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Climate change awareness and mitigation strategies in rural Mozambique

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Climate Change Awareness and Mitigation Strategies in Rural Mozambique*

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1 Introduction

Mozambique, primarily an agricultural economy, has 81% of its population engaged in agriculture, which contributes 27% to the nation's GDP.[1] However, the agricultural sector is increasingly vulnerable to the rising frequency and intensity of extreme weather events, a consequence of climate change (Intergovernmental Panel on Climate Change, 2022). Between 2000 and 2019, climate-related disasters increased by 83% compared to 1980 to 1999. The number of such disasters rose from 3,656 to 6,681 events globally. These include floods, storms, heatwaves, and droughts, all of which directly impact agricultural productivity (United Nations Office for Disaster Risk Reduction, 2020). The direct consequences of these events, including loss of lives, assets, and habitats, are immediately apparent. For Mozambique's farmers, who largely depend on rain-fed agriculture for their livelihoods, these climate shocks often lead to devastating financial losses and depletion of productive assets.[2] The resultant shocks trap many farmers in cycles of poverty, inhibiting their ability to invest in their farms and secure better returns.

The financial uncertainty triggered by climate-induced shocks has far-reaching consequences on household welfare and critical areas like nutrition, children's education, and healthcare. These effects are often long-term, perpetuating poverty among already vulnerable communities. Addressing these risks requires effective risk-mitigation strategies, such as agricultural insurance. However, Mozambique currently offers few insurance products or risk mitigation instruments for farmers, leaving a significant portion of the country's arable land underutilized. Given this context, developing agricultural insurance and other risk management tools is critical for enhancing growth in Mozambique's agricultural sector. In collaboration with the Ministry of Agriculture, previous work has focused on analyzing climate risks and their impact on human development indicators, along with assessing farmers' perceptions of risk management and the state of agricultural insurance in Mozambique.

In this report, we focus on two objectives related to these risks by studying attitudes associated with climate change in a sample of rural residents in the Zambezia province of Mozambique, a population at high risk of the consequences of climate change. First, we assess their knowledge and understanding of climate change and its related risks. This is an important dimension because, for instance, Dechezleprêtre et al. (2022) show how people's support for climate action is influenced by their knowledge of climate impacts and the perceived effectiveness of climate policies. Similarly, studies show that farmers' perceptions and awareness of climate risks influence their decisions to adopt adaptation measures. When farmers are unaware or misinformed about climate change and its associated risks, they are less likely to implement necessary mitigation strategies

[1] World Bank's Microdata Library: Agriculture, forestry, and fishing, value added (% of GDP) - Mozambique, 2022

[2] According to the Food and Agriculture Organization of the United Nations, only 3% of Mozambique's arable land is irrigated.

such as climate-smart agricultural practices or other adaptive techniques that could enhance resilience to extreme weather events (Ma and Rahut, 2024).

Second, we gather the same population's understanding of and willingness to adopt risk mitigation strategies, including the adoption of agricultural insurance. There is an overall limited understanding of mobilization against climate change, particularly in poorer countries, where the ability to mitigate the effects of climate change is minimal (see, for instance, Dechezleprêtre et al., 2022). In particular, in relation to agricultural insurance, a growing body of literature has highlighted the deep constraints to adoption. Farmers face several other barriers to adopting agricultural insurance and risk mitigation strategies. Limited access to credit makes it difficult for them to pay upfront premiums (Conning and Udry, 2007), and their high-risk aversion leads them to avoid costly but potentially beneficial investments (Rosenzweig and Binswanger, 1993). Many are also reluctant to pay up-front for uncertain benefits, contributing to low demand for insurance (Cole and Xiong, 2017; Casaburi and Willis, 2018). Low trust in institutions, basis risk, and present bias further reduce adoption (Cole et al., 2013; Clarke, 2016). Additionally, Fishman et al. (2021); Emerick et al. (2016); Dar et al. (2021) point out that alternative strategies like drought-resistant seeds and irrigation can be expensive, not widely available, and are not suitable for the most extreme weather.

The report is organized as follows. Section 2 describes the data collection activities, including the framing of the questionnaire and the characterization of respondents, Section 3 discusses the results, while Section 4 concludes and provides some policy lessons.

2 Survey

2.1 Sampling of participants

The sample analyzed in the report is based on Armand et al. (2024). The study provides a sample of migrants representative at the city block level of the total population of households containing at least one recent migrant in Quelimane, Mozambique. Quelimane is a coastal city in central Mozambique, which serves as the capital of Zambezia Province and plays a vital role as a port and agricultural hub in the region. The city has grown rapidly in recent decades, with the city's population doubling from 2010 to today, reaching over 500,000 inhabitants.[3] Much of this growth has been driven by the arrival of internal migrants, mostly from the surrounding rural areas.

As part of this project, we interviewed a sample of rural relatives of these migrants. During the baseline sampling of migrants in Armand et al. (2024), we asked respondents to provide the name

[3] World Population Review: https://web.archive.org/web/20240123115845/https://worldpopulationreview.com/world-cities/quelimane-population

and contact of a relative still residing in the migrant's place of origin. Using this information, we created a sample of 2,331 individuals aged 18 to 80 years with access to a mobile phone.

2.2 Data collection activities

Data collection for this project took place in July 2024. The survey was conducted by a team of enumerators who interviewed participants via phone, offering the option of conducting the interview in either Portuguese or a local language, depending on the interviewees' preferences. This flexibility ensured respondents could express themselves comfortably and accurately, reducing potential language barriers and enhancing data quality.

Before fieldwork commenced, the enumerators underwent extensive training conducted by the research team to ensure a thorough understanding of the survey's objectives, protocols, and ethical guidelines. The training focused not only on the technical aspects of the survey but also on proper communication techniques and cultural sensitivity, ensuring that the enumerators could navigate complex or sensitive topics with care and professionalism.

A field coordinator oversaw the entire data collection process, playing a critical role in ensuring the accuracy and reliability of the data. The field coordinator conducted daily reviews of the collected data, checking for inconsistencies, errors, or missing information. This ongoing quality control process allowed for the early identification of potential issues that could compromise data integrity. Any notable findings or concerns were regularly communicated to the research team to ensure transparency and immediate resolution of issues.

The field coordinator closely monitored the interviews throughout the data collection to verify that enumerators adhered to the established procedures and protocols. This included random spot-checks of interviews and reviewing recordings (with participants' consent) to ensure quality standards were maintained. Any questions or challenges during the interviews were addressed in real time, ensuring the smooth continuation of data collection.

Regular meetings between the principal investigator and the field coordinator were held to track the progress of the fieldwork and discuss emerging patterns or challenges. These meetings provided an opportunity to make necessary adjustments to the data collection plan, ensuring that timelines were met and data quality was maintained throughout the process.

From the original sample of 2,331 individuals, we successfully interviewed 2,261, obtaining a non-response rate of 3%. The remaining were not interviewed due to incorrect or inactive phone numbers, or refusals to participate.

2.3 Questionnaire

Appendix A provides the full questionnaire used in the survey. The questionnaire was meticulously designed to collect comprehensive data on participants' perceptions of climate-related risks, their experiences with the impacts of climate change, and their opinions on how individuals and the government should respond to these challenges. In addition, the questionnaire aimed to gather information that could inform the development of agricultural insurance products and risk management strategies tailored to mitigate the adverse effects of climate change on agricultural communities.

The survey began with a demographic section, capturing key background information on respondents such as age, gender, marital status, household size, and education level. This section allowed for data segmentation based on demographic variables, enabling a deeper analysis of how different groups perceive and respond to climate risks.

A significant portion of the survey focused on risk perception and management. Respondents were asked about their personal experiences with extreme weather events, such as floods, droughts, and storms, and how these events affected their livelihoods, particularly regarding agricultural productivity and economic stability. They were also asked about their perceptions of the likelihood of such events becoming more frequent or severe, providing insights into their level of concern and preparedness.

