



THE WARSAW INTERNATIONAL MECHANISM FOR LOSS AND DAMAGE
ASSOCIATED WITH CLIMATE CHANGE IMPACTS

Synthesizing the state of knowledge to better understand displacement related to slow onset events

Internal Displacement Monitoring Centre (IDMC)

Task Force on Displacement

Activity I.2



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WIM TFD Activity I.2

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I. Introduction

This section introduces the context in which this synthesis was developed, it explains the different concepts of the title of this document, as well as the scope and objectives of this synthesis. It also gives an overview of the different sections of this document.

A. Background

- The 2015 Conference of the Parties (COP) to the UN Framework Convention on Climate Change (UNFCCC), at its twenty-first session (hereinafter referred to as COP 21), requested the Executive Committee of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts (WIM) to establish a Task Force on Displacement, with the mandate « to develop recommendations for integrated approaches to avert, minimize and address displacement related to the adverse impacts of climate change ».ⁱ
- The work plan of the Task Force on Displacement includes the activity I.2 « Synthesizing the state of knowledge to better understand displacement related to slow onset events ».ⁱⁱ The Advisory Group Civil Society Organisations (CSOs)ⁱⁱⁱ is a member of the Task Force on Displacement and is represented by the Norwegian Refugee Council's Internal Displacement Monitoring Center (NRC/IDMC). It is leading the implementation of this activity, in consultation with the reference group, composed of the International Organisation for Migration (IOM), the UN Program for Development (UNDP) and the UN High Commissioner for Refugees (UNHCR). This synthesis further benefited from literature reviews and case studies that were made available by the Hugo Observatory and the University of Neuchâtel, as well as contributions from a broad range of experts working on the issue of slow onset events and displacement.¹

B. Key concepts

- This activity is titled, « synthesizing the state of knowledge to better understand displacement related to slow onset events ». IT is important to understand what stands behind the notion of “displacement related to slow onset events” to further define the scope and objective of this synthesis.
- « Novel climate conditions and unprecedented climate change impacts may occur on a variety of temporal and spatial scales. »^{iv} A distinction is made between “rapid onset” and “slow onset” events. « Slow onset events evolve gradually from incremental changes occurring over many years or from an increased frequency or intensity of recurring events ».^v Slow onset events include « sea level rise, increasing temperatures, ocean acidification, glacial retreat and related impacts, salinization, land and forest degradation, loss of biodiversity and desertification ».^{vi}

¹ See the Acknowledgements for a full list of contributors and reviewers.

- The term “displacement” refers to « situations where people are predominantly forced or obliged to leave their homes or places of habitual residence ».vii “Displacement related to slow onset events” results from the fact that affected persons are exposed to a slow-onset event in a situation where they are too vulnerable, lack the resilience to withstand the impacts of that hazard, and are forced to flee for their survival.viii Displacement related to slow onset events is however complex and multi-causal with the slow onset event being one among many factors of displacement. Such displacement can occur within a country (internal displacement), or across international borders (cross-border displacement).

C. Scope and objectives of the synthesis

- This synthesis focuses on assessing the state of knowledge on displacement related to slow onset events. Rapid onset events and voluntary migration are not the primary focus of this paper, however, the information developed in the following sections will explain in more detail how a clear distinction between migration and displacement is often blurred in the context of slow onset events. Also, slow onset events may in many situations interact or exacerbate rapid onset events.
- The objectives of this report are to:
 - Synthesize information on displacement related to slow onset events
 - Enhance understanding on displacement related to slow onset events.
 - Formulate key opportunities around the main knowledge gaps on displacement related to slow onset events to inform the development of recommendations by the WIM Task Force on displacement

D. Structure of the synthesis

The paper is organized as follows:

- Section I provides an introduction;
- Section II identifies what is displacement related to slow onset event;
- Section III provides an overview how slow onset events contribute to increased risks of displacement;
- Section IV explores how different types of slow onset events contribute to increased risks of displacement;
- Section V informs on the duration, destination and profile of displaced persons in slow onset contexts;
- Section VI looks at the scale of displacement related to slow onset events;
- Section VII explores the state of knowledge on ways to avert minimize and address displacement related to slow onset events;
- Section VIII draws a conclusion;

- Section IX provides preliminary recommendations;
- Section X is the endnotes.

II. Identifying displacement related to slow onset events

- There is high agreement among scientists that, in combination with other factors, « climate change is projected to increase displacement of people ».^{ix,x} Yet, in reality, displacement is the result of a much more complex and multi causal process, slow onset events being an important but not the only contributing factor towards displacement. A multitude of demographic, political, social, economic and other developmental factors also determine to a large extent whether people can withstand the impacts of the hazard or have to leave their homes.^{xi}
- Displacement related to slow-onset events often depends on whether the slow onset event have developed into a disaster situation that leaves affected individuals with no other reasonable option than to leave.^{xii} UNISDR describes disasters as, « a serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts. »^{xiii} As UNISDR notes, « the extent to which a disaster risk is deemed acceptable or tolerable depends on existing social, economic, political, cultural, technical and environmental conditions. »^{xiv} Disasters are therefore the product of hazards and human vulnerability to them. When slow onset events turn into a situation where affected populations cannot cope with its impacts, individuals may be left with no other reasonable option than to leave the slow onset induced disaster.
- However, because of the long term nature of slow onset events, individuals usually have some element of choice about when they move, or in other words, when they perceive that the situation is turning into a disaster that leaves them with no other option than to move.^{xv} The threshold is clear when the slow onset event turns into a disaster induced by a rapid onset (e.g. sudden loss of housing due to flooding induced by sea level rise), but when the disaster is triggered by a serious disruption of livelihood induced by a slow onset event (e.g. food insecurity induced by desertification) the decision to move necessarily implies a subjective perception of the risks associated with the slow onset induced disaster. In such cases, any decision to move would have perceptions of the risks of staying and perceptions of the risks of moving as important variables – for which risk perception is subjective.^{xvi}
- This perception of risk very much depends on pre-existing conditions of the individuals, households and communities.^{xvii,xviii} As mentioned, displacement is the result of the combination of exposure, vulnerability and the intensity of the slow onset event. Communities that have the same level of exposure (due to their specific geographical location in hazard-prone areas and their exposure to hydro-meteorological and geological

hazards and climate change), may have different vulnerabilities specific to their environmental, social, and economic challenges. Vulnerable people have the fewest opportunities to adapt locally or to move away from risk and, when moving, often do so as a last resort.^{xxix}

- Less vulnerable households may either migrate in anticipation to the slow onset event reaching a disaster threshold, or they may also stay if they consider they are able to mitigate losses associated with the disaster (including through adaptation and resilience building), to rebuild in the face of a slow onset event or if they expect any loss to be offset by other locational benefits or because they are able to undertake mitigation strategies.^{xxx} Less vulnerable households may also benefit from remittances from family members working elsewhere. This can induce people in these areas to stay, possibly against their best interests. Without appropriate policy interventions, perverse incentives to stay in place could greatly undermine community health and well-being.^{xxxi} Less vulnerable households that decide not to migrate preemptively of the slow onset induced disaster may then become displaced or trapped if they misperceived their ability to cope with the slow onset induced disaster. However, many of the trapped or immobile populations are people who are unable to move out of areas where their survival may be endangered because they lack the resources to move. In 2016, for example, hundreds of pastoralist families in the severely drought-affected Sanaag region of eastern Somali-land were left behind without the money or means to move away and little left to live on.^{xxxii} Immobile populations further include people that do not want to leave their homes, communities and culture.^{xxxiii} In their risk perception they may value maintaining their social and cultural capital higher than the possible loss in livelihoods and related distress.
- The decision to move and the perception of risk may also take place at the community level rather than the household level. In some cases, the impacts and risks associated with the slow onset event induced disaster have been well documented over years, like in the case of melting permafrost in Alaska or in the case of sea level rise in Fiji where communities have documented over tens of years the impacts of slow onsets on their livelihoods and have a common perception of risks associated with a decision to stay.^{xxxiv} These communities commonly seek support from their government and other external entities to help them relocate in safer areas.
- Finally, most of the literature reminds that environmental factors such as slow onset events are just one input into mobility decisions – and they are usually not the dominant input.^{xxxv} Slow onset events interact with a wide array of other non-linear drivers, which shouldn't be overshadowed. In particular, in the context of slow onset event, due to the long term nature of the event there is time to either mitigate the hazard and/or reduce populations vulnerability to it. Human activities and decisions can therefore play a major role in either mitigating the risks of displacement. Or on the other hand bad decision making may contribute to intensify slow onset events and increase communities vulnerability. For example, the pace and intensity of desertification processes are higher where human

