

Center on Risk and Inclusion in Food Systems (CRIFS)

Nigeria Risk Profile

Preliminary insights from the fieldwork with Partners:

- *Nigeria Bureau of Statistics*
- *Dev-Afrique*

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EVANS SCHOOL OF PUBLIC POLICY & GOVERNANCE

UNIVERSITY of WASHINGTON

Evans School Policy Analysis and Research (EPAR)



Agenda

1. About CRIFS – (1 slide)
2. The Nigeria context (1 slide)
3. Learning goals / mixed methods / preliminary findings (15 slides + 6 questions)
 - i. Climate risk landscape
 - ii. Improved seeds, hybrids and GMOs for climate adaptation
 - iii. Other technologies and practices for climate adaptation
 - iv. Climate risk communications
4. Feedback from AgDev and next steps (2 slides + 3 questions)

1. About CRIFS: Demand, Uptake, Adaptation (Jenny Frankel-Reed)

CRIFS Mission: *“generate and translate policy and action-focused knowledge to improve the lives and livelihoods of small-scale agricultural producers (SSPs) in low-income countries, inclusive of women, through interdisciplinary efforts that advance cost-effective strategies for managing risks and volatility.”*

Insights into closing the gap between technology and systems investments and last-mile adoption:

- Understanding when access is the barrier (policy, markets, delivery) and when adopter demand and risk perceptions limit uptake
- Work to effectively connect evidence to policy and investments

Approach: Build partnerships with in-country organizations in SSA and SA to “ground-truth” our work, speak with farmers, and disseminate findings, and leverage climate, computational, natural, and social science expertise to advance research and surface insights that informs AgDev and generates global public goods.

2. The Nigeria Context: increasing climate induced shocks, diminishing coping strategies and falling input adoption

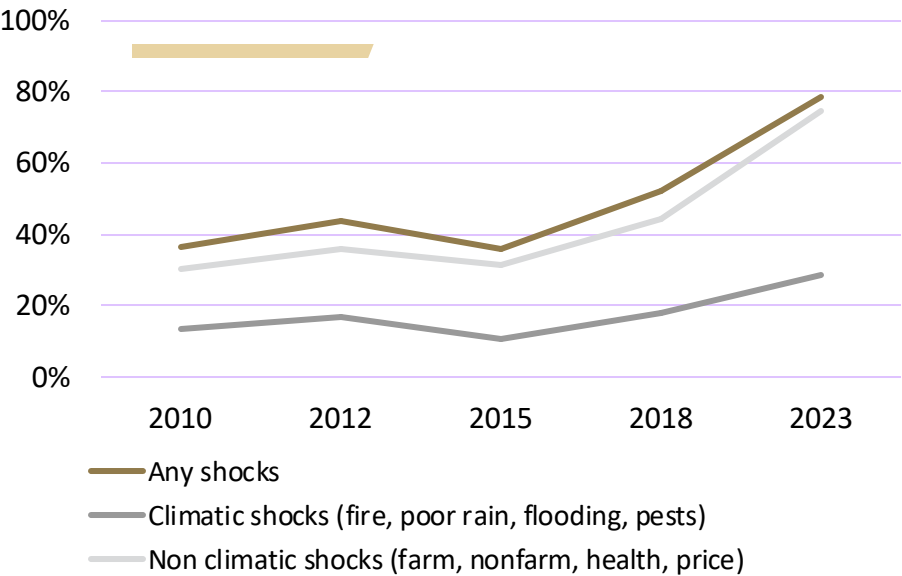


Figure below: Percentage of rural plot managers growing crops self-reporting using improved seeds - Nigeria

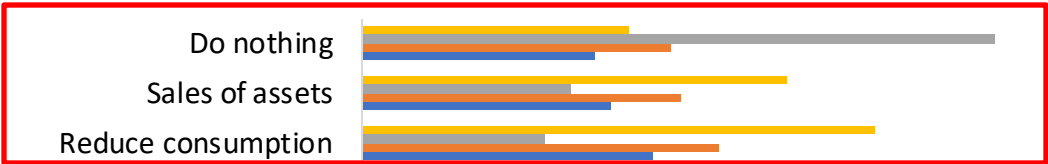
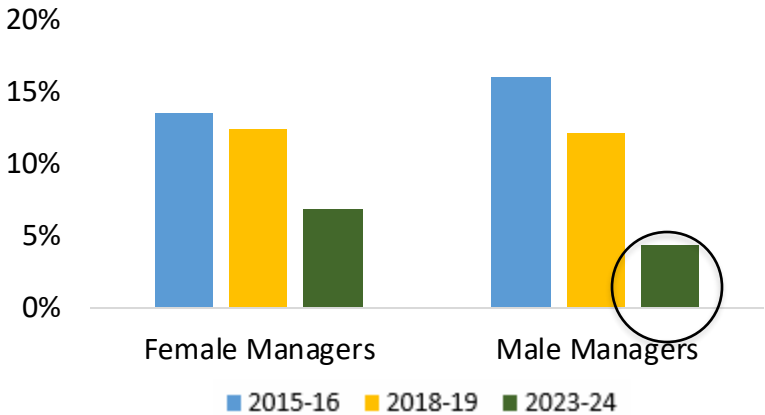
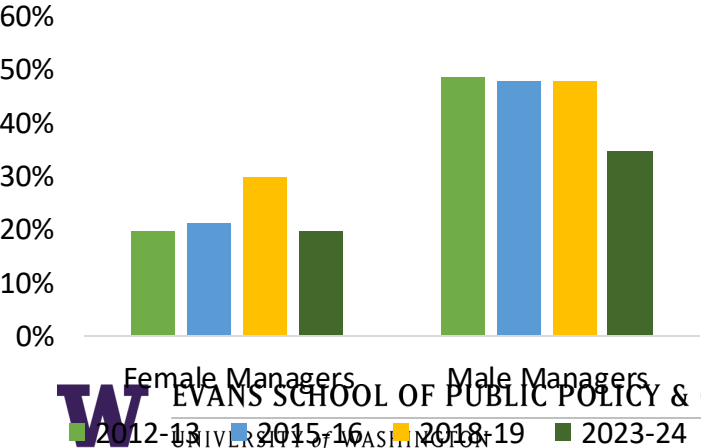


Figure left : Percentage of households affected by climate shocks reporting the use of different coping strategies, including doing nothing

Figure below : Percentage of rural plot managers growing crops self-reporting using inorganic fertilizer - Nigeria



3. Nigeria Farmer Risk Profiles: Learning goals

Combining multiple data sources (survey, admin, satellite, literature) contextualized with qualitative field work to both validate estimates and better understand uptake of technologies and practices, particularly vis a vis climate risk. CRIFS aims to:

1. Characterize the risk landscape **sub-nationally**
2. **Availability**: Understand supply-side constraints related to agro-dealers and markets (ltd data at this point)
3. Given (predictable) availability, assess SSP barriers to the adoption of adaptation technologies and practices, including:
 - **Measurement** (do data sources align? What is an improved variety to a farmer?)
 - **Awareness** of specific technologies (hybrids, GMOs)
 - **Incentives**: benefit / cost assessments (exposure, effectiveness, future orientation)
 - **Risk**: Assess if/how SSP **risk perceptions** of climate stresses v moving from the status quo, and **risk communication** are associated with adaptation behaviors

CLIMATE RISK EXISTS ➡ OPTIONS ARE AVAILABLE ➡ ADOPTION? Measurement Awareness Incentives Risk Perceptions

3. Nigeria Risk profile: mixed methods approach

Merging and triangulating data from:

1. National household survey – LSMS-ISA/GHS (for household/hh and farm detail) (n=3000)
2. New national phone surveys (PS) linked through the hh ID but focused on risk and adaptation (n=700) 21%/79% F/M
3. New in-depth qualitative focus group fieldwork in LSMS-ISA/GHS Enumeration Areas (EA) (n=5)
4. New EA community survey, agro-dealer and market visits (n=5)
5. Secondary climate data from satellite imagery (CHIRPS and CHIRTS-ERA5)
6. Prices & select sub-national admin data and gov't reports (NAERLS/FMAFS)
7. Published literature

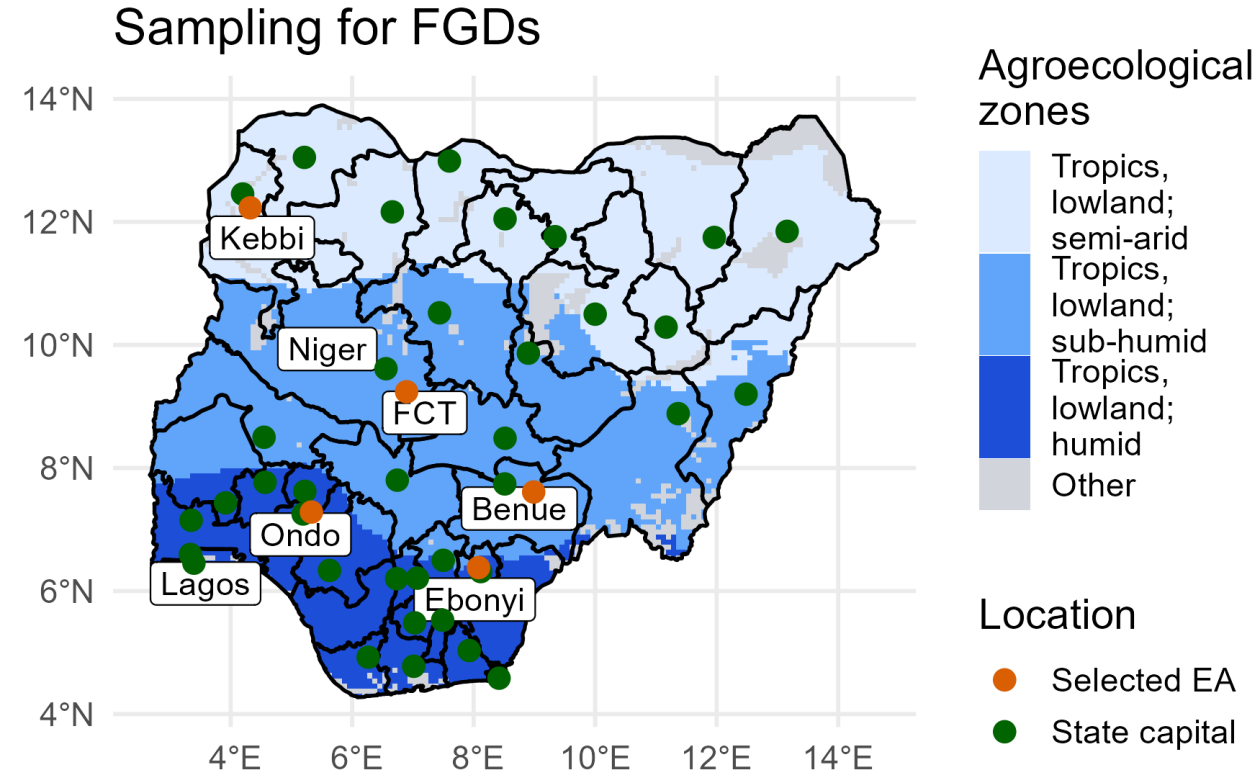
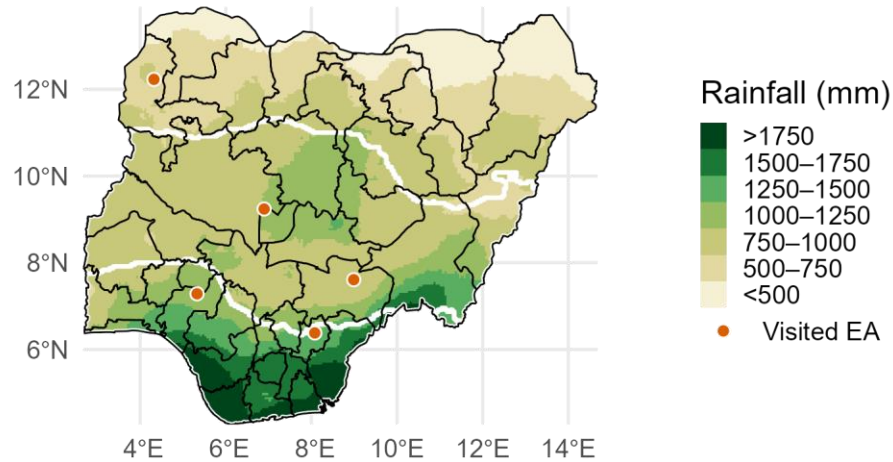


Figure: Location of EAs selected for the Risk Profile Fieldwork

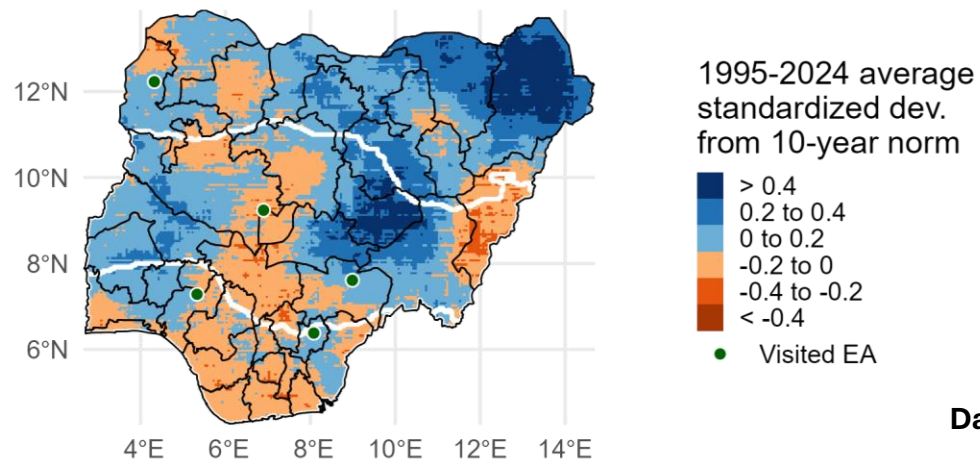
1. Jega, Kebbi State
2. Gurara, Niger State
3. Buruku, Benue State
4. Akure, Ondo State
5. Abakaliki, Ebonyi State

The Nigerian Climate Risk Landscape: Sub-national rainfall stress

Average March–August Rainfall (1995–2024)