The survey explored formal and informal strategies individuals use to manage these risks. Questions covered savings, community-based support systems, reliance on government aid, and the role of traditional knowledge and practices in coping with climate-related challenges. This section provided valuable insights into how well-prepared respondents are to cope with the increasing unpredictability and intensity of climate-related risks.

In addition to risk management, the questionnaire included a section on agricultural insurance, assessing respondents' awareness and attitudes toward such products. This section explored participants' understanding of how insurance works, their knowledge of existing agricultural insurance options, and their willingness to pay for such services. Specific questions were designed to uncover potential barriers to insurance uptake, such as cost, trust in insurance providers, and perceived relevance of insurance to their livelihoods.

The agricultural insurance section aimed to identify key factors that could facilitate or hinder the adoption of agricultural insurance. By gathering detailed feedback on these issues, the research team sought to inform the design of insurance products that better meet the needs of farmers, particularly in rural areas where the impacts of climate change are likely to be most severe. The ultimate goal is to develop insurance solutions that are both accessible and effective in helping farmers manage the financial risks associated with increasingly erratic weather patterns.

2.4 Descriptive statistics

This section provides a description of the sample. We begin by focusing on demographic characteristics. Table 1 provides summary statistics for respondents' available demographic and socioeconomic characteristics. On average, respondents are 33 years old and 57% are male. Most respondents have completed secondary education (55%), while 23% have completed only primary or no education. The main religion is Catholic, with 56% of respondents reporting it, as compared to 13% of respondents reporting Islam as their religion and 11% reporting Adventism. Respondents report a weekly individual income of 780 Mozambican Meticais and a weekly household income of 988 Mozambican Meticais.

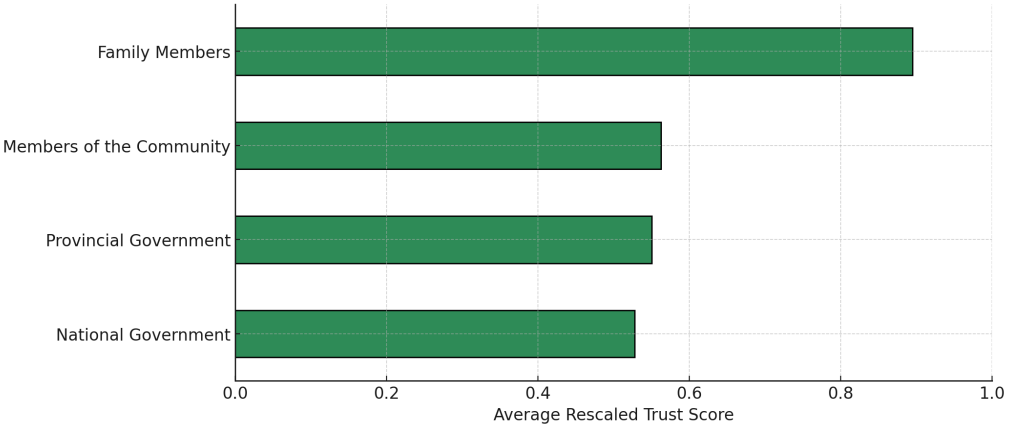
Table 1: Descriptive statistics

Variable	Mean	Standard deviation	Observations
Age	32.8	8.62	2255
Male	0.57	0.49	2253
Primary education or less	0.23	0.42	2253
Secondary education	0.55	0.50	2253
Catholic	0.56	0.50	2253
Muslim	0.13	0.34	2253
Adventist	0.11	0.32	2253
Individual income (weekly)	780.1	1695.7	2259
Household income (weekly)	987.8	1687.2	2259

Note. The table presents the sample mean, standard deviation, and number of observations for each of the variables presented. The total sample size is 2,261 respondents.

We further classify respondents based on their average level of trust towards different groups. Using a scale ranging from 0 (no trust) to 1 (complete trust), Figure 1 shows the average level of trust among respondents in family members, other members of the community, the Provincial Government, and the National Government. Family members receive the highest average trust score among respondents, indicating that interpersonal trust within the family unit remains strong. In contrast, trust in government entities, both provincial and national, is lower, reflecting potential skepticism or dissatisfaction with these institutions. This has implications for how effectively the public might receive government-led initiatives.

Figure 1: Average levels of trust among respondents



Note. The figure illustrates the average re-scaled trust scores of different entities as reported by survey respondents. These include Family Members, Members of the Community, the Provincial Government, and the National Government. The scores are re-scaled from 0 to 1, where 0 indicates no trust and 1 indicates complete trust.

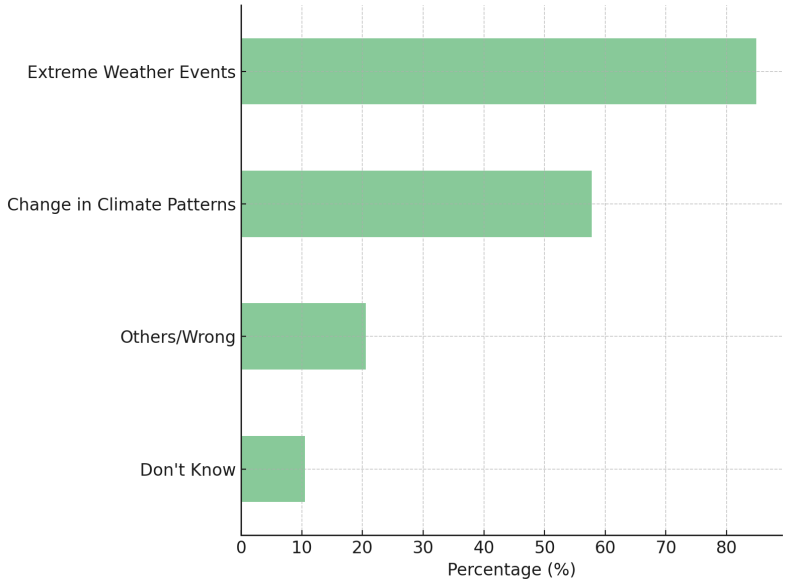
3 Results

In this section, we provide an analysis of respondents' understanding of climate change and their perception of risk associated with natural events (Section 3.1), followed by a description of their attitudes towards climate change mitigation (Section 3.2).

3.1 Understanding of climate change

We begin by focusing on whether respondents know what climate change is. Figure 2 shows the distribution of respondents' beliefs regarding the definition of climate change, provided in an open-ended question in which respondents were asked to define climate change, allowing for multiple responses. The data indicates that 47.7% of respondents primarily associate climate change with increased extreme weather events. While acknowledging the consequences of climate change, this view does not fully encompass the broader scientific definition, which includes alterations in long-term climate patterns. A correct understanding, which recognizes climate change as a shift in climate patterns, is held only by 30.9% of respondents. This suggests that most of the population does not understand the underlying processes involved in climate change. Specifically, 16.2% of respondents associate climate change with other incorrect factors, such as divine punishment, and 5.2% report not knowing what climate change is. These results indicate some level of understanding of the scientific basis of climate change. However, a considerable proportion of the population still holds alternative or incorrect views.

