Natural disasters and environmental migration as a security problem

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Climate and Society Lecture/Seminar 7, November 30, 2011

30.11. Natural disasters and environmental migration as a security problem

Question: How can natural disasters lead to conflict? How can the problem of environmental migration be addressed?

Recommended readings:

Sections 6.5, 6.6 of: WBGU 2007. World in Transition – Climate Change as a Security Risk, German Advisory Council on Global Change, Berlin: Springer, http://www.wbgu.de/wbgu_jg2007.html

Background material (optional):

➢Global Climate Risk Index 2012, Germanwatch, November 2011, http://www.germanwatch.org/klima/cri.htm

➢IPCC, Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX), http://ipcc-wg2.gov/SREX/

R. Black, et al. (2011) Migration and Global Environmental Change: Future Challenges and Opportunities, Foresight, London; http://www.bis.gov.uk/foresight/our-work/projects/current-projects/globalmigration/reports-publications.

Storm and flood disasters as conflict constellations in climate hotspots



Conflict constellations in selected hotspots



Climate-induced degradation of freshwater resources



Climate-induced increase in storm and flood disasters



Climate-induced decline in food production

Hotspot

Environmentally-induced migration

Source: WBGU 2007

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Disaster: "a situation or event which overwhelms local capacity, necessitating a request to a national or international level for external assistance; an unforeseen and often sudden event that causes great damage, destruction and human suffering"

Centre for Research on the Epidemiology of Disasters (CRED)

Disaster and crisis





Figure 8.5 Number of people affected by climate-related disasters in developing and developed countries





Trend of increasing reports of natural disasters



Source: EM-DAT table from Ferris, 2007:7

Numbers killed and affected by certain types of natural disasters (1979-2008)

Disaster type	Number of events	Numbers killed	Numbers affected	
Earthquakes	734	387,129	134 million	
Droughts	427	558,554	1.6 billion	
Floods	3,005	198,390	2.8 billion	
Volcanoes	145	25,474	4.2 million	
Storms	2,458	430,865	718 million	

Source: EM-DAT http://www.emdat.be; data accessed 29.04.09.

Global Climate Risk Index 2012 (covering 1991–2010)



Source: Germanwatch and Munich Re NatCatSERVICE



Climate Risk Index: Ranking 1991 – 2010



The Long-Term Climate Risk Index (CRI):

Annual averages in specific indicators in most affected countries (1991 to 2010)

CRI 1991- 2010 (1990- 2009)	Country	CRI score	Death toll	Deaths per 100,000 inhabitants	Total losses in million US\$ PPP	Losses per unit GDP in %	Number of Events (total 1991- 2010)
1 (1)	Bangladesh	8.17	7,814	5.51	2,091	1.56	251
2 (2)	Myanmar	10.50	7,130	14.06	659	1.68	33
3 (3)	Honduras	11.67	327	5.05	662	2.93	56
4 (4)	Nicaragua	18.00	159	2.83	212	1.90	43
5 (6)	Haiti	21.17	340	3.95	155	1.12	51
6 (5)	Viet Nam	21.50	445	0.57	1,809	1.19	40
7 (8)	Dominican Republic	30.50	211	2.51	181	0.37	44
8 (37)	Pakistan	30.67	558	0.40	1,834	0.66	144
9 (-)	Korea, DPR	30.83	74	0.33	1,172	3.61	33
10 (7)	Philippines	31.83	801	1.03	660	0.30	270

http://www.germanwatch.org/klima/cri.htm

Climate Risk Index for 2012

Ranking 2010 (2009)	Country	CRI score	Death toll	Deaths per 100,000 inhabitants	Absolute losses (in million US\$ PPP)	Losses per unit GDP in %	Human Deve- lopment Index ⁷
1 (68)	Pakistan	3.50	1,891	1.10	25,316	5.42	145
2 (53)	Guatemala	6.33	229	1.59	1,969	2.80	131
3 (100)	Colombia	8.00	320	0.70	7,544	1.73	87
4 (75)	Russia	11.00	56,165	39.30	5,537	0.25	66
5 (65)	Honduras	14.67	139	1.73	220	0.65	121
6 (88)	Oman	17.00	24	0.81	1,314	1.73	
7 (14)	Poland	17.83	151	0.40	4,745	0.66	39
8 (93)	Portugal	19.67	47	0.44	1,749	0.71	41
9 (23)	China	23.50	2,889	0.22	33,395	0.33	101
10 (38)	Tajikistan	24.17	27	0.35	262	1.77	127

Tropical cyclone risk to urban agglomerations



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Storm and flood disasters with destabilizing and conflict-inducing consequences



Destabilizing storm and flood disasters in Latin America

1. Hurricane Hazel in Haiti, 1954: Misappropriation of international financial aid led to widespread resentment within population. General strike and martial law. President forced to leave the country. Year of political chaos.