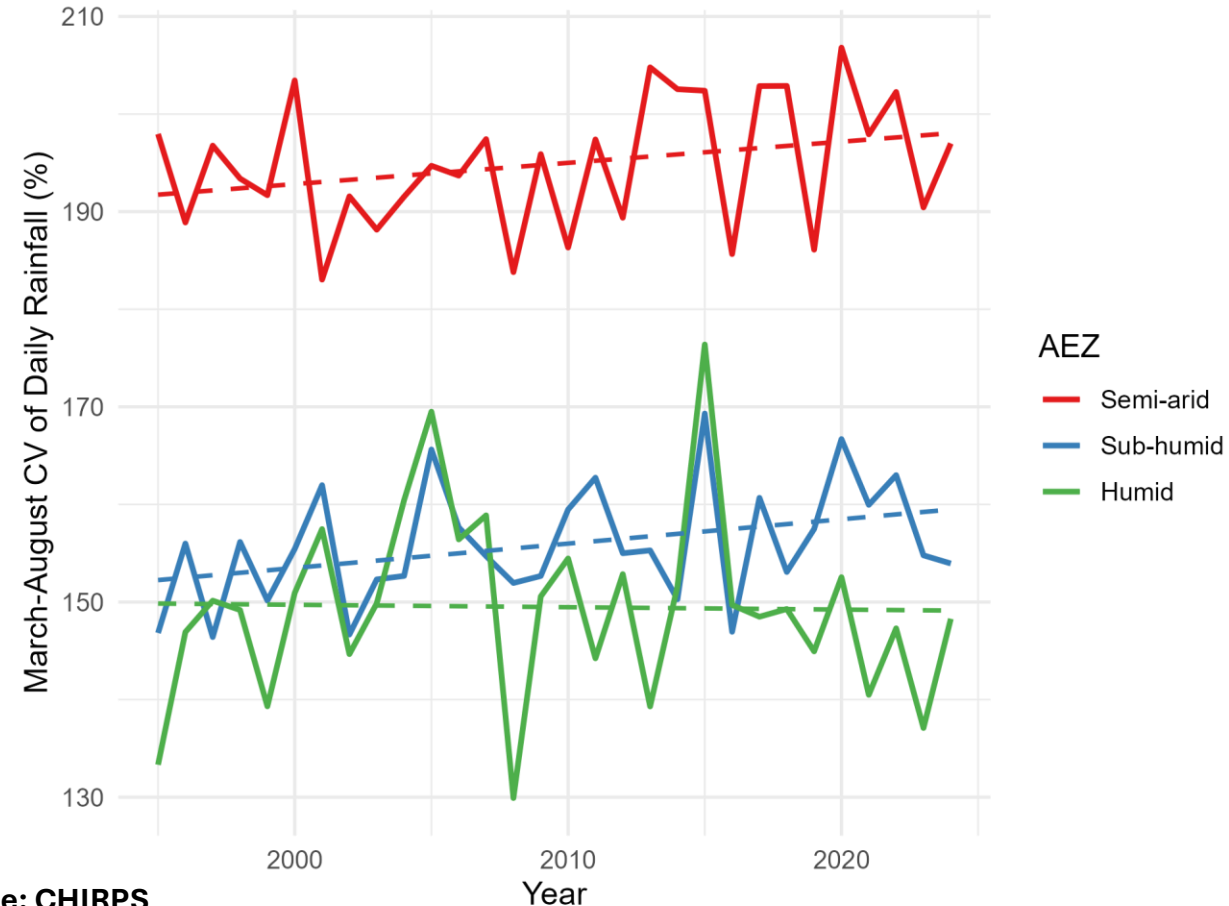


Average March–August Rainfall Anomalies (1995–2024)



Data source: CHIRPS

AEZ Average of March–August CV of Daily Rainfall

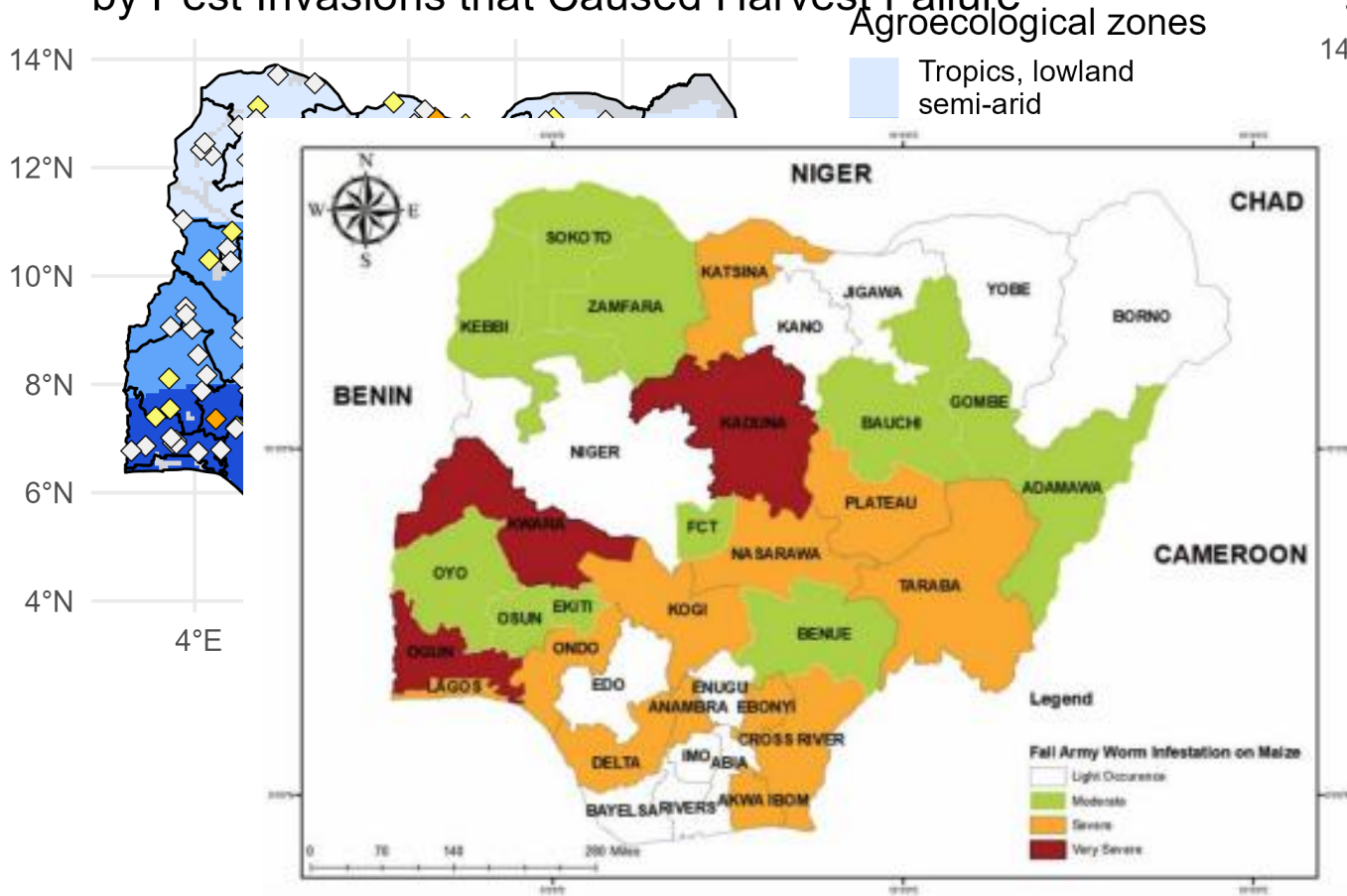


“We experienced heavy rains and floods the last two year [...] After the floods come insect infestation and fungal attack on the plants.”
- Farmer, Kebbi State

- Southern states historically wet are receiving lower than **longer-term average** rainfall and becoming more prone to droughts
- Low rainfall remains a challenge in the North despite higher-than-average rainfall in some years (suggesting fewer but more intense events)

