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Environmental Change and Forced Migration Scenarios

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The core of the project, although certainly not the only work carried out, was the case studies. The results of both the desk research and field work are summarized in this report. The case studies have been guided by Alfons Fermin, Koko Warner, Ulrike Grote, François Gemenne, and Stefan Alscher, who also carried out some of the studies. We are all extremely grateful to Halyna Zalucky for editing, formatting and commenting on all of the Case Study Reports, which provide the basis for much of this synthesis.

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Summary

The EACH-FOR (Environmental Change and Forced Migration Scenarios) Project had two central aims: (1) to explore and describe the causes of forced migration in relation to environmental change; and (2) to provide plausible future scenarios of environmentally-induced forced migration.

These specific objectives were achieved by the systematic overview and analysis of the relevant natural and human-made environment degradation processes, as well as the socio-economic, historical and demographic contexts, in the regions studied in the project; fieldwork or desk studies in 23 case study areas; and subsequent scenario development for 6 of the case study areas. The project was funded for 2 years and the budget permitted a first scoping of the issues, development and testing of the methodology and some preliminary results and conclusions.

The extent of human-induced environmental degradation has been documented in a wide range of recent publications. The most commonly discussed environmental change resulting from human activities is climate change, but there are many other signs of environmental change, some of them closely related to climate change, such as soil degradation, deforestation and desertification. In addition, there are natural hazards, such as tropical cyclones and earthquakes that affect individuals and communities. At the same time, humans face massive social, political and economic changes as a result of economic development processes, globalisation of the world's economy and increasing communication.

The topic of environmental change and forced migration has been discussed for more than two decades both with regard to defining what forced migration is and to estimating current and potential future numbers of forced migrants. A summary of previous literature was compiled during the early stages of the EACH-FOR project. There are several estimates of future numbers of migrants as a result of climate change. The numbers are always given in millions, suggesting large flows of people. Likewise, there are available estimates of the numbers of people displaced by infrastructure projects each year and the numbers affected by both natural and technological disasters. Many studies point, however, to the complex relationships between migration and environment and the many other social, economic and political factors that play a role in decisions to migrate within a country and across borders. These earlier studies provide an important motivation for the EACH-FOR research, since the numbers are not certain and there is a clear lack of empirical research in this area.

The key findings of the EACH-FOR project are:

- Climate change is not the only potential environmental trigger for migration - the environmental problems faced by migrants, potential migrants and non-migrants in the case study areas are manifold;
- The magnitude and frequency of many environmental hazards are increasing and further environmental degradation will take place due to global warming, so pressures to migrate are increasing.

- Migration is a traditional coping mechanism but in some areas these traditional patterns have changed in recent decades due to rapidly changing socio-economic and environmental conditions;
- Migration occurs when livelihoods cannot be maintained, especially when agriculture or herding is severely affected by environmental degradation or extreme events;
- Longer term or permanent migration, in contrast to seasonal or temporary migration, is becoming more common, particularly among younger generations.
- Migration decisions are complex reflecting the interconnectedness of environmental factors with economic, social and political factors;
- People who want to leave their villages/regions/country can only do so if they have the necessary financial means and access to networks that support migration;
- The study of forced displacement as a result of dam construction provides valuable lessons regarding the resettlement process, in particular the need for participatory processes with significant support and information for those being resettled.

These findings lead to a set of recommendations:

- Development policies should support protection of natural resources and control the overexploitation of water and land resources.
- Investment is needed in activities that generate jobs without destroying ecosystems and in traditional regional industries and traditional agricultural practices.
- Investment in reducing vulnerability and improving the capacity of local communities to adapt is necessary in every policy implemented.
- Recognising that seasonal migration is a viable coping strategy in response to environmental change or degradation for many households, efforts should be made to help migrants find viable work opportunities.
- A multi-level approach is essential to reduce environmental degradation and hazards ranging from local support for reducing deforestation, soil degradation, water pollution etc. to international efforts to limit climate change.
- Education campaigns could increase understanding of the causes and consequences of environmental degradation and available options to reduce it. Training of farmers (and herders and fishers) in sustainable practices would lower environmental degradation and a need for reactionary out-migration.
- There is a strong need for interdisciplinary and transdisciplinary networks to foster dialogue between experts and a wide range of other stakeholders on questions such as adaptation strategies, the linkages between environmental change and forced migration, and processes of resettlement.
- More participatory resettlement processes that include suggestions for alternative and sustainable livelihoods for those households or individuals who are resettled would lead to better integration of migrants in resettlement locations.

There are several needs for further research that arise from this work, including extending many of the case studies that were carried out, further developing the methodology, case studies in other areas, meta-analyses of case study results and participatory processes of scenario development and analysis.

Introduction

The EACH-FOR (Environmental Change and Forced Migration Scenarios) Project had two central aims: (1) to explore and describe the causes of forced migration in relation to environmental change ; and (2) to provide plausible future scenarios of environmentally-induced forced migration.

These specific objectives were achieved by: the systematic overview and analysis of the relevant natural and human-made environmental degradation processes, as well as the socio-economic and demographic contexts, in the regions studied in the project; fieldwork in 23 case study areas; and subsequent scenario development for 6 of the case study areas.

The project team is shown in the table below.

Participant organisation name	**Short name**
ATLAS Innoglobe Ltd (Hungary)	ATLAS
United Nations University - Institute for Environment and Human Security (Germany)	UNU-EHS
Erasmus University Rotterdam - European Research Centre on Migration and Ethnic Relations (The Netherlands)	ERASMUS ERCOMER
Bielefeld University, Center on Migration, Citizenship and Development (Germany)	UNIBI-COMCAD
Sustainable Europe Research Institute Nachhaltigkeitsforschungs und Kommunikations GmbH (Austria)	SERI
Université de Liège - Center for Ethnic and Migration Studies (Belgium)	CEDEM
Universidad del País Vasco / Euskal Herriko Unibertsitatea (Spain)	UPV-EHU
Erasmus University Medical Center (The Netherlands)	Erasmus MC

This report synthesises the results of the project. More detailed information on the general overview studies, the case studies and the scenarios can be found on the EACH-FOR Website (www.each-for.eu).

The Problem

The extent of human-induced environmental degradation has been documented in a wide range of recent publications (see, for example, Steffen and others, 2004; Millennium Ecosystem Assessment, 2005; IPCC, 2007; and UNEP, 2007). The most commonly discussed environmental change resulting from human activities is climate change, but there are many other signs of environmental change, some of them closely related to climate change, such as soil degradation, deforestation and desertification. In addition, there are natural hazards, such as tropical cyclones and earthquakes that affect individuals and communities. At the same time, humans face massive social, political and economic changes as a result of economic development, globalisation of the world's economy and increasing communication.

Although knowledge about these processes (environmental change, natural hazards, migration, economic development) has been accumulating over the years, there is hardly any empirically based knowledge on the linkages between the processes of environmental change and migration. One important reason for this is that the needed empirical research requires a strong interdisciplinary approach and this has been missing. The EACH-FOR project intended to take a first step in filling the gap in interdisciplinary knowledge on the links between environment and migration.

The central question that motivated the research in the EACH-FOR project is: What role does environmental change play in shaping decisions to migrate? While there has been some research on this topic (see the summary in the next section of this report), the project consortium set out to develop a methodology to answer this question and to test that methodology in a range of case studies and draw some first conclusions on the basis of that research. A second question, which also required methodological development, was: How could environmental change in the future shape decisions to migrate? Responses to this question require the development and analysis of scenarios or plausible pictures of how the future could unfold.

State of the Art on Environment and Forced Migration Research

Introduction

As Lonergan (1998) points out, migration has been described as "an extremely varied and complex manifestation and component of equally complex economic, social, cultural, demographic, and political processes operating at the local, regional, national, and international levels". Environmental change is also extremely complex, with multiple and interacting driving forces, feedbacks, and linkages across time and space.

The topic of environmental change and forced migration has been discussed for more than two decades both with regard to defining what forced migration is and to estimating current and potential future numbers of forced migrants. As pointed out in an earlier section, however, there has been little empirical research on this topic. A summary of previous literature was compiled during the early stages of the EACH-FOR project and is available from the project website. Renaud and others (2007) also provide an overview of earlier findings. More recent summaries were presented at the conference "Environmental Forced Migration and Social Vulnerability" held under the auspices of the EACH-FOR project in October 2008 (Afifi and Jäger, 2009).

Here we summarize some of the main trends in the previous literature to provide context for the work carried out in the EACH-FOR project.

Defining and Characterizing Forced Migration

The International Association for the Study of Forced Migration (IASFM) describes forced migration as a general term that refers to the movements of refugees and internally displaced people as a result of conflicts and persecution, as well as people displaced by natural or environmental disasters, chemical or nuclear disasters, famine, or development projects. Recognising that there is much debate within the international community about the definition of the term "environmental refugee (migrant)", the EACH-FOR project produced a definition of terms during the first year of the project. For the purposes of the project, the collective term Environmentally Displaced Persons (EDPs) is used and applies to people who would fall into one of the following three categories:

Environmental migrants (people who chose to move voluntarily from their usual place of residence primarily due to environmental concerns or reasons);

Environmental displaces (people who 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 (natural and/or triggered by people);

Development displaces (people who are intentionally relocated or resettled due to a planned land use change).

Many observers note that forced migration is complex. The study of forced migration is multidisciplinary, international, and multisectoral, incorporating academic, practitioner, agency and local perspectives. Three separate, although sometimes simultaneous and inter-related, types of forced migration have been distinguished according to the causal factors:

- Conflict
- Development policies and projects
- Disasters

Conflict as a cause of forced migration

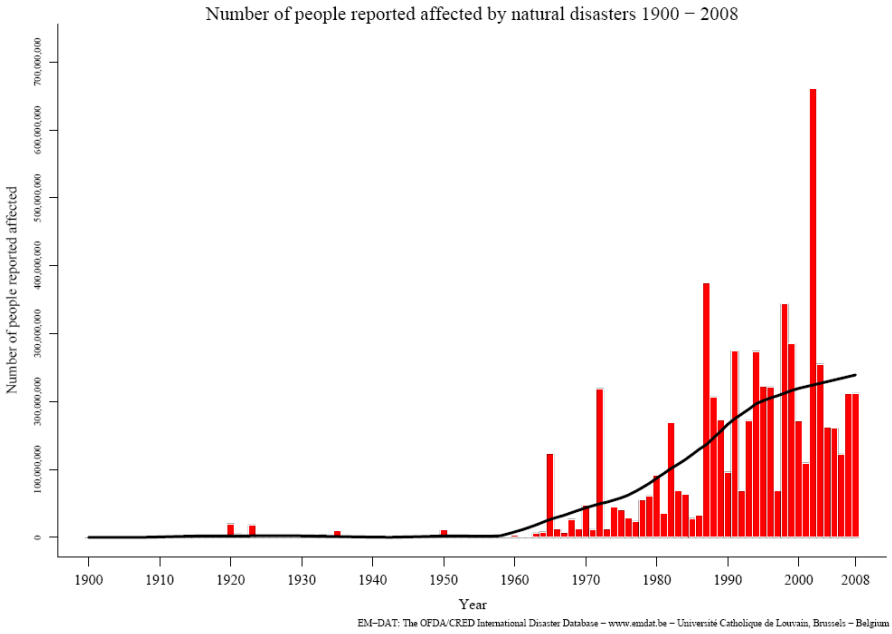
Homer-Dixon (1999) suggested that resource scarcity, made worse by environmental degradation, the inequitable distribution of resources and population growth, leads to poverty, inter-group tensions, institutional collapse and human displacement. However, these linkages have been challenged. Hartmann (1998) and Fairhead (2000), for example, find that Homer-Dixon's conceptualisation of environmental scarcity is deeply misleading and confuses distinct environmental variables. In addition, Black (2001) suggests that a review of major conflicts that have caused large-scale forced migration during the 1990s provides little evidence of a generation of environmental 'hotspots' that have developed into war. And Kibreab (1997) argues further that "in war-torn societies, insecurity is a primary cause of environmental change and consequently of population displacement and not the other way around". In summary, therefore, there does not appear to be a convincing case that environmental factors cause major violent conflicts that, in turn, lead to massive flows of forced migrants. Other factors, such as political divisions, ethnic rivalries and economic interests seem far more important in causing violence and war. Environmental issues should not be entirely discounted but must be understood as part of much broader processes of societal change (Castles 2001).

Development policies and projects as a cause of forced migration

Examples of policies and projects that can lead to migration include large-scale infrastructure projects such as dams, roads, ports, airports; urban clearance initiatives; mining and deforestation; and the introduction of conservation parks/reserves and biosphere projects.
Affected people usually remain within the borders of their home country. Although some are resettled, evidence clearly shows that very few of them are adequately compensated. It has been estimated that during the 1990s, some 90 to 100 million people around the world were displaced as a result of infrastructural development projects.

Disasters as a cause of forced migration

Natural disasters (floods, volcanoes, landslides, earthquakes), environmental change (deforestation, desertification, land degradation, global warming) and human-made disasters (industrial accidents, radioactivity) have all been shown to lead to migration. Clearly, there is a good deal of overlap between these different types of disaster-induced displacement. For example, the impact of floods and landslides can be greatly exacerbated by deforestation and agricultural activities. Estimating trends and global figures on people displaced by disasters is even more disputed and problematic than for the other two categories. But there are certainly many millions of people displaced by disasters every year. The Emergency Events Database (http://www.emdat.be/) contains essential core data on the occurrence and effects of over 16,000 mass disasters in the world from 1900 to present. The database is compiled from various sources, including UN agencies, non-governmental organisations, insurance companies, research institutes and press agencies. The figure from the EM-DAT database below shows the number of people reported affected by natural disasters between 1900 and 2008. Of course, not all of these people migrated because of the disasters but the graph does illustrate an increasing trend in the total number of people affected.



How many environmentally forced migrants?

Estimates of numbers of environmentally forced migrants and projections of future numbers are divergent and controversial. The first controversy actually concerns the naming of this category of people. While some authors, as described below, have referred to "environmental refugees", others have pointed out that the word "refugee" has a legal definition in the 1951 United Nations Convention Relating to the Status of Refugees and

does not apply to those displaced by environmental change. Thus, it has been argued that the term 'environmental refugee' should be avoided altogether. Terms such as "environmentally displaced persons" and "environmental migrants" have been introduced (see for example, Renaud and others (2007) and the discussion above).

Many have pointed to the difficulties of linking environmental change and migration and of providing numbers. For instance, Black (2001) concluded: 'this is not to say that environmental change - or indeed the existence of high risk environments with highly variable climatic or other conditions - are not factors behind large-scale (and sometimes involuntary) migration". Making any firm future projections of numbers of environmentally forced migrants is extremely difficult.

What is clear from the literature is that certain populations are becoming more vulnerable to environmental change because of other factors including poverty, resource inequality, population growth, institutional constraints and economic insufficiency (e.g., Lonergan, 1998).

The second controversy concerns estimates of the numbers. One of the earliest discussions of so-called "environmental refugees" was by El-Hinnawi (1985), who estimated that there were about 30 million such refugees and that this number would increase as a result of deteriorating environmental and economic conditions in parts of the developing world.

Myers (1993, 1994) estimated there were more than 25 million environmental refugees (10 million recognized, 15 million unrecognized) and also assumed that the total is likely to increase with increasing numbers of poor people putting pressure on the environment (Myers 1994). Myers' (1993, 1994) conservative estimate for 2050 was between 150 million and 200 million environmental refugees, mainly due to sea-level rise and agricultural failures caused by global warming and climate changes. He estimated 50 million displaced people globally due to climate change-induced famine. Myers (2001) modified his own forecasts about total numbers of people at risk of sea-level rise to a total of 162 million. He estimated that due largely to sea-level rise and flooding of coastal-zone communities, but also to increased droughts and disruption of rainfall regimes such as monsoonal systems, global warming could threaten large numbers of people with displacement by 2050 or earlier.

The World Disasters Report 1999 published by the International Federation of Red Cross and Red Crescent Societies concluded that there are 5,000 new environmental refugees every day. Forced Migration Online, a website which provides access to a wide variety of online resources dealing with the situation of forced migrants worldwide, indicates that: "it has been estimated that during the 1990s, some 90 to 100 million people around the world were displaced as a result of infrastructural development projects. It has also been reported that, on average, 10 million people a year are displaced by dam projects alone." (http://www.forcedmigration.org/whatisfm.htm)

In its Fourth Assessment Report, published during the course of the EACH-FOR project, the Intergovernmental Panel on Climate Change (IPCC), the United Nations scientific body responsible for reviewing the causes and impacts of climate change, concluded that there was a "potential for population migration" due to increases in the number of areas affected by droughts and an increase in intense tropical cyclone activities (IPCC, 2007). The IPCC

noted that many millions of people are projected to be flooded every year due to sea-level rise by the 2080s and that densely populated and low-lying areas are especially at risk, especially the mega-deltas of Asia and Africa.

Similarly, Sir Nicholas Stern wrote in his review of the economic consequences of global warming that: "Greater resource scarcity, desertification, risks of droughts and floods, and rising sea levels could drive many millions of people to migrate" (Stern, 2006).

In summary, there are several estimates of future numbers of migrants as a result of climate change. The numbers are always given in millions, suggesting large flows of people. Likewise, there are available estimates of the numbers of people displaced by infrastructure projects each year and the numbers affected by both natural and technological disasters. Many studies point, however, to the complex relationships between migration and environment and the many other social, economic and political factors that play a role in decisions to migrate within a country and across borders.

Research phases on environmentally forced migration

The research field on environmentally forced migration is, of course, still developing. Brauch (2006) identified three phases of research on environmental and security linkages: first a conceptual phase (including the work of Myers); second, an empirical phase, with many empirical research projects, led for example by Homer-Dixon, on causal relationships between environmental scarcity and conflict; and more recently, during the third phase many separate and diverse projects on aspects of the relation between environment and security , but hardly any integration of the empirical results. In addition there is ongoing work using social science approaches on migration (including work by scholars involved in the EACH-FOR project), and social geographic research on the interaction between environment and society in developing societies (including studies on sustainable livelihoods under conditions of environmental, social, political and economical changes. However, there are hardly any empirical studies on the linkages between the environmental change and migration offering insights in how important environmental factors are in migration movements.

While there is a growing body of literature on migration flows and on causes and mechanisms of international migration, these studies focus mainly on social, economic and political motives for migration, and not on environmental motives. In general they depart from the perspective of the receiving societies (in Europe, the USA) and not from the sending society's perspective. An important study with regard to causes and mechanism of migration was on push and pull factors of international migration to Europe (EUROSTAT, 2000), but the impact of environmental change as motive of migration was ignored in this project. Studies on forced migration are often connected with refugee studies (including the relation between conflict and migration), disregarding again environmental change as a motive; there is also some attention to internally displaced persons within refugee studies. Internal migration receives even more attention in social geographic research on the relation between environment and society in developing societies. However, in this research, migration is just one of the many possible responses to environmental and other changes.

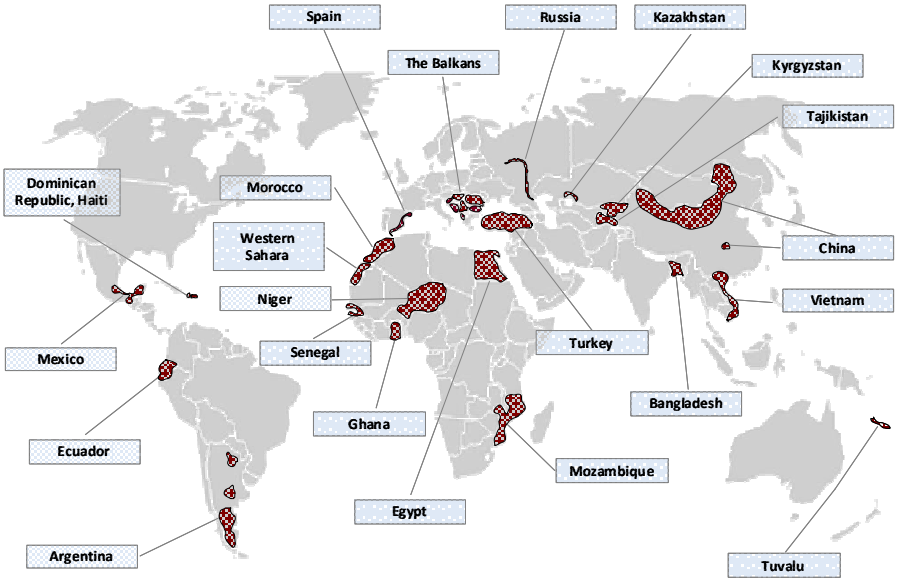
Approach taken in the EACH-FOR project

The first step in the EACH-FOR project was to produce general overview studies for each of the regions considered in the project: Europe and Russia, Sub-Saharan Africa, the Middle East and North Africa, Asia, Latin America and the Caribbean, and Central Asia. These general overviews, based on literature searches, examined the overall characteristics of the region including information about the demographic and socio-economic trends, the political context and relevant socio-cultural aspects. The main types of environmental degradation were described with an emphasis on "hot-spots" of degradation. Finally the overview studies considered the migration processes in the region including their historical development, the main patterns, trends and networks as well as migration policies.

