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Human Migration:
Implications and Opportunities for Conservation
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Abstract

Human migration has reached unprecedented levels at the dawn of the 21st century, with the global forced displacement of people hitting a record high in the year 2015. To tackle human migration, countries focus on the immediate economic, humanitarian, social and political implications of this global issue, the environmental implications being overlooked. This can be accounted for the relationships between human migration (in forms from voluntary to forced migration), biodiversity conservation projects, and biodiversity levels and trends are not well understood. Human migration has uniquely important implications for biodiversity conservation – the protection, care, management and maintenance of ecosystems, habitats, and wildlife species – in that migration is a “fast” demographic variable relative to fertility and mortality, and its impacts on habitat, species loss, and efforts to protect habitat and species can be immediate and significant. Thus, perceptions on migration are often negative, overshadowing the many positive implications for conservation. For example, the incorporation of migrants in conservation practice has been shown to have successful impacts in a number of regions. Thus, by defining human migration and its implications for conservation this paper explains how conservation can be one of the root causes of migration but also one of the solutions to tackle the issues that arise from human migration.

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Introduction

Humans have been migrating for millennia in search of better livelihoods, greater opportunities, and improved security (UNDP, 2009; Oglethorpe, 2007). However, as a consequence of both the rapidly growing world population and the global advancement of transportation and information technologies, we have also seen an increase in human migration. There are an estimated 230 million international migrants in the world today and this number is expected to double by 2050 (Martin, 2013). In addition, approximately two to three times as many people migrate within their countries (Martin, 2013; Bremner and Hunter, 2014). With urbanization and the challenges posed by climate change and armed conflict, these trends of increased human migration are unlikely to slow down soon.

Human migration entails all movements of people and occurs at local to global scales. It is a demographic event that has both temporal and spatial dimensions. In addition, one way to characterize migration is by the degree of volition involved. For example, migration typically implies a relatively high degree of volition, with individuals motivated by economic factors or family reunification, whereas refugee flows (one subset of migrants) are characterized by low volition and short or longer term displacement owing to natural disasters, or armed conflict.

The human population in any given area can change through fertility, mortality and migration. What makes human migration so crucial is that migration flows can cause rapid and unexpected changes in population size and density far beyond those typically resulting from fertility and mortality (de Sherbinin, et al., 2008; Oglethorpe, 2007). Thus, depending on the spatial scale and the geographic area, migration is often the most important demographic factor affecting the environment. As a result, scientists and policy-makers have become increasingly interested in understanding the linkages between human migration and the environment (Billsborrow and Henry, 2012; Foresight, 2011).

In recent years, scientists have begun to look at how specific population changes relate to specific changes in the environment (de Sherbinin et al., 2007). Unlike such demographic factors as fertility and mortality, however, reliable data on migrations are sparse to assist these studies. The field is further complicated by the fact that data streams may measure either stocks (counts of migrants by geographic area) or flows (movements of people between two locations over some time frame) – creating an inconsistency in the data sets. Partly owing to these data gaps and the dynamic nature of human migration, existing studies on the relationship between human migration and the environment are generally restricted to particular environmental stress factors in particular areas over a specific period of time. Systematic global-scale studies on migration and its repercussions for biodiversity and the environment are scarce (Neumann et al. 2015).

The dynamics of human migration are exceedingly complex, so understanding and describing their implications for biodiversity and conservation efforts can be challenging under any circumstance, much less in one paper. With this in mind, I have chosen to focus first on defining human migration – the drivers, typologies and theories of human migration. I then look at the key ways in which human migration influences conservation and vice versa. For the purposes of this paper, I review four types of cause and effect, at the macro level, between conservation and human migration: (1) conservation as a *push factor* in areas of out-migration (meaning that conservation is a key factor in pushing a population to migrate from a particular area), (2)

conservation as a *pull factor* in areas of in-migration (meaning that conservation is a key factor in attracting migrants to an area), (3) conservation affecting other drivers of migration, and (4) the impacts of human migration on conservation. The ways in which these relationships play out in reality depend on various micro-scale contexts and variables: the political, economic, social, demographic and environmental contexts of both the areas of out-migration and in-migration. Drawing on case studies from around the world, this paper will seek to illustrate how all of these complex linkages have played out in particular places.

Additionally, this paper will focus primarily on permanent voluntary migration, rather than, for example, short-term or forced migration. Permanent voluntary migration describes those who make the decision to migrate, and migrate for a minimum of 6 months to a year, the specific definition of permanent migration depending on the country's laws and regulations (Castles, 2000). Henceforth, the term *migration* will be used to refer to *voluntary human migration*. Conservation, in turn, is defined as the protection, care, management and maintenance of ecosystems, habitats, and wildlife species. Using the definition of International Union for Conservation of Nature's in-situ conservation, here, the term *conservation* will refer to "the conservation of the ecosystems and natural habitats and maintenance and recovery of viable populations of species, in the environments and, in the case of tame and cultivated species, in the environments where they have developed their specific characteristics" (IUCN Glossary).

Migration inevitably shapes the demographic and environmental contexts of both the areas of out-migration and in-migration (King, 2012). This raises such questions as how does migration shape the societies in these areas and how they interact with their surrounding environment? What types of land-use changes do we see as a result of out-migration or in-migration? What does this mean for conservation and biodiversity? This study explores how the process of human migration directly and indirectly affects conservation efforts in both areas of out-migration and areas of in-migration. Traditionally, human migration is perceived to have negative biodiversity impacts such as unsustainable use of natural resources, destruction of habitats, pollution, and spread of invasive species and disease. At the same time, the spatial redistribution of populations and economic activities through certain migration types, such as urbanization, can also offer positive opportunities for conservation.

Humans have been migrating for millennia, and while data are increasingly captured on human migration flows, we still lack a systematic understanding of the implications of these migration for efforts to protect and enhance biodiversity and ecosystem services. Migration is inherent for the human species, and while we can seek to prevent some types of migration through policy and sustainable livelihood practices, much of human migration is inevitable. Thus, understanding migrations patterns (where do migrants leave and where do they settle) will play a crucial role in whether and how we tackle this trend of a rapidly increasing human migration in the future.

Understanding Human Migration

In basic terms, human migration is defined as the movement of people. In more specific terms, it is a demographic event that has both temporal and spatial dimensions (Bilsborrow et al., 1997; Fussel et al., 2014). The International Organization of Migration defines migration as “*The movement of a person or a group of persons, either across an international border, or within a State. It is a population movement, encompassing any kind of movement of people, whatever its length, composition and causes; it includes migration of refugees, displaced persons, economic migrants, and persons moving for other purposes, including family reunification*” (IOM, 2011). However, in an increasingly mobile world, defining migration as *any kind of movement of people, whatever its length*, is problematic. The definition lacks the temporal dimension of migration, implying that, for instance, a person heading for a weekend holiday is ‘migrating’.