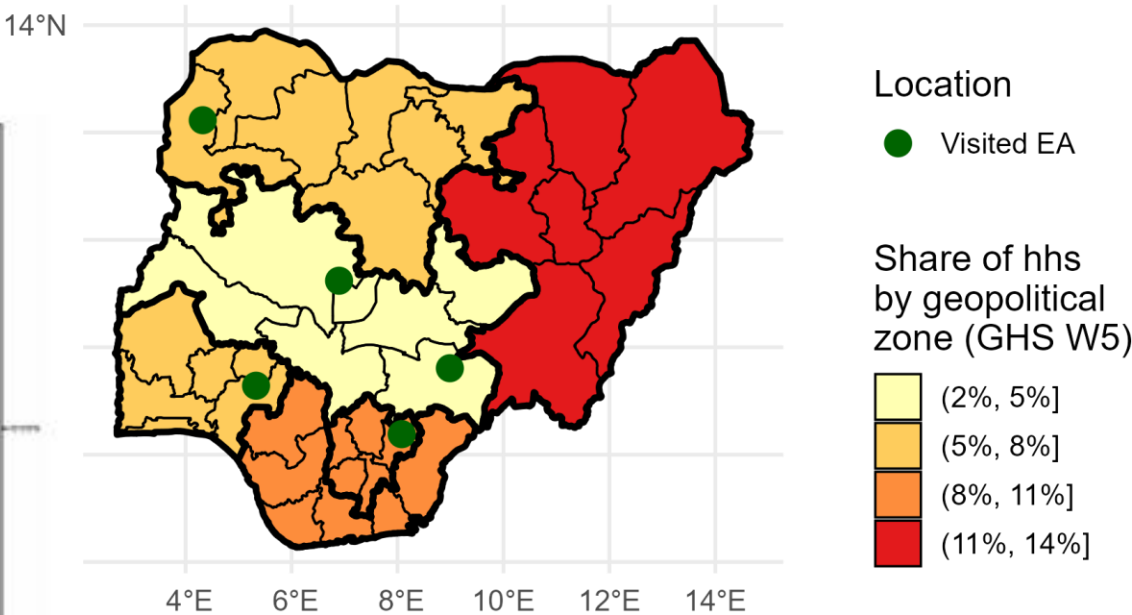
The Nigerian Climate Risk Landscape: Crop losses due to pest infestation

Share of Households by Enumeration Area (EA) Affected by Pest Invasions that Caused Harvest Failure



States where Fall Armyworm Infested maize

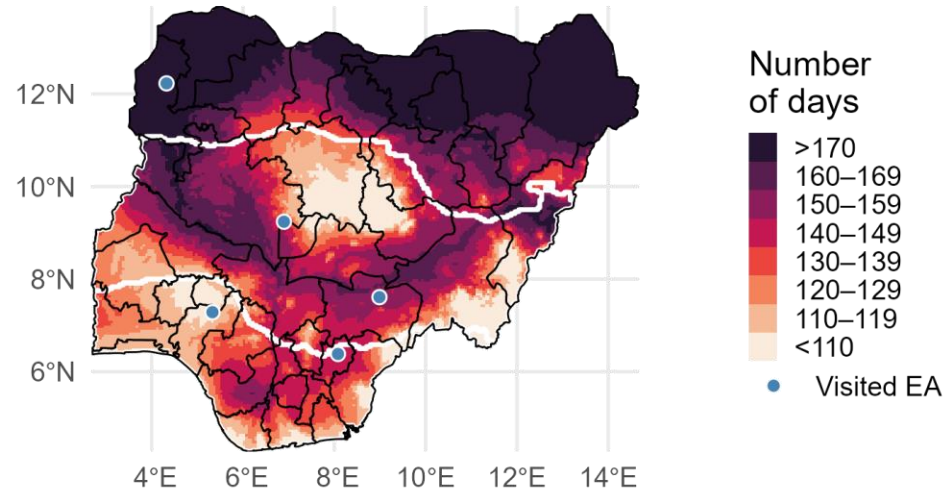
Share of Households by Geopolitical Zone Affected by Pest Invasions that Caused Harvest Failure



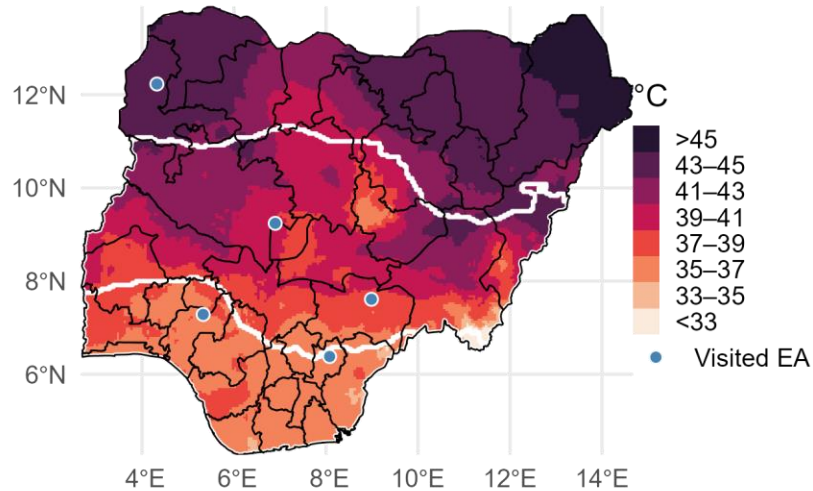
Data source: Nigeria LSMS-ISA/GHS Wave 5c 2023/24

The Nigerian Climate Risk Landscape: Heat Stress

Average March-August No. of Days with Tmax over 30°C (1995–2024)

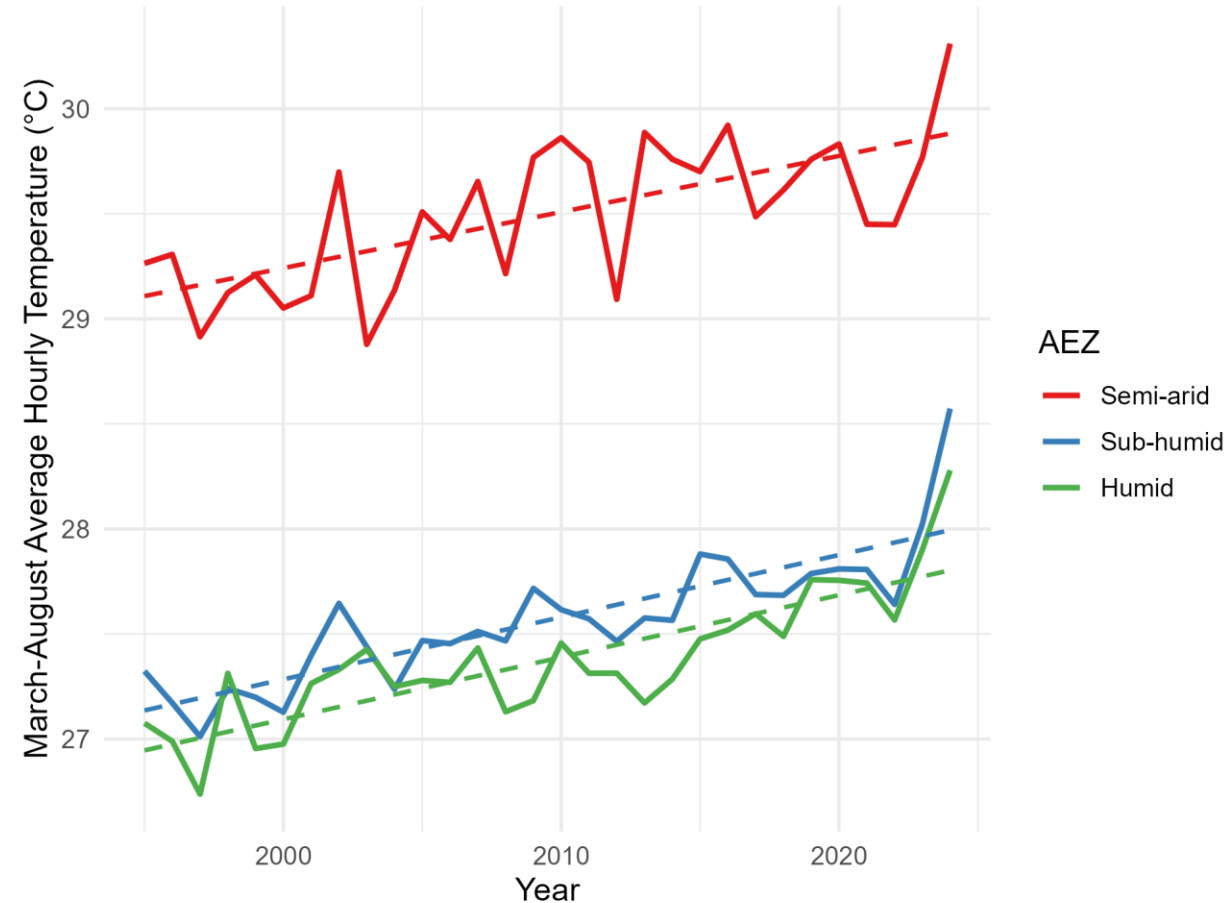


Maximum Temperature (March-August 2024)



