

**Workshop on “Quantitative Assessment of  
Environmentally-Induced Migration” \***  
**May 9 and 10, 2016**  
**World Bank, Washington, D.C**

- Summary Report -

**KNOMAD Thematic Working Group on  
Environmental Change and Migration**

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## Executive Summary

Jointly with the University of Liege, the KNOMAD Thematic Working Group on Environmental Change and Migration hosted the workshop “Quantitative Assessment of Environmentally-Induced Migration” on 9-10 May 2016 at the World Bank headquarters in Washington, DC.<sup>1</sup> The workshop was attended by more than 35 researchers and practitioners from a variety of academic institutions as well as environmental and development organizations. (see Annex 2).

The focus of the workshop was on the current state of play in the quantitative assessment of human movement – internal and international, forced and ‘voluntary’ – related to declining environmental conditions, and its impacts on migrants as well as on sending, transit, and receiving locations. The workshop also facilitated an exploration of synergies with the forthcoming World Bank study on “Climate change, Migration, and Securing Resilience” (tentative title). It addressed three dimensions in particular:

1. *Current methodologies* in quantifying the environment-migration nexus, e.g. household surveys, mobile data, and modeling;
2. *Harmonizing existing data sets*; and
3. *Maximizing the utility* of quantitative assessments for policymakers and key stakeholders.

While an increasing number of studies and datasets document the environment-mobility nexus, challenges persist on some key fronts. The number of rigorous quantitative studies is limited, and systematic reviews are still not comprehensive. The existence, usability and accessibility of data are limited in some regions. And even where data is available, methodological and data-related limitations render cross-study comparability difficult. Finally, it was also ascertained that the theoretical basis is currently not robust enough to provide a meaningful framework for environmentally-related migration. The workshop thus recommended that researchers:

1. **Review and refine migration theories** in order to better understand and map environmentally-related movements, in a similar vein as former synthesis efforts in the field;
2. **Create an improved and more actionable data basis**, by producing an inventory of data (sets), filling existing gaps, better integrating migration questions in existing data collection efforts, harmonizing data sets, and finally applying the harmonized data to create models identifying long-term trends;
3. **Strengthen the epistemic community and pursue a targeted research agenda**, to gain a more powerful voice in current climate negotiations, as well as to better align with and shape interests of policy-makers and donors; and
4. **Embrace ethical responsibility**, engaging in critical reflection on the means and ends of quantitative assessments, in order to provide better input into global, regional, national and sub-national adaptation efforts.

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<sup>1</sup> This workshop is part of the EDGE project, supported by the European Commission through the EU “Horizon 2020 Framework Programme for Research and Innovation.”

## 1. Context and Objectives of the Workshop

The Global Knowledge Partnership on Migration and Development (KNOMAD) is a global hub of knowledge and policy expertise on migration and development issues.<sup>2</sup> In order to better understand the impacts of environmental change on mobility patterns and their effects on development, a thematic working group (TWG) has been created to gather scholars who have engaged in recent research on the subject with policymakers, practitioners, and donors. The TWG on Environmental Change and Migration focuses on three forms of mobility, as outlined in the Cancún Adaptation Framework, namely “climate change induced displacement, migration and planned relocation” (UNFCCC 2010 Art. 14 (f)), while acknowledging the importance of entrapment and immobility, too. To this end, previous activities of the TWG have included a Literature Review (KNOMAD 2015a), working papers, and various seminars on the issue, including on Climate Resilience and Migration and Longitudinal Research (KNOMAD 2015b), as well as the international symposium “Environmental Change and Migration: State of the Evidence” (KNOMAD 2014).

The need for this workshop arose from the previously identified *a) lack of quantitative comprehension of the environment-migration nexus*, and the *b) difficulty in comparing the existing data on the topic*. Despite the burgeoning research on the relationship between human mobility and adverse environmental conditions, there is still a relative dearth of rigorous estimates and projections of those moving in the context of environmental changes or a quantification of the impacts of voluntary and forced movements on migrants, destination, transit and sending zones. This constitutes a considerable hurdle for related policies and adaptation strategies.

To better inform policies, reliable estimates and projections of environmentally-induced population movements at the local, national, regional and global levels are needed, utilizing multiple sources of information as well as unifying methodological frameworks. Moving beyond scattered datasets and case studies, such projections will also shed light on how environmental changes and mobility interact in the long run. It is hoped that an improved quantitative evidence base would have significant influence on policy-making in the area, similar to the impact of the quantitative work on internal displacement pioneered by the Internal Displacement Monitoring Centre (IDMC).

With this rationale, the workshop aimed to address three dimensions in particular:

1. *Current methodologies* in quantifying the environment-migration nexus, e.g. household surveys, mobile data, and modeling;
2. *Harmonizing existing data sets*; and
3. *Maximizing the utility* of quantitative assessments for policymakers and key stakeholders

The subsequent sections discuss the findings from this workshop and summarize the conclusions and next steps forward.

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<sup>2</sup> [www.knomad.org](http://www.knomad.org) and <http://www.knomad.org/thematic-working-groups/environmental-change-and-migration>

## 2. Quantitative Projects and Data

### 2-1. Quantitative Projects Achieved and Underway

Whereas research has produced a considerable qualitative understanding of environmentally-related mobility, the empirical knowledge base is still thin, although quickly improving (KNOMAD 2015a). Most of the current research is available in a comprehensive, searchable database maintained by IOM and partner institutions, the so-called Environmental Migration Portal.<sup>3</sup> The annotated bibliography on the environment-migration nexus published by KNOMAD provides further detail (2015a). This workshop invited participants to provide an overview of important quantitative projects already achieved or underway to compare their methodologies and the challenges they encountered.<sup>4</sup>

#### a) Migration, Environment and Climate Change: Evidence for Policy (MECLEP)

The “Migration, Environment and Climate Change - Evidence for Policy” project uses household surveys to collect data and improve the evidence base on the role of migration in resilience and adaptation strategies.<sup>5</sup> It is implemented by IOM through a consortium of six research partners. Capacity building and trainings for local researchers and policy-makers are also provided in the six project countries - Dominican Republic, Haiti, Kenya, Mauritius, Papua New Guinea and Vietnam.

In terms of methods, the project employs household surveys for an in-depth understanding of each case-study. Through a unified methodology, it also creates cross-country comparability. The surveys feature sections on the socio-economic vulnerability of households, on their migration histories for ten years, and on perceived impacts of migration. Sites are chosen according to the presence of ‘natural’ changes, migration, as well as reported linkages between livelihoods security, migration and environment. The study also sought to cover areas which serve as corridors for migration or where migration originates, moves to, or does both. To provide in-depth contextual understanding, a qualitative component is largely at the discretion of each research partner and case study. Through a combination of the survey sections, important information on the relationship of migration, vulnerability, and environmental change is created. The study explicitly aims to create an integrated methodology and inter-comparability; the goal moving forward is to link this information across countries.