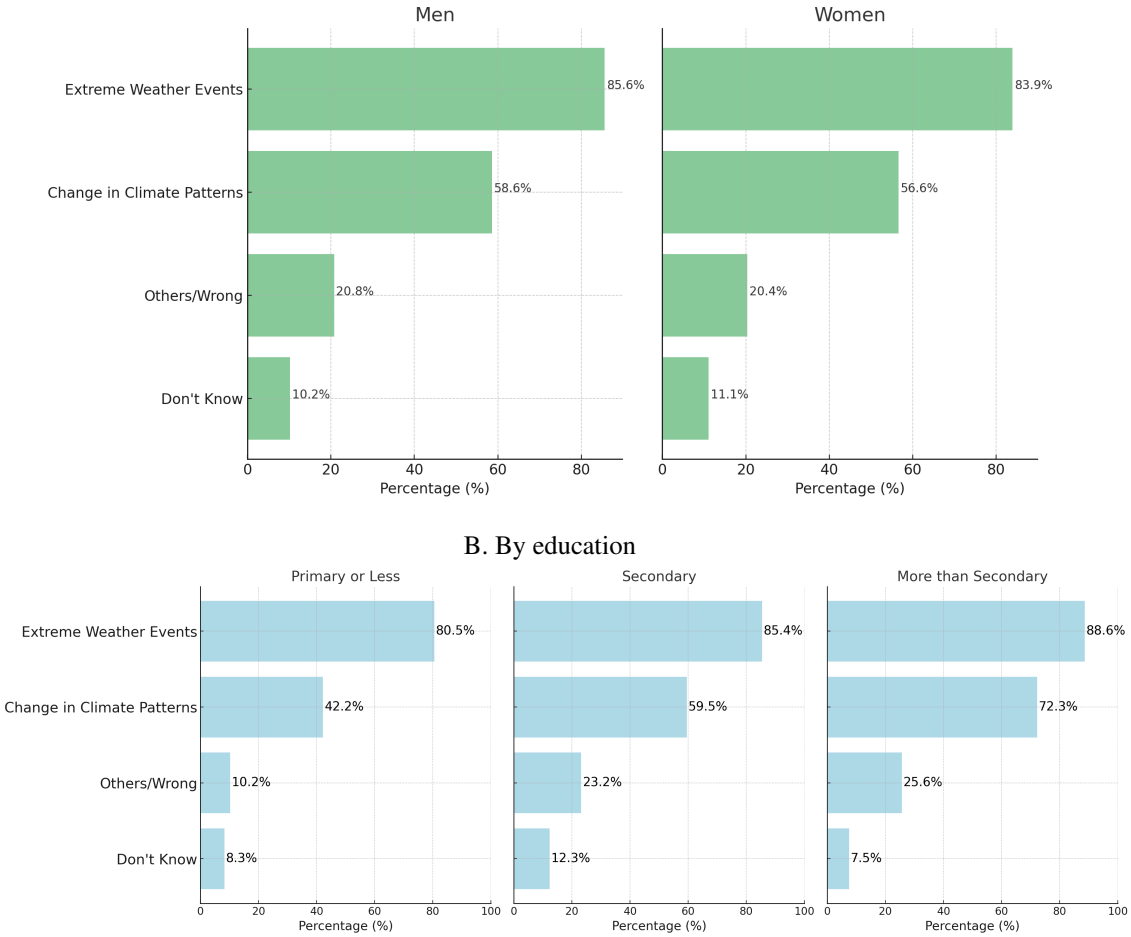
Figure 2: How respondents define climate change



Note. The figure displays the percentage of respondents who associate at least one factor from each category with their definition of climate change. The question was open-ended, and surveyors selected the option that best matched the respondents' understanding of what climate change means. Respondents could choose multiple factors, and the percentages reflect those who mentioned at least one factor from each category.

Figure 3 provides the same analysis presented in Figure 2, but distinguishing by gender and by education levels. While we observe similar results by gender, unsurprisingly, we observe a higher understanding of climate change among respondents with higher levels of education. Appendix B provides additional heterogeneity of perceptions depending on the education of the respondent.

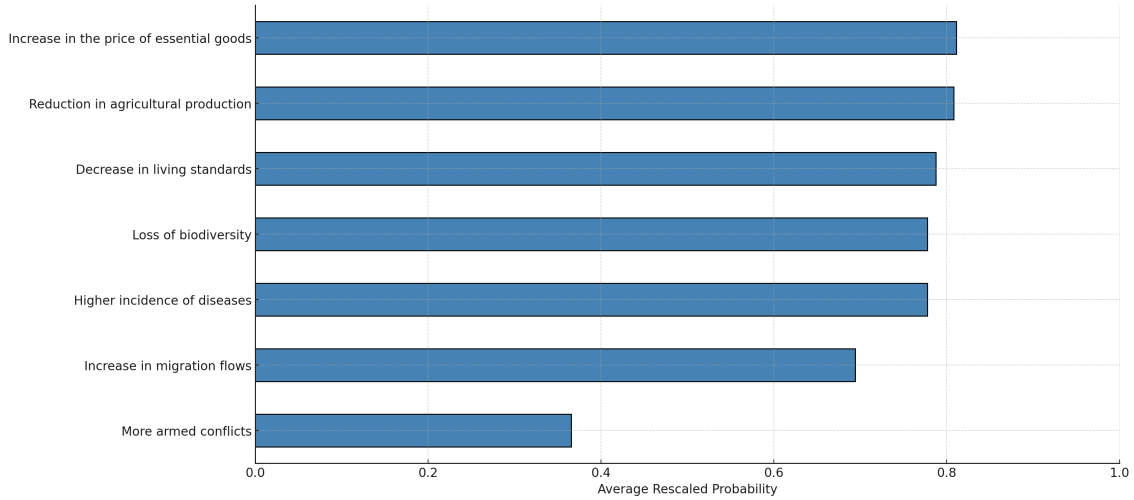
Figure 3: How respondents define climate change, heterogeneity by gender and education



Note. Panel A displays the percentage of male and female respondents who associate at least one factor from each category with their definition of climate change. The question was open-ended, and surveyors selected the option that best matched the respondents' understanding of what climate change means. Respondents could choose multiple factors, and the percentages reflect those who mentioned at least one factor from each category. Panel B displays the percentage of respondents who associate at least one factor from each category with their definition of climate change. The question was open-ended, and surveyors selected the option that best matched the respondents' understanding of what climate change means. Respondents could choose multiple factors, and the percentages reflect those who mentioned at least one factor from each category. The results are split by education level into three groups: Primary or Less, Secondary, and More Than Secondary.

While we record an imperfect understanding of climate change, respondents associate climate change with agricultural risk. In Figure 4, we show respondents' perceived probabilities of various climate change consequences. The highest perceived probabilities are for economic impacts related to agriculture, such as the reduction in agricultural production or an increase in the price of essential goods. The two events with the lowest perceived probability are increased migration flows and armed conflict.