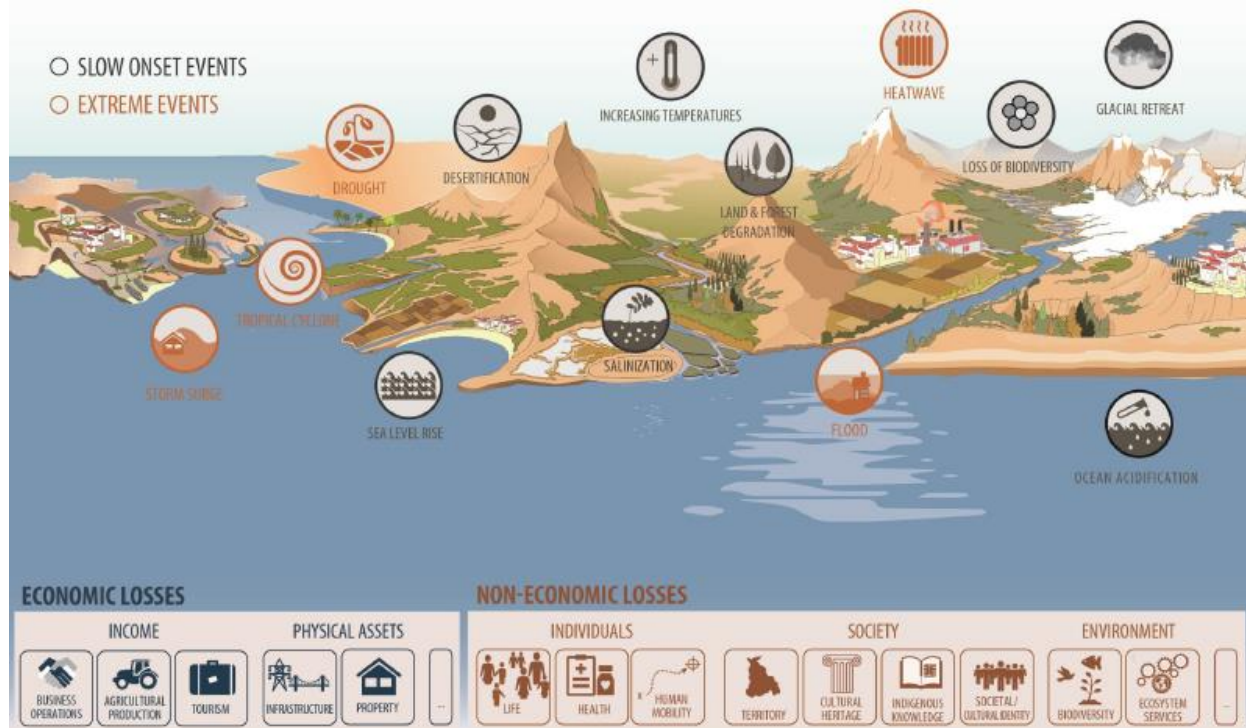
activities such as bush burning removes the protective vegetation cover or when, large hydropower project in river basins, hold and divert water upstream, this creates a prolonged reduction of upstream river discharge and may result in inland movement of the freshwater seawater interface in the deltas and estuaries contributing to the salinization of coastal deltas and riverine estuaries and exacerbating the impacts of sea level rise.^{xxvi}

III. Understanding how slow onset events contribute to increased displacement risks

- The literature identifies four major ways in which slow onset events may turn into disasters and contribute to increase displacement risks.
 1. Slow onset events may contribute to decreased ecosystem services and in particular decreased provisioning services,^{xxvii} including the availability of, and access to basic human needs such as fresh water, food, shelter, and energy production that are vital for human survival. The scarcity of vital resources may in turn lead to a serious disruption of livelihoods. When this disruption of livelihoods overwhelms the community's capacity to cope with the changes, the situation turns into a disaster and risks of displacement are more prominent.^{xxviii} Slow onset events may, for example, in combination with other factors, lead to acute food insecurity as their impacts on food production affect environmentally based livelihoods, be they based on agriculture, pastoralism, horticulture, fisheries or hunter gathering.^{xxix,xxx} Policies, institutions, and the actions of individuals, organisations, and countries strongly influence the extent to which food systems are resilient to climate hazards and adapt to climate change and whether individual households are able to access and afford sufficient nutritious food.^{xxxi} When communities are unable to cope with acute food insecurity, they may become displaced to survive in alternative locations that offer food security. The regions with the highest vulnerability to undernutrition are also areas where yield losses related to climate change are predicted to be relatively high, thus further increasing the vulnerability of these populations to food insecurity.^{xxxii}
 2. Slow onset events may turn into a disaster prompted by a rapid onset event. Many slow onset vents impacts are in fact rapid onset events. For example when sea level rise suddenly turns into flooding, or when desertification turns into wild fires, or when temperature increase turns into heatwaves. When rapid onset overwhelm the population's capacity to withstand their impacts, they may increase risk of displacement. In these context, slow onset events are one of the underlying factor of displacement. It is therefore complex to attribute a disaster to either a rapid or a slow onset event as in many situations the two types of event are intertwined. In the face of rapid onset induced disaster, people may see no other option than to seek assistance elsewhere for their survival, and are therefore displaced.^{xxxiii}

3. Slow onset events may erode community's and ecosystems's capacity to withstand the impacts of slow and rapid onset events, and possibly trigger a cascade of hazards, prompting displacement.^{xxxiv, xxxv} In fact, when livelihoods are not restored or strengthened after a disaster, either induced by a slow or a rapid onset event, subsequent events, even if less severe, can push households over the edge, pushing them more quickly into a situation of acute humanitarian need and resulting in a vicious cycle.^{xxxvi} A slow onset event may therefore turn into a disaster when the population has not yet recovered from a previous rapid onset induced disaster. Likewise, slow onset events may render populations more vulnerable to rapid onset events and contribute to a less intense rapid onset turn into a disaster because of the inability of the population, weakened by the underlying slow onset, to cope with the impacts of the rapid onset.
4. Finally, slow-onset events often are a hidden aggravating factor in many contexts, acting as a threat multiplier for other factors of crisis such as the economic, social, cultural and political factors. Increasingly, these factors become difficult to disentangle one from another, and may culminate in humanitarian crises, creating internal and cross border displacement. Slow-onset events may also create crises through the economic and social impacts of the event.^{xxxvii} Conflicts, for example, are a main responsibility of fragile governance structures and the inability of the State and relevant stakeholders to ensure peace. However, slow onset events, although they are not a direct catalyst for violent conflict, can exacerbate already fragile situations. They can fuel conflict over resource scarcity and are often described as a multiplier or magnifier of pre-existing conflicts.^{xxxviii, xxxix} Wetlands are examples of critical infrastructure that regulate and provide water to society and are of direct relevance to maintain stable, peaceful and inclusive societies that can underpin measures for improving water security as a basis for sustainable development.^{xl} Many areas of growing human insecurity are centred around internationally important wetlands, such as the Inner Niger Delta, lake Chad, the Sudd and the Hawizeh marshes. According to the Fifth Assessment Report of the IPCC, climate change impacts contribute to stresses on community cohesion (e.g. amplified poverty, economic duress) and diminish abilities to diffuse tensions that fuel violent conflict and persecution-related human mobility, especially in fragile states.^{xli} On the other hand, conflict, violence and other polarized societies, political ideologies and social and ethnic divides can further contribute to the disruption of livelihoods.^{xlii} Such disruptions may render populations more vulnerable and further exposed to slow onset events, while accelerating their vulnerability to other more acute political factors.^{xliii}
 - However, these scenarios very much vary and depend on specific contexts, each type of slow onset event comes with its impacts and contributions to livelihood disruption or rapid onset induced disaster and displacement. Looking at different types of slow onset events assist in teasing out specific ways in which slow onset events contribute to increased risks of displacement.

IV. Overview of ways different types of slow onset events contribute to increased risks of displacement



A. Increasing temperatures

- The year 2016 was the warmest on record in all major global surface temperature datasets.^{xliv} Global temperatures continue to be consistent with a warming trend of 0.1 °C to 0.2 °C per decade.^{xlv} Increasing temperatures affect soil moisture through increased evaporation. Drier soil is more susceptible to degradation in the form of desiccation (cracking), nutrient loss and surface soil erosion (wind and rain).^{xlvi} Temperature changes also affect phenology, the timing of biological events like fertilization, blooming and fish spawning changing ecosystems ability to regenerate. These negatively impact crop production and the quality and availability of pasture land for livestock the resilience of populations and of their livestock, leaving them more vulnerable to extreme natural hazards and hence enhancing risks of displacement. Increasing temperatures have been shown to reduce global wheat production by 6% for each 1°C increase and also affect rice yields with each 1°C increase in growing-season minimum temperature in the dry season resulting in a 10% decrease in rice grain yield.^{xlvii} Higher temperatures have been demonstrated rigorously to have a negative impact on crop yields in countries in lower latitudes.^{xlviii} Moreover, agriculture in lower latitudes tends to be more marginal, and more people are food insecure. In the case of the Philippines, it was found that an increase of 1 degree Celsius in the minimum temperature during the growing season

reduced the rice yield by about 10 per cent.^{xlix} In the United States, studies similarly showed that per degree of increase in the mean temperature during the growing season, corn and soybean yields were reduced by 17 per cent.^l The greater the loss of yield potential due to temperature increases, the more difficult adaptation becomes for populations dependent on domestic food supply.