The project’s strength lies in its mixed-methods and cross-country approach. Relying on broader migration studies to shed light on different forms of mobility in the context of environmental change, a wide range of possible scenarios is taken into account to produce policy-relevant findings. To reduce a common selection bias, the project looks at migration in the context of environmental change rather than assuming environmental migration.

Challenges have revolved around terminology (definitions of migrants, households, lengths and destinations of movement etc.), comparability (lack of data, different definitions in other studies, etc.), and data collection. The latter includes resistance or suspicion of target populations, security concerns, the availability of enumerators, translation issues, and a lack of access to basic population data. In some cases, existing data gaps rendered the creation of new data difficult. Where good census data is lacking, for instance, accurate sampling may be challenging. Thus, supporting better data collection and

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<sup>3</sup> Available online at <http://environmentalmigration.iom.int/research>, checked on 1/06/2016.

<sup>4</sup> For another recent and concise overview of data in this context, refer to Laczko and Singleton (2016).

<sup>5</sup> Available online at <http://www.iom.int/meclep>, checked on 1/06/2016.

management systems is essential. Further imperatives concern community involvement as well as capacity building for policy-makers and researchers to enable an adequate production and use of new data.

In conclusion, the project provides an example of well-integrated methodologies that could be scaled up in the future. That said, it was emphasized that a systematic comparison will need to rely not only on a household level, but also incorporating the political context.

### **b) Bangladesh Environment and Migration Survey (BEMS)**

The Bangladesh Environment and Migration Survey (BEMS) is part of a larger study conducted by engineers as well as natural and social scientists on human-physical landscapes in low-lying delta regions.<sup>6</sup> It aims to collect household data through surveys and integrate this data with information on water and soil composition as well as satellite images.

The household data collection adapted a version of the ethno-survey originally developed by the “Mexican Migration Project” (MMP), and also used in the “Latin American Migration Project” (LAMP), and the “Migrations between Africa and Europe Project” (MAFE).<sup>7</sup> Much of the survey instrument was kept intact, including questions on migration and border crossing histories. New questions on migration intentions, access to specific assets, perceptions about land and water use, place attachment, self-efficacy, food security, and others were added to shed more light on the specific environmental change-migration nexus. The project was conducted in nine sites in five districts in Bangladesh. The sites were selected to represent a range of levels of soil salinity and economic development. In each site, a complete household census and mapping exercise was conducted. Based on this, 200 households per site were randomly selected; their Geographic Information System (GIS) coordinates and livelihood data were collected as well. Survey instruments included household and migrant ethno-surveys and community surveys. Water samples were also gathered from drinking water sources in each site to permit analysis with the ethno-survey data. Adding to this, qualitative data collection methods included interviews with key stakeholders at each site as well as ethnographic observations on trips in 2012-15.

Challenges consisted in integrating different types of migration as well as developing a unifying terminology and sampling frame. Questions arose, for instance, about whether yearly movement of people up one mile during cyclone months needed to be considered temporary, permanent, or repeated; how varying levels of exposure to hazards add up to an actual signal to move as compared to historical levels; how have people on the ground already adapted to hazards; and what is a sensible way to marry qualitative and quantitative data.

### **c) Longitudinal studies**

The lack of longitudinal data had been previously identified as an important obstacle to more rigorous analysis (KNOMAD 2015b). In terms of longitudinal data, the range of options encompasses *panel data* (individuals/households interviewed over time), *repeated cross-section* (same region but different individuals over time), and *rotating panel* (individuals/households interviewed a fixed number of times, after which new subjects are selected).

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<sup>6</sup> <http://www.vanderbilt.edu/ISEEBangladesh/about.php>, checked on 2/06/2016.

<sup>7</sup> MMP: <http://mmp.opr.princeton.edu/>, LAMP: <http://lamp.opr.princeton.edu/>, and MAFE: <http://mafeproject.site.ined.fr/en/>, checked on 3/06/2016.

An important advantage of longitudinal studies is their comprehensiveness: They allow evaluating both the determinants and effects of environmentally-related mobility. Longitudinal studies also allow controlling for time-invariant region-specific characteristics, for instance by using fixed effects. The data does not necessitate reliance on recall data, since subjects are tracked, and is thus more precise and of higher quality. Thanks to this tracking, longitudinal migration studies also do not need to worry about selecting destinations, an often challenging task in other studies.

On the other hand, longitudinal studies are expensive and time-consuming. As a consequence thereof, research often economizes on the breadth of the studies, which leads to issues with external validity or incomplete geographic coverage. A second compromise is often made on the time scale and periods of longitudinal studies. This makes short-term and local movement or residential change of people hard to detect, even though they may be some of the most important dimensions of environmentally-related mobility. Another challenge concerns the limited availability of longitudinal studies with an explicit focus on migration. For those existing, location data and time scale might not be specific enough to assess both temporary and permanent migration.

That said, a window of opportunity is opening. The infrastructure for many longitudinal surveys is already in place. New technologies such as hand-held GPS devices, smart phones, and tablets are also helping to improve surveys and drive down costs. Including more targeted migration questions in these existing frameworks offers great potential to improve studies of the environment-migration nexus. Strategies to improve existing surveys and include a better focus on migration could revolve around targeted advocacy and dialogue as well as better funding and capacity building for policy-makers and statistical personnel. Beyond longitudinal data, another complementary method consists in collecting retrospective data from individuals and households. The Bangladesh project described above as well as the MMP, LAMP, and MAFE show that recall of migrants' first and most recent trips is often of good quality. This, combined with the use of new technologies to collect geographic information as well as physical attributes of places, represents a promising avenue for the future.