Figure 4: Perception of the consequences of climate change



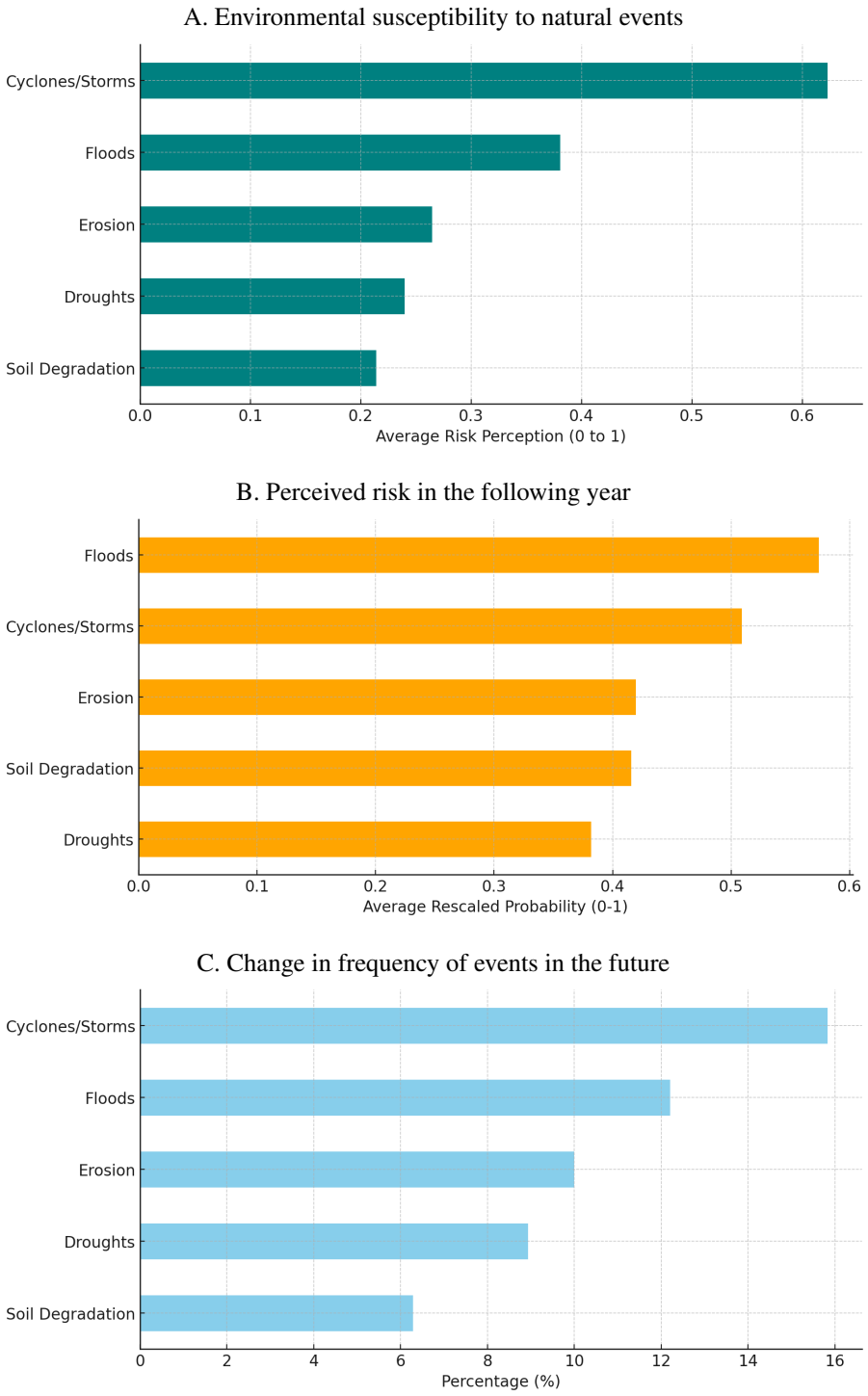
Note. The figure illustrates respondents' perceptions regarding the likelihood of various consequences if no significant action is taken against climate change. There were four degrees of probability: not likely at all, not likely, likely, and very likely. The graph presents an average re-scaled probability based on these answers.

We then focus on understanding risk perceptions among respondents. We begin by analyzing whether respondents perceive their residence as being at risk from natural events. Panel A in Figure 5 illustrates survey results on respondents' perceptions of their local environment's susceptibility to various destructive or damaging natural events, such as cyclones and storms, floods, erosion, droughts, and soil degradation. In line with the recent experiences of Mozambique with cyclones, most respondents believe they are at risk of cyclones and strong storms. For other natural events, most respondents do not believe they live in an area likely to be affected by the specified events. For instance, close to 80% believe in not being at risk of soil degradation or droughts.

Respondents provided a similar perception of risk when asked about the risks of experiencing any destructive or damaging natural events in the 12 months following the interview. Panel B in Figure 5 illustrates respondents' perceptions of the likelihood that their households will be affected by erosion, soil degradation, droughts, cyclones, and floods in the next 12 months. The main risk is again associated with cyclones and storms, with more than half of respondents believing that the event is likely or very likely in the year following the interview. Concerning the other natural events, the share of respondents reporting events being likely or very likely is strictly positive but in the minority, with the most plausible events being, in order, floods, droughts, erosion, and soil degradation.

Panel C in Figure 5 illustrates respondents' expectations regarding the change in risk levels for various environmental events in the future. Most respondents believe the risk of most events will decrease, except for floods, where the majority believe the risk will remain constant.

Figure 5: Perceived risk of destructive or damaging natural events

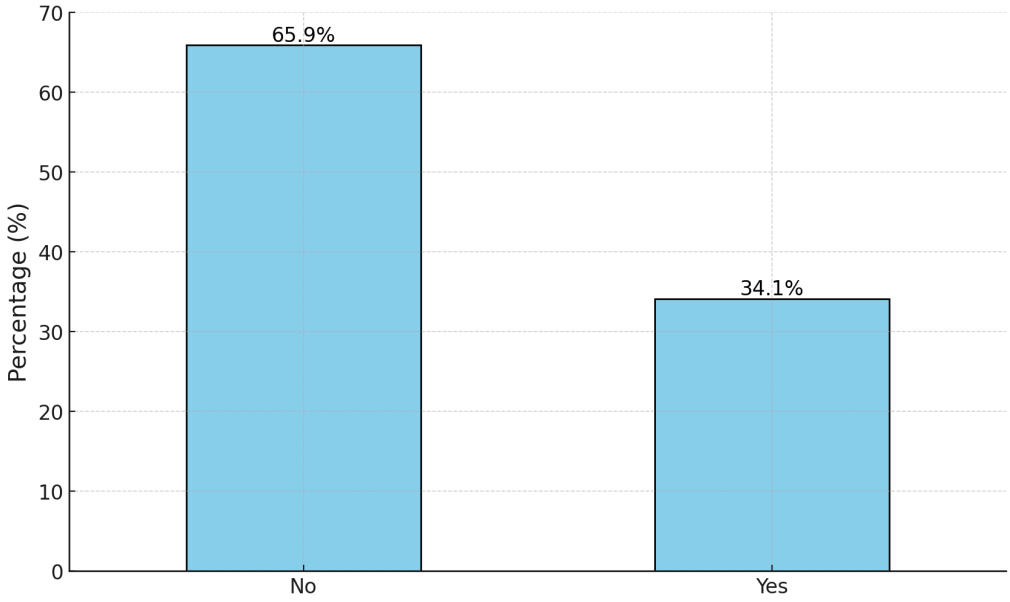


Note. Panel A shows the share of respondents who believe they are susceptible to various environmental risks such as floods, cyclones and strong storms, droughts, soil degradation, and erosion. It presents a binary yes/no response indicating public perception of risk. Panel B shows respondents' perceptions of the probability that their households will be affected by various environmental events during the next 12 months. The events include erosion, soil degradation, droughts, cyclones, and floods. The responses are categorized into four levels of likelihood: not at all likely, unlikely, likely, and very likely. Panel C shows the share of respondents who expect the risk in their area to increase for various environmental events such as erosion, soil degradation, droughts, cyclones, and floods.

3.2 Climate change mitigation and adaptation strategies

While Section 3.1 highlighted partial awareness of climate change among respondents, we are interested in understanding what is their view concerning mitigation and adaptation. We begin by focusing on whether respondents believe that mobilization can help mitigating climate change. Figure 6 depicts respondents' views on whether people can mobilize to address the effects of climate change. Among respondents, 65.9% believe that the population cannot independently mobilize to face these challenges. This result highlights a very limited awareness of mitigation strategies, while the majority think that the consequences of climate change are exogenous to their behavior.

