

The Climate Security Observatory (CSO): Embracing the complexity of the Climate Security Nexus

Grazia Pacillo, co-Lead Climate Security
Focus (g.pacillo@cgiar.org)



This presentation includes work carried out by:

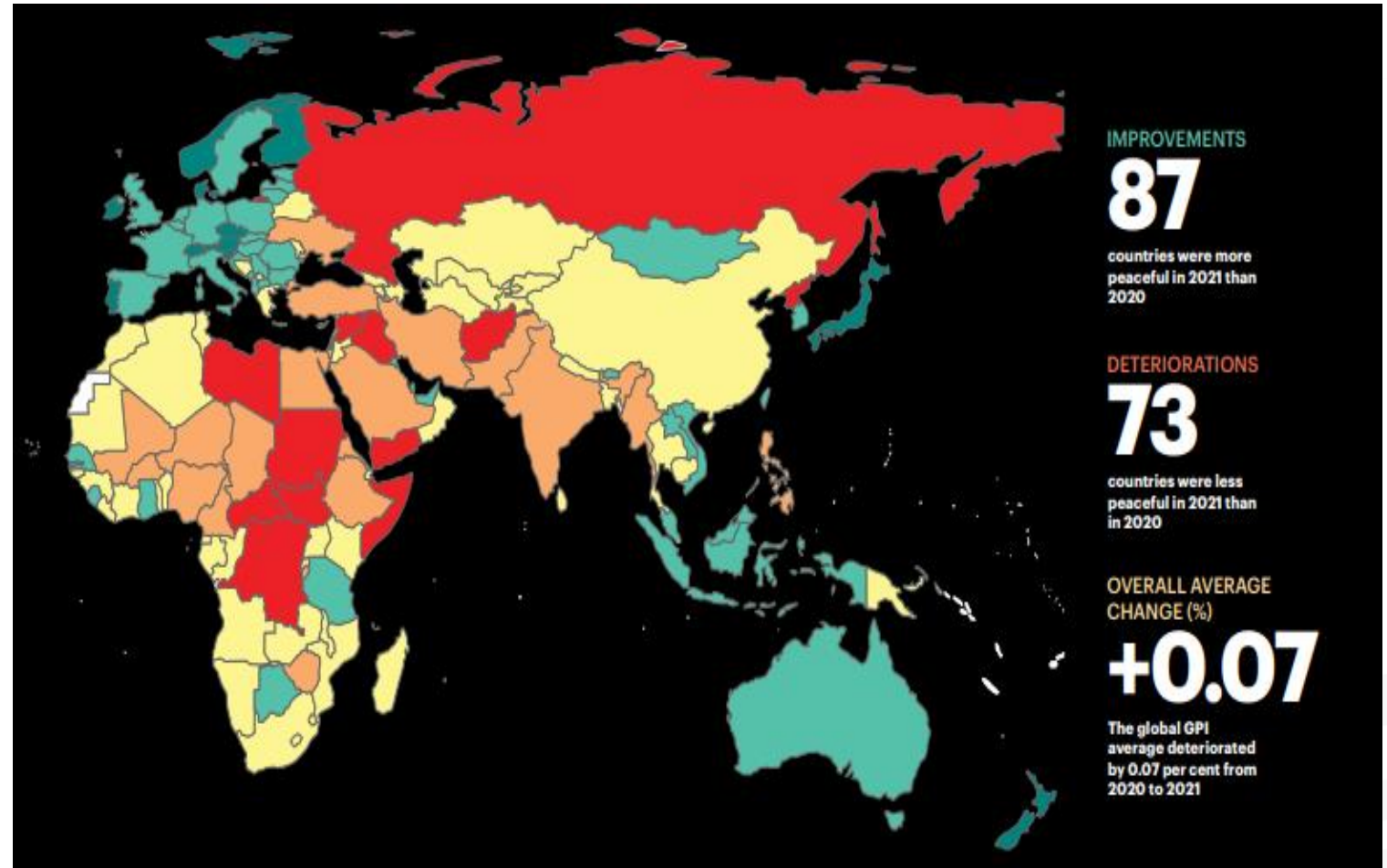
- The CGIAR Team: Tanaya DuttaGupta, Harold Achicanoy, Julian Ramirez, Bia Carneiro, Theresa Liebig, Victor Villa, Anna Belli, Frans Schapendonk, Ignacio Madurga, Adam Savelli, Carolina Sarzana
- The FAO EPIC Team (ESA Division): Adriana Ignaciuk, Antonio Scognamillo, Marina Mastrolillo

1. Motivation, research objectives, and questions
2. An integrated approach to embracing the complexity of the climate security nexus
3. The Climate Security Nexus in Nigeria
4. Next steps

Climate Security: a strategic issue for global stability, prosperity and peace

- The world is less peaceful
- The climate crisis is increasing
- Vulnerabilities and risks are worsening

- About 490 of the 800 million people currently facing chronic food insecurity are located in 21 countries affected by conflict and insecurity.
- Countries with high levels of hunger are often also highly vulnerable to climate change.
- Climate change affects food production and availability, access, quality, utilization, and stability of food systems.
- And food insecurity and conflict are highly correlated



Source: The Global Peace Index Report 2021

Motivation, research objectives and questions (1)

Lack of robust, localized, and policy-relevant evidence on the specific pathways that link climate and conflict

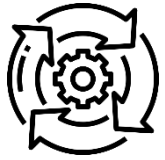
- IPCC call for action on increasing evidence on the climate security nexus (SPM.B.1.7, IPCC WPII, 2022)
- AU-PSC demand for capacity and evidence building to advance a holistic African perspective on the climate, security, and development nexus (AU, 2021)

Maladaptive responses to climate change further exacerbate marginalization, and exclusion which are commonly recognized drivers of conflicts

- CGIAR's ambition to contribute to transforming land, water and food systems in light of the increasing climate crisis
- UNFCCC call for action on transformative adaptation

Need to account for complexity, non-linearity and high heterogeneity of the climate security nexus

- Scholars call for within-country multidisciplinary analyses (Adams et al., 2018).



How does climate worsen the root causes of conflict?



Where are the most vulnerable areas to climate-induced insecurities and risks?

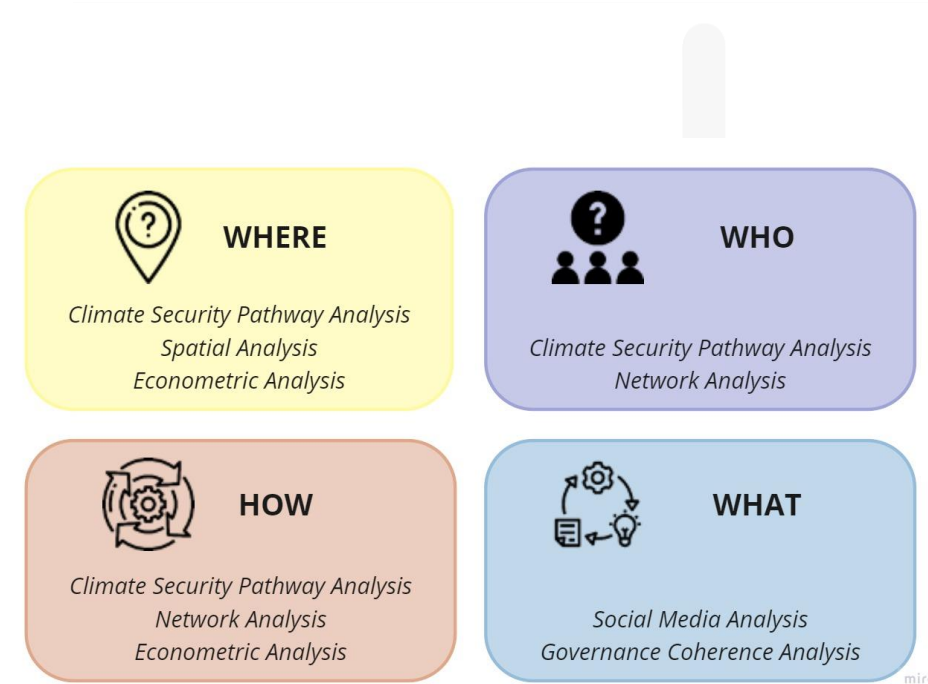
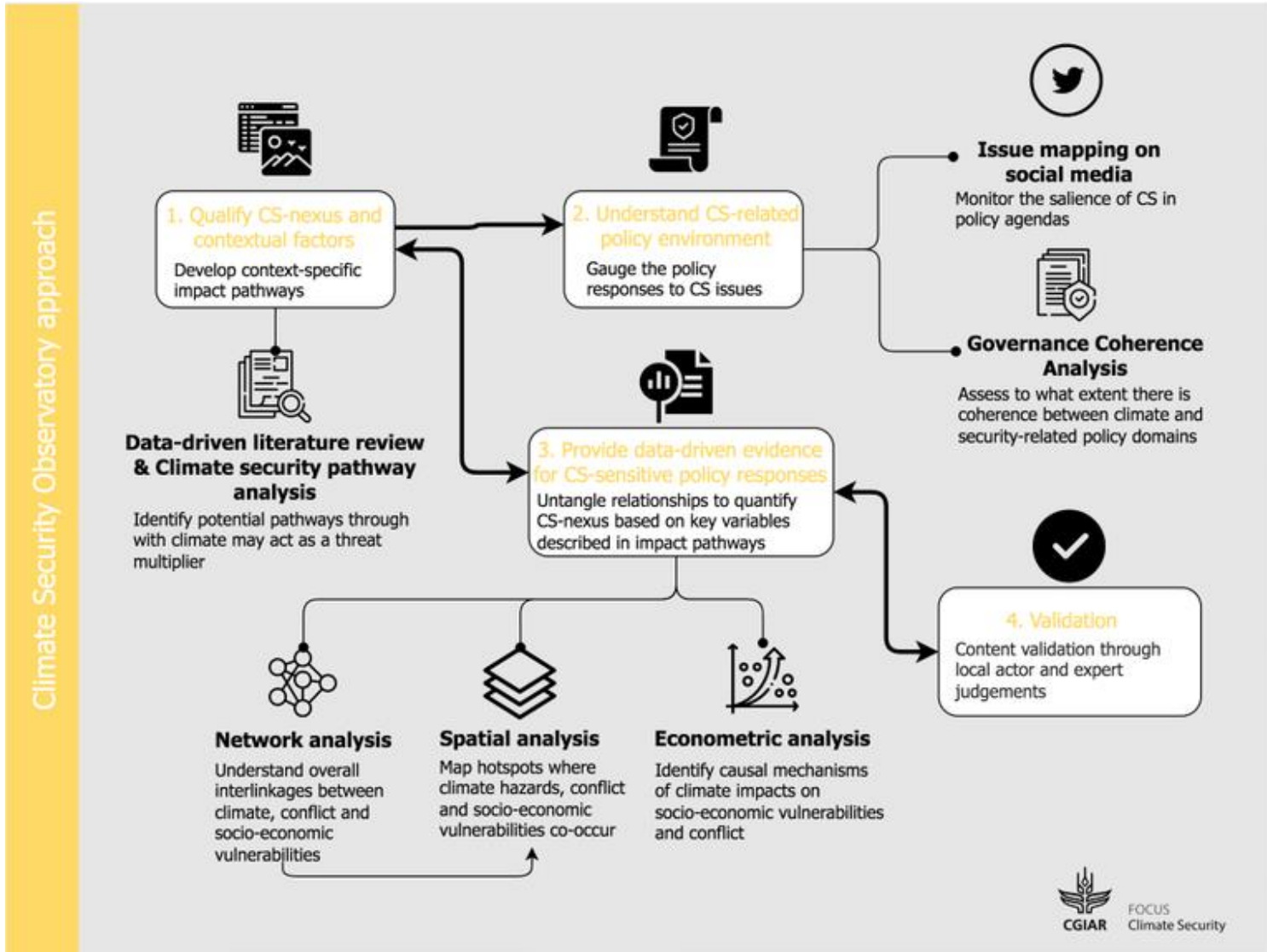


