LASER PULSE

CLIMATE SECURITY MONITORING, EVALUATION, & LEARNING (MEL)

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About LASER PULSE

LASER (Long-term Assistance and Services for Research) PULSE (Partners for University-Led Solutions Engine) is a 10-year, $70M program funded by USAID's Innovation, Technology, and Research Hub, that delivers research-driven solutions to field-sourced development challenges in USAID partner countries.

A consortium led by Purdue University, with core partners Catholic Relief Services, Indiana University, Makerere University, and the University of Notre Dame, implements the LASER PULSE program through a growing network of 3,700+ researchers and development practitioners in 86 countries.

LASER PULSE collaborates with USAID missions, bureaus, and independent offices, and other local stakeholders to identify research needs for critical development challenges, and funds and strengthens the capacity of researcher-practitioner teams to co-design solutions that translate into policy and practice.

About the Armed Conflict and Violence Prevention Learning Agenda

The Conflict and Violence Prevention Learning Agenda Implementation Team (CVP LAIT) was tasked with co-creating and implementing a bureau-wide learning agenda that:

- **Establishes the evidence base for effective approaches to armed conflict and violence prevention;**
- **Identifies opportunities for CVP investments that would produce new knowledge to fill gaps in the existing literature;**
- **Provides USAID staff with events, tools, resources, and/or guidance to incorporate learning agenda findings into their work; and**
- **Conducts original research into armed conflict and violence prevention**

Through an intensive, multi-stakeholder consultation process with USAID Washington and mission staff, preventing/countering violent extremism (P/CVE) was identified as an effort that, if backed by sound evidence and guidance, could benefit program design, outcomes, policy, and knowledge generation.

Disclaimer

CONTENTS

ACRONYMS

AfP	Alliance for Peacebuilding
CVP LAIT	Conflict and Violence Prevention Learning Agenda Implementation Team
DDRR	Disengagement, Deradicalization, Rehabilitation, and Reintegration
FAO	Food and Agricultural Organization of the United Nations
LASER PULSE	Long-term Assistance and Services for Research Partners for University-Led Solutions Engine
MEL	Monitoring, Evaluation, and Learning
P/CVE	Preventing/Countering Violent Extremism
PI	Principal Investigator
ToC/s	Theory/ies of Change
USAID	United States Agency for International Development

RESEARCH SUMMARY

This research aims to better understand the current state of measurement with regards to climate security programming across the broader peacebuilding and climate landscape. The following report explores the general characteristics of climate security studies to date—including explicit indicators, common measurement trends, and indicator examples—to determine what climate security programs are seeking to change, how they seek to do so, and how they measure such change. The studies analyzed for this report were curated from a climate security evidence review that contained 103 resources covering 128 programs related to climate security, of which 16 (12.5%) contained explicit indicators; the characteristics of these studies are synthesized within the body of this report. This catalogue reflects the limited evidence base in the field. Most of the resources identified were not evaluation reports, but instead, academic and gray literature that examine programmatic efforts.

In total, 209 indicators were extracted for analysis. Collectively, these indicators depict that climate security involves a combination of thematic indicators, each playing a role in understanding the multifaceted nature of environment, conflict, and human systems. Findings from the climate security studies reveal a broad spectrum of measures that resonate with varied themes, predominantly focused on measuring changes related to environmental and human systems or programmatic operations (although without linking those changes to one another). The indicators encompass a holistic view of environment and human systems, from assessing the intricate interplay of agricultural practices and land tenure in environmental indicators to delving into the realms of conflict, well-being, and economic facets in human systems. Based on this, a nuanced understanding emerges.

This research—which reflects the limited number of resources published to date—lays a promising but emerging foundation on the measurement of climate security programming, signaling potential avenues for future inquiry. The findings in this report showcase existing indicators and measures as examples of the current state of measurement, while highlighting the necessity for ongoing development and validation of definitional boundaries, theories of change (ToCs), indicators, and program approaches. The recent publication of new climate security resources, such as toolkits and guidance documents, including some information on measurement and evaluation, are promising advances for climate security measurement. However, they do not provide evidence of the utility, feasibility, or effectiveness of the indicators they recommend, as many have yet to be fully tested. Rather, they serve as a useful starting place from which to develop and test climate security indicators and MEL approaches.

To advance the field of climate security measurement, researchers, and implementers need to establish clear correlations between the compounding crises of climate, conflict, and security to better identify which interventions lead to meaningful impacts on climate peace and security. This approach will ensure more targeted and effective interventions.

INTRODUCTION

Climate change, violent conflict, and fragility are compounding crises and pose severe risks to global peace and security. Given the complex effects that climate change has in conflict-affected and fragile contexts, designing indicators and measuring change in climate security interventions is challenging and, in many ways, in its emerging stage. This research aims to better understand the current state of measurement with regards to climate security interventions by exploring the characteristics of existing climate security resources, including explicit indicators, measures, and common measurement trends to determine what, exactly, current climate security programs are seeking to change. It relies on the limited resources published to date in the climate security field. To supplement the existing evidence, the report also includes overviews of emerging resources that provide additional direction on measuring climate security risks and related outcomes, as well as important contextual factors relevant to climate security interventions.

MEL REPORT METHODOLOGY

To provide a clearer picture of the current state of measurement and build on the emerging base of climate security measurement, this research complements a research review of relevant climate security literature to extract, analyze, and curate climate security indicators and measures. This research conducted an inductive thematic analysis and the following themes emerged from the included literature:

- **Environmental** focuses on elements related to the natural environment, including those that are intertwined with human systems (such as agriculture and land);
- **Human systems** encompass various aspects of human-made, relational systems, including socio-political factors as well as those related to conflicts and relationships;
- **Contextual/operations** provide demographic and situational information that gives a better picture of the environment in which a program takes place; and
- **Measurement** explores a program's monitoring and evaluation processes.

Using a developed catalogue of 103 included resources, the research team manually scraped each resource to collect indicators and related monitoring, evaluation, and learning (MEL) information, including associated measure,[1] measure options,[2] data collection tools used, and disaggregation methods. A total of 209 indicators were identified and included—of these,194 were unique indicators. AfP used Microsoft Excel to track references and code key characteristics documented for each resource. Following full-text coding of the 194 unique variables, researchers employed a thematic analysis approach, paired with computerized theme and descriptive analyses of the included resources to synthesize findings across relevant resource characteristics. These characteristics included indicator key themes, research methods, analysis methods, and relevant measure information.

