



MIGRATION AS AN ADAPTATION STRATEGY: A BIBLIOMETRIC ANALYSIS

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Abstract

Considering the capability approach of Amartya Sen, in many instances, migration is an adaption strategy that is no longer freedom of choice; rather, people are forced to choose it. Specifically, people often choose migration for adaptation due to climate and environmental vulnerabilities. This Bibliometric analysis aims to provide a detailed overview of how migration is considered an adaptation strategy using the Scopus database. The search query includes 'migration,' 'adaptation', 'vulnerability', and 'climate change' as the keywords. A total of 7,335 scientific documents, including books, book chapters, articles, and review papers for 2011-2021, were analyzed using VOSviewer software. The lexical network analysis suggests a strong connection between migration and adaptation. Moreover, the spatial network analysis suggests that the migration-related research works are primarily concentrated in the USA, the UK, and Australia. The findings of an intensive review of 38 Scopus index migration literature suggest that migration is the ultimate effect of climate change, and the researchers termed this an 'adaptation strategy'. Although numerous dimensions of migration and adaptation strategy have been explored in the literature, however, future research options are still available in the field of migration-adaptation comparing circular and permanent migration, gendered dimension from the left-behind perspective, cultural diaspora between the migrants and receiving country, policies on alternative adaptation strategies, adaptation due to freedom of choice and forced migration from the wellbeing perspective. Moreover, heightened research collaboration is strongly suggested among the top migrant-sending and receiving countries to get more insights and policy formulation.

Keywords: Migration; adaptation; climate change; vulnerability; environment; hazard

Introduction

The trajectories of climate change-induced migration are multidimensional. Many studies argue on the debate of 'migration' as an adaptation strategy. Some researchers argue that migration is a livelihood diversification strategy mainly used for adaptation purposes (Bettini, 2014; Assaduzzaman et al., 2020; Grecequet et al., 2017; Baldwin & Fornalé, 2017; Choumert et al., 2015). Another school of thought disagrees with the said argument and claims that migration is not the 'only' adaptation strategy; instead, people choose this strategy as an alternative option, which is chosen as the last resort (Perumal, 2018; Upreti & Shrestha, 2017; Adri & Simon, 2018; Stringer et

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al., 2015). Researchers also argue that climate change sheds light powerfully on the discourse of migration-development-adaptation strategy (Florémont, 2012). In extremely climate-vulnerable countries like Bangladesh, rapid onset and slow-onset hazards are common, and these countries are the frontline victims of climate vulnerabilities (Ahmed & Eklund, 2021). Migration is recognized as a critical adaptation strategy that can minimize human and asset losses. Rural households, specifically coastal ones, migrate to diversify income and adapt themselves to the changing situation (Ahmed & Eklund, 2021; Ayeb-Karlsson et al., 2016; Japanwala, 2021). Nevertheless, in many instances, people undertake 'migration' as an 'alternative adaptation strategy', and this strategy is chosen as the last resort (Perumal, 2018). Researchers assert that migration can enhance capabilities. Still, the poorer communities and those who live in the highly disaster-prone coastal areas have less freedom of choice, and in most cases, they become forced migrants (Assaduzzaman et al., 2020). Researchers are currently emphasizing local adaptation strategies like changing seed varieties, fertilizer use, crop variety, and adjustment vertically instead of migration (Begum & Mahanta, 2017). The literature highly focuses on farmers, the ultimate victim of climate change. Hence, the literature demonstrates that agriculture is the leading mediating factor. More research options are available on the issues of policies regarding migration, the effect on the left behind perspectives, and rethinking migration as an adaptation from a wellbeing perspective.

After analyzing the literature on migration and adaptation, a dearth of bibliometric analysis provides a detailed outline of the keywords. It can give a synopsis of how and to what extent migration and adaptation strategies are interlinked. Apart from that, several review papers are found in the literature on the connection between migration and adaptation. Against this backdrop, this study aims to investigate the critical issues of the ongoing debate on migration and adaptation strategy using bibliometric analysis coupled with a detailed literature review on the discussion of 'whether migration is an adaptation strategy or not'. In this regard, the study focuses on 'migration' and 'adaptation' using bibliometric analysis, where the key mediating factor is climate change. Furthermore, the study aims to provide a detailed overview of how the migration-adaptation debate is contested based on selected literature. After blending bibliometric analysis and literature review, this study aims to provide future policy options based on the findings.

