

ASSESSING THE SECURITY IMPACTS OF CLIMATE CHANGE

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ABSTRACT

Climate change is an environmental challenge and one of the most pressing political and security issues of our time. All countries and regions of the world are affected by climate change: while some areas are increasingly experiencing heavy rainfall and floods, others are experiencing extreme heat waves and prolonged droughts. The effects of climate change – such as more frequent natural disasters, changes in rainfall patterns and rising temperatures, disappearing coral reefs – in combination with other factors are increasing the risk of violent conflict and disrupting people’s lives.

KEYWORDS: human security, climate change, Strata

1. Introduction

Climate change increasingly affects people’s activities, their security and “*throughout history climate change-related disasters have caused death, serious physical and mental injuries, disruptions in economic activities, destruction to the environment, and displacement of communities, among other impacts*” (Iyke, 2024). As climate change becomes more pronounced, social, economic and environmental challenges arise, “*which can contribute to insecurity at local levels, or even internationally*” (UNEP, 2024). All extreme weather events disrupt people’s lives and damage the economy. These extreme events give rise to security problems, of which we mention: increased competition for natural resources; lower living standards due to loss of jobs and lack of food; impacts on food, water and/or energy supplies; mass migration of people from affected areas to safer areas; contamination of water resources; loss of arable land and decreased agricultural production, etc. The impact of climate change on agriculture and water resources puts

pressure on the stability of society, leading to food insecurity and “*damages occur mainly through changes in average temperature*” (Kotz, Levermann & Wenz, 2024).

In areas of the world affected by conflict and crisis already vulnerable and poor communities are hardest hit by the effects of climate change.

2. Research Methodology

This scientific paper addresses how to assess the security impacts of climate change using the Strata platform. For this scientific approach we used information from the scientific literature and documents of the main international organizations involved in assessing the effects of climate change on society (in general) and security (in particular) and how these changes can be monitored.

3. Assessing the Security Impacts of Climate Change Using the Strata Platform

In present, “*climate change is considered one of the major environmental challenges threatening human security either*

individually or in combination with other environmental factors” (Oluoko-Odingo, 2023, p. 170). Climate change, due to intensifying resource scarcity, worsening social, economic and environmental factors, is also often referred to as a “threat multiplier” (UNCA, 2024) “Surprisingly, despite climate change being the most prominent and best-studied of the suite of environmental change problems, it has thus far received little systematic analysis as a security issue” (Barnett, 2003).

According to the United Nations (UNCA, 2024), the countries of the world that are already politically and economically fragile and experiencing internal conflicts are *“the most vulnerable to the effects of climate change”*. Situations of acute insecurity such as local or regional armed conflicts, food shortages, socio-political and economic instability are the result of several factors, including climate change. For populations that are capital-constrained, resource-dependent and socially marginalized *“human security will be progressively undermined as the climate changes”* (Adger et al., 2014, p. 762) and *“clearly, the nature of Anthropocene, the ecological crisis and climate change specifically takes us into a challenging space when we attempt to align this context with existing resources for making sense of the world and guiding responses to this challenges”* (McDonald, 2024, p. 324).

Although most of the politically and economically fragile states are in Africa, the more developed countries are not immune to climate change. In all regions of the world, we are seeing melting ice caps and rising sea and ocean levels, extreme weather events, with heavy rainfall in some areas and extreme heat waves and droughts in others.

Climate change is a very serious threat to human security and its consequences affect many aspects of our lives. Human security is threatened by climate change *“because it undetermined livelihoods, compromises culture and individual identity, increases migration that people would rather have avoided, and because it can undetermined the ability of states to provide the conditions necessary for human security”* (Adger et al., 2014, p. 762).

To increase and develop capacity for integrated analysis of climate change risks, the United Nations Environment Programme (UNEP) in collaboration with the Food and Agriculture Organization of the United Nations (FAO) in the framework of the European Union – United Nations Environment Programme Partnership on Climate Change, Environment and Security, has developed the Strata platform. *“The Strata methodology and prototype were developed in 2021-2022 in partnership with the University of Edinburgh and EarthBlox, with support from the EU and the Government of Norway”* (Strata, n.d., a).



Figure no. 1: *Strata evolution*
(Source: Strata, n.d., a)

Strata aims to identify, map and monitor environmental and climate change and stresses, deforestation, urban sprawl, disasters that may lead to threats to peace and security in affected areas. *“Strata offers the best available analytics and visualizations on where and how environment and climate stresses are converging with other factors of risk over space and time, to help field-based partners – national and regional bodies, political and peacekeeping missions, UN Resident Coordinators, UN country teams, EU Delegations and other stakeholders – to prioritise practical risk mitigation and resilience-building measures”* (UNEP, 2024).