#### **d) Using big data, including mobile phone data**

Big data is becoming increasingly important in the context of disasters, environmental change, and human mobility, and the World Bank has acknowledged its relevance for development action in various initiatives and reports (e.g. World Bank, SecondMuse 2014). FlowMinder and other organizations have created projects such as WorldPop to improve the spatial-demographic evidence base grounding policy- and decision-making, by integrating various sources such as mobile phone, census, survey, satellite and GIS datasets in a flexible machine-learning framework.<sup>8</sup>

Especially the increasing availability and use of cell phones have brought great advances to tracking human movement. For instance, big data helped to analyze the movement of people when cyclone Mahasen struck Barisal City in Bangladesh in 2013. During the disaster, a time-series covering spatially registered data from 5 million people resulted in 4 billion data sets to analyze. In a quasi-experimental setting, comparing the storm with a non-storm year, relative changes were tracked. Surprisingly, no

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<sup>8</sup> FlowMinder is a non-profit foundation working with data providers and international/government agencies to operationalize and scale applications in support of vulnerable populations and sustainable development, cf. <http://www.flowminder.org/>, checked on 1/06/2016. WorldPop aims to improve the spatial demographic evidence base for low and middle income countries, cf. <http://www.worldpop.org.uk/>, checked on 1/06/2016.

significant difference could be observed, meaning that people in Barisal prepared for disaster events and adapted their movements. The registration of new phones after the disaster provided important insight on where people lived and evacuated to after storm.

This example highlights some of the advantages associated with the use of big data. First, big data allows for a significant sample size and even national scale data. Second, the technology allows tracking how people move out of a certain situation or location, but also how others simultaneously move in. Third, the data makes long-time series feasible and thus provides a relatively reliable source of destinations and lengths of stay for travel. Finally, it also provides information on social networks and wealth of those moving, thus putting the data into important context.

That said, the technology also exhibits limitations and results must be interpreted with caution. First, short-term mobility is heavily underrepresented, and so are rural areas with coverage gaps. The same holds true for vulnerable groups such as children, elderly people, the poorest, and groups with low literacy rates. This leads to a bias in representation of population movement and may shift attention away from the most at-risk groups and the most vulnerable patterns of mobility. Second, the quantitative data only record movement and does not provide any contextual, qualitative understanding. Third, big data implies questions of data privacy and could be exploited or misused. Fourth, the raw data implies some challenges as it also captures people moving into the area to help affected populations, although their data can usually be removed from the analysis.

Another challenge consists in achieving access to the data. It has to be negotiated in time-consuming processes, and incentives for providers may be limited, especially when fear of losing competitive advantages prevail. Negotiations may be equally complicated with pertinent ministries, government entities, regulators, and other relevant institutions. In that respect, capacity building is often a good selling argument, as is the positive PR associated with supporting a charitable initiative. Overall, however, while establishing trust is vital, free access to data is very difficult to achieve, and business relationships may be more successful in obtaining access. Finally, once access is achieved, sharing data is a concern and would be detrimental to the purpose of FlowMinder, creating a strong firewall for collaboration.

Moving forward, workshop participants emphasized that the use of the data will certainly be scaled over the coming years and may provide important insights into the environment-migration nexus. Further sources such as utilities or social media data could help to better map out “normal” movement patterns, the baseline against which anomalousness can be discerned. They also cautioned that data privacy should be taken into account to the highest degree possible. Furthermore, it was warned that generalizing on the basis of micro-studies may be difficult.

## **2.2. Quantitative Datasets Available**

After discussing several methodologies employed in current research on environmental change and migration as well as their strengths and weaknesses, the workshop turned to provide an overview of available quantitative datasets. A variety of datasets are now available, including new forms of data through mobile phone and remote sensing, yet a more systematic engagement with the issue is still lacking, and the data are often difficult to harmonize. Furthermore, in some cases gaps in data continue to exist, while access as well as usability may be limited in others.

### **a) Climate variability datasets**



Data on climate variability and associated risks are available from various sources, including from the United Nations Office for Disaster Risk Reduction (UNISDR) on risk,<sup>9</sup> from the “International Disaster Database” (EM-DAT) on disasters,<sup>10</sup> and from the “Index for Risk Management” (INFORM) on risk assessment for humanitarian crises and disasters.<sup>11</sup> Still, it was emphasized that the research community needs to be enabled to measure exposure and climate variability better, and to cover gaps such as the lack of data on flooding. Studies often use the same data products, and the current methodology needs to be expanded to include remote-sensing and other technologies more thoroughly. While long-term forecasting of slow-onset processes was deemed vital, the workshop also vocalized a need for short-term predictions, particularly in relationship to sudden-onset natural disasters. It was highlighted that future research needs to get more granular and focus on extreme processes, and how their accumulated effect may reach trigger points that cause movement. Finally, more collaboration between social and physical scientists will be required to determine the advantage and disadvantage of data sets relevant to the climate change-human mobility nexus.

### **b) Migration data**

Estimates of international migration flows and stocks use a variety of sources to triangulate the data for better consistency. The World Development Indicators Databank (World Bank) uses the trends in total migrant stock produced by the UN Population Division (UNPD). It also relies on data on refugees by the United Nations’ Refugee Agency (UNHCR) and the United Nations Relief and Works Agency for Palestine Refugees (UNRWA) and on internally-displaced persons (IDPs) by the Internal Displacement Monitoring Centre (IDMC). Nonetheless, there is a lack of consistency across data sources, a limited availability of data for IDPs (as discussed below), and lack of recent data. To counter some of these challenges, inter-agency collaboration as pursued by the UN Inter-Agency Group for Child Mortality Estimates was highlighted as a good practice. In this vein, for instance, the work of KNOMAD’s Thematic Working Group on Demographic Changes to estimate the migrant stocks has rendered updated data which ultimately lead to a revision of UNDESA migration numbers by more than 10 million people.<sup>12</sup>

However, the lack of globally consistent data on migration remains challenging. Current stock data estimates (UN WPP) from censuses and flow data estimates (Migration DRC) from population registries are insufficient and not sub-nationally disaggregated to adequately reflect internal and international stocks or flows. They also suffer from terminological and definitional incoherence. For the Foresight Project (CIESIN 2011; Foresight 2011), for instance, the researchers relied instead on indirect estimation methods, estimating net migration through data on population growth minus natural increase rates. While this eliminates sources of uncertainty and error, it also introduces new challenges due to the computation processes. With a series of initiatives underway to improve migrant stock and flow data, such as an UNHCR working group on IDP data in which the World Bank participates, it is hoped that a more globally consistent set of data on migration will be available in the future.

### **c) Data on people internally displaced**

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<sup>9</sup> Available online at <https://www.unisdr.org/we/inform/disaster-statistics>, checked on 1/06/2016.

<sup>10</sup> Available online at <http://www.emdat.be/>, checked on 1/06/2016.

<sup>11</sup> Available online at <http://www.inform-index.org/>, checked on 1/06/2016.

<sup>12</sup> For more information on the Thematic Working Group, please refer to <http://www.knomad.org/thematic-working-groups/demographic-changes-and-migration>, checked on 1/06/2016.

Internally displaced persons (IDPs) have not been adequately addressed by the international community for a variety of reasons. One of them concerns the lack of data required to put the issue more firmly on the agenda of policy-makers and provide a solid basis for decision-making.