Materials and Methods

This article combines bibliometric analysis using VOSViewer software (version 1.6.18) with a comprehensive review of 38 relevant pieces of literature. The study is an effort to conceptualize and understand the interplay between migration and adaptation strategy. The prime concern of this study is how these two keywords are intertwined in the scientific research arena and how the researchers prefer to deal with the issues. The bibliometric analysis provides a detailed network visualization analysis that shows the connection between the keywords, bibliometric coupling with countries and authors, and so on (Priovashini & Mallick, 2021; Maretti et al., 2019; Biswas et al., 2020). In addition to the bibliometric analysis, a detailed literature review also provides a detailed understanding of the nexus between migration and adaptation strategy. In this study, for the bibliometric part of the analysis, the study considers the Scopus database, from where a total of 7,430 documents were retrieved from the online source on March 5, 2022. Due to inaccessibility to the Web of Science database, this paper only concentrates on the Scopus database. For data extraction, the timeframe 2011-2021 is considered. While cleaning the duplicate documents in the database, 95 documents were dropped; therefore, 7,335 papers were analysed. Then the final database is constituted with scientific documents such as a book (47), book chapter (169), article (6,988), review paper (96), and conference paper (35).

Search query

The scientific search query using the Boolean approach was adopted for data extraction from the online source. The search query includes migration, decision, adaptation strategy, agriculture, vulnerability, climate change, climatic hazards, coastal environmental hazards, and Bangladesh as keywords. For inclusion criteria, only the final documents (based on publication stage) like article, book, book chapter, review paper, and conference paper (document type) in English (as the only language) and timespan 2011-2021 are considered. In addition, the

search query excludes all the subject areas except social science and arts, as this study aims to explore the issues from the social science and art lens.

Methodological Steps

Figure 1 depicts the methodological process followed for bibliometric analysis and literature review. In the first stage, a bibliometric analysis was carried out using the database to explore the link strengths among the specified keywords, networks between co-authors and countries, and henceforth. After that, 38 key documents were screened from the database for a detailed literature review based on the thematic relevance to the issue. The central theme considers the relevance of migration with the adaptation strategy. The documents which introduced migration as an adaptation strategy or not are considered relevant. In the database, there remain heterogeneous documents, and all the documents do not entirely fit with the theme. After a detailed scrutiny of the database, 38 pieces of literature are found highly relevant to the issue. These relevant documents are considered for establishing the arguments. Finally, this paper concludes with future policy options.

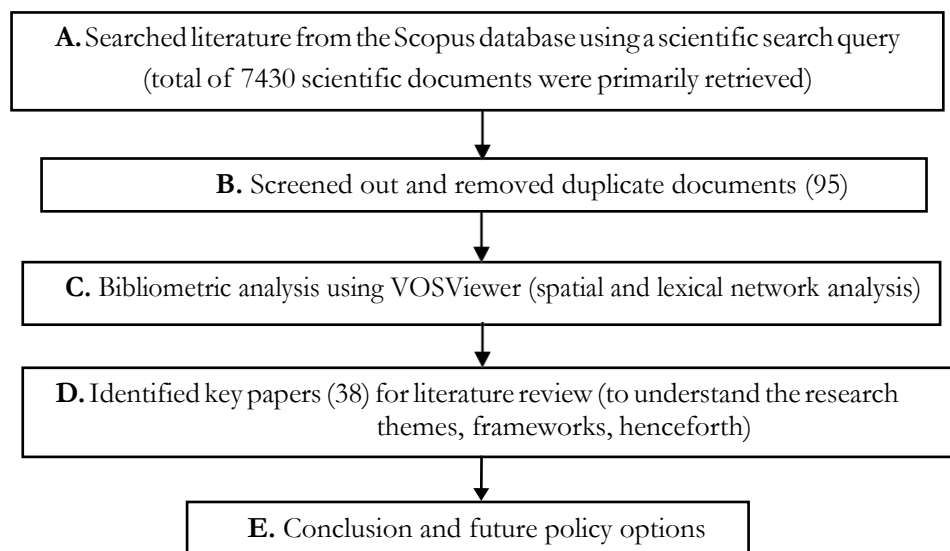


Figure 1. Methodological steps followed in the study.

