Session Report Template

The objective of this report is to showcase tangible examples where science and innovation have significantly contributed to the achievement of the SDGs and the 2030 Agenda set by the United Nations.

Context

Science and evidence-based actions are indispensable for eradicating poverty, ending hunger, tackling climate change, reversing biodiversity loss, and reducing inequality.

Science is the key, and our best hope, for accelerating progress across the Sustainable Development Goals. Achieving this requires shared expertise from all disciplines.

This was evident at the SDG Summit in September 2023, where the role of Science, Technology, and Innovation (STI) and the importance of closing STI gaps were central to discussions. In their political declaration at the Summit, Member States committed to bridging the science, technology, and innovation divides, responsibly using STI as drivers of sustainable development, and building the capacities necessary for sustainable transformations:

> *"We commit to bridging the science, technology and innovation divides and the responsible use of science, technology, and innovation as drivers of sustainable development and to build the capacities necessary for sustainable transformations.*
>
> *We reiterate the need to accelerate the transfer of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed.*
>
> *We will take action to enhance the ability of developing countries to benefit from science, technology, and innovation and address the major structural impediments to accessing new and emerging technologies including through scaling up the use of open science, affordable and open-source technology, research and development, including through strengthened partnerships.*
>
> *We aim to increase funding for SDG-related research and innovation and build capacity in all regions to contribute to and benefit from this research.*
>
> *We will seek to better realize the benefits and address the challenges of artificial intelligence.*
>
> *We undertake to increase the use of science and scientific evidence in policymaking."*
>
> ***Political declaration of the high-level political forum on sustainable development convened under the auspices of the General Assembly 18 and 19 September 2023***

Now we need to illustrate the "HOW".

How science and innovation are advancing the planet's well-being, enhancing human prosperity, fostering partnerships, and promoting peace.

1   Identification

1.1   Session ID: 2160537

1.2   Session Title: **Climate Action through Human-Centric Data Science: The CLIMB Project's Pathway to Resilience**

1.3   Session Date and Time: 17 September 2024, 7PM ET

1.4   Convenor name: Sapiens Ndatabaye

1.5   Contact: info@climbproject.org / sapiens.ndatabayekanyunyi@plus.ac.at

2   Speakers and Panelists

2.1   Moderator

2.1.1   Name: Dr. Kanta Kumari

2.1.2   Organisation name: World Bank

2.1.3   Type of organisation: international development organization

2.1.4   Title of the presentation: Introduction of the session

2.1.5   Summary of the presentation (max 200 words):

Dr. Kanta Kumari will introduce the project with its scope and objectives, after will present the agenda, making sure to highlight Importance of multidisciplinary and multisectoral collaborations in addressing climate-induced migration, and alignment with UN SDGs.

2.2 Speaker 1

2.2.1   Name: Dr. Haodong Qi

2.2.2   Organisation name: Malmö University

2.2.3   Type of organisation: academic institution

2.2.4   Title of the presentation: CLIMB's approaches for modelling climate-induced migration

2.2.5   Summary of the presentation (max 200 words): Haodong Qi will introduce CLIMB's explainable machine learning approaches and elaborate on how they may help to better understand and predict human mobility and migration in the context of climate change. Through previous use cases, he will demonstrate how our approaches can be useful for: i) identifying where and when migration responses to climate conditions are likely to occur; and ii) delivering timely and accurate migration forecasts with reliable assessment of uncertainties.

2.3 Speaker 2

2.3.1   Name: Sapiens Ndatabaye

2.3.2   Organisation name: Paris Lodron University Salzburg (PLUS)

2.3.3   Type of organisation: academic institution

2.3.4   Title of the presentation: The CLIMB system: integration of AI and blockchain to organize transparently and interactively analysis of migrations induced by climate change.

2.3.5   Summary of the presentation (max 200 words): Sapiens Ndatabaye will present how the integration of AI and blockchain in the CLIMB system represents a novel approach to analysing climate-induced migration. The talk illustrates AI sophisticated analysis, identifying patterns and trends in large datasets, as well as the power of blockchain ensuring data transparency, security, and traceability. Some details are discussed on how the data gathering has been automated, enabling real-time and accurate tracking of environmental factors that influence migration, supporting informed decision-making, and enhancing the reliability of migration data, making it a powerful tool for global climate adaptation strategies.

