

UNDERSTANDING CLIMATE-INDUCED MIGRATION: A GEOGRAPHIC REVIEW

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ABSTRACT

It is becoming harder to survive in certain areas due to the adverse impacts of climate change, forcing individuals to move in search of other safe zones. Such issues as increased temperature, floods, droughts, and rising sea levels are destroying agricultural land, houses and sources of water, making many to leave for more sustainable locations (Myers, 2002). Therefore, this paper gives an overview of scientific studies on climate migration viewed from the geographic point of view, addressing the issue of where individuals move from, where they move to, and the reasons why certain regions are more impacted than others. Specifically, the causes of migration caused by climate changes are discussed (Piguët, 2010). Furthermore, this work addresses the methods used by geographers in research and analysis of climate migration issues (Piguët, 2010). Finally, solutions of how to minimize the negative effects of climate migration on individuals are addressed, as well as the measures needed to be taken in advance (IOM, 2009). Thus, this review paper shows that climate migration is not only environmental, but also a geographic and social issue, which is determined by geography of the region and its readiness to deal with those problems.

Keywords: climate-induced migration; environmental displacement; human geography; migration patterns; climate change

INTRODUCTION

Migration has been taking place from time immemorial since people migrated from one place to another to seek better environments. However, in recent times, climate change has increasingly become one of the major factors leading to migration. Increasingly warmer climate, erratic rainfall, drought and rise in sea level are some of the issues that are causing people not to be able to survive in their respective locations due to the dependence of those particular environments on agricultural, fishing and other related livelihoods. In such cases, when the environments can no longer support life, there is nothing else left for the people than to migrate to safer and stable environments. This form of migration has been referred to as climate-induced migration and is a significant area of study in human geography (Black et al., 2011).

Climate change induced migration can occur in various forms. It occurs gradually in situations where land becomes increasingly unsuitable for farming due to persistent drought or desertification. On the other hand, it occurs suddenly in instances where natural disasters like floods, cyclones and others cause people to flee from their areas of habitation (McLeman & Smit, 2006). The implications of climate change migration are very severe in that lives of individuals are affected greatly by the loss of livelihoods, places of residence, and way of living. Some migrate to areas closer to the place of origin while some are compelled to migrate internationally despite the fact that most climate migration occurs in regions or countries (Foresight, 2011).

Geography is relevant for studying this problem in terms of the fact that climate migration does not influence all regions equally. There are specific geographical areas, such as small island states, coasts, and dry agricultural lands, which are more vulnerable to climate-related hazards than others (Black et

al., 2011). In addition to that, some societies are more capable of handling climate changes because they are more resourceful or they receive better governmental assistance compared to others, who are at a disadvantage due to poverty or poor planning (Adger et al., 2003). Thus, climate migration is related to both environmental and geographical factors.

This paper seeks to analyze current studies on climate migration through a clear and concise geographic perspective. The analysis will include causes of climate migration, methodologies employed by the researchers to study and observe patterns of migration, and the possible interventions which can help the population adapt to migration or minimize it. Through this analysis, the paper intends to demonstrate how climate migration is a multifaceted problem which needs to be analyzed from different perspectives and especially from that of geographers, planners, and policy-makers, particularly in the most affected regions but least equipped to deal with the issue.

1. CAUSES OF CLIMATE-INDUCED MIGRATION

There are many reasons why people migrate because of climate change, but most of these reasons can be grouped into two broad types: slow-onset changes and sudden-onset events. Slow-onset changes happen gradually over a long period of time, making it harder to notice at first, but the effects build up until living conditions become very difficult. Examples include desertification, rising sea levels, and long-term drought (McLeman and Smit, 2006). These slow changes often affect farming communities the most, since many people in rural areas depend directly on land and water for their food and income. When crops repeatedly fail or water sources dry up, families may decide to move to cities or other regions where they can find new ways to earn a living (Barrios et al., 2006).

Sudden-onset phenomena, on the other hand, are characterized by being rapid and having little or no warning at all. These are such disasters like floods, cyclones, hurricanes, and other severe weather incidents. Such phenomena can ruin houses, farms and other infrastructure facilities within a very short period of time, and this forces people to relocate right away to save their lives (Foresight, 2011). In contrast to slow-onset migration that may proceed gradually, sudden-onset migration may be quite urgent and even temporary, since people can return back to their houses when the threat will be over, if they are still habitable (Black et al., 2011).

The location of the area is an important factor that influences the way that these factors affect the population. Coastal zones and island states are especially prone to rising water levels and powerful storms because any change in water level may result in constant floods affecting homes and lands (Black et al., 2011). Dry and semi-dry climates like those that can be found in some parts of Sub-Saharan Africa are more likely to experience droughts and desertification processes that eventually decrease the amount of fertile soil (Barrios et al., 2006).

Nevertheless, climate change is not always the sole driver of migration. In most instances, environmental challenges are accompanied by other issues such as poverty, poor infrastructure, political instability, and inadequate government support. As a result, even where two regions face similar environmental challenges, they can record very different migration trends based on the level of support and resources available to the locals. For this reason, many scholars recommend that climate change-induced migration be seen as a combination of environmental and social factors as opposed to solely being a consequence of climate change.

2. HOW CLIMATE MIGRATION IS STUDIED AND MEASURED

The analysis of climate-induced migration can be quite challenging, mostly because it is hard to separate climate-based motives from other motivations for relocation, such as economic and security motives. Thus, scholars resort to a combination of various methods to investigate the reasons for

migration, its direction, and sources (Foresight, 2011). The most popular among these approaches can be considered population surveying and census analysis, since these methods provide information on the dynamics of changes in population density in a particular area. Analyzing the changes in the population before and after the occurrence of drought, floods, or other weather events allows making assumptions about the number of individuals that have left the affected region (McLeman & Smit, 2006).