Two coding teams separately conducted thematic analysis using a traditional card-sort theme extraction method[3] across relevant characteristics.[4] Through this process, thematic categories relating to each characteristic were created inductively through a method of open coding. Once thematic categories were developed, the data was coded and restructured within relevant thematic categories for final category-based analysis. The two thematic analyses were compared and minor differences between the two were reconciled using cross-team discussion.

INCLUDED RESOURCES

The finalized catalogue contained 103 resources covering 128 programs related to climate security, of which 16 resources (15.5%) contained explicit indicators. In total, 209 indicators were extracted for further analysis. The low percentage of resources with indicators is reflective of both the lack of evidence in the climate security space, as well as the relative prevalence of documents where one might not expect indicators—namely academic articles.

Understanding the context and methodological approach of resources is crucial for understanding the current measurement

1 "Indicator measure" is the exact question (either quantitatively or qualitatively administered) that collects data to evaluate a specific indicator.

2 "Indicator measure options" are the exact options provided to answer an indicator measure, such as a Likert scale or specific coded answers. Close-ended questions typically have explicitly stated measure options.

3 Card-sort theme extraction is a method for inductively analyzing qualitative data for the purposes of thematic analysis. Once data is organized into specific categories, a researcher physically or using CAQDAS, sorts the data into generally higher and higher groups to facilitate inductive reasoning. For more information, reference M. Miles et al. 2020, Qualitative Data Analysis: A Methods Sourcebook. 4th ed. Los Angeles: Sage.

4 Timothy Meline, 2006. "Selecting Studies for Systemic Review: Inclusion and Exclusion Criteria." Contemporary Issues in Communication Science and Disorders 33 (Spring): 21–27.

landscape. A study's context impacts the indicators' applicability and universality, and a study's methodology speaks to the indicators' reliability and validity. By examining these, one gains insights into the strength of the evidence behind the indicators and their adaptability in the ever-evolving climate security landscape. This section provides information related to the geographic context, types of resources, research methodology, and publication timelines of the 103 climate security resources and 128 programs, irrespective of whether they provided explicit climate security measures or not.[5]

Geographic Reach

The climate security body of research by project or research subject covered 69 countries and eight global, regional, or thematic geographic areas.[6] Sudan (18), Nigeria (16), Iraq (16), Jordan (16), Ethiopia (14), Israel (13), Palestine (13), and Kenya (11) emerged as the primary locations representing at least 5% of the sample each, demonstrating a heavy focus on Africa and the Middle East. The total number of countries may not match the number of projects or resource areas, as some focus on multiple countries. On a broader regional scale, Africa and the Middle East led in frequency, followed by Central and East Asia and Central and South America (see Figure 1).

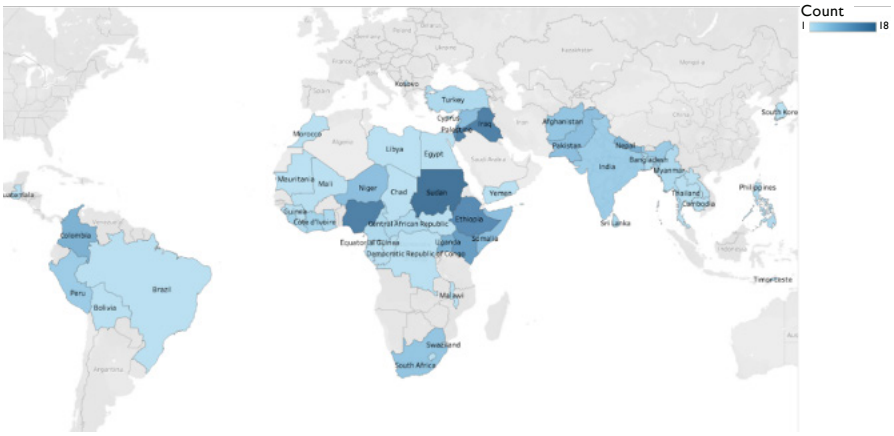

Figure 1: Geographic spread of projects/research subjects

Study Goals, Environmental Risks, and Activities

Of the 128 programs, less than half (48%) explicitly mention program goals. See Table 1 for a breakdown of relevant goals. Of these, only 9% include both environment or climate goals and peace or conflict-related goals. Environmental risks addressed by the studies include:[7]

- **Water-related issues (shortages and availability) – 37% (50)**
- **Land use, forestry, and mining – 20% (27)**

Program or Research Subject Goal	N	%[5]
Improved Collaboration and Conflict Management	15	12%
Environmental Conservation	14	11%
Water-Related Goals	6	5%
Agriculture or Food Security	5	4%
Improved Livelihoods and Poverty Reduction	4	3%
Climate Change, Including Adaptation	4	3%

Table 1: Breakdown of relevant goals

5 Given the emerging state of the climate security field, this section provides information on all included climate security resources from the corpus, irrespective of whether they provided explicit indicators.

6 This includes six global programs or study subjects, one regional (Central America), and one thematic (small island developing states or SIDS).

7 Note that the total sample size for these percentages is 135 given that some studies (103) covered more than one program (128) that addressed more than one environmental risk (135).

- **Natural resource management and land use – 18% (24)**
- **Agriculture and food security – 13% (17)**
- **Flooding, natural disasters, and high temperatures – 7% (9)**

The majority (75%) of studies targeted individuals at the community-level, particularly farmers and pastoralists. Only 13% targeted the national or regional level. The studies mentioned a variety of activities focused on livelihood adaptations, capacity strengthening, cooperative agreements, conservation, management agreements and governance, the provision of services (energy, water), and market-based approaches.

Document Types

The types of resources are journal articles (71%), books or book chapters (11%), theses (9%), and reports (6%). The remaining 3% are a combination of working papers, news articles, and/or grey literature. Given that evaluative information is often found in book chapters, evaluation reports, and other grey literature, the high percentage of resources classified as journal articles is likely a factor in the limited number of resources containing indicators and other measures.