Lee (1966) provides a definition that considers both the temporal and spatial dimensions of migration. He defines migration as a change in permanent or semi-permanent residence; something that involves an origin, a destination and intervening obstacles (Lee, 1966). However, using this definition would imply that a person moving from one apartment to another, even within a city, is ‘migrating’ which does not conform to the common understanding of the word ‘migration’. Thus, many definitions of migration specifically state that migration is the crossing of a political or administrative boundary for a certain period of time (Castles, 2000; Richard and Sabine, 2012). It is evident that, with the formation of modern states and borders, defining migration has become much more politicized and complex (Castles, 2000; King, 2012). There is no single definition for migration, and defining who is a migrant varies from country to country; their political and socio-economic interests, migration laws, and regulations (King, 2012).

Drivers of human migration

As we attempt to understand human migration, the first question that might arise is: why people move? Migration is rarely a simple, pack-the-bags-and-go process, but rather a decision influenced by multiple factors both in the areas where people reside (areas of origin) and the areas where they intend to migrate (areas of destination). Black et al. identify five macro-level drivers that influence the volume, direction and frequency of human migration: political, demographic, economic, social, and environmental drivers. Drawing from the current literature, Figure 1 illustrates these drivers, what they entail, and how they collectively influence migration decisions (Neumann et al., 2015; Foresight, 2011; Black, et al., 2011).

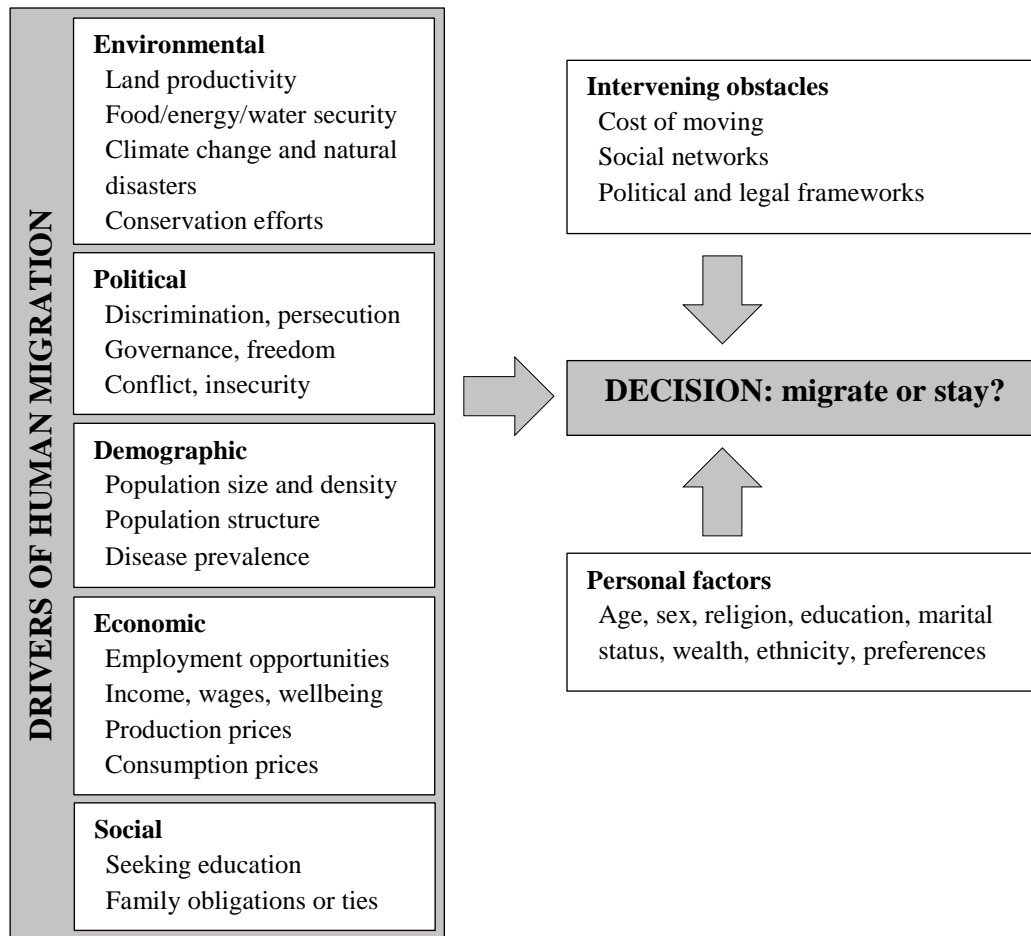


Figure 1. Drivers of human migration (Adopted from: Neumann et al., 2015; Foresight, 2011; Black, et al., 2011).

Out of the other five drivers of human migration, Martin (2013) argues that the economic and demographic factors are most influential in driving global human migration; the economic drivers including the potential for increase employment in the areas of destination, and the demographic drivers including the size and density of population in the areas of out-migration, and prevalence of diseases (Black et al., 2012; Neumann et al., 2015). The political drivers of migration include conflict, security, discrimination and persecution, as well as governance types and formalized resettlement plans. They can result in sudden, large-scale movements of people (Oglethorpe et al., 2007) as was witnessed in Europe in 2015 when millions of people fled the Middle East and North Africa largely due to these political drivers. The environmental drivers of migration include such factors as land productivity, natural resource security, climate change and natural disasters, as well as conservation efforts. These factors may act as major drivers of migration, as well as influencing other drivers of migration. The social drivers – such as family obligations and ties – have become more prevalent drivers of human migration with the advancement of transportation and information technologies (Black et al., 2012; Neumann et al., 2015; Martin, 2013).

The five drivers of migration rarely cause migration in isolation, but rather work together at various magnitudes to influence migration decisions. For instance, from an example in the Northern Ecuadorian Amazon the decisions to migrate from a rural area to an urban one (hence referred to as “rural-urban” migration) were driven by multiple drivers from economic to social, political, environmental and demographic (see box 1).

Yet, despite a strong push to migrate and the willingness of people to migrate, there are instances when people can be ‘trapped’ and forced to stay in their areas of out-migration by intervening obstacles. Generally, these migration traps are caused by poverty and the inadequate resources to overcome the cost of moving. Personal factors also effect these decisions whether to migrate or not and can be a major drawback to migration along with the intervening obstacles. For instance, in rural northwestern Ghana, the people who migrate to the south are generally men from the middle income class, as the poorest of the poor do not have the necessary means, money or family members in the productive age to migrate (van der Geest, 2010).