For the analysis, the datasets incorporated in Strata are geospatial, mostly derived from satellite imagery. *“The platform is powered by Earth Map, a user-friendly tool for complex land monitoring based on Google Earth Engine’s big data capabilities, allowing users to undertake complex analysis of earth observation, environmental and climate data in a simple manner”* (Strata, n.d., a). The datasets used are scientifically tested and validated *“to a defined set of criteria relevant to climate security and the provision of safe and trusted data”* (Strata, n.d., b).

As a working methodology, Strata combines spatial data for environmental, climate, security and peace stress indicators with information related to socio-economic vulnerability and population exposure to stress. The resulting maps highlight hotspots where environmental, climate and security stresses overlap and where they coincide with populations vulnerable to these stresses. *“The combination of data layers is based on the evidence convergence approach developed by the European Commission’s Joint Research Centre. In this approach, each indicator is*

assigned a threshold value, above which the indicator is red flagged, indicating a level of concern” (Strata, n.d., b). Thus, the Strata platform determines *“where environmental and climate stresses converge and contribute to increased risk of maladaptation, fragility, migration and conflict”* (Earth Blox, 2022).

The Strata Platform (Strata, n.d., c) primarily addresses:

- environmental specialists and decision-makers – providing them with environmental and climate programs in vulnerable, conflict-affected regions;
- political analysts and security specialists – providing them with conflict prevention and peace-building scenarios;
- analysts, theorists, researchers, academics interested in climate change, socio-economic and environmental issues.

The Strata platform offers users: - Understanding our methodology

- a well-founded, solid and transparent theoretical framework;
- support in choosing actions and solutions;
- aggregation and/or disaggregation of selected stress and strain factors;
- user-friendly, easy-to-use interface that can be customized;
- the full picture of socio-economic, climate and environmental vulnerabilities worldwide;
- a multi-level approach, from sub-national to global scale.

The steps for using the Strata platform are as follows:

1. Access the platform and log in. You can sign in in three ways: using your Google account, using an e-mail address or anonymously.



Figure no. 2: *Log in on the Strata platform*
(Source: Strata, n.d., c)

2. Selecting the state of interest

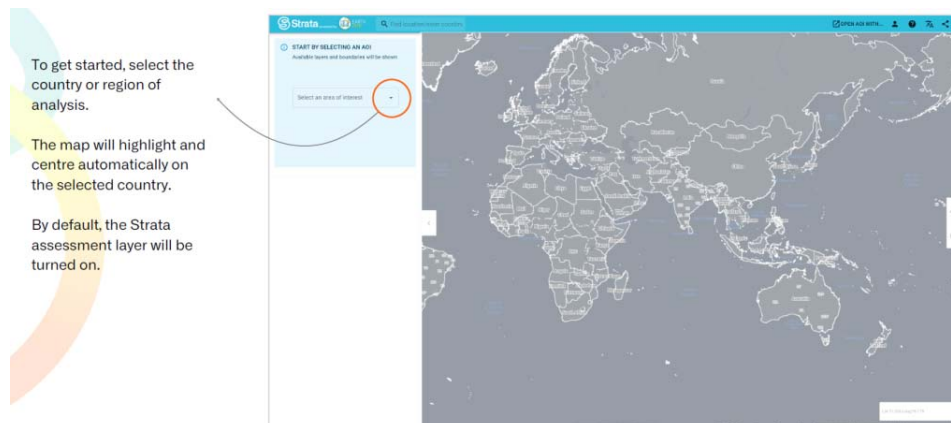


Figure no. 3: *Selecting the state of interest*
(Source: Strata, n.d., c)