Research Design	N	%
Qualitative Studies	91	91%
Mixed Methods Studies	1	1%
Quantitative Descriptive Studies	8	8%

Table 2: Research design of climate security

Analysis Methods	N	%
No Analysis Mentioned	28	18%
Thematic Analysis	19	12%
Descriptive Statistics	16	10%
Content and Discourse Analysis	14	9%
Comparative Analysis	11	7%
Inferential Statistics	10	6%
Case Study and Ethnography Analysis	6	4%
Other	5	3%
Literature Review	3	2%
Regression Analysis	3	2%
Correlation and Association Analysis	2	1%
Systems Analysis	2	1%
Economic Evaluation	1	1%
Gender and Social Inclusion Analysis	1	1%

Table 3: Analysis methods of climate security

Timeline of Publication

The majority (65%) of climate security resources were published in the last six years; similarly, of those resources that contain indicators, 63% have been published within the last six years. In general, there has been a steady increase in climate security resources since 2009 (the first year of publication of the resources included in this corpus). This trend corresponds with increasing attention paid to both climate security, the increasingly observable impacts of climate-conflict connections, and the importance of measuring and assessing climate security programing.

Methodology: Research Design and Analysis

Qualitative studies are the most commonly reported research design of climate security resources reflecting 91% (N=91) of included resources.[8] The second most common research design was quantitative descriptive studies (8%), followed by mixed methods studies (1%).

Sixty-eight percent of the resources use more than one method of data collection. The most common types of data collection are document or desk review (33%) and secondary data (33%), key informant interviews (29%), self-completed or enumerated surveys (21%), focus groups (11%), observation (7%), and records (2%). Only two of the resources had

8 Three resources did not provide sufficient information to determine the research design and were dropped from the analysis.

available data collection tools.

Only 10 included resources were evaluations. Of these limited evaluations, the majority were evaluated based on impact. 80% of the corpus examined the effect the intervention had on participants and whether these effects matched the objectives that have been set, with the remaining two (20%) being output evaluations.

Seventy-three percent of included resources (N=78) described the methods used for analysis. Only 8% (N=9) of the included studies used more than one type of data analysis. Of the types of analysis techniques used, 34% of studies were quantitative in design, 60% were qualitative, and 5% were multi-methods. The most prevalent type of analyses is thematic analysis (12% of studies), descriptive statistics (10%), content and discourse analysis (9%), comparative analysis (7%), and inferential statistics (6%).

CLIMATE SECURITY INDICATORS AND MEASURES

Climate security is an emerging programming area, and there are limited, if any, standard ToCs or indicators defined by the field to date. The resources included in this report reflect this precedent, with only six (5%) including a ToC, and only two of which were explicit. These explicit ToCs were focused on (1) awareness of the linkages between conflict and climate change, as well as engagement in peacebuilding processes, which would lead to increased climate change coping capacity; and (2) the development of inclusive, legitimate, and effective governance and sustainable livelihoods which would lead to increased capacities to manage, adapt to, and recover from climate shocks.

The lack of explicit ToCs in the resources represents an important challenge to measurement. Programmatic and evaluation indicators are generally tied directly to ToCs as a matter of good practice, as it is difficult to know what to measure unless one knows explicitly what a program is attempting to achieve and how. While programs—including those covered by the resources included in this study—may rely on implicit ToCs, if they are not explicitly documented, both measurement and subsequent learning are hindered by the inability to clearly tie evidence to intention.

Climate Security Recommendation:
Programs must systematically adopt a ToC approach to make assumptions explicit.

Adopting clear ToCs with explicit assumptions during program design will enable more effective evaluations, strengthen evidence, and guide more focused, evidence-based climate security programming.

To better understand the state of the field regarding how climate security is measured and monitored, the following section presents findings and related exemplars for climate security indicators and measures.

Included Resources with Explicit Indicators

Manual scraping of the resources identified 209 indicators, of which 194 were unique. These indicators came from only 16 resources (15.5% of the total number of resources), more than half of which (56%) were journal articles, 19% were reports, 13% were theses, and the remaining two were a working paper and a book. Forty-nine percent of the identified indicators were explicitly quantitative in nature. Most of the indicators (85%) are not defined in terms of how they were measured, and the remaining 15% are measured by counts. The lack of information as to how indicators are measured means that assessing the value of those indicators, their validity and relevance to climate security work, and their applicability to the climate security field more broadly is challenging.

Climate Security Recommendation:
Develop and Test Indicators.

As the field of climate security measurement matures, it is crucial to develop and test new indicators across a variety of contexts. New guidance documents contain recommended indicators, but there is little evidence of their effectiveness, feasibility, or utility. These indicators should be tested and not simply copied and repeated in a cookie-cutter fashion.

Disaggregates

In total, 45 of the 194 unique indicators (23%) explicitly present disaggregation, resulting in a total of five disaggregates. The most common type of indicator disaggregate is adopters/non-adopters (most likely of agriculture-related interventions), followed by geographic location, beneficiaries, gender, and age.

Indicator Disaggregates	N	%
No Disaggregation Specified	151	77%
Adopters/Non-Adopters	34	17%
Geographic Location	7	4%
Beneficiaries	2	1%
Gender	1	0.5%
Age	1	0.5%

Table 4: Types of disaggregates of climate security indicators

The lack of disaggregation is notable given the increasing importance placed on participation and inclusion in program design and implementation, as well as program monitoring within the climate security field.[9] Additionally, issues related to access and inequity are also highly relevant for climate security work.[10] Disaggregation with more specificity (e.g., ethnic groups, rural/urban, etc.) is a key to ensuring that these issues are effectively monitored.

Climate Security Recommendation:
Ensure Sufficient Indicator Disaggregation.

Climate security programming can have varied effects on different groups such as women, those in rural areas, those with less power, or those who rely on a certain kind of livelihood. Ensure that any indicator data collected can be sufficiently disaggregated to understand distinct effects.

9 Carl Bruch et al. Toolkit on Monitoring and Evaluation of Environmental Peacebuilding (Washington, D.C.: Environmental Law Institute, forthcoming)
10 Erica Gaston et al. Climate-Security and Peacebuilding: Thematic Review (United Nations University Centre for Policy Research, 2023),

Type of Indicator

Indicators were coded as contextual, process, or outcome indicators. The largest category of indicators are outcome indicators (64%), followed by process indicators (27%). It is important to note that due to the limited information on the indicators, 13 (7%) were found to be potentially either process or outcome indicators, depending on the program.[11] Thirteen percent of the indicators were contextual, meaning that they likely provide important information on the context or environment in which a program takes place. Three percent were not coded due to insufficient information.

