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Addressing the environmental factors of migration

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Climate change and environmental migration

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Summary: Climate change and global environmental conditions will likely worsen living conditions for many regions, at times requiring large-scale resettlement (such as with sea level rise in the Maldives or Bangladesh), while at other times forcing threshold effects on underlying ecological systems. Migration due to environmental changes is not a new phenomenon, but the determining factors are often more economic, social and political than purely environmental. The crucial security questions relate not to the sparking of interstate conflict due to migration across borders, but rather what the process of migration tells us about the stability and dynamics of communities in the OSCE region. Member states and organizations should focus efforts on early warning of vulnerable areas, particularly to risks of abrupt shifts in climate systems and adaptative capacity of affected communities.

1. Migration, vulnerability and ecology:

Migration as an ecological concept is well understood, as flora and fauna adjust habitation to accommodate either seasonal or long-term changes in environmental conditions. The ability of species to adjust to changes is a determining factor in extinction risk, although loss of habitat and sudden changes in the environment can create 'threshold effects' beyond which it is not possible for a community to survive. Many human societies have themselves adapted to environmental changes by adopting migration as a coping mechanism, whether in pastoral herding or seasonal agriculture. The concept of human environmental migration is therefore not a new concept, and contrary to some environmental security analyses, does not *ipso facto* constitute a security risk. The security implications of environmentally-induced forced migration depend upon the nature of the 'forcing' behind migration, and the impacts that such migration may bring.[1]

Global climate systems tend to be non-linear, meaning that when changes occur they are often quite abrupt and impacts will not be felt evenly across different regions. Paleo-climatological records indicate that temperatures as recently as 11,500 years ago changed by as much as 17 degrees Celsius in as many years, and that sea levels have risen by 3 metres in less than fifty years.[2] Small changes can set off positive feedback mechanisms in climate systems, greatly accelerating warming or cooling, and research suggests that such feedback effects (eg Arctic releases of methane, deforestation, changes in albedo) are already being observed. As greenhouse gases continue to rise, the risk is that climate systems will force environmental changes in an abrupt fashion, unlike the steady increases suggested by the Fourth IPCC Assessment Report.[3]

1.1 Adaptation and vulnerability:

Climate and environmental systems do not exist independently of social, political and economic systems. How people react to environmental changes can themselves act as feedback effects, either dampening or worsening physical processes. Likewise, the nature of human systems helps to determine how vulnerable communities are to environmental changes. The concept of vulnerability is composed of a *risk-hazard*, generally meaning the probability of negative impacts, which depends upon how *sensitive* a system is to change. Certain societies are more sensitive to the risk of sea level rise because of geographic location, while others may be more sensitive to drought conditions because they are highly dependent upon agriculture. The ability to recover from these impacts is a measure of *resilience*, often determined by the availability of assistance (financial or otherwise) from others. A final component of vulnerability is how *fragile* a system is to change, and whether the network of relations will 'break' and result in less stability.[4]

Migration can be an adaptation measure to changes, either in a positive sense (where the movement is supported and migrants have adequate resources), or a negative 'flight' reaction where outside support becomes necessary. The task for those concerned with negative impacts of environmental migration is to determine, ahead of time, which areas are most vulnerable to environmental changes, and to increase the ability of communities to adapt to potential environmental changes. This requires a broader understanding of the cascading effects of climate change, and the nature of the complex systems that support both environmental and social health.

1.2 Historical example: American Dust Bowl

A combination of social, economic and ecological factors combined in the 1930s United States, which led to hundreds of thousands of migrants from the Midwest plains state like Oklahoma, to regions like the Central Valley of California. These migrants, collectively known as 'Okies', have become iconic in American and particularly California history. A drop in commodity prices following the First World War led to an expansion of agricultural production on the American plains, resulting in greater economic vulnerability (lower incomes and higher debts), and environmental strain (abandonment of traditional conservation practices, greater mechanization, over-tilling of the soil). When a severe, seven-year drought hit the region in 1931, the overworked soil blew into large dust storms, and the farmers were not economically resilient enough to sustain their livelihoods. With many having family connections on the West Coast, and with new transportation lines leading to California ('Route 66'), for most of the 1930s thousands of migrants arrived in California each month, hoping to start again as farmers. It was only expansion of California's water infrastructure and growth in the post-1941 war economy that allowed full assimilation.[5]

The lessons of the mass migration from Oklahoma, just as the earlier exodus from Ireland during the Potato Famine, or the migrations after Hurricane Katrina in 2005, were that underlying conditions created vulnerabilities for what otherwise would be normal environmental events. Land use and tenure, adoption of new agricultural products or methods, enormous disparity in wealth, preexisting networks of relations and transportation routes (or lack thereof), create conditions in which communities are more sensitive to particular hazards, less resilient to their effects, and potentially fragile to environmental pressures.