Data analysis

A bibliometric analysis provides a detailed overview of research outputs using quantitative and qualitative analysis (Corte et al., 2019). The bibliometric analysis offers statistical analysis of the published documents, which is impactful and serves objectivity (Goyal & Kumar, 2021; Garfield, 2009). Previously, researchers defined bibliometric analysis as a quantitative technique applied to figure out the intellectual structure (Garfield, 2009). However, researchers are now mixing bibliometric analysis with a literature review to get more insights into the issues. For instance, researchers adopted bibliometric analysis using HistCite software and content analysis, which is more challenging to combine (Goyal & Kumar, 2021; Maditati et al., 2018). The literature argues that for bibliometric analysis, VOSviewer and HistCite are widely accepted tools (Maditati et al., 2018; Goyal & Kumar, 2021; Fetscherin & Heinrich, 2015). In addition, researchers are currently adopting the R package with VOSViewer software (Priovashini & Mallick, 2021; Maretti et al., 2019; Biswas et al., 2020). However, this study adopted bibliometric analysis using VOSViewer software for lexical network analysis to visualize how keyword migration relates to keyword adaptation. The connection strength is specified in Figure 3 and Figure 4. In

addition, spatial network analysis explores the connection between co-authorship and countries (Figure 2). This study also adopted a literature review based on selected 38 documents to explore the argument – is migration an adaptation strategy or not. Still, the qualitative assessment is more challenging than the quantitative analysis.

Bibliometric Analysis

Country-wise co-authorship

In the analysis of country-wise co-authorship, the threshold level of documents per country is determined as 25. The curved lines show the strength of links between countries regarding co-authorship, where greater thickness indicates a stronger connection between countries (Priovashini & Mallick, 2021; Biswas et al., 2020). In this network visualization diagram (Figure 2), a strong connection (link strength: 83) is found between the United States and the United Kingdom. The co-authorship network is quite strong (link strength: 39) between the United States and Australia. However, the link between the United States and Bangladesh is insignificant (link strength: 24). The diagram depicts that the production of scientific documents is concentrated in migrant-receiving countries. Bangladesh is one of the significant migrant-sending countries that sent almost 13,96 million migrants to overseas countries starting from 1976 to March 2022 (BMET, 2022). The reason behind the higher migration rate is identified as a vast population and a higher rate of unemployment in Bangladesh (Rudnick, 2009). Yet, less attention is paid to studying migration, adaptation, and climate change issues and less collaborative work is found with Bangladesh and other migrant-receiving countries. If the collaboration between migrant-sending countries and the migrant-receiving countries can be enhanced, then this effort can bring policy-level implications, which can also bring more profound insights into migration issues, climate change, and adaptation.