- Significantly higher sea-surface temperatures, as much as 3°C above average in some areas, are implicated in dramatic changes to the physical, chemical and biological state of the marine environment with great impacts on food chains and marine ecosystems, as well as socioeconomically important fisheries.^{li} For example, increasing temperature in the ocean contributes to significant coral bleaching in some tropical waters.^{lii} Fish deaths reported in 2016 in Fiji were associated with coral bleaching.^{liii} Many coastal economies depend on fisheries and on the tourism benefits of coral reefs, and a loss thereof would therefore have substantial economic impacts, reduce marine biodiversity,^{liv} and impact the food security of coastal populations whose livelihoods are based on fisheries, hence increasing risks of displacement.
- Increasing temperatures are often accompanied or may be resulting in frequent heat waves. The evidence is clear that exposure to more frequent and intense heatwaves is increasing, with an estimated 125 million additional vulnerable adults exposed to heatwaves between 2000 and 2016.^{lv} A recent study suggests a link between extreme temperature rise and an increase of the number of asylum applications in the European Union, but conclusive evidence on this type of causality is still lacking.^{lvi}

B. Sea-level rise

- As the oceans warm, they expand, resulting in both global and regional sea-level rise. Globally, sea level has risen by 20 cm since the start of the twentieth century, due mostly to thermal expansion of the oceans and melting of glaciers and ice caps.^{lvii} According to the latest IPCC assessment, global mean sea level is likely to rise between 0.3 and 1 metre by 2100, with a possible rise of up to 2 metres in some areas.^{lviii} Evidence of loss and damage resulting from sea level rise includes salinization of soils and reduced crop yields in cultivated areas; drinking water impairment from salinity intrusion into coastal aquifers; inundation and erosion of coastal ecosystems, including mangroves; loss of fish habitat and reduced fish production, damage to coastal infrastructure, including roads and port facilities; and loss of territory.^{lix}
- Furthermore, the degradation of coastal and marine ecosystems contributes to the removal of protection against storms, tsunamis, typhoons and other sudden onset events, leaving populations more exposed and vulnerable to natural hazards and facing increased risks of displacement. Even with no change in the frequency of storms, a rise in sea level has a substantial effect on the frequency of events that cause flooding.^{lx} In coastal areas, the increased siltation of river deltas from upstream erosion, together with the destruction of

mangroves, reefs and other natural breakwaters, has increased exposure to storm surges and seawater intrusion into coastal aquifers.^{lxi}

- Low-elevation coastal zones (LECZs) – less than 10 metres above sea level – including deltaic regions and small islands, are among the most densely populated regions in the world, especially in South and South-East Asia.^{lxii} There are currently over 220 million people living in the low-elevation coastal zones of the world’s 11 largest river deltas. An OECD report found that about 40 million people are already exposed to flooding in large coastal cities, both in developed and developing countries. The numbers are likely to reach much higher levels by the middle of the century, due to population growth in coastal cities.^{lxiii} If coasts are not protected, sea-level rise may force people to leave affected areas.^{lxiv} Small Island Developing States are often particularly affected due to their low elevation, limited territory and high dependence on natural resources and agriculture for subsistence. As salt-water intrusion threatens food and water security, and regular floods and encroachment of the sea affect towns and villages, entire communities have to consider permanent relocation to larger islands.^{lxv} With surrounding sea levels rising, it has been predicted that Kiribati will become uninhabitable in 30–60 years.^{lxvi}

C. Ocean acidification

- Ocean acidification refers to changes in ocean chemistry that have occurred as a result of the ocean absorption of carbon dioxide emissions. Ocean acidification could have major negative impacts on marine ecosystems for centuries if emissions continue.^{lxvii} Many of these species show reduced growth and/or health under conditions of ocean acidification.^{lxviii} Many coastal communities are traditionally dependent on the fisheries sector for subsistence and as a key source of income and survival. Tropical reefs support an estimated 25 per cent of marine fish species and provide food and livelihood security for some 500 million people worldwide.^{lxix} The loss of shell-forming species, coral reefs and reef-dependent fisheries affects food security, trade and tourism. The livelihoods and food security of many communities are likely to be highly affected, in particular for those with less access to income diversification and food security options.^{lxx} In such cases, they may be more vulnerable to displacement risks.

D. Salinization

- Increasing evaporation from rising temperatures contributes to the salinization of soil and water. Salts accumulate in the soils of arid environments. Saline soils contain large amounts of water-soluble salts that inhibit seed germination and plant growth, thereby reducing crop yields. Saltwater intrusion into coastal aquifers occurs when groundwater withdrawal exceeds the recharge rate. The recharge rate declines as the precipitation decreases and higher temperatures increase evaporation. Salt-water intrusion also occurs as a result of sea level rise and when storm surges cause flooding of land by salt water.^{lxxi} This phenomenon can be further exacerbated by human intervention. In low-lying coastal areas and islands, water and soil salinization increasingly undermines arable land and fresh water, affecting

food and water security for populations whose livelihoods are environmentally dependent, leaving them more vulnerable to displacement risks.^{lxxii}

E. Glacial retreat and melt of other cryosphere elements

- The major cryosphere elements include sea ice, glaciers and ice sheets and snow cover. Glacial retreat and melt of major cryosphere elements is caused by global rising temperatures and pollution. In the short to medium term, glacial melt in mountain regions can result in increased risk of glacial-lake outburst flooding. In the long term, this can lead to decreased river flow levels.^{lxxiii} This impacts food, water and energy security for users in mountain and lowland areas, and is already affecting Andes in Peru and Bolivia. In high latitudes, permafrost is melting due to temperature increases.^{lxxiv} Polar regions are heavily impacted by permafrost melt leading to subsidence and coastal erosion. Indigenous populations in these regions – while small in absolute terms – are heavily impacted. Some 73 per cent of the global mountain population lives in rural conditions and their livelihood is highly dependent on natural resources.^{lxxv} In general, livelihood options are restricted to agriculture, including livestock farming, or daily wage labour. There is evidence that, over 1970–2010, there was considerable migration and displacement from mountains at a global level, and especially in Asia.^{lxxvi}

F. Land, wetland and forest degradation

- Land, wetland and forest degradation results from a number of interacting climatic processes and human activities. In many cases, climate change is exacerbating existing degradation processes with extreme weather events such as droughts and floods, and furthermore degraded lands and forests that become less resilient to rapid onset events. During periods of limited rainfall, soils dry out and heavier rainfall results in increasing flooding, erosion and loss of soil nutrients.^{lxxvii} In drylands and mountain regions, climate change increases the susceptibility of land to degradation through reduced or erratic rainfall and higher temperatures. Deforestation disrupts watershed processes, including the infiltration of precipitation into soils. Land and forest degradation severely affects crop and livestock production systems. The Food and Agriculture Organization estimates that one quarter of the world’s agricultural land is highly degraded, some irreversibly.^{lxxviii} In Africa, up to two thirds of productive land area is affected by land degradation.^{lxxix} Climate change and worsening land quality could see crop yields halve in some regions by 2050.^{lxxx} Increasing demand for food has led to the rapid expansion and unsustainable management of crop and grazing lands, which are key factors in worsening land quality. Land and forest degradation can also impact human settlements directly (for example, in the form of deforestation around urban areas, leading to increased risk of flooding and subsidence), which then increases risks of displacement.^{lxxxi, lxxxii} Located at the interface of land and water, wetlands are crucial in maintaining the water cycle that underpins sustainable development. Through their wide-ranging ecosystem services, healthy wetlands can reduce disaster and

displacement risk by providing water and food security, the building blocks of society resilience, and by acting as protective barriers, mitigating storm surges and accommodating flood flows. The hydrological functions of wetlands like (mountain) lakes, swamps and floodplains enable the delay, capture and regulation of water flows (including peak flood flows), reducing the impacts of floods and droughts. Further, in providing food, fodder, fibre and construction materials, which are crucial for post-disaster recovery, wetlands can support communities after disaster strikes, mitigating displacement.

G. Loss of biodiversity

- Slow onset climatic processes, such as increasing air and water temperatures and altered precipitation patterns, are affecting the structure, composition and functions of ecosystems, resulting in loss of biodiversity and reductions in the ecosystem services^{lxxxiii} that support human well-being.^{lxxxiv} Ecosystem services generate substantial savings through “avoided costs”. An example from Sri Lanka indicates that a coastal wetland may provide an economic value of USD 1,907 per hectare per year in reduced flood risks.^{lxxxv} Marine and terrestrial biodiversity have declined by 39% since 1970. Temperature increases will potentially increase rates of extinction for many habitats and species. The IPCC estimated that, on average, 20 to 30 per cent of the species assessed are likely to be at an increasingly high risk of extinction due to climate change impacts as global mean temperatures exceed 2 °C to 3 °C relative to pre-industrial levels.^{lxxxvi} Disruption of ecological services may lead to serious disruption of livelihoods, in particular for populations whose livelihoods are highly dependent on the environment. This may leave them more vulnerable and exposed to displacement risks.

H. Desertification

- The United Nations Convention to Combat Desertification (UNCCD) defines desertification as land degradation in arid, semi-arid and dry sub-humid areas (drylands). Processes that contribute to desertification include: alterations in temperature and precipitation patterns; soil erosion caused by wind and/or water; the deterioration of soil properties; and the long-term loss of natural vegetation.^{lxxxvii} Climate change exacerbates desertification through the alteration of spatial and temporal patterns in temperature, rainfall, solar radiation and winds. Increasing temperatures affect soil properties and processes, including organic matter decomposition, leaching, and soil water regimes.^{lxxxviii} Drier soil is more susceptible to erosion, desiccation, nutrient loss and the corresponding impacts on crop production and the quality and availability of pasture for livestock.^{lxxxix} Drylands cover over 40 per cent of the earth’s land surface and are home to over 2 billion people.^{xc} Although significant areas of high-income countries are in drylands, including in North America, southern Europe and Australia, they dominate many of the world’s poorest countries, including in Africa and Central Asia. One estimate places 90 per cent of dryland populations in low-income

countries.^{xcii} Drylands often experience lower government investment.^{xcii} Rural people overwhelmingly perceive climatic change impacts in the form of rainfall variability.^{xciii}

- The cascading impacts of desertification include loss of livelihoods and the displacement of populations from highly degraded ecosystem zones to new areas. Severe drought events, which can last for months, and be repeated can lead to livelihoods unviable in the long term. Farmers depending on rain-fed agriculture, with no access to irrigation or water storage, or to alternative and more sustainable farming methods, are particularly vulnerable to such climatic shocks. Those who do not own the land on which they live and work may be exposed to eviction, as land loses productivity, or owners decide to switch to mechanized agriculture. There are many well-known cases of mass population departures in the context of repetitive drought, in particular in Africa (Sahel, Ethiopia),^{xciv} but also in South America (Argentina, Brazil, Mexico),^{xcv} in Central Asia and in Southern Asia.^{xcvi} These kinds of impacts often have political ramifications and conflict implications.^{xcvii} Pastoralists are also heavily affected by droughts, which can jeopardize their traditional routes and gradually undermine their traditional nomadic lifestyle.^{xcviii}