3. Selection of areas of interest for the chosen state

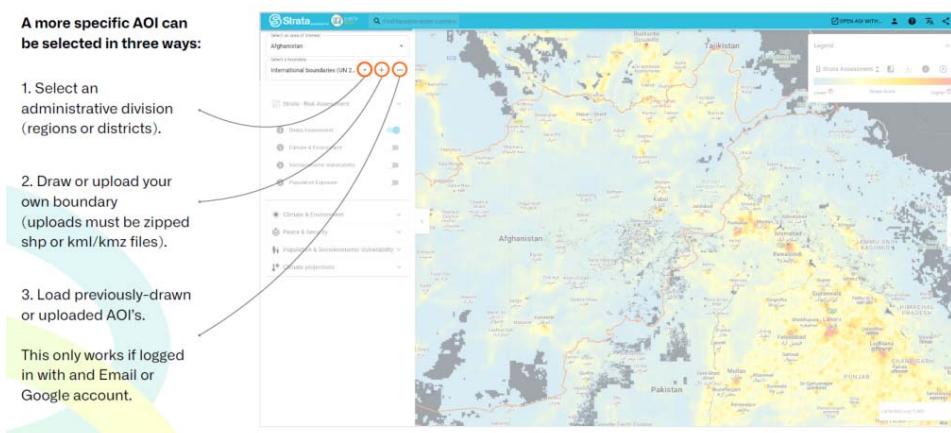


Figure no. 4: *Selection of areas of interest for the chosen state*
(Source: Strata, n.d., c)

4. Data visualization

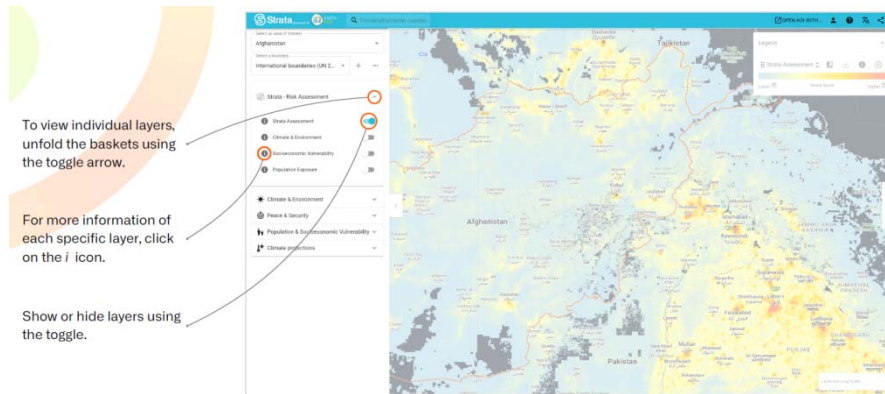


Figure no. 5: *Data visualization*
(Source: Strata, n.d., c)

5. Play layers and captions

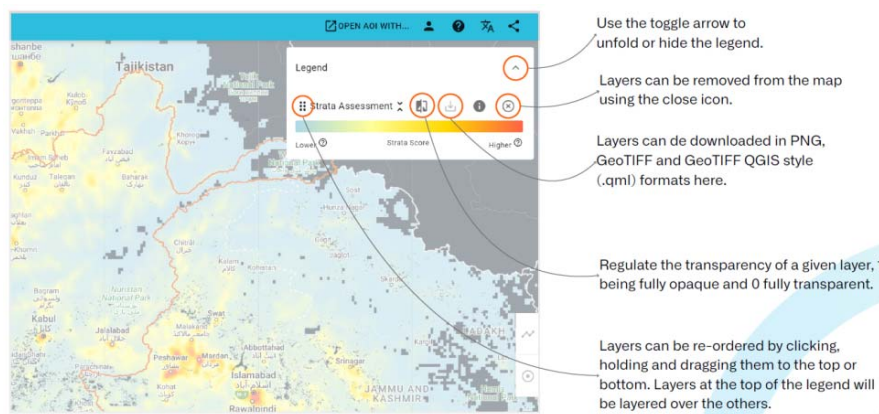


Figure no. 6: *Play layers and captions*
(Source: Strata, n.d., c)

6. Pixel Inspector

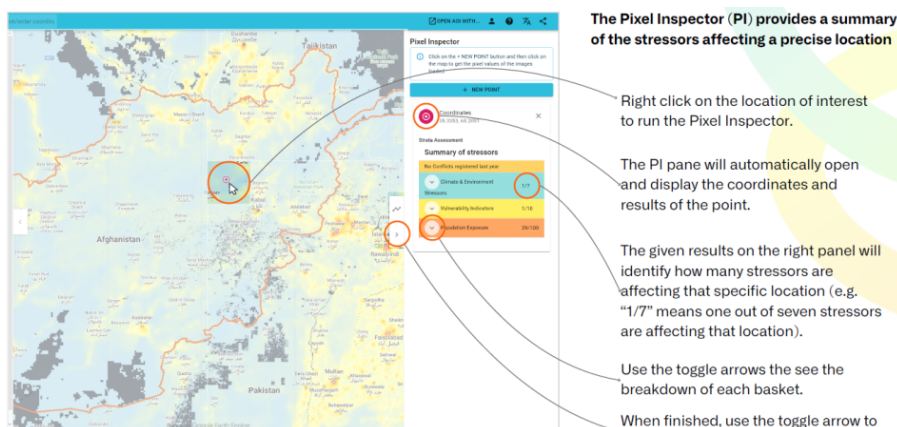


Figure no. 7: *Pixel Inspector*
(Source: Strata, n.d., c)