Satellite imagery and remote sensing is another key instrument utilized by geographers. The process involves tracking any changes that occur with land use, vegetation cover, and water availability over time, and thus allows understanding how environmental conditions change in a certain territory (Black et al., 2011). Satellite images can demonstrate, for instance, how many farmlands were lost due to drought, or how much coastal lands suffered from raising of sea level. Combining this environmental data with population movement data will make it possible to trace the link between environmental change and migration.

Geographic Information Systems (GIS) is also often used in order to map and analyze migration flows. GIS provides an opportunity to combine different sets of data including climate data, population data, land use data, and to map them all on the same map, thus making it easier to track the most vulnerable areas and the areas where the number of migrants increases. Mapping this information also allows identifying migration routes – the most common routes people travel when migrating from one territory to another.

Apart from these instruments, scientists also use interviews and case studies to help understand the individual experience of individuals that have become migrants due to climate change. Although satellite data and population figures can demonstrate general trends, interviews give the opportunity to learn more details as for what made these individuals leave, what problems they had to face, and how their lives have changed after (Barrios et al., 2006). The combination of all these different approaches, quantitative data such as population figures and maps, together with qualitative data such as individuals' stories, allows getting a complete picture of climate change-induced migration.

3. WAYS TO MANAGE AND REDUCE CLIMATE MIGRATION PROBLEMS

As mentioned above, the connection between migration and environmental factors is evident and strong. As a result, one of the best solutions to the problem of climate migration is providing assistance to local communities in order to help them adapt to the new climate conditions and avoid migration altogether. For example, in cases of drought, it is possible to construct better irrigation systems or plant drought-resistant crops. In case of the risk of flooding, it is possible to construct flood barriers (Adger et al., 2003). It means that providing people with the means to adjust to the environmental changes, one can prevent people from being forced to leave their homes.

At the same time, disaster planning and early warnings can significantly help in minimizing the negative consequences of climate migration for local communities. As early warnings allow people to evacuate before a sudden disaster takes place, the number of casualties and property damage will be lower. Moreover, disaster plans and shelters can help those people who have to be evacuated due to the disaster in returning to their homes once the situation is normalized (Foresight, 2011).

However, when it is impossible to prevent people from migrating, proper planning becomes extremely vital. It entails provision of secure housing facilities, availability of clean water, medical care, and employment opportunities in the regions where people migrate to (McLeman and Smit, 2006). Otherwise, the consequences will be the development of overcrowded cities with stretched infrastructure and poor conditions of living not only for migrants but also for host communities. Well-

designed resettlement programs will benefit people to restore their life and reduce pressure on the region.

4. DISCUSSION

As seen from the above literature review on climate migration researches, climate migration is a complicated process that is influenced by the environmental factors and social conditions. While climate change undoubtedly affects people's choice to migrate, the studies conducted show that it does not affect all regions of the world equally. While some geographic regions are more vulnerable environmentally than others due to being exposed to greater risks caused by the climate changes (coastal or agricultural regions, for example), other regions can cope with these risks better due to having more developed infrastructure or higher social support (Adger et al., 2003; Black et al., 2011). Thus, it is impossible to study climate migration in isolation from environmental changes.

The review also indicates that an integrated approach to the study of climate migration entails using a variety of approaches and techniques. Population data, satellite imaging, and GIS mapping can be used to identify the patterns of environmental migration, while interviews and case studies allow exploring the individual factors driving migration behavior (Foresight, 2011; Barrios et al., 2006). The use of one approach alone is unlikely to provide a complete picture, since statistics and maps reveal migration patterns, but fail to explain the motivation behind them. Thus, future research is likely to benefit from the integration of qualitative and quantitative methods of investigation, which will make it possible to address the human dimension of climate migration in addition to its statistical dimension.

As for the solutions to the problem of climate migration, the review emphasizes that measures that are implemented prior to migration, such as improvements in agricultural practices, water management and disaster preparedness, are usually more efficient than post-migration responses (Adger et al., 2003; McLeman and Smit, 2006). However, many of these adaptation strategies require money, technology, and government planning, which are often lacking in the regions most affected by climate change. This creates a difficult situation where the communities most in need of support are often the ones least able to access it, reinforcing the importance of international cooperation and support for vulnerable regions.

Overall, the discussion suggests that climate-induced migration should be treated as both an environmental and a geographic and social issue. Addressing it effectively requires not only reducing the environmental risks themselves, but also improving the living conditions, resources, and planning capacity of the communities most at risk. Without this combined approach, climate migration is likely to continue increasing as environmental changes become more frequent and severe in the coming years.

CONCLUSION

The current review has considered the issue of climate migration from a geographical perspective and paid special attention to the reasons for climate migration, the methods of its research, and potential means of management and mitigation of its consequences. The results demonstrate that the factors triggering climate migration include slow-onset processes, such as droughts and desertification, and fast-onset processes, like floods and hurricanes. Climate migrants are likely to come from coastal areas and dry zones because of the geographical features of those regions. The review also emphasizes that it is necessary to combine various tools, such as statistical data, remote sensing, geographical information systems, and individual interviews, for the comprehensive examination of this problem.

As far as the means of coping with this problem are concerned, they include the measures of adaptation and prevention, such as planning and resettling. Those measures are much more efficient

compared to the reactive responses but may be difficult to implement because of the lack of resources on the part of vulnerable communities. Overall, this paper concludes that climate-induced migration is not simply an environmental problem, but a geographic and social one that depends heavily on where people live and how much support is available to them. Future research and policy efforts should continue to focus on protecting the most vulnerable regions, since they are often the least responsible for climate change but the most affected by its consequences.

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