These overviews were the basis for the final selection of case study areas where field-work or more detailed desk studies would be carried out. The following case study areas were selected:

Region	Case Study Areas
Europe and Russia	Spain, the Balkans, the Volga River Basin, Turkey
Sub-Saharan Africa	Ghana, Senegal, Niger, Mozambique
Middle East and North Africa	Egypt, Morocco, Western Sahara
Asia	Vietnam, Bangladesh, Tuvalu, China (2 cases)
Latin America and the Caribbean	Ecuador, Mexico, Argentina, Hispaniola Island
Central Asia	Kyrgyzstan, Kazakhstan, Tajikistan

The locations of the Case Study areas are shown on the map below. The focus is on developing countries and some countries in economic transition, because these countries (and in particular the population in the rural areas) are most vulnerable to environmental degradation and extreme events. For several of the case studies the field-work was sub-contracted to local researchers, because they were able to provide valuable local context for the case studies and carry out the field-work using the local language. In all case studies, local experts were consulted.



For all of the case studies, except for three studies in Europe and Russia, field-work was carried out. This involved both the carrying out of semi-structured expert interviews and the administering of questionnaires to migrants and non-migrants. The field-work activities aimed to find out:

- who has been migrating away from situations of environmental degradation/change;
- where migrants are coming from and where are they going to;
- why people have migrated;
- how environmental degradation interplays with other social, economic and political factors when migration decisions are made;
- what might have prevented people from migrating in the first place (i.e. what assistance was needed, what was lacking?);
- why people who remained in areas of environmental degradation/ change remained in their location while others migrated (why did some remain?);
- how the migration activities occurred (choice of destination, what networks were used to facilitate migration?).
- the effects of migration on the area of origin (remittances, etc.)

Interviewing experts in the case study areas

To get a general overview of the case study areas, including first answers to some of the above questions, a range of experts were interviewed. These included government officials (for example, from migration departments, environment agencies and disaster relief agencies), representatives of international organisations assisting migrants and/or displaced persons and/or refugees, representatives of international environmental organisations (for example, the United Nations Environment Programme), non-governmental organisation dealing with development and/or humanitarian and/or environmental issues and academics with expertise on migration issues, environment or development and aid. These expert interviews helped in the identification of locations where migrant questionnaires could be conducted within the countries, and in obtaining diverse perspectives and a more in-depth understanding of the environmental migration topic as viewed by individuals within the country. The experts often provided access to their networks and valuable advice on where field-work should be carried out.

Questionnaires for migrants and non-migrants

A questionnaire was developed by the EACH-FOR project team to be used to interview migrants. Due to limited financial resources and time, it was only possible to interview on the order of 30 migrants and 30 non-migrants. The questionnaire covered basic information about the respondent, such as age, gender, nationality, occupation and level of education attained. This was followed by questions on migration history, such as:

- Please tell us about your migration history of the last 5 years (2002-2007/08). Where are you residing now?
- What kind of natural disaster were you threatened by?
- Were there deaths (in the year preceding your departure) in your city / village / community because of the environmental event discussed above?

- Did the environmental problems (e.g. droughts or floods) affect your crops or livestock and thus your livelihood over the years? Was this a motive for moving away?

Once the fieldwork had started, however, it became clear that a separate questionnaire was needed for those people in the case study areas who had not migrated. This questionnaire was developed and used to discuss people's decisions not to migrate as well as their possible future decisions to move away from the area. The questions included, for example:

- How would you describe the environmental situation in your place of residence? Has the environmental quality improved or worsened during the past years?
- Could you please explain why you do not plan to move away?
- Does the person who has migrated help your family in any way, such as sending money or other kinds of help?

The full questionnaires have been published as an annex to the EACH-FOR Research Guidelines, available on the EACH-FOR website.

The questionnaires were not completely relevant in the cases considering forced displacement (Ataturk dam in Turkey, Three Gorges Dam in China) and in these cases the researchers relied on interviews with those who had been displaced, asking about the circumstances and consequences of the displacement.

The results of the questionnaires and interviews have been analysed and reported in the Case Study reports, available on the EACH-FOR website. Since both time and financial resources were limited, the number of questionnaires in each case study area does not allow for robust statistical analyses of the responses. However, the general trends provide numerous insights into the decisions to migrate or not to migrate or the processes of forced displacement.

For three case studies in Europe and Russia (Spain, the Volga River Basin and the Balkans) no field work was carried out, since it was assumed at the start of the project that enough information would be available in published literature. In the Volga River Basin three expert interviews were carried out to supplement the literature review. In fact, however, these case studies did indicate a need for more local field-work to provide information on the linkages between environmental change and migration.

The overall results of the case studies including key policy recommendations have been summarised in a set of Policy Briefs, which are reproduced in the next section of this synthesis report.

Key Findings of Case Studies

Europe and Russia

Spain (A. Fermin)

Overview

Source:
Provinces of Spain with Almeria (and Murcia) circled www.on-spain.com/geography.html

The relation between migration and environment in Spain has been examined from a historical perspective. Within Europe, Spain is the country most severely affected by droughts and water shortage, and it will be hit hardest by expected future climate change. Within Spain, the Southeast region – together with the Ebro basin – experiences the impact of water shortages most severely. The case study focuses on the Southeast of Spain, and more specifically on Almeria, the most Eastern province of Andalusia. Spain has experienced enormous social, economic and political transformations during the 20th century. Its development into a highly developed and democratic state went along with its transformation from an emigration into an immigration country. The main environmental problems in Spain are water shortages, droughts, soil degradation, desertification, wildfires and oil spills. All of these environmental problems – except oil spills – are typical for the Southeast region. Environmental policies, legislation and structures have been developed and implemented to deal with these issues, including EU environmental legislation. The complex division of responsibilities between the national government, the Autonomous Communities and the provinces, however, often complicates the implementation of these laws and policies.

Cases and Methods

This study examines the changing relation between migration, environment and development in Southeast Spain from the late 19th century onwards. The focus is on Almeria, because of the spectacular transformation of the agricultural sector in this semi-arid region in combination with the availability of secondary sources. This study consisted of desk research only. Since studies on environment and migration in (Southeast) Spain are scarce, the importance of the environmental factor in migration could not be shown definitively. However, the transformation of the relationship between environment and migration due to development dynamics can be shown.

Key Findings

- Almeria - as parts of Murcia - was an underdeveloped region within Spain until the 1970s. Environmental factors played an important role: the extreme aridity of the region and the capricious rainfall - in combination with petty land ownership - inhibited the development of agriculture.
- Soil degradation and heavy deforestation are to a large extent of human origin in Almeria. The temporary resurgence of mining activities in the 19th century caused heavy woodcutting. The sudden population increase by – temporary - migration led to a further exhaustion of forests (firewood) and cultivation on marginal grounds. Almeria's

isolated location, behind mountain ranges with limited transportation links, reinforced the exhaustion of its natural resources and desertification processes.

- Environmental disadvantages for traditional agriculture (especially water shortage) in combination with poverty and economic underdevelopment pushed Almeria's population out, attracted by more promising economic opportunities elsewhere. Emigration from Almeria continued in the first phase of economic development in the 1960s, as the necessary buffer against the uneven course of development and because rising levels of development allowed more people to finance their emigration.
- Intensive greenhouse agriculture on the coastal plains together with tourism has transformed Almeria from one of the poorest into one of the most thriving provinces of Spain. Economic development, improvement of transportation links, and the introduction of technology to deal with unreliable water supply enabled the exploitation of the environmental asset of the region, its mild climate, for agriculture and tourism.
- The development and flourishing of the intensive horticultural industry was made possible by the general economic upswing in Spain, introduction of innovative technologies, capital investments, EU accession and the opening of new international markets. Cheap migrant labour for the agricultural jobs plays a crucial role in keeping Almerían agriculture competitive. This attracted a huge inflow of foreign labour migrants.
- Agricultural and tourist activities consume a large amount of water. These activities together with the associated vast population increase and urbanisation lead to an increasing stress on and even exhaustion of scarce water and land resources. The agro-environmental legislation and policies are often implemented inadequately.

Key Policy Recommendations

- The combination of the semi-arid climate, underdevelopment and isolated position of a region may easily reinforce processes of exhaustion of natural resources and desertification. Development policies should reckon with these risks.
- Emigration – both internal and international – is an essential element of processes of economic development and modernisation. Policies to curb migration will impact negatively on the livelihood security and economic development of a developing region, and may even accelerate the overexploitation of natural resources.
- Rapid economic and agricultural development and associated population growth in vulnerable, semi-arid regions require appropriate policies to control non-sustainable overexploitation of (ground) water and land resources to prevent the extension of desertification.
- Modified agricultural subsidies could encourage crop cultivation more suited to the semi-arid climate.

Russia / Volga (A. Fermin, I. Molodikova)

Overview

The Volga River Basin(VRB) is the largest European river basin system and constitutes a central region of Russia in demographic, economic and geographic terms. About 59 million people or nearly 40% of the Russian population live in the region, which produces almost 45% of the industrial and 50% of the agricultural production of the country. It includes regions that have a gross national product that exceeds the national average, but also areas of economic depression and poverty. Migration patterns in Russia have changed dramatically since the collapse of the Soviet Union in 1991. In the 1990s, forced migration of mainly ethnic Russians from Central Asia and the Caucasus to Russia dominated. Since 1997 these flows diminished, and labour migration from CIS countries to Russia started. Since 2001, Russia's restrictive migration policy led to increasing numbers of irregular migrants. This policy was replaced by a more liberal policy in 2007, to counteract the steady population decrease and associated labour shortages in Russia. This liberal migration policy led to a sudden increase in numbers of migrants, due to the legalisation of irregular migrants.

Volga River Basin
Source: CABRI-Volga Project http://cabri-volga.org

Cases and Methods

The Volga River Basin is an interesting case study region because of the vast forced displacement of people due to dam and reservoir construction projects during the Soviet era. Currently, the main environmental risks in this region are related to industrial activities and pollution, both as a heritage of the past and as a product of more recent economic developments. The definition of the case study area diverges somewhat from the natural basin, excluding the Moscow region and some other federal oblasts around the capital Moscow because here the developments in the capital determine the migration processes to a great extent. This case study explores the relation between environment and migration through desk research of the past and current situation, supplemented with 3 expert interviews.

Key Findings

- 11 large dams and reservoirs were built along the Volga River and its major tributary the Kama between the 1930s and the 1980s. Altogether nearly 650,000 people were resettled from the areas of the future reservoirs along the Volga and the Kama rivers over the period of fifty years, and nearly 2.4 million ha of land were flooded.
- Resettlement was very brutal in the Stalin era. Thereafter it was less brutal, although the local population was by no means consulted. The construction of Cheboksary dam reservoir in the 1980s as the last in the chain of Volga dams was the only case in which the public had an opportunity to participate at least in discussion. Immediately a conflict

of interests emerged between upstream and downstream regions, and until today this conflict is unresolved.

- The regulation of the river course with dams did have many positive effects, opening the region to numerous possibilities in terms of industrial and rural development, the exploitation of rich oil and gas deposits, hydroelectric power, and the extension of irrigation areas. The biggest environmental problems today originate from the major chemical and petro-chemical industrial complexes, air and water pollution originating from large cities, efforts in maintaining the navigability of the river and salinisation and water-logging of irrigated lands. Water pollution remains a major issue.
- Natural flooding is not a major issue any more due to river regulation, except in some upper tributaries of the Volga and Kama Rivers. Here occasional flooding has some minor impact but it does not lead to permanent outmigration; the population has adapted to such risks.
- Migration flows since 1991 within the VRB were similar to general migration patterns typical for Russia: incoming forced migration of the ethnic Russian population from Central Asia and Caucasus, followed after 2000 by labour migration from Ukraine, Belarus and Moldova. At the same time there is a constant outflow of people, especially from rural areas and from small towns where the socio-economic and sometimes the environmental situation is unfavourable, towards major cities, capital cities such as Moscow and to some extent abroad.
- Analysis of statistical data shows that environmental reasons for migration are a negligible motive for internal and international in- and outmigration in the VRB region. It may be a motive for migration from or to some specific local sites, but to find such particularities case study research in local contexts is required.
- Only in a few places of chemical production were levels of water, soil and air pollution so high that they indeed caused some migration, especially among young people. But this is limited in scope.

Key Policy Recommendations

- There is an urgent need for strengthening of the banks of reservoirs most subject to bank erosion. Strengthening of the banks is very costly, so federal help is necessary.
- Many of the existing dams and reservoirs have been operating for over 30 years and are becoming worn-out; they are in need of maintenance activities. The same applies to the east-west oil and gas pipeline transportation systems that intersect the Volga basin.

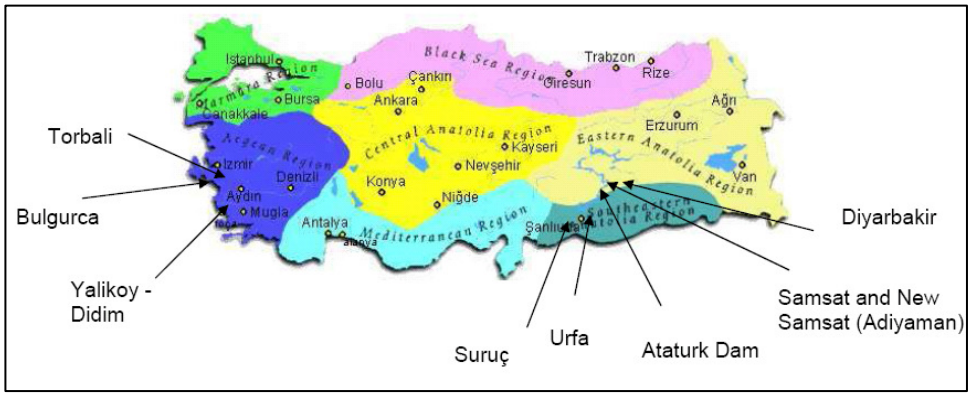
Turkey (Z. Kadirbeyoglu)

Overview

Most significant environmental problems in Turkey stem from a) rapid and unplanned urbanisation and industrialisation, which lead to air and water pollution; b) intensive agricultural production beginning in the 1950s – excessive use of pesticides and insecticides, which lead to water and soil pollution c) erosion; d) toxic wastes; and e) marine pollution. The first Environment Code was legislated in 1982 and was followed by various regulations focusing on air, water and soil quality, disposal of hazardous waste etc. In Turkey, economic development, which started gaining pace in the 1950s, increased already existing regional imbalances in incomes and living standards such that migration became attractive for many rural inhabitants.

Cases and Methods

This study examines two cases: the construction of the Ataturk Dam in the southeast of Turkey and the depletion of groundwater sources in Suruç, both of which led to significant migration. Ataturk Dam, for which the construction was between 1983 and 1992, displaced 113,476 people (Guler Parlak, 2007:11). The involuntary resettlement of displaced people was managed by the state. The displaced could either ask for monetary compensation to resettle on their own or ask for the state to resettle them in a rural or an urban area. In Suruç groundwater reservoirs were depleted in the 1990s and the majority of the population was forced to migrate. Suruç had abundant groundwater and farmers began cultivating cotton by using pumps installed after the late 1950s. Over the years the level of groundwater started to drop significantly. The water started to vanish in the 1990s. Those whose livelihood depended on irrigated agriculture migrated to the city-centres in the region or to other Turkish cities. Some became seasonal migrants and rented land elsewhere or became sharecroppers and continued agricultural production while others changed sectors. During the fieldwork in 2007/2008, 14 expert interviews, 28 interviews with those displaced by the Ataturk Dam, and 20 interviews with those who had to leave Suruç were conducted.



Key Findings - *Development-induced forced migration*

Those resettled by the state:

- New homes were not ready on time and the move was problematic as most migrants stayed until the waters flooded their village;
- Resettlement outside the region created cultural adaptation problems and migrants were discriminated against by the locals. In the case of participatory resettlement plans, the new settlement area in the region lacks employment opportunities.

Those who chose to self-resettle:

- The confiscation compensation was not sufficient and was paid in three instalments which made it very difficult for migrants to buy new homes as real-estate prices skyrocketed.
- Except for very large landowners all displaced households suffered negative consequences.

Key Findings - *Drought-induced forced migration*

- All sectors of society were impacted (not only the farmers): shop and restaurant owners, truck drivers, and merchants migrated.
- The most socially vulnerable migrate seasonally as agricultural or construction workers. Those who could afford to migrate and those who had relatives elsewhere in Turkey migrated permanently to larger cities.
- There was no state support for those who had to migrate. There is a project to deliver water to Suruç from Ataturk Dam but the project has been postponed for the past 10 years.

Key Policy Recommendations

Development-induced forced migration

- Resettlement location should be decided in a participatory manner. The problems of adaptation could be reduced if the state attempts to resettle villagers to state-owned land close to their villages. New employment opportunities should be promoted.
- There were significant levels of distrust of the state and in its ability to provide migrants with appropriate housing. More information regarding the development project is necessary. The information should be distributed widely and come in different formats to be more convincing.
- There should be more serious guidance for the displaced people, including training for new jobs and financial guidance for those who received confiscation compensation. Especially important is that small landowners and landless farmers be given the option to be resettled by the state where they could get a small plot and a house.

Drought-induced forced migration

- The state should be more involved in the regulation of natural resource use. There should be closer monitoring and enforcement of rules in order to prevent depletion of natural resources.
- If the impact of the environmental stressor is not preventable, then the state should be active in creating new employment opportunities or assisting those who decide to migrate.

The Balkans (A.Vag)

Overview

Poverty is a common feature to all countries of the Balkans. In the last 30-40 years the Balkans has witnessed the largest set of population movements in Europe, including labor migration to northern Europe in the 1960s and 1970s from Yugoslavia, and displacements as a result of conflicts in Croatia, Bosnia Herzegovina and Kosovo in the 1990s. Polls carried throughout the Balkans repeatedly show that 50-70% of young people would leave their countries at the first opportunity. The reasons are lack of socio-economic perspectives, poverty, and unemployment.

The Balkans and its neighbours

Source: http://stevecotler.com/tales/wp-content/uploads/2008/02/balkan_map.gif

Major economic problems, such as low level of investments, extensive underground economies and aid addiction persist and mainly because of these the levels of unemployment are high. Institutional weaknesses and the problems of governance are highly visible in the region. Most of the governments append low priority to environmental matters. Of course poor policies can partially evidenced by budgetary constraints.

Cases and Methods

This short summary deals with Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Former Yugoslav Republic (FYR) of Macedonia, Romania and Serbia and Montenegro which is the extension of the Western Balkans with Romania and Bulgaria.

Key Findings

- The **level of adaptation to environmental degradation**, as an overall national attribute, is relatively low in the region.

- The level of implementation of international **environmental adaptation targets** and strategies, manifested by the signatures of multilateral environmental agreements (MEAs), can be further extended.
- The level of **governmental support** of individual and community adaptation to environmental problems can be further improved.
- The size of the **population impacted by environmental degradation** is rapidly changing in many sub-regions.
- The impact of environmental degradation on **unemployment** is a link that partially explains **poverty**.
- The speed of **environmental innovations and technologies** spread can be further accelerated.
- The **attitudes towards out-migration** in the Balkans seem to be supported mainly because of the long tradition of migration from the former Yugoslavia to Western Europe.
- The **willingness of the elite to reduce inequalities** (incl. environmental inequalities) is manifested in different ways.