7. Hurricane Mitch in Nicaragua and Honduras, 1998: Food was looted in Nicaragua as a result of poor provision in the disaster areas. An armed group forced its way into a storage depot containing nternational aid supplies. The police responded by making arrests. In Honduras the government imposed a curfew and instructed the army to deploy all necessary measures against looters.

10. Flooding and landslides in Venezuela, 1999: After one of the most severe natural disasters in Latin America, looting was widespread. Soldiers fired warning shots in order to protect the delivery of food supplies. According to reports by human rights organizations, in the process of re-establishing public order alleged looters were subject to summary executions.

12. Hurricane Ivan in Haiti, 2004: The distribution of international aid supplies was accompanied by violence; convoys were looted and lorries stolen by force. Armed gangs posed a considerable security problem during the entire emergency aid operation. Source: Carius et al 2006, WBGU 2007

Destabilizing storm and flood disasters in Southern Asia

2.* Typhoon in East Pakistan, 1970: 300,000 victims to a typhoon in East Pakistan (today's Bangladesh). Dissatisfaction over government's insufficient aid measures led to strengthening of separatist opposition. Government responded with repression and violence. Civil war claimed about 3 million lives. Bangladesh independence in 1971.

3. Flooding and typhoon in Bangladesh, 1974: Claiming 30,000 victims, destruction of large part of the rice crop triggered famine. In tense political situation government called state of emergency and established presidential dictatorship. Same year President was murdered by the military. Transitional military government.

4. Flooding in Orissa (India), 1980: In the course of collecting donations for flood victims, a conflict flared up between students and business owners. Severe rioting followed in which at least 34 people were injured and several hundred arrested.

5. Flooding in Bihar (India), 1987: When survivors began looting aid supplies, the police responded with force. Batons were again used against looters. In one case, the police fired shots into the crowd. The government was accused of gross failure.

6. Flooding in Bangladesh, 1988: Anti-government resistance intensified in the aftermath of the disaster. Civil unrest grew, headed by the oppositional parties. Two years of political chaos followed, eventually leading to the overthrow of the President.

9. Typhoon in Orissa and West Bengal (India), 1999: Starving survivors looted aid convoys. A group of politicians trying to get an overview of the situation was attacked by survivors. The group was only just able to escape in their helicopter.

11. Flooding in West Bengal (India), 2000: Due to delays in the distribution of aid supplies, trains and aid convoys were looted, aid workers were attacked and aid trucks were stolen. In order to protect one aid convoy, police fired warning shots. At the political level, blame was attributed to the regional state government.

Climate change and disaster risk

Climate change increases frequency of extreme weather events:

 \rightarrow Risk of damage to property and infrastructure also rises.

 \rightarrow Insurance companies will need to significantly increase the amount of capital they hold to be able to provide insurance cover at a level comparable to today.

→Given an increase in storm intensity of 6 per cent as predicted by many climate models for a rise in temperature of around 3 °C, the capital requirement of insurers for hurricanes in the USA would have to increase by more than 90 per cent (Association of British Insurers, cited in Stern 2006).

 \rightarrow It is foreseeable that the insurance market will grow, whereby premiums for insuring against climate-related losses are likely to rise and certain risks will increasingly be classed as no longer insurable (IPCC 2007b).

Disaster victims went into express and stole vital supplies.
Reports of gangland activity and violent crime.
Public order was re-established only by National Guard.
Inadequate disaster management plunged the government into a crisis of public confidence.

Hurricane Katrina

Vulnerability of river deltas to sea-level rise



Social and economic impacts of rising sea levels

Impact (% of global total)

	inipact (78 of global total)					
Magnitude of sea level rise (m)	Land area	Population	GDP	Urban area	Agricultural area	Wetland area
1	0.3	1.3	1.3	1.0	0.4	1.9
2	0.5	2.0	2.1	1.6	0.7	3.0
3	0.7	3.0	3.2	2.5	1.1	4.3
4	1.0	4.2	4.7	3.5	1.6	6.0
5	1.2	5.6	6.1	4.7	2.1	7.3

Source: Dasgupta et al. 2007.