Data source: CHIRTS and CHIRTS-ERA5

AEZ Average of March-August Hourly Temperature



“I have been experiencing increased heat, that is higher temperature than usual but have been unable to do anything about it.” - Farmer, Niger State

Availability: “Major challenges associated with using improved seeds include high prices and limited availability in their localities.” NAERLS, 2024

Table: Certified Maize Seed					
Zone	State	Quantity Procured (MT)	Quantity Distributed (MT)	Accessibility	Source
North West	Katsina	176	176	Yes	State
North Central	FCT	3	3	No	State
	Nasarawa	2		Yes	State
North East	Gombe		10	Yes	
South West	Ekiti		8	Yes	State
	Lagos	12	12	Yes	Fg, State
	Ogun	8	8	Yes	Others
	Oyo	46	46	Yes	State
South South	Akwa Ibom*	51	51	Yes	FG, State Govt, Others
	Bayelsa	7,500	7,500	Yes	FG
	Cross River	2	2	Yes	FG
	Edo	12	12	Yes	State
South East	Anambra	280	280	Yes	FG, State Govt, Others
Notes: * denotes hybrid maize seeds. Table source is the 2024 Wet Season Agricultural Performance in Nigeria: National Report.					

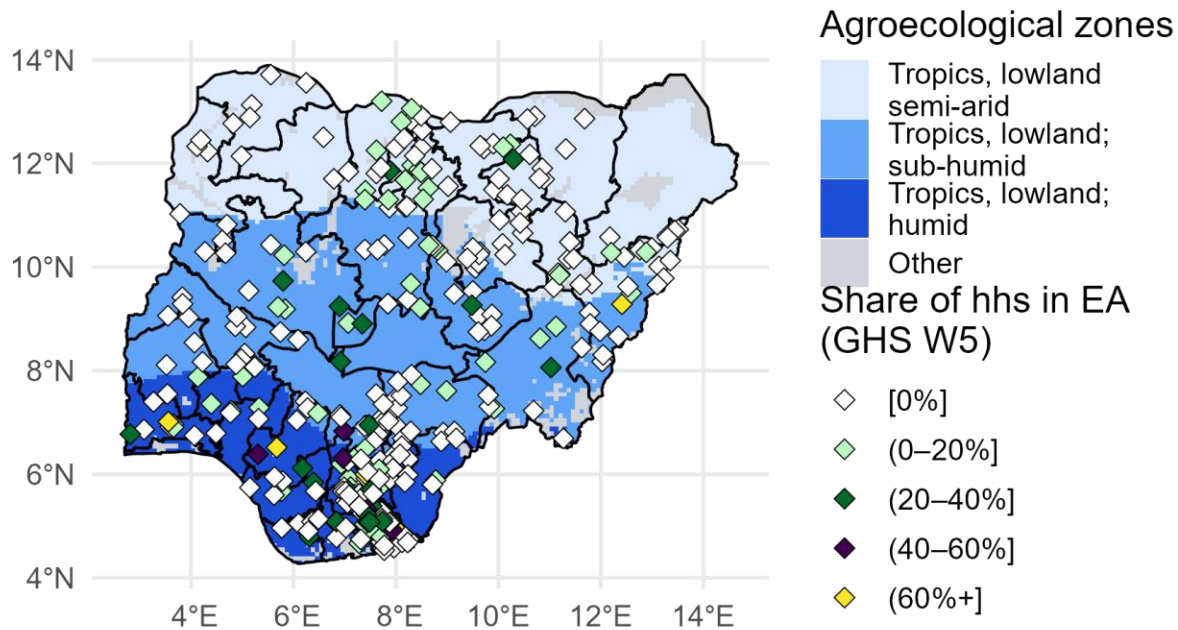
Though for MAIZE, Access and Affordability of certified seed was an issue in one state only. The NAERLS switches back and forth between “improved” and “certified” of which hybrids are a special case

“Yes, I understand improved seeds, and people know about it, but no improved variety is available in this shop.” - Agrodealer, Jega Market, Kebbi EA.

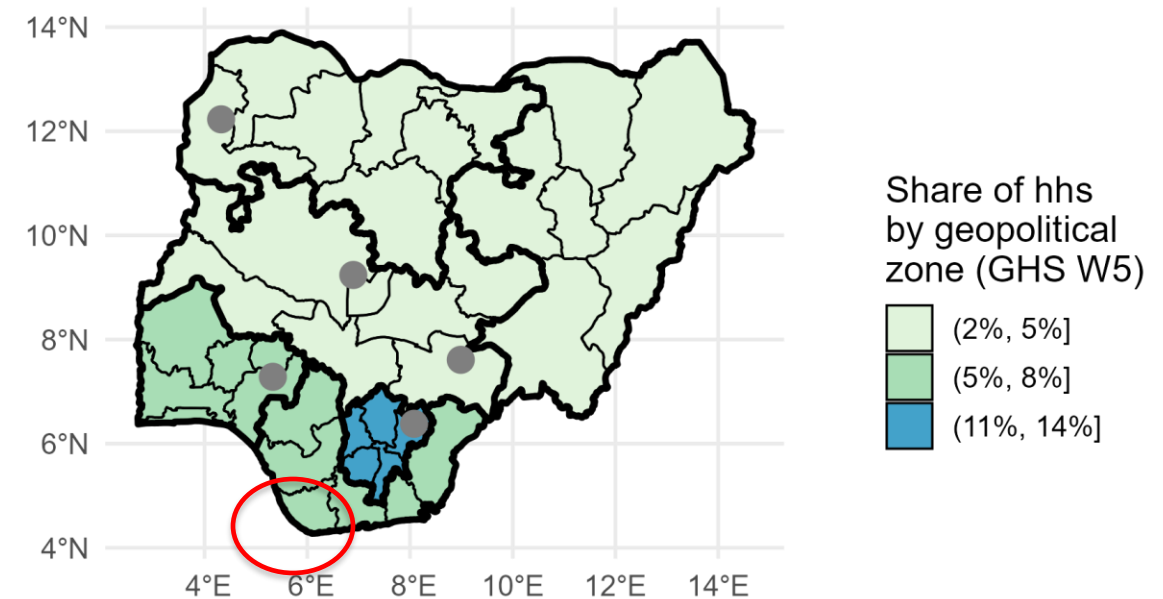


MEASUREMENT: Self-reported use of Improved Seeds from the GHS 2023/24

Use of Improved Seeds by Enumeration Area (EA)



Share of Households by Geopolitical Zone Using Improved Seeds



Data source: Nigeria LSMS-ISA/GHS Wave 1-5

Q1: Across the seed technologies that AgDev has supported over the years, is uptake lower / higher or about what you expected, and if lower, are there hypotheses we are missing?