Figure 6: Perception of public mobilization against climate change



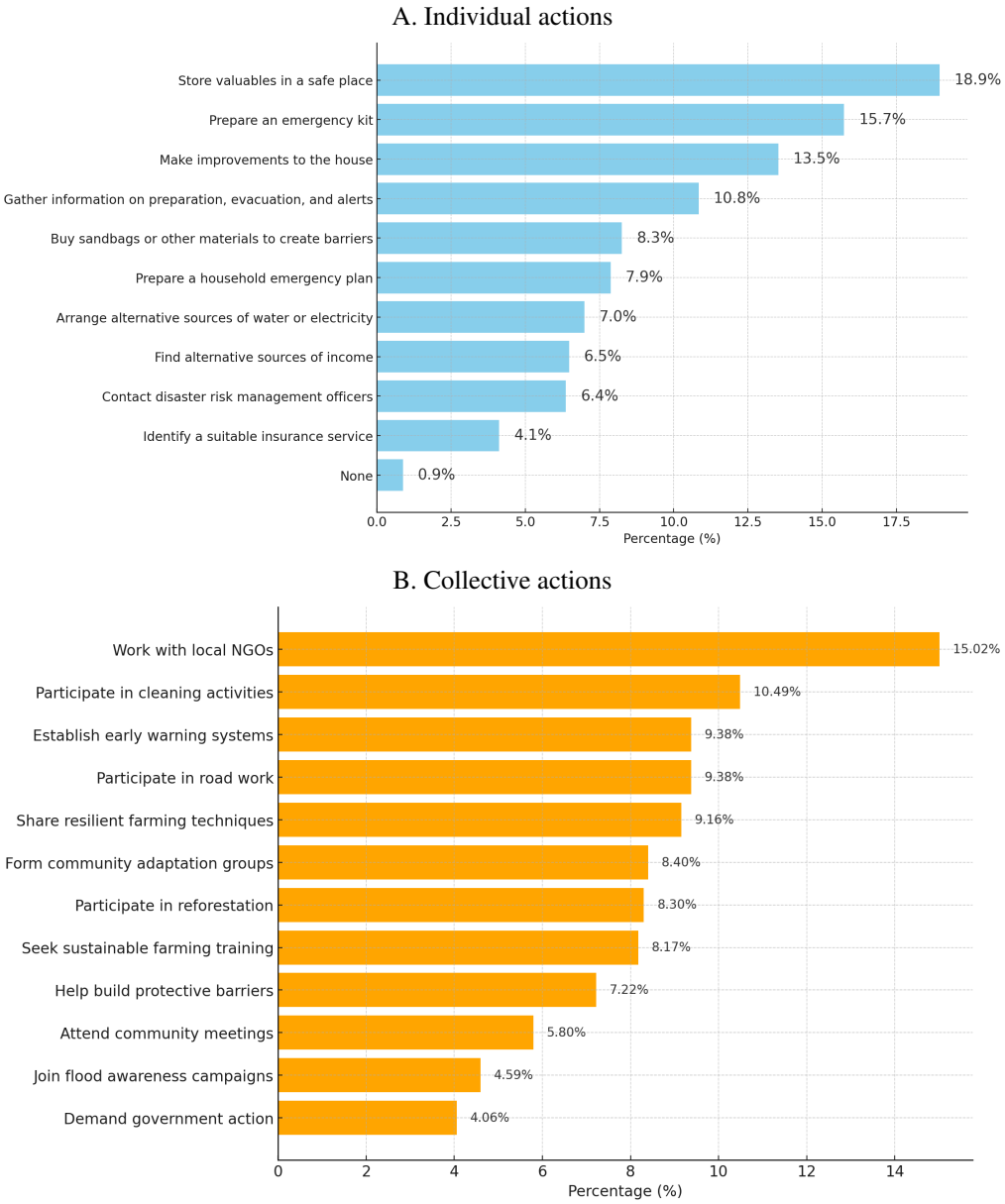
Note. The figure depicts respondents' views on whether people can mobilize to address the effects of climate change. The majority of those interviewed believe that the population cannot independently mobilize to face these challenges.

We then focus on awareness of different migitation strategies, both individual and collective. Panel A in Figure 7 illustrates respondents' opinions on the individual actions that can be taken to protect against the effects of climate change, such as floods and inundations. The most frequently mentioned actions include gathering information on preparation and evacuation plans, as well as preparing emergency kits. Fewer respondents mentioned taking more proactive measures like making home improvements or identifying alternative income sources. These results indicate that while basic preventive actions are widely recognized, there is less awareness of more comprehensive individual strategies to mitigate climate-related risks.

Panel B in Figure 7 presents respondents' views on collective actions that can be taken to protect communities from the effects of climate change. The most commonly suggested actions include

forming community groups to discuss adaptation strategies and participating in street and drainage cleaning activities. Interestingly, public mobilization to demand action from the government is the least mentioned option.

Figure 7: Awareness of mitigation actions

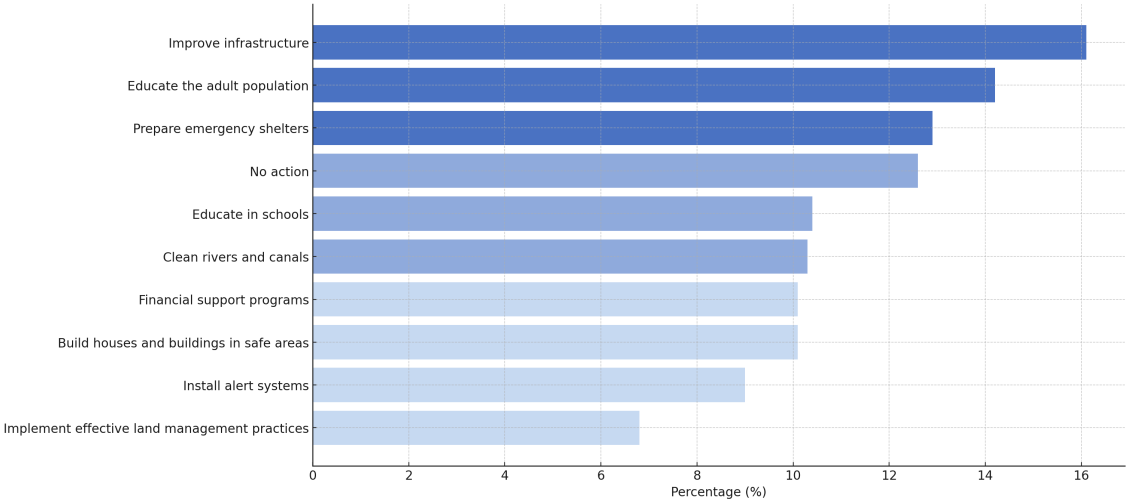


Note. Panel A shows the percentage of respondents who believe in various individual actions that can be taken to prepare for natural disasters. These actions include gathering information, preparing emergency kits, securing valuables, making home improvements, and identifying alternative income or insurance options. Panel B presents the percentage of respondents who believe in various collective actions that can be taken to address environmental risks. These actions include forming community groups, sharing information, participating in cleaning or replanting activities, and collaborating with NGOs. The responses highlight community-level strategies for mitigating the effects of climate change.

Finally, we focus on what respondents believe about governmental intervention. Figure 8 depicts respondents' opinions on measures their local governments can implement to address cli-

mate change. The most frequently cited policy is infrastructure improvement (16.1%), followed by educating the adult population (14.2%). Interestingly, a notable portion of respondents (12.6%) believe that the government should take no action. Other significant measures include preparing emergency shelters (12.9%) and educating in schools (10.4%). The least cited measure is implementing effective land management practices (6.8%).

Figure 8: Actions Demanded of the Government



Note. The figure shows the share of respondents that reported the corresponding action as a needed action to be taken by the Government. The exact question allowed for multiple answers.