2. Foresight and warning of environmental migration

Migration patterns, however, are easier to explain in hindsight than in assessing potential future scenarios. Certain methods of scenario planning do allow for assessing the risks of high-impact, unknown-probability events and their cascading impacts, including migration. An example is the project on abrupt climate change risk assessment, carried out jointly under the Global-EESE program between the Institute for Environmental Security and the US Department of Energy. By tracking early warning signals of potential abrupt changes in environmental systems, and mapping the impacts and feedback effects on inter-related systems, it should be possible to integrate regional assessments (as under proposed OSCE/IOM/UNU projects) to illustrate how climatic changes may impact states in the OSCE region.

2.1 Climate impacts

The non-linear nature of climate systems suggests that many impacts will be abrupt, giving relatively little time or warning for adaptive behaviour. The geo-physical changes that may occur can be summarized as:

- Sea level rise: In the OSCE region, more of a threat to industrialized states with intensely developed coastal regions.
- Intense droughts: Loss of rainfall could seriously affect agriculture and power production across all OSCE member states, also worsening desertification.
- Glacial melt: Crucial to water supplies, especially in Central and South Asia.
- Extreme heat events: Akin to the summer heat wave in Europe 2003, posing health challenges to vulnerable populations.
- Intense regional cooling: If climate changes cause a shutdown of the global thermohaline ocean currents, the UK, northern Europe and Scandinavia could experience drops in temperature from 2-12 degrees Celsius.[6]

With the exception of sea level rise, these events on their own do not necessitate migration if the society has access to adaptation measures. More vulnerable populations may be forced to relocate, however, if such changes interact with other conditions to amplify environmental impacts.

2.2 Central Asia and climate change impacts

The Central Asian states of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan have experienced both large-scale migrations of populations and severe environmental changes in recent decades. Intensive mining (including of uranium), large-scale deforestation, anthropogenic droughts (eg the drying of the Aral Sea), and air/water pollution have characterized areas of this region. Already origin points for migration to Russia and Europe, a large number (estimated at half of total migrants in the region) were internally displaced, with some 100,000 displaced during the 1980-90s due to environmental conditions around the Aral Sea.[7]

Climate changes are already affecting availability of water in the region, exacerbating already scarce freshwater resources that historically had been diverted for cotton irrigation or hydropower production. For example, the Toktogul reservoir in Kyrgyzstan has a negative net inflow each year, with reservoir levels in 2008 dropping to where power production has

significantly suffered. When combined with colder winters and rising energy prices for fossil fuels, the electricity shortages in Kyrgyzstan's capital Bishkek have resulted in dissatisfaction against the government as schools as businesses have closed.[8] Similar conditions were faced at the Nurek reservoir in Tajikistan, where severe winter weather and drought conditions resulted in economic damages of some 7% GDP. Furthermore this winter use of water for power production must be balanced by less use of water for summer irrigation. This places greater pressures upon agricultural production and food security, and regions vulnerable to political instability often experience a combination of net out-migration and food insecurity (this may be a reinforcing process). In 2008, food prices in many parts of Central Asia rose 26-32%, with the WFP reporting that 1.5 million in Tajikistan were food insecure. Lack of reliable transport within countries may hamper transfer of food, even when available.[9]

Unfortunately, forecasts for future droughts and the Central Asian glaciers are not positive, and the glaciers may continue to lose mass at an accelerating rate. With a combination of energy and food insecurity, global economic recession, and potential future shocks from environmental changes, Central Asian states may be vulnerable to large-scale out-migration should conditions significantly worsen.

3. Recommendations

- Conduct regional assessments of environmental vulnerability (as EEF.GAL/7/09).
- Produce integrated assessments of climate risks & regional impacts.
- Prioritize development and assistance policies to increase adaptative capacity for those are most vulnerable; prepare contingencies for future migration.

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