Concepts, theories and methodologies for addressing Environmental Migration

Cosav Migration
Working Group on environmental migration

Program
7th – 8th Novembre 2024

Université de Paris, Bâtiment Olympe de Gouges,
Place Paul Ricœur 75013 Paris
Jeudi 7 novembre : Salle M19 ground floor
Vendredi 8 novembre : Room 105 (1er floor)

Jeudi 7th novembre **Plenary Session** **Room M 19 Ground floor**	13h30	Welcoming coffee
	14h-14h15	Presentation of the workshop (S. Fanchette, F.Durand)
	14h15-14h45	Hazard 1 : *Compound Flooding: A Key Concept for Understanding Coastal Hazards*, Dr. Jamal Khan, IRD/LEGOS.
	14h45h-15h15	Hazard 2. "Where the rains falls : methods and findings", Dr. Kees Van Der Guerst, UN University Bonn (Germany)
	15h15-15h45	Habitability 1 : *Rethinking habitability for an unequal and connected world* Dr.Marion Borderon, MSc. Coline Garcia, University of Vienna, (Austria)
	15h45-16h00	Coffee break
	16h-16h30	Habitability 2: "Economic tools to study environmental migrations" Anne-Sophie Robilliard, Flore Gubert IRD/Creda
	16h30-17h00	Complex system approach : *Exploring the Climate Change-Migration Nexus: A Complex Systems Approach in Southwest Bangladesh*, Lucie Clech, post-doc Ceped/IRD
	17h00-17h30	Livelihood approach: *Intergenerational learning as a crucial mechanism for communities to adapt*, Dr. Bishawjit Mallick| Associate Professor Climate Change and International Development Studies, Utrecht University, Netherland
	17h30 – 18h	*Agent based modeling principles (Gama platform): evacuation model in case of catastrophic event* (Kevin Chapuis, IRD).
	19h30	Diner at restaurant La Bretelle, 9 rue Jean-Baptiste Berlier 75013

Friday 8th novembre - Focus Group Session **Room 105**	9h00	Welcoming coffee
	9h15h	Focus groups presentation (S. Fanchette, F.Durand)
	9h30-12h30	Group 1 : hazard approach " Jamal Khan, **Fabien Durand**, Kees Van der Guest, room 105 A
	9h30-12h30	Group 2 : Habitablity, **Flore Gubert**, Anne-Sophie Robilliard, Marion Borderon et Coline Garcia, room 105 B
	9h30-12h30	Group 3 : livelihood / mobilities perspectives/ systèmes complexes : Bishwajit Mallick, Lucie Cleich, **Sylvie Fanchette,** room 864
	9h30-12h30	Group 4 : Prospective approach and Agent based modeling methods, Kevin Chapuis, **Claire Chikly,** room M19
	12h30-14h	Lunch
Friday 8th novembre - Group feedback session **Room 105**	14 h -17h00	Group feedback: Feedback from the focus groups in plenary session, with the aim of building the skeleton of a handbook on environmental migration, which would be drafted at the end of the workshop. Discussion according to the book's outline: 1. concept and its variants - 2. methods: prerequisites for setting up methods (skills required, data, choice of scales, degree of interdisciplinarity, comparisons (several fields or not) 3. case studies 4. self-evaluation of the advantages and disadvantages of the method/conceptual approach.
	17h30 – 18h	*Building scientific expertise at IRD. Presentation of the tool, discussion and exchange on building scientific expertise on environmental migration* Nastasia Crétois, Mission Expertise and Consultancy IRD
	18h-18h15	Conclusion and dead-lines

Objectives

Last year the Community of Knowledge Migration organized a two-days workshop on Migration, Climate and Environment: Reflections and Research Perspectives. Four Round tables have been held on 1: Interdisciplinary approaches to migration, climate and environment: how to build dialogue? 2: Interdisciplinary approaches to migration, climate and environment: which methodologies? 3: Migration studies through the prism of environmental humanities: reflections on our research practices 4: Political issues in addressing so-called climatic and/or environmental migrations.