Key Policy Recommendations

- The level of national adaptation to environmental degradation can be improved by strengthening the relevant institutions and lawmaking.
- The level of implementation of international environmental adaptation targets and strategies can be increased by the signatures of specific multilateral environmental agreements, the employment of more international environmental standards and serious commitment to the development of environmental strategies.
- The level of governmental support of individual and community adaptation to environmental problems may take different forms, from direct aid in case of environmental disasters via economic support of environmentally degraded regions or sectors to the promotion of civil sector organizations.
- The impact of environmental degradation on unemployment can be decreased (among others) by better articulated unemployment policies and regional development policies.
- The spreading of environmental innovations and technologies can be supported by a number of policy factors, for example economic instruments (e.g. taxation, financial supports) and legal instruments.
- The internal cooperation between individuals and communities to adapt can be facilitated in different ways. The general abilities of the poor (mainly rural communities) to adapt have the highest importance. Education programs, policy support of partnership agreements, subsidiarity-based governance would definitely contribute to the spreading of internal cooperation.
- The specific recommendations concerning environmental remediation and adaptation are the following: intensifying flood prevention, continuing the de-mining processes and activating the anti-landmine organizations, and putting much more attention on industrial (and other) pollution.
- The specific recommendations concerning socio-economic and political questions are: continuing fight against poverty, developing and applying roma inclusion and integration programs, and further improving the performance of institutions in different ways (e.g. by education). The most important political objective of the region is accelerating the European integration process.

NIS and Central Asia

Kyrgyzstan (E. Nasritdinov, M. Ablezova, J. Abarikova, A. Abdoubaetova)

Overview

The Kyrgyz Republic (or Kyrgyzstan) is a small landlocked country that is situated in the middle of the Central Asian region. The republic gained its independence after the collapse of the Soviet Union in 1991. It shares its boundaries with China in the south-east, Kazakhstan in the north, Tajikistan in south-west and Uzbekistan in the west. Kyrgyzstan is a mountainous country: about 96% of the territory of the Republic is located 1000 meters above the sea level. The Kyrgyz Republic covers an area of 198.8 thousand square kilometers (5.3% - forests, 4.4% - lakes & rivers, 54.1% - agricultural lands, 36.2% - other).

The collapse of the Soviet Union had a substantial impact on the Kyrgyz economic and social welfare. As a result of drastic political, economic, social, and cultural transformations, GDP was halved from its 1990 level by 1995. Since 1998 however, the annual growth rate has stabilized at about 5%. The major drivers of economic growth are services, industry and agriculture. Although almost half of the population is employed in agriculture, it contributes only modestly to the Kyrgyz economy.

Kyrgyzstan is the second poorest country in the Europe and Central Asia region. As a result of economic and political reforms in the 1990s, migration became the number one issue in the Kyrgyz Republic. High unemployment rates, a decrease in living standards, shortage of land (especially in the Southern regions) and lack of social protection are the main factors causing large-scale migrations, both internal (mainly from rural areas to secondary urban cities, the capital city Bishkek and surrounding areas in the Chui and Issyk-Kul provinces) and external (predominately to Russian and Kazakhstan).

Map of Kyrgyzstan
Source: CIA World Factbook

Cases and Methods

The research team conducted fieldwork in 9 territories or settlements in Southern and Northern Kyrgyzstan: Min-Kush and Chaek (Naryn province), Kaji-Sai (Issyk-Kul province), Mailuu-Suu (Jalalabad province), Kara-Sogot, Nichke-Sai, Kara-Kulja, Kurshab and Manas Aiyly (Osh province). Sample sites were selected based on prior knowledge of the level of environmental degradation and the high rate of out-migration based on expert opinion. Four techniques were used to answer the research questions: in-depth expert interviews, semi-

structured field interviews and face-to-face structured interviews with migrants and non-migrants.

Key Findings

Migration processes in Kyrgyzstan have a strong environmental flavour and environmental problems causing migration and displacement of large groups of people bring only negative, deteriorating impacts on the life of local regional communities. The survey results show that the environmental situation has become worse for all informants. Two main environmental problems were identified: landslides and radiation from uranium waste. The uniqueness of environmental migration is that very often it is not a choice, but the only solution and in thiscase there is no winner: both those who migrate and those who stay – are losers. Their social networks, built over their lifetime, are destroyed. Their livelihood strategies, inherited from the generations of their forefathers, become meaningless. Their culture, strongly connected to the tribal identity and unity, disappears. Current governmental policies in Kyrgyzstan however, deal mostly with consequences not addressing the real causes. There is a need for both top-down and bottom-up initiatives for preserving the slopes, forests, lakes and rivers of Kyrgyz Mountains. The research also points to the interconnectedness of environmental factors with economic, social and cultural factors affecting the migration flows of people.

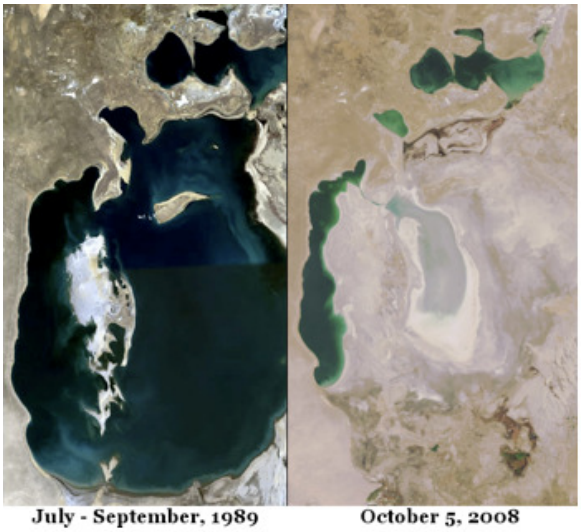
Key Policy Recommendations

- An education campaign is needed to explain both the dangers of overgrazing and methods of control.
- A revival of the traditional indigenous methods of animal husbandry and agriculture could help many Central Asian communities recover the lost ecological balance.
- A long-term program is needed for resettlement and proper medical treatment of three generations of people, who lived in the settlements affected by radioactive waste.
- Better planning is needed before migrants are resettled.
- Another long-term goal is to revive regional industries, which were functioning during the Soviet times. This will require a full inventory of existing infrastructure, analysis of the potential for revitalisation, attraction of investors, etc.
- The government should acknowledge the status of environmental migrant and establish a continuous financial support in the form of at least a small allowance.

In the authors' view, these policy recommendations should be a part of the bigger international effort to address the needs of environmental migrants. Sharing of experiences from other countries would help Kyrgyzstan especially in terms of lessons learned in other mountainous territories of the world.

Kazakhstan (D. Bulesheva, A. Joldasov)

Overview



Kazakhstan is a large Eurasian country, between China and Eastern Europe and is classified as a part of Central Asia. Ranked as the ninth largest country in the world as well as the world's largest landlocked country, it has a territory of 2,727,300 km². It is bordered by Russia, Kyrgyzstan, Turkmenistan, Uzbekistan and China. The country also borders on a significant part of the Caspian Sea. Vast in size, the land in Kazakhstan is diverse - flatlands, steppes, taigas, rock-canyons, hills, deltas, mountains, snow-capped mountains, and deserts. The Kazakh Steppe (plain), with an area of around 804,500 square kilometers, occupies one-third of the country's territory and is the world's largest dry steppe region. The steppe is composed of large areas of grasslands and sandy regions. Important rivers and lakes include: the Aral Sea, Ili River, Irtysh River, Ishim River, Ural River, Syr Dariya River, Charyn River and gorge, Lake Balkhash, and Lake Zaysan.

As a former site of the Soviet Union's nuclear testing programs, Kazakhstan suffers from a considerable number of human-made environmental disasters. Several areas have been exposed for a long time to high levels of nuclear radiation, and there is significant radioactive pollution. Semipalatinsk is one if these places. The Semipalatinsk Nuclear Testing Polygon (SNTP) was established on August 21, 1947. Embracing three provinces in the east - Eastern Kazakhstan, Karaganda and Pavlodar, SNTP occupies an area of 18,500 square kilometers with a perimeter of 600 km. Nuclear tests were performed between 1949 and 1989. These tests resulted in the formation of the "atomic lake" Balapan, plus radioactive gas emissions into the atmosphere, environmental damage and negative health implications for people living in areas adjoining the SNTP site.

Besides nuclear programs, Kazakhstan inherited the disasters resulting from agricultural and industrial policies. One of these notorious sites is the Aral Sea. The Aral Sea is fed by the two great Central Asian rivers, the Amu Darya and the Syr Darya. During the Soviet period, a substantial expansion in cotton cultivation led to the massive diversion of water from these rivers for irrigation. As a result of the diversions and inefficient usage, less and less water was available to replenish the sea, which started shrinking rapidly. Between 1960 and 1990, the Aral Sea retreated to half its size (from 66,900 to 36,500 square kilometres) and its volume dropped by two-thirds (from 1,090 to 310 cubic kilometres). By the late 1990s, the sea had reportedly lost 90 per cent of its volume. The drying out of the Aral Sea, once the fourth largest lake in the world, has had far-reaching consequences for the climate and biodiversity of the surrounding region.

Cases and Methods

The research team conducted fieldwork in 3 territories/settlements in South-western and Eastern Kazakhstan: Aralsk town (Kyzylorda province), Semei town (East Kazakhstan province), Almaty city and outskirts (Almaty province). Sample sites were selected based on prior knowledge of the level of environmental degradation and the high rate of out-migration.

Since the Semipalatinsk Nuclear Testing Site and the Aral Sea regions were officially recognized as the places of environmental disaster, 2 of the 3 sampled settlements are located in these parts of the country. The two sites were selected to conduct interviews with non-migrants or potential candidates for migration. Almaty city was chosen for two reasons. First of all, this city concentrates historically many industrial assets and thus belongs to the sites with the most polluted air, water and ground. Second, as most of the internal migrants go to Almaty in search of jobs and better lives despite the high level of pollution, the city was selected to conduct questionnaires with migrants.

Key Findings

- Kazakhstan is affected by environmental hazards of different kinds, both human-made and natural.
- Harsh economic realities and the absence of development mark the start of an environmental migration chain.
- When people moved to a place allocated by the government, their livelihood was not enhanced. New places were worse than the previous ones because all good arable lands are already taken.
- However, when individuals chose to migrate to large cities, their economic situation could be significantly improved. Young people, especially, were likely to choose this migration pathway.
- Many places affected by environmental degradation have experienced significant out-migration flows. Environmental degradation was often associated with poor economic conditions.

Key Policy Recommendations

- Environmental problems need to be acknowledged as causes of migration in migration policies.
- The human rights of migrants need to be better protected.
- A regional cooperation scheme should be pursued in this regard.
- Programmes aimed at a better integration of migrants in the places of destination need to be fostered.
- Better information on the linkages between environmental degradation and migration is needed, especially from a quantitative point of view.

Tajikistan (P. Khakimov, M. Mahmadbekov)

Overview

Tajikistan is a mountainous country. The absolute heights of the country are from 300 to 7,495m. The western deserts and semi-deserts of the Turan lowland merge with the foothills in the east. Further to the east, there are the huge mountain ranges of the Tibetan plateau and Tian Shan. This geography results in great diversity of natural conditions and environments.

Due to the specific climate conditions and landscape, the mountains of Tajikistan are considered to be the main glacial area of Central Asia. Glaciers retain huge amounts of water and regulate river flow and climate. Glaciers and snowfields are the main source of water replenishing the Aral Sea. Glaciers occupy more than 8,400 sq. km., which is about 6% of the total area of the country. The total number of glaciers is about 8000. Environmental problems of the country include landslides, floods, and soil degradation.

Map of Tajikistan
Source: www.worldatlas.com

Cases and Methods

Research suggests that about 95% of Tajikistan's territory is subjected to the increased risk of environmental degradation. Hence the decision was taken to investigate different areas of the country, affected by different types of environmental migration. Research was conducted in Spring 2008 in all districts of the Vaksh valley (Djami, Vaksh, Kumsangir, Jilikul, N. Khisrav, Shaartuz, Kabodijan, Bohtar, Javan), but also in the Kanibadam, Isfara and Asht districts in the north of country.

Interviews and meetings were conducted with experts (researchers, representatives of the Government agencies and departments, NGOs and international organisations), as well as with migrants and people affected by environmental degradation.

Key Findings

- Most environmental problems are closely related to water. 60% of the water in Central Asia is located in Tajikistan.
- Landslides, mudflows and floods are the most common environmental problems that lead to migration of people. Earthquakes are also a reason for migration.
- Currently the different kinds of land degradation have not yet become a reason for migration, because most of the non-migrants interviewed in the region said they had other important sources of income (mostly seasonal international labour migration) and were willing to remain in their homeland until their house is destroyed. These people remain potential migrants.
- The resettlement process, which includes land for building a house, a built house and some financial compensation, is sponsored by the government and some international

organisations that help displaced persons. Among the resettled people interviewed, different levels of satisfaction with the resettlement process were observed.

Key findings from the interviews with migrants were as follows:

- The main deterrents of migration are the presence of other sources of income and means of subsistence (external and internal seasonal or temporary labour migration of family members), unwillingness to leave the native places of ancestors, the absence of the possibility to move independently, since the financial possibilities of the family are restricted, as noted by many respondents. However, all interviewees are potential migrants and they are ready to leave given the least chance for migration.
- The increased frequency of landslides is the result of the low educational level of population regarding the environment and inappropriate use of the land and the construction of dwellings in the places with a high risk of mudflows.
- The complete destruction of the house due to a natural disaster (e.g. landslides in the village Kiblai, Rudaki district) leads to migration.
- The majority of forced migrants have contacts with the place of origin and are employed (continue to work) in the agricultural sector. The land provided by the authorities for the organisation of dehkan farms is one of the sources of income for their families.
- For the majority of migrants, migration caused by environmental degradation has only happened once in their life.
- Some of them had experienced migration in the distant past, when they were forced by authorities to move for the development of virgin lands in 1930-1970.

Key Policy Recommendations

- The development of a market for different kinds of insurance would help reduce migration connected with degradation of the environment.
- Resettlement of the population at governmental level must be supported by both sides (migrants and government), because the migration streams are mainly from low to high living conditions. Providing better conditions in places of destination compared to places of origin requires different resettlement policies.
- Better information on environmental conservation and disaster prevention could help reduce the flows of environmentally-triggered migration.

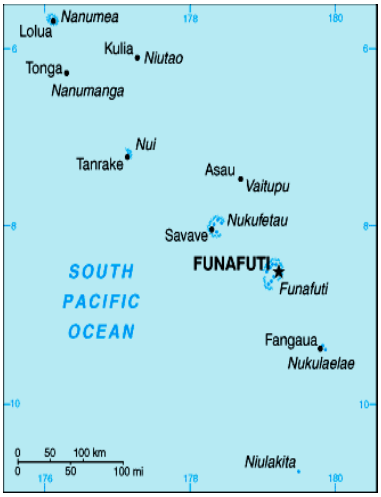
Asia

Tuvalu and New Zealand (F. Gemenne, S. Shen)

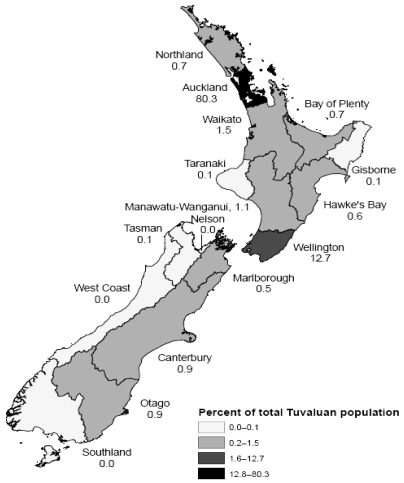
Overview

As one of the smallest and most remote low-lying atoll countries on earth, Tuvalu seems to exemplify a typical case of forced migration induced by environmental change. Tuvalu has been perceived through the lens of environmental displacement and vulnerability to climate change - a perception that has been consistently reinforced and sustained by the discourse of its government and media interests.

Tuvalu is one of only five countries comprised entirely of low-lying islands and atolls, which are 'rings of coral reefs that enclose a lagoon'. Despite a vast territory spreading over 750,000 square kilometres in the South Pacific Ocean, its land area is limited to only 26 square kilometres making it the fourth smallest sovereign nation of the world, after Vatican City, Monaco and Nauru. One main characteristic of Tuvalu's geography, and the one that draws most of the attention, is its low elevation. Tuvalu is topographically flat with an average elevation of one meter above sea-level and its highest peak at a striking 5 metres above sea-level. Due to its low elevation, Tuvalu is extremely vulnerable to sea-level rise and other climatic events. Other environmental problems also affect the small archipelago, including water stress, waste disposal and overpopulation-related problems. There are currently about 3,000 Tuvaluans living in Auckland (New Zealand). Many of these migrants were prompted to leave, to a certain extent, by environmental concerns.



Map of Tuvalu
Source: CIA World Factbook



Tuvaluan population in NZ
Source: Statistics NZ

Cases and Methods

The research for this case-study was conducted in Tuvalu in July 2007 and in Auckland in the Fall 2007. Two sites were selected for the research, which was conducted both in the origin and destination countries. In Tuvalu, interviews were conducted in Funafuti, the main and capital atoll, and also the departing point for New Zealand. In New Zealand, the research was conducted in Auckland, where most Tuvaluans live. A total of 44 interviews were conducted with migrants, both in Tuvalu and New Zealand, according to a standardised questionnaire. A total of 28 semi-open interviews were also conducted with experts: academics, elected

officials, government representatives, civil servants, NGO representatives, journalists and church ministers.

Key Findings

- With a chain of 9 coral atolls and islets, Tuvalu is not only physically small, but also geographically flat. As the entire population lives on the coastline, the immediate threat of rising sea level is very present.
- Local knowledge of global warming is variable, but certainly the frequent saltwater flooding, accelerated coastal erosion and increased difficulty to grow vegetables and plants have all become day-to-day challenges and empirical evidence of a changing environment.
- Tuvalu's environmental problems are further compounded by water shortage, waste disposal and overpopulation on the atolls.
- New Zealand is the prime destination for those leaving Tuvalu: to many Tuvaluans, New Zealand is the place where they build their home for future generations, as a risk-reduction strategy.
- Uncertainties about the future seem to be pre-eminent migration drivers, even more than actual environmental concerns.
- Although media rumours have suggested a nation-wide resettlement agreement made between New Zealand and Tuvalu, there is no explicit policy to accept Pacific Islanders who have been displaced due to rising sea levels, but only labour migration agreements.

Key Policy Recommendations

- Constant portraying of Tuvalu as a doomed, disappearing nation might compromise its potential for future development.
- More research needs to be conducted about the impacts of climate change in Tuvalu, in particular measurements of sea-level rise. This should reduce the uncertainties regarding Tuvalu's environmental vulnerability.
- Uncertainties concern not only the impacts of climate change, but also future strategies for adaptation. These uncertainties appear to be a key driver of migration to New Zealand, and could be reduced dramatically by long-term plans and policies, in particular with regard to adaptation.
- In any case, the social and cultural cohesion of the Tuvaluan society should be the main emphasis of any long-term solution.

Vietnam (O. Dunn)

Overview

This case study has examined the linkages between flooding and migration/population displacement in the Mekong Delta of Vietnam, one of the most densely populated areas on earth. The entire flood waters of the 4400 km long Mekong River drain through the portion of the Mekong Delta located in Vietnam which has an average elevation of only 0 - 4 metres above sea-level (Be *et al.* 2007; White 2002).