Type of Indicator	N	%
Contextual	29	13%
Outcome	111	59%
Process	39	20%
Process/Outcome	13	7%
Unknown	5	3%

Table 5: Type of indicator

Indicator Categories, Themes, and Exemplars

Indicator Categories	N	%
Environmental	78	39%
Human Systems	94	47%
Contexual Operations	12	6%
Measurement	14	7%

Table 6: Indicator categories of climate security indicators

The included indicators were thematically coded into 11 themes across four categories: environmental, human systems, contextual/operational, and measurement.[12]

Environmental indicators are often seen as one side of the coin in climate security work and focus on the natural environment, including those intertwined with human systems (such as agriculture and land). Human systems indicators are often seen as the other side of climate security work, encompassing aspects of human-made, relational systems, including socio-political factors and those related to conflicts and relationships. Indicators focused on context/operations provide demographic and context information depicting the context in which a program takes place, whereas measurement indicators measure a program's monitoring and evaluation processes.

Environmental Indicators

The category of environmental indicators focuses on elements related to the natural environment and includes 78 indicators (39%) related to climate security. Indicators found in this category were thematically organized into three themes: Agriculture; Climate/Environment; Land, Land Rights, and Land Tenure.

Environmental Indicators	N	%
Agriculture	48	62%
Climate/Environment	23	29%
Land, Land Rights, and Land Tenure	7	9%

Table 7: Indicator themes in environmental categorized indicators

Agriculture: The majority of environmental indicators (62%) assessed agricultural aspects of programming. These indicators were focused on assessing processes (27%), outcomes (69%), and context (2%).[13] Sixty-two percent are quantitative, and there are no perception-based indicators. These indicators cover the use of **agricultural inputs** such as seeds and pesticides, **agricultural practice and management**, **agricultural challenges**, and **livestock**-related indicators. They correspond with five of the corpus resources covering programs that focus on agriculture, crop insurance, crop improvements, market-driven approaches, and Indigenous practices in response to agricultural and water-related risks. Example indicators include:

11 Note that these indicators are included in the previous statistics on outcome and process indicators.

12 It is important to note that some indicators correspond to more than one theme depending on the program and its explicit objectives. As such, the total N (N=198) does not equal the total N of indicators (N=194).

13 For indicator assessment, not all indicators across each theme were able to be assessed and percentages may not add up to 100%.

Indicator Category	Indicator Theme	Indicator Theme Sub-Group	Indicator Exemplar
Environmental	Agriculture	Agriculture Inputs	• Farming experience • Use of pesticide • Use of herbicide
		Agricultural Practice/ Management	• Intercropping • Row planting • Use of soil and water conservation • Problems/priorities of climate-smart soil and land management
		Livestock	• Total livestock owned currently • Loss of livestock • Problems/priorities of climate-smart livestock production
		Agricultural Challenges	• Crop Damages • Irrigation problems • Drainage problems

Table 8: Agriculture indicator themes in environmental categorized indicators

Climate Security Recommendation:
Expand Indicators Beyond Agriculture.

Most indicators identified by this study are related to agriculture. Since climate security programming goes beyond agriculture, so should the indicators. This may include, for example, indicators regarding the management of natural resources, such as oil and gas, forests, fisheries, and water resources.

Climate/Environment: Nearly a third (29%) of climate/environment indicators assessed aspects of the programming environment or climate. These indicators were focused on assessing context (43%), outcomes (39%), and processes (13%). Contextual indicators focus on aspects of the environment or climate that are outside of the control of the program, including those related to traditional climate measures such as **rainfall**, **temperature**, **flooding**, or **drought**. The associated process indicators are related to how the intervention is set up, while outcomes refer to **climate change actions** and perceptions of **climate** and **environment**. Across this theme, 60% are quantitative indicators, and there is only one perception-based indicator. Example indicators include:

Indicator Category	Indicator Theme	Indicator Theme Sub-Group	Indicator Exemplar
Environmental	Climate/ Environment	Climate	• Temperature (1970-2006) • Drought occurrence (1982-2009) • Flooding occurrence (1985-2009) • Climate trends—past, present, future • Weather condition dishonesty • Drought shock
		Climate Change Action	• Opportunities to enhance ecosystem integrity and connectivity are identified and incorporated into the nature-based solution strategy • Clear and measurable biodiversity conservation outcomes are identified, benchmarked, and periodically assessed • Restoring the environment damaged during the war wich may be observed when soil or water sources are decontaminated from chemicals • Use of soil and water conservation
		Perception of Climate/ Environment	• Perception of rain

Table 9: Climate/environment indicator themes in environmental categorized indicators

Importantly, climate indicators, such as temperature, rainfall, droughts, or flooding, are often outside the control of a specific program given the long timelines needed for human intervention to affect climate change. Given these long timeframes, environmental indicators are likely to be indicators of the broader climate context in which a project takes place and useful for understanding that context, potential effects on implementation, and the achievement of outcomes. For example, it would be useful to understand under what rainfall conditions climate-smart agricultural outcomes can be achieved. These kinds of indicators can also be utilized in conjunction with other economic, agricultural, or well-being indicators to understand levels of climate resilience—the ability to withstand shocks or stressors—within a population.

Objective and subjective leading indicators can be used in conjunction with climate and environment indicators to understand whether a program is *likely* to contribute to improving climate-related indicators or at least perceived to be contributing. The corpus provided numerous examples of these, such as those listed above (e.g., reducing the illegal exploitation of natural resources such as forest or marshland can have long-term benefits for the climate). Additional, perception-based indicators that seek to understand how project participants perceive activities and their likelihood of contributing to beneficial environmental outcomes would also support efforts to anticipate long-term outcomes, impacts and potential unintended, negative effects.

Climate Security Recommendation:
Develop and Test Perception-based Indicators.

Understanding the linkages between natural/environmental and human systems can be incredibly challenging due to the various ways that these systems can impact one another and the timeframes for those impacts to manifest. Additionally, changes in the climate or environment and security (and the effect they have on one another) can be interpreted differently by diverse stakeholders. It is therefore essential that perception-based indicators be combined with more objective indicators of change to understand how stakeholders understand climate security work to judge its effectiveness, sustainability, and potential for impact. Perception-based indicators are also aligned with the process of contextualization and localization.