7. Information about the researched area

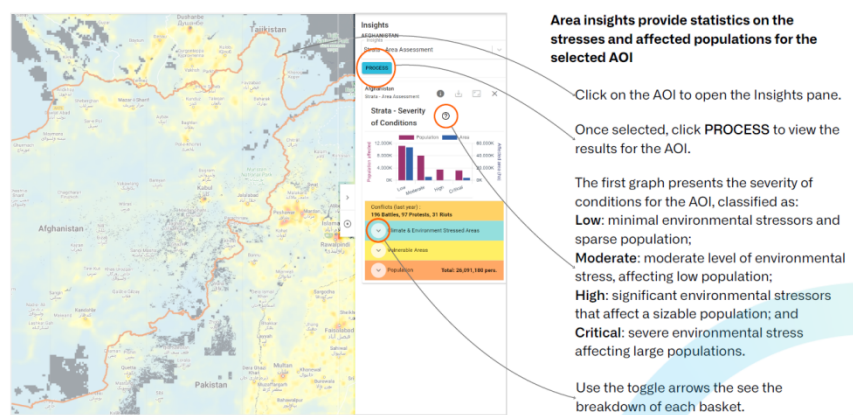


Figure no. 8: *Information about the researched area*
(Source: Strata, n.d., c)

8. Settings and account

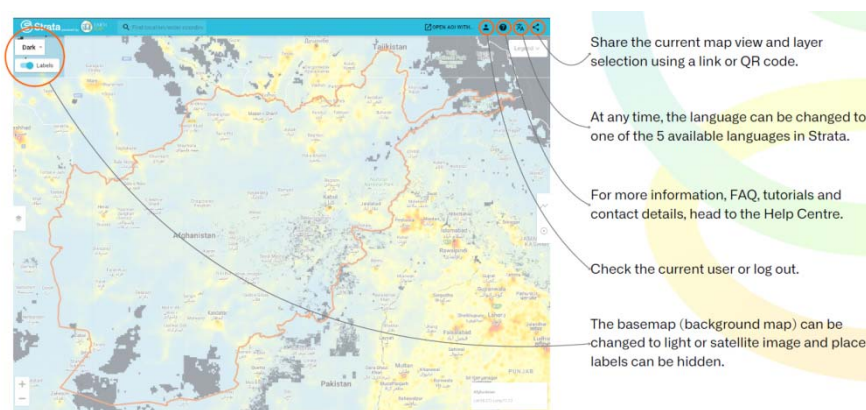


Figura no. 9: *Settings and account*
(Source: Strata, n.d., c)

4. Conclusions

The study of the impact of climate change on security is in its infancy and needs more in-depth research to better understand the relationship between climate change and the components of security.

As climate change increases in intensity and frequency, the effects may be felt in the form of economic, social or environmental challenges, contributing to the vulnerability and insecurity of certain areas of the globe. The most common concerns related to climate change include impacts on water, food, energy supply, increased competition for natural resources, declining living standards, displacement and forced migration.

While the growing nexus between climate change, security and peace is recognized, there are currently too few examples of integrated approaches that describe the specific risks arising from the interaction between climate change and insecurity. Areas affected by crisis and/or war are more likely to be 'overwhelmed' by climate change, environmental damage and insecurity. But on the other hand, insecurity hampers efforts to adapt to climate change and environmental degradation, leading to increased vulnerability and impoverishment of areas already affected by climate change, environmental degradation, but also by lack of food, water, energy resources.

As the United Nations intensifies its activities and actions to build resilience to the challenges of climate security and environmental degradation, the results and lessons learned provide practical tools and concrete examples for future planning in different parts of the world.

A real help is provided by the Strata platform, developed in partnership by the University of Edinburgh and Earth Blox, which enables United Nations teams to

collaborate internationally and provides them with reliable information “*not only on the convergence of environmental stressors occurring around the planet, but also how and why the intensity of these «hotspots» is changing over time and space*” (Earth Blox, 2022). Complex data analysis can be quickly deployed and customized, making UN experts more efficient in processing data on climate change and environmental risks and vulnerabilities.

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