full WCS value chain: data collection, analysis, translation, dissemination, and feedback loops.

The analysis under this theme focuses on:

- infrastructure and human resource capacity, inter-institutional coordination, use of digital tools and automation, and existing partnerships for last-mile delivery.
- systemic bottlenecks based on inputs from county-level KMD offices and private intermediaries.

This theme establishes the baseline for strengthening institutional collaboration (PPP), ensuring that Kenya's WCS ecosystem can sustain timely, accurate, and user-oriented climate information services at scale.

# KMD's technical forecasting capability is strong, but dissemination and institutional continuity are under-resourced

## Current Status of the Supply Side (KMD Perspective – Public)



Kenya's weather and climate services (WCS) supply system operates through two complementary but distinct pillars. The Kenya Meteorological Department (KMD) leads the generation of scientific data and national forecasts, while farmer-facing organizations (FFOs) such as Apollo, CoAmana, and Hello Tractor translate, tailor, and disseminate this information to farmers through commercial and digital channels.

### Institutional Mandate and Coverage

- KMD's mandate is to provide accurate and timely weather and climate information for safety of life, protection of property, and environmental conservation nationally and at county level.
- County offices operate under the national KMD system, managing production, analysis, and dissemination locally through Automatic Weather Stations (AWS).
- KMD has established county-level structures and partnerships with the county government to enhance local service delivery. The WCI cascade process is similar across counties; the key difference is the use of downscaling tools to localize KMD's national forecasts.

### Capacity & Infrastructure

- Each county typically has 1–2 staff (a forecaster with a degree in meteorology and an observer with a diploma).
- Data is collected daily through ground stations, satellites, and international models, then analyzed at the national level and cascaded to counties.
- Data type collected: temperature, rainfall, wind, humidity, radiation, sunshine, air temperature, soil temperature, evaporation and types of clouds
- Equipment and infrastructure challenges are recurrent: damaged AWS stations, poor internet connectivity, and long repair delays (up to several months).

### Dissemination Practices

- Disseminates through WhatsApp groups, SMS pilots (limited number of farmers), radio, TV, website and email bulletins.
- Channels include local radios, WhatsApp groups, agricultural officers, calls, emails, and KMD's website.
- Frequency: daily, weekly, and seasonal updates, but consistency varies due to resource gaps.
- County outreach already spans tens of thousands—from Narok's 1,800 WhatsApp users to Nakuru's 50,000 multi-channel reach, Bungoma's cascading through 3,000 trained group leaders, and Busia's ~80,000 listeners reached via local radio.

“The KMD's mandate on WCS is the provision of WI for safety of life and properties nationally and at the county level.”— KMD officer Nakuru

“At county level KMD works with local authorities and people from the ground for observations. And other stakeholders from regional and international level: IGAD, ICPAC etc.”— KMD officer Narok

“Currently, 20 climate intermediaries have been trained to act as local champions who help other farmers understand and use WI.” — KMD officer Bungoma

# KMD is technically capable but operationally constrained. Its main bottlenecks are staffing, financing, and structured dissemination systems

## Overall Supply-Side Readiness Summary (KMD)

Dimension	Findings from KIIs (KMD)	Readiness Rating
1 Forecast Production Capacity	Strong technical capability using satellites, ground stations, and global models (WRF, GFS). Forecasts generated daily, weekly, and seasonally. <i>"We collect data daily and share updates weekly and seasonally." – KMD officer Nakuru</i>	High
2 Infrastructure & Equipment	Gaps in computers, observation infrastructure, AWS coverage exists but is uneven; vandalism and delayed maintenance reduce accuracy. Frequent breakdowns and slow repair cycles due to connectivity (internet) and transport constraints. <i>"When stations are vandalized, it takes long to fix." – KMD officer Nakuru</i>	Moderate – High
3 Human Resources & Staffing	Counties typically have only 1–2 officers, limiting outreach and community engagement. Staff face dual burdens: technical forecasting plus farmer-facing roles. Heavy dependence on Nairobi HQ for analysis. <i>"We are few, and most time we can't reach all wards." – KMD officer Narok</i>	Low
4 Localization & Translation of Forecasts	Forecasts rarely downscaled to sub-county level, reducing perceived relevance. Translation into local languages happens inconsistently and often relies on agri-extension officers. <i>"We translate when working with agri officers, but not always." – KMD officer Busia</i>	Moderate–Low
5 Dissemination Systems	Limited last-mile reach; no active bulk SMS system after donor-funded pilots ended. Current channels (WhatsApp, radio, calls, meetings) are helpful but insufficient for scale. Feedback remains ad hoc and largely anecdotal. Plans to introduce a bulk SMS platform to strengthen last-mile delivery. <i>"We reach more people through WhatsApp and radio, but that's not enough. We need systems that can send directly to farmers." – KMD Officer, Nakuru</i>	Low
6 Financing & Institutional Sustainability	County-level dissemination lacks dedicated budgets and depends on external projects. No sustained funding for SMS systems or localized dissemination activities. <i>"We used to send SMSs under a funded project; now we wait for the next one." – KMD Busia</i> <i>"We have forecasts, but no funds for field outreach." – KMD officer Narok</i>	Low
7 Coordination with Counties	Collaboration happens through agriculture, water, and livestock departments but is informal and event-driven. No structured feedback loop; engagement tied to projects or crises. Information cascading to county level has limitation due to access to phones, understaffing and connectivity issues. <i>"We attend meetings when invited, not regularly." – KMD officer Busia</i>	Moderate