Who are the most vulnerable groups to climate and security risks that should be prioritized to ensure stability and peace in a climate crisis?



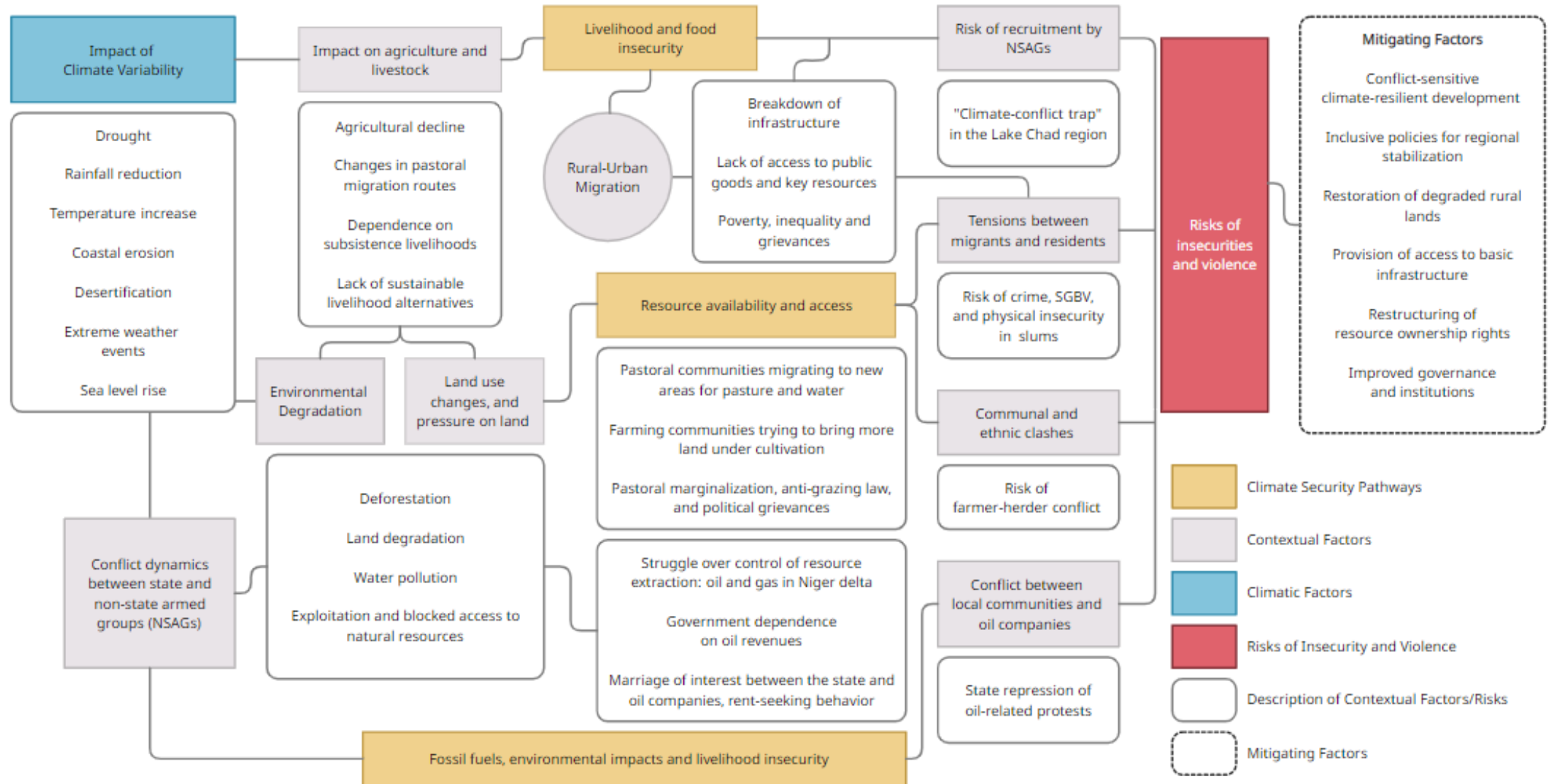
What needs to be done to break the cycle between climate and conflict?

An integrated approach to embracing the complexity of the CS nexus (1)



The Climate Security Nexus in Nigeria

1. Qualify the CS nexus in Nigeria: The Climate Security Pathways



1. Qualify the CS nexus in Nigeria: The Climate Security Pathways (2)

- **PATHWAY#1: Resource availability and access pathway (Northern arid and semi-arid; Benue and Nasarawa states)**
 - Change in grazing routes of Fulani pastoralist communities, due to climate extremes and variability
 - Simultaneously farmers are trying to bring more land under cultivation in response to weather-related shocks, resulting in land-use changes and pressure on land.
 - “desperate guests” (herders) and “unwilling hosts” (farmers)
 - Benue anti-grazing law (Fulani vs Tiv in Nasarawa state)

1. Qualify the CS nexus in Nigeria: The Climate Security Pathways (3)

- **PATHWAY#2: Livelihood and food insecurity pathway (Lake Chad Basin)**
 - Agro-pastoral and fishery losses (desertification and environmental challenges – tannery pollution; dams and depletion of fish stock in Komadugu-Yobe River)
 - Deforestation, shifting cultivation (further environmental degradation and biodiversity loss), recruitment in non-state armed groups, reduced social cohesion, gender-based violence
 - Rural-Urban Migration (IDP Borno, Yobe, Adamawa states) – Boko Haram
 - Slums and squatter settlements, reduced human security, communal tensions, crime and violence
 - Weak governance