V. Duration, destination and profile of displaced persons in the context of slow onset event

- Duration and destination of displacement related to slow onset events vary depending on whether the movement is characterized as migration or displacement.
- Seasonal and temporary migration is widely used as a coping strategy during the early stages of slow process degradation, until a certain threshold is reached in terms of impact on local livelihoods or settlement habitability. Rural-urban movements to nearby towns or to major cities further away (often the capital) are more typical in the context of migration than displacement, with migrants moving to urban centres in search of alternative, usually low-skilled jobs or education for some better-off households.^{xcix} This form of migration is usually limited to one or certain members of the household, engaged in temporary movement, preserving a connection with their community of origin and their land, including through sending remittances.^c Despite the skills constraints and competition for employment vacancies, urban areas offer a relatively flexible and diverse context in which income can be obtained and the risk of food insecurity mitigated.^{ci} Many urban and peri-urban areas will need to prepare for an influx of people, including through improved housing and transportation infrastructure, social services, and employment opportunities. For example, studies have found links between reduced rainfall and increased rural-urban migration in sub-Saharan Africa.^{cii} In southwest Bangladesh, many Bangladeshis living in the Brahmaputra (Jamuna) River delta left their families in search of employment in Dhaka or abroad as a part of their household strategy because the land can no longer support the entire family, partly

because of sea-level rise increasing both land salinization and water deficits, also seen in the Pacific Islands.^{ciii,civ}

- Seasonal migration can also take the form of rural to rural movements. People might seek work in other rural areas during quieter parts of the agricultural year, and then return when more work is available.^{cv} In many countries rural to rural mobility is commonly used by poorer households as a coping strategy on a seasonal basis. Timing of movements is often linked to agricultural cycles, with people moving during the “slack season” at home (often the dry or flood season). They move to nearby regions with more favourable conditions, for example for agricultural, herding or fishing activities.^{cvi} A study highlighted that people affected in the northwest region of Bangladesh, in the context of acute seasonal drought, engage in short distance rural to rural seasonal migration.^{cvi} This kind of migration is also part of long term traditions and form the cultural capital of some pastoralist communities and some ethnic groups like the Fulani in Mali or the Turkana in North Kenya.^{cviii}
- After a threshold is reached in terms of impact on local livelihoods or settlement habitability, protracted and permanent outward displacement is more likely.^{cix} Such movement is only taken as a measure of last resort and only after all efforts to adapt to the changing conditions had been exhausted.^{cx} Displacement is often gradual, localized and internal before it becomes cross border displacement.^{cxii,cxiii} They use (usually) internal displacement as a survival strategy in an overall setting of erosive coping measures which leave or trap such households at the margins of decent existence.^{cxiii} In terms of the displacement destination, the routes chosen and places sought are usually not arbitrary, but instead can be based on following the crowd, previous experience, kinship, word of mouth, using standard transportation routes or obeying directions from governments or external organizations – often with a significant emphasis on where previous displaced persons have ended up or are perceived to have settled.^{cxiv} Displaced persons often are the poorest households and may have no choice but to settle in environmentally hazardous areas, because these are the only places available to them. They have the least access to options to move to urban areas, few or no livelihood diversification opportunities, no land, little education, and most often move to other rural areas. When they move to urban destination in the context of slow onset events it's often to seek assistance. In this context they are generally forced to settle in peripheral areas, or informal settlements like slums, which are the most exposed to environmental risk (such as flooding, landslides).^{cxv}
- Cross border permanent movement is often made by those with assets and transferable skills, a choice to migrate as a coping strategy before their livelihoods completely fail and for longer periods of time.^{cxvi,cxvii} Indeed, long-distance moves are expensive and often require support through networks. Cross-border migration is most likely to be to neighbouring countries, particularly when diaspora/migrant support networks are present, and where economic incentives are significant (especially availability of jobs).^{cxviii} As such, cross border migration is usually beyond the means of the poorest who tend to be the most vulnerable to environmental change. Nonetheless, examples exist of significant cross-border displacement

from countries experiencing severe slow onset events.^{cxix} Cross border displacement can also be the result of protracted internal displacement related to slow onset events and combined with other factors such as conflict and/or famine for example, in particular when assistance and protection was not provided in the country of origin. Most cross-border disaster-displacement, including those related to slow onset events, takes place within regions.^{cxx} Adopting a regional approach to the issue of cross border displacement related to slow onset event is crucial. The perception of borders is very specific in some regions, such as West Africa, where borders are porous and seasonal cross border movement more likely for pastoralists looking for water and pasture for livestock. In Western Sahelian countries, an overall Southern movement towards coastal and greener countries can be observed. In the Horn of Africa/East Africa, movements of pastoralist groups across borders have long formed part of livelihood strategies in response to environmental cycles. Therefore, the meaning of border-crossing takes different dimensions, according to the context. There is also the possibility that slow onset events, when they result in rarefaction of water and pasture, reduce the ability of pastoralists to undertake long-distance, cross-border movements which have until now been important to livelihood security in some regions.^{cxxi} In the Pacific, such as the case of low-lying island States threatened by sea-level rise, international displacement may become an imperative. Sea-level rise is likely to lead to permanent movements once certain thresholds are reached, which is often well before actual inundation but related to other impacts such as salinization of groundwater and agricultural land. Finally, in this increasingly globalized and connected world, the location of the climate-related slow onset events and the location of the displacement do not necessarily need to coincide.

- People displaced in the context of slow onset events often express a deep desire to return and often do return when conditions improve. In the absence of improved resilience in both the ecosystems and social systems to slow onset events, returnees may continue to be at a high risk of repeated crises and recurrent displacement. Returns should respect the principle of non-refoulement, ensure sustainability and guard against further cycles of displacement, keep affected persons informed and allow for their participation.^{cxixii} However slow onset events' impacts are increasingly undermining the ability of the displaced persons to safely and sustainably return as the conditions which led to displacement cannot be quickly improved as can be the case with rapid onset events.^{cxixiii} Slow or inefficient recovery and reconstruction efforts from slow onset events, often hindered by the challenge of finding alternative relocation sites, resolving land tenure issues, or financing construction with higher building standards to withstand future slow onsets, can delay return for months or years, potentially leaving displaced persons in temporary or transitional shelter for years. International support for recovery and reconstruction allowing disaster displaced persons to find lasting solutions is often insufficient or ineffective due to significant conceptual, operational and institutional differences in the respective approaches between humanitarian and development actors and their respective funding mechanisms and modalities. As a result, case studies and anecdotal evidence suggests that millions remain displaced for prolonged

periods of times that go on for years to decades rather than days to months before they are able to return in their former homes or settle elsewhere.^{cxxiv} In addition, when slow onset event impacts become irreversible, such as in the case of sea-level rise or desertification where soils are degraded beyond a certain point, movements are more likely to be permanent and involve the whole household.^{cxxv} In these circumstances the movement may be permanent rather than temporary. An important study in Indonesia established a clear link between slow onset process degradation and autonomous, permanent, whole-household displacement, with long-term temperature rise (and to a lesser extent reduced rainfall) leading to an increase in this form of movement to other provinces.^{cxxvi} This type of displacement can have major impacts on the community left behind, for example in terms of social cohesion or lack of manpower needed for harvests.

- When return is not possible, literature recognizes that the impacts of slow onset events on depletion of basic resources such as food and fresh water render integration of displaced persons in host community fragile with risks of tensions between displaced persons and host communities over scarce resources. Local governance models generally face challenges to ensure the inclusion of disaster displaced persons in community service delivery schemes.^{cxxvii} It is also often difficult to successfully restart and provide support for the development of diversified livelihood opportunities as quickly as possible to support self-reliance. Rights abuses can reduce displaced persons ability to work and live a dignified life in their new communities, reducing their ability to contribute to their new, host community. The success of integration will often be context specific. The more frequent incidence and longer duration of the slow onset event, the greater the challenges for sending and receiving communities, particularly where local infrastructure, employment and social services are already stretched.^{cxxviii} Displacement in and to areas with strong tribal and ethnic zonation may for example cause additional ethnic-related issues.
- Risks of displacement are greatest for populations that are both exposed and vulnerable to slow onset events, especially in combination with other factors that create unfavourable living conditions. The most exposed population to slow onset events include those who live in most exposed areas such as drylands, mountain regions, low-elevation coastal zones, tropical rainforests and polar regions and who live in locations where degraded ecosystems that lack the resilience (and hence buffer function) to mitigate negative impacts of the slow onset events.^{cxxix} The populations most at risk of being displaced in the context of slow onset events are those whose livelihoods rely strongly on natural resources and weather patterns – particularly farmers, herders, pastoralists, fishermen, indigenous populations and others, those who lack resources to migrate voluntarily, those already affected by other crisis (such as conflict), those already displaced, groups facing heightened levels of vulnerability such as women, children, the elderly, indigenous peoples, those who live in poverty, in poorly constructed housing and infrastructure, and those who have limited financial, technical and institutional capacity to prepare, recover or adapt.^{cxxx}

- While migrants in the context of slow onset events are predominantly male, but with growing participation by women, displaced persons in the context of slow onset events are most often entire households since displacement is a survival strategy of last resort. Whether displaced persons and migrants move as individual or entire households also depends on specific culture.^{cxxxix,cxxxii}

VI. Overview of the scale of displacement related to slow onset events

- Most of the data available on disaster displacement relates to disasters triggered by rapid onset events. There is a lack of data for displacement related to slow onset events. The multi-causality of displacement makes the selection of indicators and variables difficult and disparate. The different forms of movements induced by slow onset events as well as the long term duration of population movements induced by slow onset events make the data collection even more challenging. Finally the lack of data sources hinders consistent analysis of displacement related to slow onset events data.