Box 1. Multiple drivers influencing rural-urban migration in the Northern Ecuadorian Amazon

In Northern Ecuadorian Amazon, the increasing incidence of rural-urban migration is driven by multiple simultaneous processes. Historically, rural plots have become smaller overtime due to population growth, resulting in land fragmentation and the reduced capacity of farmers to sustain themselves and their families. The local and national government policies and regional market dynamics made it increasingly hard for farmers to procure decent prices for their produce. Simultaneously, the increasing employment opportunities in urban areas attracted rural-urban migration. As a result, rural households see rural-urban migration of one or more family members as a way of diversifying risk and stabilizing the income flow of the household. This case exemplifies how the various drivers of migration work together: demographic drivers of rising population resulting in smaller farm plots, environmental drivers causing decline in land productivity, political drivers and local and national policies resulting in fluctuating market prices and increased livelihood risk, social drivers and family obligations urging migration, and economic drivers of employment opportunities attracting migration to urban areas. (Barbieri et al., 2009).

Typologies of human migration

While understanding the drivers of human migration may help us understand the multi-causality of migration, the temporal and spatial dimensions are similarly important. The use of typologies helps elucidate these dimensions. An exhaustive list of migration typologies is used across academic literature, policy and media, including but not limited to: economic migrants,

environmental migrants, refugees, seasonal migrants, temporary migrants, rural-urban migrants, or internal migrants. Each of these migration typologies reflect at least one of the three dimensions of human migration: descriptive migrant types categorize migrants by the *various drivers* of migration, temporal migrant types categorize migrants by the *period of time* that they reside in the areas of destination, and spatial migrant types categorize migrants to reflect their *origin and destination areas*. The most commonly used typologies of human migration are provided in Annex I, which provides a definition of these descriptive, temporal and spatial migrant types as typically defined by scholars and practitioners.

The drawback of the descriptive types of migration is that migration is rarely caused by a single driver but rather results from an interaction of the five drivers of human migration. Zetter argues that because of the multi-causality of migration, creating a typology of migration is not just challenging but rather impossible (Zetter, 1991 and 2007). Defining migration by a single cause can be misleading; migrants rarely fall under one typology of migrants but rather on a continuum of definitions. For instance, a migrant can be both a refugee fleeing war and a rural-urban migrant moving from rural areas to the cities. Moreover, migrants may migrate multiple times before they finally settle and thus, fall under numerous typologies of migration over time.

This raises the question of why create migration typologies? The key here is that while framing of migrants may be misleading they make migration more comprehensible and in some cases such framing is used to drive policy action (Ransan-Cooper et al., 2015). For instance, migrants who move because of environmental change are often referred to as ‘environmental refugees’. While migration is rarely caused by environmental change alone, using the term ‘refugees’ may trigger urgency and policy action (Neumann and Hilderink, 2015; Ransan-Cooper et al., 2015). This has been the case of migrants in Louisiana where the Biloxi-Chitimacha-Choctaw Indians are America’s first official climate refugees, see box 2.

Box 2. Louisiana climate refugees receiving recognition from the Obama Administration

Climate change’s impacts are expected to displace millions of people around the globe as places are becoming either temporarily or permanently inhabitable. The Biloxi-Chitimacha-Choctaw Indians living on the Isle de Jean Charles in Louisiana in the United States are one of these populations to be displaced due to climate change and the consequent rising sea levels. This Louisiana tribe was historically a fishing, trapping and hunting community. Today, the communities’ culture and livelihood is threatened as 98% of the land they have historically resided in, relative to 1955, has submerged due to rising sea levels. In January 2016, the Obama Administration announced that the State of Louisiana will receive \$93 million to relocate the resilient and historically significant community of the Biloxi-Chitimacha-Choctaw Indians. These tribal communities are now recognized as America’s first official climate refugees. (The White House, 2016; Maldonado et al., 2013).

Theories of human migration

Since the late 19th century, theorists have sought to explain why and how people migrate and what patterns of migration (where do migrants leave and where do they settle) can be expected. As a result, multiple theories of migration have emerged, most of which focus on the economic and social aspects of migration. An overview of the major categories of human migration theories – functional theories, historical-structural theories, network theories, systems theories and transition theories – is provided in Annex II.

However, due to the complex and multifaceted nature of migration, explaining human migration in a single theory is challenging, and maybe even impossible and unnecessary. In fact, Castles et al. argue that “different disciplines and theories provide different views on migration which are often complementary rather than mutually exclusive” (Castles et al. 2014). In fact, theories of human migration have changed and evolved over time, evidencing a shift from discipline-specific theories to more interrelated, cross-disciplinary theories.

The Push-Pull Relationship between Human Migration and Conservation

Lee’s (1966) push-pull theory provides this more interrelated and cross-disciplinary framework to understand why people move. Thus, I will be using Lee’s theoretical framework to depict the multiple drivers of human migration and more specifically, illustrate how conservation actions influence migration decisions as part of a multifaceted process.

In generic terms, Lee’s push-pull theory suggests that there are four factors that influence migration decision: factors in the areas of origin, factors in the areas of destination, intervening obstacles and personal factors. Illustrated in Figure 2, the + and – signs depict these push-pull factors in the areas of origin and destination where push factors attract people to migrate and pull factors repel people from migrating, and the way these factors interact with one another and influence migration decisions vary on an individual basis (Lee, 1966).

Linking Lee’s theory to conservation action, I argue that within this theoretical framework there are 3 ways in which conservation can influence migration decisions:

1. Conservation actions as a push factor,
2. Conservation areas as a pull factor,
3. Conservation actions indirectly influencing drivers of migration, both positively and negatively

In Figure 2, these + and – signs represent conservation along with other drivers of migration. The + and – signs, which include all drivers of migration, emphasize that conservation is by no means a single driver of human migration but rather a part of a process where the migrant weighs the benefits and disadvantages of migrating before making a final decision. The arrow labeled as forced migration, reminds us that migration is not always voluntary and in some cases the migrant makes no decision and is forced to migrate.

