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Coffee Farming

- **Coffee** is a mountainous tropical plant – the “Goldilocks of crops” - that requires specific temperatures, precipitation, and sunshine for growth.
- **Mexico** is the 8th largest producer of coffee in the world.
- In 2013, Mexico was hit hard by the **coffee rust fungus** causing a 30% decline in coffee production. The conditions for coffee rust are predicted to be **exacerbated by climate change**.
- Coffee farmers are reliant on crop as their **sole income source**, if they don't adapt they face certain impoverishment or forced migration.

Research Questions

RQ1: What factors influence farmers' adoption of climate adaptation strategies?

- *Hypothesis 1.1* Households with **higher financial capital** will be more likely to invest in adaptive strategies.
- *Hypothesis 1.2* Households with **previous experience with natural disasters** will more strongly **perceive the impacts of climate change** and have adopted more adaptive strategies.
- *Hypothesis 1.3* Households with **higher social capital**, as measured by group membership, will be more likely to invest in adaptive strategies.
- *Hypothesis 1.4* Households with **higher natural capital**, as measured by land holdings, will be more likely to diversify land use strategies as an adaptation.

RQ2: What strategies do coffee farmers tend to adopt?

- *Hypothesis 2.1* Households will adopt **locally relevant** strategies.
- *Hypothesis 2.2* Households will adopt strategies that **benefit both the community and themselves**.
- *Hypothesis 2.3* Households will adopt strategies that reduce **economic stressors and natural stressors**.

Key Terms & Framework

1. **Adaptive Strategies:** The actual decisions used to implement implementation of adaptive capacity (Smit & Pilifosova 2003).
2. **Adaptive Capacity:** The theoretical abilities that people hold that allow them to behave in a certain way (Smit & Pilifosova 2003).
3. **Vulnerability:** External variables, such as exposure to natural disasters, that impact possible future harm (Hinkel et al. 2011).
4. **Sensitivity:** Internal variables, such as climate perceptions, that modulate possible future harm (Hinkel et al. 2011)

