Introduction

Migration studies have long considered migration as a process aimed at adjusting to changes. One of the founders of migration studies, Ravenstein (1889), described migration as "life and progress", whereas a sedentary population meant "stagnation". Empirical evidence shows that in the face of environmental and climate stress, migration is a common household strategy aimed at supporting basic needs and livelihood strategies (c.f. Foresight 2011). The dominant narrative for migration is nevertheless one of competition and tensions, while policy makers commonly view adaptation measures as means to reduce migration pressures. But migration may also be seen as an adaptation strategy itself; as a way to reduce population pressures in climate-prone places while migrants already living outside of vulnerable areas provide important resources to help communities adapt and respond to climate change. Although discussed often, the application of the migration to the field of climate change adaptation, has not been adequately tested. Furthermore, the policy apparatus needed to deliver this potential has not been developed or assessed. A key challenge today is to flesh out the relationship between migration and adaptation to environmental and climate changes. Scholars must begin to address the common wishful thinking of managed migration as a new tool in the climate change adaptation policy solution box, a positive and somewhat

performative vision of mobility.

An additional important task is to address conflation of migration and adaptation in much of the current academic literature. Framing migration as adaptation solely in regards to environmental changes may imply these movements exist outside the "normal" livelihoods strategies. This creates a prescriptive view of migration from a sedentarist perspective and neglects the utility of migration not primarily motivated by environmental factors as a means to adapt to changing conditions. Academic work on migration and climate change adaptation has in some cases appeared to suffer amnesia of the results of migration and development research. Furthermore, potential maladaptive effects are sometimes overlooked. The outside observer is left to determine when and how migration is adaptation and whether it is "successful" or "maladaptive."

Migration, nevertheless, can be a powerful adaptation strategy and merits inclusion in the development and implementation of climate change adaptation measures (IPCC 2014). More empirical evidence is required to elucidate the processes underlying the climate adaptation-migration nexus. Because environmental factors are typically inextricably combined with other drivers of migration, a number of methodological and conceptual challenges arise in judging how migration

contributes to adaptation communities facing rapid environmental and climate change. Researchers must develop innovative research designs that will be sensitive to the diversity of the patterns of mobility. Both qualitative and quantitative studies, especially involving micro-scale analysis, are needed to advance our state of knowledge. Given the multitude of complex and context-specific factors influencing migration, a one-size-fits-all approach would be ill-advised.

The objective of this conceptual and methodological paper is therefore to flag different possible choices that can be made to study the relationship between migration and adaptation. Our assessment is based on a review and analysis of the current methodological and conceptual work on the environment and climate change-migration nexus, as well as of relevant studies in the wider body of literature on migration and development. We suggest that the key framing question is the following: ***adaptation for whom?*** First, we endeavour to define adaptation in this context. Next, we provide an overview of the relevant current body of literature, followed by a discussion of the methodological challenges facing researchers in investigating the linkages between environmental and climate change and migration. Finally, using noteworthy examples from recent empirical studies, we discuss the merits and challenges to answering our framing question from each of three possible

vantage points: the migrant, the community of origin, the community of destination. We aim to weigh the essential characteristics, advantages, and disadvantages of each approach in order to support future qualitative and quantitative research.

In the final section we stress that migration at large, not only migration triggered in part by environmental changes, can have an impact on adaptation. We recommend that research limits be pressed beyond the migrants whose mobility appears to be related to environmental changes, oft referred to as the 'environmental migrants' (Foresight 2011; IOM 2011). In the concluding section, we suggest combining methods to test both communities of destination and communities of origin and address technical challenges to this approach and suggest future paths for researchers. In the interest of answering these questions, this paper emphasizes the *impacts* of migration rather than its *causes*.

Defining adaptation

In the discussion below, we argue that migration can affect adaptation in different. Before proceeding, we first must define adaptation.

The Intergovernmental Panel on Climate Change (IPCC) defines adaptation as: "In human systems, the process of

adjustment to actual or expected climate and its effects, which seeks to moderate harm or exploit beneficial opportunities." (IPCC 2014). Adaptation is contrasted with "coping," defined as; "The use of available skills, resources, and opportunities to address, manage, and overcome adverse conditions, with the aim of achieving basic functioning of people, institutions, organizations, and systems in the short to medium term."

We understand adaptation linked to migration in broad terms, given a diversity of types of internal and cross-border migration and variable accompanying effects on individuals and households. We note that migration may not be the first adaptive response chosen or indeed, the most appropriate mechanism (Brown 2008). Migration and mobility in the broad sense can yield positive adjustments to environmental and climate changes through two mechanisms. Firstly it can contribute to building resilience to recover from unavoidable shocks, as discussed further below. Secondly migration may increase adaptive capacities, defined as the abilities (of people and societies) to anticipate and transform structure, functioning, or organization to better survive hazards and other erosive changes (IPCC 2012: 72).

