CRIFS

Center for Risk and Inclusion in Food Systems

Small-Scale Risk Profiles:
Findings on Weather Information and Risk Perceptions from Nigeria & Maharashtra

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Research | Consulting | Training

Outline

1. Background
   - Risk Perceptions and Motivation
   - New fieldwork methodology

2. Key Findings: Weather Information and advisory
   - Medium and Messenger
   - Message
   - Use

3. Key Findings: Components of Risk Perceptions
   - Attitudes
   - Exposure and Vulnerability
   - Future Aspirations and Climate Expectations

4. Implications

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Background: RISK

- DEFINITION: The IPCC defines risk as "**the potential for adverse consequences for human or ecological systems**". In food systems, risks emerge from the interaction of climatic, economic, and institutional hazards with differential exposure and vulnerability across actors.

- SOURCE OF RISK: Risk stems from **uncertainty and variability**; information, products and practices can help to manage risk

- RISK ATTITUDES: are based on one's **innate tolerance** for risk in some domain (e.g. physical or financial)

- RISK PERCEPTIONS: are the probability one attaches to a hazard occurring based on its **qualitative dimensions** such as dread, familiarity, control, reversibility, and conditioned by underlying risk attitudes. Risk perceptions drive behavior.

- ACTUARIAL RISK: is **statistically or otherwise measured or modelled risk**, and it regularly diverges from risk perceptions (e.g. the fear of flying v. driving)

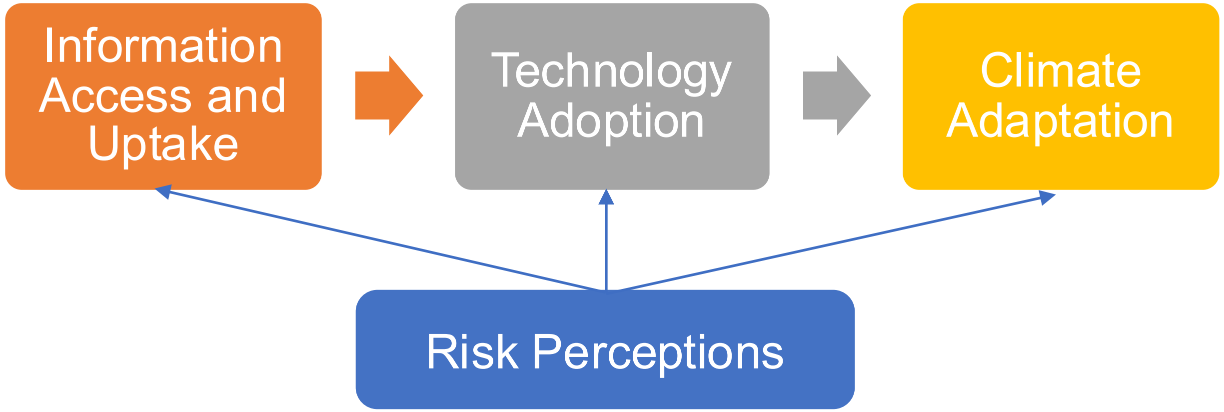
- SSP RISK PROFILES: are agricultural and economic "**snapshots**" of farmers wrapped in risk assessments and perceptions

Why are Risk Perceptions Important for Weather Information?

While there has been a steady supply of innovative agricultural technologies, in many cases, *the rate of sustained uptake has remained stubbornly low*. While provision and delivery are necessary conditions for use, they are not sufficient; only end-line adopters can fully translate innovation into impact. And the urgency is increasing.

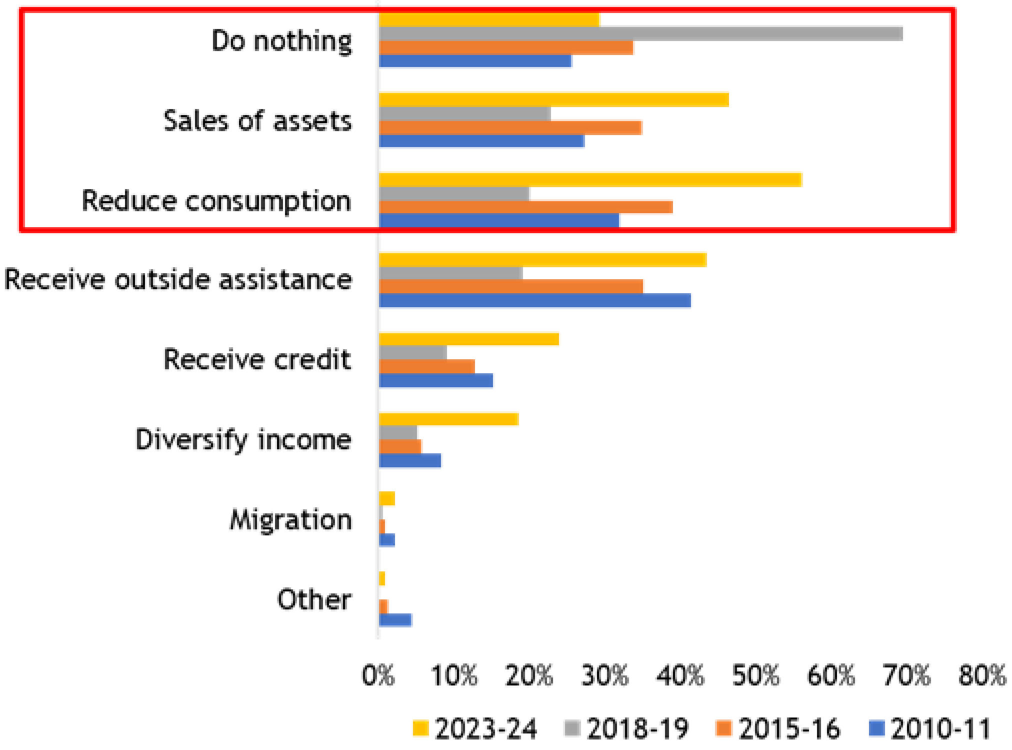
Since risk stems from uncertainty and variability, access to information can help reduce and manage risk.

CRIFS' hypothesis is that we are missing key elements of end-user decision-making: namely SSP <u>risk perceptions</u> facing market, climate and product uncertainty.



"The climate alarm is blaring from every direction," said UN Climate Change Executive Secretary Simon Stiell". APP July, 2026

Percentage of households affected by climate shocks reporting the use of different coping strategies, including doing nothing



Notes: Nigeria LSMS-ISA/GHS Waves 2010 and 2015-2023. From 2010-2018, the data captures shocks in the preceding 5 years and in 2023 in the preceding 3 years.

Background: Methods Nigeria Risk Profiles

We used a mixed-methods approach, combining data from:

- Satellite weather and land use data (CHIRPS, CHIRTS, GAEZ)
- Nationally representative household and farming surveys (LSMS-ISA GHS, NLPS), and government statistics and reports (NAERLS, NACS)
- Phone survey of 696 farming households drawn from a nationally representative sample (LSMS-ISA GHS Wave 4)
- Focus group discussions, farm visits, and agro-dealer interviews in 5 villages across Nigeria's three main AEZs

Figure 1: Agro-ecological zones (AEZs) and FGD enumeration areas (EAs)

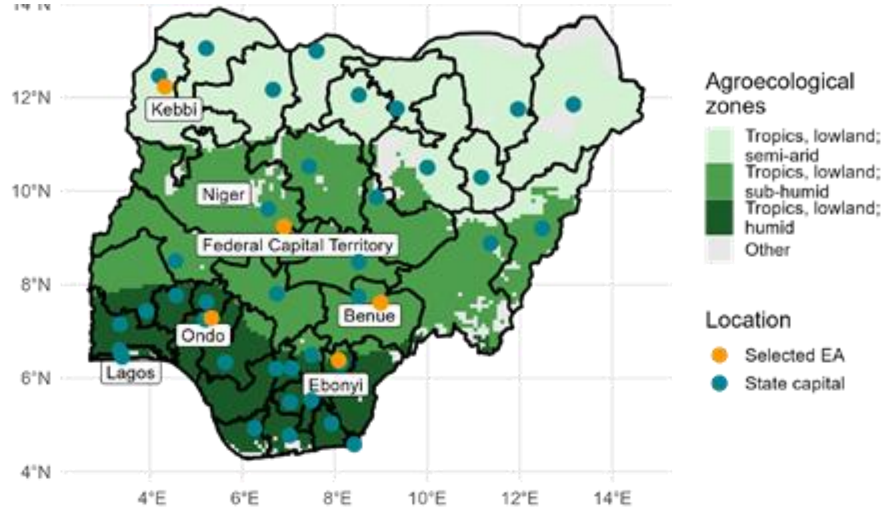


Figure 2: Location of Phone Survey households

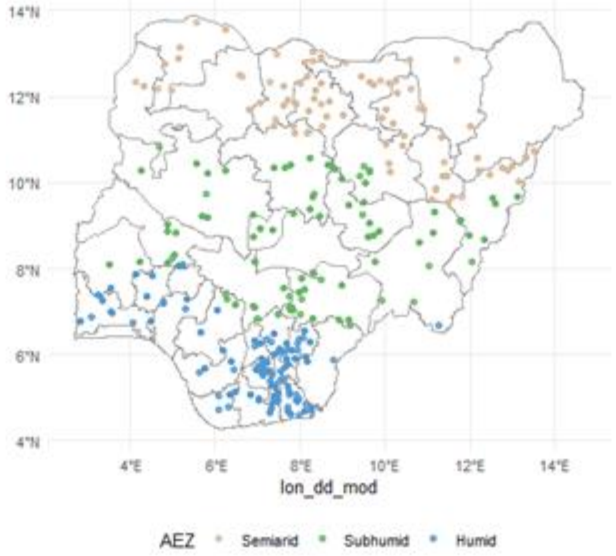


Figure 3: Fieldwork team and some participants in Niger state (March 2025)

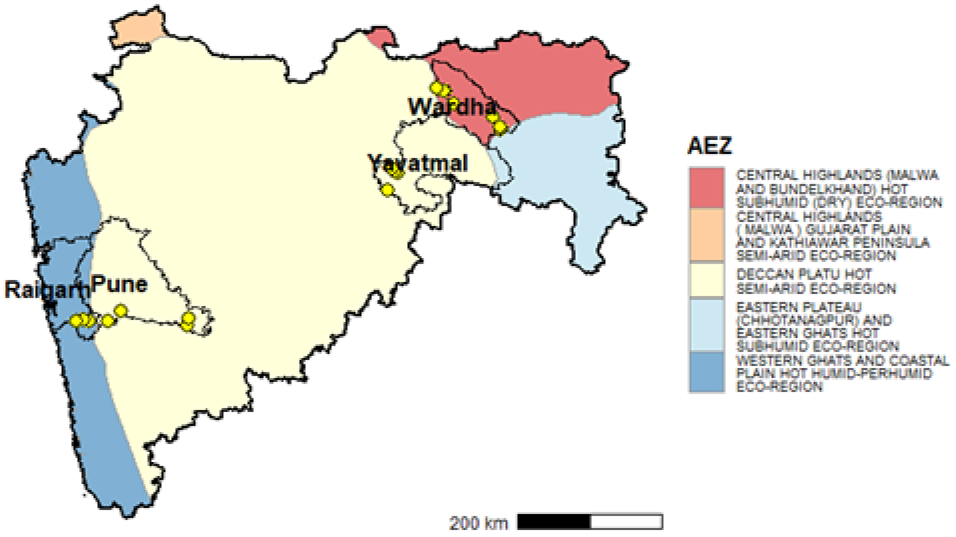
Background: Methods India (Maharashtra) Risk Profiles

Without a recent NSSO agricultural survey it was necessary to conduct our own survey (methods differences from NGA in orange). We used the opportunity to collect sex-disaggregated data:

- Desk analysis of secondary climate data from satellite imagery (CHIRPS, CHIRTS)
- Survey of 2034 farming households from three AEZs of Maharashtra state, spanning 20 villages in four districts.
- Women’s survey on climate shocks and risk perceptions (n= 800).
- Community infrastructure survey (n=20).
- Agro-dealer surveys in each sampled district (n=9).

Figure 1: Fieldwork team in Yavatmal district (May 2026)

Figure 2: Agro-ecological zones (AEZs) and visited districts



Kenya: Fieldwork planned in 2027

Why Maharashtra?

Ploughed fields in Yavatmal district in eastern Maharashtra (Fieldwork: May 2026)

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- Maharashtra has an estimated population of 126.4 million and represents 9.1 per cent of India's total population. It is the 3rd largest state by land area (over 300,000 sq. km).

- Among 29 Indian states, Maharashtra ranks #3 in climate vulnerability.

- Over 23 million households qualify as poor families in the state who receive free or very cheap ration under the national public distribution system. These families constitute 96% of our sample.