Source: Human Decvelopment Report 2007

Population, land area and GDP as a function of elevation above mean sea level (based on 1995 data)



Source: Nicholls et al., 2008

Climate-induced increase in storm and flood disasters



Migration as a conflict constellations in climate hotspots



Conflict constellations in selected hotspots



Climate-induced degradation of freshwater resources



Climate-induced decline in food production

Hotspot



Climate-induced increase in storm and flood disasters



Environmentally-induced migration

Source: WBGU 2007

World refugees



Growth of large cities



Atlas der Globalisierung 2009

Urbanisation of Africa







Urban coastal flood risk

URBAN COASTAL FLOOD RISK

The number of people living in cities that are at risk of coastal flooding is set to increase dramatically over the coming decades in both 'high' and 'low' scenarios of economic growth and governance*.



*Low scenario = high economic growth and inclusive governance; high scenario = low global economic growth and fragmented governance

Black et al. 2011 p. 30

Exposure to cyclones and earthquakes in large cities may rise from 680 million people in 2000 to 1.5 billion people by 2050



Drivers of migration

THE DRIVERS OF MIGRATION

Many factors influence whether a person or family will migrate. Their effects are closely intertwined, so it makes little sense to consider any of them in isolation.



Black et al. 2011

Trapped populations



Double risk: Impoverished people are unable to move away from environmental threats, and their lack of capital makes them especially vulnerable to environmental changes, 33

The debate on climate refugees

"Maximalist school": projects high numbers of people affected by environmental change and forced to move due to climate change

Norman Myers (2002, 2007): possibly 250 million climate refugees by 2050

Estimates range from 25-50 million up to 1 billion

"Minimalist school": critical approach towards environmental migration and its quantification

Problem of isolating environmental factors from other migration drivers

Multicausal and complex nature of migration requires more sophisticated models to deal with causes and consequences

 \rightarrow Climate refugees: threats, victims or actors?

Direct and indirect migration-conflict linkage

Direct migration

Environmental change region A \rightarrow Migration from A \rightarrow Conflict region B

Indirect migration

Environmental change region A \rightarrow Conflict region A \rightarrow Migration from A \rightarrow Conflict region B

Factors

- ≻Area affected
- Intensity of environmental change
- Speed of change
- >Who is affected in society
- Capacity and choice
- Difference between source region and target region

Refugees in the Geneva Convention

The 1951 Geneva Convention Relating to the Status of Refugees – and the UNHCR – protect individual refugees who flee their country because of state-led persecution.

Definitions of environmental refugees/migrants

"Environmental migrants are persons or groups of persons who, for compelling reasons of sudden or progressive changes in the environment that **adversely affect their lives** or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their country or abroad" (IOM, MC/INF/288 2007: 2).

Environmentally Displaced Persons (EDPs) is used and applies to people who would fall into one of the following three categories (EACH-FOR 2009):

•Environmental migrants chose to move voluntarily from their usual place of residence primarily due to environmental concerns or reasons;

•Environmental displaced are forced to leave their usual place of residence, because their lives, livelihoods and welfare have been placed at serious risk as a result of adverse environmental processes and events;

•Development displaced are intentionally relocated or resettled due to a planned land use change.

Climate refugees have to leave their habitat, immediately or in the near future, because of sudden or gradual alterations in their natural environment related to at least one of three impacts of climate change: sea-level rise, extreme weather events, and drought and water scarcity (Biermann 2009).

Impact of climate change on movement of people

1. the intensification of natural disasters;

2. increased warming and drought that affects agricultural production and access to clean water;

3. rising sea levels make coastal areas uninhabitable and increase the number of sinking island states. (44% of the world's population lives within 150 kilometers of the coast);

4. competition over natural resources may lead to conflict and in turn displacement.

Source: IOM 2009

Influence of variables on migration post-natural disaster (results from empirical studies)

Characteristics	Influence on migration*
Race/ethnicity	Racial minorities are more likely to migrate – Morrow - Jones (USA), Myers (USA), Koerber (USA) Racial minorities are less likely to migrate – Elliot (USA)
Wealth	Poor are more likely to migrate – Morrow-Jones (USA), Myers (USA), Koerber (USA). Connected factors: living in more vulnerable areas that were densely populated - Myers (USA); suffered more housing damage – Myers (USA); did not have jobs – Koerber (USA). Better-off are more likely to migrate – Findley (Mali), Elliot (USA), Chan (Malayria), Grogory (USA Dust Powd)
Home ownership	 Homeowners less likely to migrate – Grote et al. (Sri Lanka tsunami). Non-homeowners are more likely to migrate – Grote (Sri Lanka), Chan (Malaysia), Gregory (USA Dust Bowl), Koerber (USA). Lower-income groups are more likely to rent – Peacock et al. (USA).