The IPCC definition requires three annotations. First, the related perceptions and interpretations of households and

individuals are paramount. The perceived ability to employ adaptation strategies successfully may be as important as the objective ability to diversity options to respond to risks presented by climate change (Grothmann & Patt 2005). Risk perception is different from risk interpretation, the latter involving cultural values and norms. Second, actions taken to adjust to changes are not necessarily positive. Migration can also contribute to maladaptive processes, whereby actions taken directly and negatively impact vulnerability and/or significantly undermine capacities or opportunities for present and future adaptation to climate variability and change. Here included are action taken ostensibly to avoid or reduce vulnerability to climate change that impacts adversely on, or increases the vulnerability of other systems, sectors or social groups (Barnett & O'Neill 2010). Migration can be a "successful" adaptation strategy only if it can increase the ability to rely on existing strategies (Tacoli 2011b). Third, strategies to respond to changes are not temporally static. In addition, short term coping strategies that mitigate harm as adaptive, which in many cases have proven to be mal-adaptive in the long term. How the outcomes of migration may serve to increase or decrease adaptive capacities requires more empirical research.

State of the art

In fragile environments, migration is a common response to extreme vulnerability and is essential in **satisfying basic needs**. Migration scholars have long concluded that internal and cross-border migration can be employed to address income gaps and serve as a sort of insurance strategy for households (Lee 1966; Foresight, 2011). In numerous case studies, increased mobility was linked to periods of environmental stress and "tipping point" events (Tacoli 2011a). The importance of climate change to migration is its potential to erode resilience and adaptive capacities, modifying not only the number of migrants but the characteristics of pre-existing patterns. Climate change will most directly affect rural, agricultural livelihoods by affecting household production and consumption (Obokata et al 2014).

More recent observations highlight that migration could be a **powerful adaptation strategy** for populations faced with environmental and climate changes. Diverse empirical studies have shown that migration is not always a last resort strategy in the face of natural hazard events, but could also be a voluntary choice aimed at reducing exposure to risk and enhancing livelihoods for many households (Jäger et al. 2009). Evidence indicates mobility has long been employed to face unfavourable environmental and climate conditions. Already in 1966, Wolpert had shown that internal migration in the US was

an adjustment to environmental stress. Henry et al. (2003) demonstrated a link between internal mobility and rainfall in climate-sensitive rural communities in Burkina Faso. Similarly, Van Der Geest (2011) demonstrated that internal and temporary migration was part of a traditional lifestyle to cope with adverse environmental conditions in Ghana. In her review of case studies of international and intern migration related to drought, desertification and soil degradation in Sub-Saharan Africa (mainly the Sahel region), Jónsson (2010) also highlighted the role of pre-existing migration patterns and routes. One project linking rainfall patterns to human mobility in eight countries assessed the circumstances in which mobility can successfully contribute to households resources, exposing the importance of migration to community resilience in diverse settings (Warner & Afifi 2014).

An important factor in the utilization of migration appears to be the disposition of various capitals required to migrate. Household resources may equate to the capacity to migrate, an ability mediated by a number of important social, cultural, and economic factors. This is supported by studies demonstrating a U-shaped relationship between migration flows and deviation from average rainfall variability, highlighting that the capacity to migrate varies with (changing) household economic resources (Nawrotzki et al. 2013; Feng 2010). During times of

relative plenty of natural resources, households were able to free up the resources necessary for a family member to migrate and further reduce household vulnerability. During times of peak environmental stress, however, households lacking the resources to migrate were less mobile, in part due to the need to prioritize basic necessities.

In public debates, however, migration remains mostly presented as the undesirable outcome of a failure to cope with changing conditions. In conclusions from debates on the UN Framework Convention on Climate Change (UNFCCC) to-date, emphasis is placed on displacement and migration of vulnerable populations as a forgone conclusion. The presentation of migration as a problematic phenomenon is evidenced by a policy focus on influencing the modality, volume, and geographic bounds of migration rather than seeking to facilitate human mobility for the potential positive outcomes of migration (DFID, 2013; Black et al. 2011a). Misconceptions and mounting distrust of migrants and asylum seekers is likely to have contributed to this view (Bosswick 2000; Morrisey 2012). Such a **disconnect** between empirical research and public debates is likely to induce maladaptive policy responses aimed at preventing migration (Black et al 2011a).

Adaptation for whom? Three vantage points to assess

We choose to explore the impacts of migration against a framing question: ***adaptation for whom?*** There are three population groups that need to be considered: the migrants themselves, the community of origin, and the community of destination. In the concluding section, we consider the possibility of combining the vantage points.