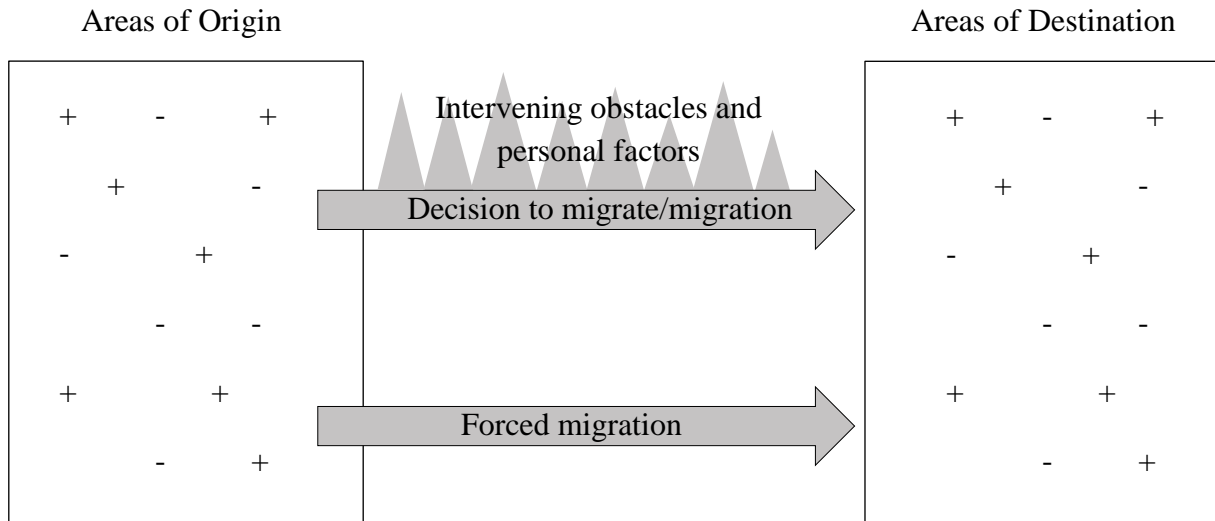


Figure 2. Understanding the push-pull theory (Adopted from: Lee, 1966)

The following sections will delve deeper into how conservation can influence migration decisions both positively and negatively, bringing in examples and case studies. Other factors, such as the personal factors of migrants (age, sex, education, and wealth) and intervening obstacles (cost of moving, social networks, technology and migration laws), influence how the whole picture of migration comes together: why people migrate and are the implications for conservation (Foresight, 2011). These implications of human migration on conservation will be explored further in the paper.

Conservation actions as a push factors in areas of origin

Conservation projects can act as a push factor in the areas of origin when they force or oblige people to migrate. One of the most extreme and clear cases where conservation acts as a push factor is the case of *conservation refugees*, which characterizes those who are forced to migrate from their habitual areas so protected areas can be formed. Since 1900, more than 180,000 protected areas have been established worldwide, forcing millions of local and indigenous people to migrate from areas where they have lived for generations (Dowie, 2009). Today, the rights of indigenous and local populations are more expansively recognized, yet local people are still restricted from a number of conservation areas and in some instances are obliged to migrate in the interest of establishing protected areas.

Other less extreme cases where conservation acts as a push factor include those situations where conservation objectives lead to restriction or change in land use practices. In such instances, local people may be incentivized to migrate to find employment opportunities elsewhere or to move to lands where they can continue practicing their traditional land use methods without limitations from conservation actions and policies.

However, conservation does not by any means only have negative implications to local communities. In many cases we have seen the positive implications of conservation initiatives on people's livelihoods in rural areas; for example, helping raise people out of poverty, increasing

land productivity, improving food security and bringing about community engagement. In some instances, conservation efforts can also provide the final positive push for people who want to migrate but do not have the resources to do so. Conservation efforts can lower the intervening obstacles of migration by improving people's livelihoods and to allow them to put aside savings that eventually may help cover the cost of migration. This may sound counterintuitive, why would people leave a place if conservation has given them a better opportunity to thrive? The reasons are many; some may want to reunite with family members, and some may expect even better opportunities elsewhere. The bottom line is that conservation actions can act as a push factor in the areas of origin and whether this has a negative or positive implication on migration decisions depends on individual basis.

Box 3. Conservation and resettlement: Should we relocate local communities?

For decades, local and indigenous communities have been relocated to other areas as a means to establish national parks and to protect biodiversity. The forced displacement of local communities brings a multitude of negative effects to these communities, such as loss of productive work, loss of subsistence, loss of income, risk of marginalization, risk of homelessness and increased poverty. Despite these negative effects, the establishment of parks continues to displace local communities. For instance, in the Congo basin of Central Africa, the establishment of parks has displaced and impoverished approximately 120,000-150,000 people and globally at least 8.5 million people have been displaced by conservation. Such displacements have failed to deliver on protecting biodiversity, and instead have created poverty which backfires on the environmental benefits. Thus, a greater recognition is needed to acknowledge "double sustainability", actions that protect both biodiversity and people's livelihoods at the same time. (Cernea and Schmidt-Soltau, 2006). I argue that conservation in the form of establishing protected areas should not be the overarching push factor for migration in its extreme form of resettlement. Such actions often fail to deliver on their initial goal of protecting biodiversity and create new tensions which can have implications from the environmental to social and political realms.

Natural amenities and conservation areas as a pull-factor

Another widely discussed situation is that in which the ecosystem values resulting from conservation efforts act as a pull factor for human migration, attracting people to migrate into protected areas, protected area edges, or other areas rich in biodiversity and natural beauty. Studies have found that the areas adjacent to protected areas experience higher population growth compared to similar rural areas without parks (Wittemyer et. al, 2008), also see box 4. Such studies imply that protected areas attract in-migration as people migrate in search for economic, social and infrastructural benefits (Hoffman et. al, 2011). For instance, parks may provide employment opportunities for local people, or tourism can bring higher income for households living near protected areas (Bobalino and Villalobos, 2014).

Some people are attracted by the natural and cultural amenities that nature provides; these migrants are called *amenity migrants*. In American West, amenity migration trends have been

prevalent for decades, and while this phenomenon is largely concentrated in the urban and suburban landscapes, the rural areas have also experienced changes in population and land use (Gosnell and Abrams, 2010).

Box 4. Migration to protected area edges: parks as a pull-factor

The potential for protected areas to attract migration has been widely debated. A global study by George Wittemyer et al. (2008) concludes that the areas surrounding 306 protected areas in 45 African and Latin American countries have faced significantly higher population growth compared to similar rural areas without parks. The study finds that relatively higher population growth in protected area edges is positively correlated with investment in conservation activities and an index of park funding. While the study finds human migration as a threat to conservation and biodiversity near protected areas as, it also highlights the value that protected areas provide to local communities. (Wittemyer et al., 2008). This study exemplifies how protected can attract human migration and increase tensions between local populations and conservation efforts. However, identifying these tensions and addressing them accordingly may be turned into the parks' advantage, these will be discussed further in the paper.