# Private sector partners (Apollo, CoAmana, Hello Tractor) are already filling critical last-mile gaps but operate without formal PPP frameworks

## Current Status of the Supply Side (FFO Perspective – Private)



- Farmer-facing organizations (FFOs) such as Apollo, CoAmana, and Hello Tractor play a central role in translating and relaying weather information to farmers through SMS, WhatsApp groups, booking agents, and field officers.
- They add value by tailoring forecasts into local languages, simplifying technical terms, and integrating crop-specific tips. However, their systems rely heavily on KMD or external weather data producer.

### Apollo Agriculture

- Role:** Integrates weather and climate information into farmer support packages (credit, input, and insurance).
- Sources:** Uses **KMD** and **Sprout** digital platforms for forecast data.
- Reach:** Operates across **~12+ counties** (Narok, Bungoma, Kakamega, Busia, Nandi, etc.).
- Channels:** Disseminates to farmers via SMS, radio, and group training; around 60–70% of farmers receive weekly updates.
- Key challenges:** High SMS cost, language barriers, low digital literacy among older farmers.

### CoAmana

- Role:** Operates digital and physical market hubs. Works with traders and farmers.
- Sources:** Uses weather information from Sprout, not directly from KMD.
- Reach:** Works in 6 counties, planning to expand to others. Operates an 80% coverage SMS system customized by location and language.
- Channels:** Uses SMS alerts, phone calls, field officers, and market-hub interactions.
- Key challenges:** No feedback system to track whether forecasts are used or acted upon.

### Hello Tractor

- Role:** Uses forecasts mainly for tractor scheduling and client advisories.
- Sources:** Uses weather data from Egerton University and KALRO, not yet directly from KMD.
- Reach:** 60% receive location-based and seasonal forecasts via the app.
- Channel:** Uses app notifications and booking agents to provide short-term forecasts before service delivery linking forecasts directly to action.
- Key challenges:** No direct data or partnership with KMD, limiting accuracy and tailoring.

“Bundling forecasts with other services improves adoption — farmers see value when it’s part of credit or insurance.”

“Our farmers recognize weather messages as part of business updates — that makes them pay attention.”

“Forecasts help us plan where to send tractors, but feedback from farmers is still limited.”

# FFOs possess strong last-mile delivery systems and solid digital capabilities, but sustainability is constrained by limited cost-recovery models, limited feedback mechanisms, and the absence of a formalized data-sharing relationship with KMD

## Overall Supply-Side Readiness Summary (FFOs)

Dimension	Findings from KIIs (Apollo, CoAmana, Hello Tractor)	Readiness Rating
1 Forecast Integration & Use	All FFOs actively use weather data in service delivery: Apollo (advisory & credit), CoAmana (market linkage), Hello Tractor (mechanization scheduling). <i>"Forecasts are part of how we decide when to send messages or tractors." – Hello Tractor</i>	High
2 Data Source Linkages	Apollo and CoAmana use KMD or Sprout data; Hello Tractor uses Egerton & KALRO. No direct data-sharing MoUs with KMD yet. <i>"We rely on KMD data for credibility, but we need structured sharing." – Apollo</i>	Moderate
3 Dissemination Reach	FFOs collectively reach 10,000–200,000+ farmers through SMS, radio, and apps. Messages localized and often translated. <i>"Our forecasts go to all registered farmers weekly." – CoAmana</i>	High
4 Localization & Farmer-Centric Communication	Tailor forecasts to specific crops, locations, and in vernacular language. Simplify terms ("rain expected Tuesday"). <i>"We simplify technical terms into local language." – Apollo</i>	High
5 Technology Infrastructure	Strong digital systems for SMS, app notifications, and WhatsApp groups. <i>"We use mobile apps, radio, and digital platforms." – All FFOs</i>	High
6 Financial Sustainability	Limited cost recovery; mostly donor-supported or internally cross-subsidized. Forecast services are free to farmers. <i>"SMS delivery costs are high; we can't sustain without support." – Apollo</i>	Moderate–Low
7 Capacity & Staffing	Lean but efficient digital and field teams. Field agents handle sensitization and farmer feedback. <i>"Our booking agents train farmers on using forecasts." – Hello Tractor</i>	Moderate–High
8 Feedback & Monitoring Systems	Feedback informal; tracked through group meetings or digital engagement (e.g., Apollo M&E, CoAmana call-ins). No unified feedback loop with KMD. <i>"We get feedback from field agents but not systematically." – CoAmana</i>	Moderate

# The WCS supply chain is technically capable but institutionally fragmented. Formalizing PPPs would bridge gaps in co-financing, feedback, and operational continuity

Private actors informally function as distribution hubs for KMD data, even though this role is not formally mandated; proof of concept for public private delivery models

### From KMD KIIs:

- KMD collaborates with county departments (agriculture, environment, water, livestock) and organizations like the Red Cross, but partnerships with private entities are mostly informal and project-driven.
- KMD officers in Narok and Nakuru expressed interest in formal PPP frameworks to strengthen dissemination and resource-sharing.