Source: [Technical Group on Population Projections, National Commission on Population, Ministry of Health and Family Welfare, Government of India](); [Council on Energy, Environment and Water]()

Figure 2: Location of Maharashtra in India

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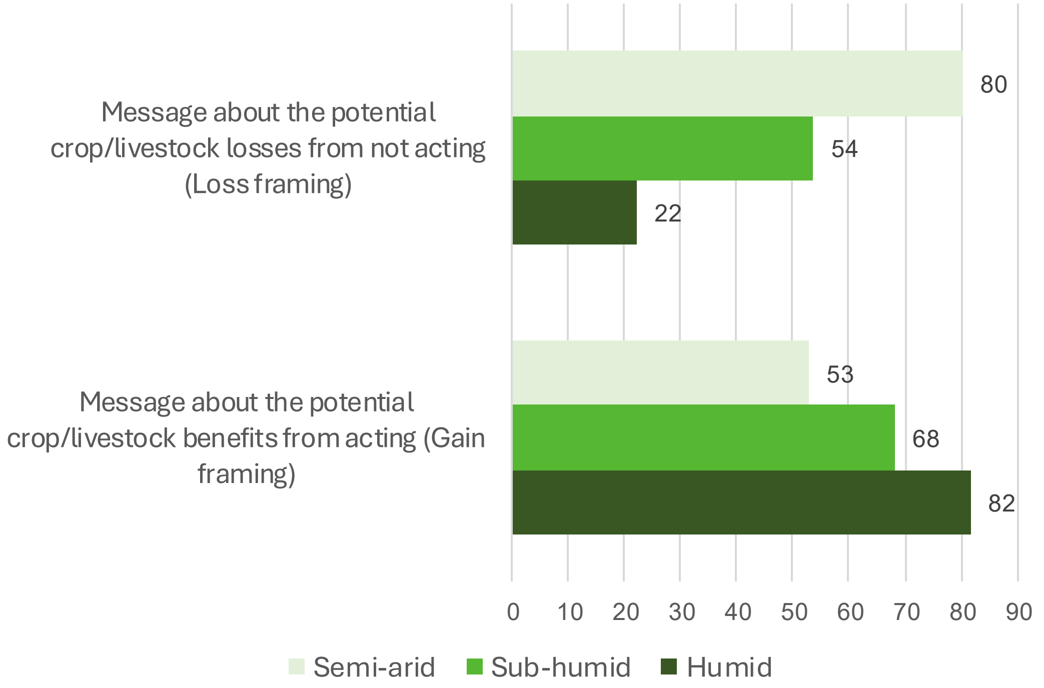
NGA: The most trusted providers of weather information are Mass Media, Farmer Groups, and Digital Platforms

Top trusted channels of weather information

Source	National	Semi-arid	Sub-humid	Humid
Radio or television program	**54%**	49%	52%	59%
Farmers' group / association / co-op	30%	42%	31%	17%
Government extension service	29%	41%	30%	16%
National Weather Service (NiMet)	17%	16%	13%	23%
Other peer farmers	14%	24%	11%	8%
Farmer field school / lead farmer	10%	19%	9%	3%
NGOs	12%	20%	12%	3%

Source: CRIFS Phone Survey, March 2025: "Which of the following providers of weather information do you trust?" (% selecting; n=695, multi-select).

Message framing most likely to influence SSPs



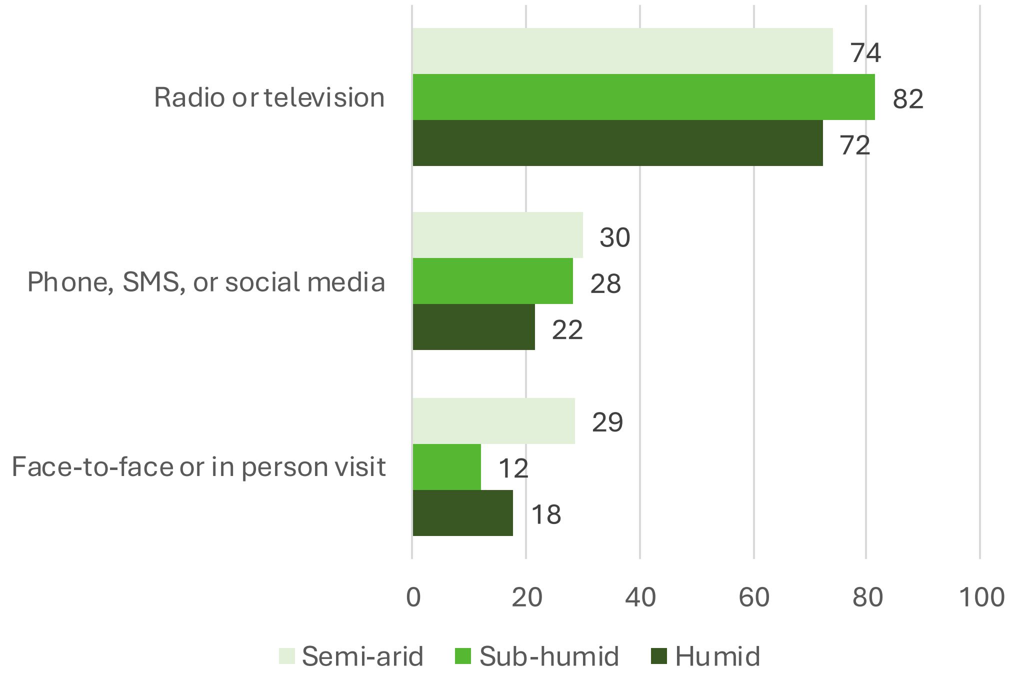
Source: CRIFS Phone Survey, March 2025: "Which of the following messages is more likely to influence you to act?" (% selecting; n=694 (223/242/229)).

52% of those who received weather info did not act; relevance, options, and timing are the binding issues

> *"I mostly get weather information from the radio. The forecast for high temperatures this year happened as predicted. I also got information that the rains will start in March, but it did not happen."*
> **— Farmer, Benue state**

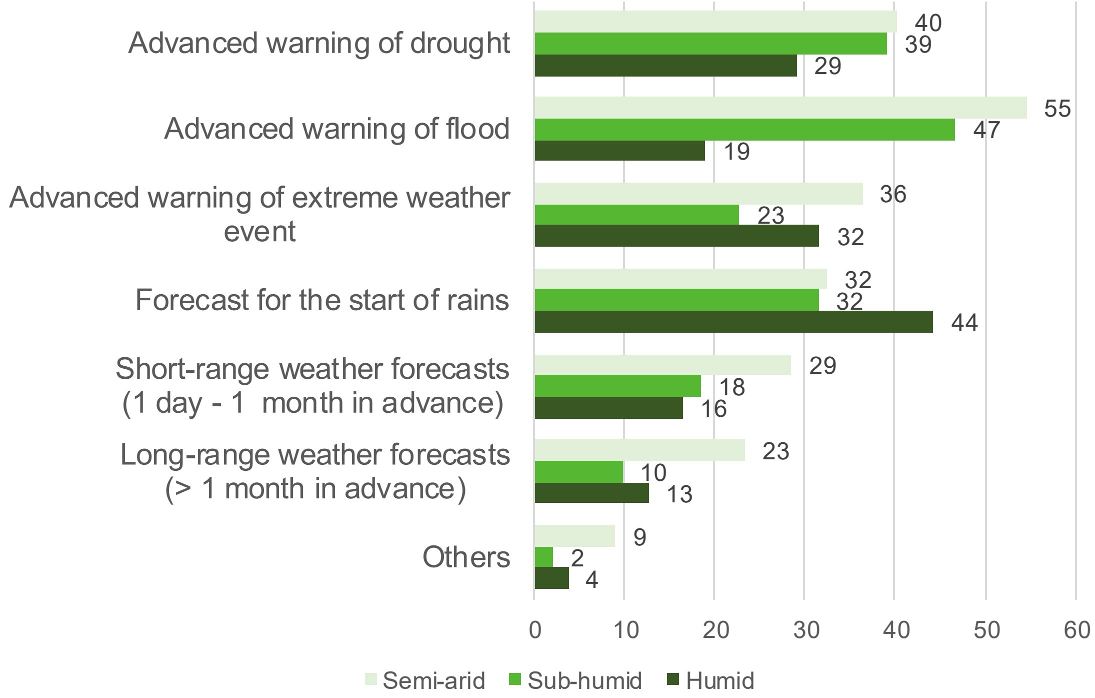
NGA: Information is still mostly received from traditional sources, and mostly for advanced warning of flood.

Medium of Weather Information Received



Source: CRIFS Phone Survey, March 2025: "Where did you receive weather/extreme weather event risk information??" (% selecting; n=248 (77/92/79)).

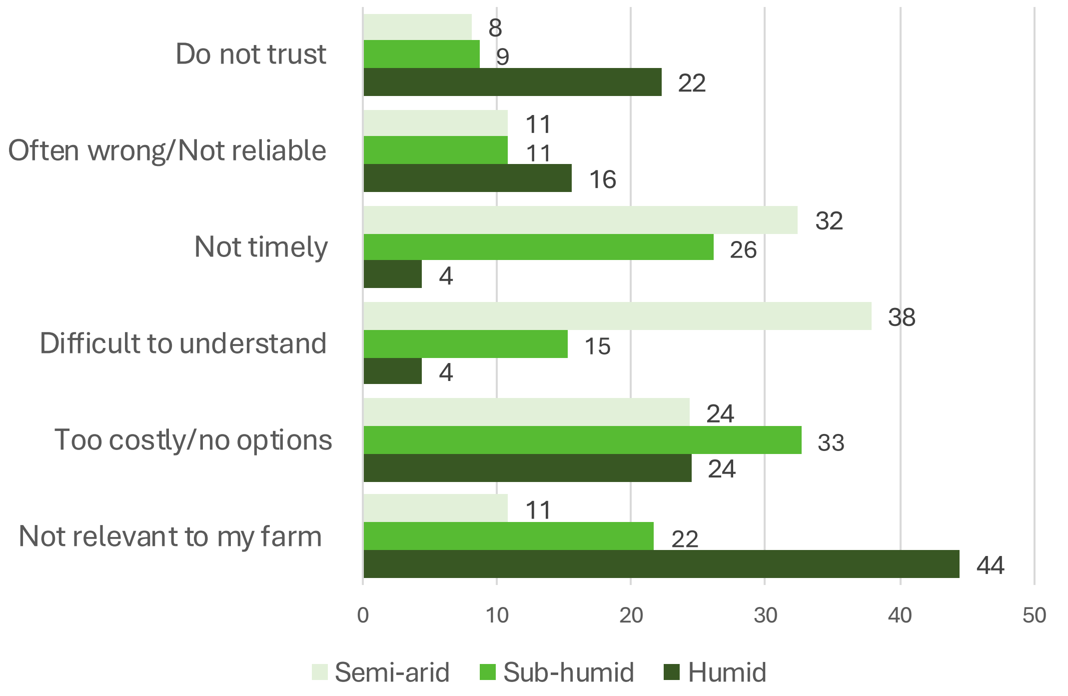
Type of Weather Information Received



Source: CRIFS Phone Survey, March 2025: "What types of weather/extreme weather event risk information did you receive?" (% selecting; n=248).

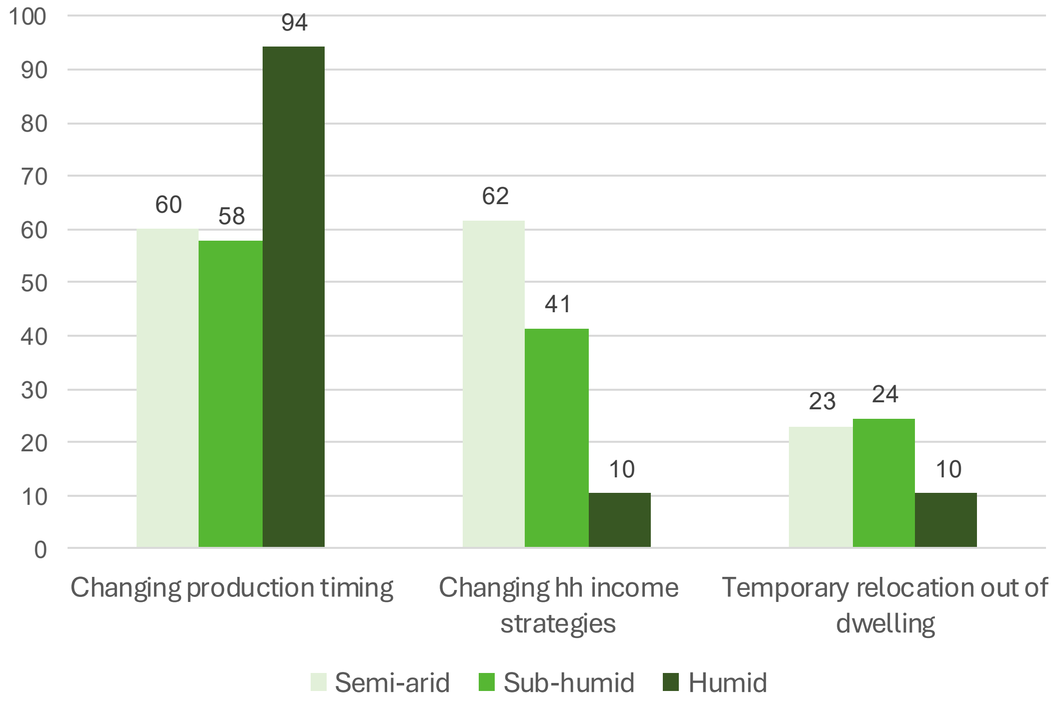
NGA: Information is mostly used for changes in production timing

Reasons for not using Weather Information



Source: CRIFS Phone Survey, March 2025: "Why didn't your household make use of the information on weather/extreme weather event risk?" (% selecting; n=128, multi-select).

Use of Weather Information Received



Source: CRIFS Phone Survey, March 2025: "How was the weather/extreme weather event risk information used?" (% selecting; n=120).

NGA: SSPs are most influenced by the Government, Farmer Groups, and National Weather Service

Channels most likely to influence SSPs to act by AEZ

Source	National	Semi-arid	Sub-humid	Humid
Government extension	**34%**	33%	50%	15%
Private extension	2%	5%	0%	0%
Farmers group/Co-op	**28%**	43%	17%	26%
Farmer Field School (FFS) or lead farmer	3%	5%	2%	0%
Other peer farmer	2%	0%	0%	6%
Trader or private company	3%	3%	4%	0%
National weather service	**27%**	10%	26%	47%
Other	3%	3%	0%	6%

Source: CRIFS Phone Survey, March 2025: "Whose information was most important in influencing you to act?" (% selecting; n=120, multi-select).

