Climate change and migration

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Widespread attention has recently been given to the issue of climate change-driven migration, both by scientists and policymakers. The triggers for the future population displacements can be both long-lasting processes, such as sea-level rise, and sudden climate events, such as disastrous hurricanes expected to be more frequent and intense. This as well as non-climatic factors will contribute to a variety of migratory flows, which will require different response ranging from humanitarian action to the redefinition of migration policies. Climate-change driven migration is also a specific challenge to the development efforts in many countries and the conflict prevention in some regions of the world. Moreover, it raises a set of new legal questions.

A tiny archipelago of Carteret Islands situated in the West Pacific Ocean and inhabited by around 2000 people has recently become a destination of many foreign journalists. Reports and documentaries shot in the islands showed knocked down tree trunks sticking out of the sea, submerged orchards and fields. The locals complained about no chances for further growing the crops and pointed remote places on the sea claiming that their family homes had been located there a few decades earlier (ABC, 2007; CNN, 2007). The Carteret Islands are sinking and according to the forecasts they might be completely under water by 2015. The Government of Papua New Guinea have been displacing the whole population to a mountainous and a few times bigger island of Bougainville. Thanks to the widespread attention given to the inhabitants of the Carterets by international media, the situation has already raised in international climate change politics to the symbol of the years to come. This was reflected, for instance, in the composition of an official programme of the last UN Climate Change Summit held in Bali, Indonesia, in December 2007. A delegates' meeting with the residents of the Carterets was included in the conference schedule. (United Nations Climate Change Conference, 2007: 13).

The problem of climate change migration concerns not only the small islands scattered in the Pacific. Around 24 million people all over the world have decided to migrate due to floods, famine or other ecological factors (UNHCR, 2002: 12), while the number of the people with refugee status granted under international law was half that size. In 2002, a Climate Change Centre within the international movement of the Red Cross and Red Crescent was established in the Hague. The objective was to study the possible humanitarian implications of climate change and monitor the probability of the increasing occurrence of natural disasters requiring international humanitarian actions. The development of the situation surpassed the predictions of the Centre's initiators. In 2007, the personnel of the Red Cross did not expect the significance of climate change to increase – they already observed it in their work. More than 40 national societies dealt with climate change in their everyday activities (Red Cross/Red Crescent Climate Centre, 2007: 2).

Two types of climate drivers

The situation of the Carteret Islands and the recent shift in the Red Cross activities are the indicators of the two types of climate change migration drivers that are now being mainstreamed into the study of population movements. These two drivers are *climate processes* and *climate events*. The former is constituted by

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slow-onset changes, such as sea-level rise, salinisation of agricultural land, desertification, growing water scarcity and food insecurity (Brown, 2008: 17). They all work patently but make certain areas of the world less and less habitable.

Sea-level rise is perhaps the most widely known effect of global warming since its direct causes are thermal expansion of oceans and the widely publicised melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets. The International Panel on Climate Change (IPCC) assesses that throughout the 20th century, the mean level of seas rose by 17 cm. Its forecasts predict that by the end of the 21st century, the sea-level will have risen by another 18 to 59 cm, depending on the scenario of future greenhouse gas emissions used (IPCC, 2007a: 5-7). Taking into account new phenomena in the future may revise these calculations, and the Panel itself already expects that adding 10 to 20 cm in all scenarios may be necessary (IPCC, 2007a: 5-7, 13-14).

However, even small changes may have serious consequences. A 45-cm sea-level rise (one within the IPCC brackets) would submerge 11 percent of the territory of Bangladesh, currently inhabited by a population of around 5.5 million. Before this happens, these people have to migrate, and in the case of their native country there are not many vacant plots to choose. The calculation for a slightly higher altitude of one metre above the sea level dooms to inundation 20 percent of the Bangladeshi territory (roughly the size of Belgium), a home to 15 million people. Globally, areas below one metre amount to 2.2 million sq km, populated by 146 million people. Among them there are world's biggest cities and other high population density regions: megadeltas of Ganges-Brahmaputra, Yangtze, Mekong, Indus, Nile, Mississippi or vast coastal plains, from Belgium to Denmark in Europe on the North Sea coast, or Florida and Louisiana in the United States (Anthoff *et al.*, 2006: 9-13; Dupont i Pearman, 2006: 4).