“Forecasts reach more people through partnerships; formal agreements would make it sustainable.” – KMD Narok

### From FFO KIIs:

- Apollo, CoAmana, and Hello Tractor all expressed willingness to collaborate formally with KMD for localized, accurate, and trusted forecasts.
- FFOs value KMD’s credibility but find data sharing ad hoc and slow.

“We rely on KMD for credibility, but we need structured data sharing and faster updates.” – Apollo Representative

“We want structured data-sharing agreements with KMD.” – CoAmana



## Joint Public Private Partnership Readiness Overview

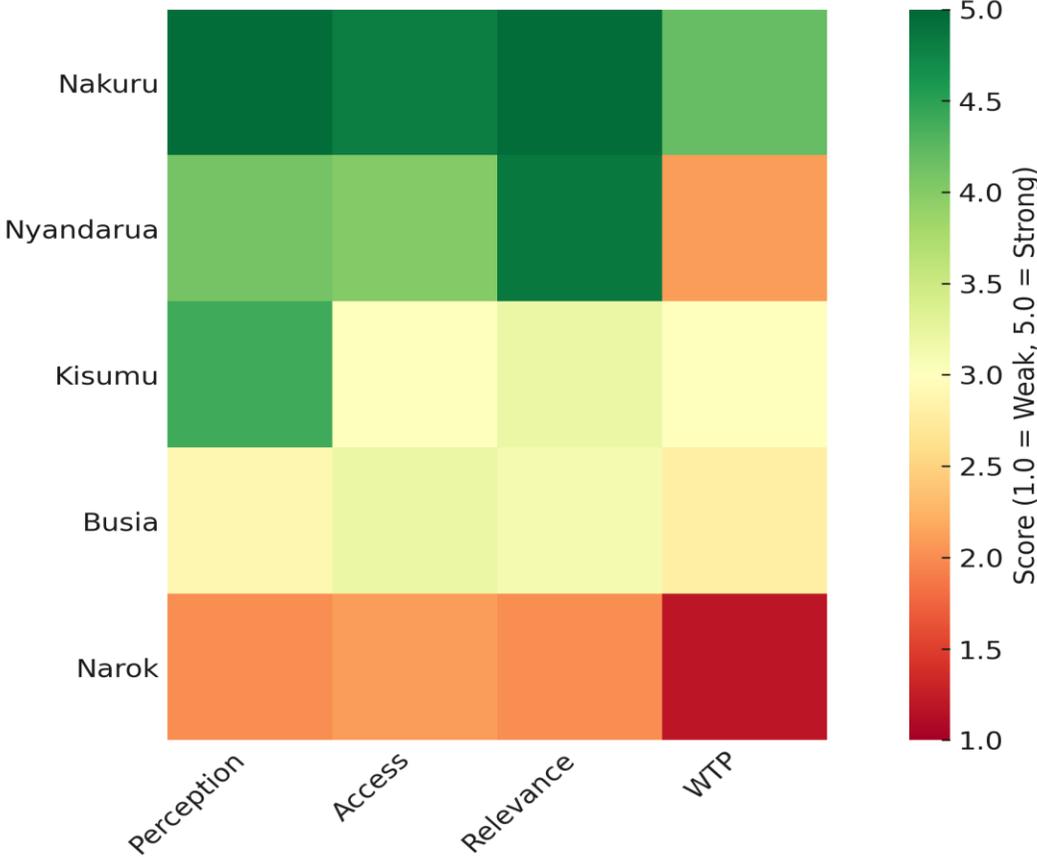
Supply Element	Public (KMD)	Private (FFOs)	Combined Outlook
<b>Technical Forecast Production</b>	Robust national system; limited localization	Depend on KMD or partner sources	Complementary; KMD supplies, FFOs tailor
<b>Infrastructure &amp; Systems</b>	Scientific stations (strong AWS coverage)	Strong digital & communication tools	High synergy potential including joint monitoring or shared accountability framework
<b>Funding Mechanisms</b>	Public, donor-dependent	Cross-subsidized, donor-backed	PPP essential for co-financing arrangements i.e., translation or dissemination
<b>Human Resources &amp; Communication Skills</b>	Strong technical, limited user engagement	Strong engagement, limited meteorology	Joint training opportunity
<b>Reach &amp; Dissemination</b>	County-level, limited outreach, frequency	Broad, digital, farmer-level	Integration can ensure scale and regularity
<b>PPP Readiness</b>	Recognizes value of FFOs but lacks formal data sharing MoUs or cost-sharing frameworks	High willingness to collaborate formally with KMD; see value in joint branding and forecast accuracy	High readiness for formal PPP pilots