For the migrants themselves

In fragile environments, migration is a common response to vulnerability. It can serve as a coping mechanisms when basic needs cannot be satisfied *in situ*. Residents in Bolivia, Senegal and Tanzania, for example, highlight identified "tipping point" events that threatened their livelihoods and precipitated migration (Tacoli 2011a).

Migration is, however, a strategy entailing potential risks. Mobility can fail to increase the resilience of the household as a whole or can increase the vulnerability of just the migrant. In a number of case studies, including in Ghana and Tanzania, migration was found to sometimes be an 'erosive' coping strategy for vulnerable households that employed migration but without achieving a positive consequence on resilience (Warner & Afifi 2014). Migrants often suffer a relatively lower socio-

economic status than their hosts and as compared to their previous status in their community of origin.

Furthermore, migration may not contribute to the ability to rely on existing strategies to cope with stress in the short term. Migrants face barriers to obtaining employment, access to adequate and dignified living conditions, and security of tenure. Migrants may also contribute a significant proportion of their income to their household, leaving themselves in relative poverty.[i] Families at area of origin may be unaware of the poor conditions in which their migrant family member is living. Stories of migrants taking out loans to visit their families and make shows of wealth are not uncommon.

The conditions of the migrants are considered in two key ways. Traditionally, when migration is considered as an adaptation strategy, it is envisioned that people affected by environmental changes would use mobility as a way to adapt *themselves* to the environmental changes they face. Migrants often enjoy **greater access to employment, services, and other life opportunities**. Interviewees who identify environmental factors in their decision to migrate often refused to be considered as victims, but insisted on their resourcefulness and proactivity (Farbotko 2005; Gemenne 2011). In the cases highlighted in the section above, migration was shown to frequently lead to a positive

impact on the adaptive capacities of interviewees. In Northern Burkina Faso, cultural factors favourable to migration also predicted successful adoption of change adaptation efforts as compared to other groups (Nielsen & Reenberg 2010).

The second is **access to improved socio-economic status.** EACH-FOR project, a multi-country research project on environment and migration, concluded that in many contexts, apparently successful migrants – a self-selecting group – were the young and socially mobile (Jaeger et al. 2009). Many enjoyed a relatively advantageous social stature after migrating. In some contexts, migration is an important rite of passage into adulthood for young males as well as a source of income. In parts of West Africa, migration and especially international migration constitutes an affirmation of household and personal success (Jónsson 2011).

For the community of origin

Literature on migration and development weighs the outcomes of migration as a meaningful development strategy for the region of origin with potential negative effects on the origin areas. Empirical results for both internal and international migration have varied, although internal remittances remain little understood. Migration can represent a deprivation of workforce and assets for those who were forced to or decided

to stay. The resilience of people who choose to stay behind or who are unable to migrate may suffer considerably from the departure of others.

At the most basic level, migration can alleviate population pressure, lessen strain on limited resources such as land or water, facilitate risk reduction; this offers those who stay better chances for survival (Mink 1993; Scheffran et al. 2012).The potential of migration to promote sustainable development is usually materialized through the mobilization of migrants' transnational networks and the sending of remittances.

While not necessarily with a climate change adaptation focus, there is ample literature on the role of migrants' networks for development. Many migrants' networks engage into overseas mobilization to support their country or region of origin, but their potential for adaptation remains undefined. Migrants' networks can improve resilience to climatic crises and vulnerability reduction through humanitarian and development projects, better access to information, lobbying in the political sphere and of course by channelling donations and remittances of emigrants (Barnett & Webber, 2010; Asian Development Bank 2012)

The privileged way of intervention for individuals and

networks are the **remittances** sent to their relatives back home on a regular basis, which can greatly improve the resilience of the latter to environmental changes and shocks. Literature on the migration-development nexus is rich with insights about how remittances can support the development of communities of origin (de Haas 2005; Gubert 2002). These transfers play a crucial role in poverty alleviation and development: they are much more stable capital flows than overseas development aid or foreign direct investment (Yang & Choi 2007). Transfers of resources can foster adaptation in three main ways identified.

First, they can bolster **capital investments and income generating** activities**.** Household by household, migration is a way of securing a source of revenue in times of hardship, thus compensating for the loss of agricultural incomes. In addition, the remittances can support farm and non-farm investment. At a more aggregate level, they foster a more resilient agriculture and are instrumental to the diversification of rural economies (Yang & Choi 2007; Barnett & Webber 2010). This is further supported by findings from all three study countries reviewed by Tacoli (2011a), in which the poorest households were those that did not receive remittances.