Table 1: Territories under 1 m above sea level in selected European and Asian countries

Country	Territory <1m a.s.l. sq km	%	Population <1m a.s.l. thous.	%
Europe				
Belgium	1,148	3,8%	262	2,5%
Denmark	3,177	7,4%	155	2,9%
Netherlands	20,277	48,8%	5,139	31,3%
Germany	13,910	3,9%	1,565	1,9%
Poland	3,781	1,2%	345	0,9%
Asia				
Bangladesh (45cm)	15,668	10,9%	5,500	5,0%
Bangladesh	29,846	20,7%	14,800	13,5%
India	5,763	0,4%	7,100	0,8%
Indonesia (60 cm)	34,000	1,9%	2,000	1,1%
Vietnam	40,000	12,1%	17,100	23,1%

Sources: OECD, 2006: 47, Dupont and Pearman 2006:50.

It might be said that there is still more than 90 years for evacuation so we should not expect any huge inflows of Bangladeshi people arriving in India due to sea-level rise. Yes and no. Climate process-driven migration would obviously be a process itself. However, the low-lying areas may become uninhabitable much earlier before they are transformed into the sea bottom. That is because sea-level rise is not only about the inundation of beaches. It is much more about the higher rate of coastal erosion, larger extent of floods brought about by sea surges, high salinisation of groundwater or river mouths and ecological changes in the coastal ecosystems, particularly those having important ecological role: mangrove forests and coral reefs (WBGU, 2006: 40-45). It all contributes to the collapse of agriculture and fisheries, devastation of coastal infrastructure, shortage of safe drinking water and probably much more problems that have already become so evident in the case of the most highly vulnerable areas, such as the small Carteret Islands in the Pacific. Moreover, the sea-level rise impact may be modified, mitigated or aggravated, by other factors: local tectonic movements, land subsidence due to the burden of the heavy urban infrastructure and underground structures or siltation in delta areas. As a result, doing credible risk analyses for particular low-lying areas is very difficult.

Climate-related events also include hurricanes, floods, landslides, avalanches, droughts, heat waves, wildfires and droughts. Together they are called *hydrometeorological disasters*, as opposed to volcano eruptions, earthquakes and tsunamis that form *geolog-*

ical disasters. A database of them all is continuously built by the Centre for Research on the Epidemiology of Disasters (CRED) at the Catholic University of Louvain in Brussels. According to this Centre (Hoyois *et al.*, 2007: 21), in a twenty-year period between 1987 and 2006 there was a big increase in the number of hydrometeorological disasters, with the escalation taking place in the years 1998-2000. In the period between 1987 and 1998 there were 195 disasters of this sort, whereas between 2000 and 2006 as many as 365. The increase amounts then to a worrisome value of 187 percent. The Intergovernmental Panel on Climate Change (2007b) predicts this trend to continue in the future. Floods, storms, droughts, heatwaves and wildfires are to be more frequent and intense while the geographical extent of their occurrence is expected to shift.

Non-climatic factors

Natural phenomena will become natural disasters if they affect communities particularly vulnerable to their impacts. Vulnerability should be understood here as a function of community's exposure to climatic conditions and its adaptive capacity (Brown, 2008: 18). The exposure of the low-lying Florida coast to sea-level rise is certainly much higher than the exposure of the high cliffs of the northern Cuba. On the other hand, Cuba's capacity to prepare to the increasing intensity of hurricanes is probably lower than the capacity of the United States. This all influence the potential of climate change-related migration on both sides of the Mexican Gulf.