Regular flooding of the Mekong River affects 40-50% of the land area across 9 Vietnamese provinces and occurs annually between July and November creating important breeding habitats for fish and distributing valuable sediments and soils in the delta environment. Thus, approximately 40% of the cultivated land in Vietnam is in this flood plain, known as the 'rice bowl' of the country. It produces more than 50% of the country's staple food and 60% of the fish-shrimp production (Be *et al.* 2007). Slow and regular flooding of the Mekong River is therefore an integral part of the livelihoods of the Vietnamese population living in the Delta (nearly eighteen million or 22% of the total population) (Be *et al.* 2007). However, varying flood levels and durations can have negative consequences, increasing the vulnerability of directly affected households and requiring adaptation strategies.

The flood depth in the Delta during the regular flooding season is between 0.5 to 4.0 metres. Flood levels reaching between 4.0 to 4.5 metres are considered 'moderate' floods and those reaching 4.5 metres or higher are considered to be 'high' or 'disaster' floods (Be *et al.* 2007; Pham 2007 pers. comm.).

Map of southern Viet Nam indicating field research sites (shaded areas).
Source: Central Intelligence Agency (2001): Viet Nam (Political) 2001
www.lib.utexas.edu/maps/middle_east_and_asia/vietnam_pol01.pdf , 04.11.2008, modified

Cases and Methods

Between October and December 2007, the research was conducted in four places (see shaded regions in map): An Giang province, Ho Chi Minh City and Hanoi (Vietnam) as well as Phnom Penh (Cambodia). 45 expert interviews were carried out with government officials, representatives from international organisations, academics, NGO representatives working on migration, environment, development, social welfare or disaster relief issues, and experts with knowledge of how migrants' lives are affected. Expert interviews were conducted in all four locations, while semi-structured interviews and questionnaires with migrants and non-migrants took place in An Giang province, Ho Chi Minh City province and Phnom Penh only.

An Giang province was selected as the site of possible migrant origin within the Mekong Delta because it is the province that experiences the highest level of flooding during the annual wet season. Ho Chi Minh City Province and Phnom Penh, as major urban centres, were selected as destination locations of migrants from the Mekong Delta.

Key Findings

While no broad-based, far-reaching conclusions on the overall situation in the Mekong Delta can be drawn from this initial scoping study, the findings do illustrate some initial patterns and important issues. The following linkages between flooding and migration were found:

- During the flooding season, people undertake seasonal labour migration and movement towards urban centres to bolster livelihoods.
- For those directly dependent on agriculture for their livelihood (usually rice farmers), successive flooding events leading to destruction of crops can drive people to migrate in search of an alternative livelihood.
- As an extreme coping mechanism, anecdotal indicators point to human trafficking into neighbouring areas as one strategy adopted by families who have suffered from water-related stressors.
- Some child care shelters in Ho Chi Minh City expect influxes of children a few months after each annual flooding season once disaster relief aid is no longer available.
- The government as part of a flood management and environmental sanitation strategy is currently undertaking planned resettlement of people living in vulnerable zones along river banks.

Key Policy Recommendations

- Further in-depth research is needed to understand the linkages between flooding and migration in the Mekong Delta of Vietnam.
- Experts on environmental and flood management issues should meet with those working on migration issues and in the social welfare sector to initiate a dialogue on environment-migration linkages in Vietnam.
- In order to avoid increasing vulnerability of people as a result of resettlement processes and possibly creating a reason for further migration, it would be helpful if the resettlement process were more participatory and included suggestions for alternative and sustainable livelihoods for those households or individuals who are resettled.
- Recognising that seasonal migration is a viable coping strategy for many households, efforts should be made to establish a facilitated seasonal work programme to help migrants from the Mekong Delta find viable work opportunities especially in urban locations.
- Efforts should be made to create opportunities for sustainable alternative livelihoods for those people living in the Mekong Delta such that they are not entirely dependent on one income opportunity.

China – Three Gorges Dam (CEDEM)

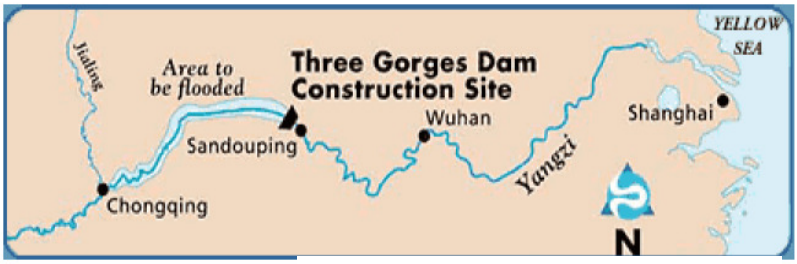
Overview

The Yangtze River is considered to be "China's Lifeline". The river has its source in the Himalayan Mountains and stretches almost 6,000 km. miles to the Yellow Sea/Shanghai. As the world's third longest river, the Yangtze flows through a region that is home to more than 320 million people. For centuries it was used as a central highway for trade, transportation, spiritual pilgrimage and in modern times as a tourist attraction. It provides sustenance for people who are living on its banks through the use of the fertile plains and fishery.

The Three Gorges Dam is the largest hydro-electric project in the world. After 13 years of construction in 2006 the reservoir had submerged 13 cities, 140 towns, 1350 villages and about 1600 factories.

In addition to producing electrical power, the second goal of the dam is flood control, as in the last 2,000 years the Yangtze River has experienced 215 devastating floods.

However, there are major environmental hazards resulting from this prestige project. Toxins from industry and mining will endanger the survival of people and animals in this area.more than 1,000 billion litres of raw sewage are dumped into the river annually. Because of the dam, natural flushing out is now impossible. Moreover some hydrologists suggest that the Yangtze's heavy load of sediment and its shifting floor of gravel could hamper the dam's turbines and fill the bottom of the reservoir, causing even worse flooding.



Flooded area
Source: PBS 2007.

Cases and Methods

The case study selected the resettlement of migrants from the Three Gorges Dam area in coastal regions as the main subject of research and fieldwork. More specifically, Chongming Island of Shanghai Municipality, Jiashan County of Zhejiang Province and Jiangsu Province were sites for in-depth interviews with migrants.

Some expert interviews were recorded with express consent of the interviewee while others refused to be recorded. Migrant interviews were noted but not recorded since, given the sensitivity of the issue, recording may result in the refusal of the interview or affect the quality of the interview.

Key Findings

In the case of the Three Gorges Dam, the whole migration process was initiated and planned by the government. The individual choice of the migrants was very limited. In general, State policies on migration are considered to be fair in terms of housing, land and financial assistance, although there is difference of degree, depending on the province, municipality, town or even village where migrants were resettled.

Migrants generally have equivalent or even better living conditions than in their home town. Nevertheless, compared to local residents, their living conditions are often of lower status. The problems they face can be summed up as follows:

- Different land quality and farming methods in the resettlement area and their hometown creates difficulties for migrants to live on farming.
- Although all migrants received housing compensation and financial assistance for housing costs, the criteria are not sufficiently transparent and the way of distribution differs from one province to another.
- One of the main complaints is the difficulty to find employment due to: language problems; low employability because of poor education; and lack of networks, government assistance, training, and access to financing for running small businesses.
- As family members of the migrants can be resettled in different provinces, care of older people in the family becomes difficult.

Hence the following conclusions can be drawn:

- Most of the migrants had little or no knowledge about the destination before the resettlement.
- It appears that no significant change occurred in material living standards after several years of resettlement.
- The social cost of such migration processes is huge. Migrants lost their social network and are separated from their close family members. The only psychological preparation they have may be that they were told that migration is a sacrifice for the country and for other people and they realized they had no choice but to leave.
- Local policy makes an important difference for the adjustment and life of the migrants after resettlement.
- The example of Chongming Island (Shanghai) shows that participation of migrants in decision-making helps both migrants and local authorities. Migrants are more likely to accept the local policy, since they feel that their opinions and circumstances are taken into account. For local authorities, participation can help them to understand the opinions and demands of the migrants and issue more practical policies.
- Individual characteristics of migrants have important impacts on life after resettlement, such as the education level, language ability, age, and professional skills. In general, younger people with better education tend to have an easier adjustment process. Gender does not seem to make a significant difference in the life of migrants after the resettlement.

Recommendations

- As often as possible, forced resettlement should be avoided. Though material conditions can be similar before and after the resettlement, social costs are often significant, and difficult to assess precisely.
- Better information and psychological preparation could be provided to migrants. This would improve their adaptive capacities in the destination region.
- Material assistance provided to the migrants should be uniform across destination regions.
- Participation of migrants in the decision-making process should be encouraged.

China – Inner Mongolia (Qian Zhang)

Overview

The Chinese province of Inner Mongolia is a region affected by desertification and overgrazing. Inner Mongolia is a vast steppe historically occupied by different minority groups who were all involved in pastoralism. Although large-scale immigration of Han peasants and reclamation of rangelands since the end of the 19th century have fundamentally transformed both the demographic features and landscape in this area, there are still around 78.8 million ha natural grassland, around 68.8% of the total area of Inner Mongolia Autonomous Region and 171,500 people in pastoral area, around 13.6% of rural population and 7.2% of the total population in Inner Mongolia. Until today, animal herding is still the main source of livelihood for people in the pastoral area.

A lot of resources and efforts have been committed to mitigating environmental problems, including the sand-storms arising in Inner Mongolia. Desertification in this area is caused by a complex combination of historical, social and political factors, as it is in other dry areas of the world. Human activities are, however, believed to be the main cause in China. Accordingly, two big programmes have been carried out in the rural area of Inner Mongolia, for "returning farmland to forestry" and "closing rangeland and resettling pastoralists", which involve resettling a large number of people. Peasants and pastoralists were encouraged, organized and subsidized to stop using their household contracted lands and to resettle in some small town or urban areas. In this way, the lands are expected to regenerate without cultivation or grazing activities and the affected people are also expected to have a better life in other places. In practice, the resettlement programs have integrated several other goals like urbanisation and poverty alleviation. Starting in 1998 and accelerating in 2001, more than 6000 people have been removed from environmentally vulnerable areas in Inner Mongolia. It was planned that altogether around 650,000 should be resettled between 2002 and 2008 within the province, with a governmental budget of more than RMB100 million (Chu & Meng 2005).

Map of china showing the location of Inner Mongolia
Source: http://en.wikipedia.org/wiki/Inner_Mongolia

Cases and Methods

Erenhot was chosen as the case study area. It is located on the border with Mongolia in the northern part of Inner Mongolia Autonomous Region. Two resettlement programs were launched in 2001 and 2006 to move pastoralists out of the pastoral area. The first program organized pastoralists to raise milk cows in a newly-built village near Qiha town and the second one subsidized pastoralists to move to Erenhot city.

Expert interviews were carried out with scholars, NGOs and governmental officials in order to get a general overview of environmental migration in China, to discover the causes of migration in relation to environmental change and to explore their association with other social, political and economic phenomena in Inner Mongolia. Further, a border city with its neighbouring pastoral area was chosen to carry out questionnaires with 15 migrants and 15 non-migrants. The aim was to find out whether and to what extent environmental change affects an individual or a family's decision to migrate.

Key Findings

Since this case study is carried out in just one township with a limited numbers of respondents, the conclusions cannot be generalized regarding the relationship between environmental change and migration in Inner Mongolia. The main findings are:

- Environmental degradation rarely in and of itself causes migration but it is a contributing factor in most migration decisions. In this case study, environmental degradation, including climate change and natural hazards, has reduced the productivity of rangeland and increased loss of animals. Consequently, pastoralists who can not get enough income have to migrate. Therefore, migration motivated directly by economic reasons is indirectly driven by environmental degradation.
- For environmental degradation, migration is used as a coping strategy much more by the government than by individuals. Although migration may reduce environmental stresses, it may increase economic and social stresses in the destinations. Pastoralists' perceptions of environmental change and their environmental identity affect the significance of environmental factors in their migration decisions.
- Resettlement programmes set up the basic institutional structure of the migration processes and they affect the matrix of push and pull factors for the migration decisions of pastoralists. Many migrants use resettlement programs to reduce short-term social and economic stresses and the move is temporary. Others have high expectations of an improved standard of living in the destinations.
- Return migration, which is expected to become a typical pattern and provide better income after the environment has improved, is important for many migrants. Many pastoralists in the first resettlement program have returned to their homes.
- Human-made environmental problems are expected to increase.
- Most migrants are still involved in resource use in the pastoral area. Part of their food consumption and income still relies on animals kept in the pastoral areas.
- Pastoralists became more vulnerable recently. Although the main stress is not from environmental degradation, but instead a host of other social, economic and institutional factors, the latter affect their abilities to adapt to a changing environment.

Key Policy Recommendations

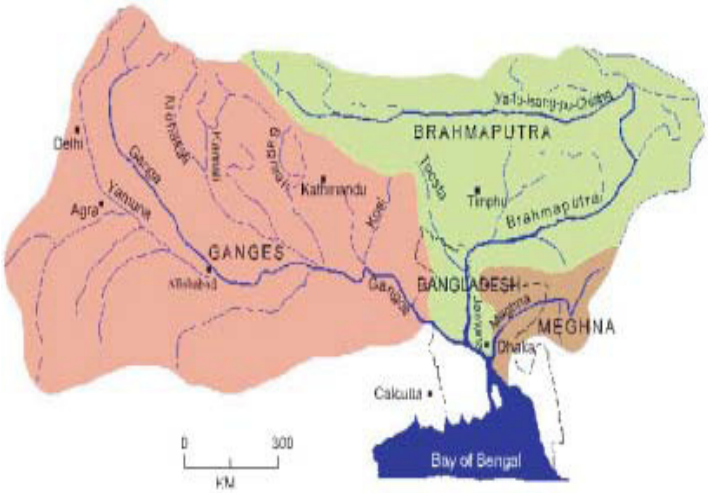
- Further in-depth research is needed in order to understand the linkages between human activities, desertification and migration in the province of Inner Mongolia.
- Resettlement programmes need to take into account people's perceptions of environmental changes so that other factors of stress are minimised in the process.
- The importance of the environment for the socio-economic conditions of the region needs to be fostered.

Bangladesh (A. Poncelet)

Overview

Map of Bangladesh
Source: Magellan Geographix (1999)

In Bangladesh there are seven major and over two hundred minor rivers. These rivers and tributaries define the geography of the country and the way of life of its people. The rivers are the main sources of irrigation, aquatic resources including fish and the principal arteries for commercial transportation. As a result, the communities living along the rivers' banks are predominantly dependent on the flood plains for their livelihoods but are exposed to natural hazards like floods, cyclones and droughts. The vulnerability is worsened by problems like upstream river erosion and climate change (International Federation of Red Cross and Red Crescent Societies 2008). Because it is a delta country, most parts of Bangladesh are less than 12 m. above sea level, and it is believed that about 50% of the land would be flooded if the sea level were to rise by a metre (Ali, 1996). Consequently, floods occupy a unique position in the economy and culture of Bangladesh. The population knows how to live with floods. Due to the effects of climate change however, flooding is accelerating.



Catchment area of the Ganges, Jamuna and Meghna rivers
Source: Haque Sarker M. et al. (2003)

Cases and Methods

Between February and March 2008, the field research for this case study was conducted in different places of Bangladesh that are the most heavily hit by environmental disasters thus far or that will suffer most in the future: Dhaka, along the Indian border in the North-West in Chilmari; *Chars* in the district of Gaibandha on the Jamuna River; and villages in districts of Bagherhat, Pirojpur, Khulna and Shatkhira.

In total 15 expert interviews were carried out with government officials, representatives from international organisations, academics and NGO representatives working on migration, environment, development, social welfare or disaster relief issues. Research was also conducted directly with migrants and non-migrants from the South-West and from the North-West and people living in the slums of Dhaka (15 semi-structured interviews and 30

questionnaires). These interviews and questionnaires provide a good overview of the motivations and strategies of the population regarding migration.

Key Findings

- Flood and erosion disasters are a complex mix of both natural and socio-political and economic processes in the current context of Bangladesh.
- Millions of people have recently been affected by floods and *monga (*seasonal food insecurity in ecologically vulnerable and economically weak parts of north-western Bangladesh) requiring evacuation, shelter and relief assistance.
- Currently nobody controls movements of displaced people. Even if the causes of migration are very similar from one person to the next, people opt for different strategies in terms of destination and timing for migration.
- Currently, migrating (temporarily or not) appears to the affected population to be one of the best strategies to cope with floods, riverbank erosion, cyclones, *monga*, etc. and consequently to survive. However, while migrating might be the only option in the future, not everybody has the means to do so nor is everybody satisfied with this option. There is no guarantee of employment or housing in the place of destination. The current structures and organisations to help disaster victims will not be enough to cope with the increase of migration flows in the future.
- People will also have to adjust to climate change. But there might be a moment when they will not be able to adapt any more. In 20 or 30 years massive movements are likely. Poor people will be the most vulnerable.
- Given the political instability of the region, population movements associated with climate change could pose a threat to regional security. However, adaptation strategies could reduce the environmental vulnerability and increase the resilience of local populations.
- The population is already busy finding adaptation strategies. The worsening of the situation, however, increasingly renders migration as the only option available (a choice that many have already made).

Key Policy Recommendations

- It is crucial to stimulate the creation of interdisciplinary networks to foster dialogue between experts on questions such as adaptation strategies to climate change in Bangladesh and in other countries.
- Similarly, it would be very interesting to conduct more detailed research in urban centres such as Dhaka, Chittagong etc. to examine what is being implemented to absorb the large influx of migrants in these already overpopulated cities. How does the integration of this population in the slums take place?
- These questions should also be examined in the Indian context since many Bangladeshi decide to migrate there.

Sub-Saharan Africa

Mozambique (M. Stal)

Overview

The main environmental problems in the least developed south-eastern African country, Mozambique, are the reoccurring flooding events along the Zambezi River Valley in Central Mozambique as the major displacement factor and the droughts along the fertile banks of the Zambezi River. The floods in 2000 were the worst to hit Mozambique for 150 years, making thousands of people temporarily homeless. This was followed in 2000 by tropical cyclone Eline which caused further devastation. In 2007 the tropical Cyclone Favio increased the number of homeless people in Mozambique following the flooding of the Zambezi River. In 2008 the Zambezi River flooded once again displacing more than 90,000 people. Floods, cyclones and droughts are not the only natural hazards to affect the people of Mozambique; coastal soil erosion and rising sea levels affect a large amount of people along the 2,700km long coastline. The river delta regions are at particularly high risk of inundation and erosion. Other types of natural hazards like wildfires and earthquakes also cause problems for the development of the country and the safety of its people.

Source: Perry-Castañeda Library (2007): Mozambique (Political) 1995 www.lib.utexas.edu/maps/mozambique.html; 10.08. 2008 (modified)

Cases and Methods

Due to budgetary constraints fieldwork was limited. Data was gathered in seventeen semi-structured expert interviews conducted in Maputo, the capital of Mozambique. The expert interviews were carried out with government officials, NGO representatives, representatives from international organisations and academics working on migration and environment. Furthermore, thirteen semi-structured interviews at resettlement centres with displaced and resettled people along the Zambezi River valley in central Mozambique were conducted, and twenty-five questionnaires were completed by migrants and non-migrants. The questionnaires were mainly conducted in urban areas.

Key Findings

- The people that lost their houses due to tropical cyclones in both 2000 and 2007 managed to stay in their places of origin and rebuild their houses with basic improvements in construction for storm resistance. On the other hand, the floods in Mozambique resulted in the displacement of thousands of people who had been living in the low-lying river areas. These areas are not only high risk areas for flooding, but are also the most fertile areas for agriculture. People not only lost their houses and belongings during the flooding; they also lost their harvest and, therefore their means of livelihood.

- People are displaced on a temporary basis, generally during the flood emergency period. Following reccurring flooding events, people tend to be relocated on a permanent or semi-permanent basis.
- Along the Zambezi River Valley, temporary mass displacement that is taking on permanent characteristics can be observed.
- There is no evidence yet for major international migration resulting from the Zambezi River flooding events and the people are not yet tending to move to urban agglomerations.
- The Government of Mozambique is trying to develop rural areas by providing the essential infrastructure and giving people incentives to produce more solid houses within the resettlement process. Nevertheless, resettlement does not seem to be the best option to deal with the existing and upcoming impacts of environmental change in Mozambique. Resettlement is causing further problems. It is not solving the problems of the people who, even after the resettlement process, are still dependent on governmental and international aid and remain very vulnerable to flooding events. If extreme weather events continue to impact Mozambique in the future, the environment will have an increasing role as a push factor for people's decision to leave their places of origin.