A. Diversifying sources of data collection

- A major constraint is the availability and accessibility of data and the geographic level of representation of data sources. Though displacement data are generally available in some censuses, it is rare that slow onset events are clearly identified as a key driver for displacement. A possible reason for censuses seldom investigating slow onset events as potential drivers for displacement could be that the institutions and agencies responsible for census data collection are not yet fully aware of the importance of this issue in policy discourse.^{cxxxiii} Authors have suggested the use of population censuses relying on base-area information and focusing on flows of displaced person from areas affected by slow onset events.^{cxxxiv}
- Researcher may further lack the resources to collect relevant data. Universities from the Global South, and from West Africa in particular, are often ill-equipped to collect data on displacement related to slow-onset events. The international conference on the State of Research on Environmental Migration in West Africa, organised in Ouagadougou on 7-9 February 2018, was a significant milestone in the direction of better support to research efforts in these universities, as it established a regional network of local researchers working on these issues. Future data collection efforts could build upon this network.
- Data can also come from innovative sources such as drones pictures, data generated by mobile networks' customers, mobile applications (e.g., Ushahidi, IOM MigApp). In all of these efforts, the privacy of personal data needs to be protected.
- Where data are available and quantitative analyses are completed, they are often imbued with challengeable assumptions.

B. Quantification and projections on displacement related to slow onset events

- Models that attempt to forecast human displacement depend on a variety of assumptions, including the physical science of the climate system which is rapidly evolving, the effect of a changing climate on hazards, food and water security and other ecosystem services upon which humans depend, how these climate change-related hazards and effects will impact people, how well people adapt to these hazards and effects, and the decisions that people take about movement and their ability to manifest these decisions.^{cxxxv} In 2007, for example, the Stern review noted that « greater resource scarcity, desertification, risks of droughts and floods, and rising sea levels could drive many millions of people to migrate ».^{cxxxvi} More recently, the Lancet Countdown indicator reported that « climate change is the sole contributing factor for at least 4400 people who are already being forced to migrate, worldwide and that the total number of people vulnerable to migration might increase to 1 billion by the end of the century without significant further action on climate change ».^{cxxxvii} There is much vagueness surrounding the concepts employed, the underlying mechanisms involved, the number of persons affected and the geographical ones concerned. Slow onset events are often not isolated from other climate change impacts and it is not clear what type of movement (forced or voluntary or a mix) these estimates referred to. Estimates may instead just be indicative of the number of people who are likely to be at risk from adverse impacts of climate change, rather than those who are likely to migrate. Most of these estimates also fail to take into account the non-linear (and non-gradual) interactions of different factors leading to displacement, despite the widespread recognition of non-linear outcomes in such social phenomena.^{cxxxviii}
- A number of studies have also attempted to calculate the numbers of displacement by projecting slow onset events impacts on an exposed population. The NASA Earth Science Division, for example, is using computer simulation to estimate number of people that could be displaced by the impacts of sea level rise, based on 23 years of sea level data.^{cxxxix} From 2100 and beyond, without mitigation and adaptation interventions, more than 1 billion people might need to migrate because of sea level rise caused by any ice sheet collapse.^{cxl} These studies generally assume that displacement out of areas affected by slow onset events are one-way and permanent.^{cxli} This assumption doesn't reflect the polymorphous and gradual nature of movement related to slow onset events (seasonal, cyclical, temporary, prolonged, permanent).
- A recent report from the World Bank aims to address this data gap. It's focusing on slow onset events, internal displacement and development in Sub-Saharan Africa, South Asia, and Latin America. The model applies demographic, socioeconomic, and slow onset events impact data at a 14-square kilometer grid cell level to model likely shifts in population within countries. To address the uncertainties of analyzing displacement over the next 30 years, the report considers three potential climate and development scenarios. In the worst-case or "pessimistic" scenario, the number of internally displaced persons could reach more than 143 million (around 86 million in Sub-Saharan Africa, 40 million in South Asia, and 17 million

in Latin America) by 2050.^{cxlii} Internal displacement will intensify over the next several decades and could accelerate after 2050 under the pessimistic scenario due to stronger climate impacts combined with steep population growth in many regions.^{cxliii}

- Other models exist that tend to take into account complex combinations of both natural and human factors that intertwine to influence the risk of future displacement. Climate Interactive and IDMC’s model on Pastoralist Livelihood and Displacement for example incorporates available historical data on a large number of climatic, environmental and human factors, and facilitates the projection of displacement under different climate, environmental and demographic change scenarios, and future humanitarian, development and adaptation policies or interventions.^{cxliv} The model was developed in 2014 and was used to monitor the displacement of pastoralists in the Horn of Africa during the 2010 to 2011 drought, as well as to collect data on slow-onset hazards in 2015 and 2016. The Rainfalls Agent-Based Migration Model (RABMM) is another example.^{cxlv} It uses the Rainfalls survey data to represent the level of vulnerability of households to rainfall variability-induced changes in livelihood and food security, and their subsequent impact on the migration and displacement of households members. On the basis of the livelihood and food security systems modeled, each households determines its resilience each month using attributes such as income, food production, family size, and the migration and displacement of household members. Changes in rainfall over time affect these attributes and therefore adjust each households’ degree of resilience and their propensity towards migration and displacement.
- New approaches will be necessary to more accurately estimate the number of people displaced in the context of slow onset events and to capture situations where slow onset events has an important contributory role alongside other social and economic considerations.^{cxlvi} It would be important to take into account not just the future impacts of slow onset events on displacement, but also current and past slow onset events. However, the time dimension is often lacking in current datasets, so that it is impossible to assess the evolution of environmental conditions and displacement movements associated thereof over time.

C. Data collection methodology, selection of indicators and variables

- Due to the time lag between the event, the mobility gradual response and the multiple interlocking factor of slow onset-related displacement, accurate data collection and global quantitative projections are difficult to make.^{cxlvii} This poses a number of challenges, not just in the collection of data but in methodology for integrating and analyzing the data, including in their selection of the indicators and which variable is chosen for analysis.
- When trying to determine the role that slow onset events play in a decision to move, it might be challenging for the displaced person or researchers to extract that from other factors. Some displaced people may name the slow onset event as the primary cause for their displacement in response to surveys, but most often, displaced persons refer to loss of

livelihoods, food security, or conflict as the more immediate reason why they were forced to leave. While the drivers of displacement in these contexts are clearly multiple and complex, some data collection tools attempt to isolate slow onset event as a driver of displacement. For example, in the horn of Africa, the UNHCR-led Protection Monitoring and Reporting Network and IOM use a “drought” or “drought-related or “lack of livelihood” category for the purpose of recording displacement data.^{cxlviii} This short-hand appears to be used to refer to people whose proximate reasons for leaving their homes are related to severe food and livelihood insecurity linked to pasture, water and food shortages, as opposed to those labelled as being displaced by conflict or violence, even where conflict may be an underlying or contributing factor.^{cxlix} Decoupling them, or even indicating the dominant factor(s), is not necessarily easy or non-contentious for displaced persons or researchers. When being interviewed, the displaced person might have an incentive to play up or to play down any climate or environmental factors.^{cl} That might be based on the interviewees’ trust (or lack thereof) of the interviewer or the interviewees’ expectations of what the interviewer is trying to glean from the interview. There might also be legal benefits for claiming refugee status, irrespective of the influence of the slow onset event on the displacement.^{cli} Given the truism that displacement is complex, it will not always be feasible to collect robust, verifiable data that indicate lucidly the slow onset component in decisions to move.

- These situations challenge the artificial distinctions that have been made in the past when disaggregating displacement figures by “cause” whether it be conflict, disasters linked to natural hazards or development projects.^{clii} Focusing on a single cause may distort and oversimplify the context and, without further analysis, may hamper the identification of appropriate solutions. Complex combinations of both natural and human factors that intertwine to influence the risk of future displacement call for a more holistic interpretation that includes not only triggers, but also the latent and structural factors that determine how exposed and vulnerable people are to hazards in the first place.^{cliii}
- Data further speaks to the variety of movements induced by slow onset event such as displacement as well as other more voluntary forms of population movement or migration.^{cliv} Given the drought conditions that affected hundreds of millions of people in Asia and Africa in 2016, IDMC made a concerted effort to collect quantitative data on the displacement associated with them. Some figures were obtained from Cambodia, Ethiopia, India, Mozambique, Somalia and South Sudan, but they hardly paint a complete or coherent picture. In India, population movements associated with the impacts of drought are recorded as part of broader seasonal and labour migration. This makes it difficult to identify people in distress whose movements might be better described as displacement. In Mozambique, Ethiopia, Somalia and South Sudan, displacement was reported in areas where people’s vulnerability was strongly linked to conflict and violence as well as the impacts of drought.^{clv}

VII. State of knowledge on ways to avert, minimize and address displacement related to slow onset events

The extent and severity of displacement will depend on the ability of governments and communities to effectively prepare for slow onset events and to respond to peoples' needs in times of crisis. Both slow onsets and rapid onsets must often be addressed simultaneously, since they interact in many places. This section explores the current state of knowledge and outlines the potential for filling the knowledge gaps on ways to avert minimize and address displacement related to slow onset events.