- Government extension service, farmer groups/cooperatives, and the National Weather Service were the providers of weather information most likely to influence farmers to act.
- Private extension, farmer field school, other peer farmers, and trader/private companies were the least likely to influence farmers to act.
- Almost half of farmers in the humid AEZ reported the National Weather Service was most important in influencing them to act on weather risk information.

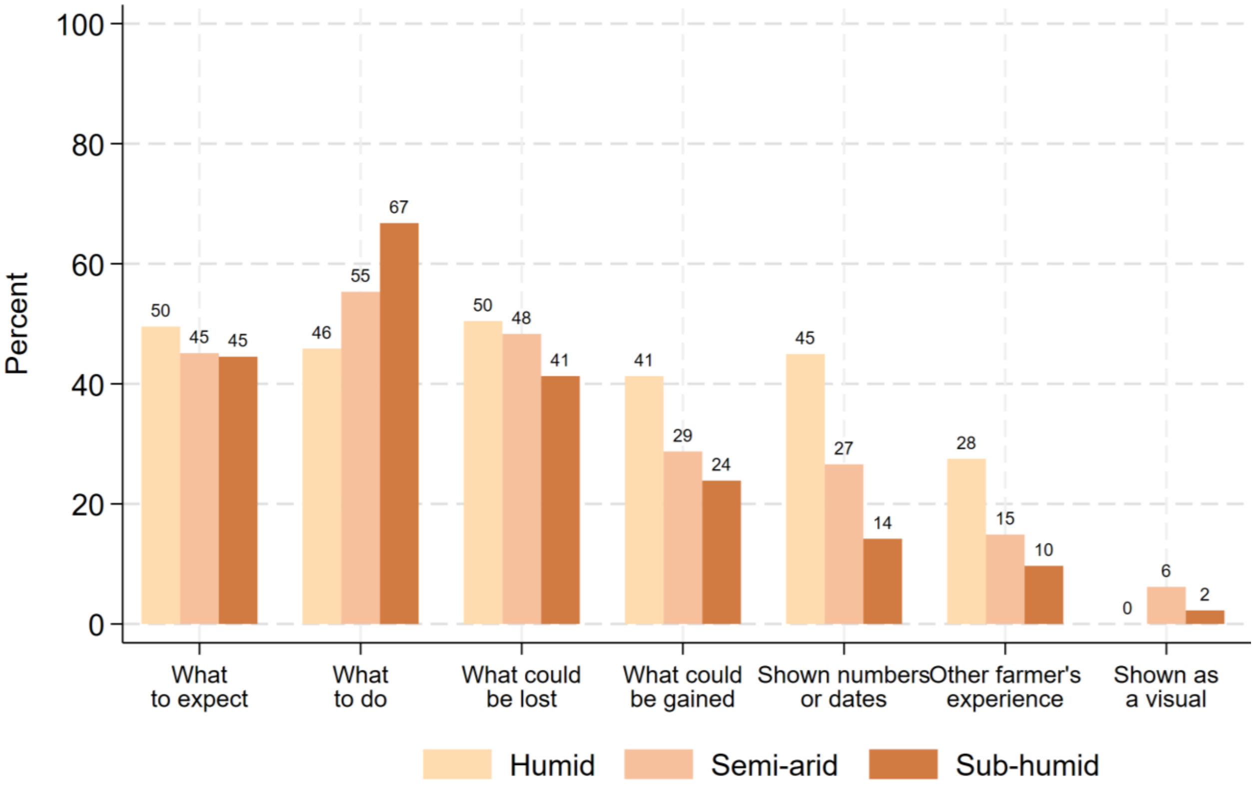
MAH: The most trusted providers of weather information are Mass Media, Government, and Digital Platforms and Loss framing slightly more prevalent than Gain framing messages

Top trusted channels of weather information

State	State	Humid	Semi-arid	Sub-humid
Radio/ TV/Newspaper	**41%**	61%	39%	33%
Govt. Extension / KVK	37%	24%	39%	42.5%
WhatsApp / YouTube / Google	29%	19.5%	29%	35%
Farmers' group / association / co-op	17%	15%	18%	18%
National Weather Service	13%	10%	11.5%	16%
Farmer call center	8%	2.5%	7%	12%
Input dealer / trader	5%	5%	7%	3%
Other	2%	2.5%	1.5%	1%
GO	2%	2%	1%	2%

Source: CRIFS India Household Survey. "Which of the following providers of weather information do you trust the most?" (% selecting; n=2034, multi-select).

Types of framing of weather information



Source: CRIFS India Household Survey, May 2026. "Thinking about the most important weather information you received, how was it presented to you?" *(n = 2,034, multi-select)*

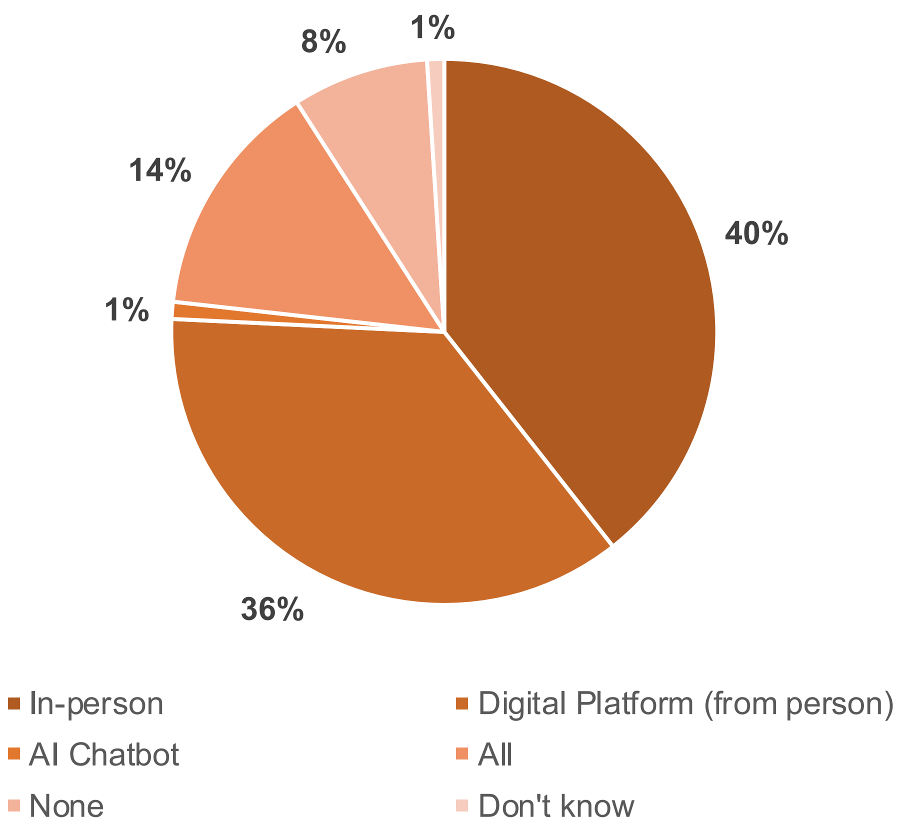
52% of those who received weather info did not act; relevance, options, and timing are the binding issues

MAH: Most farmers trust advice from a person, and almost all do not know or trust AI

- 36% of farmers trust advice from a person through a digital platform, as compared to 1% trusting an AI chatbot.
- 14% of farmers are open to advisory through any platform.
- These patterns remain consistent across AEZs with no significant differences.

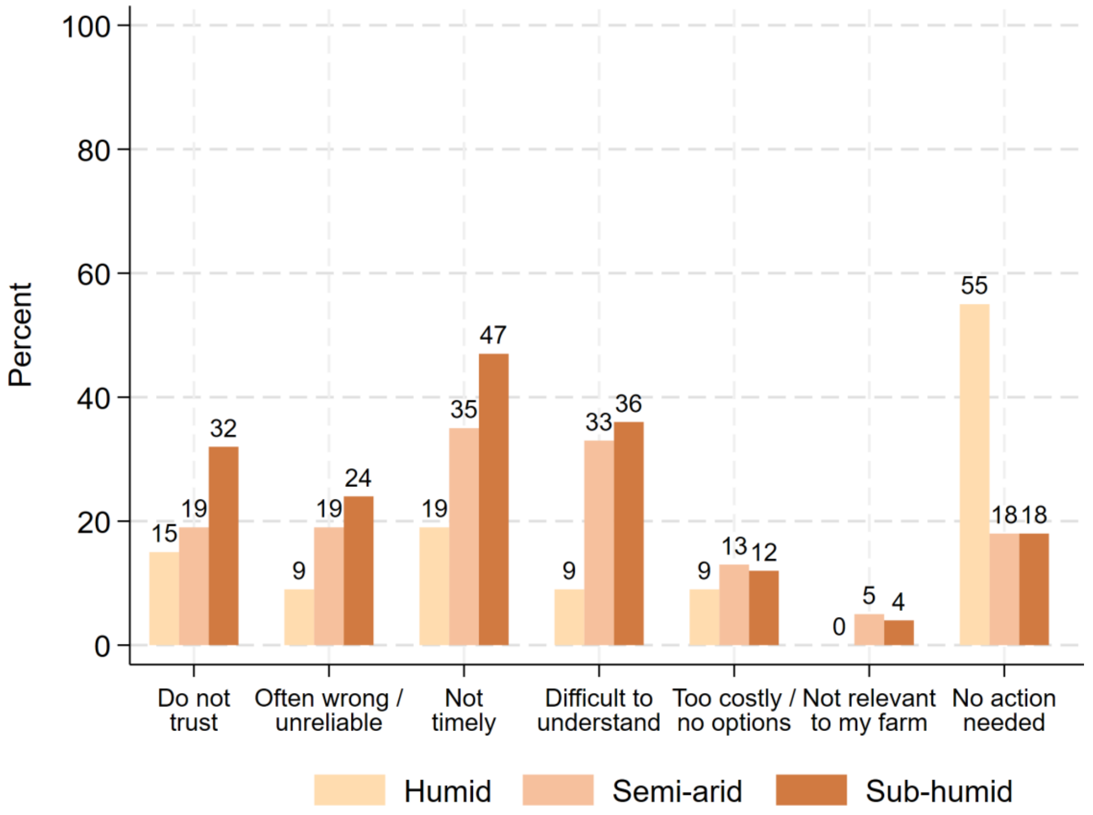
- 52% of those who received weather info did not act
- Timing (31.6%), difficulty in understanding (26%) and trust (22%) are the binding issues overall, but there is variation by AEZ
- Almost half the sample in sub-humid reports timeliness, whereas over half the sample in humid reports no action was needed

Trusted sources of agricultural advisory



Source: CRIFS India Household Survey, May 2026. "Which type of agricultural advisory do you trust most?" (n = 2,034, single-select)

Reasons for not using weather information



Source: CRIFS India Household Survey. Why didn't your household make use of the information on weather/extreme weather event risk?" (% selecting; n=465, multi-select).

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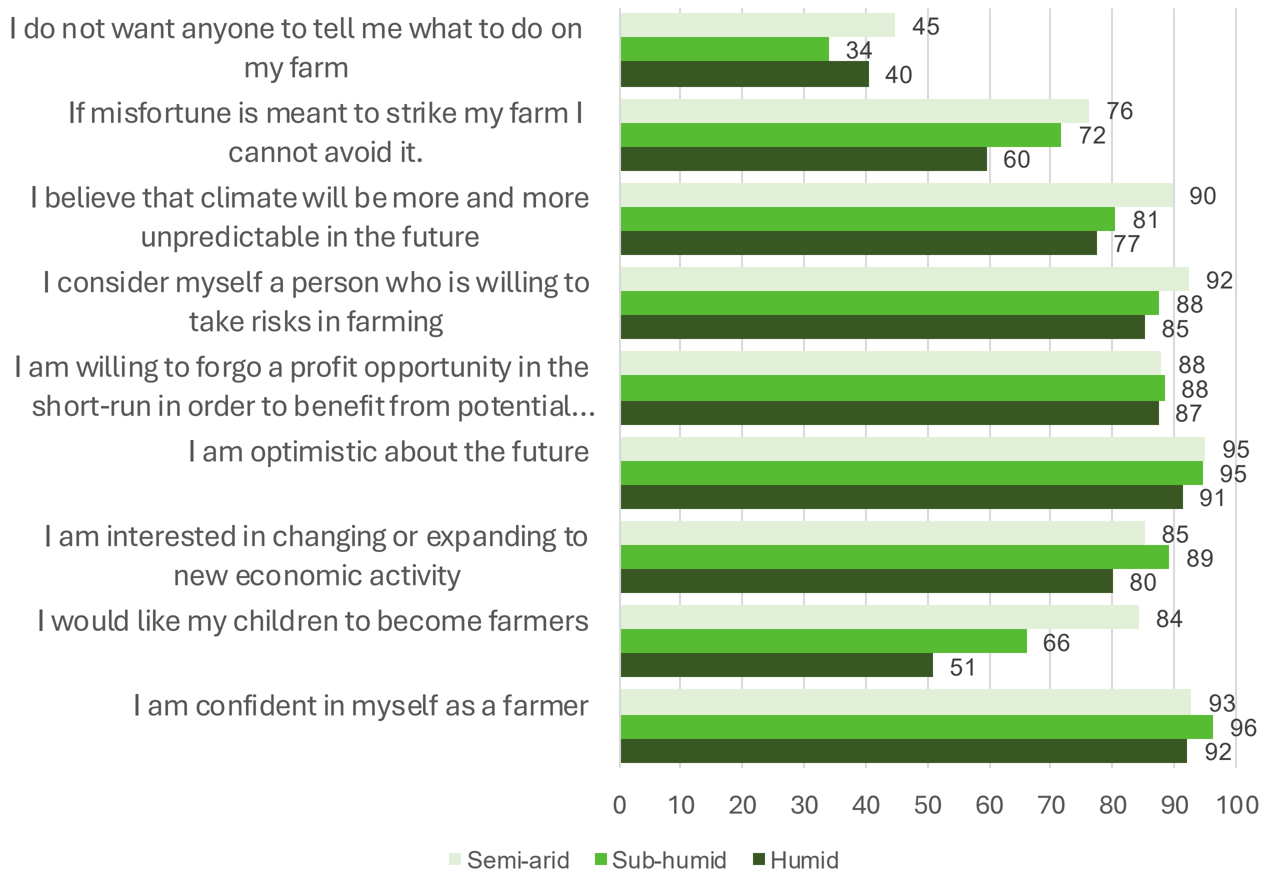
NGA: SSP Attitudes vary by AEZ

Percent that agree or strongly agree with statement, by AEZ



Source: CRIFS Phone Survey, March 2025: "Please indicate your level of agreement with [STATEMENT]?" (% selecting; n=694).