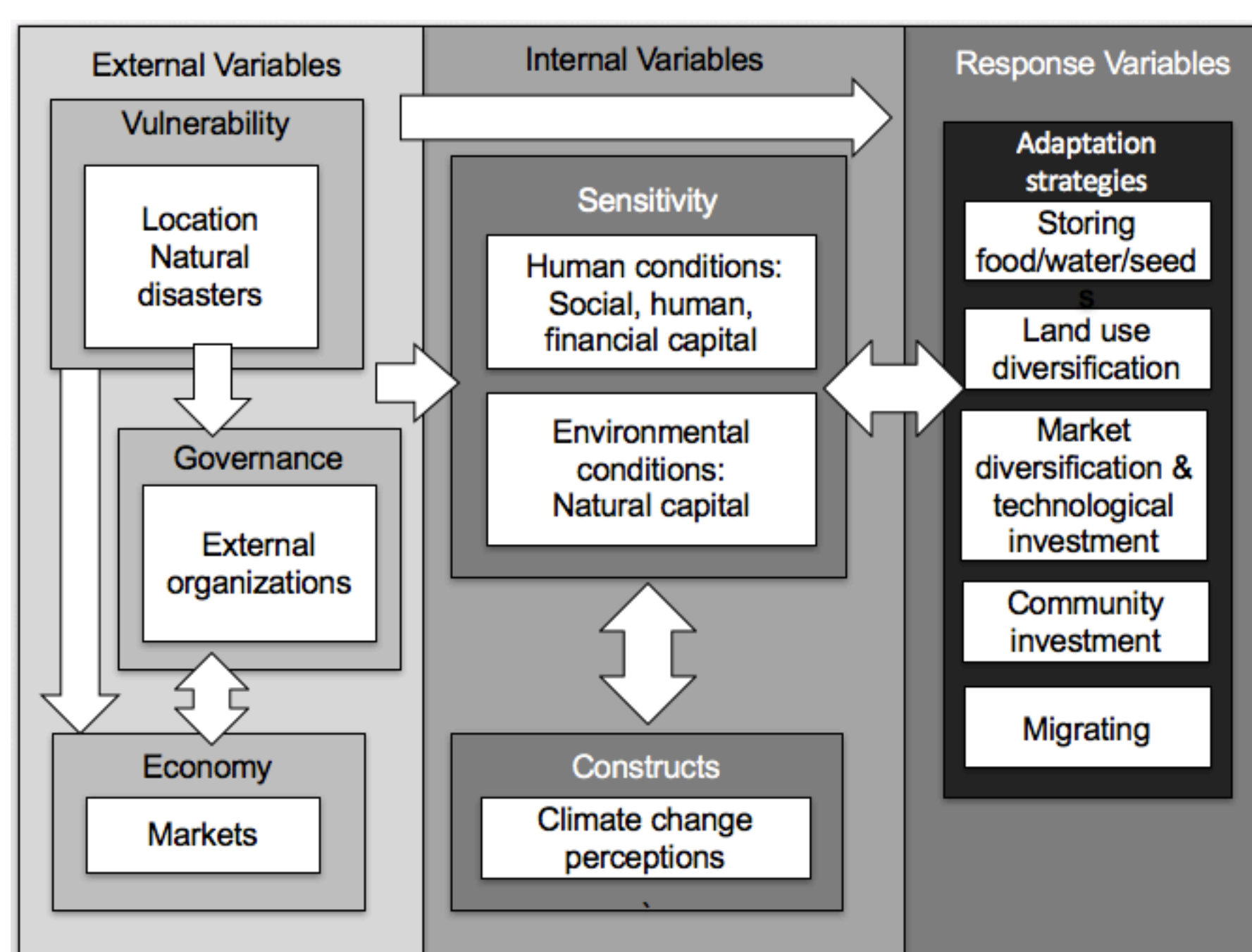


Fig. 1 Adapted from Scoones et al.'s (1998) Sustainable Livelihoods Framework. Notice that external and internal variables interact to create individual choices for adaptation strategies.