What do farmers consider an IMPROVED SEED? Source or type/traits

- Surveys ask if farmer's use improved seeds to mean hybrid. But do farmers share the same understanding? We asked farmers in the focus group discussion the following questions:
- **Are improved [CROP] seeds something you know about?** Yes = 96, No = 4
- ***'What is an improved seed to you? Select all that apply:***

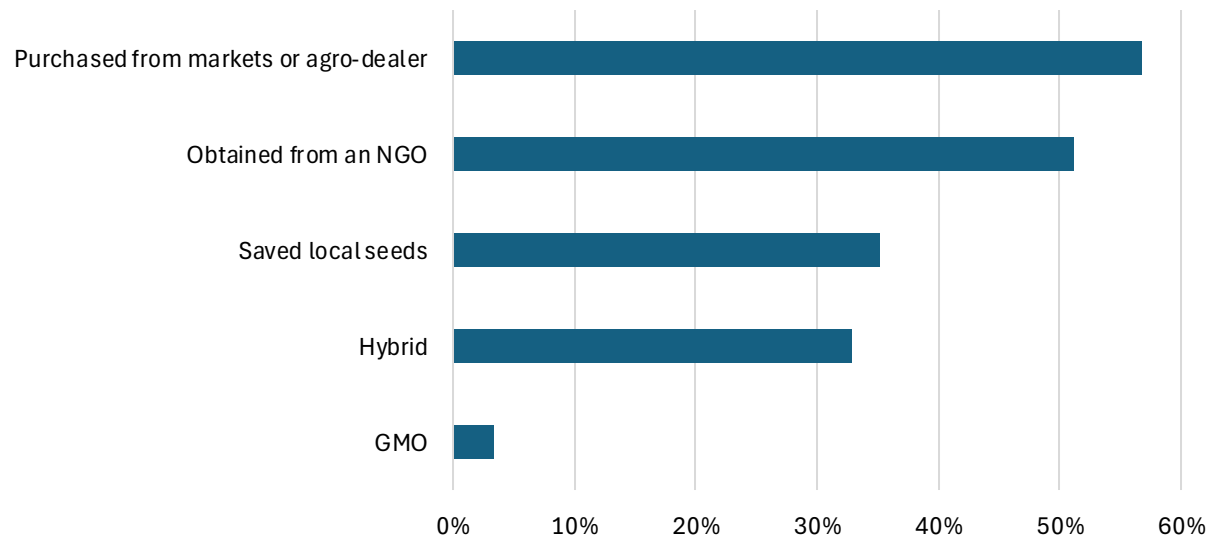


Figure: Knowledge of what constitutes an improved seed among FGD respondents
*Data for 8 respondents still being processed

“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-July, within 3 months.”
- Farmer, Niger State

“We have heard about improved seeds but have not used it or been given it [...] I plant CP [and other rice seed varieties].”
- Female farmer from Niger State who uses but is not aware of using an improved rice seed variety (CP variety).

Q2: To what extent is survey measurement of adoption rates and farmer mis-identification driven by terminology?
Next two slides show responses when farmers are asked explicitly about hybrids or GMOs

MEASUREMENT/AWARENESS/INCENTIVES: GMO seeds

Table: Are genetically modified organisms (GMOs) crops something you know about?

	Freq.	Percent
No	538	77
Yes	157	23
Total	695	100

Data source: Risk Profile Phone Survey

Table: Are you willing to plant a GMO crop?

	Freq.	Percent
No	17	11
Yes	136	89
Total	153	100

Data source: Risk Profile Phone Survey

“I have heard of Tela maize but haven’t sold it.”
- Agrodealer, Akure, Ondo State

Table: 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?

	Freq.	Percent
No	59	8.50
Yes	635	91.50
Total	694	100

Data source: Risk Profile Phone Survey

The term GMO does not appear as a barrier to planting in this group. Of the 157 who knew what a GMO was (and 94% of those correctly identified it as being genetically modified though 72% also said “any seed sold by a MNC) 89% were willing to plant it compared to 91% when the term GMO was not used.

MEASUREMENT/AWARENESS/INCENTIVES: HYBRID seeds

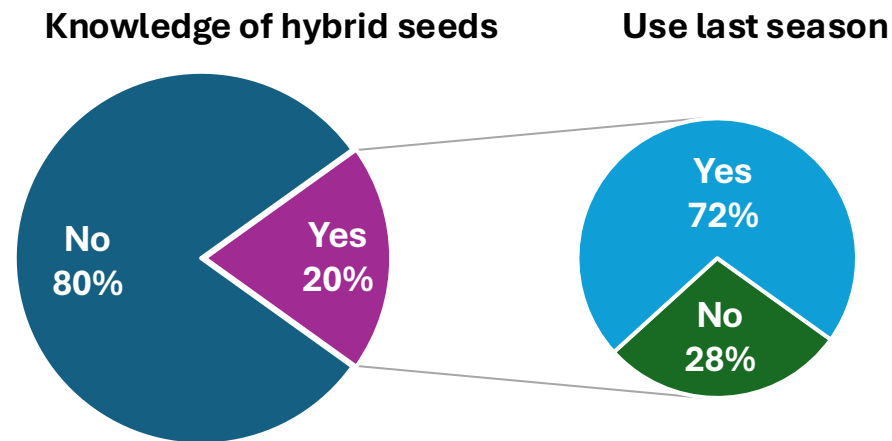


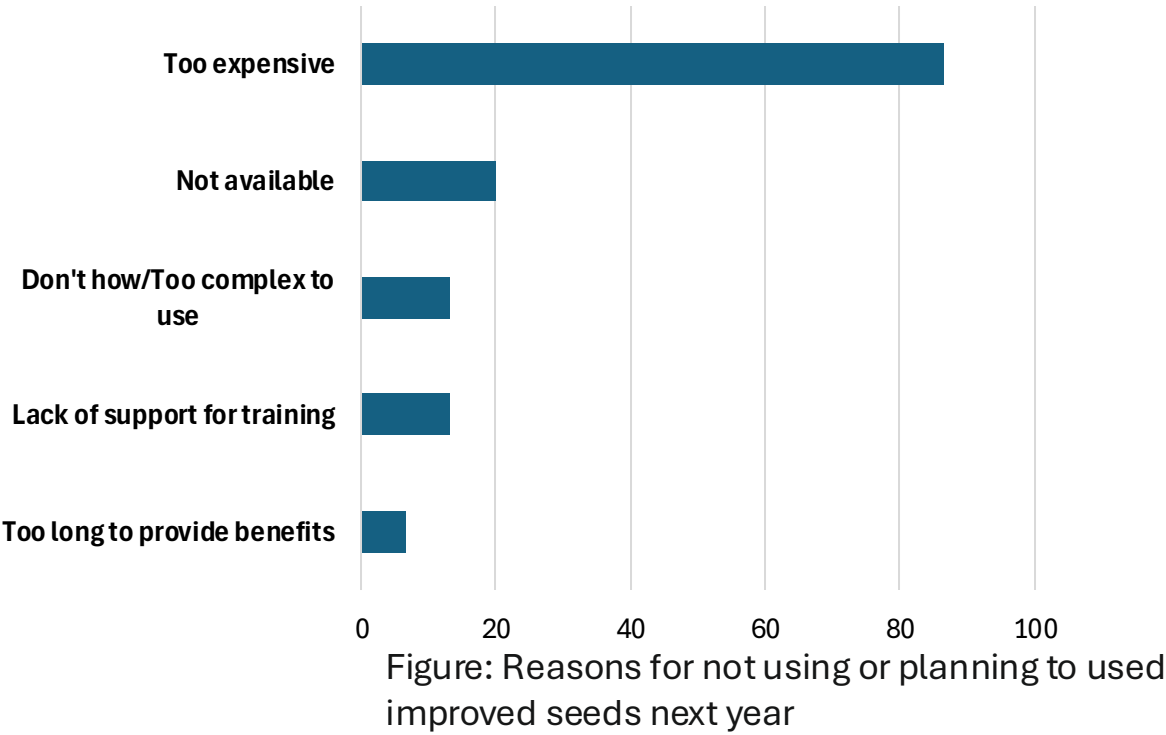
Table: Expected change due to use of hybrids (%)

	Yield	Profit	Labor time	Non-labor inputs
Increase	93	96	53	51
Decrease	2	2	38	37
No change	4	1	8	11
Don't know	1	1	1	1

Self-reported hybrid adoption rate in the PS = ~14%
(20% $\times$ 72%)

Self-reported improved seeds adoption nationally from LSMS-ISA/GHS 2023-24 is ~5%