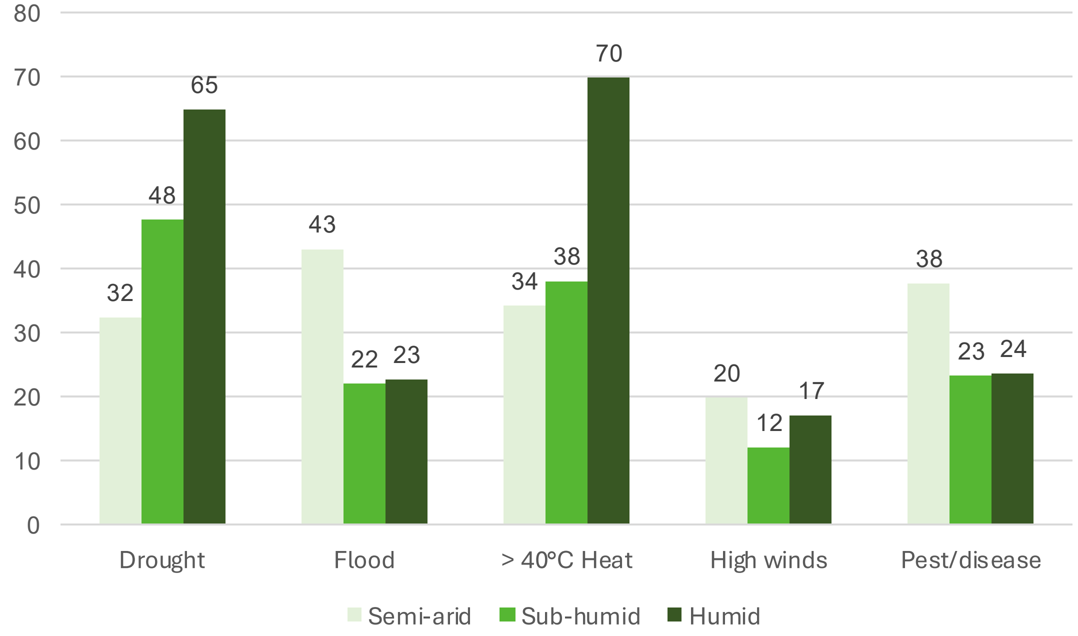
- Fatalism (If misfortune is meant to strike my farm, there is nothing I can do about it) is highest in the semi-arid (76%), where measured exposure and expectations of future variability is also highest, and where the desire for autonomy ("do not want anyone to tell me what to do on my farm") and for one's children to be farmers is also strongest.

- The combination may dampen incentives to invest in adaptive technology even where exposure is greatest.

Positive future orientation co-exists with a worldview that limits perceived personal agency over misfortune

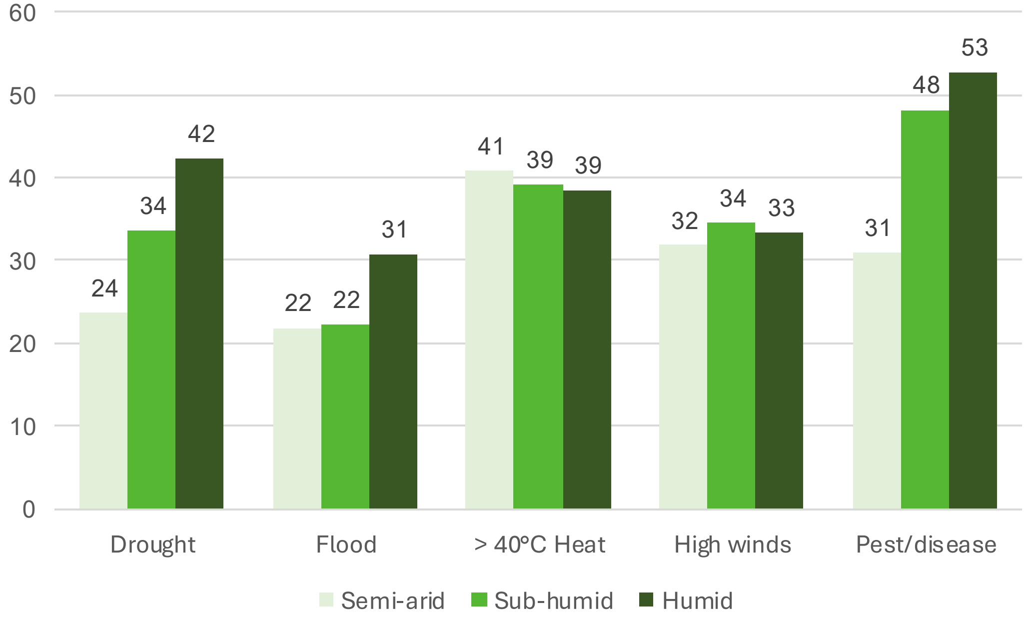
NGA: Self-reports are relative to own baselines

Self-reported exposure: *% reporting any during past 5 years exposure*



Source: CRIFS Phone Survey, March 2025: "During the past 5 years, how frequently did your household experience [EVENT]?"

Future expectations of weather shocks: *% expecting "likely" occurrence in next 2 years, among past-affected*



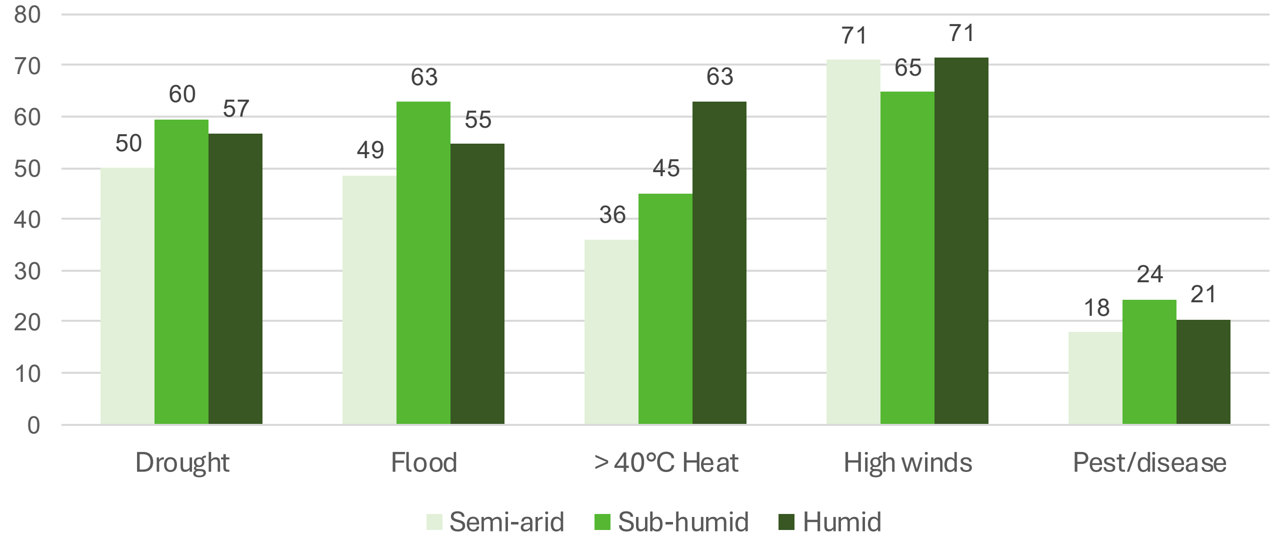
Source: CRIFS Phone Survey, March 2025: How likely do you think [EVENT] is to occur in the next 2 years?"

- Past-year reporting of heat ranges from 34–70% and drought from 32-65% across AEZs (from semi-arid to humid). Semi-arid reported exposure is highest for floods and pests, sub-humid for drought, and humid for drought and heat.
- Forward-looking expectations are more compressed than past exposure for heat and wind; humid AEZ predicts most events, especially pest exposure.

NGA: Perception of risk (by hazard) rises as sense of control declines

At the national level, 71% of SSPs feel unable to control wind losses, 57% drought losses, but only 20% feel unable to control pest losses

Extent of Control over losses: *Percent reporting "No control" over losses from each hazard, by AEZ*



Source: CRIFS Phone Survey, March 2025: "If you knew about the [EVENT] in advance, to what extent could your household control or avoid losses to crops or livestock when exposed?".

Cassava storage in Ebonyi state (Fieldwork: March 2025)

- **Perceived control: less against the weather, confident against pests**

> *"If torrential downpours come early in the planting season, I replant. But around September, I don't plant again."*
> **— Farmer, Niger state**

> *"I have had insect infestation … I buy insect killer powder from Jega market to kill the insects."*
> **— Farmer, Kebbi state**

NGA: Differences in perceived drought and measured drought

Measured (i.e. satellite) ≠ self-reported (i.e. survey)

Over half of households exposed to meteorological drought do not report being affected: False “Negative” - does not report the meteorologically measured shock & False “Positive” - reports experiencing a shock that is not measured meteorologically

Panel A: LOW Cumulative rainfall (more than 1 sd below avg)*		
Measured	**No self-report**	**Self-report drought**
No (n=297)	75.4%	**24.6% ← false positive**
Yes (n=351)	**55.0% ← false negative**	45.0%
$\chi^2(1) = 29.3, p < 0.001$		**z-score < -1*

Panel B: HIGH Consecutive dry days (more than 1 sd above avg)*		
Measured	**No self-report**	**Self-report drought**
No (n=490)	68.6%	**31.4% ← false positive**
Yes (n=158)	**51.3% ← false negative**	48.7%
$\chi^2(1) = 15.6, p < 0.001$		**z-score > 1*

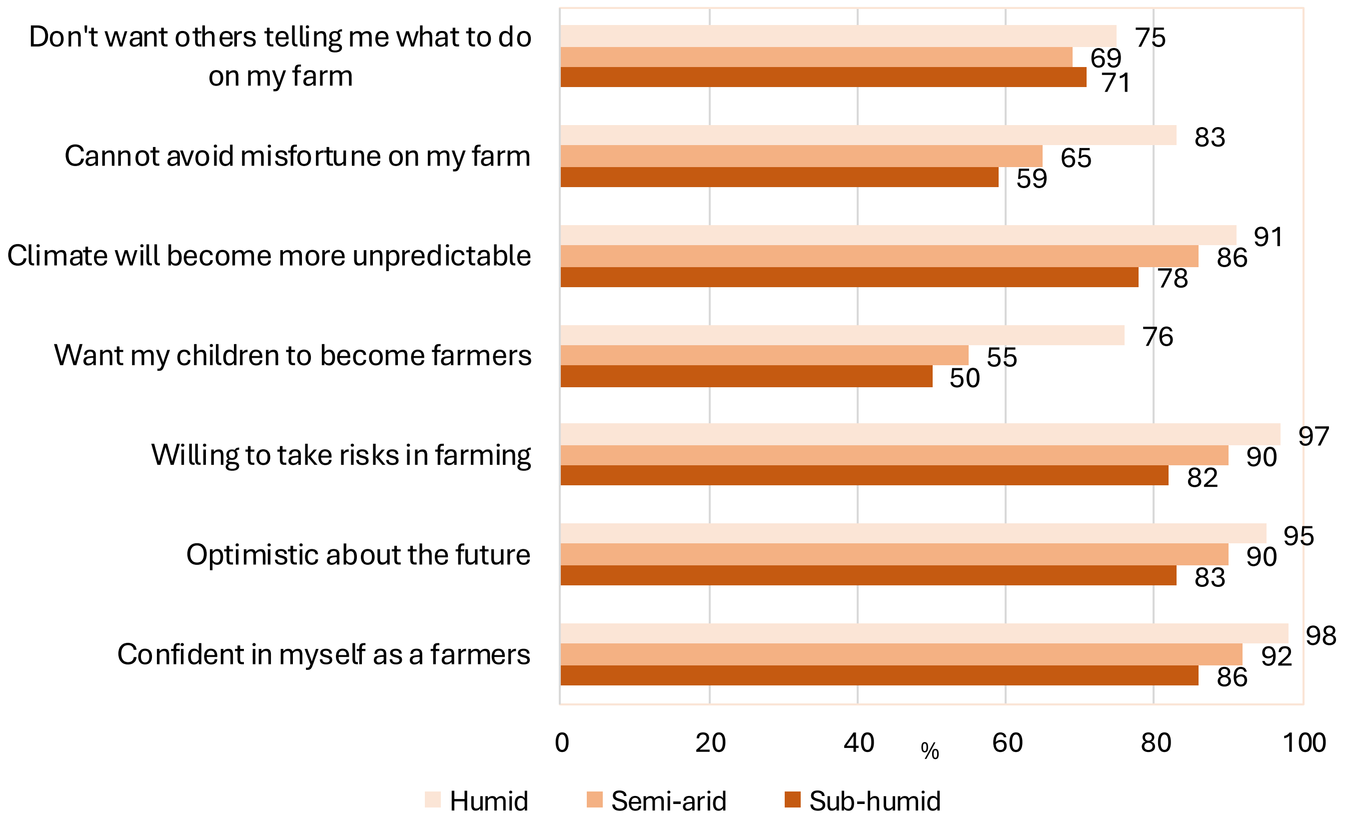
What predicts the mismatch?