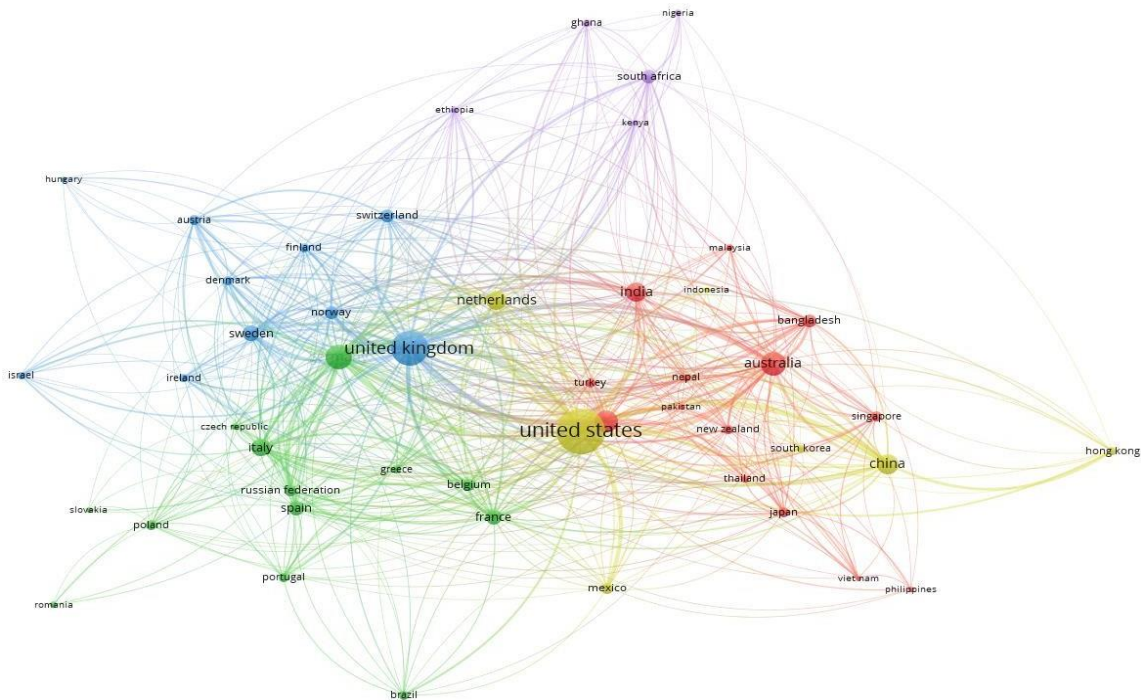


Figure 2. Spatial network analysis.

Co-occurrences of all keywords

Zhang et al. (2019) suggest that keywords symbolize the central idea of a scientific research paper; hence, analysis of keywords is meaningful. In the bibliometric study, the researchers analyze the co-occurrences of keywords which identifies the strength of connections among the keywords used in the literature database (Priovashini & Mallick, 2021; Biswas et al., 2020). In this study, for keywords analysis, the minimum threshold level of occurrences of keywords is determined 5. From a total of 21,707 keywords, Figure 3 is obtained. If the link between keywords is observed, it can be found that migration and climate change are strongly interlinked (link strength: 354). Similarly, the connection between migration and adaptation is also significant (link strength: 79). The links strength between migration and climate change; climate change and adaptation indicate strong connections. While reviewing the literature on migration, climate change, and adaptation, it is found that the researchers who are interested in climate change-induced migration issues are also interested in the adaptation strategy. Many researchers identified migration as one of the adaptation strategies usually chosen by the households (Japanwala, 2021; Ahmed & Eklund, 2021; Assaduzzaman et al., 2020; Wiig et al., 2020). Specifically, in vulnerable coastal communities, people often choose migration as a livelihood adaptation strategy because they lack freedom of choice (Assaduzzaman et al., 2020).

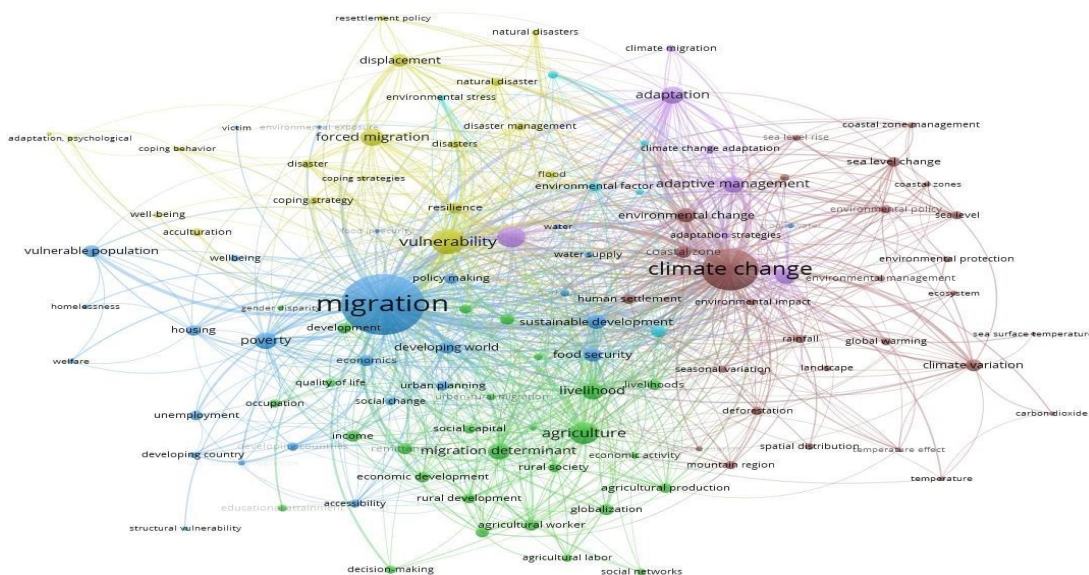


Figure 3. Lexical network analysis.

In Figure 4, the keyword 'adaptation' is highlighted to visualize and understand the connection between 'migration and adaptation' and the nexus between 'climate change and adaptation' more clearly. It is observed that the term 'adaptation' is linked with many keywords, including migration, climate change, Bangladesh, vulnerabilities, coastal zone, agriculture, livelihood, and so on. Researchers use adaptation mostly in circumstances that are highly intertwined with adaptation. However, there remain different keywords related to the keyword 'adaptation', such as gendered dimensions, cultural diaspora, capabilities, freedom of choice, and henceforth. Moreover, the scope is also available to strengthen the connection between 'adaptation and wellbeing'.