A. Averting and minimizing displacement related to slow onset events

- As mentioned above, displacement results from the fact that affected persons are exposed to a slow-onset in a situation where they are too vulnerable and lack the resilience to withstand the impacts of the slow onset.^{clvi} While mitigation actions are important to reduce the intensity and frequency of slow onset events, reducing exposure and vulnerability is essential to reduce risks of displacement.
- Systematic observation and early warning systems have become more sophisticated and increasingly accurate at forecasting weather, rainfall, and other related factors that indicate slow onset events. They help identify most exposed areas and households at risk of being displaced through integrating demographic information and vulnerability assessments into climate change hazard risk mapping as well as identifying socio-economic or other factors (e.g., lack of secure land tenure) that contribute to displacement risk. They can support the development of models that contribute to anticipating the impacts of slow onset events on land and populations, such as accretion and erosion rates relative to the local rate of sea level rise for example. However, most of these systematic observation and early warning systems are most often only looking at two types of slow onset events, desertification or sea level rise. Full implementation of the Sendai Framework for Disaster Risk Reduction should contribute to address this gap as the framework provides for the monitoring of disasters, including those linked to slow-onsets, at local and national level, involving national statistics ministries.^{clvii} When robust early warnings systems are in place, it is important that governments and/or the international community respond promptly and with sufficient resources to them to avoid slow onset event to escalate in forced displacement.
- Supporting programs aimed at building the resilience of vulnerable communities whose livelihoods are highly sensitive to slow onset events, including through climate change adaptation, disaster risk reduction and development plans, contribute to develop livelihood opportunities, decrease vulnerability to slow onset events and related disasters and diminish displacement risks. This can support people to adapt locally or “stay in place” in areas most exposed to slow onset events. Averting displacement requires extensive skills and capacities across the whole of society, including vulnerable communities should be part of the

solutions. Research findings suggest that the affected communities are aware of wide range of traditional and innovative adaptation strategies to enable them to remain in their areas of origin. In consultation with community members, special effort should be undertaken to educate and empower communities, in particular women and other groups, who due to cultural and societal norms would not otherwise engage in community discussions nor participate in surveys or interviews. It is therefore essential that processes and safeguards are in place for community participation in decision making.^{clviii} Participative projects with local populations can be set up in order to build upon local knowledge. Such participative projects can also allow for mutual learning.^{clix} Components of successful local adaptation strategies to slow onset events include: diversifying income generating activities; building more responsive financial protection systems and social protection programs for vulnerable groups. Poverty reduction and social protection programs targeted at rural areas and sharing of technologies across countries can further help to increase adaptive capacity to climate change, potentially reducing the need for people to move under distress. Fundamental capacity constraints that need to be addressed include: weaknesses in the enabling environment for climate change adaptation and disaster risk reduction at national, sub-national, and sector levels; difficulty and limited access to adaptation financing; and limited human and institutional capacities that hamper the effective use of available financing.

- Determination and implementation of measures to reduce exposure of a particular area will further help to reduce their communities vulnerability. Measures very much depend on specific context and types of slow onset this area is exposed to. Often relevant measures in one sector will involve a strengthening of the policy that already exists, emphasizing the importance of including long term climate change considerations along with existing local coping mechanisms and integrating them into national development plans. Improving land, water and natural resources management can help to avoid unintended consequences from slow onset events. Understanding the roles of ecosystems in reducing consequences of these slow on-setting events and hence managing and restoring these natural functions forms a way of reducing the exposure to these events in the first place. These measures are often cross sectoral and can include science, research and development and technological innovations such as the development of drought-resistant crop varieties or new technologies to combat saltwater intrusion, improved water management, improved food security through crop diversification, improving livestock and fisheries breeding and farming techniques, developing local food banks for people and livestock, and improving local food preservation, better land use planning and management through erosion control and soil conservation measures, agroforestry and forestry techniques, finding alternative energy sources, as well as better urban planning; investing in climate-smart infrastructures; coastal zone management including coral monitoring and restoration and improving coastal defences through afforestation, reforestation, set-back areas and vegetation buffers, etc.^{clx} Sustainable water management and natural resource management such as safeguarding critical wetland infrastructure as part of integrated disaster risk management, resilience-

building, and adaptation strategies, for example, can better support communities and households to stay in place and avert and minimize displacement. The above mentioned measures would benefit from planning and implementation at the regional level in addition to the local and national level to address regional slow onset events and ensure a more harmonized preparedness and response at the regional level.

B. Migration with dignity as a positive adaptation strategy

- When living conditions deteriorate, individuals and households that are able to do so, commonly use migration to seek opportunities within their country or abroad to cope with the impacts of slow onset events. Pastoralists for example use migration as a traditional coping method to access water and grazing land in times of environmental stress.^{clxi} Evidence in South Asia, the Sahel, the Pacific Islands and Central America, describes, for example, how cross-border movement serves a critical adaptive function for those facing drought and desertification in the Sahel,^{clxii} and how such movement is also an important adaptive response in Pacific Islands States at risk from rising sea-levels and the increasing frequency and intensity of extreme weather events.^{clxiii,clxiv} Where the limits of local adaptation are anticipated, well-planned migration to more viable areas can indeed be a successful strategy. Managed properly, migration has the potential to support affected communities to better cope with slow onset events. Positive impacts of migration are not just for the migrant her/himself, but also for the communities of origin and of destination. In fact, evidence indicates that migration could successfully reduce vulnerability by providing greater employment and education opportunities for those who migrate, while supporting/easing pressure on households back home, including through remittances and the transfer of knowledge and skills upon their return.^{clxv} Migration can create positive momentum in destination areas such as urban areas which can benefit from agglomeration and economies of scale.^{clxvi}
- Whether or not migration is able to effectively reduce vulnerabilities often depends on a few variables. Households with more diverse assets and access to a variety of adaptation, livelihood diversification, or risk management options, through social networks, community or government support programmes, and education, can use migration in ways that enhance resilience.^{clxvii} The availability of safe migration pathways and social safety networks is also essential to avoid that the migrants find themselves in vulnerable in transit situations.^{clxviii} In the absence of legal opportunities to immigrate, at least some portion of those who lose their livelihoods as a result of climate change and other environmental hazards will likely become irregular migrants.^{clxix} Migration is more likely to be available to, and serve as a positive coping mechanism among, wealthier households. Slow-onset hazards may afford people more time to build their social networks and financial assets in a manner that allows more choice on how and where they migrate.^{clxx}

- However, migration carries serious risks for the respect of human rights of the migrants and is more likely to be an ineffective coping strategy for poor, rural households that have fewer resources and social safety nets, and can end up increasing vulnerability not only for those who move by leaving them more vulnerable to exploitation and abuse, but also for those left back home.^{clxxi} Migration has potentially severe impacts on mental and physical health, both directly and by disrupting essential health and social services. To ensure migration is a positive strategy that can benefit people exposed to slow onset events including those that are the most vulnerable and avoid forced displacement, governments can support their population to migrate by creating the conditions for safe, dignified and positive migration. They need to put in place a strong enabling environment for migration supported by direct incentives, such as skills training and job creation programs, establishing safe, dignified, and voluntary migration channels, and supporting the migration planning. For example, Kiribati's migration strategy is based around equipping Kiribati nationals with the skills needed to find work and settle abroad autonomously.^{clxxii} The policy is clearly designed as a long-term strategy to avoid forced displacement of populations at a later date in the context of climate change. Strategies supporting migration need to safeguard not only the resilience of those moving, but also of those in sending and receiving communities.^{clxxiii} Providing education on land issues would also be important to minimize the risk of tensions between migrants and destination communities
- From a national perspective, migration of people can be a possible way to overcome the fact that slow onset events erode the country's carrying capacity to sustain a vibrant economy. Particularly in the case of subsistence-based or agricultural production based economies having strong dependencies on the natural resources availability (including water) and healthy ecosystems. For governments where the resources and capacities are lacking to organize a transition toward a more climate-resilient economy, encouraging and supporting a positive migration can form an immediate solution.

C. Planned relocation

- Planned relocation is considered in the literature as an option to avoid forced displacement in the context of slow onset events. Planned Relocation is defined as: « a planned process in which persons or groups of persons move or are assisted to move away from their homes or places of temporary residence, are settled in a new location, and provided with the conditions for rebuilding their lives. Planned Relocation is carried out under the authority of the State, takes place within national borders, and is undertaken to protect people from risks and impacts related to slow onset events, including the effects of climate change. Such Planned Relocation may be carried out at the individual, household, and/or community levels. »^{clxxiv}
- However relocation of communities carries serious risks for human rights of affected populations and some governments may abuse relocation to facilitate development projects

or for political purposes.^{clxxv} Because of the many potential negative effects associated with the process, research strongly suggests that relocation in the context of natural hazards and environmental degradation should take place only as a last resort after all other options have failed and community resilience has significantly eroded.^{clxxvi}

- When relocation is planned for and implemented in a way that fully respects human rights of affected communities, it can be considered a useful tool to protect many of the most vulnerable to slow onset events that are or will be unable to move, before they are forced to be displaced or when they're trapped.^{clxxvii} Governments may undertake relocation as an anticipatory measure where slow onset events threaten to render certain areas uninhabitable.^{clxxviii} In Fiji, for example, the government is proactively assessing the vulnerabilities of rural communities in anticipation of the possibility that they may need to be moved. In the US, a number of Alaskan indigenous communities have sought government support to move for over a decade because slow onset events such as loss of sea ice, coastal erosion, melting permafrost have made it difficult to continue living in their places of origin.^{clxxix} Literature provides a range of case studies and recommendations to support government on planning for a participatory and voluntary relocation as a measure to minimize displacement and move at-risk populations out of harm's way and mitigate risks for those it is intended to benefit, including the disruption of livelihoods and loss of income, socioeconomic networks and cultural heritage.^{clxxx}