Following this meeting, we set up a working group on concepts and methodologies for dealing with environmental migration. We felt it was necessary to take stock of the literature on this highly complex issue and the methods and concepts used in research. An initiative was launched to share our respective bibliographies in order to stimulate our discussions. The critical analysis of these methods is a challenge for our Migration Knowledge Community, which

aims to be interdisciplinary (ocean, earth, environmental and social sciences) in order to better measure environmental and global changes and understand the response and adaptation strategies implemented by populations, civil societiy and governments in the South.

The aim of this workshop is to discuss these methods and concepts with a view to producing a handbook on environmental migration, and perhaps preparing ourselves to respond to future calls for projects or even requests for collective expertise.

Four conceptual approaches (Hazards, Habitability, Livelihood and Foresight) have been identified, using a variety of methods to understand the complexity of migration decisions (complex systems, empirical approach based on multi-site qualitative surveys, role play, exploratory approach, agent based modelling, etc),

Other conceptual approaches include: Climate (in)Justice; triple nexus approaches (Migration, Conflict, Environment or Migration, Health, Climate Change) and the notion of compound and cascading risks, the migration-sustainability nexus.

What's interesting about our group is its multi-disciplinarity between fields (SHS and environmental sciences. Agent based modellers can process both quantitative and qualitative data to characterize, and even predict (future scenarios), cascade effects and feedback loops between processes. Certain macro-economists can play the role of interface between SHS and natural and life sciences, particularly in the analysis of quantitative data.

Abstracts

I. Hazard conceptual approach :

1. "Compound Flooding: A Key Concept for Understanding Coastal Hazards ») Jamal Khan, Post doc, IRD LEGOS, Toulouse

Coastal regions are critical hubs of human activity, situated at the dynamic interface between land and ocean. Environmental hazards in these areas are often shaped by a combination of terrestrial and oceanic factors. Coastal flooding, for example, is commonly associated with storms, including tropical and extra-tropical cyclones, that bring not only strong winds but also trigger extreme rainfall. As a result, two types of flooding often occur simultaneously or consecutively: wind-driven storm surges from the ocean and rainfall-induced inland flooding. Such flooding events driven by multiple drivers are known as "compound flooding". In recent years, the concept of compound flooding has gained significant attention within the coastal hazard community. Researchers are increasingly focused on observing, identifying, and modeling these complex cross-scale interactions. Studying the intricate interplay between land and ocean in the context of compound flooding presents numerous technical challenges but also offers valuable opportunities to enhance our understanding of human responses, such as migration, to these evolving coastal hazards. This talk will delve into the concept of compound flooding, exploring its observation and modeling, and highlighting its relevance to environmental migration.

Dr. Jamal Khan is a post-doctoral researcher based in LEGOS, Toulouse. He obtained his PhD in 2021 on oceanography studying the extreme water level dynamics and flooding hazard in the

Ganges-Brahmaputra delta. His current research interest is focused on the water level and flooding dynamics in the land-ocean continuum.

2. “Where the Rain Falls project (2010-2012), methodologies and key findings”
Kees Van Der Geest will share methodologies and key findings of the Rainfalls Project, which studied the impact of rainfall variability and climate change on livelihoods, food security and migration in vulnerable regions. Research across eight countries in the Global South revealed that changing rainfall patterns disrupt agriculture, leading to food insecurity and prompting migration. The study further found that migration is often used as an adaptation or coping strategy, but it can strain households, especially women, who face increased workloads when men leave. The project highlights the need for policies that integrate climate adaptation with safe migration pathways, promoting development while addressing environmental and social challenges.

Dr. Kees van der Geest is Head of the Environment and Migration: Interactions and Choices (EMIC) Division at United Nations University Institute for Environment and Human Security (UNU-EHS). He has been studying the multiple linkages between climate change and different forms of human mobility for over twenty years, since the start of his PhD research in Northwest Ghana, in 2002. At UNU-EHS he was part of the first multi-country studies on environmental migration (EACH-FOR, 2007-2009) and the impact of rainfall variability on human mobility patterns (Where the Rain Falls (2010-2012).