2.4 Speaker 3

2.4.1   Name: Dr. Stefano Iacus

2.4.2   Organisation name: Harvard University (HU)

2.4.3   Type of organisation: academic institution

2.4.4   Title of the presentation: Harvard Dataverse, digital traces and how to leverage these new data to forecast migration.

2.4.5   Summary of the presentation (max 200 words): Stefano M. Iacus will present the Harvard Dataverse repository, which will host the CLIMB data and outputs. Dataverse is an open-source platform that enhances the sharing and discoverability of research data. He will then discuss various types of digital traces that can complement traditional data in informing forecasting models and how they can be used at different time scales.

2.5   Speaker 4

2.5.1   Name: Dr. Tuba Bircan

2.5.2   Organisation name: IDEMA

2.5.3   Type of organisation: Private sector

2.5.4   Title of the presentation: Climate-Induced Mobility through Evidence-Based Insights

2.5.5   Summary of the presentation (max 200 words): Climate-induced mobility represents a growing challenge as environmental changes increasingly drive human migration. This talk will discuss the nuanced landscape of climate-induced migration, offering a comprehensive exploration of how data-driven, human-centric approaches can inform and shape effective policy responses. The CLIMB project distinguishes itself by leveraging advanced data analytics and interdisciplinary collaboration to predict and address the complexities of climate-induced mobility. Through this lens, the presentation will highlight the importance of integrating empirical evidence with policymaking to ensure that interventions are both effective and equitable. Attendees will gain insight into the innovative methodologies fostering informed decision-making that respects human rights and promotes resilience in vulnerable populations. This session will highlight the critical role of robust concepts and theories in adopting innovative methods and data, ultimately leading to more effective and responsive policy solutions.

2.6   Speaker 5

2.6.1   Name: Dr. Emmanuel Letouzé

2.6.2   Organisation name: DPA (Data Pop Alliance)

2.6.3   Type of organisation: NGOs

2.6.4   Title of the presentation: The potential of CDRs to analyze and address human development needs.

2.6.5   Summary of the presentation (max 200 words): **Emmanuel Letouzé** will discuss the transformative potential and practical applications of combining Call Detail Records (CDRs) with additional data sources to understand and address human development needs. With the widespread adoption of mobile phones in recent decades, CDRs have emerged as a powerful tool for analysing human behaviour, migration patterns, social interactions, and the socioeconomic characteristics of populations. These data can provide decision-makers with high-resolution insights into social needs, the impact of crises, and the effectiveness of policies across both spatial and temporal dimensions. However, to fully harness this potential, it is crucial to establish a supportive ecosystem that prioritizes privacy protection, good governance, ethical standards, inclusion, and technological innovation. CDRs, when used responsibly and in conjunction with other data sources, can significantly enhance our ability to learn from and improve how we address human development challenges.

2.7   Speaker 6

2.7.1   Name: Laure Tall

2.7.2   Organisation name: IPAR

2.7.3   Type of organisation: academic institution

2.7.4   Title of the presentation: Migration and climate change in Senegal: social and political realities

2.7.5   Summary of the presentation (max 200 words): In Senegal, migration is driven by the degradation of the agricultural production system, drought, demographic pressure, and the vulnerability of agriculture. These climatic events have reduced livestock productivity and agricultural yields, increasing food insecurity and negative health impacts. Migration serves as a strategy to cope with crop failures due to climate change, which may cause internal displacement and international migration. However, the impact of climate change on migrants is often overlooked or poorly documented. This session will explore the social realities of climate change and highlight policy gaps in protecting climate migrants.