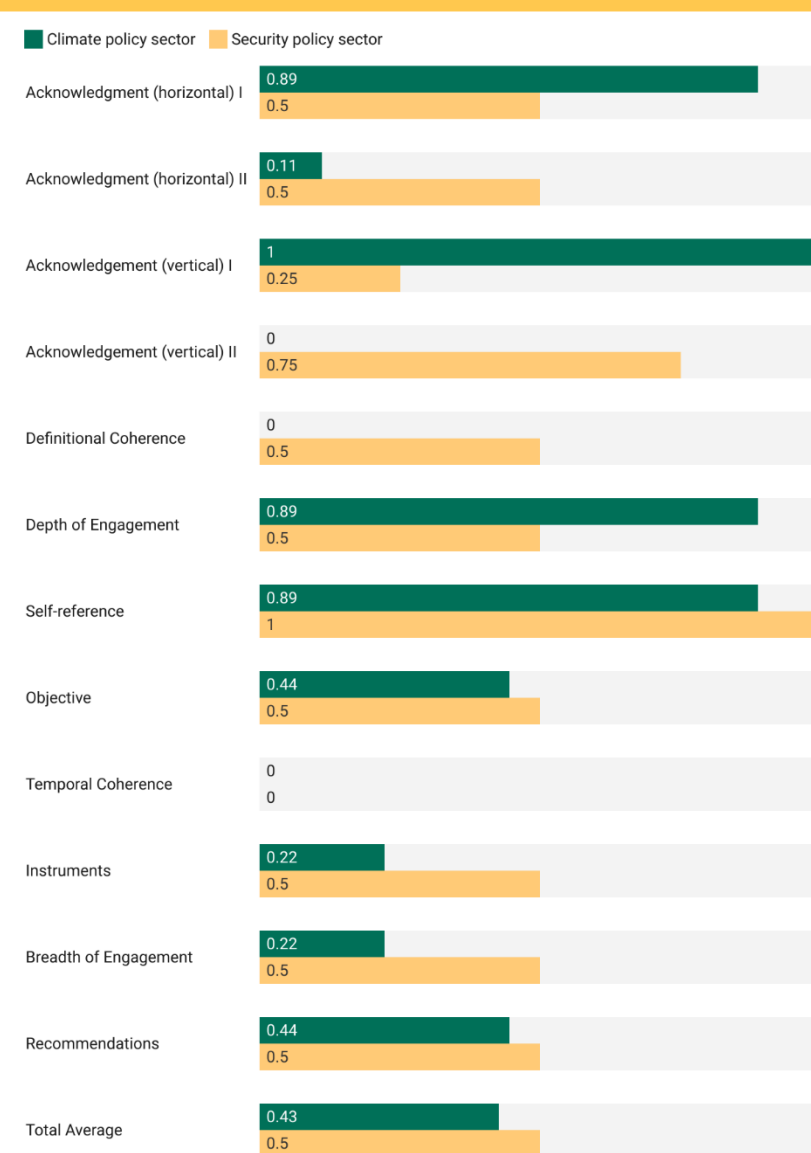
1. Qualify the CS nexus in Nigeria: The Climate Security Pathways (4)

- **PATHWAY #3: Fossil fuels, environmental impacts, and livelihood insecurity pathway (Niger Delta)**
 - Storms surges impact on the oil industry
 - Oil spills impacts on local livelihoods: agricultural (land degradation) and fishery losses (reduction of stock) also due to water pollution
 - Erosion of traditional livelihoods: migration, reduced social cohesion, grievances, youth recruitment by the oil industry to protect facilities, protests (e.g. Ijaws and Ogonis)
 - Weak governance, poor environmental protection frameworks, exclusion of local communities

2. Understand the CS-related policy environment (1)

Policy Coherence Assessments

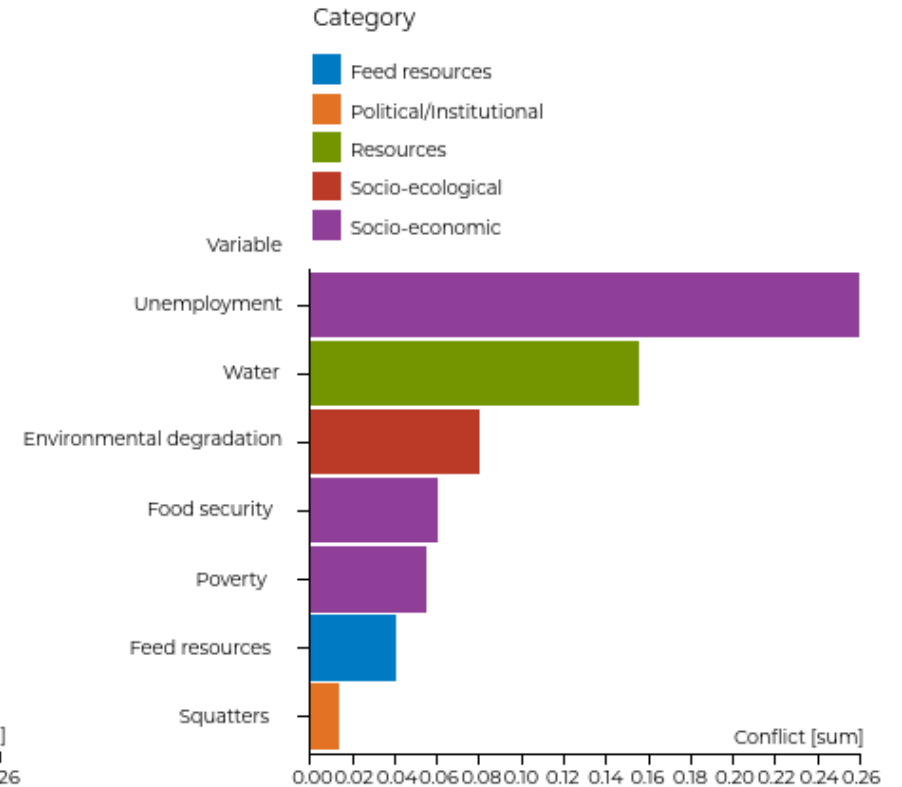
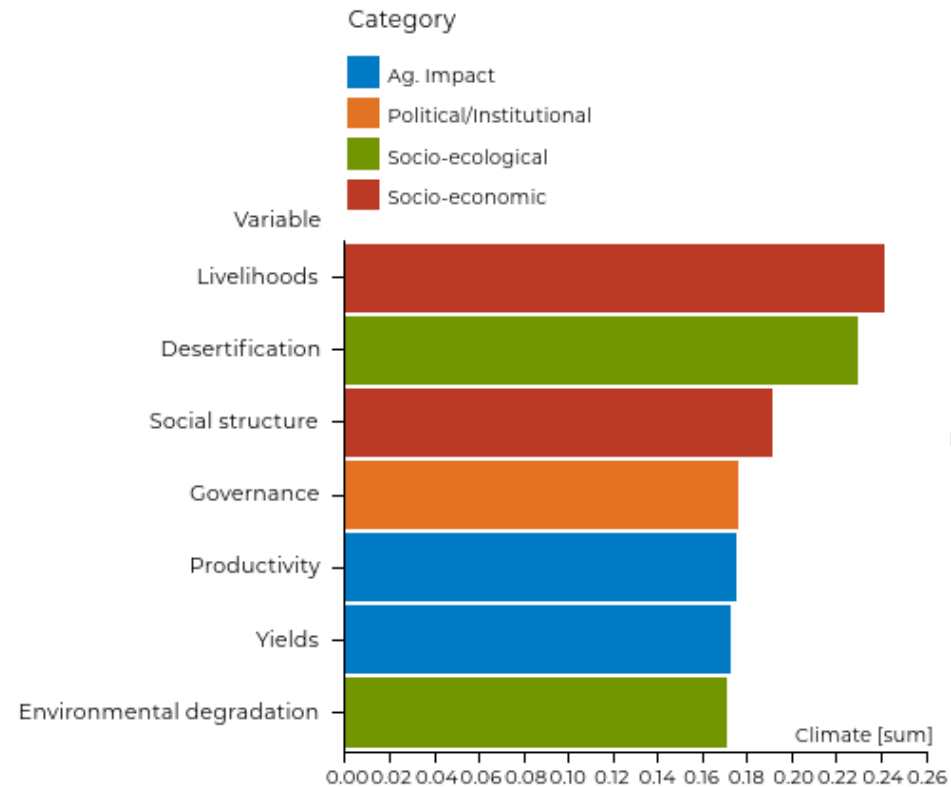
- Nigerian policy outputs/strategy documents on average achieved a **low to medium coherence score** – to some degree attempting to pursue synergistic objectives across sectors, but falling short in several key areas that prevent optimization
- Policies from both climate- and peace and security-related fields generally engage with the topic of climate security at a surface level but lack specific climate security-related implementation mechanisms and policy measures
- Peace and security-related outputs are generally far less coherent than climate-related documents



Average policy coherence scores for Nigeria [0-1] (broken down across climate and security policy sectors and across analytical categories)