Key Policy Recommendations

- The resettlement process needs to be modified and the opinion of the resettled people has to be considered in the process.
- A major focus for sustainable development should be on disaster risk reduction along the Zambezi River and in the whole country.
- Improvements in irrigation systems would avoid settlements in the fertile high flood risk areas along the low- lying banks of the Zambezi River.
- Internal displacement in the Zambezi River valley shows that environmental disasters have a destructive impact on the economy, society and the environmental system of Mozambique. Particularly in poor countries where people are often directly dependent on the environment, people commonly settle in vulnerable areas susceptible to the force of environmental impacts as these are commonly the most productive and fertile areas for agriculture. There is a need to focus on environmentally supportive programmes in those vulnerable areas, especially when the impacts of environmental change are increasing.

Niger (T. Afifi)

Overview

Droughts, the drying out of Lake Chad, Niger River problems, and deforestation are important push factors that influence the migration decisions of the Nigeriens. With respect to the Human Development Index, the Republic of Niger ranks last out of 177 countries with an average life expectancy of 44 years. Unfavourable climatic conditions, lack of resources and weak economic growth, inadequate food production, a high level of malnutrition, insufficient basic structures, poor industrial performance, demographic growth and weak performance of social sectors makes Niger one of the Highest Poor Indebted Countries.

Cases and Methods

Due to time (3 weeks), budgetary and security constraints, it was not possible to visit all the regions but only the Niamey region and Tilabéri. However, it was possible to interview migrants from all the regions who moved to Niamey and Tilabéri. Moreover, the International Organisation for Migration (IOM) office in Niamey facilitated meetings with returned migrants from Libya in the frame of a re-integration program that the office organizes, helping this category of Nigeriens to start new lives in Niger after having been deported from Libya or after returning back voluntarily.

The field work consisted of interviews with 25 experts from local authorities, university, Non Governmental Organisations and international organisations. Moreover, a total of 60 migrant and 20 non-migrant questionnaires were filled out. The places that were visited within the region Niamey were selected randomly, and in most of the cases the people interviewed as well. 5 of the questionnaires were filled out with the support of the head of the Filingue department in Niamey, who facilitated the contacts, based on his personal contacts to the IOM office.

Key Findings

- Historical factors contributed significantly to the environmental problems in Niger. When the colonisation began at the beginning of the 20th Century, the farmers had to provide the colonial forces with construction services. Therefore, the lands were neglected. Later, when the economy was monetized, the Nigeriens had to pay taxes to the colonial power, which forced them to plant cash crops, leading to further deterioration of the land. Moreover, they had to leave the land and look for cash from neighbouring countries, which had a progressively negative impact on the lands. When the droughts came, there were no reserves, which led to famines.
- There is a clear vicious circle concerning environmental deterioration in Niger; the droughts lead to financial problems, making people attempt to increase their income by cutting trees and overgrazing, which in turn exposes the soil to wind and rain, leading to further degradation.

- Most of the people who migrate due environmental problems do not say that at first; they usually complain about their low income and bad living conditions. However, the root causes are environmental.
- Most of the people who migrate due to environmental problems are willing to return back, since seasonal migration (within the country) has always taken place. Nevertheless, due to the deteriorating environment, some leave for Nigeria, Mali, Chad, Cameroon, and Benin for a longer time, and a few do not return back
- In general, Nigeriens are very attached to their land and they would migrate only as a last resort. Evidence for this is that many interviewed migrants are people who left the country for Libya and returned back to Niger, although Libya is not a francophone country and the communication in the Maghreb countries (francophone and geographically close to Niger) would be much easier for them. However, they prefer to stay very close to their country and 'keep an eye' on it till the conditions allow them to return back.
- There is some evidence that people who leave for Europe mainly do that for prestige (rich people in the Northern Agadez region) and also mostly come back. However, farmers in the South (if leaving the country) leave for other African countries that have a similar culture and traditional work activities (farming and shepherding).

Key Policy Recommendations

- There are already state development programmes that help the people restore the environment. However, the people who can do that are the women, children and elderly people, after the young men leave and look for income sources. Therefore, these programmes should be extended and their numbers should increase, giving more incentives for people to return and restore the environment.
- There is a need for more research about the topic with more cooperation with the local research institutes and NGOs.
- Databases are needed on migration in general and environmental migration specifically to get better global estimates.
- Awareness about the topic must be increased through informing the local research institutes, NGOs, policy- makers and the media.

Senegal (F. Bleibaum)

Overview

Senegal is situated on the western coast of Africa; its vegetation is mainly bush savannah. It has experienced a persistent decline in rainfall since the late 1960s. The effects of drought are most obvious in central and northern regions. Other environmental problems include: poor soil fertility due to monoculture, erosion, over-usage of fertilizers and salinity of the soil. Farmers face socio-economic problems such as high costs of seed and fertilizer, lack of storage, transformation and commercialisation infrastructure and lack of information. Senegal is an (ancient) country of emigration, mostly to European countries like Spain, Italy, and France and to other African countries, like Guinea, Ivory Coast, Ghana or South Africa. There is also immigration from neighbouring West African countries like Guinea, Mali and Mauritania.

Cases and Methods

In addition to a set of expert interviews, a total of 34 interviews were conducted with non-migrants (farmers and herders) and migrants in two regions of Senegal:

- in the central region of the so-called Peanut Basin and in the North near the river Senegal (see map). Due to the monoculture of peanut practiced in central regions, the soil salinity and lack or overuse of fertilizer, the soil fertility is poor. Farmers have to live on only one, if at all, agricultural season per year. The region experiences strong out-migration, especially of younger people, to the cities or abroad.
- in the river valley region, irrigated agriculture is possible in some zones but farmers face difficulties in access to land and in paying the fees for the use of irrigation infrastructure. Due to dam construction and the new irrigation system, several problems have occurred: floods, lack of flooding, soil salinisation and water pollution (due to fertilizer and pesticides). In this region there is emigration as well as immigration, the latter mostly by seasonal workers.

Key Findings

- All of the interview partners living in the central regions said they will leave (for the cities or abroad) if life in the village - which depends on agriculture - is no longer possible.

- All of the interview partners living near the river, where irrigated agriculture is possible, said that they are going to stay.
- Almost all (except for 4) of the migrant interviewees living in towns said they would return to their home villages if the situation in the agricultural sector improved.
- Almost all of the migrant interviewees, except for those coming from relatively fertile regions in the South, can be regarded as forced migrants – forced by the environmental conditions, poverty and the lack of (state) support.

Key Policy Recommendations

At the national level, the following is needed:

- training of the farmers in processing and food transformation techniques, so as to enable them to sell goods with added value;
- training of farmers (and herders and fishers) in sustainable agricultural practices (compost, field trees and hedges, fallow land etc);
- strengthening of farmers' organisations to enable them to have a voice in national policy planning;
- creation of other income-generating activities – apart from agriculture – in rural areas;
- promotion of an equitable access to water and land resources for farmers and herders, and promotion of accountability of political decisions (such as land distribution) on local and national levels;
- promotion of regional economic integration, of the (food) transformation sector and a (selective) protection of the national market.

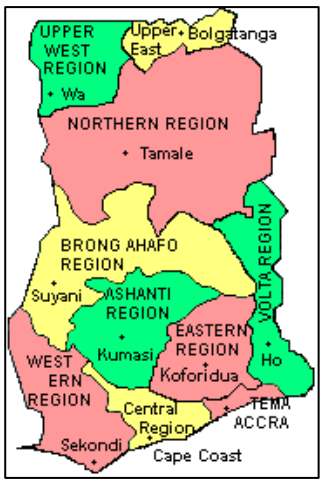
At the international level, the following is needed:

- cooperation between international organisations such as IOM, World Bank, EU, CEDEAO in the elucidation of the causes of migration;
- fair agricultural and trade policies in European and North American countries (e.g. reducing agricultural and export subsidies, prohibition of dumping, etc);
- granting the right of the countries of the South to protect their national markets and to promote regional economic integration;
- promotion of sustainable agricultural development and the development of Senegal's secondary sectors so as to decrease their dependency on imports and their vulnerability to price fluctuations.

Ghana (K. van der Geest)

Overview

The Republic of Ghana is located on West Africa's Gulf of Guinea. Ghana has a medium human development index (HDI). There are large regional disparities with southern Ghana developing fast while northern Ghana is lagging increasingly far behind. North-South internal migration developed in the course of the 20th century, triggered by unequal development between the regions and better labour opportunities and farming circumstances in the central and southern parts of the country. The county has a tropical climate with two rainy seasons, except for the north. A quarter of the population and most of the industries are concentrated in the coastal districts. The middle tropical forest belt, known as the Ashanti region, produces most of the country's cocoa, minerals, and timber. The northern districts mainly consist of savanna (drylands) and are characterized by low average annual precipitation rates and recurrent droughts. Ghana's most significant environmental problems are (1) water shortages, desertification and droughts in the northern regions, (2) soil degradation and erosion, (3) a high rate of deforestation, (4) a fragile coastal and marine zone under pressure of urbanisation and industrialisation, and (5) water and industrial pollution. Since the 1992 Rio Earth Summit, environmental issues receive more attention from the government, NGOs and international organisations. In 1994 the Environmental Protection Agency (EPA) was established, mandated to regulate the governmental environmental activities. In 2005 the first State of the Environment Report was launched by the Ghanaian Minister of Environment and Science.



Source: www.ghanaweb.com

Cases and Methods

This study examines the importance of the environment as a driver for the internal North-South migration in Ghana from the northern savanna zone to the moister forest and coastal zones in central and south Ghana. Comparable North-South migration can be observed in other West African countries. Ghanaian migration to non-African destinations (including Europe) originates almost exclusively from South Ghana and not from the North, as recent studies show. Poverty in Ghana is concentrated in the rural areas of the North and many people living there try to escape poverty by migrating southward. In some northern districts, about half the population is presently living elsewhere in Ghana. In this study various data sources are utilised, gathered by Kees van der Geest for both his PhD thesis and the EACH-FOR project. For his PhD research a survey was carried out among 203 migrants from the Northwest Ghana settled as farmers in rural areas in central Ghana; this was supplemented by 37 extra interviews with migrants for the EACH-FOR project. Additionally, to test the hypothesis that less environmentally endowed areas experience higher outmigration rates, a cross-sectional analysis was carried out on secondary data for the various northern districts with different indicators of natural resource scarcity. Furthermore, a longitudinal analysis was carried out employing census and rainfall variability data to test the hypothesis that migration propensities increase in times of environmental stress. The combination of these various data sets and methods produced a more complete picture of the causal relation between environment and migration.

Key Findings

- The vast majority of the interviewed migrants experienced a degree of environmental push. Most of them mentioned environmental reasons for leaving their homes, such as scarcity of fertile land, unreliable rainfall, low crop yields or food security problems.
- Migration is a strategy to improve food and livelihood security of both the migrants and their relatives that stay behind. Only some migrants in the sample were forced to migrate due to hunger and food insecurity, and for them migration is a survival strategy.
- Analysis of secondary data on scarcity of natural resources shows that migration propensities are higher in districts with more scarcity of natural resources, especially in those with low annual rainfall, and with higher rural population densities that results in farmland scarcity.
- Contrary to what one would expect, the persistent droughts of the 1970s and 1980s in the Sahel zone were a period of reduced North-South migration and of increased return migration. This can be explained by a widespread economic crisis, political instability and high food prices in South Ghana. This finding shows that under certain conditions stronger political and economic forces may override an existent or even increasing environmental push on migration flows.
- The prime environmental driver for migration from North Ghana appears to be not so much environmental degradation and disaster, but much more structural environmental scarcity of fertile land in the North. The environmental pull of abundance of fertile land in Central Ghana appears to be at least as important.

Key Policy Recommendations

- Policy to curb North-South migration in Ghana will impact very negatively on the livelihood security of the population in the less developed northern regions, because migration is a strategy for improving food security and survival. This will lead to increased poverty of the population and widening of the development gap between North and South Ghana.
- Such a policy of internal migration control will in addition have negative repercussions for the environment of the North, because it will lead to growing population pressure on the fragile ecosystem and scarce natural resources of the northern drylands without the 'remedy' of outmigration.
- Policies to protect the environment of the fragile savanna ecosystems in North Ghana will only be effective if combined with policy measures to improve the food and income security of the local population. Development policies should not overlook the widening development gap between North and South Ghana and the concentration of persistent poverty in the rural North.
- There are no shortcuts to development in northern Ghana, but one way to improve the situation in the North is to increase the connections (including the transport system) between the North and the South and within the North. For example, farmers are eager to produce vegetables for the increasingly wealthy urban market in the South. At present, transaction costs are too high for developing this sector properly.

Middle East and Northern Africa

Egypt (T. Afifi)

Overview

The Arab Republic of Egypt appears to be particularly vulnerable to environmental change because of its dependence on the Nile River as the primary water source, its large traditional agricultural base, and its long coastline, already undergoing intensifying development and erosion. The total area of Egypt is about one million km², most of which has arid and hyper-arid climatic conditions. 97 percent of Egypt is desert; only 5 percent of the land area in Egypt is actually occupied and less than 4 percent of the land is suitable for agriculture. Because such a small percentage of land is habitable, population densities in these areas (that is, the coastal zones and along the Nile River) is high, and in some areas along the Nile River are even greater than 1,000 people per square kilometer. In addition, Egypt suffers from other environmental problems, such as water pollution, soil pollution, soil salinity, desertification and air pollution. Whether all these factors have a direct impact on forced migration is a critical question, first, since there are other significant push and pull factors that influence migration, and second, since the relatively short time of the field work did not allow for in-depth investigations that cover all these environmental factors.

Cases and Methods

The 30 migrants that were interviewed were mainly in the centre of the Nile Delta, the Nile Valley (South and North), Eastern and Western Nile Delta, newly reclaimed desert lands and slums of Old Cairo. The selection of the interviewees was random, due to the limited awareness of the topic 'environmental migration' and the difficulties of accessing the target groups in an organized way. The target groups were people who left the Nile Valley and Delta for the slums of Old Cairo, people who left the Oasis and moved to Cairo, people who moved from one area to another within the Nile Valley and Delta, people who moved from fertile lands to the newly reclaimed desert lands, and people who stayed in the Nile Valley and Delta. Due to the relatively limited number of interviewees, the case study relied not only on the information about their personal experiences but also on their stories about their parents, relatives and friends. The total number of interviewed experts was 21. Most of the interviews were made with the support of the IOM office in Cairo. The field trip took 6 weeks in total.

Key Findings

- There are many other factors that intervene in migration decisions, such as poverty and unemployment, which are more striking for the interviewees, even if the poverty and unemployment are totally or partially caused by environmental degradation.
- There are considerable pull factors that support the migration decision of people who are affected by environmental degradation. For example, the style of life in Cairo, the higher living standards and income in the Gulf countries are strong reasons why people leave their towns/country.
- People would leave their home and move to another place only if there are absolutely no more livelihood possibilities for them, such as the example of soil scrapping or urbanisation, where it was not their decision but the land owners'. In this case, they have to leave for other places/regions in order to make their new living. Another case is the official displacement that occurred during and after the construction of the Aswan Dam, and where the people living in Nubia had to leave for Kawm Umbo after their land was submerged by Lake Nasser.
- The migrants who leave their villages/regions/country can only do so if they have the financial means, which is often not the case, since the environmental degradation had a negative impact on their income. In any case, most of the migration that takes place due to environmental problems is internal.
- The ownership of the land is a very important factor that influences the migration decision. As long as the farmers are hired on the land, they are very mobile and flexible in response to environmental changes. Owners of the land would not leave unless there is no other way or they are officially displaced by the government.
- The state does not yet consider environmental migration as a serious problem, or at least, the issue does not have high priority.

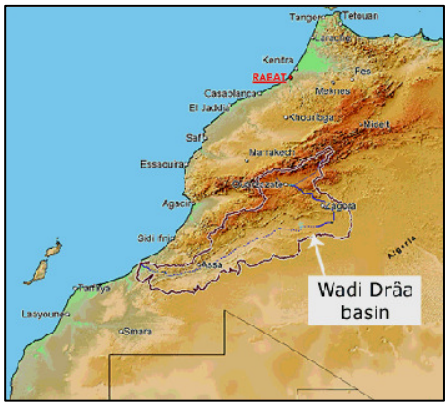
Key Policy Recommendations

- There is a need for increased research about the topic in cooperation with local research institutes and NGOs. This research must be linked to decision-making processes.
- Field studies require more time and financial resources.
- Create databases on migration in general and environmental migration specifically and use them to make more robust global estimates.
- Improve the infrastructure of the regions that absorb (environmental) migrants.
- Increase awareness about the topic through informing the local research institutes, NGOs, policy makers and media.

Morocco (A. Fermin)

Overview

North Africa is one of the most arid and water-stressed regions of the world. It is also a main migrant-sending region for Europe, due to its vicinity, its relatively young population, the huge development differences between both sides of the Mediterranean, and the long-established migration networks. Morocco is one of the main countries of origin and transit of migrants heading to Europe. In Morocco, three environmental zones can be distinguished: the coastal plains and plateaus where three-fourths of the population live, the highland areas of the Rif and Atlas Mountains inhabited by a fifth of the population, and the pre-Saharan and Saharan desert areas with low population. These geographic zones correspond with socio-economic zones: the main and wealthier cities are concentrated in the North. Main environmental degradation problems in Morocco are land degradation and desertification; salinisation of groundwater reservoirs and soils; oil pollution of coastal waters; and air and water pollution. During the past 20 years Morocco suffered a constant water deficit, caused by climate changes as well as anthropogenic factors such as growing demographic pressure, increased urbanisation and development of the industry and tourist sectors.



Morocco and the Drâa river basin
Source: http://portal.unesco.org/science/

Cases and Methods

The case study examines migration in relation to environmental degradation in rural oasis villages in the Drâa valley, a basin that reaches from the High Atlas mountains southwards. Two palm groves in the most southern part of the Middle Drâa on the fringe of the desert are selected for the case study: Ktaoua and Mhamid. The semi-arid climate in this pre-Saharan region is characterized by high temperatures, strong thermal amplitudes, strong rates of evaporation, rarity and strong annual variability of rainfall, rare but intensive rainstorms causing floods, frequent sandstorms and the advancement of the desert. Due to climate change, temperatures and rainfall variability have increased over the last decades. The main rural economic activities of irrigated agriculture and livestock farming are mainly self-sufficient. Agricultural productivity is low, due to petty and scattered landownership, lack of modernisation, unfavourable climate conditions, high soil salinity, the advancement of the desert, the fatal bayoud palm disease and recurrent locusts plagues. The El Mansour Eddahb dam and reservoir, constructed upstream in 1972 to reduce flood risks, to generate hydroelectric energy and to assure irrigation needs, has had adverse effects on the environment and agriculture in the Middle Drâa basin: flow reduction, falling groundwater tables, drying up of basins, salinisation, and irregular water supply. This encouraged the spreading of motor pumps for pumping groundwater. The case study consisted of desk research and interviews with 30 older migrants, 30 non-migrants, and several experts.

Key Findings

- The negative impact of environmental degradation on agriculture and livestock farming over the last few decades is a main motive for migration. The migrants left because no

other options to survive were available. Environmental degradation over the last decades is attributed to the dam construction and prolonged periods of drought in the 1980s in particular.

- Secondary data and expert interviews, however, indicate that the relation between environment and migration is much more complex and less deterministic. Temporal and seasonal internal migration is a traditional strategy to diversify resources. Both migration patterns and environmental degradation have changed over the last few decades not only induced by climate change and negative effects of the dam construction, but also because of sedentarisation of nomadic cattle breeders and the disruption and opening up of the traditional rural society.
- The mechanisms of migration vary between the different occupational and socio-ethnic groups. Although internal migration of family members is still dominant, permanent migration of families is occurring more often.
- There are relevant differences between migrants and non-migrants, but not in their perception of environmental degradation. Almost all families are affected by temporary or seasonal migration. Even in harsh climate conditions, people develop mechanisms and strategies of adaptation.

