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# **Migration: A Problem & Solution in the Face of Environmental Change**

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## **Introduction**

The American Association for the Advancement of Science has warned that there will be approximately 50 million environmental refugees by 2020 (Black et al., 2011). Other estimates pertaining to environmental migration vary from 25 million up to 1 billion with the most frequently cited number being 200 million people displaced by 2050 (Gemenne, 2011; Laczko & Aghazarm, 2009; Myers, 2002). Such alarming discourse almost entirely focuses on displacement, and presents migration as a problem (Black et al, 2011). By contrast, a recent report prepared by the UK Government Office for Science broadens the perspective on environmental migration suggesting that it should not be viewed as a “wholly new migratory phenomenon which is attributable to environmental change” (GOS, 2011:32). Instead, environmental change acts upon the drivers of migration by changing livelihoods and affecting environmental hazardousness of places (Black et al, 2011). Changes in the environment, such as land degradation, coastal and marine system degradation, desertification, changing rainfall patterns, and sea level rise are already happening (GOS, 2011) and will further be exacerbated by the effects of climate change (Parry et al., 2007). According to the UK Government Office for Science (2011:10) “migration, in the face of environmental change, may not be just part of the problem but also part of the solution”.

This essay explains evidence supporting the claim made by the UK Government Office for Science. Firstly, this essay will address the conventionally perceived problems associated with environmental migration – ‘brain drain’ as a problem for source regions, and pressures posed by migrant influxes into destination regions. Secondly, this essay will demonstrate that migration may constitute a solution to the challenges faced by affected communities by increasing their resilience in the face of environmental change.

## **Brain Drain: A Challenge for the Source Regions**

Concerns about ‘brain drain’, defined as emigration of skilled and knowledgeable workers (IMO, 2005), is not misplaced in the context of environmental change, as it may limit the capacity of affected communities to properly address the effects of a change. For example, brain drain in Fiji led to the loss of skilled workers in the occupations that are essential to the provision of an effective response, relief, and re-construction work in a case of a disaster. Emigration of nurses and doctors in Fiji led to an acute shortage of health professionals (Chandra, 2003). The shortage of health professionals, in turn, caused the closure of wards, extended waiting lists and times (Connell, 2011). Thus, the capacity of the health sector was significantly reduced. In addition, Fiji lost a substantial amount of civil servants, which reduced the managerial capacity of the government to deliver services (Liki, 2001). A deficit of skilled workers also occurred in the areas of engineering, meteorology, veterinary care, urban planning, agricultural science, and geology (Connell, 2011). As a Small Island State, Fiji is highly vulnerable to extreme weather events and their frequency is projected to increase with climate change (Connell, 2011). Therefore, skilled worker emigration in the case of Fiji greatly increased the island’s vulnerability to the effects of extreme weather events. The brain drain in Fiji is mostly attributable to differences in wages and working conditions, while links to environmental change have not been explicitly demonstrated (Connell, 2011).

A clearer link between environmental change and brain drain is shown in the case of Karakalpakstan. Karakalpakstan is an administrative region in Uzbekistan located on the South of the Aral Sea (McLeman, 2011). Due to the retreat of the Aral Sea and the subsequent negative effects on the environment, public health, and the economy, this region experienced high levels of emigration (McLeman, 2011; Naumann, 2012). The emigration started with the displacement of 100,000 people between the late 1980s and early 1990s and continued at a rate of 3000 – 4000 people emigrating per year, as recorded until the year 2003 (Crighton et al, 2003; McLeman, 2011; Small et al, 2001). Among the migrants were many skilled medical staff and health administrators (Small et al, 2001). The loss of health professionals decreased the capacity of the regional health system to contend with a variety of problems, such as chronic respiratory diseases, renal diseases, and child mortality rates, all of which were already higher than the average national and international levels due to the effects of the disaster (McLeman, 2011;

Naumann, 2012). Hence, migration induced by environmental change weekend the region's health care system, increasing the vulnerability of its population.