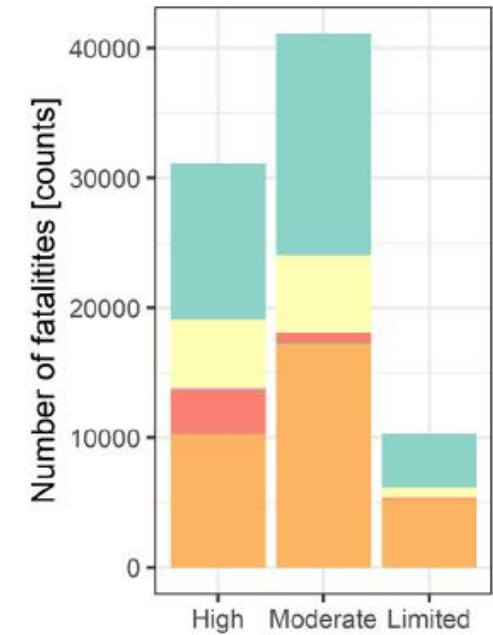
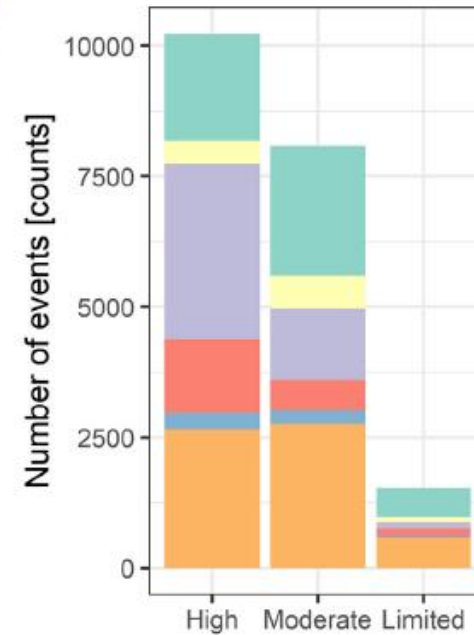
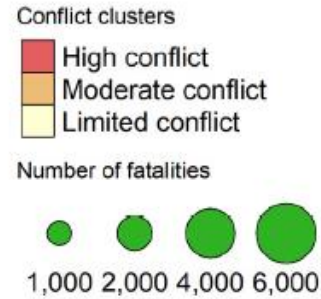
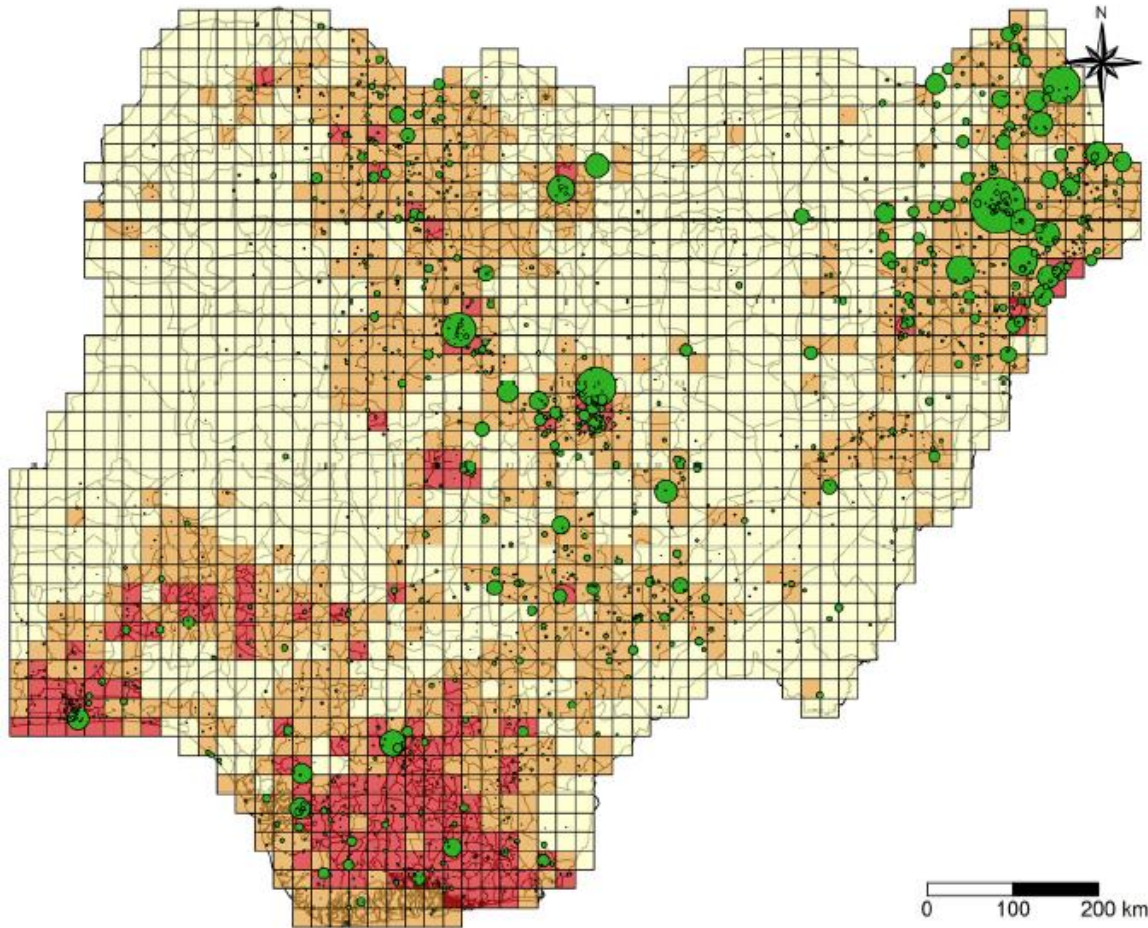
2. Understand the CS-related policy environment (2)

Social Media policy gap map



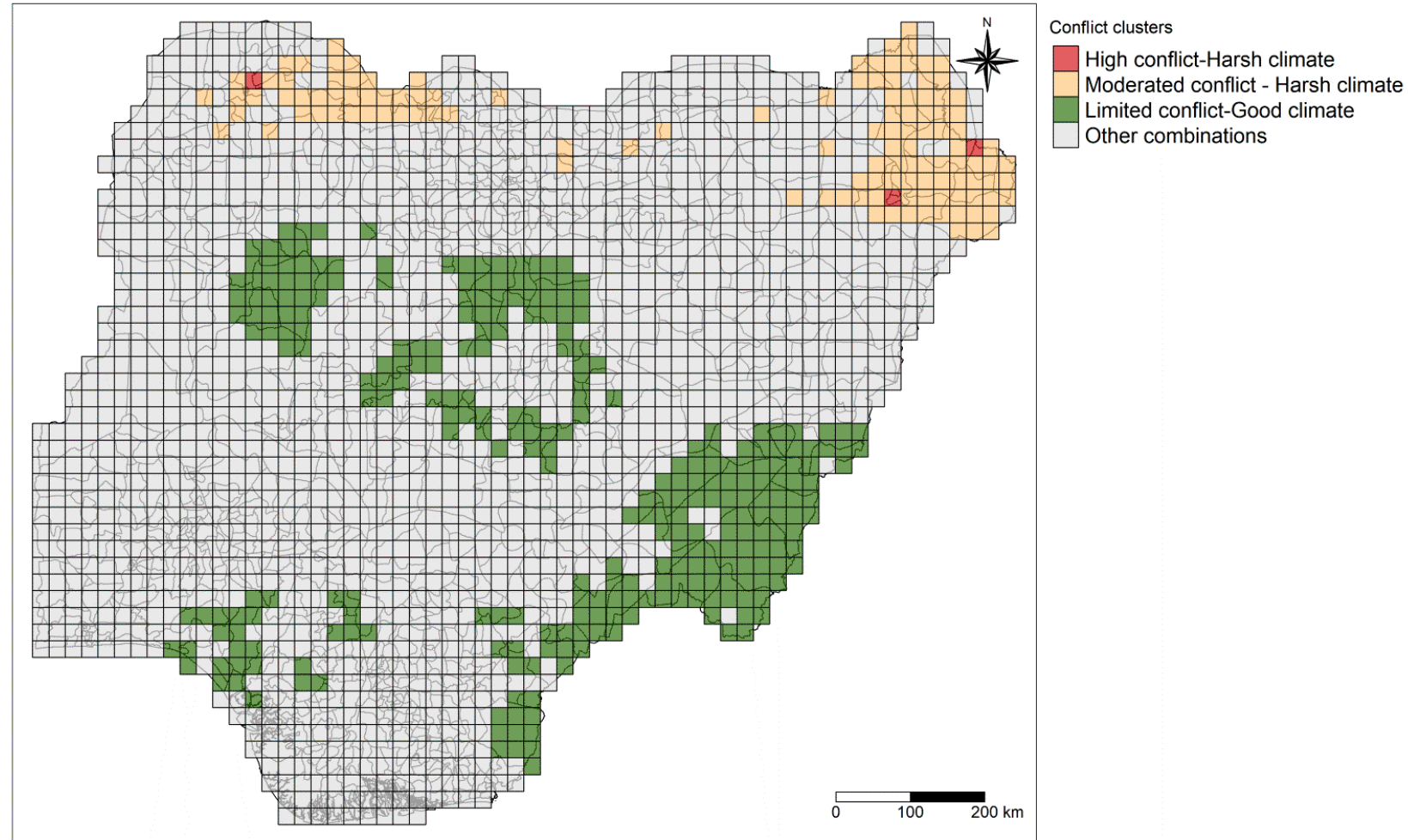
- Climate discussions around agriculture and livelihoods
- Conflict discussion predominantly around unemployment. No significant correlations with climate-related variables