3   Content

3.1   Session Abstract (max. 500 words)

Climate risks are likely to increase (forced) migration in a local- to regional scale as it affects cross-border migration. As a result, macro analyses of cross-country migration flows tend to find small and very uncertain climate impact on human mobility. Rather than aiming for a global study, CLIMB adopts a bottom-up approach: collecting timely and granular data on specific cases where the climate-migration nexus can be more apparent, both conceptually and empirically. This includes a comprehensive analysis of call-data

records (CDR) and other possible traces of human mobility. In addition to leveraging CDR, CLIMB also makes use of Earth observation (EO) obtained through satellite remote sensing, geospatial time-series indicators and social media data, and combines them with survey and official statistical data. This holistic approach allows us to analyze migration processes from a multi-stage perspective (e.g. from initial displacement to onward/return migration), hence gain more insights about the temporality of climate-induced migration. It also allows us to better understand how migratory processes are shaped by multi-level (macro, meso, and micro) factors: climate risks, socio-economic crises, public opinion, social networks, and human perceptions, aspirations and capabilities, among others.

, The Belmont Forum funded interdisciplinary CLIMB project stands at the intersection of technology and humanity, leveraging advanced data analytics and AI to examine and predict how human population may react to adverse impacts of climate change. This session will outline our innovative approach, which synergizes geospatial intelligence with humanitarian data, fostering informed decision-making that respects both the environment and human rights. We will discuss our collaborative efforts across various sectors, emphasizing how these alliances embody the UN's core values of integrity, professionalism, and respect for diversity. Project Objectives

List the key objectives your session or project aimed to achieve.

3.1.1 Objective 1 (max 50 words):
Develop a holistic conceptual and methodological framework to better understand the mechanisms underlying climate-induced migration, and to predict spatial and temporal mobility patterns in Africa and beyond. We discuss components of a system that enables anticipatory actions to assist forcibly displaced people.

3.1.2 Objective 2 (max 50 words):
Use multi-level (macro-, meso-, and micro-scale) big data for comprehensive analysis of climate-induced migration processes.

3.1.3 Objective 3 (max 50 words):
Extract human-centric information (awareness and perceptions of climate risks, aspirations and capabilities, and social networks) from social media data, and through respondent-driven sampling (RDS) survey and incorporate it into computational models for targeted support to vulnerable groups.

3.2 Key Themes

Main themes and topics that were covered during the session. The same ones you selected when you submitted your original session proposal. Select from the following. Maximum three

- Digital
- Environment and Climate
- Development

4 Planned Impacts of the science and innovation presented in your session

4.1 Contribution to the SDGs

The SDGs provide a comprehensive framework for addressing the world's most pressing challenges and promoting sustainable development globally. Select the Goal/s that your project contributes to (max 3 SDGs)

10. **Reduced Inequality**: Reduce inequality within and among countries.

11. **Sustainable Cities and Communities**: Make cities and human settlements inclusive, safe, resilient, and sustainable.

13**. Climate Action**: Take urgent action to combat climate change and its impacts.

5 Contribution to the UN Summit of the Future

5.1 Main challenges (max 200 words)

Climate change (interlinked with humanitarian crises and other economic and health factors) can lead to internal resettlement, international migration, and other (new) forms of human mobility. However, the empirical link between various climatic conditions and migration outcomes is highly contested, and, to date, no unified theoretical approach can adequately capture the complexity and contextual dependency of climate-induced migration.

One significant challenge is the lack of timely and granular data in vulnerable regions, which hinders the ability to predict and respond effectively to climate-induced migration. Recommendations include enhancing data collection methods and fostering international collaborations for better data sharing.

5.2 Additional goals (max 200 words)

Beyond the primary goals, the project aims to foster global partnerships and enhance the use of big data in policymaking to support sustainable development.

1) To develop CLIMB's conceptual and methodological framework for studying the processes, drivers, enablers, and temporalities of climate-induced migration.

2) To estimate the intensity (probability) of displacement within and across administrative areas using EO

3) To map the locations of climate shocks using EO data, and that of political and economic crises using global events data.

4) To extract human centric information (awareness and perceptions of climate risks, aspirations and capabilities, and social networks) from CDR and social media data, and through respondent-driven sampling (RDS) survey.