Equally important is the fact that, with the exception of a direct threat to person's life, the decision to migrate is made because of a variety of "push" and "pull" factors. Different root causes of migration are well known. They include economic factors (unemployment, disparities between wages), social factors (welfare, education), environmental conditions (degradation of ecosystems), degraded security conditions (armed conflicts, persecution of minority groups) and other (Renaud *et al.*, 2007: 10). Usually, if not most often, a combination of them contributes to a person's decision to migrate or to stay, and even isolating the most decisive factor of an individual's choice can be impossible. Climate-related factors, such as catastrophic floods or advancing desertification, will further complicate people's decisions and its interpretations for academic research and policy-making.

Theorising climate change-driven migration

El-Hinnawi defined *environmental refugees* in 1985 as "those people who have been forced to leave their traditional habitat, temporarily or permanently, because of a marked environmental disruption (natural and/or triggered by people) that jeopardized their existence and/or seriously affected the quality of their life". By the environmental disruption the author of the definition meant "any physical, chemical, and/or biological changes in the ecosystem (or resource base) that render it, temporarily or permanently, unsuitable to support human life" (Renaud *et al.*, 2007: 13).

Though it is not a controversy that environmental factors can influence individual's decisions about migrating, the concept of environmental refugees has, nonetheless, remained highly contested since its very inception. Because of a variety of migration root causes some scholars denied there being anyone who could be called an environmental refugee (see e.g. Black, 2001). Others proclaimed environmental changes to be the main cause of future population movements (see e.g. Biermann and Boas, 2007) and some attempted even to quantify their scale. Myers (2005: 1) assesses the number of people who will migrate as a direct result of climate change to amount up to 200 million in the first half of the 21st century. This number seems to be the most frequently reproduced in papers and articles theorising on climate-related migration, though, as Brown (2008: 4) notes, this "repetition does not make the figure any more accurate". The scepticism about numbers does not, however, imply any criticism of Myers's extrapolation. No one can really accurately assess the future number of people migrating mainly due to the changing climatic conditions. Brown (2008: 11-12) juxtaposes the estimate of 200 million climate migrants with the current global statistics on migration. It is ten times more then today's number of refugees and internally displaced persons and roughly the size of the whole current global migrant population (192 million people live nowadays outside their place of birth).

To define what kind of assistance the 21st century's environmental refugees may need, Renaud *et al.*

Table 2. Identifying Categories of Environmental Migrants

			Nature of Environmental Degradation			
		Inherent Vulnerability of Affected Communities/Persons	Direct, Gradual (e.g. land degradation, pollution)	Indirect, Gradual (e.g. sea-level rise)	Direct, Sudden (e.g. flood, typhoon, earthquake)	Indirect, Sudden (e.g. volcanic ash follout, drought)
Type of assistance or help available/needed/ expected to cope with environmental degradation at point of origin	Self-Help (skills/ financial)	Low	III	III	II	II
	State Assistance	Medium	III	III	I-II	II
	International Assistance	High	II-III	III	I-II	II
	No Assistance Expected	Very High	II	II	I	I-II

Key: I = Environmental Refugee, II – Environmentally Forced Migrant, III – Environmentally Motivated Migrant

Source: Renaud et al., 2007: 31.

(2008: 29-32) propose to distinguish between three classes of environmental change-related migrants. The first group would be those *environmentally motivated*. Due to the steadily deteriorating environment they decide to abandon their land in order to pre-empt the worse. Whereas they "may leave", the second group, *environmentally forced* migrants, "have to leave" so as to avoid the threat. These two categories imply the option to decide to stay or not to stay, or when to leave. For the third group, classified as *environmental refugees*, there is no option other than an immediate escape. In fact, the difference between all could be sought in the swiftness of necessary actions. By combining the nature of possible environmental changes, assessment of inherent vulnerability of communities affected by these changes, and the classification of environmental migrants, Renaud *et al.* propose a matrix identifying the type of assistance that should be rendered to various groups of environmental migrants (see table 2). The proposal is only tentative, and the categories used by the researchers seem to be blurred; however, policymakers and practitioners in the field of migration would probably find it more informative than the discussion of the definition of environmental migration dominating this field of study.