Conservation actions indirectly influencing drivers of migration, both positively and negatively

Conservation efforts may also indirectly affect migration by influencing other drivers of migration: economic incentives, political and social stability, and environmental factors in particular. Conservation activities can both provide new employment opportunities, such as employment in national parks, and deteriorate economic opportunities, such as turning lands into protected areas which might have otherwise been converted to farmland and provided employment opportunities to farm workers. In many cases, conservation projects may affect people's livelihoods, which in turn can contribute to either social and political stability or instability, and be reflected in people's migration decisions. This was the case in Syria where the lack of conservation actions along with a record drought contributed to migration fluxes and eventually political unrest, see box 5.

Box 5. Syria: from environmental drivers to political drivers of migration

Before the Arab Spring spread to Syria in 2011, the country faced one of the most severe droughts on record. With poor governance and unsustainable agricultural and environmental policies, the drought led to environmentally-induced migration from rural Syria to the cities. As a consequence, the greater population density in cities and rising unemployment contributed to people's frustration with the government and the political unrest in the country. In the case of Syria, the lack of conservation activities and environmental policies meliorating the livelihood impacts of the drought contributed to the social and political instability and eventually resulted in a large flux of refugees fleeing across international borders. (Kelley et al., 2015).

Impacts of human migration on conservation

Typically, research on the implications of human migration on conservation is focused on the areas of destination, and much research focuses on migration to areas near protected areas. However, it is important to understand what happens in the areas of origin as well to get a full picture of how the changes in population dynamics influence conservation efforts at a larger scale (de Sherbinin et al., 2008; Billsborrow and Henry, 2012).

Here I explore the direct and indirect, as well as positive and negative, impacts of human migration on conservation in both areas of origin and destination. The "direct impacts" of human migration refer to the physical impacts of population density on land use, conservation, and biodiversity. These often include such impacts as abandoned or unmanaged land due to out-migration, or land clearing, habitat destruction and biodiversity loss due to the accommodation of in-migration. The "indirect impacts" refer to impacts that occur over a longer period of time, such as exchange of knowledge and change in land use, or increased pollution, or spread of invasive species. The impacts of migration are contextual and depend on the specifics of the migrant populations, as well as the environmental factors, politics, culture, and social dimensions of the areas of origin and destination.

This topic, the relationship between conservation efforts and human migration, is by no means a new topic. Humans have migrated for millennia across the globe in search of better livelihoods, greater opportunities and improved security (UNDP, 2009; Oglethorpe et al., 2007) and, in the process, inevitably contributed to the loss of biodiversity both directly and indirectly. Scientific evidence shows that human hunters have been a key cause in the extinction of many species as far back as 10,000 or even 50,000 years ago (Cincotta et al., 2000). This is one reason why migration is generally perceived to have negative impacts on biodiversity. As people move into new areas this inevitably results in habitat destruction or fragmentation and loss of species and genetic diversity as land is cleared and settled in. However, the spatial redistribution of people and economic activities can offer (and have offered) conservation opportunities. Out-migration from an area may promote conservation and biodiversity, for instance, through lowering population density or pollution.

Figure 3 summarizes various ways in which human migration can impact conservation, both in the areas of origin and areas of destination. While not exhaustive, this list includes a number of scenarios that have transpired with some frequency. Without appropriate contextualization, one cannot assume that any scenario will benefit conservation or detract from it. For instance, remittances sent by migrants to their home communities could either result in more sustainable use of natural resources, or they could initiate more destructive land use. Or migrants can bring new land use practices and traditional knowledge to the areas of destination which either have positive implications for conservation or result in destruction of habitats and loss of species.