- Larger households and more diversified livestock holdings → fewer false positives: asset bases appear to buffer hazard sensitivity
- Extension access → fewer false negatives: extension may help farmers recognize drought impacts when they occur
- Female-headed households show marginally higher false-positive rates for rainfall-based drought

Source: CRIFS Phone Survey, March 2025 + CHIRPS, 2024 growing season; full regressions in Appendix 5.

MAH: SSP attitudes vary by AEZ

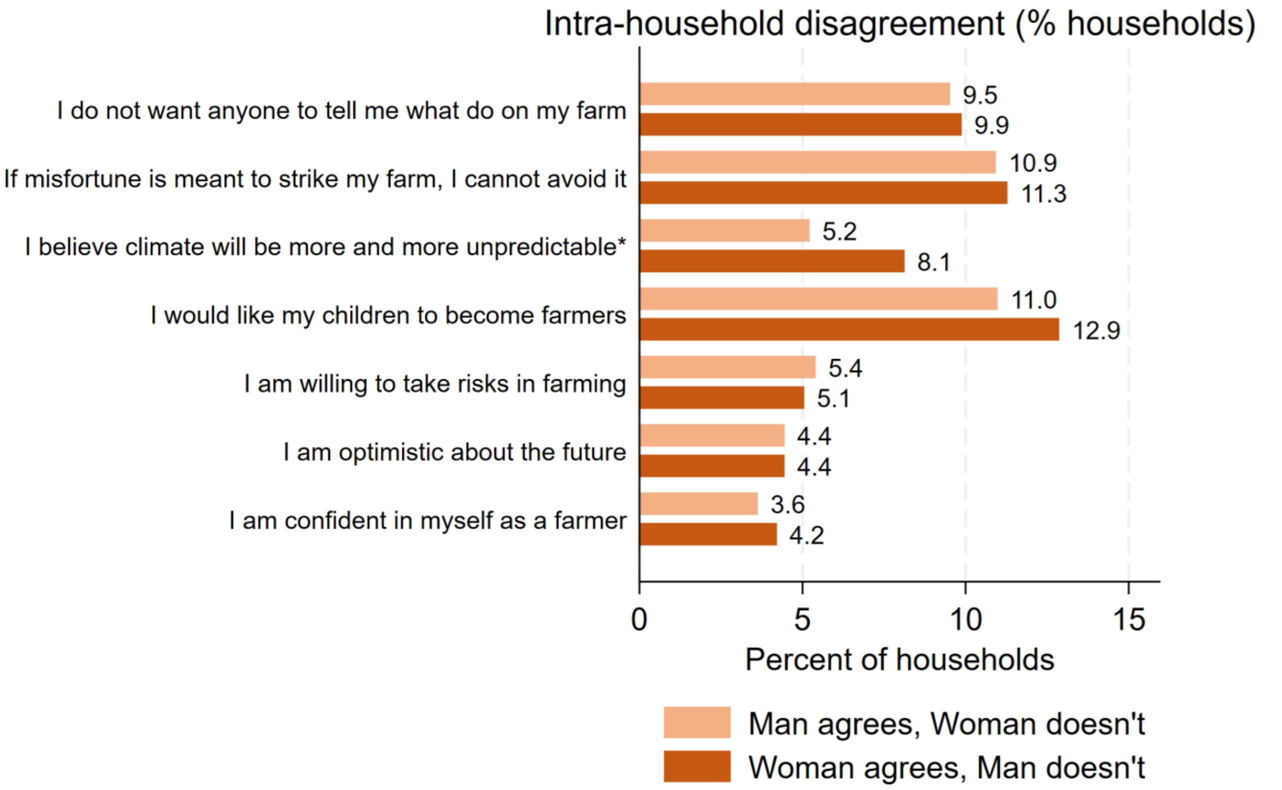
- **Fatalism** (If misfortune is meant to strike my farm, there is nothing I can do about it) is highest in the **humid AEZ** (83%), and where the desire for autonomy ("do not want anyone to tell me what to do on my farm") and for one's children to be farmers is also strongest.
- Most SSPs in the **humid AEZ** also report **high confidence (98%), optimism (95%)** and **willingness to take risk (97%).**



Source: CRIFS Household Survey, May 2026: "Please answer to what extent do you agree or disagree for each statement". (% selecting; n=2034).

MAH: Within households, SSP attitudes do not vary by gender to a large extent

- Overall, there is not much disagreement within households by gender.
- Of the households with disagreement, there are significantly more households where only women believe climate is increasingly unpredictable (8%), than where only men believe so (5%).
- The percent of households where only women want their children to become farmers (12.9%) is greater than those where only men want their children to become farmers (11%)

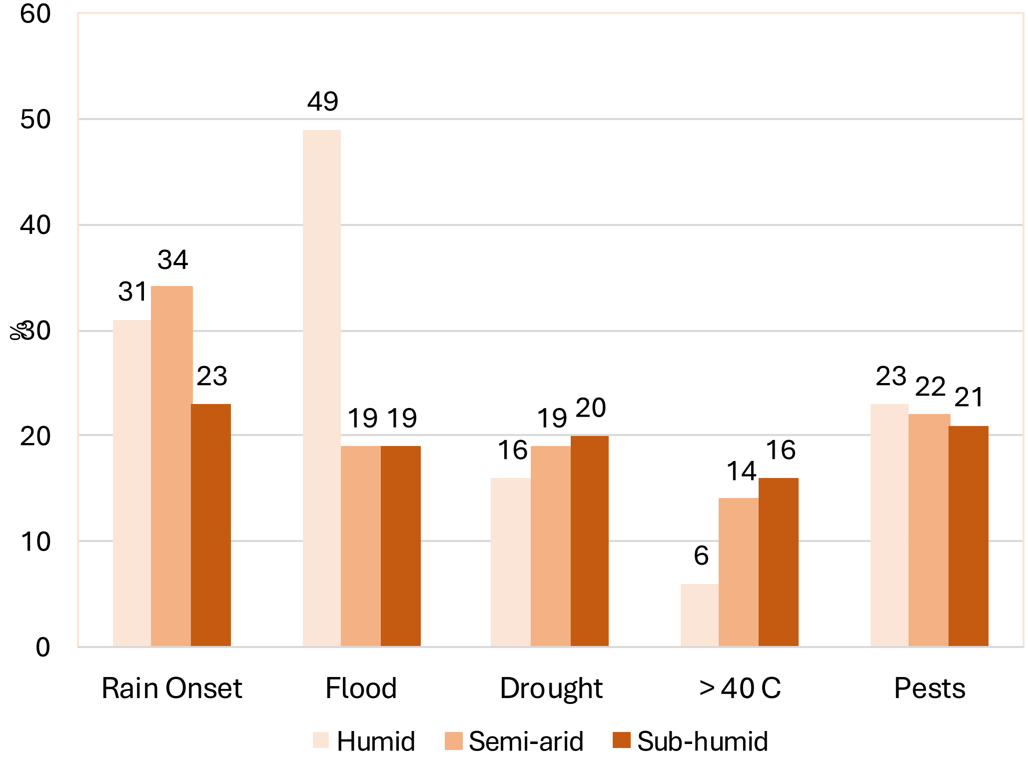


* $p<0.05$, paired t-test comparing direction of disagreement

Source: CRIFS Household Survey, May 2026: "Please answer to what extent do you agree or disagree for each statement". (% selecting; n=2034).

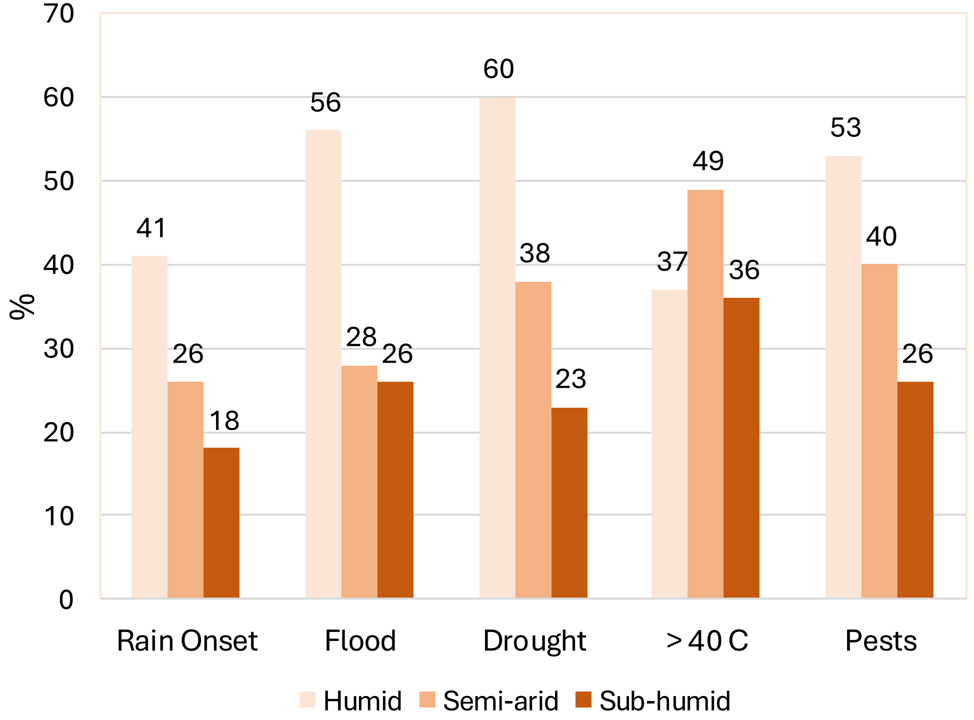
MAH: Self-reported exposure and future expectations of weather shocks

Self-reported exposure: *% reporting any during past 2 years exposure*



Source: CRIFS Household Survey, May 2026: "During the past 2 years, how frequently did your household experience [EVENT]?"

Future expectations of weather shocks: *% expecting "likely" occurrence in next 2 years, among past-affected*

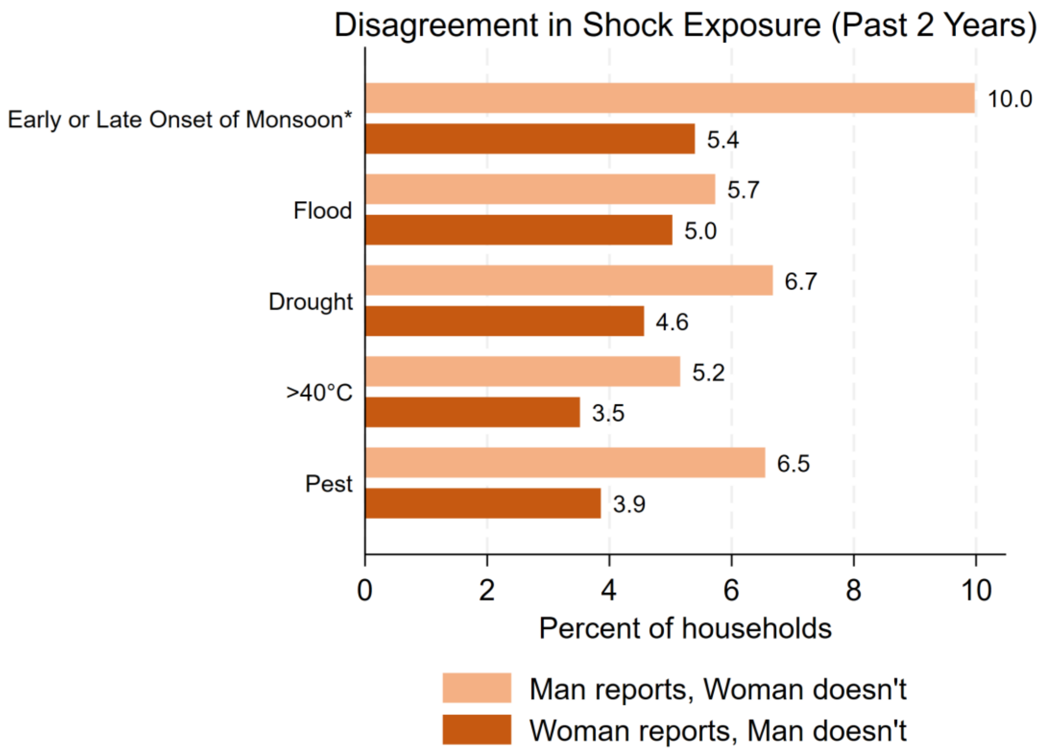


Source: CRIFS Household Survey, May 2026: How likely do you think [EVENT] is to occur in the next 2 years?"

- Past two-year reporting of untimely rain is 37% in the full sample; early or late onset of rains is reported by ~30% of households.
- As in NGA, forward-looking expectations are more equally spread out: Despite the lowest past exposure among climate events, a heat wave is the most anticipated (over 40%) among those exposed in the past, followed by ~39% pests and ~37% expecting drought and unseasonal rain.