However, remittances, transfers of money directed by migrants to their country of origin (IMO, 2005), may counterbalance the negative consequences of brain drain. For example, emigrant nurses from Toga and Samoa send large quantities of money for long periods of time, thus benefitting the receiving country's economy (Brown & Connell, 2004). Because the replacement of skilled labourers in small island states is not always easy or even achievable due to the time necessary for training, the high costs associated with training, and low demand for the acquisition of particular skills (Connell, 2011), even high volumes of remittances, at least in the short-term, would not be sufficient to effectively solve the problems caused by emigration. However, the overall effects of remittances may provide a substantial support to the remaining population, as will be shown in this essay.

### **Pressures Imposed Upon the Places of Destination**

Another major threat associated with environmental migration is the additional pressure that influxes of environmental migrants put on cities. Urban populations already constitute over one half of the world's population and are projected to increase by up to 59% before the year 2030 (Bakewell, 2008). More than 90% of this increase will occur in the cities of developing countries, where natural population increase and rural-urban migration are the key causes of urban population growth (UN DESA, 2008). Rural-urban migration, in turn, is often linked to environmental change (GOS, 2011). For example, a study examining the determining factors of cross-country urbanisation concluded that climate change increased rural-urban migration in sub-Saharan Africa (Barrios et al, 2006). Similarly, a survey found that in Bangladesh migration was used as a strategy to cope with tidal surges, riverbank erosion, and cyclones (Parvin, 2008). Future environmental changes are likely to enhance rural-urban migration leading to accelerated city expansion (GOS, 2011). Unfortunately, cities in low income countries are already experiencing over-population, which lead to an immense shortage of adequate housing, poor land-use planning, water shortages, and problems concerning social cohesion (GOS, 2011; McDonald et al, 2011). Influxes of environmental migrants would exacerbate these problems.

Migrants in low income countries are likely to increase the vulnerability of their city of destination to future environmental changes. Firstly, migrants tend to extend urban settlements to locations that are at high risk of natural disaster. For example, 40% of new migrants who arrived in Dakar between 1998 and 2008 settled in high flood risk areas (World Bank, 2010). In Buenos Aires and Lagos migrants are more likely to settle in areas exposed to floods and landslides (World Bank, 2010). Secondly, migrants are more reluctant to build resilience against natural hazards than long-term residents. Such reluctance can be explained by a lack of experience of extreme weather events, negatively reinforcing peer support, temporary residence (which decreases incentive to invest in risk reduction), and the necessity to pay remittances (Tompkins et al, 2009). In addition, considerable time is required for migrants to learn the norms of collective action and disaster response (Putnam, 2007). Hence, migrants tend to be more severely affected by natural hazards than long-term residents, as shown in cases of Estelí and Mombasa (Moser et al, 2010). Thirdly, lower income migrants, and especially displaced people, are settling in informal settlements or slums, where they are facing higher physical and mental health risks due to overcrowding, lack of infrastructure, and lack of access to clean water and waste disposal (Patel & Kleinman, 2003; UN Habitat, 2011). Therefore, migrants may widen the vulnerable part of the city population, putting additional strain on health and other support services, especially in the case of natural disasters.

It has been suggested that demographic changes resulting from influxes of migrants lead to social problems due to increased population growth and ethnic diversity (GOS, 2011). For example, rainfall variability contributes to rural-urban migration and rapid urban population growth in Africa (Barrios et al 2006). This rapid population growth, in the conditions of economic stagnation, weak institutional governance, poverty, and inequality, has been associated with increased urban violence, leading to the highest homicide rates in the world (Beall & Fox, 2011). Migrant populations may also contribute to greater ethnic diversity, which is associated with decreased social solidarity and social capital, due to decreased levels of altruism, community cooperation, social cohesion, and trust (Putnam, 2007). In addition, sensitivity analysis of factors contributing to violent conflicts showed that ethnic variability constitutes a factor in the development of low level armed conflicts (Herge, 2006). Despite these trends, Gledistich et al (2007) show that countries receiving environmental migrants mostly remain peaceful, as environmental migrants, unlike traditional refugees, do not have the experience of

victimization and persecution, and are lacking the means to induce a violent conflict. Instead, environmental migrants' priority is to bridge the ethnic gap in order to increase their prospects for securing employment and receiving relief aid in cases of displacement (Raleigh et al, 2008). Therefore, migrants try to merge with host ethnic groups (Raleigh et al, 2008). Anthropological research shows that such attempts at integration were made by redefining social obligations and kinship (Giuffrida, 2007). Therefore, the link between an influx of environmental migrants and the extent of social problems is debatable, as it mostly depends upon contextual factors and the incentive for migrants to integrate into the host society.