*Moderate-high readiness*
*High readiness*

# Group Insight Clusters Across Thematic Areas: Gender and County Disparities

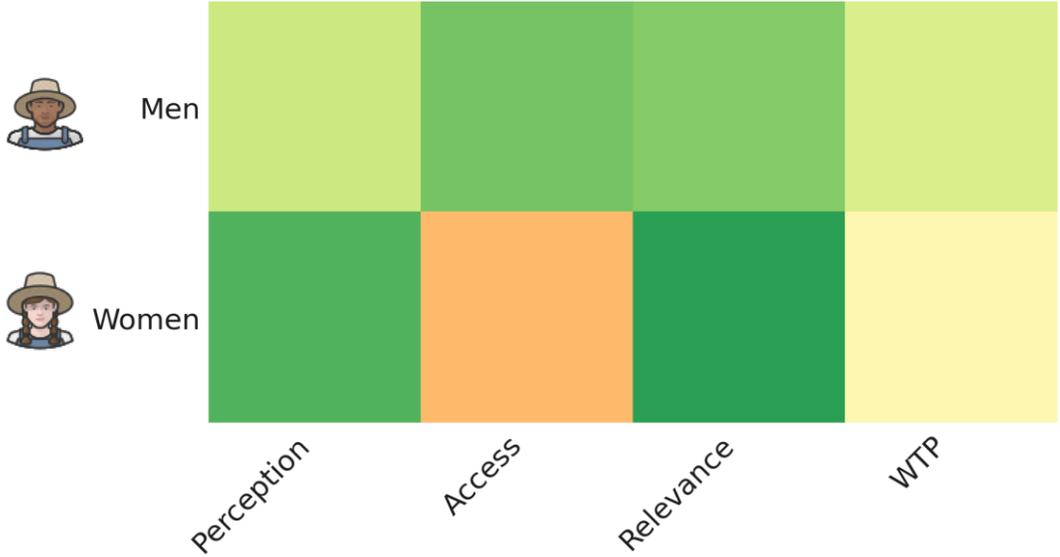
## County heatmap

→ County readiness ranges from high (Nakuru/Nyandarua) to very low (Narok) highlighting the need for county-specific engagement strategies and localized pilot execution.



## Gender heatmap

→ Women value weather information more but have limited access and lower WTP opting inclusion-first delivery.



# Agenda

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**Approach, Methodology and Deliverables**

**Key Findings, Results and Discussion**

***National and Regional Benchmarks***

**Segmentation of Farmer Profiles/Persona**



# Kenya benchmarks show high awareness and access to WCS through, yet many farmers still struggle to translate information into action, despite a willingness to pay about KSh 91 per month for agro-climate services

National-level benchmark figures for Kenya are not readily available; therefore, results from other project-based sample studies are presented below solely for comparison with this study's findings.

**Awareness of WCS in Kenya is high overall, with stronger awareness among male farmers**

**... access to WCS is realized through differentiated delivery channels aligned with farmer preferences**

**Despite high exposure, many Kenyan farmers do not fully translate WCI into action**

## Awareness for WCS



Kenya Benchmark<sup>1</sup>

**97.3%**

Kenyan farmers "know" climate information services (ICPAC's 2024 socio-economic survey)



67.8%

32.2%



Male-headed households more likely to report awareness

Key success drivers for the rapid rise in awareness is the result of:



### Localized Forecasts<sup>2</sup>

KMD downscaled forecasts for 47 counties. Includes weekly/monthly/seasonal outlooks & crop-specific agro-advisories.



### Community Media Outreach<sup>3</sup>

Climate info in local dialects. Anyole Radio (Western Kenya) is 1 of 5 KMD-supported community stations.



### Mobile & Digital Tools<sup>4</sup>

KALRO's KAOP platform (App with USSD/SMS support) provides real-time weather & agronomic advice.

## Access to WCS



Kenya Benchmark<sup>5</sup>

**82%**

Kenyan farmers have access to weather or climate info; main access point is through the radio (84%)

Kenya has multiple pilot services providing tailored forecasts via phone and web. Key delivery mechanisms include:

### RANET Radios<sup>7</sup>

KMD stations broadcasting hyper-local forecasts in regional languages.

### KAOP App<sup>9</sup>

Interactive forecasts/soil data. USSD/SMS fallback for basic phones.

### Agro-Weather SMS<sup>8</sup>

Daily & seasonal warning alerts via SMS. Rebroadcast via radio (UN-backed).

### KEEP Platform<sup>9</sup>

E-Extension Platform with toll-free voice hotline for expert Q&A.

## Usage + Willingness to Pay (WTP)

### Usage



- Survey in 2018 (across 250 households in Makeni County) showed that while most farmers in Kenya receive forecasts, **only 40%** translate them into action.
- KMD in 2020 reported **one-third** of farmers do not use government forecasts.