D. Protection and Assistance

- Slow onset events can negatively impact an array of internationally guaranteed human rights. This includes specific substantive human rights, like the rights to adequate food, water, health, and housing, as well as the rights to participation and information.^{clxxxi} Furthermore, those already in vulnerable situations are at the greatest risk of suffering human rights harms as a result of displacement related to slow onset adverse effects. Slowly unfolding emergencies can be mitigated by early response through preparedness, early warning . Because of their long term nature, slow onset events allow for humanitarian community can step in early enough to reduce human suffering and help prevent the downward spiral of increased vulnerability to future hazards. Unfortunately, the response to most slow-onset emergencies often ends up resembling the response to rapid-onset events, a large influx of resources aimed at saving lives, the creation of temporary and often parallel coordination structures, and a response dominated by food aid.^{clxxxii} Time after time, the international community waits until a slow-onset event reaches the acute phase of disaster and is then dealt with using the tools created for a rapid-onset related disaster.^{clxxxiii}
- People compelled to move in the context of the slow onset events are often those in greatest need of protection during their movement. Specific groups of people including women and girls, children, people with disabilities, the elderly, and indigenous communities among others have specific protection needs. Women and girls in particular have specific health care

needs and are vulnerable to sexual and gender-based violence. Women and girls, already experiencing gender inequalities that limit their access to financial resources, land, education, health care and are excluded from decision-making processes find themselves in more vulnerable situations as displaced persons. Existing research also points to the differentiated impacts experienced by women and men in the context of displacement linked to slow onset events.^{clxxxiv} As such, gender inequalities are magnified by slow onset events, resulting in what the IPCC found to be “higher workloads, occupational hazards indoors and outdoors, psychological and emotional stress, and mortality” for women as compared to men.^{clxxxv} Most displacement linked to slow onset events takes place within countries, the protection of internally displaced persons is therefore important.^{clxxxvi} States have the primary duty and responsibility to protect and assist IDPs in accordance with their obligations under international human rights law as well as, where applicable, international humanitarian law. According to the literature, despite widespread recognition of the principles outlined in the UN Guiding Principles on Internal Displacement, most States neither have laws and policies specifically addressing internal displacement in disaster contexts, nor do they address such displacement in their legal frameworks on disaster management and response.^{clxxxvii} Where States have adopted IDP specific instruments, the challenge lies in implementing them in operational terms. Institutional accountability for IDP protection at the international level in disaster situations is also not clear.^{clxxxviii}

- Some people displaced in the context of slow onset event are compelled to cross borders in order to reach safety and/or protection and assistance in another country. While many international organizations work in this field, none is explicitly mandated to assist and protect in situations of cross-border population movements. In the absence of explicit provision in international law regarding admission and stay, some countries have offered temporary protection status or granted humanitarian visas for people who have been displaced following a sudden onset event.^{clxxxix} However it would seem that harm must be relatively imminent before international protection would be forthcoming, which may be especially problematic for contexts of creeping slow-onset processes.^{cx} Most of the people displaced in the context of slow onset event may indeed not benefit either from the legal protections afforded by the complementary and temporary protections and assistance often provided in response to rapid-onset induced disasters or in situations where the slow onset event is entwined with situations of humanitarian crisis such as conflict and violence.^{cxci} The principle of *non-refoulement* may also be explored as a complementary framework for the protection of persons displaced in the context slow onset climate change. The returnability of the person concerned could be analysed on the basis of three elements: whether it is legally permissible, factually feasible and morally reasonable to oblige the person concerned to return to his or her country of origin or permanent residence.^{cxcii} In the context of slow onset events, it is likely that people who flee non habitable lands would be considered as factually infeasible and morally unreasonable to be returned to their homeland. However, while many countries refrain from returning foreigners to their countries of origin when their country has been

gravely affected by a disaster, such measures are often neither foreseen in law nor used in a consistent manner.^{cxci}

VIII. Conclusion

- It is difficult to paint a consistent picture of the reality of displacement related to slow onset events, because of the wide range of slow onset events, their impacts, affected regions and drivers and types of movement. Displacement related to slow onset events is neither easy to characterize nor to plan for, but rather requires an understanding of the potential effects of various slow onset processes which are likely to interact with other displacement factors, including resilience, violence, and rapid onset events. Despite this challenge, the literature on displacement related to slow onset events remains consensual on demonstrating how slow onset factors are just one input into mobility decisions, and they are usually not the dominant input. However slow onset events contribute to increased risks of displacement, in particular when they reach the tipping point of turning into a disaster situation. Thus, it is best understood not as its own displacement category but as a factor to be considered when looking at a potential slow onset and displacement situations.
- There are inherent uncertainties in the way slow onset impacts will play out in a given locale and this will affect the magnitude and pattern of displacement. Literature further recognizes that more research is needed to better contextualize and understand displacement related to slow onset events, particularly at scales ranging from regional to local, where slow onset events impacts may deviate from the broader trends identified in a global-scale analysis. In many cases, a richer, more detailed set of climate, biophysical, socioeconomic, and political indicators is available at regional, national, and local levels.
- Increasing the modeling resolution and improving data inputs to produce more spatially-detailed projections are among the opportunities identified in this synthesis. Building country-level capacity to collect and monitor relevant data can increase understanding of the interactions among slow onset events impacts, ecosystems, livelihoods, and displacement and help countries tailor policy, planning, and investment decisions. New data sources, including from satellite imagery and mobile phones—combined with advances in climate information can be beneficial to improving the quality of information about slow onset related displacement. Inclusion of slow onset events and displacement questions in national census and existing surveys is another way to advance data collection. Over time, as more data becomes available on slow onset events and its impacts on livelihoods, the scenarios and models would be more accurate.
- It is clear that the scale and nature of this displacement will largely depend on the adaptation, disaster risk reduction and development policies that are implemented, not only to mitigate the impacts of slow onset events, but also to facilitate, initiate and/or manage migration as a positive strategy and planned relocation as a last resort option. Opportunities exist in

relation to addressing the underlying determinants of vulnerability, increasing the involvement of the private sector in resilient development, increasing exposed areas habitability in the longer term, and supporting resilient development through strengthening underlying governance structures.

- Empirical studies stress that in the context of slow onset event migration does not necessarily represent a failure of adaptation policies, but may also be an actual adaptation strategy used by migrants themselves. At present, however, migration policies are still generally missing from adaptation policies. Literature further recognizes that there is a ‘tipping point’ at which communities fall from voluntary adaptive migration into forced displacement, when coping capacities are exhausted communities fall into a gradual process of impoverishment and become displaced. Literature further identifies planned relocation as a last resort option for protecting those trapped in areas highly affected or prone to the adverse effects of slow onset events.
- The literature portrays displaced persons as victims of slow onset events in need of assistance and protection but it also provides examples of how affected communities can also be drivers of community based solutions. Return is a desirable durable solution but, regardless of the various factors pushing a decision to leave, return is less likely when slow onset climate processes are in effect because of their virtual irreversibility. Integration then becomes a major issue that requires more attention and resources.
- Research capacity in least developed countries in particular, and in countries most vulnerable to climate change needs to be strengthened through increased financial support, transfer of research methodologies and capacity-building activities for national researchers, institutions, and affected communities in vulnerable countries. Ensure that research agendas are driven by national needs and priorities, as identified by governments, independent researchers, communities affected and other concerned entities. Support to local research capacities, as well as their inclusion into international networks, need to be considerably strengthened.
- The Warsaw International Mechanism has a unique opportunity to support the international community in addressing these challenges through enhancing understanding, coordination and action. The WIM can play a key role in enabling research to be more consistently shared with relevant stockholders and policy maker, and in ensuring research is addressing relevant stockholders and policy maker’s needs. Exchange between scientific research and policy is two-way, with research needing to ensure that the questions are investigated thoroughly and results are relevant and useable, while policymakers and practitioners need to listen to and incorporate the scientific results.

IX. Challenges as opportunities

This section provides an overview of areas in which gaps exist and where there are opportunities for advancing the state of knowledge on slow onset displacement to improve planning, implementation and monitoring of progress in averting, minimising and addressing displacement.

Opportunities on assessing impacts of slow onset on displacement risks

- Enhance the identification, mapping and assessment of condition and vulnerability of most exposed areas to slow onset events and populations living in these areas. Historical analogues should be used to assist with the identification of those areas particularly exposed, rather than just existing databases and climate projections.
- Systematically record loss and damage (including displacement) related to slow onset events i.e through setting up a loss and damage accounting system in countries as a critical public service for risk information, attribution and policy formulation on risk reduction policies, including on addressing slow onset related displacement.
- Improve research on impacts of slow onset on other drivers of displacement (including conflicts) and inter-relationship of these drivers, as well as on loss of cultural heritage and loss of identity and their consequences on displacement.
- Improve research on how different types of slow onset events, including others than desertification and sea level rise, increase risks of displacement.
- Enhance understanding on interaction between slow-onset processes and sudden-onset events, and their impacts on displacement.

Opportunities on understanding factors of displacement and on identifying the displacement threshold

- Improve understanding on the determinants of displacement decisions and the identification of the threshold when a slow onset turns into a disaster and leave most vulnerable populations with no other reasonable option than to move for survival.
- Improve understanding on differentiated perceptions of risk of slow onset event and encourage policymakers and decision makers to consider the perception of the risk by those affected, to elaborate population's mobility responses.

Opportunities on identifying slow onset related displacement patterns

- Improve policymakers preparation to urban migration and displacement by ensuring flexible social protection services and including migrants and displaced persons in planning and decision-making.
- Improve research on immobile populations and how they can be supported to stay or move depending on their desire.
- Improve research on impacts of slow onset related displacement on populations located in zones of transit and communities located in destination areas.
- Improve research on duration and destination of displacement by type of slow onset event.
- Improve research on prolonged and protracted displacement in the context of slow onset events, including factors that affect the duration of displacement and the situation of communities left behind.
- Improve profiling of displaced populations and their specific protection needs.