- Of the 20% who are aware:
72% used hybrid seed last year, and all plan to continue using it next year
28% did not use hybrid seed, and of them 61% plan to adopt next year



Quantity of purchased improved seed varied btwn 1 kg and 25 kg, with the average cost in the open market high at ~ ₦2,800/kg. NAERLS, 2024

AWARENESS & INCENTIVES: Other inputs and adaptation behaviors

Table: Knowledge and use of other adaptation technologies

Technology or practice	Knowledge			Use in last ag season		
	No	Yes	N	No	Yes	N
Inorganic fertilizer	22%	78%	676	12%	88%	529
Herbicide/pesticide	35%	65%	672	12%	88%	437
Changing what you grow	90%	10%	678	30%	70%	71
Changing land or soil mgmt.	90%	10%	678	83%	17%	71
Changing water mgmt.	97%	3%	677	26%	74%	23

Data source: Risk Profile Phone Survey

Table: Expectation of changes due to use of herbicide/pesticide

	Yield	Profit	Labor time	Non-labor inputs
Increase	96%	95%	47%	64%
Decrease	2%	2%	48%	30%
No change	2%	2%	5%	6%
Don't know	0%	0%	0%	0%
N	437	437	437	437

Data source: Risk Profile Phone Survey

Q3: Do you observe patterns of differential uptake across technologies and geographies?

Q4: Do you hear about labor constraints to the same extent as limited access to credit or complementary inputs?

“I adapt to the changing climate/weather- late rains and early stopping of rains – by changing planting timing.”
- Farmer, Ebonyi State

INCENTIVES: % reported past and future risk exposure

Figure: Percentage of households affected by climate events over the past 5 years

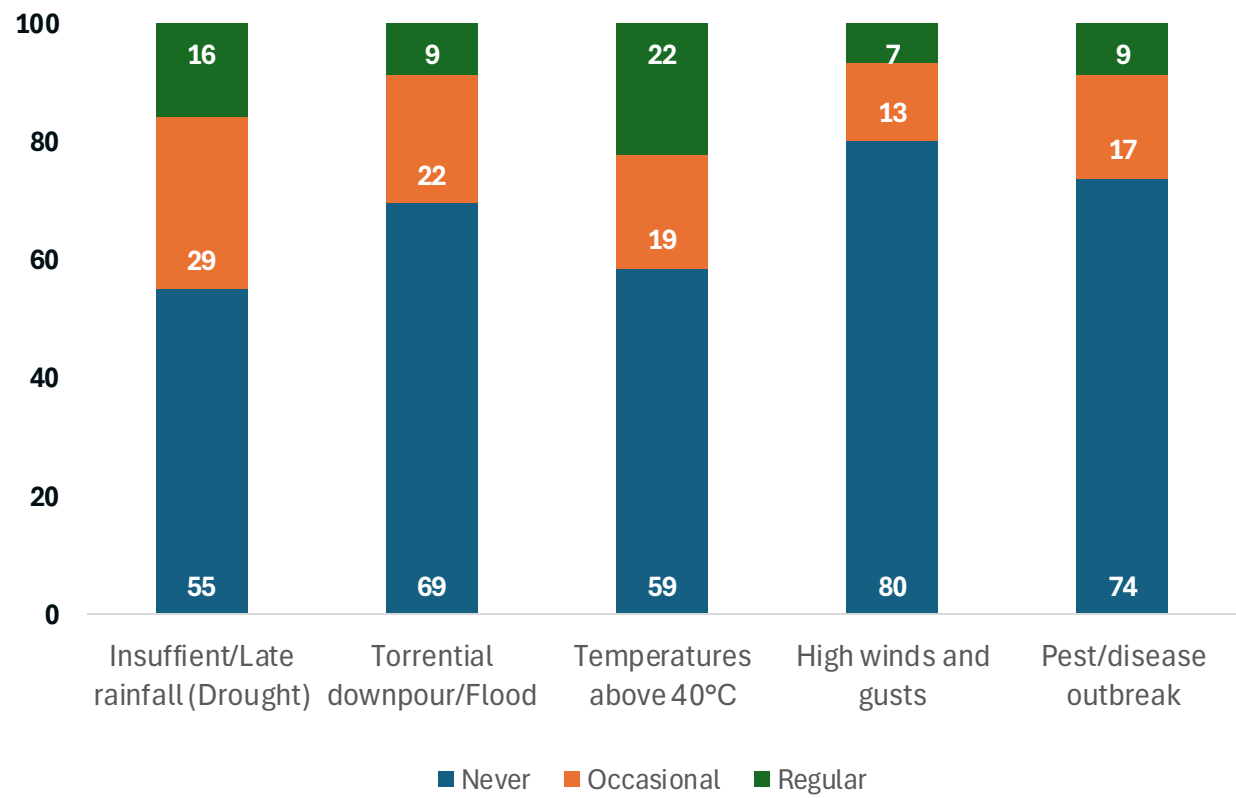
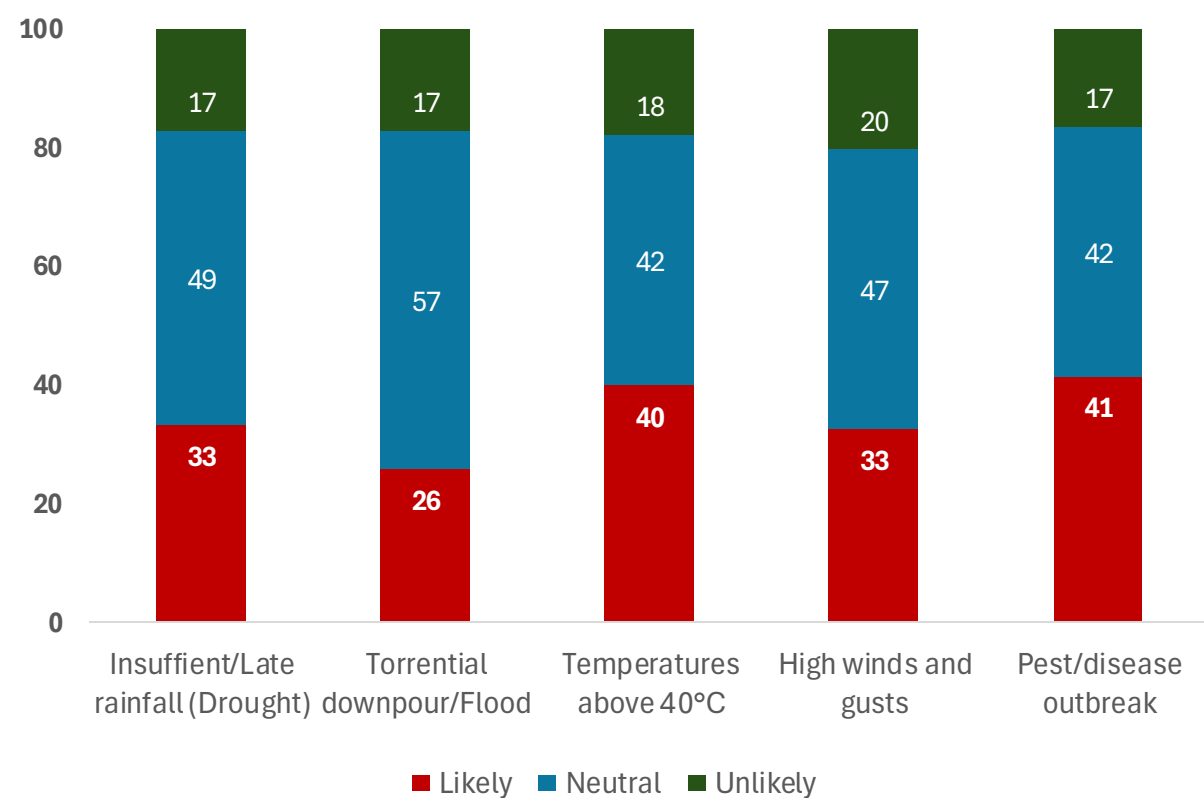