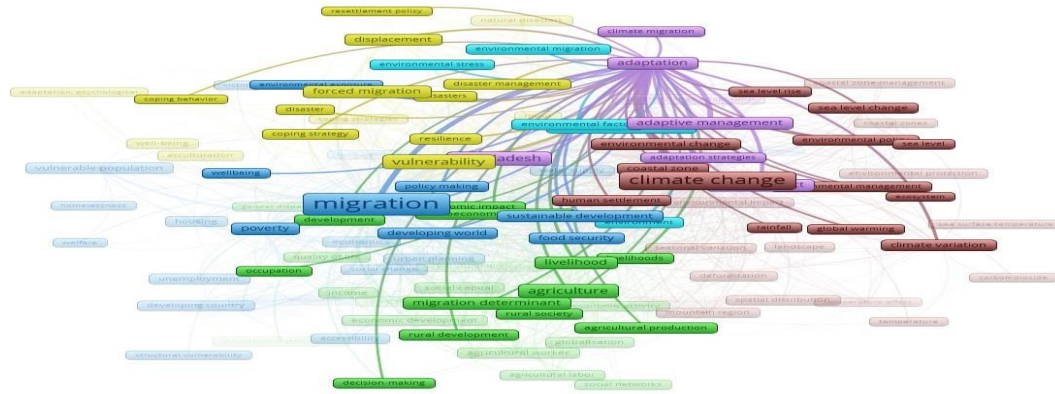


Figure 4. Lexical network analysis focusing on adaptation.

Results and Discussion

Argument on migration as an adaptation strategy

Figures 2, 3, and 4 clarify the connection between migration, adaptation and climate change. In addition to the visualization graphics, this part of the study explores 38 selected pieces of literature from the identical Scopus database to establish arguments in the migration-adaptation debate. Scholars profoundly expanded and shared their views and contribution to the literature on migration and adaptation in different fields of knowledge. Moreover, in the migration-development discussion, climate change effects are also emphasized (Florémont, 2012). Therefore, this study explored the nexus between migration and adaptation and analyzed how the researchers argued from different perspectives.

The mainstream argument on migration as an adaptation strategy is supported by numerous scholars (Bettini, 2014; Assaduzzaman et al., 2020; Grecequet et al., 2017; Baldwin & Fornalé, 2017; Choumert et al., 2015; Nishimura, 2015; Mallick and Siddiqui, 2015), which is contested by other scholars (Adri & Simon, 2018; Falco et al., 2018). Like pulled migration, forced migration can also be viewed as an adaptation strategy, although the old school of thought viewed forced migration from the security lexicon. It has been replaced by resilience, adaptation, and human security perspectives; therefore, resilient migrants took the position of 'climate refugee'. However, climate change caused by artificial, and many natural reasons, is often inevitable and is responsible for migration. In this regard, bilateral migration reduces a 15% global risk though it mostly depends on population and places. Adaptation is a crucial part of the climate change policy in reducing climatic shocks. In this respect, Sen's capability approach is tremendously indispensable to segregating planned and forced migration. According to the capability approach, migration as an adaptation strategy - is no longer freedom of choice, especially for the coastal communities. According to the capability framework, coastal communities have fewer free choices and are forced to choose migration (Bettini, 2014; Abid & Abid, 2021; Grecequet et al., 2017; Assaduzzaman et al., 2020), which is an adaptation strategy. Similarly, due to climatic and environmental stressors, people often choose temporary migration, an adaptation strategy that can diversify livelihood options too (Antwi-Agyei et al., 2018). The rural community is more vulnerable due to climate change issues such as erratic rainfall, decreased crop yield, drought, and so on; therefore, they choose rural-urban migration as a livelihood adaptation strategy, contributing to a quick change in the local ecology. In literature, migration is identified as one of the most effective livelihood adaptation strategies, and in many instances, migration is inevitable due to environmental stressors (Dumenu & Obeng, 2016; Manrique et al., 2018; Tabbo et al., 2016; Mallick & Siddiqui, 2015).