Land, Land Rights, and Land Tenure: Only 4% of environmental indicators assessed land, land rights, and land tenure, and refer to the management of specific plots and the safeguarding of land rights, access, use, and/or management. These indicators were predominantly focused on assessing outcomes (71%), with only two process indicators and one contextual indicator. The corpus does not indicate any qualitative indicators, despite Sustainable Development Goal Indicator 1.4.2's explicitly references to perceptions of land tenure rights. Example indicators in this theme include:

Indicator Category	Indicator Theme	Indicator Theme Sub-Group	Indicator Exemplar
Environmental	Land, Land Rights, and Land Tenure	Land	• Improving the sharing of territory which may be observed in practice when land is restituted to a displaced person whose lands were dispossessed
		Land and Resource Rights	• The rights, usage of and access to land and resources, along with the responsibilities of different stakeholders, are acknowledged and respected
		Land Tenure	• Men-managed plots • Women-managed plots

Table 10: Land, land rights, and land tenure indicator themes in environmental categorized indicators

Notably, the management of other kinds of resources outside of land are missing from the corpus. This could include, for example, the management of forests, fisheries, and water resources and is in line with the recommendation above to expand indicators beyond agriculture.

Human Systems Indicators

The category of human systems indicators encompasses various aspects of human-made, relational systems, including socio-political factors, as well as those related to conflicts and relationships. It includes 94 indicators (47%) related to climate security. Indicators found in this category were thematically organized into six themes: conflict; well-being; economic; relational; governance; and conflict sensitivity.

Human Systems Indicators	N	%
Conflict	22	26%
Well-Being	22	26%
Economic	20	21%
Relational	19	20%
Governance	6	6%
Conflict Sensitivity	5	5%

Table 11: Indicator themes in human systems categorized indicators

Conflict: Nearly a quarter (26%) of human systems indicators assessed aspects of conflict. These indicators were focused heavily on assessing outcomes (95%), which is to be expected given that limiting, managing, or resolving conflict is often a key objective of climate security work. The majority (64%) of these indicators came from a single resource on water cooperation and environmental peacemaking,[14] with a focus on military and diplomatic **hostility**, the level of **disagreements**, and the number of **encounters**. Fifty-five percent of the indicators are quantitative only. Example indicators include:

14 Tobias Ide and Amit Detges. International Water Cooperation and Environmental Peacemaking. Global Environmental Politics 18, no. 4 (2018): 63–84.

Indicator Category	Indicator Theme	Indicator Theme Sub-Group	Indicator Exemplar
Human Systems	Conflict	Reported Violence	• Violence within 50 kilometers • Frequency of incidents of violence between communities A and B in a designated area in a three-month period • Frequent military encounters • Preparation for future conflicts
		Dispute Resolution	• Key issues resolved

Table 12: Conflict indicator themes in human systems categorized indicators

Interestingly, there do not appear to be any indicators related to community or individual-level feelings or perceptions of security, despite these types of indicators gaining increasing prominence in the climate security space.[15] There also are no indicators on capacities to manage conflict or maintain security.

Climate Security Recommendation:
Incorporate Indicators of Security.

The research found limited use of security or conflict-related indicators, which are essential to climate security work. Such indicators would go beyond simply counting the number of conflicts or the number of conflicts resolved and could include indicators related to conflict management institutions or infrastructure, as well as proxy measures of human security, such as social cohesion or governance mechanisms, which can be used to effectively manage conflicts. The limited use of security or conflict-related indicators may reflect limitations in the available resources included in this research or a significant gap in the state of the field.

Well-Being: Similarly, nearly a quarter (26%) of human systems indicators assessed aspects of well-being. These indicators were focused heavily on assessing outcomes (86%). Like conflict indicators, the objective of many climate security programs is to improve human well-being, in addition to reducing conflict. Well-being is a broad theme that includes indicators related to **education**, **food security**, **health**, **housing**, and **mortality**. Also, like conflict indicators, well-being indicators skew toward quantitative indicators, although 41% could be either qualitative or quantitative. Example indicators include:

Indicator Category	Indicator Theme	Indicator Theme Sub-Group	Indicator Exemplar
Human Systems	Well-Being	Health and Nutrition	• Illness
		Mortality	• Infant mortality
		Education	• School enrollment
		Food Security	• Proportion of households reporting year-round access to sufficient food
		Housing	• Roofing material of the house

Table 13: Well-being indicator themes in human systems categorized indicators

15 See, e.g., "Home: Everyday Peace Indicators," Everyday Peace, 2021.

Economic: Overlapping with well-being and agriculture indicators, economic indicators account for 21% of human systems indicators. They are almost entirely focused on assessing outcomes (95%) and are largely (80%) quantitative. There are no perception-based indicators. Economic indicators address levels of **income**, **poverty**, **livelihoods**, and **assets**. The largest group of these indicators (30%) comes from a resource focusing on drought tolerant agriculture in Africa. Example indicators include:

Indicator Category	Indicator Theme	Indicator Theme Sub-Group	Indicator Exemplar
Human Systems	Economic	Income	• Non-farm income
		Poverty	• Poverty headcount ratio
		Livelihoods	• Secondary job
		Assets	• Total value of assets

Table 14: Economic indicator themes in human systems categorized indicators

Relational: Similarly, 20% of human systems indicators assessed relational aspects of programming, focusing on the **relationships** and **interactions** between people and groups of people. There is some overlap in these indicators with conflict and governance indicators. Unlike other human systems indicators that are heavily quantitative in nature, 26% of relational indicators are quantitative only. These indicators predominantly focused on assessing outcomes (89%) and processes (58%).[16] Many of these indicators (42%) come from a single case study on natural resource management education. Example indicators include:

Indicator Category	Indicator Theme	Indicator Theme Sub-Group	Indicator Exemplar
Human Systems	Relational	Government Engagement/ Cooperation	• Diplomatic recognition and intergovernmental cooperation • Functional integration and institutionalized cooperation • Transnational ties
		Quality of Relationships between Groups	• Listening to others about their differences which may be observed in practice when participants hear others speak about their different cultures, origins, or struggles. • Friendships between individuals who normally do not interact which may be observed in practice when two individuals or more from different groups help each other or keep contact over time
		Joint Climate Action between Groups	• Implementing common projects on shared environmental challenges which may be observed when participants set common objectives or plans on an environmental issue, such as water or deforestation.
		Climate Security Cooperation	• Identification of shared environmental problems which may be observed when a participant verbally expresses or agrees that an environmental-related problem affects him/her and others outside his/her community • A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before a nature-based solution intervention is initiated

Table 15: Relational indicator themes in human systems categorized indicators

16 For indicator assessment, some indicators could assess multiple categories and percentages may not add up to 100%.

Governance: Only 6% of human systems indicators assessed aspects of governance. These indicators are split evenly between qualitative and quantitative or qualitative indicators, as well as process and outcome indicators. These indicators focus on **management** processes **governance**. Example indicators include:

Indicator Category	Indicator Theme	Indicator Theme Sub-Group	Indicator Exemplar
Human Systems	Governance	Level of Corruption	• Corruption perceptions index
		Government Contribution to Climate Security	• Discussion with high-ranking decision-makers about the creation of environment-related institutions which may be observed in practice when participants send an email, call, or talk face-to-face with high-ranking decision-makers • Creation of a new environment-related institution which may be observed when the government takes the decision to establish a new environmental-related institution. This may be observed by a signed document or an official declaration

Table 16: Governance indicator themes in human systems categorized indicators

Conflict Sensitivity: Similarly, only 5% of human systems indicators assessed aspects of conflict sensitivity, centering on climate security processes and whether they **reduce negative impacts** while **maximizing positive ones**. As such, all the indicators are process-focused and phrased as yes/no questions. Additionally, all the indicators come from a single resource, indicating limited usage. This resource covered three programs in Israel and Palestine with joint goals related to environmental conservation (water, birds, and general challenges), as well as cooperation and relationship building. Example indicators include:

Indicator Category	Indicator Theme	Indicator Theme Sub-Group	Indicator Exemplar
Human Systems	Conflict Sensitivity	Conflict Sensitivity	• The design of the nature-based solution incorporates risk identification and risk management beyond the intervention site • Relationship between the conflict context and the intervention • The direct and indirect benefits and costs associated with the nature-based solution, who pays and who benefits, are identified and documented • Participation is based on mutual respect and equality, regardless of gender, age, or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent (FPIC) • Stakeholders who are directly and indirectly affected by the nature-based solution have been identified and involved in all processeses of the nature-based intervention • Decision-making processes document and respond to the rights and interests of all participating and affected stakeholders

Table 17: Conflict sensitivity indicator themes in human systems categorized indicators

While uncommon, these indicators are important, as work done in fragile, violent, and conflict-affected contexts cannot be assumed to be conflict-sensitive and can inadvertently worsen relationships or otherwise fuel conflict dynamics. Monitoring climate security work for conflict sensitivity is therefore essential. It is also important to monitor for conflict-sensitive capacities among programs, as the indicators in this corpus monitor the conflict sensitivity of processes used in designing, implementing, and documenting climate security work.

Contextual Indicators

The category of context/operations indicators encompasses population statistics and location information that provide a better picture of the environment in which a program takes place. It includes 12 indicators (6%) related to climate security. Indicators found in this category were thematically organized into two themes: demographics and geographic.

Context/Operations Indicators	N	%
Demographic	8	67%
Geographic	4	33%

Table 18: Indicator themes in context/operations categorized indicators

The majority (92%) of context/operations indicators focus on context, measures that are outside the objectives of the program to change. This includes the gender, ethnicity, age, or sex of people involved in the program, household size, or distance to a hospital. Example indicators include:

Indicator Category	Indicator Theme	Indicator Theme Sub-Group	Indicator Exemplar
Contextual	Demographic	Socio-Economic	• Gender • Ethnicity • Age • Household size • Number of years of residence in the village
	Geographic	Location	• Distance from seed market • Distance from hospital • Distance from market

Table 19: Demographic and geographic themes in contextual categorized indicators

In some cases, these indicators can serve as an early warning mechanism to anticipate when tensions may rise or conflicts may flare, such as after a period of drought or when there is a movement of people into or out of a village. If used to disaggregate information, these indicators could also identify the different effects that climate change and climate security programming have on different groups and whether programs are addressing inequities.

Measurement Indicators

Measurement indicators measure a program's monitoring and evaluation processes and are focused heavily on accountability of the program. However, this category includes one indicator on unintended outcomes, which seeks to capture unintended and adverse consequences arising from the program. Example indicators include:

Indicator Category	Indicator Theme	Indicator Theme Sub-Group	Indicator Exemplar
Measurement	MEL Process	MEL Process	• Identifies clear strategies to monitor and evaluate CSA projects • A monitoring and evaluation plan is developed and implemented throughout the intervention lifecycle
		Adaptive Management	• A framework for iterative learning that enables adaptive management is applied throughout the intervention lifecycle
		Unintended Outcomes	• The established safeguards are periodically reviewed to ensure that mutually-agreed trade-off limits are respected and do not destabilize the entire nature-based solution • The potential costs and benefits of associated trade-offs of the nature-based solution intervention are explicitly acknowledge and inform safeguards and any appropriate corrective actions

Table 20: MEL process indicator themes in measurement categorized indicators

Monitoring unintended outcomes in climate security interventions is essential given the complexity of the work, as well as the often challenging and fluid contexts in which it takes place.

EMERGING RESOURCES IN CLIMATE SECURITY

The current limited state of evidence in the climate security field, as evidenced by this research effort, underscores the challenge of having a limited availability of evaluative resources. The field currently demonstrates a lack of evidence concerning tested ToCs, program approaches, impact, and MEL frameworks. While there has been an increase in climate security-related resources, they represent hypotheses of how to approach this work rather than established findings. The foundation for this work is rooted in interdisciplinary approaches. In this context, it is crucial to recognize that new and emerging resources in the climate security field offer potential directions and opportunities. These resources can play a pivotal role in testing MEL approaches and developing indicators to bridge the gaps, providing valuable insights into climate security dynamics and their impacts.

The following provides a summary of selected new and emerging climate security resources.

- In 2020, The Hague Centre for Strategic Studies published its ***Climate Security Assessment***, a methodology for assessing the link between climate hazards and security.[17] It includes specific indicators in various thematic areas, including an index for climate security risk and its component indicators, such as natural hazards, vulnerability, exposure, and susceptibility. While this resource's focus is on understanding the risks that climate-related disasters pose to national security, the indicators could be tailored to climate security programming.

- Recent toolkits published by USAID, including one on ***Water and Conflict***[18] and another on ***Land and Conflict***,[19] include information on MEL approaches and indicators. The Land and Conflict Toolkit outlines example indicators to track land-related work, although these are entirely quantitative in nature. The Water and Conflict Toolkit

17 Femka Remmits et al. *Climate Security Assessment: A Methodology and Assessment of the Nexus between Climate Hazards and Security of Nations and Regions* (The Hague Centre for Strategic Studies, 2020).