Key Policy Recommendations

- Traditional community management of resources is adapted to the aridity and fragility of the ecosystem, but is a handicap in modernizing agriculture and improving agricultural production. Rural development should examine how to save water as well as equipping and modernizing these rural areas.
- The construction of the dam and reservoir, with beneficial effects such as regulating floods, has adverse ecological effects. Alternatives to dam construction and ways to counteract the harmful ecological and agricultural effects of dams are needed.
- The institutions and organisations responsible for water management and rural development have to develop interventions in a responsive way, together with those concerned. Engineers should take advantage of the wealth of traditional practical knowledge accumulated by the peasants.
- Policy makers should guard against diverting all the scarce water towards the growing cities and tourist sectors, thus neglecting the needs of the peasants.
- Migration is a normal adaptation strategy in this region. It is even a necessary response to reduce population pressure on natural resources. Authorities should be worried only if migration occurs suddenly and massively. Migration cannot be curbed, but only regulated.

Western Sahara (O. Alvarez Gila, V. López de Maturana Diéguez, A. Ugalde Zaratiegui)

Overview

Western Sahara is a former Spanish colony, whose sovereignty is disputed by Morocco and the Polisario Front in a war that has lasted since the mid-1970s. As a result of this conflict, its territory remains divided into two zones, one under Moroccan rule and the other governed by the so-called Sahrawi Arab Democratic Republic (SADR) authorities from the refugee camps of the Tindouf area in Algeria, to which a large part of the original population of the territory fled. Western Sahara is located on the western edge of the Sahara desert, in a region characterised by its extreme climate conditions (dryness, high variability of the sparse rainfalls, persistent dust storms and lack of available water). Three major migratory processes are taking place in the territory: a) an incoming migration from Morocco backed by the Moroccan government; b) several outmigratory flows from both Western Sahara and the refugee camps, mainly to Europe; and c) it is also a crossing point for sub-Saharan migrants trying to reach Europe. Although Western Saharan immigration to Europe is quantitatively small, there are some concerns about future increases due to the lack of perspectives of a resolution of the conflict in the near future and, along with this, the environmental and economic problems that the Sahrawi population faces in their land of residence.

Cases and Methods

The study focused on analyzing the extent to which environmental issues are affecting -or will probably affect- migration from Western Sahara and the Sahrawi refugee camps to Europe. Political concerns have been the main reason for most of the migratory movements that have taken place in the territory in the last three decades, linked to the conflict and open war in the region until 1991. The change of the international political situation, and the *de facto* ceasefire that was implemented more than a decade and a half ago, are leading to an emergence of new reasons that are increasingly taken into account by possible migrants. Fieldwork was performed in the refugee camps of Tindouf, as well as in some regions of Spain where there are colonies of Sahrawi immigrants. 61 migrant and 18 non-migrant interviews were made in both areas, and 14 expert interviews were made with Sahrawi and Spanish politicians and functionaries and NGO officials.

Key Findings

- There is historical evidence of the long-term use of periodic, temporary migration to the south of Morocco as a customary response of traditional, nomadic Sahrawi societies to the changing challenges of environmental conditions.
- The changes that resulted from colonialism (end of nomadism, urbanisation and fragmentation of the political space with the creation of international borders) obliged Sahrawis to modify the previous patterns of migration, as the traditional ways and

destinations were no longer available for them. The drought of 1969-1975 marked a breaking point, and a link between environmental changes and migration was then suggested for the first time.

- In the case of the Morocco-ruled Western Saharan territory, today immigration clearly surpass out-migration flows. It seems that the economic attractiveness of the region, to a great extent politically backed by the Moroccan government, is exceeding any possible negative consequence of the extreme environmental conditions of the region.
- In the case of the Sahrawi refugee camps in Algeria, environment must be accepted as one of the current factors that is determining patterns, protagonists and destinations of migratory flows abroad. Environmental factors are creating serious problems for public health, and they are also limiting the capacity of the camps to implement productive agriculture.
- SADR authorities have created and controlled so far, with the help of an international web of locally based NGOs, a kind of "circular migration" between some countries (Spain, Italy, Algeria's coastland, and Cuba until the 1990s) and the camps themselves, in order to permit the most vulnerable part of the population to enjoy what we can define as temporary environmental migration. But a change of attitude has been noticed in the younger generations born in the camps, for whom political matters like the fight for the independence are no longer their main concern, but the search for better living conditions.

Key Policy Recommendations

- Political issues are still more relevant that any other reason to explain most of the migratory movements involving Western Sahara and its population. Thus, first of all a permanent agreement on the legal status of the territory is highly necessary, something that cannot be done without external political pressure.
- Meanwhile, external humanitarian aid must be redirected, from simply supplying the basic needs for life, to allow the inhabitants of the refugee camps to engage in economic activities that can help them to improve their living conditions and upgrade their capacity to face environmental challenges, among others.
- In any case, it is not very likely that, if present conditions do not change, an increasing flow of emigration abroad can be avoided. This migration could even become massive once the new generations supplant the older ones that supported the war against Morocco, as they do not share the same life perspectives. For historical reasons, but also due to the aid provided by Spanish institutions and NGOs to Sahrawi refugees, it is very likely that these migrants will mainly opt for Spain as country of destination.
- It would be most useful to implement monitoring of the impact of the new demographic pressures on the territory of Morocco-ruled Western Sahara, as they can have further implications for future migratory movements.

Latin America and the Caribbean

Argentina (O. Alvarez Gila, M. Irianni, G. Velázquez, A. M. Fernández Equiza, C. García Larramendy)

Overview

Due to its geographical extent, Argentina has a wide variety of ecosystems, in which environmental problems are also varied. Among them, and depending on the region, extreme events such as droughts and floods, lack or diminishing of available water, and soil degradation because of the introduction of new crops and the expansion of a foreign-market oriented intensive agriculture are the main environmental hazards. The population of Argentina is sparse and unequally distributed. With respect to migration, Argentina is today still receiving immigration from neighboring Latin American countries, but at the same time has strong out-migration flows to Europe (mainly Spain) and the United States.

Cases and Methods

The research combined both nation-wide and regional analysis. First, a series of correlations using nation-level statistics were performed for indicators linked to life quality, in which environment is also included, and figures of migration and the maps of some of the major environmental risks, not only due to climate change. Second, a regional case study on the links between environmental problems and migration was conducted in one of the regions facing flood hazards, the Salado River valley, at the Partido de Bolívar in the center of the province of Buenos Aires, with 160 householders interviewed. Finally, some of the regions were defined in which climate change is most likely to create pressure on the population, and the behavior of possible migrants was analysed for the case of Jáchal in the San Juan province.

Key Findings

- At the national level, the environmental risks that have been analyzed (floods, tornadoes, earthquakes and soil erosion) seem not to have led to substantial population movements. Economic reasons appear to be the main drivers of emigration from the country.
- Even for internal migration, the environment does not appear to be a significant cause. Only in some short-distance movements, found for example in the case study of Partido de Bolívar, do environmental changes play a role as a cause of migratory movements.
- It is not very likely that the Argentinean population can emigrate abroad in large numbers due to environmental problems. The most probable scenario is that in the case

of global warming some internal migration would be one way to adapt to the pressure on the population.

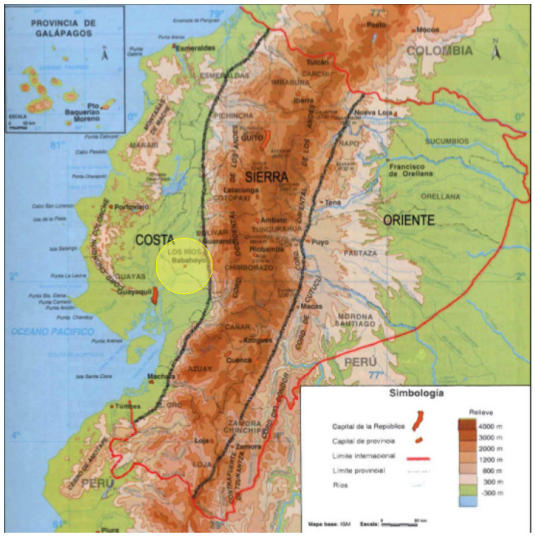
- There is also high concern about the possible effects on the environment and some sectors of Argentinean society through changes in land use due to the expansion of new monoculture crops to produce agro-fuels.

Key Policy Recommendations

- Economic policies should be directed towards improved strategies for mitigation and adaptation to climate change in Argentina and also to maintain the level of migration at current levels:
  - Recovering an adequate governmental regulatory capacity, increasing its autonomy from interest groups, both domestic and foreign. As a first step, it is imperative to develop a proper system of reporting and monitoring.
  - Reducing the dependency on activities that enhance the vulnerability to climate change.
  - Regulating the uses of land, thus guiding investment and public/private partnerships to strengthen sustainable productive activities and improving quality of life in the areas of lesser vulnerability to the impacts of climate change.
- The best strategy for mitigation and adaptation to environmental changes is to invest in activities that generate jobs without destroying ecosystems. This recommendation applies especially to the uses that lead to deforestation, destruction of fragile ecosystems, removal of former sustainable activities, displacement of peasants, and promotion of large-scale, ecologically damaging mining. It is also necessary to improve the management of water resources, especially in areas of the country where it is a critical, sparse resource.
- Rural communities should be strengthened, by providing assistance for family agriculture, recognition of traditional knowledge and practices, support for self-organisation and self-management, and ensuring them a continued access to land and facilitating international fair trade.
- Local actions are necessary but not enough. For instance, the process of replacing fossil fuels with agro-fuels is not sustainable if the impacts on the places of production are considered: competition with other uses of land (food production), the degradation of ecosystems and the displacement of population.
- A joint effort by governments, international institutions and other organisations is needed to prepare host societies socially, culturally and politically, using both formal education and mass media.

Ecuador (O. Alvarez Gila, V. López de Maturana Diéguez, A. Ugalde Zaratiegui)

Overview



Ecuador's economy is mainly dependent on first sector activities, such as agriculture, fisheries and oil production. Divided into three main regions geographically, the country faces significant environmental problems: a) deforestation in almost all the regions; b) soil degradation and desertification in the Andean region; c) pollution, especially in urban areas, but also in several intensive agriculture areas; and d) floods in the plains of the coastal region. The country is also periodically affected by the El Niño climatic oscillation that creates abnormal extreme events, like floods and droughts (one of the strongest ever occurred in 1997-1998). Migratory movements in Ecuador had usually been internal until the last quarter of 20th century; thereafter migration abroad has increased dramatically, in particular in the late 1990s. Moreover, these last waves of Ecuadorian migration were mainly directed to Europe, especially to Spain. Currently the EU hosts more than half of Ecuadorians living outside of the country.

Cases and Methods

The study focuses on the case of Los Ríos province, located in the western, coastal region of the country, in the Guayas river basin. The province's economy is mostly devoted to extensive agriculture for export; and it consists of a series of low plains with low capacity for draining excess water, thus the risk of floods is one of the highest in the country. The area was forcibly hit by the 1997-1998 El Niño; at the same time, these years also marked the beginning of a remarkable current of migration to Europe. The case study thus focused on assessing the relationship between these two occurrences. The fieldwork was conducted in 2007/2008 in two places. 53 migrant surveys were performed in Spain (regions of the Upper Ebro valley and Catalonia), where there is a concentration of Ecuadorian immigrants. 16 non-migrant surveys were carried out in Los Ríos province, along with several expert interviews with government officials and NGO members.

Key Findings

- Environmental problems do play a role, along with other economic and social issues, in the creation and maintenance of both internal and international migratory flowsin Ecuador,.
- Nonetheless, perceptions of the role played by environmental factors in the decision-making among immigrants from rural environments differ from those of urban immigrants. The latter are more likely to give an environmental reason.
- Migration has been used often as a means to cope with the effects of some periodic, environmental events, such as droughts or floods, especially in the rural areas of the coastal region and some parts of the Andean region, which are the most affected.

Householders of these areas traditionally migrated for short periods to the main cities or other wealthy regions of the country in order to obtain additional income to overcome the worse effects of natural disasters in their family economy.

- The El Niño event of 1997-1998, because of its unusual features (both in strength and length), did actually change the migratory behaviour of the Ecuadorian population, especially in the coastal region, where its effects were much more damaging. It resulted in huge harmful floods that were accompanied by a wider economic crisis (failure of the financial system and collapse of the international prices of oil).
- The combination of all these elements -among which environmental factors acted as a trigger- weakened the capacity of Ecuadorian economy to relocate internally the people seeking temporary migratory opportunities. Europe, and especially Spain, then became a new destination, because of the attractiveness of the economic growth in this country in the 1990s and the first half of the 2000s.

Key Policy Recommendations

- Environment-related questions should be systematically included in any enquiry promoted by public and private institutions on migration.
- Investment in reducing vulnerability and improving the capacity of local communities to face the effects of recurrent extreme climate events, like the ones provoked by El Niño, must be taken into account in every policy implemented, in order to reduce or prevent massive migratory flows in the future.
- Development projects should include the environmental perspective, emphasising the identification of local practices to confront damaging environmental changes and events, and on improving the resilience of the local population.
- It is also necessary to implement stricter controls on the managing of international aid for recovering from environmental catastrophes by NGOs and similar organisations; local actors point to some irregular practices that involve the diversion of the funds from the most urgent needs for reconstruction.
- Instruments must be developed to help local authorities in developing countries in particular to implement policies for the protection of the environment and management of environmental problems, instead of the economy-first perspective that predominates today.

Hispaniola (S. Alscher)

Overview

Hispaniola Island, the second-largest and most populated island of the Caribbean Sea, is divided into two independent nations: Haiti, the poorest country in the Western Hemisphere, and the Dominican Republic. Both countries share the same ecosystem, and hence are confronting similar challenges. Nevertheless, the degree of slow-onset environmental degradation and the level of impact in the case of natural disasters differ enormously. While Haiti suffers severe deforestation and soil degradation (only a little more than one percent of the forest cover is left), the Dominican side has been able to restore substantial parts of formerly lost forests. During the hurricane season, human losses are much higher in Haiti than in the Dominican Republic. For example hurricane Jeanne in 2004 caused 3,000 deaths in Haiti and 19 in the Dominican Republic. Other major environmental problems in both parts of the island are soil erosion, water scarcity, pollution of air, water and soil, and rapid urbanisation. Both nations are emigration countries, but the Dominican Republic also is a destination for (mainly Haitian) immigration and transit migration.

Cases and Methods

The Hispaniola case study analyzed the impacts of environmental problems, mainly deforestation and the passage of tropical storms, on migration in the Dominican Southwest (selected communities in the provinces of Independencia and Neiba). This region is affected by deforestation, suffered the consequences of heavy rainfalls and flash-floods, and is one of the principal regions of origin for Dominican migrants heading towards Spain. Beside cross-border trade, the regional economy is strongly dependant on agricultural production. In addition to the withdrawal of the state from the countryside, the economic basis of small-scale farmers is frequently threatened by the passage of tropical storms. Deforestation through legal and illegal logging aggravates the impacts of extreme meteorological events and landslides and floods have become more likely. This serves as an accelerator for migration decisions. During the fieldwork in spring 2008, 19 expert interviews, 15 qualitative interviews with people living in affected areas and 30 questionnaires have been conducted in the Dominican Republic, mainly in the region of field research and in Santo Domingo. The Haitian case study, limited due to security concerns, was realized in the surroundings of Port-au-Prince. 10 qualitative interviews and 35 questionnaires have been applied.

Key Findings

Dominican Republic

- Environmental degradation, above all deforestation, heavy rainfalls during the hurricane season, and soil erosion are perceived by the local population as a problem, but not as a major driving force for emigration. Most interviewees saw missing infrastructure (social

services, education, etc.) and the withdrawal of the state from rural areas as major root causes. Above all young people are leaving their villages.

- A 'stepping-stone' migration is a typical pattern: from the remote mountain village to the municipal or provincial centre, then to Santo Domingo – and eventually abroad (in the case of the selected region, mainly to Spain).
- Environmental problems are rather an accelerator of migration decisions. Bad harvests due to floods and/or soil erosion push the villagers to look for other sources of income. As job opportunities are missing, internal or international migration is the only option. Furthermore, the extension of agro-industrial mono-cultivations is expulsing women from the countryside (preference for male labour force).
- Dominican emigrants lend their lands to Haitian immigrants, who cultivate the lands after clearing them using the method of 'chopping and burning'. Remaining Dominican villagers blame Haitian immigrants to be responsible for deforestation; social tensions probably will increase.

Haiti

- Even though many interviewees mentioned environmental problems such as poor soil quality, floods and the passage of hurricanes, these problems are not perceived as major root cause for emigration.
- Nevertheless, the environment is the basis for agriculture, which is still the major income source for the majority of the Haitian population. This economic basis is threatened by the extremely high grade of environmental degradation (nearly no forests left, 50% of topsoil washed into the ocean).
- Political (corruption) and economic (poverty) constraints are obstructing efforts for reforestation.

Key Policy Recommendations

- Further promotion of NGO-sponsored programmes on sustainable agriculture and reforestation campaigns. These courses should be extended to include Haitian immigrants. Bilingual courses (Spanish & Creole) would be helpful to promote the integration of Haitians into their new places of residence and could also contribute to decrease tensions between Dominicans and Haitians.
- Investments in rural areas (infrastructure, social services, education etc.)
- Consultation and participation of the population in disaster prevention and response as well as in reconstruction of villages destroyed by tropical storms
- Further research on the environment-migration nexus, especially cross-regional studies within the Dominican Republic and in-depth studies in Haiti.

Mexico (S. Alscher)

Overview

Due to its long tradition of emigration and given the size of the Mexican population in the United States (30 Mio. persons of Mexican origin in 2007), Mexico is one of the most cited cases in migration research. By examining the impact of environmental change on migration processes, this Policy Brief touches on an aspect which has been widely neglected in scientific research. The major environmental problems in Mexico are related to the degrading quality of soils (soil erosion, desertification) – mainly due to deforestation, salinisation and intensive agriculture – on the one hand and the insufficient availability of water on the other. Other major problems are rapid urbanisation and pollution of soil, air, and water. Furthermore, Mexico is prone to a series of natural hazards such as droughts, earthquakes, tropical storms, volcanic eruptions and flooding. While Mexico has proved to be an active member in international organisations related to climate change and environmental issues, the national legislation and above all the implementation of laws on environmental protection show some serious deficiencies. The model of economic development aggravates environmental problems, which is the case in industry (pollution, toxic waste), intensive agrobusiness (soil erosion), but also regarding small-scale farmers (illegal logging, change of agricultural production methods from traditional, sustainable to "modern" and unsustainable techniques).

Cases and Methods

The Mexican case study analyzed the impact of environmental change on migration in two selected regions: Western Tlaxcala (about 70 km east of Mexico City) and the Sierra and Soconusco regions in Chiapas (Southeast-Mexico), near the border with Guatemala. Both regions have become major sending regions for international migrants within the last 10-20 years. In the case of Tlaxcala, local farmers are faced with soil erosion and changing rainfall patterns (less rain, shorter periods of precipitation). The rural economy of Chiapas, strongly dependant on agricultural production, is threatened by the frequent passage of hurricanes and other tropical storms, whose impacts are aggravated by legal and illegal logging of forests, leading to a higher risk of flooding and landslides. The path of hurricanes Mitch (1988) and Stan (2005) had disastrous consequences for the local population, above all in remote mountain areas and in shanty-towns of the urban centres. While the slow-onset degradation in Tlaxcala is an additional factor for emigration, the impacts of natural hazards in Chiapas served as a trigger and accelerator for migration processes. During the field research, which took place in 2007/2008, a total of 23 expert interviews were conducted. The fieldwork was complemented by 39 questionnaires in selected communities of the Sierra & Soconusco region and 15 questionnaires in two communities in Western Tlaxcala (Hueyotlipan and Benito Juárez).