To bridge this gap, the first attempt to create a methodology for IDPs was pioneered by IDMC. IDMC's Global Report focuses on the flow of IDPs. Data is derived from primary data collection on the ground, IOM field operations, several aggregators (national /regional/global level databases), and reporters. In the estimations, a variety of variables both adding and subtracting from this flow have to be taken into consideration, such as deaths, cross-border flights, local integration on the one side, as well as failed settlement elsewhere and new children born to IDPs on the other side of the equation.

The terminology varies greatly and makes data less inter-comparable. The aggregation of the data requires major interpretation and harmonization to overcome data challenges and limitations. Moreover, data are often not granular enough or disaggregated to reflect the duration, patterns of movement, real trajectories, and eventual place of resettlement. Beyond, accessibility, availability and quality of data pose challenges. Due to these methodological constraints, the published Global Stock and Global Flow Figures acknowledge significant gaps in estimates.

IDMC initiated a constant learning process over the past five years, trying to more clearly determine the intended users of the data, how to render it more relevant for policy-makers, and who among the displaced are to be prioritized for protection. While important advances have been achieved, such as the Internal Displacement Tracking Matrix by IOM,<sup>13</sup> there are still large gaps. One data gap concerns slow-onset disasters, which imply extensive methodological and conceptual constraints. For droughts, for instance, determining a broader range of factors leading to the threshold for leaving is difficult. Another gap concerns the stock data for prolonged and protracted internal displacement situations, such as pockets of people still displaced from older disasters.

#### **d) Satellite imagery**

Satellite imagery and spatial analysis have emerged as important tools for quantitative analysis of human movement. Various satellites provide reliable observations of water, ice, ocean, bottom pressure, sea-level and other variations. Important sources include the Landsat satellites, but also GRACE, AQUA, TERRA, AVHRR, PaISAR, and others.<sup>14</sup> Methodologies range from traditional to advanced remote sensing and image processing techniques.

These technologies provide a range of advantages, yet also imply challenges. First of all, ground truth validations are essential to verify and contextualize the data, but demanding in many places. Second, cloud-free coverage for multi-temporal datasets can be equally challenging. Third, geospatial data is not readily available or not very accurate for many countries. Therefore, it can be difficult to access these datasets, or they come at a cost. Fourth, limitations also persist with regard to in-country coordination and collaboration across various actors due to language barriers, competitiveness, cultural barriers, and security concerns. Fifth, some data, such as hydrological parameters, need to be derived for remote locations in which they tend to be unavailable, which introduces error and uncertainty into results. Finally,

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<sup>13</sup> Available online at <http://www.globaldtm.info/>, checked on 1/06/2016.

<sup>14</sup> Cf., for instance, <http://landsat.usgs.gov/>, <http://www.csr.utexas.edu/grace/>, <http://aqua.nasa.gov/>, [http://www.nasa.gov/mission\\_pages/terra/index.html](http://www.nasa.gov/mission_pages/terra/index.html), checked on 1/06/2016.

error and uncertainty standards for environmental data are sometimes difficult to ascertain from the datasets provided.

### **e) Spatial Analysis**

Spatial statistics are useful to analyze and map out entities using a variety of characteristics. Using spatial analysis, the Foresight Project for instance found that people have been more likely to move into hot spot zones designated as high risk areas for natural disasters (CIESIN 2011; Foresight 2011). There are several models available to map climate change vulnerability hotspots. Exposure hotspots are for instance illustrated in the “Regional Climate Change Index”, a relative indicator of change in precipitation and temperature from 1960-79 to 2080-99 (Giorgi 2006) as well as in the “Four degree interactive maps” by the UK Met Office (2013). Others have mapped out the agriculture and food security vulnerability to a maximum daily growing season temperature exceeding 30°C (Ericksen et al. 2011). Furthermore, some authors have analyzed multi-sectoral hotspots of impacts based on sector-specific thresholds for climate change impacts in water, agriculture, ecosystems and health (Piontek et al. 2014). By integrating remote sensing, even more detailed vulnerability maps can be created, combining data on exposure, sensitivity, and lack of adaptive capacity (de Sherbinin et al. 2014; de Sherbinin et al. 2015).

Questions remain, however, particularly on the integration of climate scenarios and associated impacts in future migration modeling. These concern the limits of habitability for certain ecosystems, the identification of thresholds of change in temperature or precipitation that might trigger migration, and the incorporation of extreme events. It is also unclear whether household surveys and longitudinal studies can help to parameterize models for sensitivity to climate changes.

### **3. Upcoming World Bank Report on “Climate Change, Migration, and Securing Resilience” (tentative title)**

After examining methodologies and available datasets, the workshop had an opportunity to hear about the upcoming study on climate change, migration and resilience conducted by the World Bank. The World Bank recognizes climate change as a challenge for the whole development agenda as well as for its goals of ending extreme poverty and fostering shared prosperity.

The forthcoming report will shed light on the interactions of human mobility and natural resources. Several previous World Bank reports have built a knowledge foundation for this endeavor (World Bank 2012, 2013, 2016a, 2016b). Mapping critical assets and their characteristics will be crucial to analyze climate and social tipping points that may induce different types of mobility at various levels. The study proposes to rely on a mixed-methods approach, using both quantitative and qualitative analysis to provide a nuanced approach to the complex issue. The report will use the latest science on climate scenarios, and model biophysical impacts of climate change, poverty/area-adaptive context as well as household dynamics data. Overall, it seeks to develop area and livelihood-based analogs to predict pathways, thresholds, scale of issue as well as potential hot-spots of environmentally-related migration until 2050.

The study ultimately aims to develop tangible policy recommendations on mobility in the context of environmental change. It investigates what investments can lead to better outcomes for households and regions facing environmental pressures. The added value consists in moving existing knowledge towards a long-term, evidence-based operational approach voicing practical implications for pertinent stakeholders. It identifies entry points for policy to improve household and area resilience as well as adaptive capacity. An improved characterization of the issue, paired with recognition of its multi-faceted

challenges, is intended to foster constructive dialogue on the practical implications of integrating mobility into the sustainable development discourse.

Workshop participants emphasized the importance of understanding threshold levels and trigger points for migration decisions, as well as levels of variability of perceived incidence. Instead of “fighting” or “slowing down” population movements, providing more safe, secure, legal and orderly migration as adaptation opportunities are required. Urban displacement, where people have to flee to peri-urban or suburban areas, was highlighted as a knowledge gap. Similarly, the knowledge on immobility, entrapment, as well as secondary and tertiary movements is limited. Understanding the impacts of mobility on migrants themselves will be crucial. The workshop also advised that the study be written from the perspective of end users and be made as accessible as possible. This could mean to organize it along principles, countries, issues or ecosystems, and make best practices, lessons learnt, and viable strategies available to decision-makers in a user-friendly manner.