ACLED Conflict Data

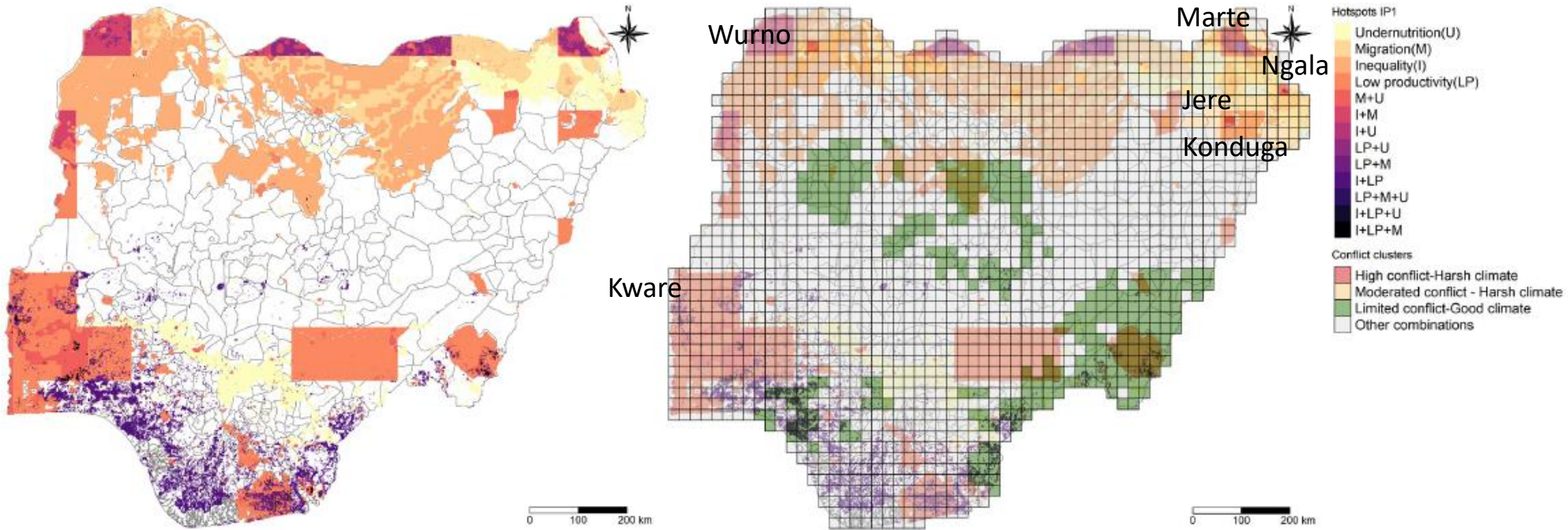


3. Provide data-driven evidence for CS-sensitive policy response (2)

- The ACLED conflict data are interacted with multiple sources of climate data (CHIRPS, TerraClimate, and AgERA5 – 5km).
- The conflict and climate clusters are determined through pattern-based spatial cluster analysis using a regular grid of 30 km² of resolution
- Overlaying conflict and climate allow to highlight the country hotspots where these two phenomena coexist.



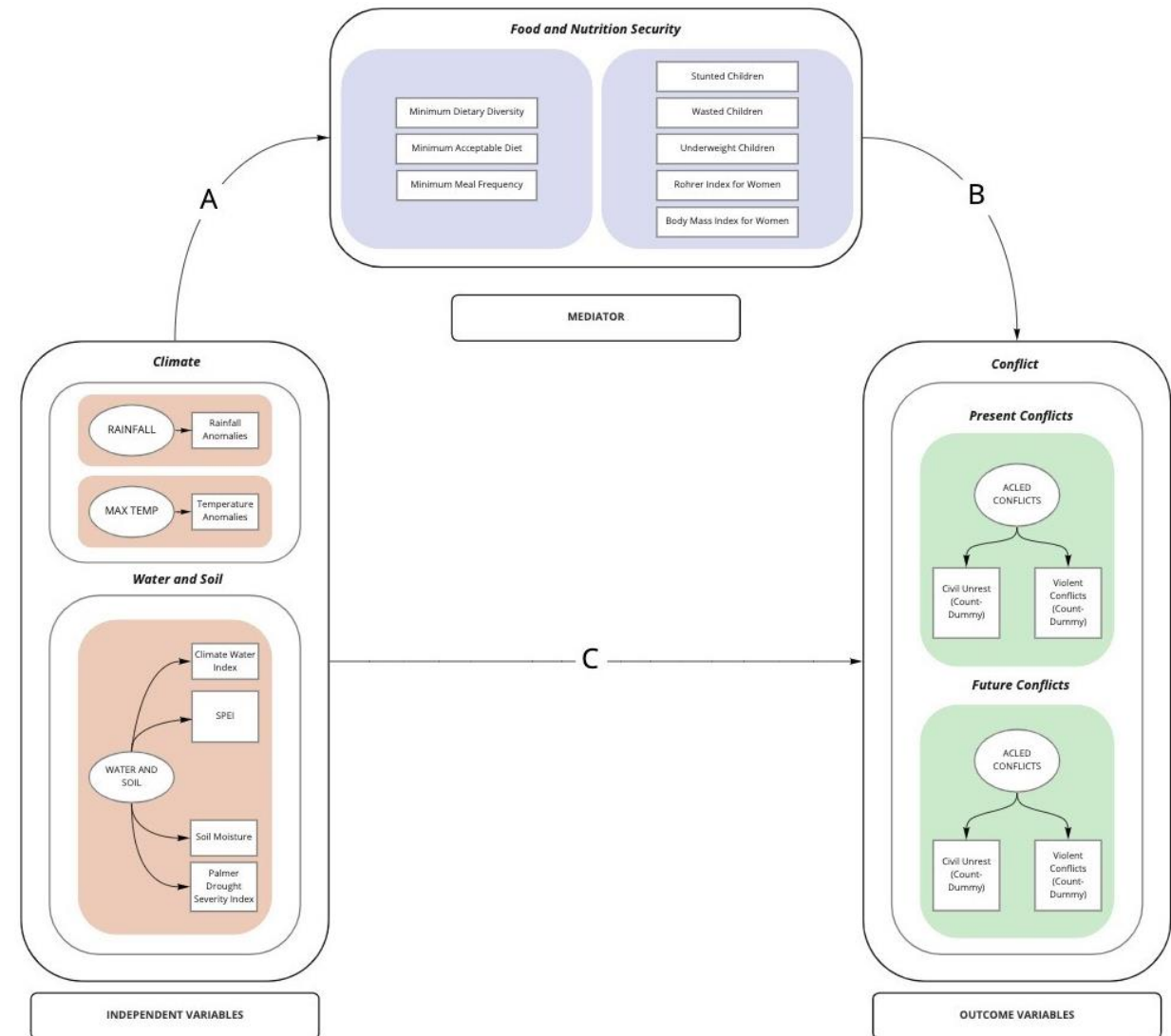
3. Provide data-driven evidence for CS-sensitive policy response (3)



- Climate Security hot-spots: (migration and inequality) in local authorities of Kware and Wurno, (low productivity) in northern limits of Marte and Ngala (inequality and low productivity) and in Jere and Konduga local authorities.

3. Provide data-driven evidence for CS-sensitive policy response: The econometric approach (4)

- A three-variable **Causal Mediation Model** is used to identify the direct and indirect effects of climate variability on conflict risk (Helman et al., 2020; Baron et al., 1986).
 - Pathway A*) links climate, water and soil variables with food and nutrition security.
 - Pathway B*) links climate to conflict through the food and nutrition security mediators (*indirect pathway*).
 - Pathway C*) directly connects climate, water, and soil variables (independent variables) with conflicts
- DHS (2003, 2008, 2013, 2018); ACLED; TerraClimate.
- Conflict Buffers (55km): IH
- Grid (20k)-quarter/year dataset