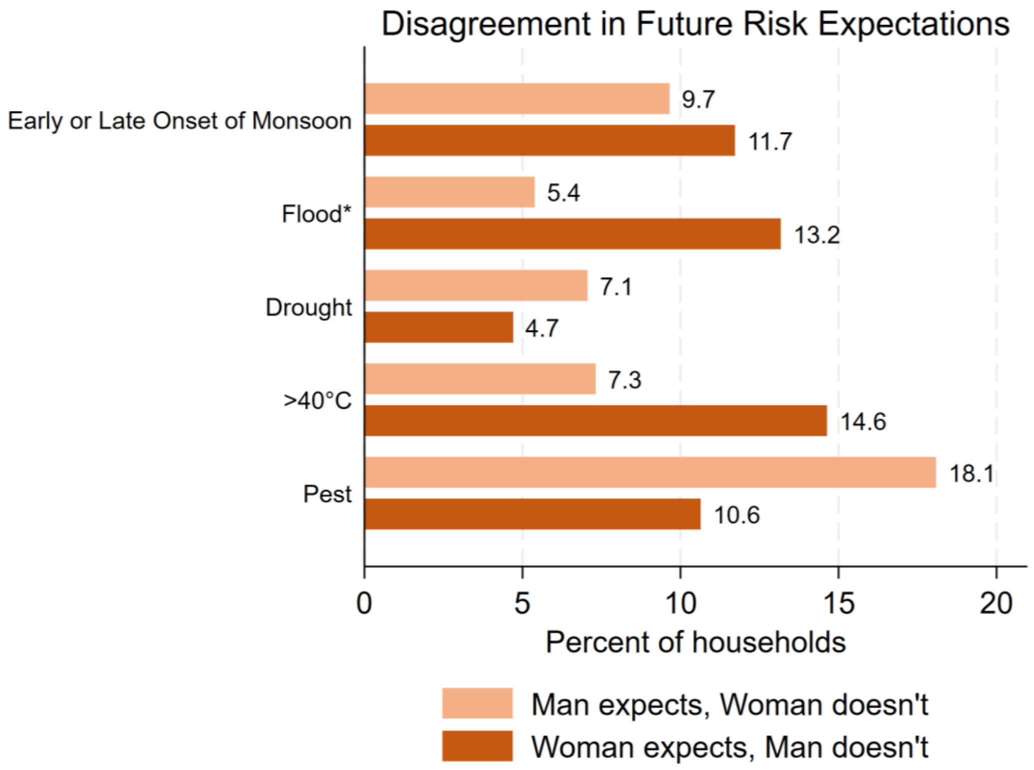
MAH: The most significant intra-HH disagreement is on onset of monsoon

- While the percent of households with intra-household disagreement is small, most significant disagreement on shock exposure is on the onset of monsoon.
- For future risk expectations, in 13% of the households, women are significantly more likely to expect floods when men in the household do not expect floods.


Disagreement in Shock Exposure (Past 2 Years)

* $p<0.05$, paired t-test. Restricted to households with a woman responde

Source: CRIFS Household Survey, May 2026: "During the past 2 years, how frequently did your household experience [EVENT]?"


Disagreement in Future Risk Expectations

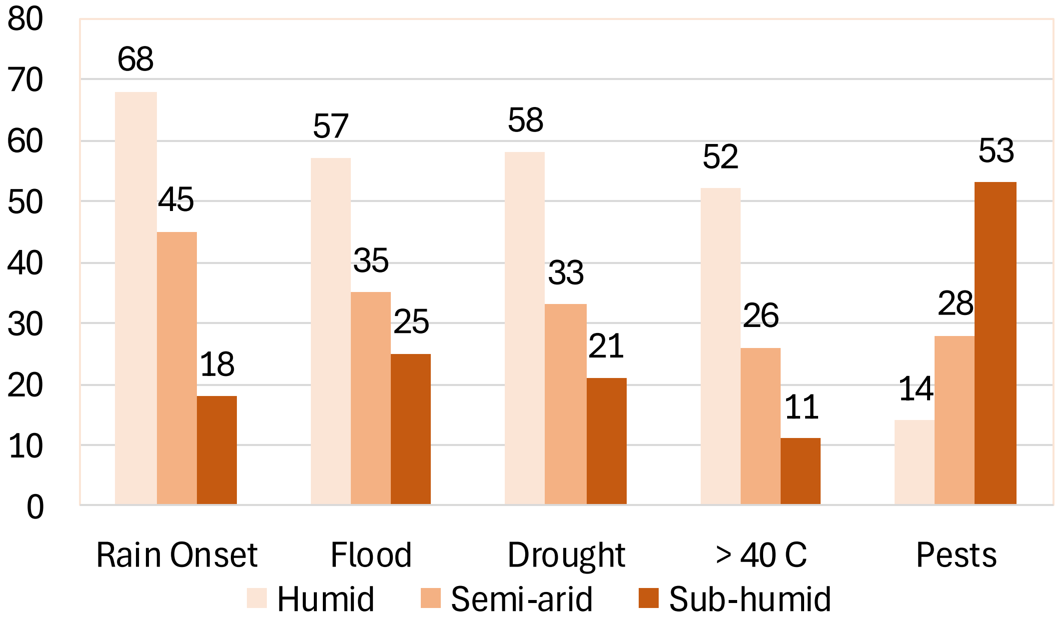
* $p<0.05$, paired t-test. Restricted to households with a woman respondent

Source: CRIFS Household Survey, May 2026: How likely do you think [EVENT] is to occur in the next 2 years?"

MAH: Risk perceptions also vary by AEZ

In the full sample, 43% feel unable to control losses from early or late rain onset, 41% feel unable to control flood losses.

Figure 1: Percent reporting "No control" over losses from each hazard



Source: CRIFS India Household Survey: If your household is exposed to [shock] in the next agricultural season, to what extent can your household control or avoid losses while dealing with [shock]?

Fields in Pune district (Fieldwork: May 2026)

- **Perceived control: less against rain onset, flood; confident against heat waves**

MAH: What drives adoption of ICT-Based Agro-Advisory?

Regression findings on adoption of ICT-based agro-advisory in Maharashtra, controlling for other factors

Negatively Associated

- Farmer confidence
- Fatalism (belief that misfortune cannot be avoided)

Positively Associated

- Desire for children to become farmers
- Belief that climate will become more unpredictable
- Poverty
- Disadvantaged caste status
- Exposure to flood shocks

MAH: Related Patterns Across Attitudes, Assets, and Practices

Additional regression findings, controlling for other factors

Wanting Children to Farm

Associated with greater adoption of both land management and water management practices.

Autonomy & Fatalism

Autonomy in farm decisions raises the odds of acting on weather information, but lowers land management adoption. Fatalism lowers acting on weather information.

Caste

Disadvantaged caste households adopt ICT-based agro-advisory and land management practices at higher rates than general caste households.

Female-Headed Households

Report significantly lower confidence as farmers and are less willing to take risks in farming.

Land Size

Larger landholders report higher confidence, risk-taking, and decision-making autonomy — but also stronger expectations of unpredictable climate.

Livestock & Poverty

More livestock: higher confidence, optimism, and risk-taking, but less desire for children to farm. Poverty: higher confidence only.

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2. Key Findings: Weather Information and advisory
   - Medium and Messenger
   - Message
   - Use
3. Key Findings: Components of Risk Perceptions
   - Attitudes
   - Exposure and Vulnerability
   - Future Aspirations and Climate Expectations
4. Implications

Simplicity, timeliness, localized information and trust can increase the traction of weather information - **The Messenger**

- **There are AEZ differences around trusted sources of weather information, and reasons for not acting on information: the Humid AEZ (southern-most) is most unique in Nigeria, and the Sub-Humid AEZ (eastern-most) is the most unique in Maharashtra.**
- **Trust** was big reason for not acting on climate information, highlighting the importance of community leaders or other influential allies for messaging in rural communities (22% in humid AEZ, 30% in sub-humid AEZ)
- In Nigeria, **radio** or television program is the most trusted weather information source across all AEZs, followed by Farmers' group / association / co-op and Government extension service in the semiarid and sub humid AEZ.
  - The National Weather service (Nimet) is the second most trusted in the humid AEZ. Coupled with the most cited "lack of relevance," the NiMet may help localize information with rainfall predictions for 774 local government areas.
- In Maharashtra, **radio** or television program is the most trusted weather information source in the humid AEZ, and government extension is most trusted source the semiarid and sub humid AEZ.
  - A third of the sample used the weather information because it was easy to understand, and 31% in the sub-humid AEZ cited timing as being important in acting on information

Simplicity, timeliness, localized information and trust can increase the traction of weather information - **The Message**

- **Weather information often doesn't translate to action. 52% of farmers in both NGA and Maharashtra, who received weather information didn't act on it.**
- **Top reasons for not acting on received information vary across and within countries:**
  - In Nigeria, top reasons were irrelevance (27% - highest in the humid), not affordable (27% highest in the sub-humid), and it arrived too late (20% highest in the semi-arid).
  - In Maharashtra, top reasons were no action needed (55%- highest in the humid), not timely (47%- highest in the sub-humid), and difficult to understand (36%- highest in the sub-humid)
- **Messaging is most likely effective if it addresses the issue of control directly**, given that the majority of SSPs reported that "if misfortunate is meant to strike my farm, there is nothing I can do about it.

Implications: messenger, the message, and the recipient

The messenger and medium

- Continue to leverage radio and television, and for less familiar technologies use multiple media and for new AI / digital lead with trusted humans.

- Government extension and farmer's groups are more trusted than market sellers or traders across all AEZs.

The message

- Message to inform, not sell.
- The most salient information is likely to offer deviations from norms, rather than levels and provide thresholds.
- Prioritize immediacy and simplicity, lead with risks perceived to be controllable, be upfront about costs, and frame in terms of gains.

The recipient

- Balance AEZ, hazard, and SSP heterogeneity with the desire to scale.
- For the many respondents who do not expect rising future climate risks, messaging in terms of market or other risks may offer more uptake incentives.
- Timing of message is important

- Upstream measured risk and downstream perceived risk are partially misaligned, and it is the perceived risk that ultimately drives uptake.
- While some attitudes such as fatalism and natural variability may be more difficult to overcome, the gap in information access and uptake can be closed through careful design.

APPENDIX

NGA: Across AEZ results

AEZ Risk Snapshot: Technology, Attitudes, Vulnerability, Exposure

Panel A: Semi-Arid AEZ (n=223)

Indicator	Estimate
Adaptation technology	
Aware of hybrid seeds	29%
→ of which, using this season	72%
Aware of inorganic fertilizer	83%
Worldview (Add all)	
"If misfortune is meant, I cannot avoid it"	76%
"Future climate will be more unpredictable"	90%
Livelihoods	
Avg. landholding (ha)	1.26
Avg. livestock (TLU)	1.09
Avg. daily consumption ($2021 PPP)	$2.55
Avg. distance to nearest market (km)	62.5

Panel B: Sub-Humid AEZ (n=242)

Indicator	Estimate
Adaptation technology	
Aware of hybrid seeds	23%
→ of which, using this season	91%
Aware of inorganic fertilizer	77%
Worldview	
"If misfortune is meant, I cannot avoid it"	72%
"Future climate will be more unpredictable"	81%
Livelihoods	
Avg. landholding (ha)	1.41
Avg. livestock (TLU)	0.94
Avg. daily consumption ($2021 PPP)	$3.07
Avg. distance to nearest market (km)	73.6

Panel C: Humid AEZ (n=230)

Indicator	Estimate
Adaptation technology	
Aware of hybrid seeds	7%
→ of which, using this season	79%
Aware of inorganic fertilizer	75%
Worldview	
"If misfortune is meant, I cannot avoid it"	60%
"Future climate will be more unpredictable"	77%
Livelihoods	
Avg. landholding (ha)	0.56
Avg. livestock (TLU)	0.20
Avg. daily consumption ($2021 PPP)	$4.75
Avg. distance to nearest market (km)	53.1

SSPs perceive climate risk based on past exposure, their sense of control over the particular hazard, their fatalism, and their vulnerability, associated with their asset base.

Forecasts (NiMet CSP) 2026 growing season:

- Borno: Late onset of rains, shorter than normal rainy season, but more than normal rainfall. Severe dry spell (>21 days) June-August
- Warmer than normal (avg. 1°C): > 34°C in Feb, 37°C in March, and in some regions >40°C in April

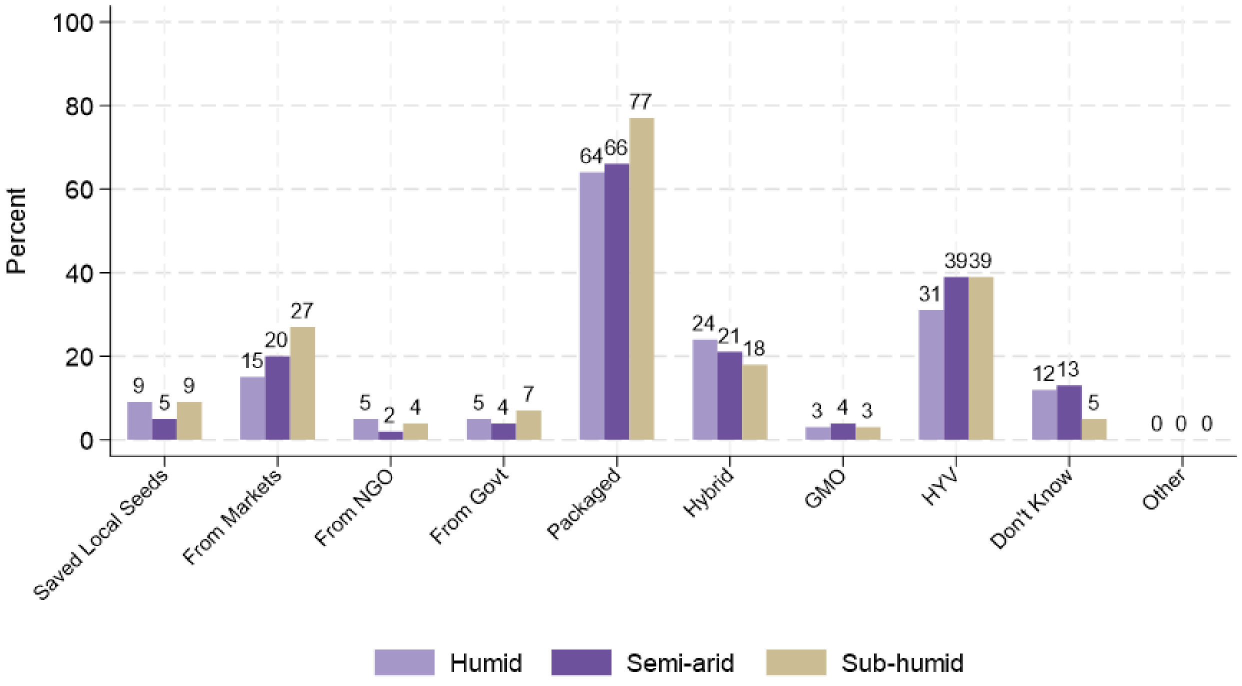
- Ogun State is predicted to have a severe dry spell from March to May 2026.
- Between 34°C and 40°C in April and May. Most states are expected to experience daytime temperatures up to 0.6°C above normal in May.