Implications

When it comes to the effects of climate change-driven migration, it might be argued that they probably embrace most of the consequences any mass-scale migration entails. They must then range from the stress of an individual's adjustment to a new situation (what concerns both migrants and host society members) to the system-wide changes in the composition of societies, labour market implications, and upgrading migration on the political agenda. There are, however, some areas where climate-related population movements are already changing our established ways of thinking.

One of them is the nexus of migration and conflict. In an article published in June 2007 in *Washington Post*, the UN Secretary-General Ban Ki-moon claimed that "…the Darfur conflict began as an ecological crisis, arising at least in part from climate change". Presumably, for many readers considering the conflict to result from ethnic tensions between Sudanese Arab and black populations the explanation of the Secretary-General was at least surprising. Ban's article is based on statistics showing that the average precipitation in Sudan has declined some 40 percent since the early 1980s. What was at first con-

sidered by scientists to be an unfortunate quirk of nature was subsequently found to coincide with a rise in temperatures of the Indian Ocean, a symptomatic example of the ongoing climate change. New climatic conditions over the Indian Ocean disrupted the cycle of seasonal monsoons and induced an advancing process of desertification over vast areas of Africa. "It is no accident that the violence in Darfur erupted during the drought," claims Ban Ki-moon. Until then, Arab nomadic herders moved with their livestock to the areas settled by black farmers during the dry season. Farmers gained access to goods traded by Arabs and allowed them to use their wells and pastures. Once the rains stopped, farmers started to fence their land as they feared it would be ruined by the passing herds. At the same time the advancing desert prevented Arabs from continuing their nomadic lifestyle and forced them to migrate to the lands occupied by the black farmers. When there was no longer enough food and water for all, the conflict broke out (Ban, 2007).

The migration from areas undergoing the process of desertification proves to be conducive to the origination of conflicts when people move to other rural areas. It triggers different chain reactions when people migrate to towns and cities. Urban areas offer access to cash economy (rather than subsistence farming) and can make it easier to provide public services. However, rapid and planned urbanisation has serious implications for urban welfare and the provision of public services. Already one-third of the world's urban population lives in slums (Brown, 2008: 32). If climate change increases food and water scarcity in rural areas, the incentive for their dwellers to set out to the cities and look for their earnings there will rise. Not many of them will have a chance to settle elsewhere than in the slums. The prospects of social and economic development of many countries of the South as well as halting raising socioeconomic disparities in some countries of the North will be then even more doubtful than are nowadays.

The situation of slums reflects all the main problems of development: poor quality housing, limited clean water and sanitation, lack of access to professional medical care and education etc. Forced migration undermines the improvement in any of these fields. Its impact is evident, for example, in the case of public health. In north-eastern Brazil, periodic epidemic waves of a parasitic disease called visceral leishamaniasis (VL) have been associated with migration to urban areas taking place after long periods of drought. Not only is population displacement a vector of disease, but also increases the vulnerability of migrating people. It is well documented that refugee populations suffer worse health outcomes than settled populations (Brown, 2008: 31-34).

Apart from new security and development issues connected to climate-related migration, a certain number of novel legal issues arise. The first of them is the legal status of environmental migrants. If they flee their place of residence as a consequence of natural disaster but stay in their country of citizenship, they remain, at least theoretically, under its jurisdiction and protection. However, once a person crosses the national border, he or she is treated as an alien, and no one bears any legal obligation of rendering him or her assistance. The person does not enjoy the status of refugee because, under international law, this can be granted only to persons owing to their "well-founded fear of being persecuted" in their country of nationality. This is what stipulate the relevant provisions of the 1951 Geneva Convention and the 1967 New York Protocol, two universally accepted international treaties relating to the status of refugees. Protection of refugees is also a responsibility of the United Nations High Commissioner for Refugees. Although its mandate has already been expanded to cover other categories of people, it would certainly be unable to cope with a future task of assisting environmental migrants. Not all categories of people migrating due to climate-related factors require special international protection, but some legal solutions are necessary at least for those fleeing the extreme climate events.