3. Provide data-driven evidence for CS-sensitive policy response: The econometric approach (4)

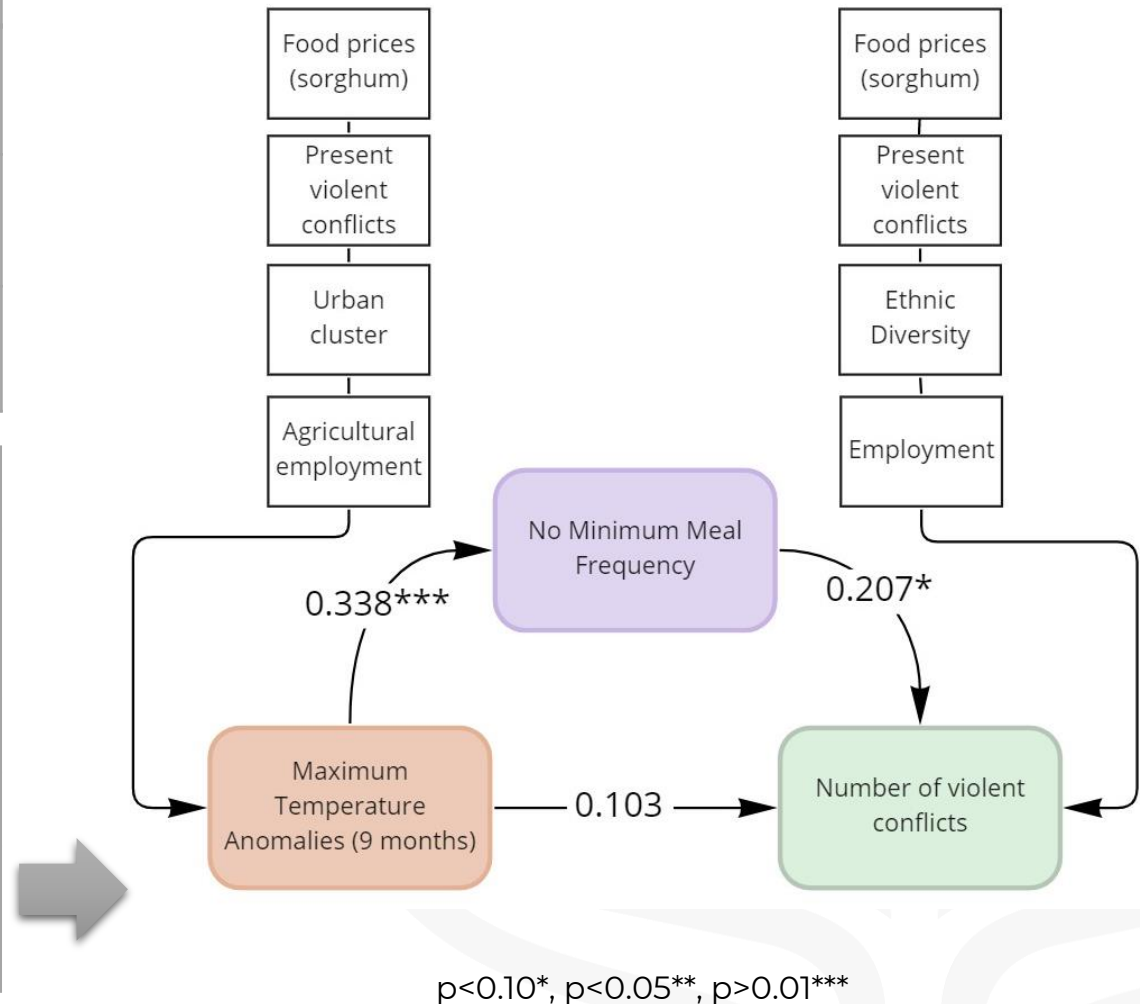
<i>Variables</i>	<i>Description</i>
No Minimum Meal Frequency	Number of clusters in the grid with at least 50% of the households food insecure, meaning that children (6-24 months) in the clusters do not have the minimum meal frequency required by the DHS
Positive Temperature Anomalies	Increasing maximum temperature in the last 9 months (deviations) - continuous
Extreme Temperature Anomalies	Increasing maximum temperature in the last 9 months (deviations) - 75th percentile - continuous
Future violent conflicts	Number of future violent conflict per grid (hyperbolic)
Present violent conflicts	Number of present violent conflicts per grid (hyperbolic)
Urban	More than 50% of the clusters in the grid are urban clusters
Agri work	More than 50% of the clusters in the grid are working in agriculture
Ethnic diversity	Categorical variable counting the number of ethnicities per grid
Sorghum prices	Mean of sorghum prices per grid (taking into account the closest market)
Employment	More than 50% of the clusters in the grid are working clusters

3. Provide data-driven evidence for CS-sensitive policy response (5)

<i>Continuous Positive anomalies Temp 9 + Meal Frequency (count) + Violent conflicts (future 9 months)</i>					
9 months		No minimum meal frequency	Direct effect	Indirect effect	Total effect
	Coeff	0.384***	0.324***	0.093**	0.417***
	P-Value	0.001	0.002	0.039	0.000

<i>Continuous Positive anomalies Temp 9 + Meal Frequency (count) + Violent conflicts (future 9 months)</i>					
9 months		No Minimum Meal Frequency	Direct effect	Indirect effect	Total effect
	Coeff	0.338***	0.103	0.207*	0.311***
	P-Value	0.005	0.488	0.058	0.002

Controls 1 equation: urban-rural, agricultural employment, present conflicts, and prices
Controls 2 equation: employment, ethnic diversity, present conflicts, and prices

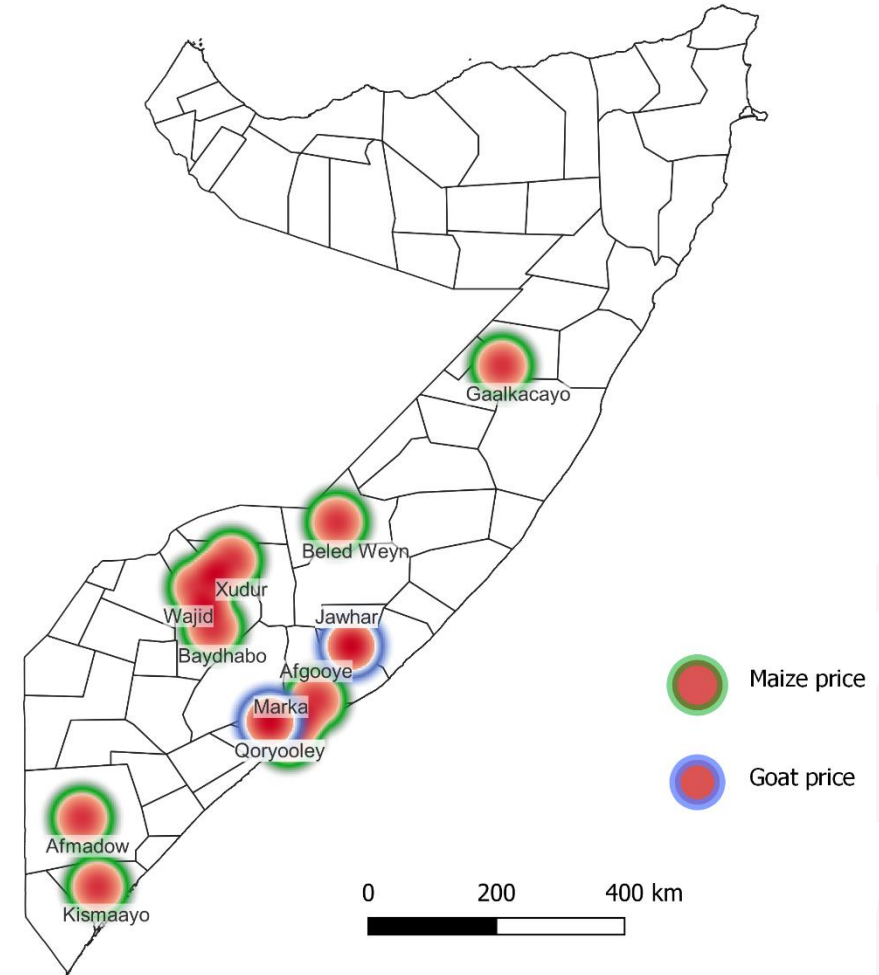
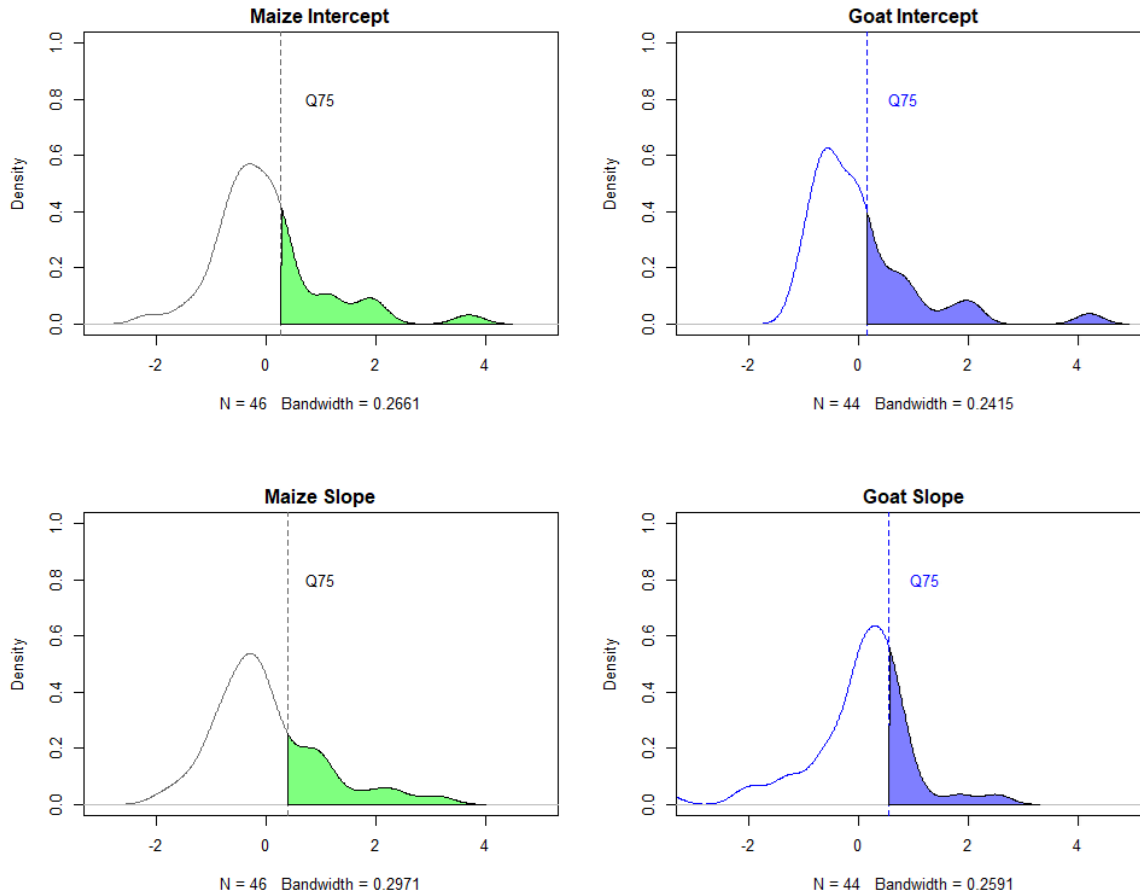