However, migrants may also contribute to their host region by providing new skills and filling gaps in the labour market. For example, Liberian refugees helped to increase rice production by introducing rice cultivation in lower swamp areas in the Forested Region of Guinea (Jacobsen, 2002). This practice was common in Liberia but unknown in Guinea; hence, refugees increased rice productivity in the receiving region (Jacobsen, 2002). In countries like Sudan, Tanzania, and Zambia migrants also helped to increase agricultural production by supplying additional labour to cultivate previously unused but agriculturally suitable land (Armstrong, 1989; Bakewell, 2000; Kok, 1989). Therefore, in countries with excess resources migrants may bring a positive contribution instead of constituting a problem.

### **Migration: A way of Building Resilience to Environmental Change**

Evidence shows that migration may constitute a means of building resilience to the negative effects of environmental change, and thus, may be a part of the solution to the challenges facing affected communities. Whilst resilience is defined in various ways (Gunderson, 2000), in the context of environmental change and migration, the most relevant is the definition of social resilience: the ability of communities or groups to cope with external disturbances and stresses, such as environmental change (Adger, 2000). In many cases, environmental change has a slow onset; examples include land degradation, droughts, and alterations in rainfall patterns (McLeman & Hunter, 2010). Such changes may degrade household and individual assets, and damage livelihoods (Desinghar, 2011). Yet, instead of triggering permanent relocation, slow-onset environmental changes normally stimulate temporary migration or migration of only few household members (McLeman & Hunter, 2010).

Evidence shows that such migration patterns build resilience to the changing conditions through income diversification, acquisition of new skills, adjustment of household consumption levels, and remittances.

When environmental change affects subsistence production by, for example, decreasing agricultural yields, households may attempt to build their resilience through income diversification. In Bangladesh, riverbank erosion and increased soil salinization, caused by tidal surges, decrease agricultural productivity, undermining the livelihoods of local people (Pelling-Rowell et al, 2011). Since other work opportunities in the region are limited, in order to secure livelihoods, households tend to send a member to work temporarily in a city (Pelling-Rowell et al, 2011). Hence, such rural-urban migration in Bangladesh constitutes a strategy of coping with the effects of environmental change through income diversification (Parvin et al, 2008). This strategy is undertaken by over 500,000 Bangladeshis each year (Constanza et al, 2011). Similarly, following Cyclone Zoë in Tikopia in the Solomon Islands, some members of households migrated to the city of Honiara, intending to gain employment, and thus, adapting to the negative effects of the cyclone (Rasmussen et al, 2009). Therefore, migration with the purpose of gaining alternative source of income may help to compensate for the loss incurred as a result of an environmental change.

Another way of building resilience is through the acquisition of skills and learning to cope with a changing environment (Fazey et al, 2007). In regions where appropriate knowledge is not available, temporary and cyclical migration may allow migrants to learn and develop new skills elsewhere. For example, tribal indigenous people living in the Jharkhand state of India have some of the lowest levels of human development indicators, including very poor education (Desinghar, 2011). Because farming is one of the primary subsistence activities, the livelihoods of these people are threatened by soil degradation (Desinghar, 2011). The problems in this region are exacerbated by rising temperatures and the increased occurrence of extreme weather events (Wadood & Kumari, 2009). A study has found that seasonal migration has become an important coping strategy undertaken to sustain households (Desinghar, 2011). Migration to the regions of India where intensive agricultural practices were adopted during the Green Revolution, allowed migrants to acquire skills and knowledge about the use of agrochemicals and modern agricultural techniques (Desinghar, 2011). Upon returning, migrants use the acquired skills and knowledge in their home region, thus improving their livelihoods. The study showed that 98% of the migrants

reported that migration helped to improve their lives and 22% of migrant households invested migration earnings in agriculture, e.g. by purchasing pesticides, to reduce the need for further migration (Desinghar, 2011). Although in the short-term the transfer of intensive agriculture methods by Indian migrants is increasing social resilience of the tribal households, it may undermine the ecological resilience of the region, as intensive agriculture often leads to soil degradation and water pollution (Shiva, 1995). In the long term, these ecological problems may lead to a decrease in yields, and thus, negatively affect the social resilience of tribal households.