The other legal questions arise in the case of those who migrate due to climate processes. This relates in particular to the small island states, some of which are endangered with the total inundation. Various analyses (e.g. Barnett and Adger, 2003: 322) demonstrate that there are four independent states "comprised entirely of low-lying atolls" whose existence is threatened with even small sea-level rise. They include Maldives in the Indian Ocean and three Pacific nations: Kiribati, Marshall Islands and Tuvalu. Large parts of certain other small island states are composed of low-lying atolls, and it is unclear if the higher islands could sustain the population relocated from those atolls that are endangered with submer-

sion. The extinction of small island states, once the question of political fiction, is already a regular item on the agenda of many UN bodies. It is especially difficult to see what rights would be enjoyed by people leaving states that are doomed to become inhabitable. What will happen with their citizenship if their states cease to exist? Can they form a national minority in the territory of another state? Are they entitled to any compensation for the lost property? Can they still be regarded as indigenous group in the receiving country if that was their status in the country of origin? What obligations, if any, have other states to the populations affected by sea-level rise? These questions have recently been posed especially in the new UN Human Rights Council. The long expressed concerns of small island states are thus becoming more widely recognized. The first ever resolution on human rights and climate change adopted by the Council in March this year is its evidence.

Conclusions

The studies of the possible scenarios of the development of future climate conditions on the Earth suggest that it might strongly influence the patterns of population movements. The correlation between migration and climate factors, be it long-lasting processes or sudden events, is not obvious. Any attempt to measure it must take into account the exposure of the examined community to the climatic conditions as well as the assessment of its capacity to adapt to the future climate. Globally, the impact of climate change is expected to substantially augment the stock of migrants. Some of them will follow the already established routes of mass-scale migration. Many will only migrate locally, having no resources for long journeys but being forced to look for a new domicile due to the worsening climatic conditions. There are always those who set out early to outrun the others and those who flee in the last possible moments. The policymaking in the field of migration should take these differences into account as well as the fact that climatic conditions will not be the only basis of people's decision to leave or to stay.

Those who will leave and especially those who will be forced to leave should already be a subject of concern to the policymakers. There is increasing evidence that these new types of migration flows when met with certain social and economic circumstances contribute to the outbreak of violent conflicts and hinder the development efforts. They also create new legal problems as different as the general (non-) recognition of environmental refugees under the international law and the definition of the future rights of the citizens of nations endangered with extinction due to sea-level rise.

Widespread attention has recently been given to the issue of climate-related migration. It is certainly worth further research. As cynical as true is, however, the claim that those who are most vulnerable to climate processes, such as desertification, or climate events, such as natural disasters, are not necessarily the ones that are most likely to migrate.

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British Academy:n ja Chinese Academy of Social Sciences:in (CASS) yhdessä järjestämässä tapahtumassa professori Duncan Gallie (vas.), Foreign Secretary ja exofficio Vice President of British Academy, lausui tervetulosanat. Scientific Secretary Anouk Tso ja professori Li Hanlin, Director General, Bureau of Scientific Management, CASS, toivat myös omat tervehdyksensä tapahtumaan. British Academy kutsui Suomesta tapahtumaan professori Kauko Laitisen, Helsingin yliopisto, ohjelmapäällikkö Petteri Pietikäisen, Suomen Akatemia ja tutkimusjohtaja Elli Heikkilän, Siirtolaisuusinstituutti. Kuva: Elli Heikkilä.