Study Area

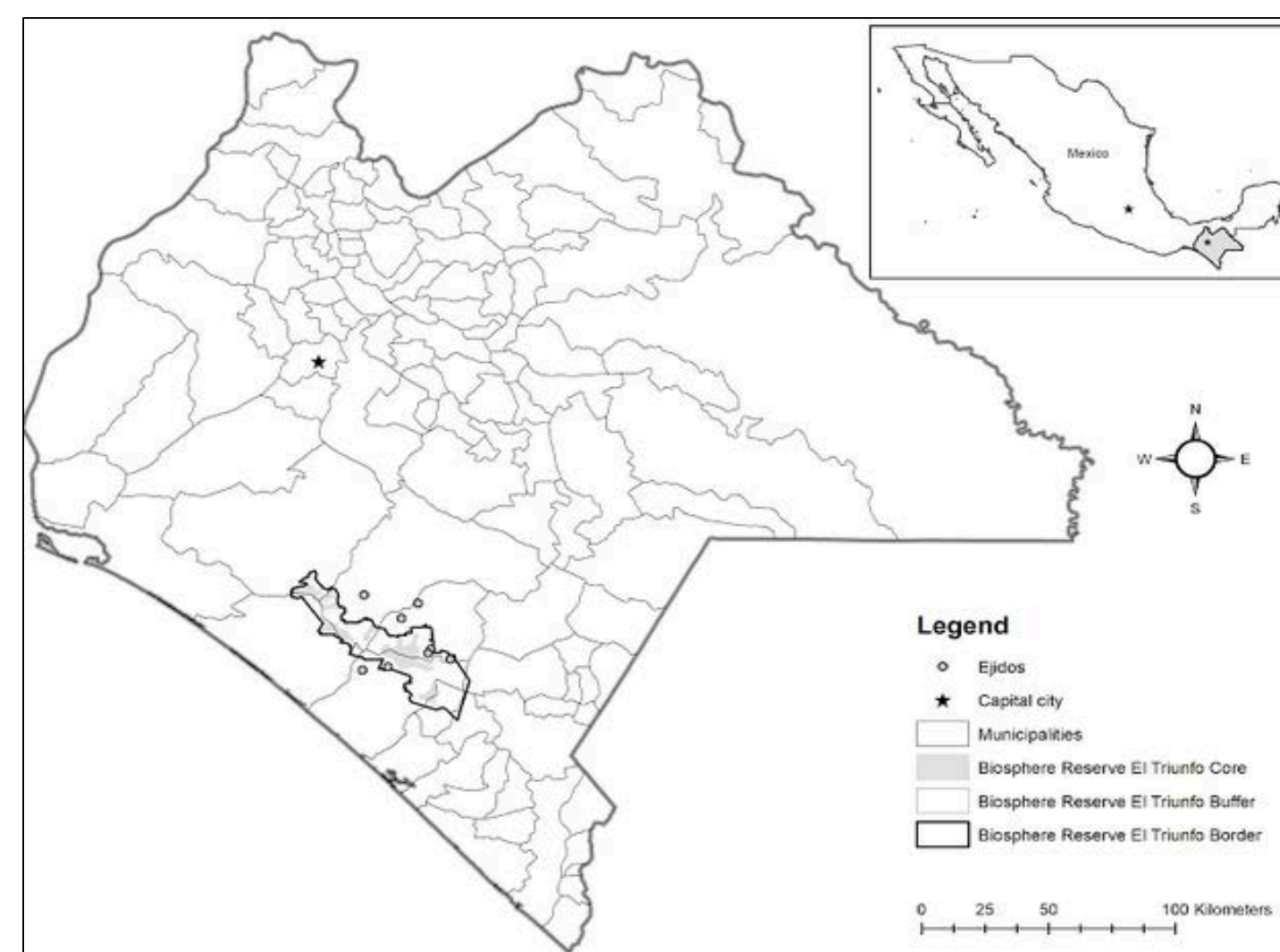


Fig 2. A map of El Triunfo Biosphere Reserve, in Chiapas, Mexico as outlined in **bold**, along with the location of all 8 towns surveyed that buffer the park. Implementing conservation agriculture practices in the region is important for sustainability of the park.



Fig 3. Typified by steep slopes between, this region is highly susceptible to flooding, landslides, and hurricanes.