Next steps



3. Provide data-driven evidence for CS-sensitive policy response (6) Random Coefficient Model (RMC): Climate insecurity hotspots (current hotspots)

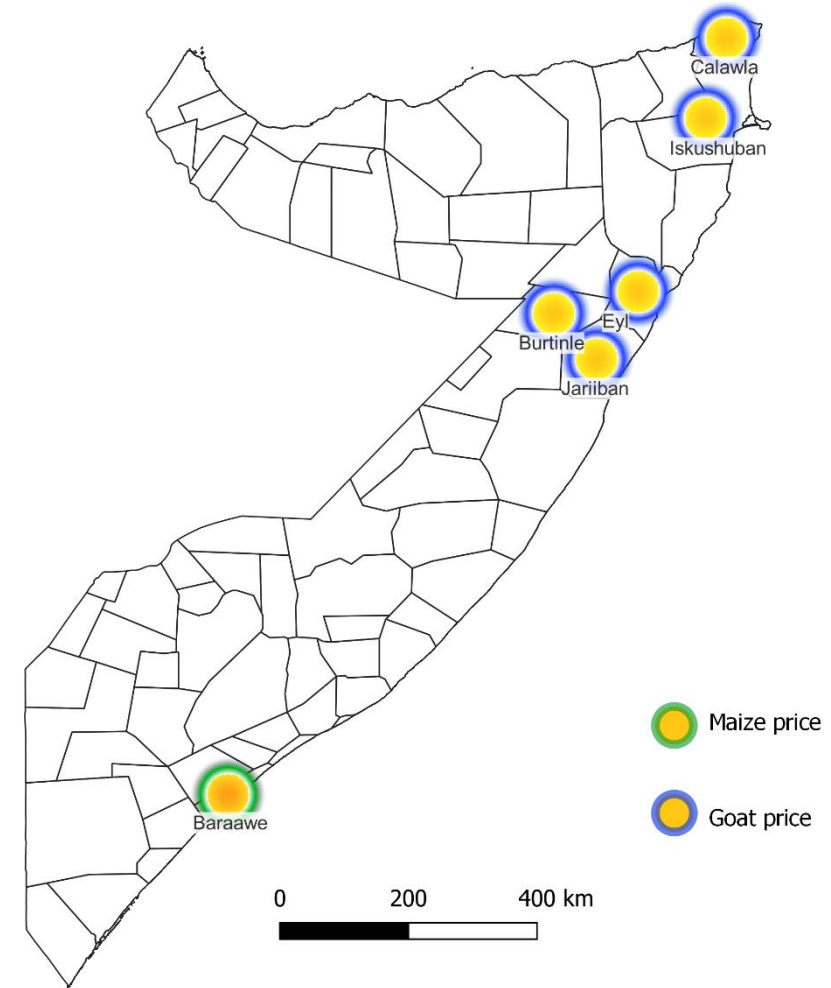
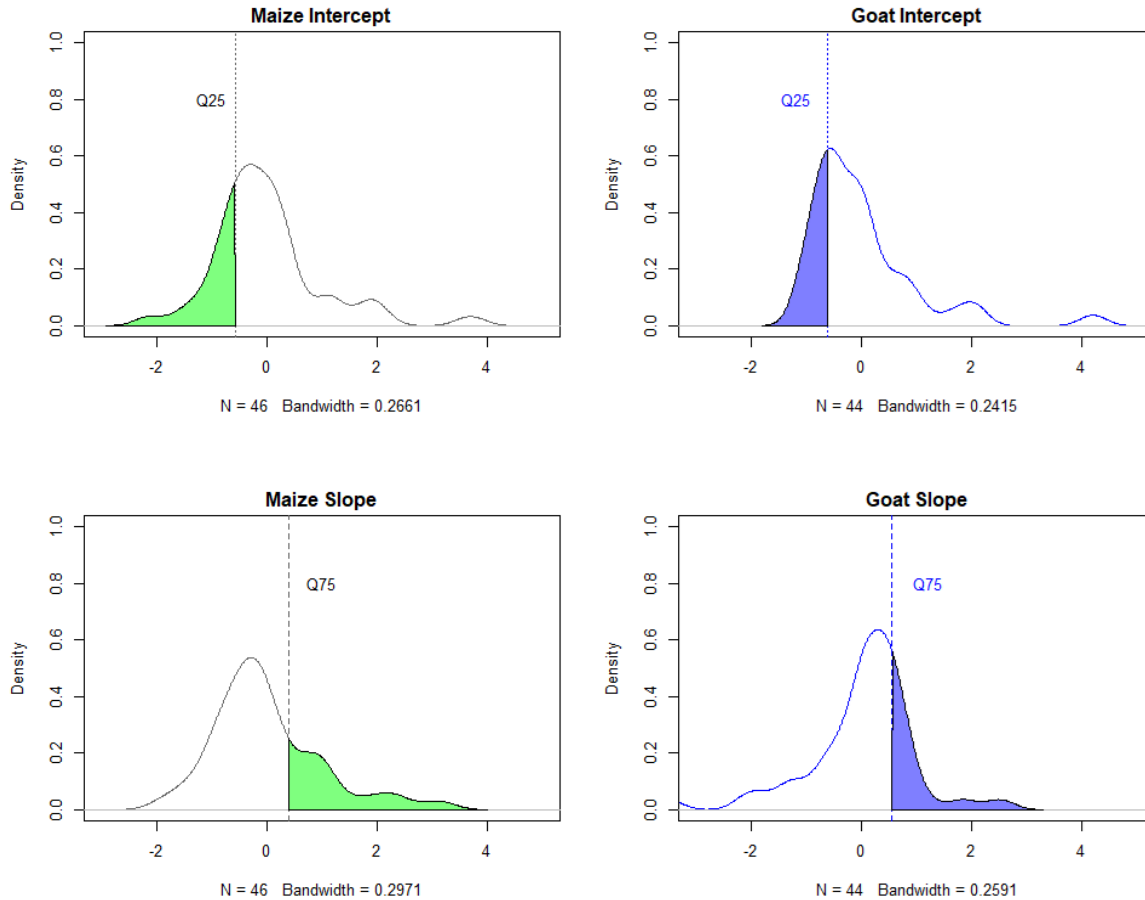
Climate Insecurity Hotspots



- Moderate dry agro-pastoralist inter-riverine regions
- Structural causes of conflicts

3. Provide data-driven evidence for CS-sensitive policy response (7) Random Coefficient Model (RMC): Climate insecurity “vulnerability” hotspots (potential hotspots)

Climate Vulnerability Hotspots



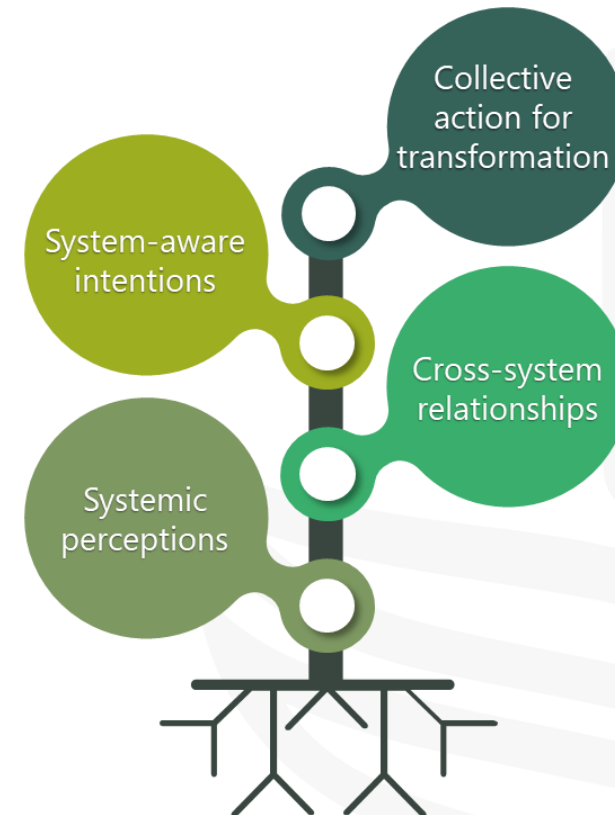
- Mostly controlled by single governing authority
- Relatively less conflict prone but may evolve in future of hotspot of climate

4. Validation: Transformative Scenario Planning (1)

TSP is an approach that brings concerned stakeholders from different, often conflicting, perspectives together. People discuss a situation which is deemed by all as problematic and unsustainable and build stories that illustrate a range of potential futures that could come from taking different action paths.