II. Habitability :

3. “Rethinking habitability for an unequal and connected world”

(Dr Marion Borderon, Coline Garcia MSc*, University of Vienna, Vienna, Austria*)

As global climate change intensifies, understanding what determines a place's habitability is increasingly critical, especially given the alarming projections of shrinking 'human climate niche' and the potential displacement of populations. While the concept of habitability offers insights into the societal impacts of climate change with a place-specific focus, existing approaches to assessing habitability have considerable gaps. First, the local perspectives on habitability are not sufficiently considered; second, habitability is not homogenous in a given place; and third, the habitability of a place cannot be understood in isolation from other places.
We present an approach to make habitability more operationalizable and fruitful regarding equitable and just climate resilient development. We therefore add a bottom-up view, by:
A) including local values, perceptions, discourses and practices as affecting (perceived) habitability; B) differentiating the habitability of a place by social groups - members of a community conceive the habitability of a given place as different, depending on their positioning along intersecting axes of privilege and marginalization, unequal access to resources, and vulnerability; and C) considering the connectivities of places to other, proximate and distal places and processes across space and scales; habitability must thus be seen also as a product of the wider political ecology and political economy that bind places and people in larger scale economic, political and ecological structures, processes and flows of resources, finances, knowledge and people.
We exemplify this with results from an international research project on climate mobilities in five countries and derive recommendations for research and policy priorities.

4. "Economic tools to study environmental migrations"

Dr Anne-Sophie Robilliard, and Dr Flore Gubert, IRD/Creda

The methodology session "Economic tools to study environmental migrations" presents how development economics analyses the relationship between climate shocks and migration flows focusing on empirical approaches. The primary empirical objective is to measure the impact of climate shocks on migration flows, addressing heterogeneity in responses and the underlying mechanisms driving these movements. The session will also present the datasets most often used to study the relationship between climate shocks and migration, discussing issues such as the definitions and specifications of migration (internal vs. international, short vs. long-term, permanent vs. temporary, distress vs. economic, household vs. individual) and climate shocks (rainfall and temperature variations). Key discussions will focus on the specification of the relationship between climate shocks and migration, whether linear or non-linear, considering extreme or usual deviations, and contemporary or lagged effects. Identification issues will also be discussed (endogeneity, biases, omitted variables) as well as the notions of internal and external validity. Additional topics will include the intersection of migration with concepts of habitability, and the distinction between mobility and migration, providing a nuanced understanding of environmental migrations.

III. Complex system approach and livelihood

5. Complex system approach: "Exploring the Climate Change-Migration Nexus: A Complex Systems Approach in Southwest Bangladesh", Lucie Clech, post-doc Ceped/IRD

As part of the “Climate Change, Migration and Health System Resilience in Haiti and Bangladesh (ClimHB)” project, we tested and published (1) an exploratory approach that combines local experiences and perceptions of environmental change and a systems approach to studying migration for a rural community in southwest Bangladesh. This approach is a first exploratory attempt by our interdisciplinary team from the social and health sciences to answer a question about the importance of the local context and its complexity in understanding migration decisions. Perceptions and accounts of experiences help us to understand the motivations behind behavioural strategies. In this sense, the first part of our work is based on empirical anthropological data. Using a people-centred perspective, we (three social science researchers) explored the complexity of the links between climate-induced change, environmental degradation caused by waterlogging, a type of prolonged flooding, that have multiple causes (mismanagement, shrimp farming, etc…) and seasonal rural migration. It has been reported as one of the main problems along with Covid-19 and cyclones in the area, and is exacerbated by changes in seasonal patterns. We conducted fourteen semi-directed interviews and six focus group discussions in March-April 2022 about the changes affecting the community and local livelihoods, with an inductive approach. Interview by interview, we began to draw some mental maps of the information, double-checking within and across categories of respondents, focusing on the 'change->impact->reaction->impact' pathway on local livelihoods. From this mental map, we developed a model, in the form of a diagram, showing the influence of changes on livelihoods, as well as interactions and feedback inside the system based on a “common sense approach” (3), converging with “the conceptualised system dynamics model” presented by Hossain et al. (4) and the complex adaptative system (5) produced by Talukder et al. (6) of social ecological system in Bangladesh. These recent studies have employed similar