18 Ekta Patel et al. *Water and Conflict: A Toolkit for Programming* (USAID, 2022).

19 Karol Boudreaux and Daniel Abrahams. *Land and Conflict: A Toolkit for Intervention 2.0* (USAID, 2022).

references the importance of contextual and early warning indicators. Some relevant indicator examples include violence at water points and increased public grievances shared through social media.[20] This toolkit also notes that "perception-based information is especially key to understanding…the dynamics between water programming and the local context,"[21] demonstrating the need for both quantitative and qualitative data to effectively assess climate security.

- Another recently published resource, the ***Pacific Climate Security Assessment Guide***,[22] does not provide specific indicators. However, it does outline questions for climate security assessment research that could inform the development of climate security indicators. For example, questions persist about the current state of social cohesion and relationships between groups, as well as environmental degradation in key economic sectors. These questions could be converted into indicators that are tracked at baseline and throughout climate security program implementation.

- The forthcoming ***Toolkit on Monitoring and Evaluation of Environmental Peacebuilding***[23] provides practical guidance on developing ToCs and related indicators across the intersection of environment and peace. The toolkit also includes example ToCs and indicators, including for climate-related interventions, relevant to climate-security efforts.

- Much of the climate security-related work to date has focused on agricultural projects. While also not specifically climate security focused, the Food and Agriculture Organization of the United Nations (FAO) published a "how-to" guide for ***Operationalizing Pathways to Sustaining Peace in the Context of Agenda 2030***[24] that contains information on how climate relates to food security and agriculture. The guide includes an annex with various pathways to address conflict and agriculture, providing example output and outcome indicators that could be adapted to climate security work. For instance:

    - Pathway 2: Strengthened conflict management mechanisms includes outcome indicators, such as the percentage or number of disputes resolved by project-supported conflict management mechanisms and the percentage or number of community members who are confident in the efficacy of institutions to prevent and mitigate conflicts. Output indicators include the number of community members participating or involved in conflict resolution.

    - Pathway 3: Increased agricultural production includes outcome indicators, such as the percentage of community remembers reporting increased benefits from natural resources due to increased productivity and the percentage of community members that can maintain a viable agriculture-based livelihood. Output indicators include the number of hectares of land or pasture regenerated or protected from further degradation and the number of jointly-agreed secure migration/transhumance corridors established.

- The recently published ***Climate Security and Peacebuilding Thematic Review***[25] provides an overview of climate security and related case studies. The review also includes best practices related to ToC development and guidance on indicators, including minimizing reliance on universal indicators and the incorporation of more qualitative indicators to yield insights into how things work (or not). The review also recommends developing indicators "in consultation with beneficiaries and community or government partners."[26] It does not, however,

20 Patel et al. (2022).
21 Ibid.
22 UNDP and PIFS, *Pacific Climate Security Assessment Guide* (Fiji, 2023).
23 Carl Bruch et al. *Toolkit on Monitoring and Evaluation of Environmental Peacebuilding* (Washington, D.C.: Environmental Law Institute, *forthcoming*).
24 FAO, *Operationalizing Pathways to Sustaining Peace in the Context of Agenda 2030:A How-To Guide* (Rome, 2022)
25 Erica Gaston et al. *Climate-Security and Peacebuilding:Thematic Review* (United Nations University Centre for Policy Research, 2023).
26 Ibid.

provide specific example or recommended indicators.

These highlighted resources do not provide evidence of the utility, feasibility, or effectiveness of the indicators they recommend. They are, however, a useful starting place from which to develop and test climate security ToCs, indicators, and MEL approaches. Some of these resources point to specific climate security-focused indicators, rather than generic environmental or human systems indicators. They also highlight the importance of indicators of perceptions, as well as contextually-specific and relevant ToCs and indicators.

CONCLUSION

Climate security measurement includes a combination of thematic indicators largely focused on environmental and human systems. A closer analysis reveals that while most environmental indicators evaluate agricultural dimensions, the exploration of climate aspects and land rights remains comparatively limited, signaling potential avenues for future inquiry. The analysis also detects a concentration on conflict and well-being related outcomes, as well as gaps in perception-based indicators of security and capacities to manage conflict. Economic and relational indicators further contribute to the diversity of indicators, depicting an environment where relationships, livelihoods, and assets intertwine. A smaller, yet crucial proportion of indicators delve into governance and conflict sensitivity, underlining the critical need to assess management processes and ensure the integration of conflict sensitivity into interventions in fragile and conflict-affected contexts.

Contextual/operational indicators and measurement indicators serve as the backbone of understanding the overarching context and its effects on programming. The emphasis on demographic, geographic, and environmental aspects can act as a potential early warning mechanism. Similarly, attention to unintended outcomes in measurement indicators underscores the need for vigilance in monitoring the often-unpredictable outcomes of climate security interventions in fragile and complex environments.

The synthesis of these findings presents a nuanced landscape of climate security measurement, highlighting both its emerging stage, as well as the diversity of indicators across environmental, human, and contextual dimensions. It also identifies significant gaps in the field, including the absence of evidence regarding tested ToCs, program approaches, impact, and MEL frameworks. However, the increase in new resources focused on climate-security can play a pivotal role bridging some of these gaps, but they underscore the need for further research and development in this area.

CLIMATE SECURITY FIELD-BASED MEL RECOMMENDATIONS

Unique recommendations resulting from the climate security findings presented within this report are incorporated within the report sections. The following overarching recommendations were informed by individual study recommendations, challenges, and best practices, as well as broader insights from research to enhance the state of climate security monitoring, evaluation, and learning. Some recommendations have been made by the researchers based on their subject-matter expertise.

1. **Develop localized indicators:** Climate security manifests in context-specific ways and will look different depending on the geography, climatic vulnerabilities, and stressors experienced, and the socio-economic and political systems implicated. It is important to develop locally-relevant and contextually-specific indicators, and the best way to do this is alongside stakeholders who are grounded in those contexts. The Everyday Peace Indicators and Grounded Accountability Model[27] can serve as useful examples of how to apply this approach for climate security.

27 See "Grounded Accountability Model," ConnexUs, April 17, 2023, https://cnxus.org/gam/.

2. **Develop appropriate time-bound indicators:** Recognizing that many changes development interventions seek to achieve take considerable time to effect and are often influenced by external factors outside the control of a program, it is vital that indicators be aligned with realistic expectations for change. Indicators must both capture achievable and realistic changes within an intervention timeframe and lay a foundation for capturing the nuances of long-term change contributing to broader phenomena.