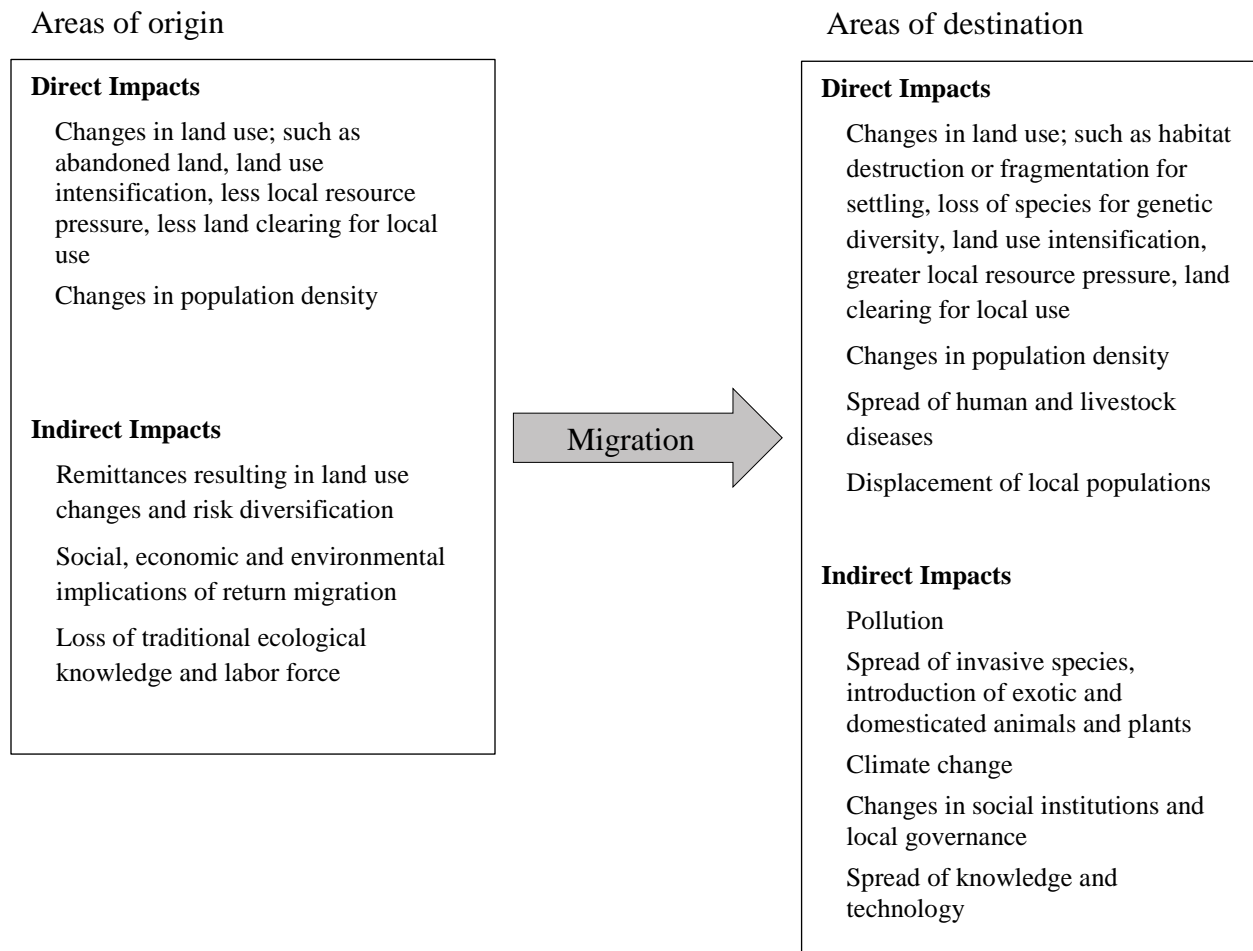


Figure 3. Impacts of human migration on conservation and biodiversity (Adopted from: Oglethorpe et al., 2007).

As mentioned above, the ways in which these different impacts play out in reality are context-specific. The case studies below look at the impacts of human migration to the edges of protected areas in Uganda and Madagascar, and illustrate how similar patterns of migration in two different locations can have vastly different direct and indirect impacts on conservation efforts, box 6 and 7. Thus, given the varied types, drivers, and spatial scopes of migration events, no single approach can be employed to address the existing or envisioned interactions between human migration and conservation; approaches must be multi-faceted and context specific.

Box 6. Impacts of migration on biodiversity in protected area edges: a case from Uganda

Since 1959, the population near Kibale National Park in western Uganda has increased by approximately 398%. Migration from southern Uganda has transformed the landscape near the park in multiple ways, mainly through land conversion to agriculture, with deleterious direct impacts as migrants have settled into previously forested lands and turned them into agricultural lands. However, the migrants' land use practices have positive indirect impacts in terms of sustainability and rate of deforestation. Comparing the land use practices of migrants and non-migrants in the areas surrounding Kibale National Park, a study by Hartter et al. (2015) shows that the land use practices of the migrants result in less deforestation than the land use practices of the native communities. Thus, while the direct impacts of migration near the park are negative due to land conversion, the indirect impacts are positive due to better land use practices and more suitable crops for biodiversity. (Hartter et al., 2015). This study exemplifies the fact that migration may in fact be beneficial for conservation efforts even though the initial direct impacts may be detrimental for the land people settle in. Further in the paper I will explore how identifying these direct and indirect positive and negative impacts of human migration on conservation can allow us to enhance conservation through migration.

Box 7. Madagascar mining rushes: impacts of migration to protected area landscapes

Madagascar is an island with exceptional and irreplaceable biodiversity, including many endemic species. Since 2003, the Madagascar government has sought to protect this rich biodiversity through its "Durban Vision", a vision to expand the surface area of protected areas from 1.7 million hectares to 6 million hectares by 2012. Today, there are 671 protected areas (some of which have temporary status) covering approximately 16 million hectares of land. While the government has gone beyond the goals set in the Durban vision, in practice, the increased hectares alone have little meaning. Since 1990s, Madagascar has faced multiple mining rushes driven by drought and desertification in areas of origin, and employment opportunities in mining areas, areas of destination. These large migration fluxes have had detrimental impacts on the islands rich biodiversity. Small-scale mining poses a direct impact to conservation efforts and biodiversity as land at the edges and within protected areas is cleared for mining. The indirect impacts of the migrants living in these areas pose a further threat as miners live off of the biodiversity within the protected areas, and practice logging for timber and charcoal. (Cook and Healy, 2012). In these situations where there is simply no positive impacts of migration in the areas of destination and where the migrants are simply there to extract natural resources, finding and enhancing the positive impacts is impossible. In such cases the task is to find ways to mitigate the impacts of migration on conservation efforts for instance through resource certification or community-based resource management; the approach depending on the specific case.

Human Migration: Implications and Opportunities for Conservation

This paper has focused on understanding human migration, its drivers, typologies, and theories and its relationship to conservation. The relationship between human migration and conservation is defined by the micro-scale contexts – political, economic, social, demographic and environmental factors – of the areas of origin and destination in a given context and thus, there is no single approach to address the existing or envisioned interactions between human migration and conservation. Here, we build on these ideas to explore the implications and opportunities of human migration for conservation, and how to intentionally prevent or mitigate the impacts of human migration through conservation efforts.

A recently published *Migration and Conservation Toolkit* by the International Institute of Sustainable Development was developed to explore these very topics, to “help conservation practitioners assess the impacts of human migration on critical ecosystems and to provide guidance on identifying, designing and implementing response strategies” (Crawford and Dazé, 2016). The toolkit consists of four phases: 1. Defining the Scope; 2. Analyzing the migration context and analyzing the conservation context; 3. Analyzing existing and potential impacts of migration; and, 4. Identifying and prioritizing interventions. The toolkit and its four steps provide a detailed plan of how to practically address human migration and conservation issues in a specific area of concern.

However, working at the global scale, such analysis is not feasible. Thus, building on these ideas the following sections will provide a broader understanding of what trends of human migration are to become prevalent and the most relevant to conservation efforts at the global scale, what are the options in responding to these trends, and how to turn the challenges posed by human migration to enhance conservation.

Predicting human migration

The two overarching factors driving global human migration in the 21st century are urbanization and climate change (Seto, 2012); with both positive and negative effects on conservation efforts and biodiversity. Other major trends posing challenges to conservation are increasing population densities in the world’s 25 biodiversity hotspots and migration from areas of armed conflict. Predicting these trends will help conservation practitioners to identify where the tensions between conservation and human migration exist and how to address these tensions in the most effective manner whether it is through preventing or mitigating impacts.

Historically, demographic research has focused on rural-urban migration as it is easier to quantify, and this research has played an important role in understanding and enhancing economic development (Bilsborrow, 2002). Given current trends in expanding rural-urban migration worldwide, by 2030, the populations of urban areas are expected to increase by 185% (Oakleaf, et al., 2015). For conservation, the rural-urban migration is an ever-growing challenge as more highly concentrated urban areas drive global environmental change (Seto et al., 2012): high population densities in urban areas result in concentrated resources needs, land conversion, greater pollution levels and poverty-induced degradation of surrounding environment, just to mention a few.