The findings from the workshop as well as the close collaboration with the KNOMAD chair and co-chairs have facilitated important knowledge creation and sharing, and KNOMAD will continue to contribute to the progress of the flagship report.

#### **4. Conclusions and Next Steps: Towards a Quantitative Assessment of the Environment-Migration Nexus**

Bringing together the findings of two days of discussions, the workshop aimed to establish an agenda for better quantitative assessment of the environment-migration nexus.

While a considerable number of datasets document the nexus, methodological and data-related limitations render cross-study comparability difficult. Major constraints identified concern insufficiently detailed data on various socioeconomic and demographic characteristics, the definition of migrants, the choice and definition of proxy variables for environmental factors, the empirical methodology, and the geographic level of representation of data sources. Furthermore, the literature lacks a sufficiently large number of rigorous studies to perform a meta-analysis in the spirit of Hsiang et al. (2013) for conflict.

While making data sets comparable is important, equally vital is the clarification of which questions the research community wants to answer with these harmonized data sets, which exact data needs to be combined to this end, and which ethical implications arise. Questions could concern not only the number of people moving, their trajectories and modalities of movement, but also the needs, risks, and levels of vulnerability. The workshop thus recommended review and refinement of existing migration theories; creation of an improved and more actionable data basis; strengthening of the epistemic community; pursuit of a targeted research agenda; and embracing of ethical responsibility.

##### **a) Reviewing and Refining Migration Theory**

It was ascertained that the theoretical basis is currently not robust enough to provide a meaningful framework for environmentally-related mobility. One of the greatest challenges is the multi-causality of decisions to migrate. The real impact of environmental change on migration patterns will vary according to a significant number of co-variants. Even multi-level models such as the one employed in the Foresight Report (Foresight 2011) tend to be rather static in that they do not model the interaction effects between variables.

There was agreement that review and refinement of theories are needed to better understand and map environmentally-related movements, potentially in a similar vein as former efforts pioneered under the umbrella of the International Union for the Scientific Study of Population (IUSSP) and others (Massey et al. 1993; Massey et al. 1999; Massey 2012, 2015). Questions that are currently inadequately explained include the specific characteristics of affected groups, their trajectories and modes of mobility, voluntary and involuntary immobility, and others. A synergy with the upcoming World Bank study on climate change, resilience, and migration could be in exploring tipping points and thresholds of migration decisions, creating a better understanding of exposure, sensitivity, and resilience or adaptive capacities of migrants.

The review and refinement would need to be connected with theories of environmental change and development to provide a more comprehensive and adequate framework explaining mobility in the context of environmental change.

#### **b) Creating an Improved and More Actionable Data Basis**

Data still poses a considerable challenge for quantitative research. On the one hand, in some regions relevant data is still missing or lacking migration information. In order to increase the availability of data on migration, it was recommended that donors, researchers, and governments advocate for a better inclusion of migration questions in all existing and future data collection efforts. An example mentioned was the disaggregation of SDGs by migratory status. A better inclusion of migration-related indicators in data bases such as the World Development Indicators may also be sensible. On the other hand, even where data is available, access to this data and its usability are often limited. Access to data needs to be eased wherever feasible. Finally, even when data is available and accessible, the sets are often difficult to compare and lack inter-operability.

To overcome these hurdles related to data for quantitative research, a five pronged-approach was proposed:

- i. First, to enable the approach, a funding agenda would need to be detailed and pursued.
- ii. Second, a mapping exercise would produce an inventory of data (sets) with relevant information for the migration-environment nexus, and summarize their strengths, weaknesses, and previous usage in an accessible way. This repository could be made user-friendly, for instance, through an interface that directs users to the most relevant datasets according to their interests in policy questions.
- iii. Third, to improve the existing data bases, the research community could work to fill the gaps identified through the mapping exercise and advocate for a better integration of migration in data collection already conducted.
- iv. Fourth, after deciding what numbers need to be produced for what purpose and on which level of analysis, data sets and variables could be harmonized. To this end, a common matrix would need to be developed.
- v. Finally these harmonized data sets could be used for applied and improved quantitative research on the environment-migration nexus, creating models to identify long-term trends in the data.

#### **c) Strengthening the Epistemic Community and Pursing a Targeted Research Agenda**

Strengthening a community of researchers on the issue was emphasized as a crucial asset to moving the agenda forwards. This could include more collaboration between social and natural scientists and engineers to determine advantages and disadvantages of certain data sets, but also better inter-agency coordination to improve their quality. Such an effort could lead to a more powerful voice in processes such as UNFCCC, the Warsaw International Mechanism for Loss and Damage, and forthcoming IPCC reports. It would also allow for a better coordination and alignment with policy-makers and donors in order to incorporate migration more substantially into modeling and projections related to climate change. .

Beyond, such a community could more easily pursue a targeted research agenda on quantitative assessments of the environment-mobility nexus. To this end, it was suggested that scaling up existing case study and longitudinal approaches to a more global level would be useful. This could help to clarify whether results converge, if more stylized findings can be achieved, and whether a ranking of the most important environmental stressors in different regions is achievable. Such an effort could include an updated meta-analytical review of existing research to synthesize findings across cases, along similar lines as previous efforts (Obokata et al. 2014). It could also further explore synergies with the upcoming World Bank report on climate change, resilience, and migration, and help to develop new KNOMAD working papers.

#### **d) Embracing Ethical Responsibility**

There was agreement that the existing global and regional projections of the number of environmentally-induced migrants require refinement to spur the policy dialogue at a global level in a more useful way, and to provide better input into national and sub-national adaptation efforts. It was suggested that mapping out existing interests of policy-makers and media on quantitative migration data – such as in the Sendai Framework for Disaster Risk Reduction or in the context of the Sustainable Development Goals - may be a good entry point to make research more relevant. On the other hand, the workshop participants emphasized the ethical responsibility of the research community. A high degree of self-awareness on the goals of quantitatively analyzing environmentally-related mobility is required in order to make a constructive contribution to the discourse. This necessitates both a clear research agenda as well as a stringent communication strategy. Communicating uncertainty, issue-based likelihood representations, and risk maps could help to limit potential misinterpretations and frame a more constructive use of numbers. Nonetheless, the ethical challenges of quantifying human movement remain significant and require a comprehensive, critical engagement of civil society, donors, and governments.