- Moderate °C dry spells predicted for Oyo and Kogi states Mar-May 2026.
- Means 28°C - 31°C in March-May. Expected daytime temps 0.2°C-0.6above normal in March.

Source: CRIFS Phone Survey, March 2025 and LSMS-ISA W5.

MAH: How do SSPs understand what an improved seed is?

Majority of farmers associate improved seeds with packaged seeds, across AEZ



CRIFS India Household Survey: "What is an improved seed to you?" (% selecting; n=2034, multi-select)

Patterns: The figure here shows that most respondents associated improved seeds with packaging (64-77%), followed by High-Yielding Varieties (31-39%), purchased from markets (15-27%) and hybrids (18-24%).

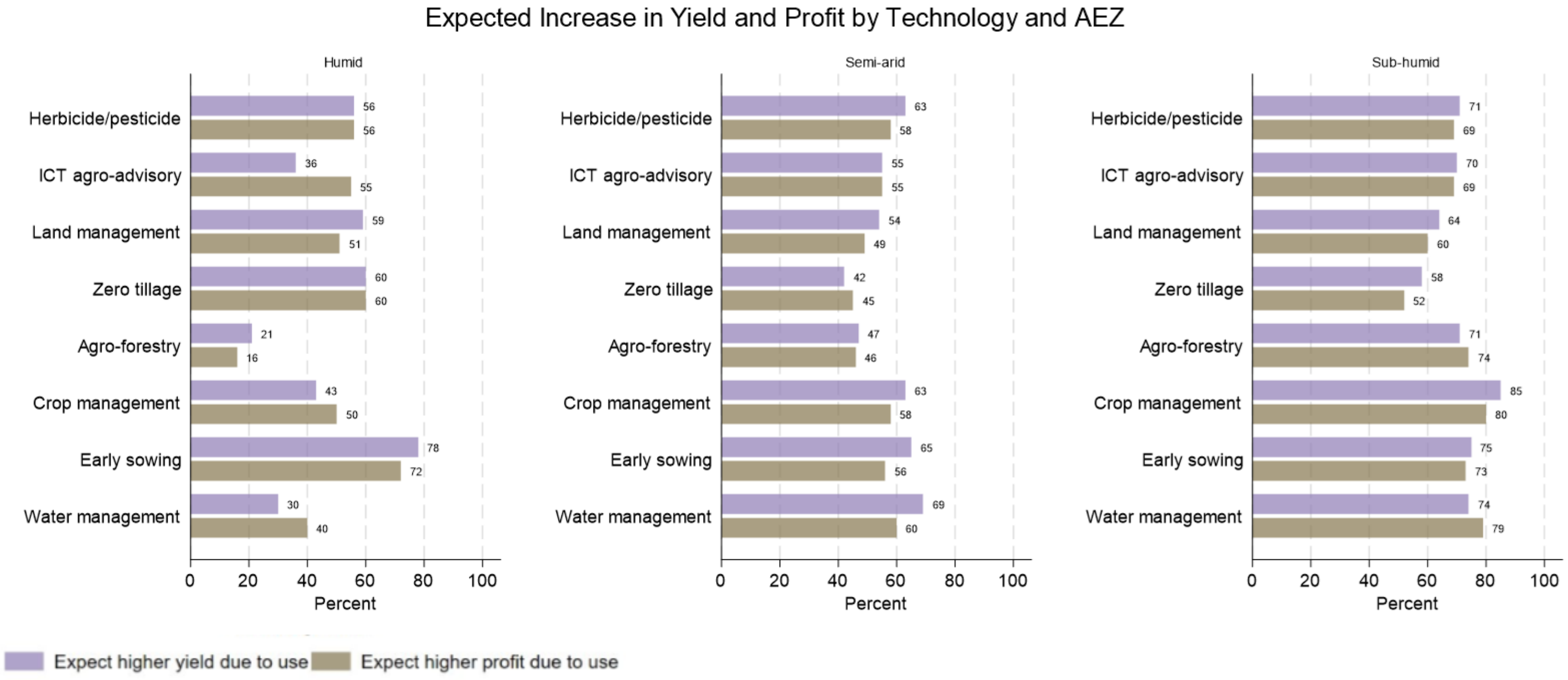
Farmers identify improved seeds mostly by observable cues (packaging) and types (HYV).

Figure 2: Seeds at an agro dealer shop in Raigad district (Fieldwork: May 2026)

MAH: Across AEZ results

Non-seed climate adaptation technologies and practices

Figure 2: Expectations of Increase in Yield & Profit due to Technology Use (% among aware)



CRIFS India Household Survey: "If you were to use or are using this [[tech_name]], how do you expect it to affect yield (& profit) under normal climate conditions?"

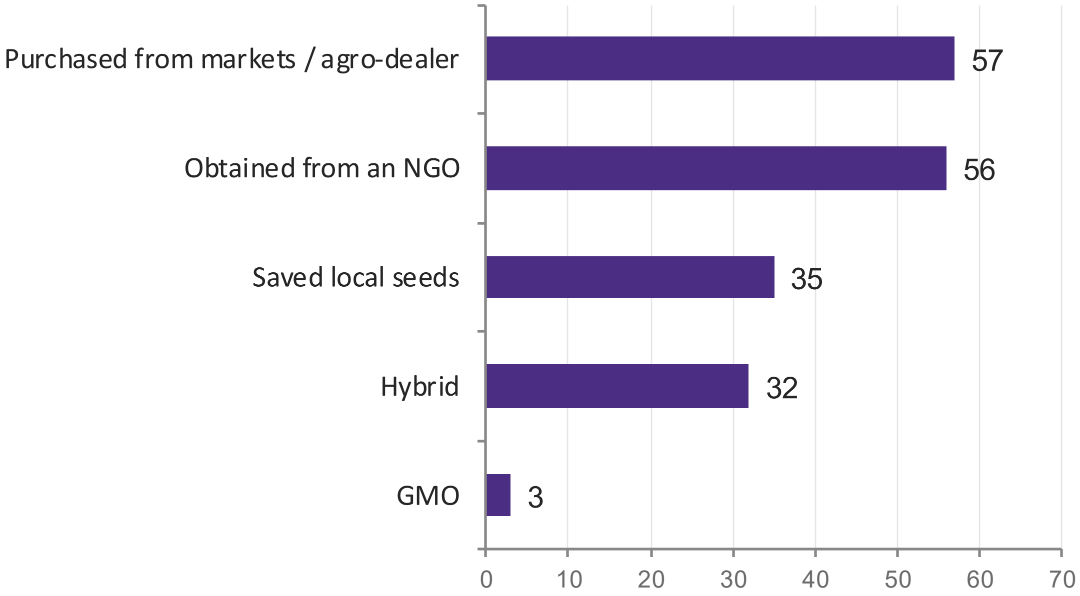
For a majority of technologies, < 50% of households expect an increase in the cost of non-labor inputs and labor time.

Notable exception: Early sowing (57% expect an increase in labor time)

NGA: FGD

Measurement, use, and farmer understanding of improved seeds

Figure 1: What is an improved seed to you? (% selecting)



CRIFS FGD, March 2025: "What is an improved seed to you?" (% selecting; n=93, multi-select)

Different definitions of "Improved Seed"

To breeders / surveys:
Seeds sourced from a formal breeding program enhancing genetic traits.

To farmers (FGDs):
Identified by where the seed came from: a market, an agro-dealer, an NGO, a marriage. Only ~1/3 link "improved" to "hybrid."

Nationally representative surveys use the phrase "improved" (LSMS-ISA) or certified (50x2030)

Implication: Trends in self-reported "improved seed" adoption (16% → 5% in male plot managers, 2015–24) may partly reflect terminology drift, not behavior.

> *"We have heard about improved seeds but have not used it or been given it… I plant CP [and other rice varieties]."*
> **— Female farmer, Niger state — was using an improved rice variety (CP) but did not identify it as such.**

Figure 2: Rice being dried in Niger state (Fieldwork: March 2025)

NGA: Across AEZ results

Farmer understanding of hybrid seeds

20%

of farmers nationally know about hybrid seeds

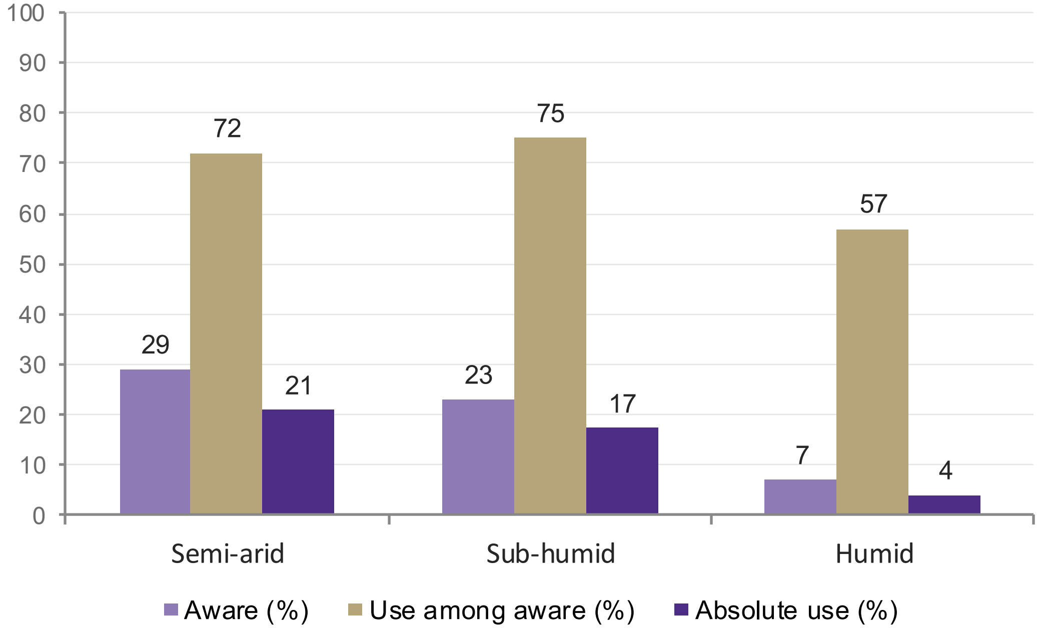
72%

of those aware, used hybrids last season

89%

of those aware, are using or planning to use hybrids in the next season

Figure 1: Hybrids awareness and adoption by AEZ



Source: CRIFS Phone Survey, March 2025: "Is hybrid seed something you know about?" "Is your household using or planning to use hybrid seed in this agricultural season?" (% selecting; n=678).

- There are over 500 languages spoken across Nigeria with some lacking an equivalent concept for "hybrid" e.g. Pidgin.
- Awareness is much lower in the humid AEZ. Consultations suggest that dominant tuber crops and local language translation may play a role: For example, in Yoruba, the term for hybrid "irugbin arabara" is also used for improved seed more broadly. In Hausa, hybrid seeds are "iri dan aure," which translates to "seed sourced from marriage".
- The hybrid-use rate (~14% nationally, 21% semi-arid and 17% sub-humid) is roughly double the self-reported *improved-seed* rate in LSMS-ISA 2023–24 (~5%). This suggests that terminology may lead national surveys to understate uptake.

NGA: Across AEZ results

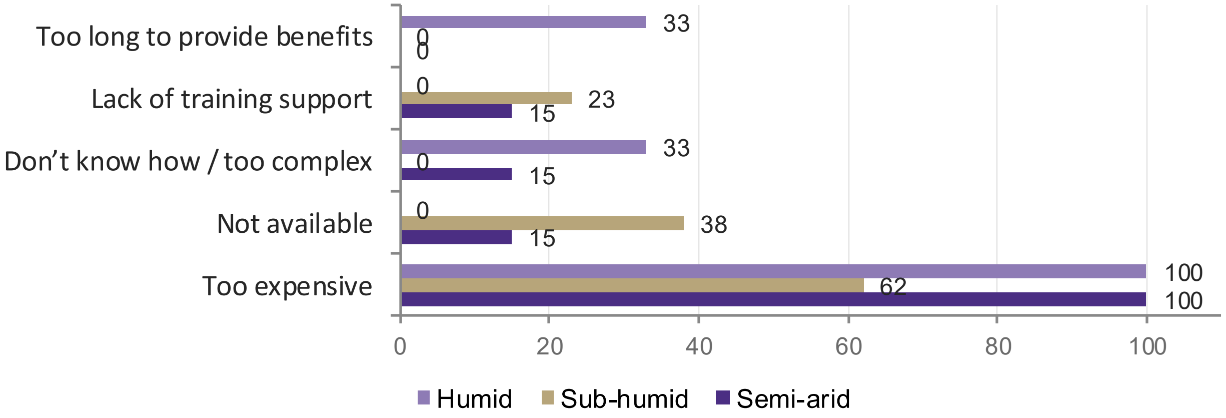
Measurement, use, and farmer understanding of hybrid seeds

96% of the aware expect hybrids to **increase profit**. Yet 28% of those aware do not use them.