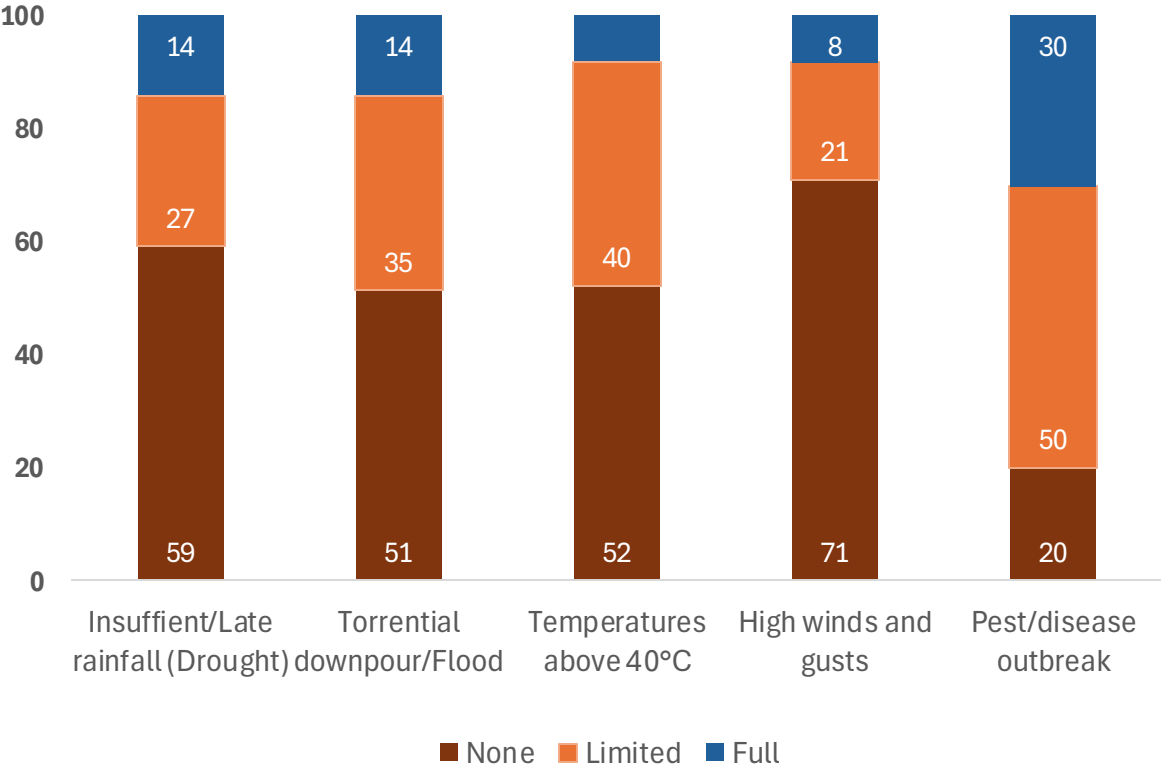
Figure: Percentage of households expecting future occurrence of climate events



Data source: Risk Profile Phone Survey

INCENTIVES / RISK PERCEPTIONS: farmers report having little control over associated losses, except pests and disease

Figure: Extent of control over losses caused by climate events



Data source: Risk Profile Phone Survey

“If I experience torrential downpours early in the planting season (immediately after planting), I replant the crops, but if the heavy downpour occurs much later in the season, like around September, I don’t plant again.”

- Farmer, Niger State

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

“I have had insect infestation [...] I buy insect killer powder from Jega market to kill the insects.”

- Farmer, Kebbi State

RISK PERCEPTIONS: Future aspirations, patience, risk-taking and worldview (locus of control)

Level of agreement (percent)			
		Strongly or somewhat Disagree	Strongly or somewhat Agree
Statement			
I am confident in myself as a farmer		4	94
I would like my children to become farmers		26	67
I am interested in changing or expanding to new economic activity		9	85
I am optimistic about the future		3	94
I am willing to forgo a profit opportunity in the short-run in order to benefit from potential profits in the long-run		8	88
I consider myself a person who is willing to take risks in farming		9	88
I believe that climate will be more and more unpredictable in the future		10	82
If misfortune is meant to strike my farm I cannot avoid it		24	69
I do not want anyone to tell me what to do on my farm.		55	40

Positive future orientation

Fatalistic

Data source: Risk Profile Phone Survey

“I have not done anything different to adapt to climate change, I just trust God.”
 “Sometimes I replant the crops that were damaged.”
 - Farmer, Kebbi State

Climate Risk Communication: Some descriptives from questions from the climate info module

Which of the following providers of weather/extreme weather event information do you trust? Select all that apply. (N=695)

	N	Percent
Government extension service	199	29
NGO	82	12
Farmers group association/cooperative	207	30
Farmer field school or lead farmer	71	10
Other peer farmer	97	14
Trader, market stakeholder, or private company	69	10
National weather service	120	17
Radio or television program	373	54
Other	27	4

Did you act on the weather/extreme weather event risk information? (N=248)

	N	Percent
No	128	52
Yes	120	48

Data source: Risk Profile Phone Survey

Why didn't your household make use of the information on weather/extreme weather event risk? Select all that apply. (N=128)

	N	Percent
Do not trust	17	13
Often wrong/Not reliable	16	13
Not timely	26	20
Difficult to understand	23	18
No options to respond/too costly to respond	35	27
Not relevant to my farm	34	27
Other	5	4

“I mostly get weather information from the radio. The forecast for high temperatures this year happened as predicted. I also got weather information that the rains will start in March, but it did not happen.”
- Farmer, Benue State

Q5: How have you seen climate risk communicated to farmers? Are some messages or messengers more effective at eliciting behavior change? Q6: How do we think about the risk/return tradeoffs for adopting productivity enhancing v. climate adapting technologies – including adaptations that may be yield neutral in the absence of a climate anomaly, but not costless?

Next steps (Didier Alia)

1. Finish data analysis: Merging data and completing the data analytics involving NBS and DevAfrique, including text analysis of FGD transcripts + econometrics (multivariate) of quantitative responses. Some initial priorities, differences across:

- **Commodity mix in EA areas**
- **Farm hh characteristics (including ability to pay and willingness to adopt/adapt)**
- **Deeper climate analysis and relevant indicators**
- **Changing shares of planted area, timing and pre-harvest losses**
- **Differences by M/F plot managers**

2. Improve the design of the fieldwork in Maharashtra in partnership with MAVIM / BISA

3. Workshop with a broader group of Nigerian partners working on technology adoption and climate adaptation

4. Outputs: Risk profiles series (Nigeria, Kenya, Maharashtra, Ethiopia? Bihar?); Github datasets and code, climate metrics/risk dashboard, conference papers (ICABR/APPAM)

Recap of Questions (Didier Alia)

1. Across the seed technologies that AgDev has supported and deployed over the years, is uptake lower / higher or about what you expected and if lower, are we missing hypotheses?
2. To what extent is survey measurement of adoption rates and farmer mis-identification driven by terminology?
3. Do you observe patterns of differential uptake across technologies and geographies?
4. Do you hear about labor constraints to the same extent as credit or access to complementary inputs?
5. How have you seen climate risk communicated to farmers ? Are some messages and messengers more effective at eliciting behavior change?
6. How do we think about the risk/return tradeoffs for adopting productivity enhancing v. climate adapting technologies – including adaptations that may be yield neutral in the absence of a climate anomaly, but not costless?
7. **Keeping in mind that analytics are just beginning, is there anything you would like us to focus on with NBS or DevAfrique?**
8. **What is important to adapting this work to Kenya and Bihar?**
9. **Ideas for dissemination venues once the analysis is complete?**