Burkina Faso provides a more sustainable example of how education acquired by migrants enhances resilience to environmental change. Agriculture in Burkina Faso is risky because of the poor soil quality and soil erosion (Desinghar, 2011). Moreover, the situation was aggravated by prolonged droughts in 1973 – 74, 1982 – 85, and 2000 – 2001 (Anyamba & Tucker, 2005; Desinghar, 2011). Yet, instead of promoting unsustainable methods of agricultural intensification, a substantial public investment was made in the soil and water conservation (SWC) between 1985 and 2000 (Reij et al, 2005). The SWC measures permit increased agricultural production through sustainable use, thus being appropriate for fragile environments (Desinghar, 2011). A survey of 135 non-migrant and 115 migrant households in Burkina Faso discovered that the use of SWC was significantly higher among migrant households, increasing yield by 40 - 100% (Konsiega, 2004). Considering that the decision to apply the SWC was dependent upon the field owner, and was facilitated by the knowledge of project benefits (Konsiega, 2004), Desinghar (2011) suggests that it was the higher educational levels attained by migrants that allowed migrant households to access the governmental and NGO support schemes better than non-migrant households. Therefore, skills and education acquired by migrants in more developed host regions can be used to adapt and enhance resilience to environmental changes home regions.

Another way in which migration may help people cope with livelihood challenges posed by environmental change is through adjustment of household consumption patterns. For example, a severe drought in Burkina Faso in the year 1997 caused great crop losses followed by a food deficit (Roncoli et al, 2001). In order to mitigate the effects of food insecurity, some of the households sent young children to stay with their relatives in areas which at that time were more food secure (Roncoli et al, 2001). This unusual migration strategy allowed the number of



consumers in each household to be reduced, and thus reduced pressure on the scarce food supplies available to the households.

Whilst migration of any other family member would also alleviate pressure on households' resources and general demand on resources in the sending region (Barnett & Webber, 2009), a much greater contribution to household resilience is made through remittances sent by migrants. Remittances constitute a significant flow of finances to regions most vulnerable to environmental change. In the year 2010 the total value of remittances received in developing countries amounted to \$307 billion, exceeding the total Official Development Assistance (ODA) of \$120 billion sent by the OECD to the developing world in the same year (World Bank, 2011a). This amount also equals 40% of the foreign direct investment inflows received by developing countries between 2008 and 2010 (World Bank, 2011a). Moreover, most of the top-remittances receiving countries, such as Mexico, Jamaica, Columbia, India, Bangladesh, and Senegal (World Bank, 2011b), are also the countries that are the most vulnerable to environmental change (Tol et al, 2003). It is estimated that these countries have the lowest adaptive capacity but will face the highest impacts of climate change on water resource, agriculture, biodiversity, and sea level rise (Tol et al, 2003). Hence, migration that results in the payment of remittances could provide substantial support to people remaining in the regions affected by environmental change, contributing their resilience, whilst simultaneously decreasing population pressure.

Some studies have already demonstrated the beneficial effects of received remittances to the livelihoods of households affected by environmental change. For example, in the years 1983 – 1985 a severe drought in Mali caused a significant decline in crop yields (Findley, 1994). Many households in Mali used agricultural activities for subsistence and normally purchased only 40% of their food in the market (Findley, 1994). However, due to the decline in agricultural productivity, households needed to purchase 20% more food in the market (Findley, 1994). A survey showed that 63% of the surveyed households during the drought became dependent on remittances sent by their family members, who had migrated abroad (Findley, 1994).

Remittances may act as a form of insurance in response to the damage caused by environmental change to the assets and livelihoods of migrant households. For instance, data on the annual amount of remittances received by households in Jamaica suggests that the level of received remittances increases in response to economic challenges faced by the country. The

average remittances received per household in Jamaica spiked in the year 1997, which was the worst year of a recession that caused a 2% contraction in country's economy (Wallsten, 2004). The spike in the received remittances in 1989, in turn, coincided with hurricane Gilbert, which caused \$1 billion damage, worth 28% of country's GDP (Wallsten, 2004). For every dollar of hurricane damage there was a 25 cent increase in remittances (Wallsten, 2004). Hence, the macro-data suggests that remittances may have effectively provided 'insurance settlements' for households during those two events.