Influence of variables on migration post-natural disaster

Characteristics	Influence on migration*
Education	Less educated are more likely to migrate – Morrow-Jones (USA)
	More educated are more likely to migrate – Grote (Sri Lanka), Chan (Malaysia), Gregory (USA Dust Bowl), Saldana (Mexico), Findley (Mali).
Age	Older people are more likely to migrate – Morrow-Jones (USA), Afolayan &Adelekan (Sudan).
	Younger people are more likely to migrate – Koerber (USA); McLeman (USA), Findley (Mali)).
Gender	Women are more likely to migrate – Morrow-Jones (USA).
	Men are more likely to migrate – Delaney (Hurricane Mitch), EACH-FOR Project (Niger), Halliday (Central America), Delaney (Andrew). Source: IOM 2009, pp.280-281

Environmentally induced migration and intervening factors and strategies (phase 1)



Source: WBGU 2007





FINAL PROJECT REPORT

COMMENT

flucture CHARGE Future droughts will threaten food security µ450

siculory Scientists mark their tribes with tattoos p454

Families in Bangladesh seek safer are as after severe floods in 2007.

Migration as

adaptation

Mobility can bring opportunities for coping with

environmental change, say Richard Black, Stephen R.

G. Bennett, Sandy M. Thomas and John R. Beddington.

on magic tricks and card shuffles p.457 the discoverer of dendritic immune cells p460

The effects of global environmental schange, including coastal flooding, a reduced rainfall in drylands and water scarcity, will almost certainly alter a patterns of human migration. Conventional in a negative light, with many millions of people forced to move, and tension and conflict the result. Our study suggests that the picture is not soone-sided.

The study, the UK government's Foresight report on migration and global environmental change, examines the likely movement of people within and between countries over the next 50 years¹. It contends that, although environmental change will alter an already complex pattern of burnan mobility, migration will offer opportunities as well as challenges. The greatest risks will be borne by those who are unable or unwilling to relocate, and may be exacerbated by maladaptive policies designed to prevent migration. It is time for a fresh discourse and fresh research — on migration in relation to global environmental change.

International action and research are needed to identify the positive and negative outcomes of migration influenced by environmental change. Whether movement occurs within or between countries, there is a need to prepare for it and in some cases enable it. It is important to deepen understanding of how migration will affect other types of social change, such as the evolution of cities, the formation of poverty traps' and the coexistence of cultures. Current policy frameworks should take account of these factors to avoid having to deal later with impoverishment and displacement under high-risk conditions.

THE REALITY OF MIGRATION

Many people across the world are already migrating, motivated by strong socioeconomic factors. The United Nations estimates that there are about 210 million international migrants, but as many as 740 million internal (intranational) migrants². People migrate for complex reasons to improve incomes, to join fam-

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ily members, to escape persecution; and to remove themselves from environmental or other threats, often temporarily. Such >

•Environmental change will affect migration, specifically through influence on economic, social and political drivers which themselves affect migration.

However, the range and complexity of the interactions between these drivers means that it will **rarely be possible to distinguish** individuals for whom environmental factors are the sole driver ('environmental migrants').

There are potentially grave implications of future environmental change for migration, for individuals and policy makers, requiring a strategic approach to policy which acknowledges the **opportunities provided by migration**.

•Powerful economic, political and social drivers mean that **migration is likely to continue** regardless of environmental change.

People are as likely to **migrate** *to* **places of environmental vulnerability as** *from* these places. For example, compared to 2000, there may be between 114 and 192 million additional people living in floodplains in urban areas in Africa and Asia by 2060, in alternative scenarios of the future.

• The impact of environmental change on migration will increase in the future, **threatening people's livelihoods**, and a traditional response is to migrate.

Environmental change will alter populations' **exposure to natural hazards**, and migration is, in many cases, the *only* response to this. For example, 17 million people were displaced by natural hazards in 2009 and 42 million in 2010 (this number also includes those displaced by geophysical events).