Key Findings

Western Tlaxcala

- The use of heavy machinery and the growing reliance on monocultures led to increasing problems of soil erosion. The quality of soil is even worsening through use of fertilizers and pesticides. The application of these 'modern' methods is driven by growing competition (liberalisation, free market policies).
- Furthermore, changing rainfall patterns (rain season starting 4-6 weeks later than two decades ago) lead to substantial problems for the regional agriculture as the period between sowing and harvesting becomes shorter. This leads to a reduction of productivity and hence to a decrease of family income.
- A common coping strategy is migration (internal and international, legal and undocumented). A preferred option is temporary migration to the U.S. or Canada (H2A Visas, PTAT), working ½ year abroad and ½ year at home. Environmental factors do play an increasingly important role, but are not the central root cause for migration.

Sierra & Soconusco (Chiapas)

- Small-scale farmers in Chiapas – as elsewhere in Mexico – have been strongly affected by the crisis of Mexican agriculture since the 1980s. Elimination of subsidies, growing competition and unstable prices are threatening the existence of many farmers. In Chiapas, agriculture still plays an important role in employment.
- The economic problems are aggravated by the frequent path of hurricanes and other tropical storms. Legal and illegal logging aggravates the impact of the storms and heavy rainfalls as natural barriers are missing. This leads to massive floods and landslides, literally 'washing away' the economic basis of farmers in affected regions.
- The impacts of tropical storms serve as a trigger of migration processes since hurricane Mitch (1998) and are nowadays an accelerator for migration decisions.
- Local resettlement programmes failed (low acceptance by affected population), mainly because of missing services and deficient constructions.
- Villagers were complaining about slow and minimal or even lacking state support after the passage of hurricane Stan, comparing their situation with the fast and extensive support in the Cancún and surroundings after Hurricane Wilma (both in October 2005).

Key Policy Recommendations

General Recommendations:

- State support for a change in agricultural production towards sustainable methods;
- Investments in rural areas (infrastructure, social services, education etc.);
- Further in-depth research on the environment-migration nexus.

Specific Recommendations for Chiapas:

- Consultation and participation of the population in disaster prevention and response as well as in reconstruction of villages destroyed by tropical storms;
- Equal treatment of regions affected by natural disasters, independent from the economic importance of the regions;
- Control and prosecution of illegal logging; extension of protected areas; reforestation of deforested areas.

Scenarios

A scenario is not a prediction of what the future will be but rather a description of how the future might unfold. Scenarios explore the possible, not just the probable and challenge their users to think beyond conventional wisdom. Scenarios are carefully created stories about the future. They include an interpretation of the present, a vision of the future and an internally consistent account of the path from the present to various futures. Scenarios support informed action by providing insights into the scope of the possible. They also can illustrate the role of human activities in shaping the future and the links among issues. In the process of helping to clarify possible future developments and their effects, scenarios often are a source of inspiration for creative ideas.

Approach taken in the EACH-FOR Project

In order to generate scenarios for environmentally forced migration for six selected case studies, the following approach was used.

1) *Scenarios for the globe*

Rather than develop scenarios at the global level, the scenarios developed for UNEP's *Global Environment Outlook* (UNEP 2007) have been used. There are four GEO scenarios: Markets First, Security First, Policy First and Sustainability First. Their basic characteristics are summarised in the box below.
For each of the case studies for which scenarios have been developed, two of the GEO scenarios have been used, as shown in the Table. The development until the year 2050 are considered in the scenarios.

Case Study	**Scenarios considered**
Spain	Markets First; Policy First
Egypt	Security First; Policy First
Ecuador	Security First; Policy First
Mozambique	Markets First; Policy First
Central Asia – Fergana Valley	Policy First; Security First
China – Inner Mongolia	Markets First; Policy First

2) *Developing local stories*

For the regional level, the implications of the two storylines with an emphasis on the significant hot spots of the case study were developed. Where relevant the GEO storylines were supplemented with other scenarios, such as those developed by the Intergovernmental Panel on Climate Change. For the national level, a set of indicators for the GEO scenarios were derived from International Futures (Ifs, 2008). The indicators show divergent developments under different scenarios and are interpreted according to the focus of each case study.

THE GEO Scenarios

In the **Markets First** scenario, the private sector widens its influence into previous governmental areas, i.e. privatisation of education, security, research, health and other social services, together with a continued movement towards free trade and the commoditisation of nature. International trade accelerates, although no global free trade zone is achieved. Existing regional agreements are strengthened, and new South-South cooperations emerge. Formal environmental protection is limited by efforts to increase economic investment and expand trade. The Kyoto Protocol sees no significant international follow up after 2012. Ecosystem services are turned into commodities. The economic exchange of goods like water, genetic material, knowledge and culture increases dramatically. Terrestrial and marine biodiversity decrease. Agriculture is intensified in all regions, which increases the potential of soil degradation. Water use efficiency increases in most regions (due to privatisation and better technologies), but the number of people living with severe water stress grows significantly because of growing populations and climate change (UNEP, 2007).

Security First can be also described as 'Me First' and brings a fairly narrow notion of security that implies increased limits on how people live, both physically and physiologically. Restrictions on migration reduce the movement of people and trade barriers that of goods. Governments are strong in decision making, but multinational corporations and private interests increase their influence. The authority of international institutions declines, and public participation gets marginalized. Total energy use increases significantly, while energy efficiency slowly improves. A dramatic resurgence in the use of coal results in strongly rising levels of atmospheric CO_2. The combination of climate change, growing populations and greater economic activity strains freshwater resources (both quantity and quality) and brings a dramatic increase of people facing severe water stress; conflicts on shared resources result. Both terrestrial and marine biodiversity are under great pressure (UNEP, 2007).

The **Policy First** scenario is a highly centralised approach with a move to a more holistic government balancing economic growth with social and environmental issues. National governments and international organisations (e.g. United Nations) lead in those efforts. Subsidies that encourage the overexploitation of resources are reduced or eliminated. Public investments in science and technology grow, and the number of protected areas increases with more or less effective efforts in preventing land-use change in these areas. International agreements increase energy efficiency and induce a move to more low carbon and renewable sources (i.e. biofuels). However, total energy consumption continues to increase. The higher demand for bio-fuels results in a significant increase in land devoted to pasture and a decrease of forest land. Growing populations and economic activities still put pressure on resources, particularly in developing regions. The number of people living under severe water stress continues to rise, but institutional efforts to better share resources help limit the impacts. The increased demand, however, places a strain on the quality of water resources. The loss of biodiversity is dramatic, mainly due to climate change and agricultural practices (UNEP, 2007).

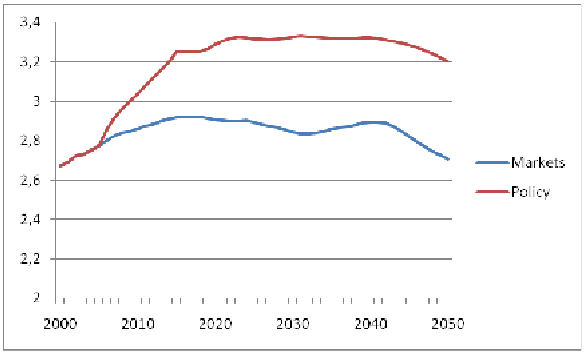
In **Sustainability First**, actors from local, national, regional and international levels and from all sectors (government/civil/private) address environmental and social concerns. The rules of international trade are reformed and public resources are shifted from military to social

and environmental issues. Climate change remains a persistent problem. Even though the growth in the level of CO_2 is limited, it is not possible to avoid potentially significant warming and sea level rise. In the energy sector, total energy use increases, but the mix of fuels change significantly with wind, solar and modern bio-fuels becoming an important fraction beside natural gas as the dominant source. The expansion of agricultural land comes at the expense of forest land, but the loss of the latter slows significantly over time. The growth of water stress is reduced, but some regions still face increasing problems, both with quantity and quality. Efforts to reduce biodiversity loss are high, but the challenges are strong and there is significant species loss in some areas (UNEP, 2007).

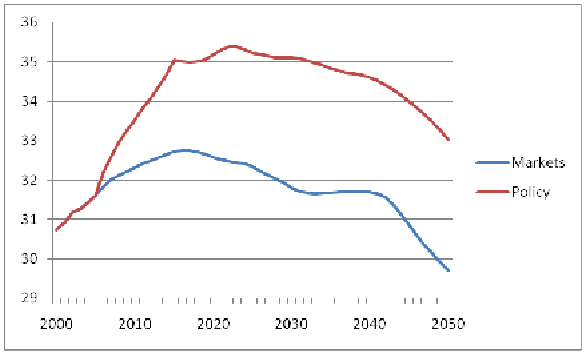
Results for the 6 case studies

Spain

The scenarios for Spain focussed on the issues of water shortage and drought, since these were the major issues identified in the Case Study that could affect migration. Several available studies indicate that the frequency of droughts will increase in the future as a result of climate change. The two Figures below show the indicators agricultural yield and water usage for the two GEO scenarios (derived from International Futures). In the Policy First scenario, the fact that more care is taken of the environment leads to higher water availability and usage and higher agricultural yields. In the Markets First scenario the water usage declines below the level of 2000 after 2040.



Yield - tons per hectares

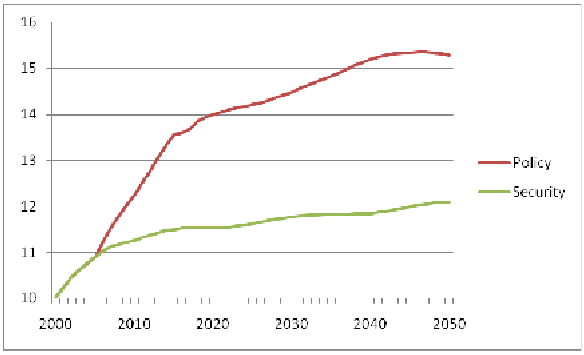


Water Usage, annual - Cubic Km

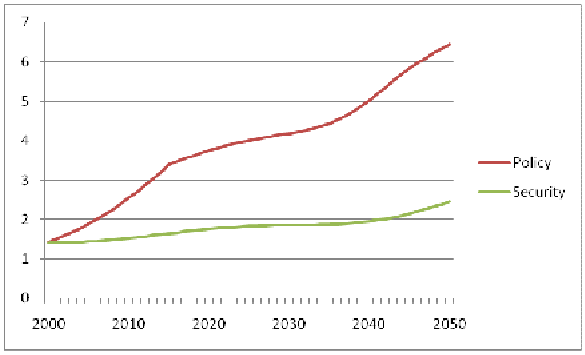
The combination of high temperatures, increased frequency and duration of heat waves and increased water stress in the Markets First scenario suggest that the southern Spain region would be less attractive for amenity migration and for horticulture than at the present time. The environmental changes could become significant push factors. In total the potential for migration from Southern Spain appears to be considerably higher in the Markets First than in the Policy First scenario.

Egypt

For the scenarios for Egypt one focus was on water shortages and desertification, which are big issues today according to the case study. However, sea-level rise could become the biggest challenge in this century, as the Nile delta is especially vulnerable. The area lies widely below the mean sea level and is the most important agricultural land of the country.



Yield - tons per hectares



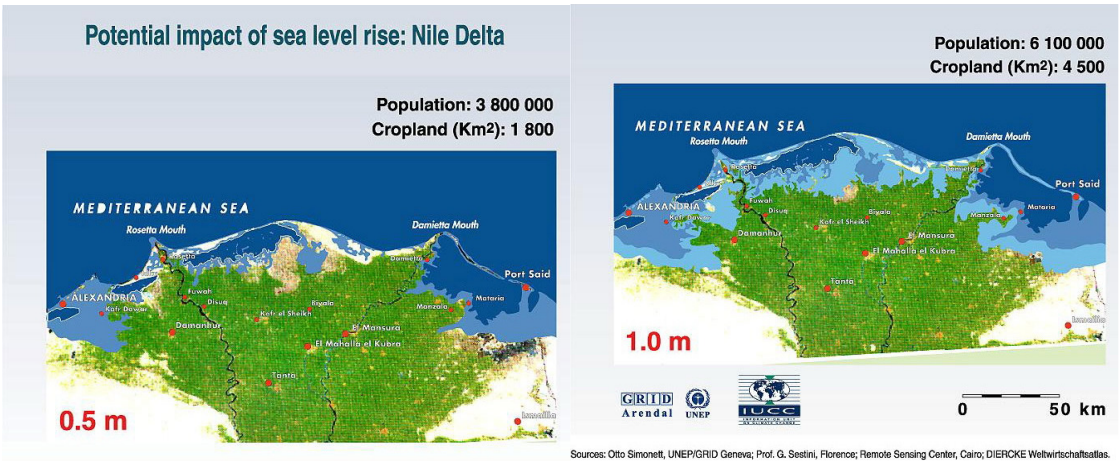
Aid (foreign), net - Billion $

The two figures show the agricultural yield and foreign aid (derived from International Futures) for the two scenarios analysed for Egypt. In both cases there are large differences. In a Policy First world, where more attention is given to issues of sustainability, agricultural yield is much higher than in a Security First world, where pressures on the environment are much higher. Furthermore, in a Security First world, in which the regions act autonomously, the amount of foreign aid reaching Egypt is much lower than in a Policy First world.

These results suggest that in a Policy First world, while there would be impacts due to the population increase and to unavoidable climate change, Egypt would be able to cope, especially given increased foreign aid and possible increased agricultural exports. Therefore the potential for international migration in this scenario is low. In contrast, the Security First scenario has larger impacts and much less capacity to adapt to change, so the potential for international migration is high.

In addition to the above factors, as mentioned above sea-level rise is a major threat to the Nile Delta region, as documented in a number of studies (for more details, see the Scenario Report for Egypt on the EACH-FOR website).

According to a World Bank Study (Dasgupta et al., 2007) a sea-level rise of one meter would flood a quarter of the Nile Delta forcing about 10 per cent of Egypt's population from their homes. They point out that the impact would be even more significant if Egypt's population, as expected, doubles to about 160 million by the middle of this century. A 5 m sea-level rise would, according to the World Bank study, impact 20% of the population. A 1m sea-level rise would impact 12.5% of Egypt's agricultural extent, rising to 35% for a 5m sea-level rise. The figure below shows possible impacts of 0,5m and 1,0m sea level rise scenarios produced by UNEP's GRID-Arendal. Recent assessments suggest that sea-level rise will be at least one metre by 2100. The rise would be larger in a Security First world than a Policy First world. The numbers of people affected by a one metre sea-level rise in Egypt are significant, so this is an area for further study with respect to forced migration.

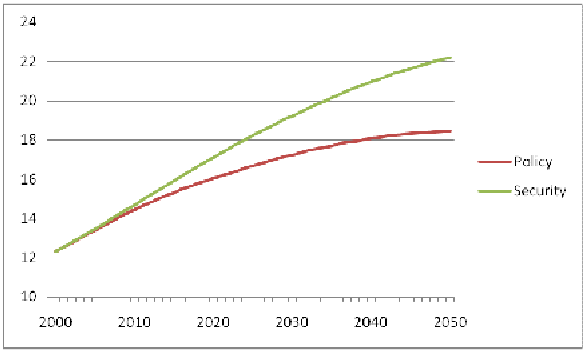


Potential impact of sea level rise in the Nile Delta with rise of 0,5m (left) and 1,0m (right)
Source: http://www.grida.no/publications/vg/climate/page/3088.aspx

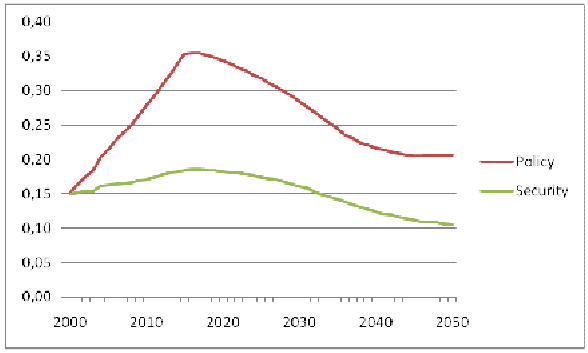
Ecuador

The focus in the scenario development was land degradation, identified in the case study as one of the main issues potentially affecting migration.

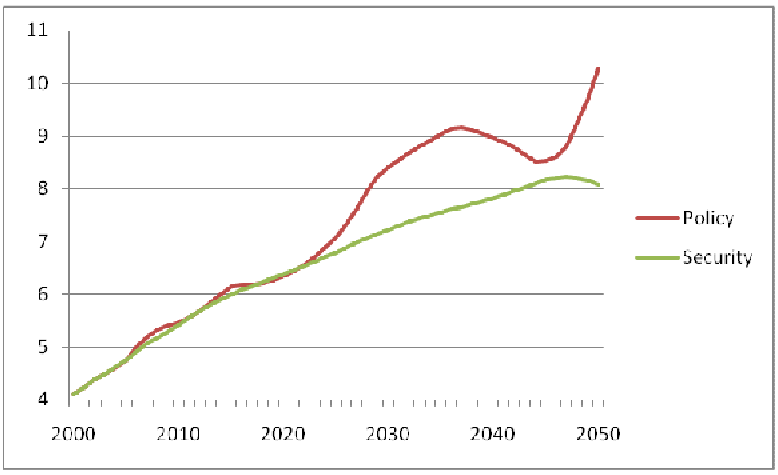
Ecuador's agricultural productivity and economic welfare increase more in Policy First by 2050 than under Security First (see the Figures below for the total population in the two scenarios, agricultural yield and foreign aid)). In contrast, Security First shows a significantly higher rise of population. Combining those three indicators suggest a dramatic picture under Security First conditions (which overall tend to serve a small elite anyway): More people with less food and less financial resources compared to Policy First. At the same time also factors of quality of life such as life expectancy and malnourished children improve less under Security First. This could substantively add to existing push factors of migration. Overall, the analysis of the scenarios for Ecuador suggested that the push factors for migration are greater in the Security First scenario. However, in a Security First world, sometimes referred to as Fortress World, international migration outside of the region is severely restricted, which means that although the potential for migration is high, the actual result is increased human suffering in the country itself.



Population - Mil People



Aid (foreign), net - Billion $

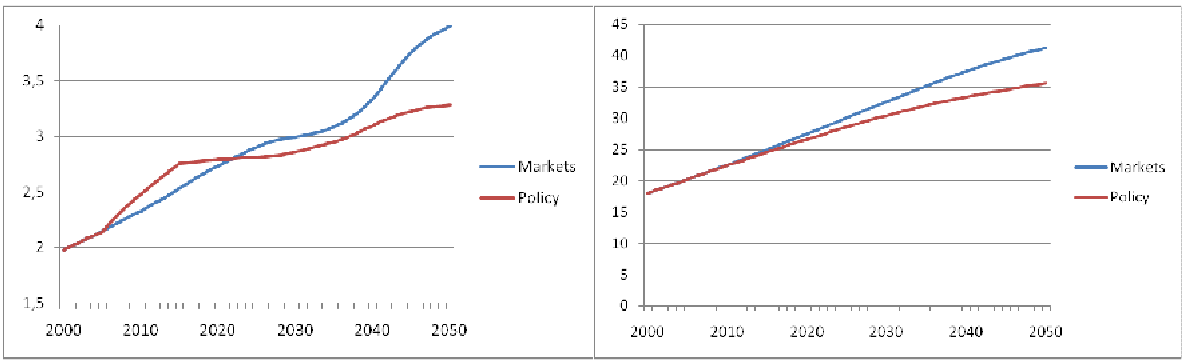


Yield - tons per hectares

Mozambique

For Mozambique the Markets First and Policy First scenarios have been analysed. In both scenarios, the increasing population is an important driver. Under Markets First, an intensified and profit-driven agriculture is characterized by unsustainable practices and leads to severe land degradation. Privatisation and amalgamation of sectors improves human development, but trade-offs from globalisation and limited efforts in environmental issues show negative impacts. In Policy First, regional integration and policies with economic and environmental stewardship are guided by the regulatory frameworks of the New Partnership for Africa's Development (NEPAD) and the African Ministerial Conference on the Environment, and help reaching environmental and human development goals.