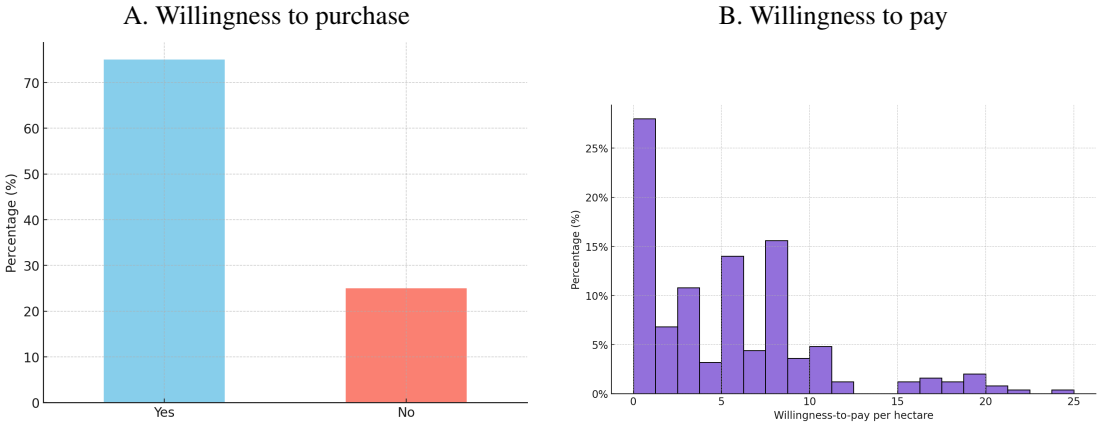
3.2.1 Agricultural insurance

In this section, we focus specifically on the attitude of respondents concerning agricultural insurance. To this purpose, we restricted the sample to those respondents reporting having any agricultural production for sale or their consumption. Given the low awareness of insurance products, we first explained agricultural insurance. The exact definition of agricultural insurance provided to respondents is "a regular payment that ensures that, in adverse situations, the person receives financial assistance to cover the damage. This insurance is independent of the assistance that the government may provide to the affected population." Given this information, we asked whether the respondents would consider purchasing agricultural insurance available to protect their crops against losses due to climate events, such as droughts or floods.

Panel A in Figure 9 presents the willingness of respondents to purchase agricultural insurance. The data reveals that a significant majority (approximately 70%) of respondents expressed a positive inclination towards purchasing agricultural insurance to protect their crops against climate-related events such as droughts or floods. Conversely, about 30% of respondents indicated they would not consider purchasing insurance. This distribution highlights a substantial interest in agricultural insurance within the surveyed population, though a notable portion remains hesitant or uninterested.

In addition, among those who reported willingness to purchase the product, we collected information on their willingness to pay. In particular, we asked respondents how much they would be willing to pay for insurance that covers the total value of their crops if they were destroyed by climate events, such as droughts or floods.[4] Panel B of Figure 9 presents the distribution of willingness to pay for insurance coverage (per hectare) in Mozambican Meticais. The average willingness to pay for the presented agricultural insurance is 7.87 Mozambican Meticais, or 0.12 US$. This value is extremely low compared to average market prices for agricultural insurance, highlighting the difficulty of selling such a product in this context.

Figure 9: Agricultural insurance



Note. Panel A shows the percentage of respondents considering purchasing agricultural insurance versus those not. This reflects the population's general openness to insurance products designed to mitigate the financial risks associated with adverse climatic events. Panel B illustrates the willingness-to-pay (in Mozambican Meticais) per hectare of land owned or farmed among respondents who answered positively when asked if they would consider purchasing insurance. In Panel B, for graphical purposes, we exclude outliers willing to pay more than 50 Mozambican Meticais (6 observations).

Table 2 provides simple relationships between climate change awareness and willingness to purchase agricultural insurance. Coefficients in the table are estimated using OLS regressions with dependent variables in rows and independent variables in columns, without controlling for any additional variable. We focus on the two outcome variables analyzed in this section: willingness to purchase agricultural insurance and willingness to pay for agricultural insurance.

We consider two sets of control variables. The first is climate change awareness, defined by an indicator variable equal to one if the respondent defines correctly climate change, meaning they explicitly mention a "change in the climate". The second set of variables are the perceived risk of destructive events, such as floods, cyclones and storms, droughts, soil degradation, and erosion.

Estimates highlight some important results. First, respondents with a higher awareness of climate change tend to be more willing to purchase and pay for agricultural insurance than those unaware. Being aware leads to an increase of 35–36 percentage points in the share of respondents willing to purchase the insurance and an increase of 4.45 Mozambican Meticais in the willingness to pay.

[4]This question was not incentivized for logistical reasons, so it needs to be considered self-reported.

While the willingness to pay remains relatively low among these respondents, it also represents a significant increase. We do not see a clear pattern concerning the relationship with perceived risks of destructive natural events.

Table 2: Climate change perceptions and attitudes towards agricultural insurance

Dependent variables:	Willingness to purchase			Willingness to pay		
	(1)	(2)	(3)	(4)	(5)	(6)
Climate change awareness	0.347**		0.355*	4.451*		3.882
	(0.132)		(0.166)	(2.151)		(2.605)
Perceived risk of floods		0.087	0.140		0.158	1.027
		(0.188)	(0.189)		(2.970)	(3.019)
Perceived risk of cyclones and storms		-0.206	-0.136		-4.380	-3.860
		(0.174)	(0.176)		(2.660)	(2.676)
Perceived risk of droughts		0.079	0.134		1.601	2.297
		(0.168)	(0.169)		(2.571)	(2.607)
Perceived risk of soil degradation		0.020	0.091		-7.475*	-6.741*
		(0.203)	(0.204)		(3.133)	(3.164)
Perceived risk of erosion		0.321	0.315		3.449	3.685
		(0.189)	(0.188)		(2.865)	(2.862)
Constant	0.449***	0.585***	0.323	5.330**	10.904***	7.725**
	(0.090)	(0.131)	(0.178)	(1.624)	(1.952)	(2.889)
Observations	348	303	303	256	234	234

Note. Coefficients are OLS coefficients from regressions with the dependent variable reported in row and independent variables reported in column. Standard errors are reported in parentheses. * denotes p-value ≤ 0.10, ** p-value ≤ 0.05, *** p-value ≤ 0.01. *Climate change awareness* is an indicator variable equal to one if the respondent correctly defines climate change, meaning they explicitly mention a "change in the climate". *Perceived risk* refers to the self-reported likelihood of being affected by destructive natural events, such as floods, cyclones, storms, droughts, soil degradation, and erosion. This variable ranges from 0 to 1, with 1 indicating the highest perceived risk level.

4 Conclusion

This study highlights the significant challenges facing Mozambique's agricultural sector, the backbone of the country's economy, employing over 80% of the population and contributing 32% to the national GDP. Agriculture in Mozambique is under increasing threat due to the rising frequency and intensity of extreme weather events, a direct consequence of climate change. These events cause immediate damage, such as loss of lives and assets, and exacerbate long-term financial instability for farmers, leading to a cycle of poverty that diminishes their ability to invest in and sustain their livelihoods.

The survey conducted in rural Mozambique aimed to assess local knowledge of climate risks and farmers' willingness to adopt risk mitigation strategies, such as agricultural insurance. The findings reveal a mixed understanding of climate change among respondents, with only 37.2% correctly identifying it as a shift in long-term climate patterns. Most respondents associate climate change primarily with an increase in extreme weather events, such as cyclones and droughts, which aligns with their lived experiences but falls short of the broader scientific definition.

Despite this imperfect understanding, farmers are acutely aware of the risks posed by climate change to their agricultural livelihoods. Cyclones and storms are seen as the most immediate threats, while risks such as soil degradation and drought are perceived as less likely. Interestingly, although most respondents believe that future risk levels for most environmental events will decrease, they still recognize the ongoing threat of floods.

The survey also explored potential strategies to mitigate these risks. While most respondents were aware of basic individual actions, such as gathering information and preparing emergency kits, fewer mentioned more proactive measures like making home improvements or securing alternative income sources. At the collective level, forming community groups and participating in street and drainage cleaning activities were seen as important. Still, there was little emphasis on public mobilization to demand government action.

Regarding agricultural insurance, the study found that while 70% of respondents were willing to purchase insurance to protect their crops from climate-induced disasters, their willingness to pay for such insurance was limited. This suggests that while there is an interest in agricultural insurance, affordability remains a key barrier.

We highlight the following policy lessons:

1. **Enhance climate awareness and education**. There is a need for comprehensive public education campaigns to improve understanding of climate change and its broader impacts, especially among rural farming communities. Correcting misconceptions and providing accurate information could help farmers make more informed decisions about risk management.