methodologies but have been published under various terminologies and conceptual frameworks, highlighting the necessity for a more refined and coherent conceptual approach to complex systems. For the past decades, numerous studies in environmental sciences have tried to address issues of dynamics between social systems and ecological systems, from various conceptual angles. Here, in the context of climate change, rather than opposing the anthropological and environmental approaches, we combine an anthropological approach based on knowledge, experience and perception of environmental change with the analysis of climate data and a complex systems approach that allows the integration of climate, social and ecological systems. Further methodological thinking, testing and conceptualisation work is needed to mature such an approach, which has many advantages. For this workshop, we aim to start a discussion on possible future development of this approach.

Dr Lucie Clech was a postdoctoral researcher at Ceped (IRD) on the ClimHB project and the project's scientific coordinator. She has a transdisciplinary bacj ground in ecology and environment (MSc) and anthropology (PhD).

6. Livelihood approach: "Intergenerational learning as a crucial mechanism for communities to adapt", Dr. Bishawjit Mallick| Associate Professor Climate Change and International Development Studies, Utrecht University, Netherland

In this paper, I will talk about intergenerational learning that fosters a shared understanding of environmental changes, enhances collective memory, and strengthens social cohesion, all essential for resilience. With their lived experiences of past climate events and knowledge of local ecosystems, older generations provide valuable insights into sustainable practices and coping strategies. On the other hand, younger generations bring new perspectives, technological knowledge, and innovative approaches to dealing with climate risks. The interaction between these generations creates a dynamic learning environment where traditional knowledge is adapted and expanded to meet contemporary challenges. This concept is empirically presented in my recent paper, Environmental migration and non-migration: Learning through an intergenerational lens | Migration Studies | Oxford Academic (oup.com)
Besides, in collaboration with my colleagues, we developed a role-playing game (RPG) to explore these dynamics as an educational tool to simulate the challenges and decision-making processes involved in staying or leaving climate-vulnerable areas. The RPG serves as a microcosm of the real-world complexities communities face, allowing participants to embody different generational roles and experience the consequences of their decisions in a controlled yet immersive setting. Through the game, players (i.e. farmers communities vulnerable to climate risk) must balance immediate survival needs with long-term sustainability, consider the trade-offs between staying and migrating, and navigate the tensions between preserving traditional ways of life and embracing modern innovations. The findings from the RPG suggest that intergenerational learning significantly influences decision-making processes in the context of climate risk.

IV : Prospective approach and Agent based modelling

Dr Kevin Chapuis, Computer Sciences, IRD

I will introduce Agent based modeling principles through the use of the Gama platform, an open source software developed at IRD to help non computer scientists grow their own agent-based model. Pros and cons of the approach will be presented and compare to other modeling techniques. I will introduce few models I developed about case studies that could (methodologically) be related to environmental migration: evacuation model in case of catastrophic event (Chapuis et al., 2023 - 10.1080/13658816.2022.2069774) and study of mitigation policies against covid-19 in Al-Zaatari refugee camp (Taillandier et al. 2024 - 10.1371/journal.pone.0299626).

After a master graduation in social sciences & philosophy, I have done a PhD in computer science at University Pierre et Maris Curie (Paris 6) in 2016. My thesis was about job satisfaction and how agent based modeling can help to understand the impact of job organization on the satisfaction of workers. Until then, I have managed to work on the edges of social sciences and artificial intelligence through the prism of the agent-based modeling paradigm. I worked on the application of ABM in several field of research - massive evacuation, mitigation policies, circular economy and participatory modeling among others - all connected to the issues of urban sustainability. In 2024, I join IRD as a fellow researcher to further advance the science of model for sustainable cities.

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