Results

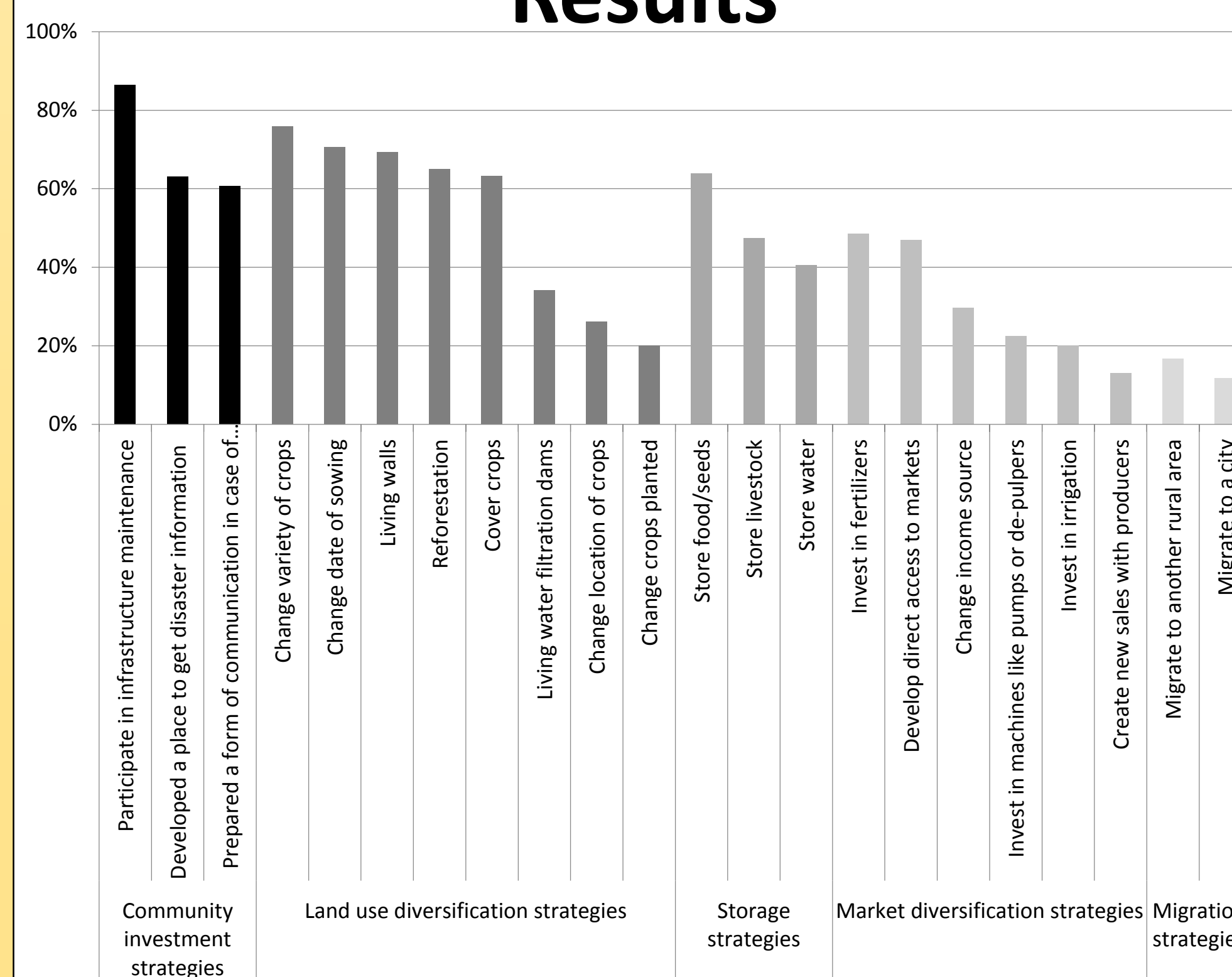


Fig 4. Frequency of adoption of adaptation strategies, categories adapted from a World Bank survey (Agrawal 2010).