Later, the pluralism concept of migration and climate change is introduced in the debate on 'migration as adaptation strategy'. Climate change-induced risk on livelihood is one of the significant determinants of migration. For instance, in Nicaragua, due to the rapid onset hazard, a higher incidence of international migration occurred than past, which is termed a livelihood adaptation strategy, and this strategy enhanced the higher capability of the migrants. In addition, migrants send economic and social remittances such as money, knowledge, social networks, and so on, amplifying the left-behind household's adaptive capacity (Baldwin & Fornalé, 2017; Jha et al., 2018; Cohen et al., 2013; Loebach, 2016). On the contrary, evidence also suggests that migration is responsible for higher inequality in the society (Hillmann et al., 2015), more stress and workload on left-behind women, social vulnerabilities, and so on (Ahmed & Eklund, 2021). Mitra (2018) encountered this argument, asserting that women are being empowered more than before due to the migration of males from the household.

'Migration is one of the mainstream adaptation policies; however, in literature, 'in situ adaptation' policies are also highlighted. Migration termed as a long-term adaptation strategy is crucial. However, 'in situ adaptation' policies such as diversification of crops, farming methods, innovation of drought-tolerant crop variety, land management system development, and short-term coping practices are also inevitable for capacity building to combat climate change-induced vulnerabilities. The household-level adaptation strategies differ from the individual-level adaptation strategies based on purpose, timing, and time scale (Ruiz-de-Oña et al., 2019; Antwi-Agyei & Nyantakyi-Frimpong, 2021; Carman & Zint, 2020). In literature, climate change adaptation, disaster risk reduction (DRR), migration, and sustainable development are also analyzed (Sudmeier-Rieux et al., 2017).

The argument against migration as an adaptation strategy

In contrast to the supporting argument on migration as an adaptation strategy, some researchers disagree with perceiving migration as an adaptation strategy (Perumal, 2018; Upreti & Shrestha, 2017; Stojanov et al., 2016). 'Climate refugees' have thrived within the talks about climate change; still, in the climate-induced migration discourses, the researcher's focus on migration is too simplistic, sensationalized, and understated. People generally prioritize in-situ adaptation strategies, which means local adaptation strategies, and finally, take migration decisions as the 'last resort'. For example, the people who migrated to Dhaka city from other parts of Bangladesh are categorized into climate-induced migrants and non-climate-induced migrants. The climate-induced migrants were forced to move due to rapid and slow-onset hazards; on the contrary, non-climate-induced migrants have higher aspirations and are opportunity seekers. However, migration and sustainable development are multidimensional and still poorly explored; therefore, mobility needs to incorporate into this discourse as all these issues are strongly linked with climate change (Adri & Simon, 2018; Perumal, 2018; Upreti and Shrestha, 2017). In India and Bangladesh, migration is treated as a climate change adaptation strategy, yet other drivers also determine migration. Likewise, in Assam, due to climate change impacts, the farmers prefer fertilizer use, new crop variants, and adjustment vertically as adaptation strategies which indicates that the farmers prefer 'in situ' adaptation measures other than migration (Stojanov et al., 2016; Begum & Mahanta, 2017). In developing countries, agriculture is the principal mediator between climate change and migration; and to reverse the higher migration trend, policies on sustainable rural development can open a new opportunity. Likewise, the literature also emphasized more on mainstream livelihood adaptation strategies, which means local autonomous adaptation practices, than migration strategies to combat climate change effects. Hence, a more comprehensive approach is recommended to bring sustainable local development (Falco et al., 2018; Stringer et al., 2015). In this discourse, Warner and Afifi (2014) contend that communities with climatic stressors undertake migration for 'resilience' purposes and can be benefitted from the action. On the contrary, for others, migration is anticipatory.

Both of the aforementioned arguments are extremely supportive of understanding and analysing the theoretical background and geographical contexts associated with migration and adaptation. Moreover, the arguments contribute a lot to future researchers' understanding and differentiation of the in-situ adaptation

strategy and migration strategy. This study aims to examine the connection between keywords migration and adaptation using bibliometric analysis and a review of the literature, which is a unique contribution to the existing literature. This study opens a window of opportunities to study migration more intensively by focusing on different dimensions of migration.