3. **Engage diverse stakeholders in indicator design:** Engage a wider range of stakeholders in measurement design, including religious leaders, educators, community elders, indigenous leaders, and civil society leaders, amongst others. Their insights can refine indicators, making them more relevant and actionable.

4. **Undertake evaluations and share learnings:** This report indicates that there is still limited published evidence on climate security, the underlying ToCs that guide climate security action, and the indicators used to monitor and measure progress and outcomes. Additional evaluation and assessments are needed to better understand what works in this field and the best ways to monitor progress in dynamic and often challenging contexts.

5. **Fund capacity building for local research:** Invest in training local researchers and institutions to develop, test, and collect climate security measurements. This investment not only builds local expertise, but also ensures that measurements are grounded in local realities.

By implementing these recommendations, the field of climate security programming can ensure more accurate, relevant, and actionable insights, driving more effective interventions tailored to the unique needs of each context.

CLIMATE SECURITY PUBLICLY AVAILABLE INCLUDED STUDIES WITH INDICATORS

Citation	Research Design	Location
Bob, Urmilla, and Salomé Bronkhorst, eds. Conflict-Sensitive Adaptation to Climate Change in Africa. Climate Diplomacy, 2014. https://catalogue.unccd.int/793_Conflict_Adaptation.pdf#page=243.	Qualitative	Kenya
Boyer, Romane. "Experiential Education in the Context of Environmental Peacebuilding—A Case Study of Tejedores de Vida in Colombia." Dissertation, Malmö University, 2020. https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1481907&dswid=-228.	Qualitative	Colombia
Chemonics International Inc. Pathways to Peace: Addressing Conflict and Strengthening Stability in a Changing Climate: Lessons Learned from Resilience and Peacebuilding Programs in the Horn of Africa. United States Agency for International Development, 2020. https://www.climatelinks.org/sites/default/files/asset/document/2020_USAID-ATLAS-Project_Lessons-learned-from-resilience-and-peacebuilding-in-the-Horn-of-Africa.pdf.	Qualitative	Ethiopia
Diko, Stephen Kofi, Seth Asare Okyere, Seth Opoku Mensah, Abubakari Ahmed, Owusua Yamoah, and Michihiro Kita. "Are Local Development Plans Mainstreaming Climate-Smart Agriculture? A Mixed-Content Analysis of Medium-Term Development Plans in Semi-Arid Ghana." Socio-Ecological Practice Research 3, no. 2 (2021): 185–206. https://doi.org/10.1007/s42532-021-00079-2.	Other	Ghana
Fahad, Shah, and Wang Jing. "Evaluation of Pakistani Farmers' Willingness to Pay for Crop Insurance Using Contingent Valuation Method: The Case of Khyber Pakhtunkhwa Province." Land Use Policy 72 (2018): 570–77. https://doi.org/10.1016/j.landusepol.2017.12.024.	Qualitative	Pakistan
Garnett, Johanna. "Saving the World with Organic Agriculture: Grassroots Permaculture Education in Myanmar (Burma)." Food Studies: An Interdisciplinary Journal 6, no. 1 (2015): 39–51. https://doi.org/10.18848/2160-1933/cgp/v06i01/40522.	Qualitative	Myanmar
Goodyear, Earl James. The State of Disaster Risk Reduction in Iraq. United Nations, 2009. https://www.humanitarianlibrary.org/sites/default/files/2013/05/unpan050289.pdf.	Qualitative	Iraq
Hewawasam, Vindya, and Kenichi Matsui. "Equitable Resilience in Flood Prone Urban Areas in Sri Lanka: A Case Study in Colombo Divisional Secretariat Division." Global Environmental Change 62 (2020): 102091. https://doi.org/10.1016/j.gloenvcha.2020.102091.	Qualitative	Sri Lanka
Ide, Tobias, and Adrien Detges. "International Water Cooperation and Environmental Peacemaking." Global Environmental Politics 18, no. 4 (2018): 63–84. https://doi.org/10.1162/glep_a_00478.	Qualitative	Global
Irfanullah, Haseeb Md. Connecting Conflict, Climate Change and Ecological Crisis. ITAD, October 2021. https://www.itad.com/wp-content/uploads/2021/11/Working-Paper-October-2021.-Connecting-Conflict-Climate-Change-and-Ecological-Crisis-002-ID-265107.pdf.	Qualitative	Global

Linke, Andrew M., Frank D. Witmer, John O'Loughlin, J. Terrence McCabe, and Jaroslav Tir. "Drought, Local Institutional Contexts, and Support for Violence in Kenya." Journal of Conflict Resolution 62, no. 7 (2017): 1544–78. https://doi.org/10.1177/0022002717698018.	Qualitative	Kenya
Nguimalet, Cyriaque-Rufin. "Comparison of Community-Based Adaptation Strategies for Droughts and Floods in Kenya and the Central African Republic." Water International 43, no. 2 (2018): 183–204. https://doi.org/10.1080/02508060.2017.1393713.	Qualitative	Kenya and Central African Republic
Sagara, Brad, and Dan Hudner. Enhancing Resilience to Severe Drought: What Works? Mercy Corps, 2017. https://www.mercycorps.org/research-resources/enhancing-resilience-drought.	Qualitative	Ethiopia (Somali)
Schilling, Janpeter, Korbinian P. Freier, Elke Hertig, and Jürgen Scheffran. "Climate Change, Vulnerability and Adaptation in North Africa with Focus on Morocco." Agriculture, Ecosystems & Environment 156 (2012): 12–26. https://doi.org/10.1016/j.agee.2012.04.021.	Qualitative	Morocco
Speelman, Stijn, Aung Tun Oo, and Guido Van Huylenbroeck. "Characterising Households' Vulnerability to Climate Change in Pyapon District in the Delta Region of Myanmar." International Journal of Global Warming 16, no. 4 (2018): 365. https://doi.org/10.1504/ijgw.2018.10017113.	Qualitative	Myanmar
Wossen, Tesfamicheal, Tahirou Abdoulaye, Arega Alene, Shiferaw Feleke, Abebe Menkir, and Victor Manyong. "Measuring the Impacts of Adaptation Strategies to Drought Stress: The Case of Drought Tolerant Maize Varieties." Journal of Environmental Management 203 (2017): 106–13. https://doi.org/10.1016/j.jenvman.2017.06.058.	Quantitative descriptive	Nigeria

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