## Annex 1 – Workshop Agenda

DAY 1: May 9 <sup>th</sup> , 2016	
8:30-9:00	<b>Light breakfast</b>
09:00	<p><b>Welcome and Introductions</b>            Dilip Ratha, Head of KNOMAD, World Bank            Susan Martin, Chair of KNOMAD Thematic Working Group “Environmental Change and Migration; and Georgetown University            François Gemenne, University of Liège / Sciences Po</p> <p>Tour de table: What are the key issues to address the environment-migration nexus with quantitative data? What do we know? What don't we know?</p>
09:45	<p><b>Quantitative Projects Achieved and Underway</b>            Household surveys            Sara Vigil, University of Liège/ FNRS            Julia Blocher, United Nations University / University of Liège            Katharine Donato, Vanderbilt University</p> <p>Longitudinal studies            Rachel Baker, Princeton University</p> <p>Using mobile data            Linus Bengtsson, Flowminder            David Wrathall, University of Oregon</p> <p>Chair: Caroline Zickgraf, University of Liège</p>
10:45	<b>Break</b>
11:00	<b>Quantitative Projects Achieved and Underway (continued)</b>
12:30	<p><b>Lunch, including following presentation</b>            The World Bank’s Upcoming Report on Climate Change, Resilience and Migration            Kanta Kumari Rigaud, World Bank</p>
14:00	<p><b>Quantitative datasets available</b></p> <p>Climate variability datasets            Valerie Mueller, International Food Policy Research Institute (IFPRI)            Raphael J. Nawrotzki, University of Minnesota</p> <p>Population data            Emi Suzuki, World Bank</p> <p>Data on people displaced by disasters</p>

	<p>Michelle Yonetani, International Displacement Monitoring Centre (IDMC)</p> <p>Spatial analysis and satellite imagery  Douglas Howard, Georgetown University  Alexander de Sherbinin, Columbia University</p> <p>Chair: Robert McLeman, Wilfrid Laurier University</p>
15:15	<b>Break</b>
15:30	<p><b>Breakout Groups – Comparing datasets</b></p> <p>Group 1 “Issues of interoperability”  Facilitator: Francois Gemenne, University of Liège / Sciences Po</p> <p>Group 2 “Assessing trends”  Facilitator: Susan Martin, Chair of KNOMAD Thematic Working Group “Environmental Change and Migration, Georgetown University</p>
16:30	<p><b>Discussion of Breakout Groups</b>  Chair: Elizabeth Fussel, Brown University</p>
17:00	<p><b>Concluding Remarks/ Wrap-Up</b>  Chair: B. Lindsay Lowell, Georgetown University</p>
17:15	<b>Adjourn</b>
19:00	<b>Dinner</b> (Restaurant Primi Piatti, 2013 I Street NW, Washington DC)



<b>DAY 2: May 10<sup>th</sup>, 2016</b>	
8:30-9:00	<b>Light breakfast</b>
09:00	<p><b>“Towards a Quantitative Assessment of the Environment-Migration Nexus: Building a Foundation for Global Maps of Displacement”</b> Introduction of Partners and Presentation of the Project</p> <p>Valerie Mueller, International Food Policy Research Institute (IFPRI) François Gemenne, University of Liège / Sciences Po</p>
09:30	<b>Addressing Outstanding Issues</b>
10:00	<p><b>Fundraising Strategies</b> Chair: François Gemenne, University of Liège / Sciences Po</p>
10:30	Break
	<b>Consultation on World Bank’s Upcoming Report on Climate Change, Resilience and Migration</b>
11:00	<b>Expert feedback on the methodology (Margaret Arnold, François Gemenne)</b>
11:30	<b>Exploring synergies and broader engagement (Susan Martin)</b>
12:15	<p><b>Conclusion of meeting</b> Chair: Anne T. Kuriakose, World Bank</p>
12:30	<b>Lunch</b>

## Annex 2 – List of Participants

Name	Affiliation(s)	Bio Information	Email
Alex de Sherbinin	Earth Institute at Columbia University	Alex de Sherbinin is the Associate Director for Science Applications at the Center for International Earth Science Information Network (CIESIN), an environmental data and analysis center within The Earth Institute at Columbia University specializing in the human aspects of global environmental change. Dr. de Sherbinin is a geographer whose research interests focus on the human aspects of global environmental change and geospatial data applications, integration, and dissemination. He has written on a range of topics, including climate vulnerability mapping; climate change and migration; urban climate vulnerability and resilience; population dynamics and the environment; environmental indicators; and remote sensing applications for environmental treaties.	adesherbinin@ciesin.columbia.edu
Anne Jerneck	Lund University Centre for Sustainability Studies	Anne Jerneck is a professor of sustainability science at Lund University and a principal investigator in the Linnaeus Centre Lund University Centre of Excellence for the Integration of Social and Natural Dimensions of Sustainability (LUCID) where she also supervises PhD candidates. Her interdisciplinary profile in research, teaching and mentoring is oriented towards processes of socio-ecological and institutional change in the context of poverty, inequality and sustainability in sub-Saharan Africa and beyond. She also has an interest in methodology in development studies and sustainability science. Since the late 1990s she has designed and developed interdisciplinary courses in international Master's programmes at LU. Presently she is a teacher and examiner in several Master's programmes.	anne.jerneck@lucsus.lu.se
Anne T. Kuriakose	World Bank	Anne T. Kuriakose, Ph.D. is Senior Social Development Specialist at the Climate Investment Funds (CIF) at the World Bank in Washington DC, where she is responsible for mainstreaming gender across the USD 8.1 billion CIF program. She also serves as Gender and Climate Lead for the World Bank Group. Anne has over 20 years of experience in gender	akuriakose@worldbank.org