A more detailed analysis of the changes in the amount of remittances received by households in response to rainfall shocks in the Philippines supports this hypothesis. Yang & Choi (2007) analysed a comprehensive set of data on the effect of rainfall shocks on the income levels of 27,811 migrant and non-migrant households, remittances received by these households, and the level of household expenditure over a two year period. A regression analysis of this data showed that remittances received by migrant households increased in response to the effects of rainfall shocks on household income (Yang & Choi, 2007). As a result of such increases, remittances replaced up to 60% of household income, significantly strengthening their capacity to cope with the effects of changes in rainfall (Yang & Choi, 2007). Therefore, remittances may insure households facing environmental change, thus strengthening resilience to withstand the negative effects on their livelihoods.

Besides, appropriate policy may help to direct the benefit of remittances beyond the household level towards strengthening resilience at the community and wider societal levels. An example of such a policy is a public-private partnership '3-for-1 program' that has been established in Mexico (Faist, 2008). Under this program the government encourages Hometown Associations, formed by migrants from the same town, to invest remittances into government approved development programmes, focusing on the provision of basic infrastructure, services, and the provision of employment opportunities (Faist, 2008; Goldring, 2004). For each \$1 of remittances invested into a project under such programmes the project receives supplementary \$1 from each: local, state, and federal governments (Faist, 2008). As a result, between 1993 and 2000 in the region Zacatecas alone 429 projects worth over \$16.8 million were funded (Goldring, 2004). This approach facilitates the direction of excess remittances towards the development of greater resilience to future environmental and economic distress.

## **Conclusion**

The evidence demonstrates that migration in the face of environmental change may indeed constitute a threat by weakening some of the key service sectors in the sending countries. As shown in case of Fiji, brain drain may lead to a shortage of skilled workers in the sectors that are highly important to the provision of disaster response, thus increasing the region's vulnerability. The case of Karakalpakstan demonstrates that environmental change in itself may become a motivating factor for the brain drain. Hence, brain drain may cause a feedback effect, enhancing vulnerability of the regions affected by environmental change. Even though remittances may financially compensate a source country's economy for the loss of the income that could have been generated by the emigrants, it is unlikely to ensure an efficient replacement of the skilled labour force in the key sectors. The case of Mexico, however, shows that governmental initiative may facilitate the direction of remittances towards the development of infrastructure and services, which may contribute to the increased resilience of the sending region. Therefore, the net effects of brain drain will vary according to the contextual factors of any specific location. In places where environmental change decreases productive capital (e.g. agricultural land degradation), migration becomes an important strategy for securing the livelihoods of people dependent upon such capital. Evidence shows that migration may provide an opportunity for household income diversification, as happens in Bangladesh and Solomon Islands, as well as the acquisition of new knowledge that may help people to adapt to environmental change, as shown by examples in India and Burkina Faso. Furthermore, the adjustment of consumption patterns, as demonstrated by child migration in Burkina Faso, and the provision of remittances may serve as insurance against future environmental changes.

Unfortunately, evidence also indicates that migrant into cities in low income countries may exacerbate existing urban problems, increasing the proportion of the urban population that is vulnerable to further environmental changes, which may lead to social tensions. These problems, however, should not be exclusively attributed to environmental migrants. Instead, these pressures highlight the already existing urban problems and the need for sustainable urban management. Adapting to urban growth and helping migrants to successfully integrate into the host societies may help not only to avoid the conventionally perceive problems, but may also facilitate the utilisation of the skills of migrant labourers, which are shown to benefit in resource rich countries.

Therefore, discourse on environmental migration cannot remain ignorant of the substantial benefits that migration provides to the people affected by environmental change and the potential benefits that migrants may bring to their destinations. Seeing migration not only as a problem, but also as a solution could incentivise a constructive approach for adapting to the current and imminent environmental changes in both sending and receiving regions.

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