### WTP



- A study by *Feed the Future Innovation Lab* involving Kenyan farmers who received KALRO SMS advisories, showed that **51%** of respondents were willing to pay.
  - An average of **KSh 91 per month** for agro-weather advisories.
- WTP does not differ significantly by gender or education. Higher WTP is associated with larger landholdings, access to off-farm income, and prior exposure to SMS advisory services,

# Across contexts, WCS are widely known but unevenly understood, tactically used rather than strategically leveraged, commercially valued but at low price points, and structurally constrained by delivery ecosystems and gendered access gaps (1/2)

Cross-Country Synthesis of Weather & Climate Services (WCS)			
Pillar	Evidence Snapshot (from project-based studies)	Cross-Country Pattern	Key Insight & Learnings
<b>1. Awareness &amp; Comprehension</b>	<ul style="list-style-type: none"> <li>→ <b>Tanzania:</b> 75% reported access, but only 22% trusted accuracy <sup>(5)</sup></li> <li>→ <b>Mali:</b> 47.5% unclear how to apply CIS <sup>(2)</sup></li> <li>→ <b>Ethiopia</b> (recipient group): 73% self-reported understanding, but only 40% found services sufficient <sup>(1)</sup></li> </ul>	<ul style="list-style-type: none"> <li>▪ High exposure does not translate into trust, comprehension, or sufficiency.</li> <li>▪ Probabilistic interpretation remains a recurring bottleneck across contexts.</li> </ul>	<ul style="list-style-type: none"> <li>★ Exposure doesn't necessarily mean effective use. The primary constraint is translation into actionable insight.</li> <li>★ Trust and usability gaps undermine impact even where access levels are high.</li> <li>★ Simplification and contextual interpretation are strategic levers.</li> </ul>
	<b>2. Access</b>	<ul style="list-style-type: none"> <li>→ <b>Ethiopia</b> (multi-region): 18% of farming households accessed WCS <sup>(1)</sup></li> <li>→ <b>Mali</b> (localized rice systems): 81–85% accessed CIS <sup>(2)</sup></li> <li>→ <b>South Africa:</b> 69% accessed weather forecasts vs 24% seasonal forecasts <sup>(2)</sup></li> </ul>	<ul style="list-style-type: none"> <li>▪ Access varies dramatically by geography, ecosystem maturity, and program intensity.</li> <li>▪ Localized value-chain programs significantly outperform national-level systems.</li> <li>▪ Seasonal/climate services are consistently less accessible than short-term weather forecasts.</li> </ul>
<b>3. Channel &amp; Delivery Modality</b>	<ul style="list-style-type: none"> <li>→ <b>Ethiopia:</b> 63% preferred radio; 2% preferred SMS (linked to literacy constraints) <sup>(1)</sup></li> <li>→ <b>Mali:</b> 64% cited radio as primary channel <sup>(2)</sup></li> <li>→ <b>Benin SMS RCT:</b> 84% SMS use (June), 76% (August) <sup>(4)</sup></li> </ul>	<ul style="list-style-type: none"> <li>▪ Radio consistently dominates as the most scalable mass channel.</li> <li>▪ SMS/digital channels show high uptake only in structured interventions or higher-literacy contexts.</li> </ul>	<ul style="list-style-type: none"> <li>★ Radio is the backbone; digital is the accelerator.</li> <li>★ Mass awareness relies on traditional channels, while precision timing and behavioral nudging require digital augmentation; contingent on literacy and device access.</li> </ul>

Benchmarked Countries



# Across contexts, WCS are widely known but unevenly understood, tactically used rather than strategically leveraged, commercially valued but at low price points, and structurally constrained by delivery ecosystems and gendered access gaps (2/2)

## Cross-Country Synthesis of Weather & Climate Services (WCS)

Benchmarked Countries



Pillar	Evidence Snapshot (from project-based studies)	Cross-Country Pattern	Key Insight & Learnings
<b>4. Usage for Decision-Making</b>	<ul style="list-style-type: none"> <li>→ <b>South Africa:</b> Daily activity (31%), planting (19%), crop choice (12%), irrigation (4%)<sup>(3)</sup></li> <li>→ <b>Ethiopia:</b> Agrochemical timing (35%), planting (16%)<sup>(1)</sup></li> <li>→ <b>Benin RCT:</b> Planting (84%), fertilizer (79%), pesticide (75%) across season stages<sup>(4)</sup></li> </ul>	<ul style="list-style-type: none"> <li>WCS is predominantly used for tactical timing decisions (planting, spraying, fertilizer).</li> <li>Structural shifts (e.g., irrigation planning, crop switching) are limited.</li> <li>Usage aligns closely with crop calendars.</li> </ul>	<ul style="list-style-type: none"> <li>★ WCS mainly drives tactical rather than strategic adaptation.</li> <li>★ To unlock deeper resilience shifts (crop diversification, irrigation investments), services must be bundled with advisory, finance, or risk-sharing instruments.</li> </ul>
<b>5. Willingness to Pay (WTP)</b>	<ul style="list-style-type: none"> <li>→ <b>Zimbabwe:</b> 68% willing to pay; mean US\$1/month<sup>(6)</sup></li> <li>→ <b>Mali:</b> 60% overall (65% men; 48% women)<sup>(2)</sup></li> <li>→ <b>Ghana:</b> 50% men vs 31% women<sup>(7)</sup></li> <li>→ <b>SSA meta-analysis:</b> ~75% pooled WTP, mean US\$8/year<sup>(8)</sup></li> </ul>	<ul style="list-style-type: none"> <li>Stated WTP is moderate-to-high across contexts, but payment amounts are consistently low.</li> <li>Evidence is largely stated preference rather than observed subscription behavior.</li> </ul>	<ul style="list-style-type: none"> <li>★ WTP exists but monetization headroom is limited. Standalone subscription models face viability constraints.</li> <li>★ Commercial sustainability likely requires bundling (insurance, inputs, credit) or subsidy layering.</li> </ul>
<b>6. Gender Disparities</b>	<ul style="list-style-type: none"> <li>→ <b>Rwanda:</b> Phone ownership of 76% men vs 58.7% women<sup>(9)</sup></li> <li>→ <b>Ghana (Northern):</b> Radio access – 72% men vs 58% women<sup>(10)</sup></li> <li>→ <b>Ethiopia:</b> Estimated access ~21% male-headed vs ~10% female-headed households<sup>(1)</sup></li> </ul>	<ul style="list-style-type: none"> <li>Gender gaps are strongest in device ownership, channel access, and WTP.</li> <li>Not all studies disaggregate, but patterns are consistent where data exists.</li> </ul>	<ul style="list-style-type: none"> <li>★ Gender inequity is structural, not demand-driven. Device ownership, literacy, and asset access are binding constraints.</li> <li>★ Closing gender gaps requires infrastructure and inclusion strategies, not only awareness campaigns.</li> </ul>