Migration as an adaptation strategy from the Bangladesh perspective

Bangladesh has been a giant migrant-sending country over the years. From 2005 to 2019, the coastal regions such as Barisal, Faridpur, Madaripur, Khulna, and Satkhira Bangladesh (BMET, 2022) contributed a significant portion of the country's total international migrants. The fundamental reasons are identified as the climate-induced vulnerabilities and the higher unemployment rate in Bangladesh (Assaduzzaman et al., 2020; Rudnick, 2009). The geographic position and low-lying topography cause more vulnerability, hindering socio-economic development (Zahid et al., 2018). Due to sea level rise-induced vulnerability, the people of coastal Bangladesh often adapt themselves through internal and cross-border migration. Migration differs based on the duration of stay at the destination country or place; and from the coastal belt of Bangladesh, both permanent and circular migration occur (Chen and Mueller, 2018; Saroar & Routray, 2015). The climate vulnerabilities and the effects such as sea-level rise, salinity intrusion, cyclones, and flooding are becoming common worldwide, where coastal zones of Bangladesh are the frontline victims of these events. From the highly climatic vulnerable coastal zones of Bangladesh, not only due to slow-onset hazards such as salinity or environmental erosion but also, households are predicted to move due to rapid onset hazards like cyclones (Ahmed & Eklund, 2021; Wiig et al., 2020). In the coastal areas of Bangladesh, migration is often considered an adaptation strategy where climate change impact is severe. Environmental stressors and shocks hamper people's livelihood in Bangladesh, and people usually apply adaptation strategies such as modification of practices, seeking alternative livelihood options, and migration (Assaduzzaman et al., 2020; Ayeb-Karlsson et al., 2016). In the vulnerable climatic areas of Bangladesh and India, farm households choose migration as the most crucial coping strategy. They also prefer resilient and weather-tolerant varieties as an adaptation strategy. In Bangladesh, the poorest people are bound to move as they have fewer livelihood options, while the wealthiest people migrate when they have alternative options (Bhatta & Aggarwal, 2016; Wiig et al., 2020; Rahman and Gain, 2020). Usually, migration is chosen as an adaptation strategy by households which are more climatically exposed (Wiig et al., 2020; Rahman and Gain, 2020). India and Bangladesh, adjacent to the Sundarbans, are highly prone to extreme climate vulnerabilities. In these areas, for taking permanent and short-term migration decisions, social safety net programs play a crucial role. Riverbank erosion is one of the predictors of migration in Koyra Upazila of Bangladesh, and people choose migration as an adaptation strategy for survival (O'Donnell and Wodon, 2015; Rahman and Gain, 2020).

Conclusion and Future Policy Options

This study aims to identify the nexus between migration and adaptation strategy by combining bibliometric analysis and literature review. The bibliometric research demonstrates a strong connection between migration and adaptation strategy. It is also apparent that climate change is a key mediating factor in migration-adaptation literature. Moreover, literature on migration, climate change, and adaptation strategy is intensely concentrated in the United States, the United Kingdom, and Australia. Therefore, research collaboration with the migrant-receiving country with the significant migrant-sending countries like Bangladesh is highly recommended, which may provide deeper insights into the fact. Literature termed 'migration' as an adaptation strategy and recognized it as the 'strategic policy option' for the coastal communities that are highly prone to climate change-induced vulnerabilities. Another school of researchers disagrees and often prefers to say that migration is the 'last resort', which means that if other adaptation strategies fail, people make migration decisions. This debate may last over time. The current trend of study sheds light on the urgency of climate change education among the climate-sensitive and vulnerable communities, project-based learning, migration from a gendered perspective, comparison of temporary and permanent migration, religious and cultural norms, alternative adaptation strategies, agricultural policies, causal factors of migration, mental health, capability approach, choice

experiment, depoliticization of adaptation in the migration-adaptation discourses. The researchers are putting their arguments in favour or against 'migration as an adaptation strategy' nevertheless, the study area differs from country to country and context to context. Though the current studies are giving preferences on gendered perspectives yet, the gendered norms, cultural diaspora, socio-economic vulnerabilities of the female migrants, and the left-behind women perspectives are less explored. More studies on circular and permanent migration can also be highlighted as a research gap. In addition, though the researchers have started thinking about migration from a capability perspective and freedom of choice; still, forced migration from a wellbeing perspective can add value to the existing migration-adaptation discourse. Along with migration, the prospect of alternative in-situ adaptation strategies can be explored more for sustainable development. Both national and international policies on alternative adaptation strategies can be analyzed to understand and formulate more effective adaptation strategies in response to climate change effects. In addition, an increased level of research collaboration between the climatic well-off countries and climatic worse-off countries can provide a detailed framework for the adaptation policies and practices.

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