Many of the world's expanding urban areas are located in areas with rich biodiversity. A study by Cincotta et al. explores the population growth in the world's 25 biodiversity hotspots, areas with exceptionally rich species and genetic biodiversity as defined by Conservation International (Cincotta et al., 2000). In 1995, the population density in the hotspots was estimated at 73 people per square km, which was 71% greater than that of the world as a whole. Estimating the population growth in biodiversity hotspots between 1995 to 2000, the study found that in 19 of the world's biodiversity hotspots, the population growth was higher in hotspots than in the world as a whole (Cincotta et al. 2000). Given current trends of urbanization, the urban land cover in these biodiversity hotspots is expected to increase by more than 200% between 2000 and 2030 (Seto et al. 2012). This could have detrimental impacts for biodiversity and threaten many of the world's endangered species as identifies by IUCN's Red List of Threatened Species. However, by identifying the tensions that arise from rural-urban migration to these areas, appropriate interventions can be identified.

Climate change poses further challenges to both human migration as well as conservation and biodiversity. It is estimated that 200 million people will be displaced by climate change and rising sea levels by 2050 (Wyett, 2013). Climate-induced migration can be both sudden as a result of rapid-onset environmental changes such as natural disasters or gradual, owing to slow-onset changes such as land degradation. Some of the slower-occurring migration trends resulting from climate change can be predicted, making it easier to address the challenges climate migration poses for conservation efforts and biodiversity. However, in some cases, climate migration can happen rapidly, causing large fluxes of people to move within countries or across international borders. The conservation community can play a role in mitigating the impacts of climate change on local livelihoods, and thus, possibly reduce climate migration.

Finally, migration resulting from armed conflict and political instability is another trend expected to continue emerging in parts of the world. The year 2015 has been a record high year for refugees, with over 65.3 million people being displaced due to armed conflict (Edwards, 2016). Much of the migration due to conflict seen today is in the global South, where the vast majority of refugees settle at the borders from the country they are fleeing from. With limited resources, and in some cases ineffective and corrupt governance, large refugee fluxes pose both direct and indirect challenges for biodiversity through habitat destruction and fragmentation, pressure on natural resources, poaching of animals for food, pollution due to limited infrastructure and sanitation. Addressing these threats during armed conflict is challenging, which highlights the importance of conservation practitioners to work through other stakeholders to prevent and mitigate possible negative impacts that may have long-lasting effects.

These challenges of human migration for conservation are multiplied by the challenges of addressing migration at the policy level. With the formation of modern states and borders, human migration has become much more politicized. Thus, reaching legally binding frameworks on the issues around migration is unlikely, and addressing international human migration remains a challenge. Many of the current policy approaches, such as the UN Principles on Internal Displacement, are soft law approaches to address internal migration (IOM, 2014). However, in 2011, countries came together at the Nansen Conference on Climate Change and Displacement in the 21st Century to build a consensus on how to address cross-border displacement in the

context of disasters. This led to the launch of the Nansen Principles, an international policy framework to address cross-border disaster-induced displacement in the time of climate change. Challenges and gaps in the principles remain and the revised Nansen Initiative, launched in 2012, seeks to build a sound knowledge base and identify best practices on how to effectively respond to the humanitarian challenges of climate induced migration. (Kälin, 2012).

When addressing the challenges of human migration, whether for conservation and biodiversity, for social, political and economic stability, or all of the above, the first question to ask is: which is more desirable, prevention of migration or mitigation of its impacts? In addition, policies need to determine whether to work at the policy or field level, whether to focus on the areas of out-migration or the areas of in-migration, and whether to address the future or the present situation (Oglethorpe et al., 2007). The following will explore the opportunities for conservation in preventing migration in the areas of out-migration, in mitigating the impacts of migration in the areas of in-migration and opportunities in enhancing conservation through migration.

Preventing human migration with conservation

While the priority of conservation efforts is to conserve ecosystems and natural habitats and maintain and recover populations of species, conservation efforts also play an important role in building resilient communities, developing reliable livelihoods and mitigating environmental changes. As discussed, conservation can act as a push factor for human migration and it can also influence other drivers of human migration both positively or negatively. Thus, in a case where prevention of human migration is desirable, there are opportunities for conservation to prevent human migration in the areas of out migration by enhancing natural resource dependent livelihood practices and providing people incentives to stay.

The challenge in preventing human migration

Mitigating the impacts of human migration

In the areas of in-migration, human migration has inevitable negative direct implications for conservation, as land is cleared to accommodate the increasing population in a localized area. Here, the opportunities for conservation are two-fold: conservation efforts can be used to mitigate the impacts of human migration in areas of in-migration, or the inevitable impacts in the areas of in-migration can be offset by engaging in conservation efforts in other areas.

One way to look at the mitigation of impacts in areas of in-migration is to flip the through process. It is easy to think that the impacts of migration have to be somehow mitigated; however, how about we take what human migration has to offer and use them to enhance conservation efforts. For instance, in Box 6. the case from Kibale National Park in Uganda showed that the migrant's land use practices caused less deforestation and were more beneficial for biodiversity than the native land use practices. In such cases human migration could in fact be turned as the benefit of conservation efforts by building programs and policies on the migrants' best practices to enhance conservation efforts.

In Austria, at the Hohe Tauern National Park these ideas of enhancing conservation through human migration have resulted an innovative program enhancing asylum seekers, see box 8. The new project seeks to engage asylum seekers in conservation efforts in the park and thus, to promote the values of nature protection, sustainable use, and community integration through environmental education and employment opportunities.

Box 8. The engagement of asylum seekers in Austria’s nature conservation

The Hohe Tauern National Park is the largest national park in Austria with unique Alpine landscapes and vegetation. The areas surrounding the National Park have been marked by human activities such as Alpine pastoralism for centuries. The park is freely accessible to anyone, and its protection is anchored in the consciousness of each and every individual. The park launched a two-year training project several years ago called “Edelweiss1”, as a means of engaging unaccompanied minor refugees in the conservation activities within the park and assisting them with the transition into professional life. The park is now launching a follow-up project, “Edelweiss2”, to provide employment opportunities for asylum seekers in Austria. The aim of the project is to share the values of nature protection and sustainable use with asylum seekers in order to promote peace, stability and integration. While the project has inevitable positive impacts for nature conservation it also promotes social inclusion and sharing of local customs and traditions, deepens language skills, and gives the opportunity for local people to dispel their fears about migrants and distant cultures. (Fuchs, 2015).