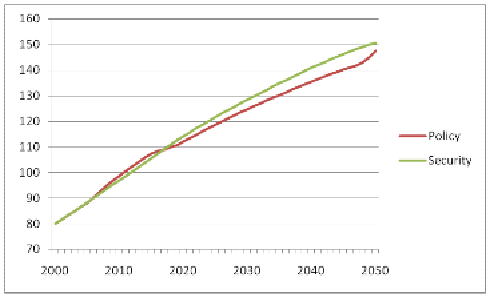
On the national level, the International Futures indicators show similar trends under both scenarios, but there are some important differences. Agriculture yields rise more under Markets First, but the slower increase of population almost compensates the lower food productivity in Policy First. Under the projection of increasing frequency and intensity of extreme weather events in combination with the high vulnerability of the local population, another indicator becomes crucial: Foreign Aid (Figure 5). Mozambique's ability to cope with floods and droughts will probably depend on financial support from outside, and this support is significantly higher in a Policy First world.



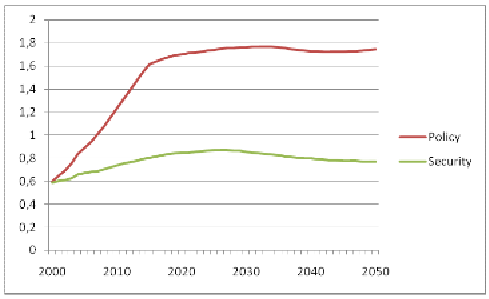
Yields in tons per hectares Population in million people

Ferghana Valley

For the Ferghana Valley, the Policy First and Security First scenarios were analysed.
A security-orientated world is marked by barriers that restrict trade as well as the movement of people. But this focus on limiting migration leads to a paradoxical situation. As the indicators show, the pressures on migration increase under Security First conditions. In a policy driven world the economic, demographic and social situation in the Ferghana Valley develops much better. This could potentially diminish trends of migration. On the other hand environmental factors stay alarming: In both scenarios the amount of annual water usage almost doubles while the area of forests decreases. This would easily lead to water shortage and desertification and demand rapid adaptation measures. This would require significant amounts of foreign aid – aid that would be significantly higher in the Policy First scenario.



Water Usage, annual - Cubic Km



Aid (foreign), net - Billion $

The different scenarios analysed show that the migration potential is much higher in the Security First scenario than in the Policy First scenario. Among the possible environmental problems, natural disasters such as floods, landslides and mudflows are those that are most likely to displace populations, a fact that has also been shown in the fieldwork studies. In a Policy First scenario, such disasters can be prevented and mitigated, so as to avoid forced migration. Furthermore, given the transnational nature of the Ferghana Valley, such disasters can induce distributional conflicts in a Security First scenario. Such conflicts can also be significant migration drivers, as evidenced during the civil war that took place in Tajikistan until 2005.

Agricultural production and the decline in crop yields are major triggers of migration flows. If policies of sustainable development are not implemented – as would be the case in a Security First scenario – such degradation would be further aggravated, leading to more important migration flows, in a cumulative fashion. Finally, droughts are projected to intensify in the summer season. In both scenarios, this is not expected to be a major driver of migration, as resources are often used for the basic needs of the households rather than migration in such cases. If these droughts lead to regular and intensified decline in agricultural yields, however, this degradation could lead to population movements.

Inner Mongolia

For Inner Mongolia, the Markets First and Policy First scenarios were analysed. Both scenarios lead to a high migration potential, though this potential is linked to different factors. Given that policies of environmental conservation often include resettlement schemes, the policy first scenario is likely to result in more displacements than the markets

first scenario. The Markets First scenario shows an acceleration of land degradation due to overgrazing problems, as well as to climate change. Hence the economic conditions of pastoralists deteriorate, and many lack the resources to migrate or engage in another economic activity. Population continues to grow in Inner Mongolia, leading to a further depletion of resources.

In the Policy First scenario, ambitious measures of environmental conservation are undertaken. Such measures include the preservation of grassland areas in Northern China, including Inner Mongolia. The economic costs of desertification are high, and there is a widespread concern about the sand storms that now reach Beijing and the Korean peninsula. Hence the restoration of grasslands is a top priority of Chinese environmental policies. These policies include reforestation and resettlement schemes, similar to those that have been undertaken already. However, return migration could eventually be possible in the case where desertification would be halted and grasslands restored, which is not the case at the moment.

Discussion

We have used the GEO scenarios to provide possible pictures of the world in the future. The scenarios illustrate different possible developments depending on whether the pathway to the future are characterised by an emphasis on economic growth, on a strengthening of environmental governance or on regions isolating themselves. Obviously these are caricatures of the future but they serve a purpose in posing the question: **What** would happen to environmentally forced migration **if** this kind of development were to take place? The answers to this question have been answered in a very preliminary fashion in the EACH-FOR project. Interestingly, the analyses show that the largest increase in push factors is in the Security First scenario, but this is the scenario in which international migration is restricted (we can picture the world with high walls around each region), so the conclusion is that for this scenario the migration potential is high but the result will be increased suffering in the regions for which scenarios were developed.

The analysis is preliminary, because if funding and human resources had been available, a further round of analysis would have been carried out in the field-work areas, in which a discussion of the scenarios with local stakeholders would have permitted both an elaboration of the scenarios at the local level and a more differentiated analysis of the scenario implications.

Overall Key Findings of the EACH-FOR Project

Climate change is not the only potential environmental trigger for migration

The environmental problems faced by migrants, potential migrants and non-migrants in the case study areas are manifold:

- soil degradation and erosion;
- deforestation;
- water, soil and air pollution;
- water-logging and salinisation of irrigated lands;
- landslides and mudslides;
- radiation from nuclear waste;
- saltwater intrusion and accelerated coastal erosion;
- flooding and riverbank erosion;
- tropical cyclones;
- extreme aridity and irregular rainfall;
- and sea-level rise.

Migration is a traditional coping mechanism

Migration has been used often as a means to cope with the effects of some periodic, environmental events, such as droughts or floods. A preferred option is temporary or seasonal migration. During periods of environmental stress, for example, people move to other areas, in particular to agro-ecologically more endowed areas or urban centres, to earn money. For herding nomadic people, seasonal migration is even part of their lifestyle.

In some areas these traditional patterns have changed in recent decades, partly because of climate change but also because of other human-induced factors such as sedentarisation of nomadic people and the disruption and opening up of the traditional rural society by colonisation, urbanisation, global competition, migration, schooling, media, tourism and state interventions.

In many of the EACH-FOR case study areas, temporary or seasonal migration is common; some family members leave while others stay. Those who stay behind often have to wait their turn, or because of social norms (women, care for children or parents) or because of other ways to earn a living (commercial activities). Even in harsh climate conditions, people develop mechanisms and strategies of adaptation.

Migration is a strategy to improve food and livelihood security of both the migrants and their relatives that stay behind. Many of the people interviewed in EACH-FOR case studies who migrate due to environmental problems are willing to return back if the environmental problems are mitigated, since seasonal migration (mostly within the country) has always taken place.

The ownership of the land is a very important factor that influences the migration decision. As long as the farmers are hired on the land, they are very mobile and flexible in response to environmental changes. Owners of the land would not leave unless there is no other way or they are officially displaced by the government.

Migration occurs when livelihoods cannot be maintained

The environment is the basis for agriculture (and fishing and herding), which is still the major income source for the majority of the population in the developing and transition countries studied in the EACH-FOR project. When this economic basis is threatened by the environmental degradation, people migrate elsewhere in search of an alternative livelihood. However, fieldwork also showed that in many cases all sectors of society were impacted (not only the farmers): shop and restaurant owners, truck drivers, and merchants migrated because of the environmental stressors.

Migration decisions are complex

Many of the people who migrated due to environmental problems did not attribute the migration directly to environmental factors. Instead they referred to low income and bad living conditions, or in some cases to political and social conditions. However, in many cases one of the root causes of their loss of livelihoods is environmental.

The research results repeatedly point to the interconnectedness of environmental factors with economic, social and political factors affecting the migration flows of people. The natural and human-made disasters are a complex mix of both natural and socio-political and economic processes.

While the environment can be an important "push factor" for migration (and in some cases it is the sole driving factor), it is often closely interwoven with other social, economic and political triggers for migration decisions. Other "push factors" include lack of infrastructure (social services, education, etc.) and the withdrawal of the state from rural areas. At the same time there are often significant "pull factors", especially more promising economic opportunities elsewhere and the supposed attractions of urban areas. Once migration has started, it reinforces further migration, by networks that facilitate migration and "a culture of migration".

The complexity of the migration decision-making processes is also illustrated by examples of counterintuitive findings. In some cases, for example, severe environmental deterioration led to reduced migration and even to increased return migration. This can be explained by the overall political and economic context at the time: under certain conditions stronger political and economic forces may override an existent or even increasing environmental push on migration flows.

Finally, the complexity is further illustrated by the findings that even if the causes of migration are very similar from one person to the next, people opt for different strategies in terms of destination and timing for migration.

Although environment is often not the only trigger for migration, the EACH-FOR case studies show that it is an important factor and with the expected climate change it will grow in importance.

Who migrates?

Many of the EACH-FOR case studies show unambiguously that people who want to leave their villages/regions/country can only do so if they have the necessary financial means and access to networks that support migration. In fact, the financial means are often not available, since the environmental degradation had a negative impact on their income or, as discussed above, the overall political or economic context overrides the environmental push factor..

Many of the case studies find that it is the younger generation that migrates. The older people stay in the places of origin even in the face of severe environmental stress. The migration decision is generally not made at the individual level but at the household or family level. The older people stay behind to maintain the home etc, while the young migrate in search of employment and send back remittances.

Internal or international migration?

An important outcome of the fieldwork is that migration induced by environmental hazards and degradation is mainly internal and seldom international. This is understandable: environmental hazards negatively affect the economic base of households (and thus their means to finance migration). Furthermore, the case studies are mainly within rural, backward regions. From migration studies it is already known that international migrants to Europe or the US are not the poorest, but people that have some means (both financial and social capital/networks + some education) to invest in the migration abroad. They often originate from cities or urban environments (but sometimes via step-by-step migration from rural areas).

In some cases there are no "winners"

The uniqueness of environmental migration is that very often it is not a choice, but the only solution. In some of the EACH-FOR case studies there are no winners: both those who migrate and those who stay – are losers. In these cases, the social networks, culture and livelihood strategies of migrants and non-migrants, are destroyed (in contrast to seasonal and temporary migrants who maintain contacts with their relatives who stay behind).

Many people who had migrated also reported that their quality of life in the place of destination had not improved: it had been difficult or impossible to find employment or housing or adequate land for agriculture.

The special case of forced displacement

Three of the EACH-FOR case studies paid particular attention to forced displacement as a result of dam construction.

In the case of the Volga River Basin, the regulation of the river course with dams during the Stalin era did have many positive effects, opening the region to numerous possibilities in terms of industrial and rural development, the exploitation of rich oil and gas deposits, hydroelectric power, and the extension of irrigation areas. However, resettlement was very brutal in the Stalin era. After this time, resettlement was less brutal, although the local population was by no means consulted.

The study of the Ataturk Dam showed that for those who chose to be resettled, the move outside the region created cultural adaptation problems and migrants were discriminated against by the locals. On the other hand, employment opportunities were improved, for some who were resettled to western Turkey. In the case of participatory resettlement plans, the new settlement area in the region lacked employment opportunities. For those who chose to resettle on their own, the confiscation compensation was not sufficient and was paid in three instalments, which made it very difficult for migrants to buy new homes as real-estate prices skyrocketed. Thus, except for very large landowners, many displaced households suffered negative consequences.

In the case of the Three Gorges Dam, most of the displaced people had little or no knowledge about the destination before resettlement. While there was no significant change in material living standards after resettlement, the social cost was large. Participation of migrants in decision making was found, where it occurred, to have positive effects.

Migrants, displaces or refugees?

The EACH-FOR research shows that most often environment is only one of the many motives for migration, and mostly the migrants are only forced in a lesser degree. Thus, the term **environmental refugee** is mostly inappropriate: they are not refugees, and their move is not only environmentally motivated. But there are exceptions, such as the potential disappearance of Tuvalu, people fleeing floods in Bangladesh, Vietnam or Mozambique (although they mostly stay within the country) etc. We can conclude that a more accurate use of terms is needed; for example in accordance with the EACH-FOR definitions of environmental migrants, refugees and displacees.

Key Recommendations

Implement sustainable development

Policies, including development policies, must be implemented to support protection of natural resources and control the non-sustainable overexploitation of water and land resources. If environmental considerations are not taken into account in environmentally vulnerable areas, this might have destructive consequences for the environment and subsequently for the economy in the long term. A further major focus for sustainable development should be on disaster risk reduction.

Investment and public/private partnerships must be guided to strengthen sustainable productive, income-generating activities and improve quality of life. This means investing in activities that generate jobs without destroying ecosystems and reviving some traditional regional industries. Rural communities should also be strengthened by providing them assistance for family agriculture, recognition of traditional knowledge and practices, support for self-organisation and self-management, and ensuring them a continued access to land. Fair agricultural and trade policies would reduce poverty and enhance quality of life in developing countries.

Improve the capacity to adapt

Adaptation strategies could reduce the environmental vulnerability and increase the resilience of local populations. Investment in reducing vulnerability and improving the capacity of local communities to adapt must be taken into account in every policy implemented.

Policies should also take advantage of the wealth of traditional or indigenous knowledge accumulated by the local population in dealing with environmental challenges.

Improve the livelihoods of seasonal migrants

Recognising that seasonal migration is a viable coping strategy for many households, efforts should be made to establish facilitated seasonal work programmes to help migrants find viable work opportunities.

Mitigation is also necessary

The EACH-FOR case studies provide numerous examples of possibilities for reducing environmental change. Local support is needed for reducing deforestation, soil degradation, water pollution etc. At the same time, international efforts to limit climate change are essential. Care should be taken that efforts to reduce emissions of greenhouse gases in one region (e.g. through the use of biofuels) do not lead to environmental degradation in other regions (e.g. biodiversity loss and soil degradation through monocultures for biofuels).

Training, education and networking

Education campaigns could increase understanding of the causes and consequences of environmental degradation and available options to reduce it. Training of farmers (and herders and fishers) in sustainable practices would lower environmental degradation.

There is a strong need for interdisciplinary and transdisciplinary networks to foster dialogue between experts and a wide range of other stakeholders on questions such as adaptation strategies, the linkages between environmental change and forced migration, and processes of resettlement. International dialogues could promote exchange of experiences and learning among regions.

Migration is not always a "bad thing"

Out-migration – both internal and international – is an essential element of processes of economic development and modernisation. Policies to curb migration could have a negative impact on the livelihood security and economic development of a developing region, and may even accelerate the overexploitation of natural resources.

Resettlement must be carefully planned

Better planning is needed before migrants are resettled. Programmes aimed at a better integration of migrants in the places of destination need to be fostered. The social and cultural cohesion and the human rights of those being resettled must always be considered. New homes should be ready before people are moved.

More participatory resettlement processes that include suggestions for alternative and sustainable livelihoods for those households or individuals who are resettled would have more success. New employment opportunities should be promoted through incentives that would channel investment to the new district/city. More information regarding the development project is necessary. The information should be distributed widely and should come in different formats in order to be more effective. There should be training for new jobs and financial guidance for those who received confiscation compensation.

The responsibility of the EU

The EACH-FOR research has demonstrated that environmental change is one of the motives for migration, but mostly these migrants move within their country or region, not to Europe. This has three implications for the EU. First, although it suggests that there will not necessarily be large flows of environmentally forced migrants to the EU, it does mean that development policies of the EU should focus on increasing the capacity of those people in developing countries affected by environmental changes and hazards to cope. Second, when people cannot migrate because they have neither the money nor the networks to do so, they will suffer as a result of environmental changes and hazards, so the EU must be prepared to help them with humanitarian aid. Third, since climatic change, which is not the only, but nevertheless is a significant, push factor in many developing countries, is currently

the result of economic activities in developed countries, the EU has a responsibility to reduce emissions and mitigate the effects of climate change and thus the impacts on people in developing countries, who otherwise will face an increasing pressure to migrate.

Future research directions

The EACH-FOR project was funded for two years. During this time a methodology for examining the links between environmental change and migration was developed and tested in the field, general overviews of the regions were prepared and preliminary work on scenario development was carried out. There are several needs for further research that arise from this work.

The first need would be to expand many of the case studies that were carried out. In the case of the studies that relied primarily on desk research (Spain, the Volga River Basin and the Balkans), this would mean carrying out field-work along the lines developed in the EACH-FOR project with semi-structured interviews and questionnaires. For the areas where fieldwork was carried out, expanding the work would certainly involve distributing many more questionnaires to migrants and non-migrants in order to be able to draw statistically significant conclusions.

A second avenue would be to use the EACH-FOR methodology, while expanding it to allow for more in-depth and longitudinal studies, in other areas where environmental change can/could be linked to migration. Indeed several regions where this linkage can be made were discussed at the conference on Environmentally Forced Migration and Social Vulnerability (EFMSV) in Bonn in October 2008 (see, for example, Afifi and Jäger (2009)).

More structural data (statistical data) with regard to the link between environmental change and migration are needed. Also case studies in urban areas are necessary; especially the effects of sudden natural hazards such as hurricanes and floods on urban populations. Studies are also needed to investigate further how environmental migrants survive in cities, whether and when they return to their area of origin, how their remittances 'cause' changes (also in land use) in the area of origin; and the effects of large scale migration movements on the environment of the place of settlement. There is also a need to investigate further the links between internal migration motivated by environmental factors and international migration (step-by-step migration; from rural to urban areas and subsequently (or perhaps in the next generation) abroad.

However, the need is not simply for more case studies with more interviews: A larger set of case studies with more detailed information would it make it possible to carry out meta-analyses and econometric modeling to provide a more differentiated and more accurate view of the complex set of environmental, economic, social and political factors influencing people's decisions to migrate or not to migrate.

The EFMSV Conference in Bonn (October 2008)

An important lesson learned in the EACH-FOR project with regard to this type of field-work concerns the involvement of local (i.e. in the case study area) researchers. They bring invaluable local information and perspectives, so their participation should be encouraged. We have learned that sufficient human and financial resources should be provided for translating their reports, so that the project can take full advantage of their valuable contributions to this kind of work. In this regard sources are also important to ensure that the results of the research can be disseminated in local languages in the areas where research has been carried out.

In further research on environmentally forced migration, the results of the EACH-FOR project suggest that much stronger links should be made to both development research and vulnerability research. Many of the case studies highlight the important role of poverty in migration decisions, with the very poor clearly not having the resources to move away from hazardous or slowly degrading areas. Here the link to the development research community could strengthen the discussion of opportunities to respond to the challenges that are being faced and how to improve the capacity to adapt. Likewise, the community of scholars that assess vulnerability could provide methodologies and insights that improve the analysis of linkages between environment and migration.

Last but not least and as mentioned earlier in this report, there is a need to include participatory scenario development and analysis in case studies of environmental change and migration. In the EACH-FOR project, resources were not available for this important kind of research. It was possible to develop coarse storylines for scenarios, but not to engage in a structured dialogue with local stakeholders in order to elaborate the scenario narratives for the local level and discuss the local implications for migration of the different scenarios. Without this step, it will not be possible to make reliable estimates of the potential effects of different pathways on migration patterns.

Given the current concerns about climate change, increasing water stress, loss of biodiversity, ocean acidification, land degradation and locally serious levels of air, soil and water pollution, there is a strong need for further research to understand the factors that influence people's decisions to migrate or stay and to explore possible future pathways and their implications.

Fieldwork in Bangladesh

List of Abbreviations

CEDEAO	Communauté des Etats de l'Afrique de l'Ouest
CIS	Commonwealth of Independent States
EACH-FOR	Environmental Change and Forced Migration Scenarios
EM-DAT	Emergency Events Database (http://www.emdat.be/)
EPA	Environmental Protection Agency
GDP	Gross Domestic Product
GEO	Global Environment Outlook
HDI	Human Development Index
IASFM	International Association for the Study of Forced Migration
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
NEPAD	New Partnership for Africa's Development
NGO	Non-governmental Organisation
PTAT	Program for Temporal Agricultural Workers to Canada (Programa de Trabajadoras Agricola Temporales a Canada)
SADR	Sahrawi Arab Democratic Republic
SNTP	Semipalatinsk Nuclear Testing Polygon
UNEP	United Nations Environment Programme
VRB	Volga River Basin

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