2. **Develop affordable agricultural insurance products**. The high willingness to adopt agricultural insurance highlights the importance of creating accessible, low-cost insurance products tailored to the needs of smallholder farmers. Subsidized premiums or government-backed schemes could encourage wider uptake.

3. **Strengthen community-based risk mitigation**. Given the high levels of trust within families and communities, collective action strategies could be leveraged to build resilience against climate shocks. Encouraging local initiatives such as community insurance pools or cooperatives may help mitigate financial risks.

4. **Improve infrastructure and government engagement**. Infrastructure improvements were identified as the most demanded government action, so investments in climate-resilient infrastructure, such as better drainage systems and stronger emergency shelters, are critical. Furthermore, building trust in government institutions through transparency and active engagement could improve the effectiveness of government-led climate adaptation programs.

5. **Incorporate local knowledge into policy design**. Policy initiatives should be informed by local perceptions of risk and the realities farmers face. By involving communities in designing and implementing management tools, such as insurance, policies are more likely to be accepted and successfully implemented.

By addressing these key areas, Mozambique can better equip its agricultural sector to cope with the growing challenges of climate change, ultimately fostering greater resilience and economic stability for its rural population.

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APPENDIX

A Questionnaire

A.1 Climate Change and Risk Perception

1. How would you explain what 'climate change' is in your own words?
2. In your opinion, has the climate in your region changed in the last 10 years? That is, do you think certain weather phenomena have become more/less intense or frequent?
3. How has the climate changed in your region?
4. What do you think is the cause of these changes?
5. Has your household ever been affected by *flooding or heavy rain*?
6. When was the last time you were affected?
7. Has your household ever been affected by *cyclones and strong storms*?
8. When was the last time you were affected?
9. Has your household ever been affected by *droughts*?
10. When was the last time you were affected?
11. Has your household ever been affected by *land degradation*?
12. When was the last time you were affected?
13. Has your household ever been affected by *erosion*?
14. When was the last time you were affected?
15. Do you currently consider that you live in an area prone to *flooding or heavy rain*?
16. Do you currently consider that you live in an area prone to *cyclones and strong storms*?
17. Do you currently consider that you live in an area prone to *droughts*?
18. Do you currently consider that you live in an area prone to *land degradation*?
19. Do you currently consider that you live in an area prone to *erosion*?
20. What is the likelihood of *flooding or heavy rain* affecting your household in the next year (12 months)?

21. What is the likelihood of *cyclones and strong storms* affecting your household in the next year (12 months)?

22. What is the likelihood of *droughts* affecting your household in the next year (12 months)?

23. What is the likelihood of *land degradation* affecting your household in the next year (12 months)?

24. What is the likelihood of *erosion* affecting your household in the next year (12 months)?

25. Do you expect the risk of *flooding or heavy rain* in your area to increase, decrease, or remain the same?

26. Do you expect the risk of *cyclones and strong storms* in your area to increase, decrease, or remain the same?

27. Do you expect the risk of *droughts* in your area to increase, decrease, or remain the same?

28. Do you expect the risk of *land degradation* in your area to increase, decrease, or remain the same?

29. Do you expect the risk of *erosion* in your area to increase, decrease, or remain the same?

30. Imagine that the area where you live is affected by a natural disaster (e.g., flooding). According to your knowledge, what would be the consequences?

31. In the event of a natural disaster (e.g., flooding) affecting your household, what strategies would you use to cope with and recover from the impact?

32. Do you agree with the following statement: "Disasters, such as droughts and floods, are acts of God."

A.2 Consequences of Climate Change

1. If nothing is done to limit climate change, what is the likelihood of it causing a *reduction in agricultural production* in your province?

2. If nothing is done to limit climate change, what is the likelihood of it causing a *decline in living standards* in your province?

3. If nothing is done to limit climate change, what is the likelihood of it causing an *increase in the occurrence of diseases and other health issues* in your province?

4. If nothing is done to limit climate change, what is the likelihood of it causing an *increase in the price of essential goods (e.g., food, fuel, etc.)* in your province?

5. If nothing is done to limit climate change, what is the likelihood of it causing an *increase in migratory flows* in your province?

6. In what direction do you think the migration will occur?

7. If nothing is done to limit climate change, what is the likelihood of it causing *more armed conflicts* in your province?

8. If nothing is done to limit climate change, what is the likelihood of it causing a *loss of biodiversity* in your province?

A.3 Awareness of Mitigation and Prevention

1. In your opinion, what actions can we take individually to protect ourselves against the effects of climate change, such as floods and heavy rain?

2. What are the main challenges you face in adapting to climate change?

3. Now, let's talk about collective actions, that is, actions taken in groups. Do you think the population can organise to face the effects of climate change, such as floods and heavy rain?

4. In your opinion, what actions can we take collectively to protect ourselves? What other actions?

5. Now, let's talk about public actions, that is, actions taken by local and national governments. Do you think the government should take measures to protect us against the effects of climate change, such as floods and heavy rain?

6. What actions can governments take?

7. Do you believe that the local government is taking sufficient measures to combat the effects of climate change, such as floods and heavy rain?

8. Please indicate to what extent you agree or disagree with the following statements.

9. If a disaster, such as droughts and floods, were to occur in the next 12 months, your household would be well prepared in advance.

10. Do you have any agricultural income/production for subsistence or for sale? What is the size of your land(s)?

11. An agricultural insurance policy is a regular payment that ensures that, in the event of adverse situations, the person receives financial assistance to cover the damage. This insurance is independent of the assistance that the government may provide to the affected population.

If agricultural insurance were available to protect your crops against losses due to climate events, such as droughts or floods, would you consider purchasing it?

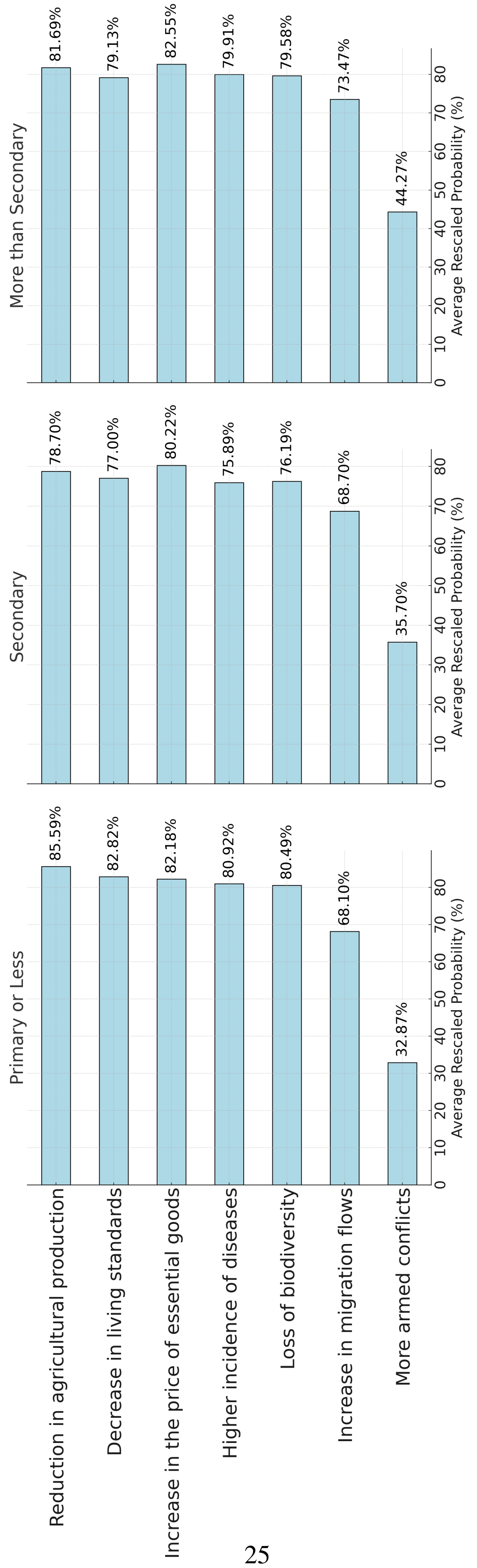
12. How much would you be willing to pay for insurance that would cover the total value of your crop if it were destroyed by climate events, such as droughts or floods? You can indicate a value per month or per year.