Conclusion

This paper has focused on understanding human migration, its drivers and typologies, and the four ways in which human migration and conservation interact: (1) conservation as a *push factor* in areas of out-migration (meaning that conservation is a key factor in pushing a population to migrate from a particular area), (2) conservation as a *pull factor* in areas of in-migration (meaning that conservation is a key factor in attracting migrants to an area), (3) conservation affecting other drivers of migration, and (4) the impacts of human migration on conservation. The case studies exemplify how the micro-scale realities – political, economic, social, demographic and environmental factors – play out in both the areas of origin and destination. The case studies also highlight the importance of looking at human migration in context. To understand the relationship between human migration and conservation and biodiversity, one cannot just look at global migration patterns but rather the local context in which these demographic and environmental changes happen.

The real challenge in tackling human migration is that migration is seen as a problem rather than an opportunity. Closing borders, whether it is of countries or protected areas, is not the right policy approach; migration routes change constantly and adapt to changing tensions and regulations, if a border is closed the migrants will find alternative ways to respond to the situation. Thus, it is important to identify these tensions in order to predict future migration patterns and routes, and to develop the optimal policy approach.

For conservation efforts alike, human migration is seen as a problem rather than an opportunity. As people migrate to new areas the negative direct implications for conservation are inevitable as land is cleared to accommodate the increasing population in a localized area. However, there are multiple opportunities as well; these just have to be identified. For conservation practitioners working in a specific location the first step is to identify what are the migration and conservation issues in the area of concern; is there in-migration or out-migration? Is the ecosystem and biodiversity in the area somehow threatened? The second step is to analyze the existing and potential impacts of human migration on conservation efforts and to identify what are the priority conservation issues that ought to be addressed. The final step is to identify and prioritize interventions, to implement and follow-up on progress.

In identifying and prioritizing interventions, conservation efforts can help either prevent migration or mitigate the impacts of migration. For instance, conservation efforts that promote better livelihood strategies can prevent out-migration based on resultant greater human well-being, conservation efforts can be used to mitigate the impacts of human migration in areas of destination, the inevitable impacts in the areas of destination can be offset by engaging in conservation efforts in other areas, or conservation efforts that help migrants to assimilate into society can promote stability and security in areas of in-migration. These opportunities should be explored further in areas expecting increasing human migration and increased pressure on biodiversity and conservation, to identify specific opportunities for these areas.

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Annex I.

Typologies of human migration (Oglethorpe et al., 2007; Castles, 2000; IOM, 2001; Zelinsky, 1971)

Type	Definition
Descriptive migrant types	
Conservation refugees	Forced to leave their habitual homes due to the establishment of protected areas
Economic migrants	Leave their areas of origin in order to improve their quality of life, typically through employment; these include temporary labor migrants, highly skilled migrants and illegal immigrants
Environmental migrants, also environmental refugees	Obligated to leave their habitual homes due to rapid or slow changes in the environment that adversely affect their lives or living conditions
Family reunification migrants	Migrate to regroup with their family in an area other than that of their origin
Internally displaced persons	Forced or obliged to leave their homes typically due to armed conflict, situations of violence human rights violations, natural or man-made disasters but do not cross an internationally recognized state border
Return migrants	Return to their areas of origin after a period away
Seasonal migrants	Move regularly according to the seasons in search for opportunities such as labor, education or production opportunities
Transient migrants	Do not have a fixed place of usual residence; these include nomads and wanderers
Refugees and asylum seekers	Forced or obliged to leave their homes typically due to armed conflict, situations of violence human rights violations, natural or man-made disasters crossing an internationally recognized state border
Temporal migrant types	
Circulation	Refers to a variety of short-term, repetitive or cyclical movements of human populations such as seasonal or transient migration; lacking the intention of permanent or long-lasting change in residence
Long-term migrants	Change their residence for a longer period of time; usually defined as a period of 12 months or more
Temporary migrants	Move for short periods of time, not changing their primary residence
Spatial migrant types	
Internal migrants	Move from one area to another within an internationally recognized state border
International migrants	Move from one area to another crossing an internationally recognized state border
Rural-urban migrants	Move from rural to urban areas
Rural-rural migrants	Move from rural to rural areas
Urban-rural migrants	Move from urban to rural areas
Urban-urban migrants	Move from urban to urban areas

Annex II.

Theories of human migration have changed and evolved over time showing a shift from discipline-specific theories to more interrelated, cross-disciplinary theories. An overview of the major categories of human migration theories – functional theories, historical-structural theories, network theories, systems theories and transition theories – is given in Table 1.

Table 1. Major theories of human migration (Castles, et al., 2014; King, 2012).

Period	Theory	Major Theorists
1880s-1960s	Functionalist theories: the neoclassical economics and push-pull theories argue that most migration is driven by economic incentives, rural-urban migration, and unequal opportunities	Ravenstein (1885, 1889), Lee (1966), Todaro and Harris (1970)
1970s-1980s	Historical-Structural theories: these theories argue that societies are built of core capitalist economies and their underdeveloped peripheries (eg. urban and rural) and individuals do not have free choice to migrate but are rather driven by structural forces and the pulling forces of the political-economic system	Massey <i>et al.</i> (1998), Cohen (1987), Piore (1979), Sassen (1988, 1991), Wallerstein (1974, 1979)
1960s and 1980s-1990s	Migration Network theory: migration networks are sets of interpersonal ties that connect migrants, former migrants and non-migrants in the areas of destination and origin, earlier theorists have also called this theory ‘chain migration’ to emphasize the role of forming agency and personal ties, a link or a chain to previous migrants	Kenny (1962), Price (1963), Massey <i>et al.</i> (1993), Bourdieu (1985)
1970s and 1990s-	Migration Systems theory: this theory focuses on migration as a circular, multi-causal and interdependent process, and looks at how migration is connected to social transformation and development	Mabogunje (1970), Massey (1990), de Haas (2010)
1970s and 1990s-	Migration Transition theories: these theories see migration part of broader processes of development, social transformation and globalization, where migration patterns change over the course of development; generally migration tends to increase with development but it is important to acknowledge that the process is complex and non-linear	Zelinsky (1971), Skeldon (1990, 1997)

From post-industrial revolution to the age of globalization, these theories emerged to reflect new patterns in human migration. The functionalist theories were written in the times of post-

industrialization arguing that migration is mostly rural-urban migration driven by economic incentives and unequal opportunities. The historical-structural theories challenged these theories in the time of globalization arguing that migration was driven by the structural forces of capitalist societies where individuals did not have the power to decide whether to migrate or not but were rather driven by structural forces. In 1960s and 70s, the migration network, systems and transition theories emerged explaining the ever-more complicated and interrelated factors that cause humans to migrate: interpersonal ties, social transformation, development, and globalization. A common factor in all of these migration theories is that migration is driven by economic and demographic inequalities and/or social aspirations for better opportunities.