5) To study public opinion and discourse regarding climate change and its intersection with migration using social media data.

6) To evaluate how governance through humanitarian funding and development activities have impacted people's perceptions of climate risks, aspirations and capabilities, and migration patterns in Africa and beyond.

7) To develop predictive models using various Big Data sources and CLIMB's conceptual and methodological framework.

8) To simulate future scenarios of climate-induced migration in Africa and beyond.

5.3   Integration: economic, social, and environmental (max 500 words)

The CLIMB Project integrates these dimensions by using a holistic data-driven approach that combines economic data, social media analysis, and environmental monitoring to understand the multifaceted impacts of climate change on migration.

5.4   Impact on the 2030 Agenda (max 1000 words)

The project supports the 2030 Agenda by ensuring no one is left behind, emphasizing gender equality, and promoting the principle of non-discrimination. It also aims to enhance the ability of developing countries to benefit from scientific advancements and foster sustainable development practices. *More info on: 2030 Agenda:* https://sdgs.un.org/2030agenda

Please select also the transition relevant to your science project:

(1) food systems; (2) energy access and affordability; (3) digital connectivity; (4) education; (5) jobs and social protection; and (6) climate change, biodiversity loss and pollution

6   Forward-looking Statement

6.1   Financial aspects

Why giving $ 1 million to your project will turbo boost the achievement of the SDGs.

 - $1 million will enable the expansion of data collection efforts to more regions, improving predictive models and response strategies.
 - Funding will support the development of advanced analytical tools and training programs for local researchers and policymakers.
 - Resources will be allocated to enhance collaboration between international research institutions and NGOs for better data integration and policy formulation.
To Further Advance the Project:
 - Access to Funding
 - Skilled Personnel
 - Establish Partnerships and Collaborations
 - Advanced Technology

6.2 To further advance your science project, you will need:

Please select an option and develop it further (50 words). Multiple selection is possible.

- **Access to Funding**: Securing additional funding will enable the expansion of the CLIMB project, allowing for more extensive data collection, advanced technological integration, and the scalability of our models to other regions. With adequate funding, the project can also support more comprehensive field studies and validation efforts.
- **Skilled Personnel**: Employing highly skilled personnel, particularly in AI, Blockchain, and geospatial analysis, is crucial for the success of the CLIMB project. Experts in these areas will enhance the accuracy and depth of climate and migration data analysis, ensuring robust and reliable predictive models.
- **Open Access to Data:** Ensuring open access to high-quality, up-to-date data will significantly advance the CLIMB project by enabling more accurate modeling and fostering transparency. Access to diverse datasets is crucial for refining predictions and validating outcomes, thus improving the overall effectiveness of the project.
- **Access to Resources (**laboratory facilities, research tools, and technology).
- **Establish Partnerships and Collaborations**: Building partnerships with academic institutions, government bodies, and international organizations will strengthen the CLIMB project by pooling resources, sharing expertise, and ensuring the broader application of our findings. Collaborative efforts can also facilitate the exchange of best practices and innovative methodologies.
- **Dissemination and Communication activities:** Effective dissemination and communication strategies are vital to ensure that the insights from the CLIMB project reach policymakers, humanitarian organizations, and the general public. This will enhance the project's impact and drive policy changes that address climate-induced migration more effectively.
- **Open Access to Data:** Ensuring open access to high-quality, up-to-date data will significantly advance the CLIMB project by enabling more accurate modelling and fostering transparency. Access to diverse datasets is crucial for refining predictions and validating outcomes, thus improving the overall effectiveness of the project.
  - **Enhance the Regulatory Environment** that supports research initiatives.
  - **Access to Market**
  - **Advanced Technology**

7 Conclusions (max. 300 words)

The CLIMB Project exemplifies how science and innovation can drive sustainable development by addressing the complex challenges of climate-induced migration. Through a multidisciplinary, data-driven approach, the project not only contributes to key SDGs but also fosters international collaboration and innovation. Future efforts will focus on expanding data collection, enhancing analytical capabilities, and strengthening partnerships to ensure the continued success and impact of the project.