A.4 Trust and information campaigns

1. We are almost finished. In this last part, we would like to ask you about your sources of information and the trust you have in different members of the community.
2. What news sources do you regularly use? Please select all that apply.
3. And what about specific information about the weather and climate events? What sources do you use?
4. In the last 2 weeks, have you received any text messages from NOVAFRICA on your phone?
5. Were the messages about climate change?
6. Have you ever participated in any awareness programme on climate change?
7. Now I will ask you some questions about trust.
8. Do you trust the information about the weather and climate events provided by the *media (TV, radio, newspapers)*?
9. Do you trust the information about the weather and climate events provided by *governmental organisations*?
10. Do you trust the information about the weather and climate events provided by the *local community/community leaders*?
11. Do you trust the information about the weather and climate events provided by *non-governmental organisations (NGOs)*?
12. To what extent do you trust *members of your family*? *Members of your community*? The *Provincial Government*? The *National Government*? The *Novafrica Association*?

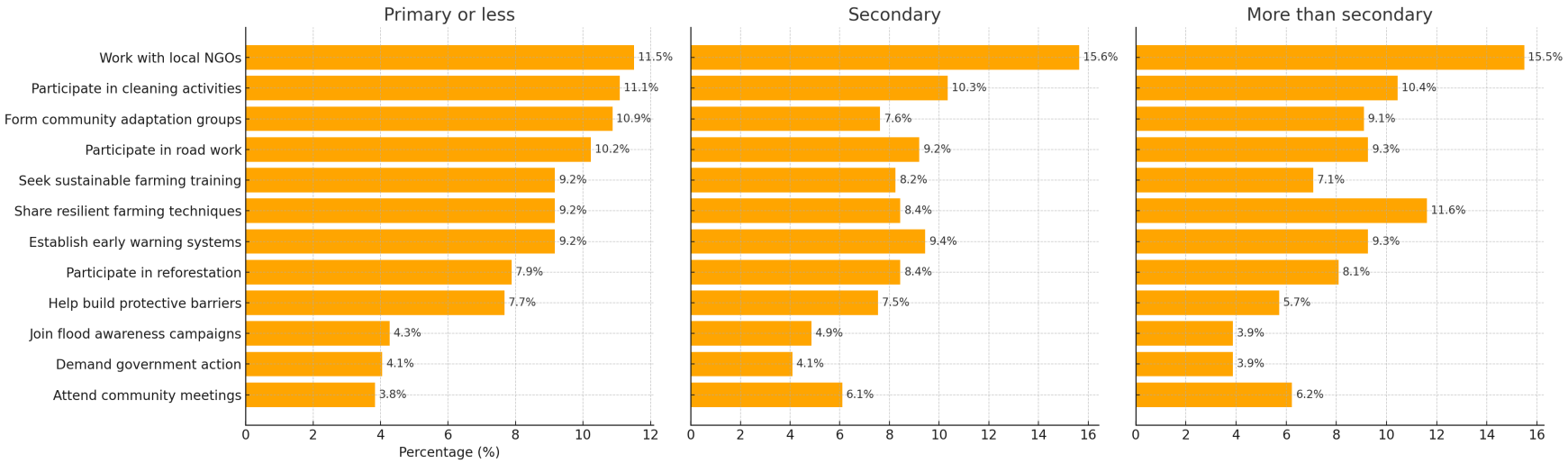
B Additional heterogeneity results by education

Figure B1: Perception of the consequences of climate change, heterogeneity by education



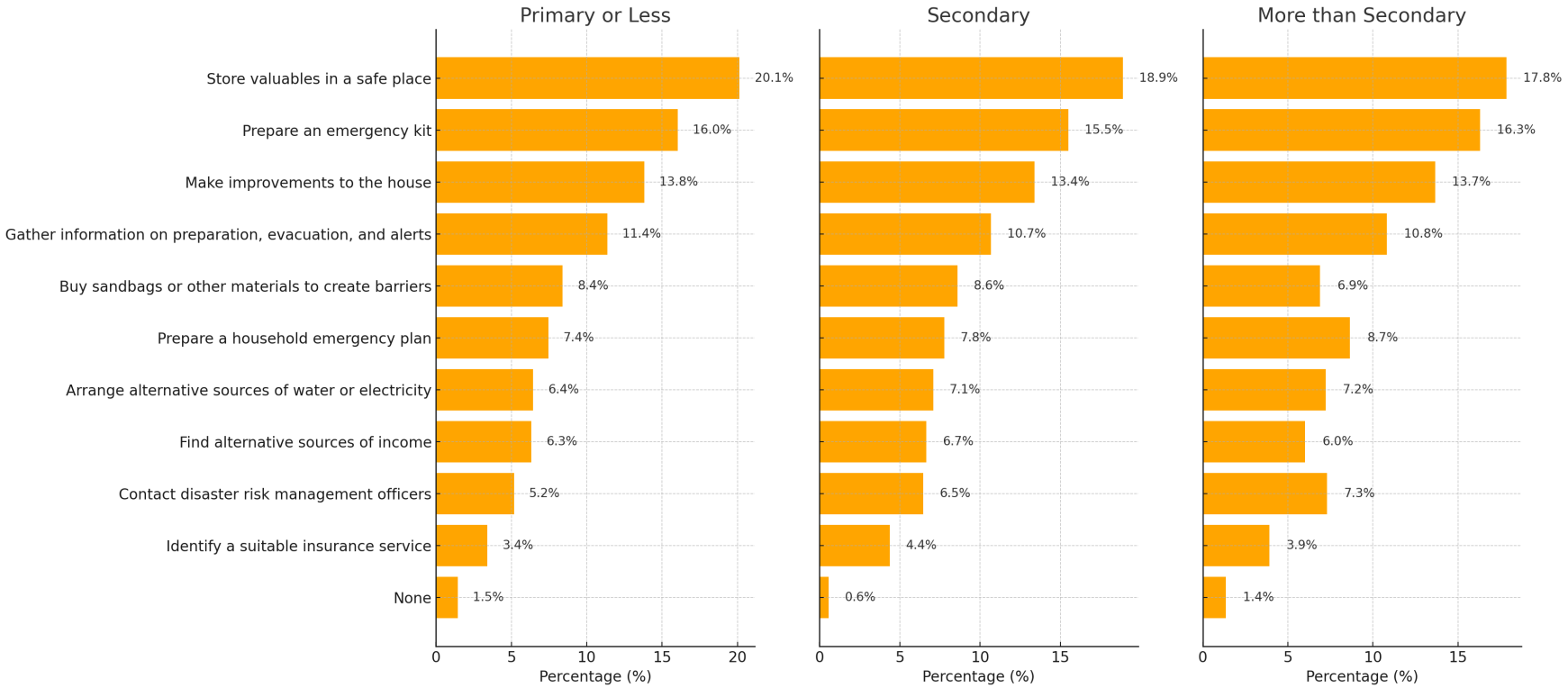
Note. The figure illustrates respondents' perceptions regarding the likelihood of various consequences if no significant action is taken against climate change. There were four degrees of probability: not likely at all, not likely, likely, and very likely. The graph presents an average re-scaled probability based on these answers.

Figure B2: Awareness of collective mitigation actions, heterogeneity by education



Note. The figure presents the percentage of respondents who believe in various collective actions that can be taken to address environmental risks.

Figure B3: Awareness of individual mitigation actions, heterogeneity by education



Note. The figure presents the percentage of respondents who believe in various individual actions that can be taken to address environmental risks.

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