Source: (1) Seneshaw, T. et al. 2023, (2) Diallo, A. & Dossou Yovo, E. R. 2024, (3) Nocezo, Y.-I. et al. 2024, (4) Yegbemey, R. N. et al. 2021, (5) N2Africa / AFD & Kukua. 2016, (6) Manzvera, J. et al. 2024, (7) Antwi Agyei, P. et al. 2021, (8) Gouroubera, M. W. et al. 2025, (9) Birachi, E. et al. 2020, (10) Baffour Ata, F. et al. 2022

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***Segmentation of Farmer Profiles/Persona***

# Using the baseline data, distinct farmer profiles were developed that reveal meaningful differences in how various groups access, comprehend, and use weather information



## What the Segmentation Captures

- Differences in awareness, access, usage patterns, and WTP
- Influence of demographics (gender, age, literacy) and livelihoods
- Behavioral and attitudinal factors shaping adoption of WCS
- Barriers and enablers affecting last-mile reach and effective application

## Why This Is Critical for the Pilot and Scale-up

- Enables targeted delivery models aligned to farmer needs
- Supports channel optimization (SMS, IVR, radio, agents)
- Helps design differentiated value propositions by segment
- Informs behavior change strategies and interpretation support
- Creates a clear baseline structure for monitoring adoption shifts over time
- Strengthens the theory of change by tying WCS investments to specific behavioural shifts across segments, not broad outreach targets

# We identified 4 farmer personas/profiles based on the baseline insights



## Early Adopters



## Conditional Adopters



## Guided Adopters



## Conventional Farmers

	Early Adopters	Conditional Adopters	Guided Adopters	Conventional Farmers
Core Profile	<ul style="list-style-type: none"> <li><b>Gender:</b> Mostly men, young-middle (25-45 yrs)</li> <li><b>Education:</b> Secondary/higher</li> <li><b>Livelihood:</b> Primarily engaged in mixed or crop-focused farming as a business. agro-entrepreneurs</li> </ul>	<ul style="list-style-type: none"> <li><b>Gender:</b> Mixed; 30-55 yrs.</li> <li><b>Education:</b> Primary/secondary.</li> <li><b>Livelihood:</b> Primarily smallholder farmers, partly reliant on casual labor, petty trade or livestock</li> </ul>	<ul style="list-style-type: none"> <li><b>Gender:</b> More women and elderly. 45-65 yrs</li> <li><b>Education:</b> Primary or none</li> <li><b>Livelihood:</b> Household-based or subsistence farmers; often engaged in small casual work or petty trade</li> </ul>	<ul style="list-style-type: none"> <li><b>Gender:</b> Mixed; elderly (&gt;55 yrs)</li> <li><b>Education:</b> Primary or none</li> <li><b>Livelihood:</b> Predominantly subsistence farmers, livestock keepers, with minimal market orientation</li> </ul>
Awareness & Access	<ul style="list-style-type: none"> <li>High awareness of WCS, trust and familiarity with multiple WCI sources (KMD and FFOs).</li> <li>Receive WCI regularly often through SMS, WhatsApp or apps.</li> </ul>	<ul style="list-style-type: none"> <li>Aware of WCS but irregular access; rely on group meetings, WhatsApp, or extension agents.</li> <li>They get forecasts through local radio, and FFOs, but delivery is often inconsistent or delayed, reducing their confidence.</li> </ul>	<ul style="list-style-type: none"> <li>Awareness moderate; receive information through radio, local meetings, or family members' phones, but access is indirect.</li> <li>Many depend on spouses/children, for messages due to literacy or phone ownership barriers.</li> </ul>	<ul style="list-style-type: none"> <li>Low awareness and trust; limited access to digital channels;</li> <li>They rely primarily on natural indicators: observing the moon, animal behavior, or wind patterns and on community elders for seasonal guidance.</li> </ul>
Usage	<ul style="list-style-type: none"> <li>Understand probability, short-term vs. seasonal forecasts, and can adjust decisions accordingly.</li> <li>Use forecasts proactively for planting schedules, spraying, labor planning, and harvest timing.</li> <li>Use WCI as a planning tool rather than emergency info and actively compare sources to verify accuracy.</li> </ul>	<ul style="list-style-type: none"> <li>See value in forecasts, especially for planting, spraying, and harvesting decisions, but application is selective.</li> <li>If a forecast conflicts with visible weather patterns or experience, tend to rely on intuition. Trust is fragile and directly tied to the timeliness and accuracy.</li> </ul>	<ul style="list-style-type: none"> <li>Understand forecasts only when simplified or contextualized ("avoid spraying today, rains coming tomorrow").</li> <li>Rarely apply independently and most use it reactively rather than proactively, mainly for household planning or avoiding loss, not long-term farm management.</li> </ul>	<ul style="list-style-type: none"> <li>Scientific forecasts are not yet integrated into decision-making. Often perceive forecasts as unreliable or irrelevant to local realities and prefer familiar cues used for decades.</li> <li>When WCI is received, it's usually through others (youth, neighbors) and rarely acted upon directly.</li> </ul>
Willingness to Pay (WTP)	<ul style="list-style-type: none"> <li>High WTP for accurate, timely, and location-specific forecasts.</li> <li>Some already subscribe to FFOs advisory offerings.</li> </ul>	<ul style="list-style-type: none"> <li>Willing to pay only if information is accurate, locally specific, and delivered consistently.</li> <li>Open to trial or bundled models that demonstrate tangible value.</li> </ul>	<ul style="list-style-type: none"> <li>Low-to-minimal WTP; generally expect information to be free or community-provided.</li> <li>Accept small contributions only if service proves reliable &amp; convenient</li> </ul>	<ul style="list-style-type: none"> <li>None or extremely low WTP.</li> <li>Many view WCI as a public good that should be provided freely by government or NGOs.</li> </ul>