Opportunities on displacement related to slow onset events data

- Ensure that already available data and expertise are acknowledged, used and disseminated and that relevant stakeholders are consulted and integrated in new research efforts.
- Integrate slow onset and displacement questions in existing data collection efforts (including databases on demography, agriculture, land-use, etc.)
- Produce a harmonized inventory of data sets and national assessments and apply the harmonized data to create models identifying evolution over time and long-term trends, including at different temperature increase scenarios.
- Identify key common variables, methodologies and tools for investigating, analysing and mapping loss and damage associated with slow onset events and the way they impact displacement. This common methodology could be built on systematic inventory and evaluation of the questions used in existing surveys and questionnaire to assess the link between slow onsets and displacement to harmonize questions in future research.
- Collect disaggregated data including gender, elderly, youth, disabled persons, ethnicity etc. on underlying drivers of displacement, as well as related to the latent and structural factors that determine how exposed and vulnerable people are to hazards in the first place.
- Develop and use innovative approaches for data collection : drones pictures, data generated by mobile networks' customers, mobile applications with full respect and safeguards for protecting personal data. These applications could be further developed in partnership with local universities and could allow for information to be posted directly by users, in an open-source format.
- Improve free and transparent access to data and methodologies for governments, researchers and communities to generate long-lasting benefits for appropriate policy reform.
- Promote interagency and interdisciplinary data collection and data sharing.
- Enhance context specific, people-centred and defined data in order to best address the rights, interests and voices of displaced persons.

Opportunities on ways to avert, minimize and address displacement related to slow onset events

- Improve integration of ways to reduce vulnerability and exposure to slow onset events in sustainable development, adaptation and disaster risk reduction policies to better support communities and households to stay in place and avert and minimize displacement.
- Improve research on how human decisions on ecosystem and land use management can mitigating displacement risks.
- Improve accuracy of systematic observation and early warning systems in monitoring impacts on populations for all types of slow onset events in all relevant regions.
- Improve knowledge on the benefits and risks of migration as adaptation in the context of slow onsets, especially for most vulnerable groups.
- Enhance knowledge on practical challenges of relocation with respect of international human rights standards, social justice, cultural and individual considerations, wellbeing of relocated people and host communities.
- Enhance knowledge on strategies to ensure sovereignty, cultural continuity, and community cohesion in the face of large-scale and permanent displacement and relocation.
- Enhance understanding of provision of assistance before, during and after displacement, including responsible entities, types of assistance, and assessment of its efficiency. Identify benefits from early response and assistance before the slow onset reaches the tipping point of a disaster.
- Enhance understanding of specific challenges and solutions for conflict-ridden and fragile states that have less capacity to prepare for and respond to slow onset events.
- Enhance knowledge on specific protection needs of protracted displaced persons and how these needs evolve over time. Assess the effectiveness of existing protection measures and explore how existing protection instruments can be tailored to those displaced in the context of slow onset events, including at the regional level.
- Enhance knowledge on post displacement situations and challenges associated with achievement of durable solutions (e.g., return or successful integration into a new community) as well as actions which can be taken to minimize these risks and obstacles, including when country of origin is permanently affected by slow onset events.
- Improve enablement of local communities including for women, children, Indigenous peoples, and other groups in decision making and driving solutions and experience sharing.
- Enhance financial, technical and capacity support to improve awareness-raising of decision makers, migrants and displaced communities, host communities and communities of origin

from local level to international levels, including improved access to information and legal support and innovative solutions.

X. Recommendations (FOR CONSULTATION)

- Recognise the need for and encourage significant national and international investment in better understanding the phenomenon, including through systematically recording pre-emptive evacuations, spontaneous and planned movements during extreme events, planned relocations and returns at regular intervals before during and after events.
- Increase national ownership of and accountability for data collection, analysis and reporting, by integrating data collection on slow onset displacement into national progress reporting against the SDGs and the Sendai Framework for Disaster Risk Reduction.
- Recognise displacement in slow-onset contexts as a development issue that is determined by sectoral policies and investments at local, national and regional levels. In so doing, frame the discussion on slow onset displacement around risk and impacts, with increased investment in understanding local contexts and reducing vulnerability and exposure.
- Increase investment in understanding the build-up of slow onset crises and specific thresholds that result in forced displacement. Consider allocating a fixed percentage of adaptation funding for risk assessments and threshold monitoring.
- Recognise the opportunity to present existing challenges as future opportunities. Understand investing in filling data gaps and monitoring the drivers, scale, patterns, risks and impacts of slow onset events and associated displacement as 1. a prerequisite for negotiations and agreements on financing instruments and technical assistance; and 2. as a basis for developing migration and displacement strategies for rural-rural, rural-urban, internal and cross-border movements as part of current and future adaptation to climate change.

XI. End notes

ⁱ UNFCCC, 2016, Decision 1/CP.21, Adoption of the Paris Agreement, para. 49, available at: <http://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf>

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^{xiii} General Assembly, 'Report of the Open-Ended Intergovernmental Expert Working Group on Indicators and Terminology Relating to Disaster Risk Reduction' (n 55) 13.

^{xiv} Idem. 14.

^{xv} Glantz (1994, 1999) refers to them as "creeping environmental changes", which are incremental changes in conditions cumulating to create a major catastrophe or crisis that becomes apparent only after a threshold has been crossed.

^{xvi} H. Upadhyay, I. Kelman, Lingaraj G J, A. Mishra, C. Shreve, R. Stojanov, (2015) Conceptualizing and contextualizing research and policy for links between climate change and migration", International Journal of Climate Change Strategies and Management, Vol. 7 Issue: 3, pp.394-417, <https://doi.org/10.1108/IJCCSM-05-2014-0058>

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- ^{clxi} Nansen Initiative, Op. Cit.
- ^{clxii} The World Bank, 2014, Turn Down the Heat: Confronting the New Climate Normal, p.144.
- ^{clxiii} The Nansen Initiative, 2013, Human Mobility, Natural Disasters and Climate Change in the Pacific, Background Paper 9
- ^{clxiv} OHCHR, 2018, The Slow onset effects of climate change and human rights protection for cross-border migrants (A/HRC/37/CRP.4)
- ^{clxv} IOM, 2015, When do households benefit from migration? Policy Brief Series Volume 1, Issue 8
- ^{clxvi} H. Upadhyay, I. Kelman, and al., Op. Cit.
- ^{clxvii} K. Warner, T. Afifi, 2014, Op. Cit.
- ^{clxviii} Idem.
- ^{clxix} IOM, 2009, Op. Cit.
- ^{clxx} UNDP, ODI, 2017, Climate change, migration and displacement The need for a risk-informed and coherent approach
- ^{clxxi} K. Warner, T. Afifi, 2014, Op. Cit.

^{clxxxii} The relocation strategy of the Kiribati Government has two key components. Firstly, opportunities must be created to enable the migration of those who wish to do so now and in the coming years. This will assist in establishing expatriate communities of I-Kiribati, who will be able to absorb and support greater numbers of migrants in the longer term. It will also benefit those who remain by lifting the levels of remittances. Secondly, the levels of qualifications able to be obtained in Kiribati will be raised to those available in countries such as Australia and New Zealand. This will make qualified I-Kiribati more attractive as migrants, but will also improve the standards of services available locally.

<http://www.climate.gov.ki/category/action/relocation/>

^{clxxxiii} K.K. Rigaud, A. de Sherbinin, Op. Cit.

^{clxxxiv} UNHCR, Brookings Institution, Georgetown University, 2015, Planned relocation guidance,

<http://www.unhcr.org/protection/environment/562f798d9/planned-relocation-guidance-october-2015.html>

^{clxxxv} For example relocation has been used to force integration into the main society and dependency on the main government for support in the new settlement areas, in which rural populations, now without livelihoods, have little-to-no income opportunities. See <https://www.hrw.org/news/2013/06/27/china-end-involuntary-rehousing-relocation-tibetans>

^{clxxxvi} H. Graeme, 2012, Climate Change-Induced Mobility and the Existing Migration Regime in Asia and the Pacific, in *Climate Change and Displacement: Multidisciplinary Perspectives*, Hart Publishing, Oxford, p. 10.

^{clxxxvii} IPCC, 2014, p.767

^{clxxxviii} UNHCR, Brookings Institution, Georgetown University, Op. Cit.

^{clxxxix} R. Bronen, Op. Cit.

^{clxxx} Georgetown University, UNHCR, IOM, 2017, A Toolbox: Planning relocations to protect people,

<https://reliefweb.int/report/world/toolbox-planning-relocations-protect-people-disasters-and-environmental-change>

^{clxxxxi} OHCHR, 2018, Op. Cit.

^{clxxxii} OCHA, 2011, OCHA and slow-onset emergencies, Occasional Policy Briefing Series, Brief No. 6

^{clxxxiii} Idem.

^{clxxxiv} IOM, 2014, Outlook on Migration, Environment and Climate Change, Brief 13

^{clxxxv} IPCC, 2014, Op. Cit.

^{clxxxvi} The UN Guiding Principles on Internal Displacement, describe IDPs as “persons or groups of persons who have been forced or obliged to flee or leave their homes or places of habitual residence” for reasons including “natural or human-made disasters” and who have not crossed an international border.

^{clxxxvii} Global Protection Cluster: <http://www.globalprotectioncluster.org/en/areas-of-responsibility/protection-in-natural-disasters.html>

^{clxxxviii} Idem.

^{clxxxix} Nansen Initiative, Op. Cit.

^{cx} J. McAdam, 2017, From the Nansen Initiative to the Platform on Disaster Displacement: Shaping International Approaches to Climate Change, Disasters and Displacement. *University of New South Wales Law Journal*, Vol. 39, No. 4, 2016 · UNSW Law Research Paper No. 4.

^{cxci} OHCHR, 2017, Op. Cit.

^{cxcii} W. Kaelin, 2010, *Conceptualising Climate-Induced Displacement*, Oxford: Hart Publishing,

<http://www.legalanthology.ch/wp-content/uploads/2013/12/Kalin-Conceptualising-Climate-Induced-Displacement1.pdf>

^{cxci} Nansen Initiative, Op. Cit.