Top stated reason:

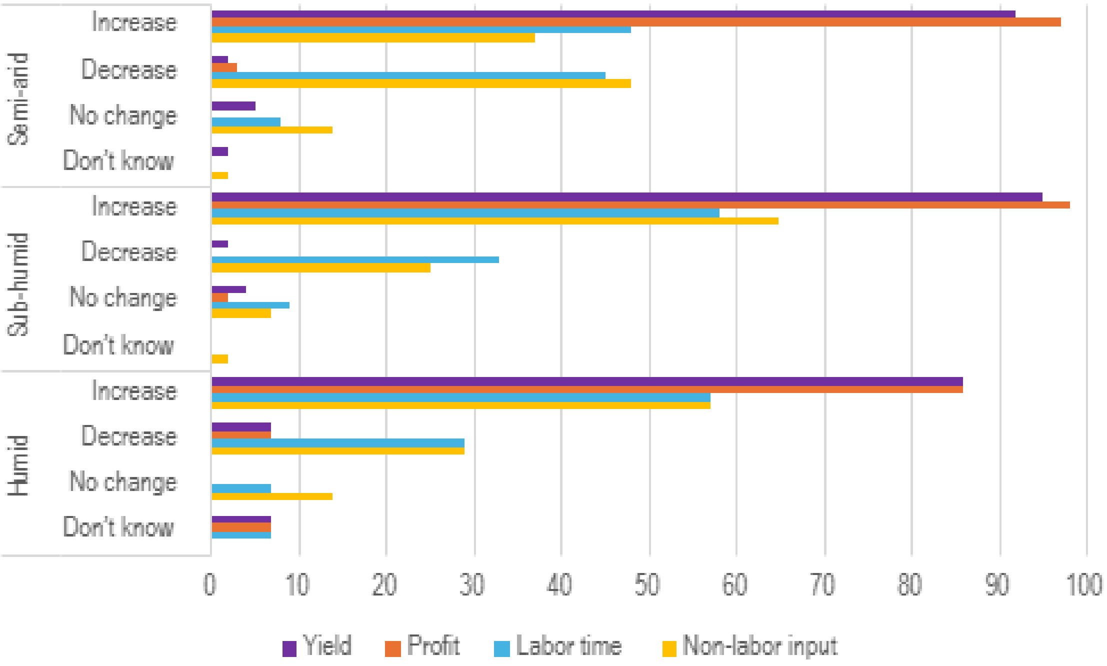
- Too expensive: Cost is relevant in all AEZs
- Limited availability is an issue in the sub-humid AEZ.
- Complexity and time-to-benefit are important in the humid AEZ.

Figure 1: Reasons for non-adoption among the aware, by AEZ



Source: CRIFS Phone Survey, March 2025: "Why did your household choose not to use [hybrid seeds] in this agricultural season?" (% selecting; n=15, multi-select).

Figure 2: Expectations among the aware (% reporting 'increase')



Source: CRIFS Phone Survey, March 2025: "If you were to use or are using [hybrid seeds], how do you expect it to affect yield, profit, labor time, and non-labor inputs?" (% selecting; n=134).

NGA: Across AEZ results

Measurement, use, and farmer understanding of GMO seeds

Table 1: Knowledge and use of GMO seeds

Item	Semi-arid	Sub-humid	Humid	National
Knowledge of GMO seeds	35%	24%	9%	23%
Willing to plant GMO (if aware)	86%	93%	89%	89%
Willing to eat GMO produce (if aware)	92%	91%	71%	89%
Would plant "scientifically altered seed for higher resistance"	**95%**	**95%**	**85%**	**91%**

Source: CRIFS Phone Survey, March 2025.
"Are genetically modified organism (GMO) crops something you know about?"
"Are you willing to plan a GMO crop?"
"Are you willing to eat the product of a GMO crop?"
"If you were told that a new seed variety had been scientifically altered in a lab to have higher pest resistance and produce a greater yield, would you plant it?"
Humid AEZ "if aware" rows use very small n (18-21).

> *"I have heard of Tela maize but haven't sold it."*
> **— Agro-dealer, Akure, Ondo state**

- Willingness when *not* using the term "GMO" (last row) is similar to willingness *with* the term (row 2).
- The label itself does not appear to be a barrier among those exposed to the concept.
- Of the 23% aware of GMOs, 89% are willing to plant them.

NGA: Across AEZ results

Other climate adaptation technologies and practices

Table 1: Awareness of technologies and practices

Technology / practice	National	Semi-arid	Sub-humid	Humid	Use this season (of aware)
Hybrid seeds	20%	29%	23%	7%	*89% / 91% / 79%*
Inorganic fertilizer	78%	83%	77%	75%	*95% / 93% / 84%*
Herbicides / pesticides	65%	65%	71%	60%	*97% / 94% / 84%*
Changing what to plant	10%	5%	7%	20%	*75% / 88% / 67%*
Changing land / soil management	10%	4%	8%	18%	*88% / 83% / 79%*
Changing water management	3%	4%	4%	5%	*100% / 100% / 80%*

Source: CRIFS Phone Survey, March 2025: "Is [TECHNOLOGY/PRACTICE] something you know about? Is your household using or planning to use [TECHNOLOGY/PRACTICE] in this agricultural season?" (% selecting; n=695).

Table 2: Expectations of Changes due to Technology Use by AEZ (% among aware)

		Inorganic Fertilizer			Herbicide / Pesticide		
Outcome	Change	Semi-arid	Sub-humid	Humid	Semi-arid	Sub-humid	Humid
Yield	Increase	99%	99%	98%	97%	95%	95%
Profit	Increase	100%	99%	96%	97%	95%	94%
Labor time	Increase	67%	70%	64%	51%	42%	48%
Non-labor inputs	Increase	77%	73%	71%	59%	61%	73%

Source: CRIFS Phone Survey, March 2025: "If you were to use or are using this [TECHNOLOGY/PRACTICE], how do you expect it to affect yield, profit, labor time, and non-labor inputs?" ((% selecting).

Pattern: Purchasable inputs (top three rows) have **high awareness and conditional use**. Management practices (shaded) have **low awareness everywhere** and are uniformly limited for water.

Figure 1: Urea being sold in market in Kebbi state (Fieldwork: March 2025)

Risk Profiles: Snapshots by AEZ

Semi-arid AEZ

- Nigeria’s northern belt
- The two largest ethnic groups, the Hausa and Fulani, are Muslim, and Islamic culture is embedded within the region
- Low and variable rainfall, recurrent heat, and short growing seasons
- Most commonly planted crops: sorghum (71% of farmers), cowpea (55%), and millet (54%)

Table 1: Semi-arid AEZ snapshot

Panel A: Measured exposure & livelihoods (n=223)

Indicator	Estimate
Precipitation (2005–24)	
Harmful (<480 mm)	0.5%
Borderline (480–880 mm)	82.0%
Favorable (>880 mm)	17.5%
Temperature	
Locations with high HDD	32.3%
Locations with medium-high HDD	62.8%
Livelihoods	
Avg. landholding (ha)	1.26
Avg. livestock (TLU)	1.09
Avg. daily consumption ($2021 PPP)	$2.55
Avg. distance to nearest market (km)	62.5

Panel B: Self-reported exposure & perceptions

Indicator	Estimate
Past-year exposure	
Late onset of rains	19%
Flood or torrential downpour	32%
Temperatures above 40°C	27%
Pest / disease outbreak	30%

Figure 13: Millet plantation in Kebbi state (Fieldwork March 2025). Millet is a heat-resistant crop that is well suited to the high temperatures of the semi-arid AEZ

Forecasts (NiMet CSP) 2026 growing season:

- Borno: Late onset of rains, shorter than normal rainy season, but more than normal rainfall. Severe dry spell (>21 days) June-August
- Warmer than normal (avg. 1°C): > 34°C in Feb, 37°C in March, and in some regions >40°C in April

> *“I have not done anything different to adapt to climate change. I just trust God.”*
> **— Farmer, Kebbi state (semi-arid)**
> *Source: CRIFS Phone Survey (Mar 2025)*

Sub-humid AEZ

- Nigeria's Middle Belt and parts of the southern Guinea savanna belt, including states such as Benue, Niger, Kogi, and Oyo.
- The ethnic composition of the zone is highly diverse, with Yoruba particularly prominent, and Hausa-Fulani populations found across several states as both crop producers and pastoralists.
- The main crops planted include maize (62%), yam (37%), sorghum (36%), and cassava (35%).

Table 2: Subhumid AEZ snapshot

Panel A: Measured exposure & livelihoods (n=242)

Indicator	Estimate
Precipitation (2005–24)	
Harmful (<480 mm)	0.0%
Borderline (480–880 mm)	64.0%
Favorable (>880 mm)	36.0%
Temperature	
Locations with medium HDD	55.8%
Locations with high HDD	2.1%
Livelihoods	
Avg. landholding (ha)	1.41
Avg. livestock (TLU)	0.94
Avg. daily consumption ($2021 PPP)	$3.07
Avg. distance to nearest market (km)	73.6

Source: Phone Survey (Mar 2025) and CHIRPS/CHIRTS.

Panel B: Self-reported exposure & perceptions

Indicator	Estimate
Past-year exposure	
Late onset of rains	35%
Flood or torrential downpour	14%
Temperatures above 40°C	33%
Pest / disease outbreak	19%

Source: hone Survey (Mar 2025).

Figure 14: Cassava mounds in Benue state before 1-2 months before the beginning of the planting season (Fieldwork, March 2025). Cassava is planted year-round in the subhumid AEZ of Nigeria.

Forecasts (NiMet CSP) 2026 growing season:

- Ogun state predicted to have a severe dry spell March-May 2026.
- Between 34°C and 40°C in April and May. Most states expected to experience daytime temperatures up to 0.6°C above normal in May.

> *"The traditional rice variety usually takes about 8 months to mature… With improved [hybrid] seeds, we can plant rice in May and harvest in June or July, within 3 months."*
> **— Farmer, Niger state (sub-humid)**

Risk Profiles: Snapshots by AEZ

Humid AEZ

- Covers much of southern Nigeria's forest and coastal belt, including states such as Ebonyi, Ogun, and Rivers
- Characterized by high rainfall, dense vegetation, and generally favorable moisture conditions for crop production.
- Mains crops: cassava (86%), maize (43%), and yam (43%)

Table 3: Humid AEZ snapshot

Panel A: Measured exposure & livelihoods (n=230)

Indicator	Estimate
Precipitation (2005–24)	
Harmful (<480 mm)	0.0%
Borderline (480–880 mm)	10.4%
Favorable (>880 mm)	89.6%
Temperature	
Locations with low-medium HDD	100.0%
Locations with high HDD	0.0%
Livelihoods	
Female-headed households	30%
Avg. landholding (ha)	0.56
Avg. livestock (TLU)	0.20
Avg. daily consumption ($2021 PPP)	$4.75

Source: Phone Survey (Mar 2025) and CHIRPS/CHIRTS.

Panel B: Self-reported exposure & perceptions

Indicator	Estimate
Past-year exposure	
Late onset of rains	50%
Flood or torrential downpour	7%
Temperatures above 40°C	59%
Pest / disease outbreak	16%

Source: Phone Survey (Mar 2025).

Figure 15: Mango and palm oil trees in Ebonyi state (Fieldwork, March 2025)

Forecasts (NiMet CSP) 2026 growing season:

- Moderate dry spells predicted for Oyo and Kogi states Mar-May 2026.
- Means 28°C - 31°C in March-May. Expected daytime temps 0.2°C-0.6°C above normal in March.

> *"I have been experiencing very high temperatures … I harvest cassava earlier. There is nothing I can do for yam and cassava plants that are not ready for harvesting."*
> **— Farmer, Ebonyi state (humid)**

Summary of findings

- **Climate extremes are becoming more frequent but Self-reported ≠ measured.** Over half of households exposed to meteorological drought do not report being affected. Larger households and more diversified livestock holdings may buffer hazard sensitivity.
- **Technology awareness is low (**only 20%), but **Adoption conditional on awareness is high (72%)**.
- **Measurement limitations likely mask actual adoption rates.** We find that SSPs commonly define "improved" by where seed was obtained (e.g. market or NGO). Only about a third of respondents identified a hybrid as an improved seed.
- **The term hybrid is not consistently understood.** "Hybrid" does not similarly translate to consumers or suppliers across local languages. For example, in the Yoruba language, the term for hybrid "irugbin arabara" is also used for improved (non-traditional) seed more broadly.
- **Misidentification remains a problem:** we found non-improved seed identified as improved and visa versa.
- **Liquidity constraints may limit uptake.** Among farmers aware of hybrids, 96% expect them to increase profits, yet 28% don't adopt, citing costs.
- **More uncertainty around costs than benefits**: SSPs are more homogeneous in their beliefs around technology benefits than in their beliefs around technology costs, including labor and other inputs.
- **Incentives to invest may vary by climate hazard.** 71% and 59% feel unable to control high wind and drought losses, respectively. Yet only 20% feel unable to control crop losses to pest outbreaks.
- **Climate information often doesn't translate to action.** 52% of farmers who received weather information didn't act on it. Top reasons were that the information wasn't relevant to their farm (27%), that they had no affordable way to respond (27%), or that it arrived too late (20%).
- **Fatalism:** While being generally optimistic despite beliefs in a worsening climate, over two-thirds of respondents felt that "if misfortunate is meant to strike my farm, there is nothing I can do about it."
- **AEZ variability:** across expectations of future climate risk; awareness and use of production technologies and crop and soil strategies (with water management consistently the least known across regions); and SSP attitudes towards risk and the future. There are AEZ differences around trusted sources of weather information, but reasons for not acting on information (timeliness and relevance) are more common.