		and social development, with particular expertise in climate adaptation, rural development, and water resources. Since joining the World Bank in 2005, Anne has worked in regional and anchor units on operations in CDD, irrigation, and governance. She has led analytical work on gender and labor, water management, adaptation and social protection. Her country experience includes work in India, Pakistan, Bangladesh, Sri Lanka, Cambodia, Vietnam, Ethiopia, Chad, Ghana, Kenya, Romania and Tajikistan.	
B. Lindsay Lowell	Institute for the Study of International Migration Georgetown University	Professor Lowell of Georgetown University pursues research interests in immigration policy, labor force, economic development, Mexico-US migration, education and the global mobility of the highly skilled. He has written over 150 reports and articles in journals such as Demography, American Economic Review, Population and Development Review, Industrial Relations and Work and Occupations. He received his PhD as a Demographer from Brown University.	lowellbl@georgetown.edu
Caroline Zickgraf	University of Liège	Dr. Caroline Zickgraf is FNRS Post-doctoral Fellow at the University of Liège in Belgium and lecturer at Sciences Po Paris. She has consulted on environmental migration issues in West Africa for the World Bank, ICMPD, and the Nansen Initiative. Dr. Zickgraf currently co-leads the project EDGE (Environmental Diplomacy and Geopolitics), a Horizon 2020 project funded by the European Commission.	caroline.zickgraf@ulg.ac.be
Celine Bonfils (remote participation)	Lawrence Livermore National Laboratory, California	Climate scientist, Deputy group leader of the CLIMA group at LLNL	bonfils2@llnl.gov
Dalila Gharbaoui	University of Liège (Belgium) / University of	Dalila Gharbaoui is a Research Fellow at the University of Canterbury and PhD candidate in Political and Social Sciences under the New Zealand Marsden Fund at the Macmillan Brown Center for Pacific Studies and the University of Liege.	Dalila.gharbaoui@gmail.com

	Canterbury (New Zealand)		
David Wrathall	University of Oregon		davidwrathall@gmail.com
Dilip Ratha	World Bank	Head of KNOMAD and Lead Economist, Migration and Remittances Unit, Global Indicators Group, Development Economics, World Bank. Mr. Ratha is credited to be the first to analyze and formalize the global significance of remittances. In 2012, he founded KNOMAD, a multidisciplinary, global hub of knowledge on migration. He is the focal point for the World Bank's Migration Working Group and the Diaspora Bond Task Force, and a co-coordinator of the (G20) Global Remittances Working Group. Besides migration, he has done pioneering work on innovative financing including diaspora bonds, future-flow securitization, and shadow sovereign ratings.	dratha@worldbank.org
Douglas Howard	Georgetown University	Dr. Howard is an Associate Professor in the School of Foreign Service at Georgetown University. He is a professional geologist with 30 years of expertise in planetary geosciences. He is currently working on a project to understand the change in environmental conditions related to protracted refugee camps in Ethiopia and Djibouti, Africa.	Douglas.howard@georgetown.edu
Elisabeth Gilmore	University of Maryland	Elisabeth Gilmore is an Assistant Professor in the School of Public Policy at the University of Maryland, College Park. In January 2017, she will be an Associate Professor in the Department of International Development, Community and Environment at Clark University. Her research focuses on three related streams: 1) Quantifying and projecting the societal and economic impacts of climate change; 2) Evaluating the potential for low carbon energy technologies for	elisabeth.gilmore@gmail.com

		climate mitigation and societal development; 3) Applying data and modeling tools, specifically integrated assessment models, for decision-making and regulatory analysis. Presently, she is lead PI on a Department of Defense, Minerva Research Initiative award on projecting the risk of civil conflict under different climate change scenarios. She received a dual PhD in Engineering and Public Policy and Chemical Engineering from Carnegie Mellon University.	
Elizabeth Fussel	Brown University, Population Studies and Training Center	I am a sociologist and demographer with expertise in Mexican and Central American migration to the United States, as well as internal migration in the U.S. after Hurricane Katrina. I earned my PhD from University of Wisconsin-Madison in 1998 and held a postdoctoral fellowship in the Population Studies Center at University of Pennsylvania (1998-2001). I have held faculty positions at Tulane University, Washington State University and Brown University.	Elizabeth_Fussell@brown.edu
Emi Suzuki	World Bank	Emi Suzuki, Ph.D., is a Demographer at the World Bank. Her areas of interest are demography and health statistics. She has over 14 years of experience in World Bank's demographic and health statistics, and currently leads demographic estimation work for the World Bank.	esuzuki@worldbank.org
François Gemenne	University of Liège / Sciences Po	I am a political scientist, focusing on environmental migration and climate (geo)politics. I work mostly in two universities: at Sciences Po in Paris, where I am the executive director of the 'Politics of the Earth' research program, and at the University of Liège (that's a city in Belgium), where we're about to launch an Observatory dedicated to environmental migration.	F.Gemenne@ulg.ac.be
Hanspeter Wyss	World Bank	Hanspeter Wyss is a Senior Program Officer at the World Bank's Development Economics - Indicators Group (DECIG). In the Migration & Remittances team his responsibilities include the contribution to the implementation of the Global Knowledge Partnership on Migration and Development (KNOMAD), primarily in the areas of environmental change and migration, migrants' rights and integration in host communities, and gender.	Hwyss1@worldbank.org

Jonas Bergmann	Georgetown University	Jonas Bergmann currently graduates from the MSc in Foreign Service at Georgetown University, where he focused on the nexus between Migration, Sustainable Development, and Human Rights. In Washington, Mr. Bergmann worked with the Institute for the Study of International Migration, Human Rights Watch, and the Berkeley Center; former internships include the Global Public Policy Institute in Berlin, the German Foreign Service, and the Chilean National Human Right Institute. He has participated in various refugee and migration networks and co-founded a local empowerment NGO in Germany.	jb2406@georgetown.edu
Julia Blocher	United Nations University / University of Liege	Julia Blocher is a Research Officer at the United Nations University Office to the United Nations, as well as a Ph.D candidate and Associate Member of the Hugo Observatory for Environmental Migration. Her main research interests are in the geopolitical impacts of climate change and migration, displacement and planned relocations, and border policy. She previously worked for the Internal Displacement Monitoring Centre (IDMC-NRC) and the United Nations High Commissioner for Refugees (UNHCR).	blocher@unu.edu
Kanta Kumari	World Bank	Kanta Kumari Rigaud is a lead environmental specialist at the Climate Change Group at the World Bank and also the Focal point for the Pilot Program for Climate Resilience, one of the programs of the Climate Investment Funds. She works with multiple country teams on mainstreaming climate resilience into core development planning, knowledge products to enhance the uptake of climate resilience and policy related work.	kkumari@worldbank.org
Katarina Csefalvayova	University of Bratislava	Katarina Csefalvayova is Vice-Dean for International Development of the Faculty of International Relations at the University of Economics in Bratislava. A specialist of water issues, she has researched extensively on the geopolitical dimensions of natural resources, and water in particular. She holds a PhD. in international economic relations from the University of Economics in Bratislava. She is also a Member of Parliament of the Slovak republic.	katarina.csefalvayova@gmail.com