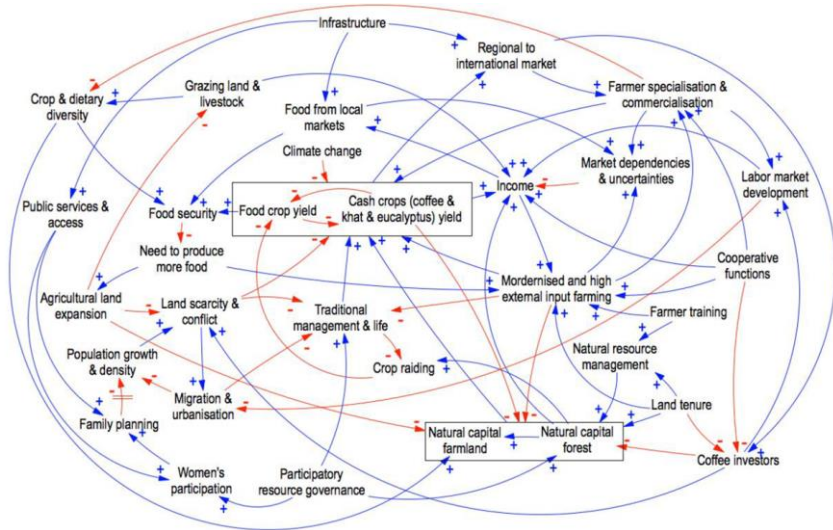
Objectives

- 1) Investigate the potential of transformative scenario planning as a method to develop bottom-up strategies towards managing climate security risks in agroecological systems.
- 2) Examine the validity of Climber ´s quantitative impact pathways through qualitative, place-based analysis.
- 3) Identify bottom-up solutions for resilience building that address climate security risks, along with scenario pathways to scale their transformative potential.

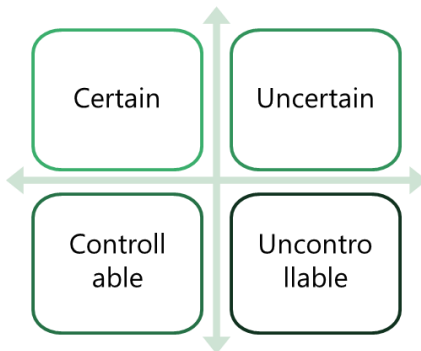


4. Validation: Transformative scenario planning (2)

Causal loop diagrams indicate how drivers of change in a social-ecological systems affect one another.



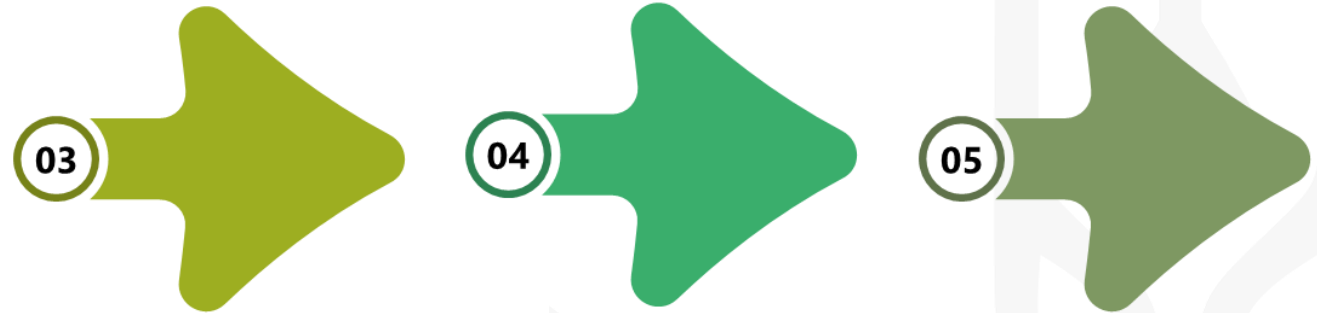
Drivers of CS risks



Construct future stories

Workshop 2:

- Explore full development and consequences of solutions, along with synergies.
- Integrate certainties and uncertainties into future vision.
- Build a set of scenarios around the development of solution.



Characterize CS risks

Workshop 1:

- Participatory assessment of climate security risks
- Define main drivers of CS risk, their certainties and uncertainties
- Identify innovative solutions for resilience building

Define actions

Workshop 3:

- Creative presentation of scenarios
- Identify needs for adaptive and transformative action
- Develop intentions and define required actions for system transformation

The CSO geographical focus





FOCUS
Climate Security



CGIAR delivering the scientific foundations for peace and security

Thank you

<http://climatesecurity.cgiar.org>

One CGIAR mission “Ending hunger by 2030 through science to transform food, land and water systems in a climate crisis” is central to **conflict prevention and peace building**

Annex



About our team and expertise

One CGIAR mission “*Ending hunger by 2030 through science to transform food, land and water systems in a climate crisis*” is central to **conflict prevention and peace building**

The **CGIAR FOCUS Climate Security** team creates environmental, political, gender-sensitive, and socioeconomic solutions to issues of *peace and security in the fields of climate, land, and food systems science* in the Global South.

We work on assessing and quantifying the impacts of the climate crisis across a range of different multidimensional social and political phenomena, through the **6 research initiatives and across multiple ONECGIAR research projects.**

Our research flagship initiatives (2022)

Climate Security
Migration Nexus



Climate Security
Measurement
and Indicators



Gender and
Social Inequality



Climate Security
Practices



Climate Security
Governance



Climate Security
Digital
Innovations



On-going research projects (2022-2024/2030)

Building Systemic Resilience against Climate Variability and Extremes (ClimBeR)

Guatemala, Kenya, Senegal, Zambia, The Philippines

Livestock and Climate System Resilience (LCSR)

Kenya

Fragility, Conflict and Migration

Design in progress

miro

Building Systemic Resilience against Climate Variability and Extremes (*ClimBeR*)

This Initiative aims to transform the climate adaptation capacity of food, land and water systems in six low- and middle-income countries, ultimately increasing the resilience of smallholder production systems to withstand severe climate change effects like drought, flooding and high temperatures.

Livestock and Climate System Resilience (*LCSR*)

This initiative aims to partner with public and private actors to develop and deliver actionable innovations that measurably help producers, businesses, and governments adapt livestock agrifood systems to climate change and reduce greenhouse gas emissions, contributing to sustainability and development goals across livestock systems.

Migration, Conflict and Fragility (MCF)

This initiative will promote resilience in fragile and conflict-affected settings (FCASs) and areas experiencing frequent migration by using demand-driven research to inform partners' efforts to promote food security and inclusive benefits from food, land, and water systems (FLWSs).



FOCUS
Climate Security

About CGIAR

CGIAR is an international research consortium with the goal of improving global agricultural resilience and development strategies from socioeconomic, environmental, and nutritional perspectives

Vision: A world with sustainable and resilient food, land, and water systems that deliver diverse, healthy, sufficient, and affordable diets, and ensure improved livelihoods and greater social equality, within planetary and regional environmental boundaries

Mission: To deliver science and innovation that advance the transformation of food, land, and water systems in a climate crisis

About us

Climate security

Our work and initiatives

Entry points for collaboration

CGIAR research centers



International Food Policy
Research Institute (IFPRI)



Center for International
Forestry Research (CIFOR)



Science for resilient livelihoods in dry areas

International Center for
Agricultural Research in the
Dry Areas (ICARDA)



INTERNATIONAL
LIVESTOCK RESEARCH
INSTITUTE

International Livestock
Research Institute (ILRI)



INTERNATIONAL CROPS RESEARCH
INSTITUTE FOR THE SEMI-ARID TROPICS

International Crops Research
Institute for the Semi-Arid
Tropics (ICRISAT)

Alliance



The Alliance of Bioversity
International and the
International Center for
Tropical Agriculture (CIAT)



AfricaRice

Africa Rice Center



International Institute of
Tropical Agriculture (IITA)



International Water
Management Institute

International Water
Management Institute (IWMI)



International Rice Research
Institute (IRRI)



WorldFish



World Agroforestry (ICRAF)



International Potato Center
(CIP)



International Maize and Wheat
Improvement Center (CIMMYT)

1. How can compound risks to climate resilience can be effectively monitored and assessed in a real-time or almost real-time manner? (**Climate Security Index**)
2. Are national and regional stakeholders aware of the climate security risks (**Policy Gap Maps**)?
3. How can policies/programs/investments become more climate security sensitive? (**Climate Security Proofing Guidelines and Climate Security Policy Coherence Toolkit**)
4. How to leverage climate finance to ensure peace and security and increase sustainable climate resilience? (**Climate Security Investment Plans**)