• The **complex interactions of drivers** can lead to different outcomes, which include migration and displacement. In turn, these types of outcomes can pose more 'operational' challenges or more 'geopolitical' challenges. There are powerful linkages between them. **Planned and well-managed migration** (which poses operational challenges) can reduce the chance of later humanitarian emergencies and displacement.

• Environmental change is equally likely to **make migration less possible as more probable**. This is because **migration is expensive** and requires forms of capital, yet populations who experience the impacts of environmental change may see a **reduction in the very capital** required to enable a move.

• Consequently, in the decades ahead, millions of people will be **unable** to **move away** from locations in which they are extremely vulnerable to environmental change. To the international community, this '**trapped**' **population** is likely to represent just as important a policy concern as those who do migrate. Planned and well-managed migration can be one important solution for this population of concern.

• Preventing or constraining migration is not a 'no risk' option. Doing so will lead to increased impoverishment, displacement and irregular migration in many settings, particularly in low elevation coastal zones, drylands and mountain regions. Conversely, some degree of **planned and proactive migration** of individuals or groups may ultimately allow households and populations to remain in situ for longer.

The challenges of migration in the context of environmental change require a **new strategic approach to policy**. Policy makers will need to take action to reduce the impact of environmental change on communities yet must simultaneously **plan for migration**. Critical improvements to the lives of millions are more likely to be achieved where migration is seen as offering **opportunities as well as challenges**.

• Measures that prevent harmful environmental changes, reduce their impact, and **build resilience** in communities will diminish the influence of environmental change on migration but are unlikely to fully prevent it.

• Migration can represent a 'transformational' adaptation to environmental change, and in many cases will be an extremely effective way to build long-term resilience. International policy should aim to ensure that migration occurs in a way which maximises benefits to the individual, and both source and destination communities.

• Cities in low-income countries are a particular concern, and are faced with a '**double jeopardy**' future. Cities are likely to grow in size, partly because of rural–urban migration trends, whilst also being increasingly threatened by global environmental change. Future threats will **add to existing fragilities**, whilst new urban migrants are, and will continue to be, particularly vulnerable.

This report argues **against preventing rural–urban migration**, as this could lead to graver outcomes for those who are trapped in vulnerable rural areas.

In summary, the key message of this report is that migration in the face of global environmental change may not be just part of the 'problem' but can also be **part of the solution**. In particular, planned and facilitated approaches to **human migration can ease people out of situations of vulnerability.**

1. Many of the **funding mechanisms** for adaptation to environmental change are currently under discussion. It is imperative that these mechanisms are not developed in isolation from migration issues and, furthermore, that the transformational opportunities of migration is recognised.

2. Whilst the twin challenges of population growth and environmental change will pose an increasing threat to urban areas in the future, cities in many countries are already failing their citizens. Action is required before the situation becomes irreversible, to build urban infrastructure that is sustainable, flexible and inclusive.

The **cost of inaction** is likely to be higher than the costs of measures discussed in this report, especially if they reduce the likelihood of problematic displacement. Giving urgent policy attention to migration in the context of environmental change now will **prevent a much worse and more costly situation in the future**.

Research deficits

Longterm scenarios and modelling

Broad concepts of (climate) refugees

Generalised assumptions about human behaviour, often overestimating migration

➢No account for adaptation, from dikes to long-term relocation of population centres

>Multi-causality

➢No sufficient political response mechanisms and institutions to the emerging crisis

7.12. Regional cases studies: Africa and Middle East

Question: Are conflicts in Africa driven more by resource scarcity or by resource abundance?

Recommended readings:

➢Oli Brown, Alec Crawford, Climate Change and Security in Africa, International Institute for Sustainable Development, Winnipeg, Canada, March 2009, www.iisd.org.

Sections 7.2. to 7.4 of: WBGU 2007. World in Transition – Climate Change as a Security Risk, German Advisory Council on Global Change, Berlin: Springer.

Background material (optional):

>Oli Brown, Alec Crawford, Rising Temperatures, Rising Tensions, Climate change and the risk of violent conflict in the Middle East.

➢J.W. Busby, T.G. Smith, K.L. White, S.M. Strange, Locating Climate Insecurity: Where Are the Most Vulnerable Places in Africa?, in: Scheffran, J., Broszka, M., Brauch, H.G., Link, P.M. & Schilling, J. (eds.) (2012): Climate Change, Human Security and Violent Conflict: Challenges for Societal Stability, Berlin, Springer Verlag, Hexagon Series Vol. 8 (forthcoming).