# Targeted opportunities and engagement strategies by farmer segment are outlined to inform tailored delivery models and drive higher adoption for the pilot and beyond



## Early Adopters



## Conditional Adopters



## Guided Adopters



## Conventional Farmers

### Opportunities

- Strong foundation for paid models (micro-subscriptions, premium SMS/WhatsApp).
- Ideal test group for hyper-local forecasts, pest/disease alerts, and advanced advisory bundles.
- Can serve as “WCS champions” to influence other segments.

- Largest “conversion” segment open to WCS but trust depends on delivery consistency.
- High potential for bundle-based offerings (inputs, credit, mechanization).
- Ready to shift if value is demonstrated through timely, localized information.

- Benefit significantly from simplified, voice-based, and group-based communication.
- High potential for adoption through intermediaries.
- Key segment for reducing gender and literacy gaps.

- Major opportunity to expand reach by building foundational awareness.
- Respond well to demonstrations, visual tools, and trusted community figures.
- Basis for long-term adoption through integration of traditional knowledge.

### Recommended Engagement Strategy

- Offer premium or subscription-based packages with reliable weekly updates, hyper-local accuracy.
- Include advanced decision-support value add features (i.e., pest alerts, rainfall probability charts).
- Co-develop feedback loops where these farmers validate and rate forecast accuracy to strengthen system trust and co-creation.

- Introduce “try-before-you-pay” or freemium models to build trust and demonstrate reliability.
- Ensure predictable delivery timing to establish habit through SMS, WhatsApp & group messaging.
- Use trusted intermediaries (agro-dealers, cooperatives, and FFO agents) to reinforce credibility and provide follow-up interpretation.
- Use bundled products (inputs, mechanization, credit) to increase perceived value.

- Prioritize short IVR in local languages, community radio segments, and group dissemination through VSLA and women’s groups.
- Provide simplified “do this today/tomorrow” advisories aligned with farm tasks.
- Leverage trusted intermediaries to bridge literacy and device gaps.

- Focus on awareness and trust-building, using community demonstration plots.
- Integrate traditional knowledge with scientific forecasts in messaging to enhance credibility and gradual acceptance.
- Leverage local radio programs, church or mosque announcements, and farmer field days for exposure.
- Position progressive farmers as “WI ambassadors” to bridge the generational gap in understanding.