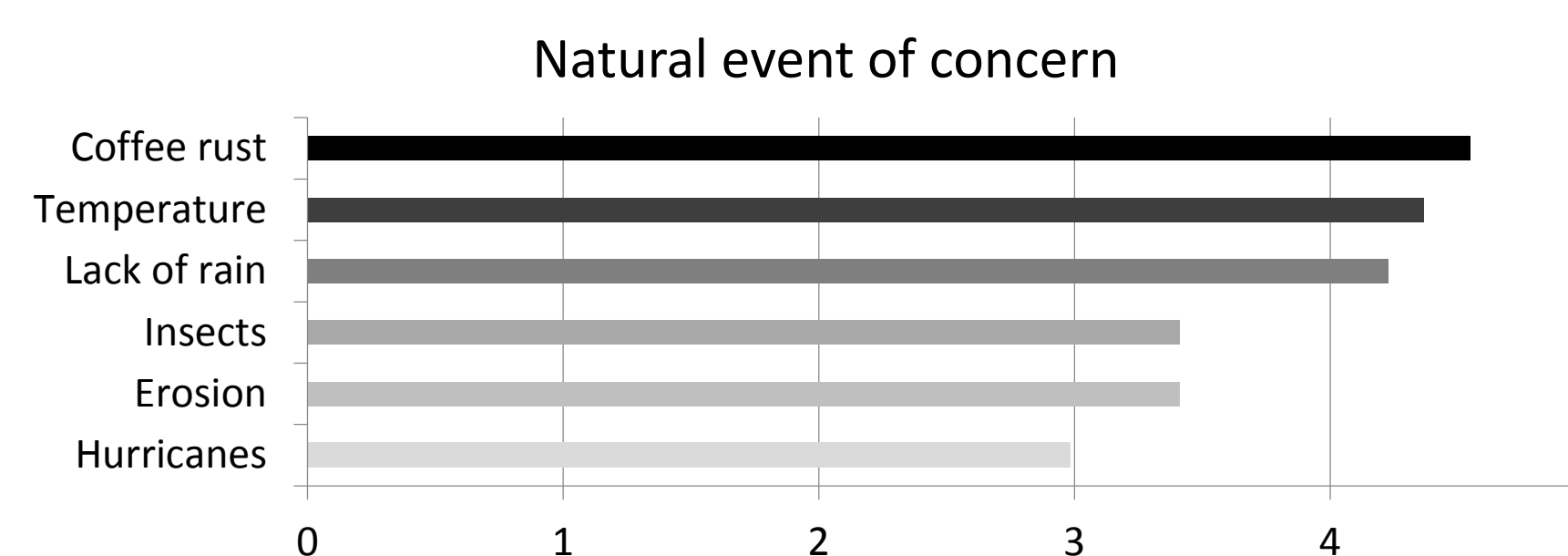


Fig 5. The reported natural disasters of greatest concern, demonstrating the phenomenon where more recent events have greater importance.

Results

No.	Indicator	Measuring unit	Parameter Estimate
1	Disaster experience	Whether they have experienced a natural disaster in the last ten years	1.034**
2	Climate perceptions	Average perceptions of climate change on a 5 point Likert scale	0.795**
3	Group membership	Average # of groups in which households are involved	0.632***
4	Wealth index	Household assets transformed by PCA	0.628**
5	Land ownership	Average # of hectares owned	0.043***
6	Distance to markets	Distance from field to markets.	0.004**
7	Location	Dummy town variable	Included
8	Schooling	% heads of household that have completed primary school education	
9	Age	Average age of the head of household	
10	Family size	Average # of people in a household	
11	Dependency ratio	Average dependency ratio	
12	Gender	% of household heads that are male	
13	Environmental knowledge	% of environmental concepts understood	
14	Information received	% of information on environmental concepts received	
15	Health	% of households that experienced a gastrointestinal problems	
16	Subsidies	Average subsidies received in 2015	
17	Land quality	% of land owners with land that is uncultivable	
18	Organizations	Average # of organizations in the community	
R ²			0.1914

Fig 6. The final variables selected are in **bold**. Notice that both external and internal factors play a role in adoption of adaptation strategies.

Main Findings

1. **Developing community infrastructure** is a highly adopted (86%) adaptation strategy.
 - Predicted by **wealth, land ownership, and disaster experience**.
2. **Changing variety of crops** and the **sow date** are highly adopted, at (75%) and (70%).
 - Predicted by **wealth, distance to markets, disasters experience, climate perceptions, and group membership**.
3. **Storing seeds** is a highly adopted adaptation (64%).
 - Predicted only by **climate perceptions**.
4. **Investing in fertilizers** was moderately adopted (48%).
 - Predicted by **wealth, group membership, and disaster experience**.
5. **Migrating** is not often adopted (17%).
 - Predicted by **land holdings and disaster experience**.
6. Most concern on **coffee rust & changing temperatures**.
7. These results will be invaluable to park managers looking to target communities that are most susceptible to climate change events.

Acknowledgements

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References:

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