Katharine Donato	Vanderbilt University	I am a Professor of Sociology at Vanderbilt University. My research addresses many topics related to international migration, including health, employment, gender, children, and most recently, the environment.	katharine.donato@vanderbilt.edu
Kayly Ober	WB / University of Bonn	Kayly is a research associate/PhD candidate at the University of Bonn with the TransRe Project, focusing on the governance of the climate-adaptation-migration nexus. She's also a consultant with the Climate Policy Team at the World Bank, where she's working on an upcoming report on climate change and migration. Previously, she's worked at the World Bank, Overseas Development Institute, Woodrow Wilson Center, and World Resources Institute, among others.	kaylyo@gmail.com
Lennart Olsson	Lund University	Lennart Olsson is the founding Director of LUCSUS (Lund University Centre for Sustainability Studies) as well as coordinator of the Linnaeus Centre LUCID. His current research focuses on the politics of climate change in the context of poverty, food insecurity and ill-health in sub-Saharan Africa. He was Coordinating Lead Author for the chapter on Livelihoods and Poverty in IPCC's 5th Assessment Report 2011-14.	lennart.olsson@lucsus.lu.se
Linus Bengtsson	Flowminder	Co-Founder Flowminder.org  Analyzing population flows with anonymized mobile location data and providing decision support for free to relief agencies and organizations to enable more effective aid distribution during crisis response and disease outbreaks	linus.bengtsson@flowminder.org
Margaret Arnold	World Bank	Margaret Arnold is a Senior Social Development Specialist with the World Bank specializing in social resilience, the social dimensions of climate and disaster risk management, and community-based and inclusive approaches to risk management. Margaret has been with the World Bank since 1995, and has worked on urban development and post-conflict reconstruction in addition to disaster and climate risk management. She was part of a two-person team that established the World Bank's first unit focused on natural hazard risk management in 1998 (the Disaster Management Facility), and is	marnold@worldbank.org

		credited with facilitating the Bank's recognition of disaster risk reduction as a development priority.	
Michelle Yonetani	Internal Displacement Monitoring Centre, Norwegian Refugee Council	Michelle joined IDMC in late 2010 to develop its work on disaster-induced displacement, bringing over 10 years of operational and policy-oriented humanitarian and development experience, particularly from the Asia and Pacific regions.  Her background in disaster preparedness and response program management, humanitarian advocacy, and organizational and institutional capacity development includes work with communities displaced by conflict and the 2004 Indian Ocean Tsunami disaster in Sri Lanka.  Michelle has a Masters degree in International Policy from the Monterey Institute of International Studies.	michelle.yonetani@idmc.ch
Paula Puskarova	University of Bratislava	Currently Fulbright Post-Doc Scholar at Seton Hall University, NJ, USA - 2013-2014: post-doc position at Vienna University of Economics and Business, Dpt of Economic Geography and Geoinformatics - new to environmental studies, so far focused on growth economics	paula.puskar@gmail.com
Rachel Baker	Princeton University	Rachel's research combines climate and socioeconomic data to investigate how climate affects livelihoods in developing countries. In particular she is interested in how climactic variations affect health and migration in Sub-Saharan Africa. Her research hopes to inform predictions regarding the future impact of climate change in this region. Rachel has an undergraduate degree in physics and a master's in applied mathematics from Cambridge University. She is currently pursuing her PhD in the STEP Program at Princeton University.	racheleb@Princeton.EDU
Raphael Nawrotzki	University of Minnesota,	Raphael J. Nawrotzki holds a PhD in Sociology from the University of Colorado Boulder. Currently, he works as postdoctoral associate for	rnawrotz@umn.edu



	Minnesota Population Center	the University of Minnesota Population Center on the Terra Populus project. His research centers on the relationship between environment and society, with a focus on climate change and migration.	
Robert McLeman	Wilfrid Laurier University	Robert McLeman is Associate Professor of Geography and Environmental Studies at Wilfrid Laurier University. His research and teaching focus on the relationship between humans and the natural environment, and engaging the general public in environmental science. A former diplomat, Dr. McLeman has published extensively on the impacts of climate change on livelihoods and migration patterns.	rmcleman@wlu.ca
Sara Vigil	University of Liège/ FNRS	Sara Vigil is an FNRS Research Fellow at the University of Liège and Erasmus University Rotterdam. Her PhD research focuses on the linkages between climate change, land grabbing, and migration. She conducts fieldwork in Senegal and Cambodia. Sara is a research partner of the EU funded projects MECLEP, EDGE and HELIX, and a lecturer at Sciences Po Paris and Paris 13 University.	sara.vigil@ulg.ac.be
Sonia Plaza	World Bank	Sonia Plaza is a Senior Economist at the World Bank, in its Macroeconomics and Fiscal Management Global Practice. She works in the Global Knowledge Partnership on Migration and Development (KNOMAD). She is the co-chair of the "thematic working group on diaspora" of the KNOMAD initiative. She was a core member of the Africa's Silk Road: China and India's New Economic Frontier She is a co-editor of the book Diaspora for Development in Africa and lead author of the book Leveraging Migration for Africa: Remittances, Skills, and Investments. She advises many universities on transfer of skills and tapping to their diaspora. Her expertise includes migration, remittances, and trade policies.	splaza@worldbank.org
Susan Martin	Georgetown University	Susan Martin is the Donald G. Herzberg Professor of International Migration and serves as the Director of the Institute for the Study of International Migration in the School of Foreign Service at	Susan.Martin.ISIM@georgetown.edu

		<p>Georgetown University. She also serves as the Chair of the Thematic Working Group on Environmental Change and Migration for the KNOMAD project at the World Bank. Previously Dr. Martin served as the Executive Director of the U.S. Commission on Immigration Reform, established by legislation to advise Congress and the President on U.S. immigration and refugee policy. Her most recent book publications include International Migration: Evolving Trends from the Early Twentieth Century to the Present and Migration and Humanitarian Crises: Causes, Consequences and Responses. She is also the author of numerous articles and book chapters on environmental change and human mobility. Dr. Martin received her MA and PhD in the History of American Civilization from the University of Pennsylvania.</p>	
Tomas Bird	Flowminder/University of Southampton	Geo-statistician	tomas.bird@flowminder.org
Valerie Mueller	International Food Policy Research Institute (IFPRI)	<p>Valerie Mueller is a Senior Research Fellow at the International Food Policy Research Institute (IFPRI) in Washington, D.C. She received her Ph.D. from the Department of Agricultural and Resource Economics at the University of Maryland, College Park, and soon after became an Earth Institute Postdoctoral Research Fellow at Columbia University prior to joining IFPRI. Her research largely falls into three main themes: 1) the role of labor mobility in managing climate risk and its associated spillover effects, 2) the impact of migration on the broader structural transformation process, and 3) experiments on mechanisms to improve the delivery of rural services in developing countries.</p>	V.Mueller@cgiar.org

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