Compiled by Bereket Asrat | Program Consultant

# Annex I: List of Indicators

Thematic Area	Key Focus Areas	Baseline Indicators (disaggregated by country, gender, age)
Awareness & Perception	Level of awareness of WCS; perceptions of trust, credibility, and usefulness; misconceptions or gaps in understanding.	<ul style="list-style-type: none"> <li>▪ % of farmers who are aware of at least one source of weather and climate information</li> <li>▪ % of farmers who trust the WCS information they receive</li> <li>▪ % of farmers who perceive WCS as useful for agricultural decision-making</li> <li>▪ % of farmers holding misconceptions about forecast interpretation</li> </ul>
Access & Usage	Physical and digital access, frequency and patterns of use, and inclusivity across gender, age, and marginalized groups.	<ul style="list-style-type: none"> <li>▪ % of farmers who report receiving tailored weather forecasts at least once a week</li> <li>▪ % of farmers accessing WCS through digital channels (i.e., SMS, app, IVR)</li> <li>▪ % of farmers reporting dissemination channels as convenient and accessible</li> <li>▪ % of farmers reporting dissemination language is understandable</li> <li>▪ % of farmers demonstrating accurate interpretation of at least two key forecast terms (i.e., probability, advisory)</li> </ul>
Relevance & Value	Perceived alignment of WCS with farmers' decision-making needs; preferred service types (e.g., early warnings, forecasts); observed benefits.	<ul style="list-style-type: none"> <li>▪ % of farmers who report WCS information is timely and aligned with their farming needs</li> <li>▪ % of farmers who identify the 7-day weather forecast as most helpful</li> <li>▪ % of farmers who identify seasonal forecasts as most helpful</li> <li>▪ % of farmers who report on changing farming practices based on received forecasts</li> <li>▪ % of farmers who report positive outcomes (i.e., yield protection, input optimization) linked to WCS use</li> </ul>
Affordability & Willingness to Pay	Willingness and ability to pay; perceived return on investment for FFOs; current cost structures for accessing services.	<ul style="list-style-type: none"> <li>▪ % of farmers who report WCS services are currently affordable</li> <li>▪ % of farmers willing to pay for WCS under specific pricing scenarios (i.e., per season, bundled with input/service)</li> <li>▪ Average amount farmers are willing to pay for timely weather information (i.e., monthly, seasonal)</li> <li>▪ % of FFOs willing to invest in climate services for their clients</li> <li>▪ % of FFOs who perceive WCS as offering high return on investment</li> </ul>
Supply & Business Model Viability	Capacity and constraints of providers; effectiveness of partnerships; sustainability and scalability of delivery models.	<ul style="list-style-type: none"> <li>▪ Number of farmers reached with WCS per FFO</li> <li>▪ % of FFOs reporting the ability to interpret and disseminate WCS data accurately</li> <li>▪ % of partners who have participated in a PPP or PPE model for WCS delivery</li> <li>▪ % of partners who report PPPs have improved quality, reach, or timeliness of WCS</li> <li>▪ % of partners who believe existing WCS models are financially and operationally sustainable</li> </ul>

## Annex II: Shortlisted Counties

→ Potential focus counties were selected based on their relative vulnerability to climate change, relevance of the pilot intervention (7-day hyper-local weather forecast) in the counties, and FFO presence.

High Risk	Medium Risk	Low Risk
<p><b>Northern Kenya (Hello Tractor)</b></p> <ul style="list-style-type: none"> <li>Very high vulnerability to climate. Among the most drought-prone areas in Kenya, with repeated droughts (6 droughts in 10 years) and minimal preparedness</li> <li>Major risks: Drought, erratic rainfall</li> </ul>	<p><b>Narok (Apollo Agriculture)</b></p> <ul style="list-style-type: none"> <li>Moderate vulnerability. Located on the semi-arid Mau escarpment; experiences drought cycles typical of western Kenya</li> <li>Drought</li> </ul>	<p><b>Uasin Gishu (Agribora)</b></p> <ul style="list-style-type: none"> <li>Lower vulnerability. Semi-humid highlands with fewer extreme climate events; better infrastructure and fewer disasters</li> </ul>
<p><b>Busia (Apollo Agriculture, Hello Tractor)</b></p> <ul style="list-style-type: none"> <li>Very high vulnerability to climate. Among the most drought-prone areas in Kenya, with repeated droughts (6 droughts in 10 years) and minimal preparedness</li> <li>Frequent flooding</li> </ul>	<p><b>Bungoma (Apollo Agriculture, Agribora)</b></p> <ul style="list-style-type: none"> <li>Moderate vulnerability. Western region with heavy rains; however, recurring floods and land degradation are concerns</li> <li>Heavy rains, erosion</li> </ul>	<p><b>Nakuru (Apollo Agriculture, Hello Tractor)</b></p> <ul style="list-style-type: none"> <li>Lower-medium vulnerability. Rift Valley face flash floods (e.g., Mai Mahiu landslide) tied to El Niño, but relatively less frequent, with better adaptive infrastructure</li> <li>Flash floods, landslides</li> </ul>
<p><b>Kisumu (Hello Tractor)</b></p> <ul style="list-style-type: none"> <li>High flood exposure. River Nyando floods regularly, and heavy rainfall from Lake Victoria contributes to flood frequency</li> <li>Flooding, lake-influenced microclimates</li> </ul>	<p><b>Kakamega (Apollo Agriculture)</b></p> <ul style="list-style-type: none"> <li>Moderate vulnerability. Rainforests and high rainfall year-round; flood risk in concentrated areas</li> <li>High rainfall, occasional storms</li> </ul>	<p><b>Nyandarua (CoAmana, Apollo Agriculture)</b></p> <ul style="list-style-type: none"> <li>Lowest vulnerability. High, fertile highlands; substantial tree cover and water security, though still within a country with high exposure overall.</li> <li>Frost</li> </ul>