Second, they can provide **support in the wake of environmental hazards.** Natural disasters usually trigger

waves of solidarity among emigrant groups, which organize themselves to provide relief efforts in the immediate aftermath of disasters (Yang 2008). A number of studies in Jamaica, Haiti, and the Philippines found that remittances towards these countries increased following disaster events (Foresight 2011). Internal migrants and international diaspora groups may support the livelihoods of communities of origin in the short term (Adger et al. 2002), providing formal or informal insurance against risks (Gubert 2002). Diaspora philanthropy can be channelled by a large array of organizations: NGOs, places of worship, hometown associations, formal and informal alumni groups, and so on. They can also follow informal channels of interpersonal networks. This latter form diaspora philanthropy is facilitated by the existence of online social networks and the use of new communications technology.

Finally, remittances could also fund **collective adaptation projects.** Although there is little evidence of remittances resources being pooled to fund projects specific to climate change adaptation, the exacerbation of climate change impacts might make this more likely. Diaspora and migrant networks have been known to implement long-run risk alleviation strategies or mobilize resources over time following natural hazard events (Asian Development Bank 2012). Such networks directly provide long-term support to collective resilience-

building projects and indirectly contribute by providing resources, information and capacities to help communities deal with environmental changes. In a few study areas, for example in Bolivia, remittances provided the bulk of the capital needed for local agricultural development (Tacoli 2011). In many contexts remittances are important in developing the agricultural sector. Finally, they can provide political and social capital, lobbying local, national and international authorities to promote resilience building.

For the community of destination

The effect of migration on people and communities are diverse. Yet the dominant narrative on the impacts of migration for the community of destination, in the context of environmental change, is one of competition, tensions and conflicts. According to a United Nations (UN) review of an array of policies of low and middle-income nations, the proportion with policies to reduce migration to urban centres, especially the larger cities, rose from 51 percent in 1996 to 73 percent in 2005 (UN 2006). For example, reviews of Poverty Reduction as well as Development Strategy Papers across Africa argued that is commonly used as a "scapegoat" for a host of larger socio-economic structural issues (DFID 2013). These assessments indicate that migration flows are perceived as putting pressure

on urban areas, promoting the spread of crime and HIV/AIDS, stimulating land degradation and reinforcing both rural and urban poverty (Black et al. 2006). Overall, migration has been presented as a threat rather than as a driver of adaptation in communities of destination. There is therefore a significant need to assess the impact of migration on the adaptive capacity of their community of destination. The concept of environmentally-induced migration may have acquired an additional unwanted character because it arose at a time in which migrants and asylum seekers were increasingly viewed in negative light. Casting environmental migrants as failures played into negative and commonly held pre-misconceptions of migrants and helped reinforce with a distrustful (Bosswick 2000; Oels 2011).

Empirical research stresses that there are still very important and potentially maladaptive migration flows towards areas that are highly vulnerable to the impacts of climate change, and coastal and deltaic cities in particular (de Sherbinin et al. 2014). Migration flows also contributes to resource scarcity, overcrowding and inadequate infrastructure (de Sherbinin et al. 2007). Already densely populated urban areas may not be able to absorb large numbers of migrants. Disaster risk is further exacerbated by the increasing scale and frequency of natural disasters. For example, poorly managed evacuations and

relocations contributes to the high disaster risk of impoverished communities in the Philippines. This adds to poor governance, insufficient understanding of the impacts of climate change and other hazards and lack of effective early warning systems for extreme weather events (Ginnetti et al. 2013).

Environmental factors have been noted on occasions to lead to local-level conflicts. Many researchers have become aware of inequalities between migrants and members of the host communities along with socio-cultural sources of tensions. Few empirical studies have explored this comprehensively and many researchers are hesitant to make this link assertively. One such study, conducted by O'Loughlin et al. (2012), found a non-linear relationship between temperature and conflict in East Africa between 1990 and 2009: while much warmer than normal temperatures raise the risk of violence, average and cooler temperatures have no effect.

However, there is a vast body of literature that must be recognized that professes the benefits of migration, as a component assisting in a wider socio-cultural phenomenon of adaptation, for building resilience in the community of destination.

First, both internal and international migration can be viewed

as an **adjustment to the imbalances of the labour market** (Lee 1966; Ravenstein 1885). In growing urban areas in particular, migrants provide new skills and may fill demographic gaps, in particular those related to aging populations (Foresight 2011).

Second, recent works on multiculturalism and migration policies have highlighted the **cultural benefits of migration for diversity**. Diversity has dividends for education, inclusiveness, and innovation.

A final, and related, point is that because of the diversity that accompanies migrant communities, migration acts as **a vehicle for transfers of knowledge and technologies, and thus can help spurring growth and development** (Freeman & Kessler, 2008). Migrants are a self-selecting group, and may contribute an entrepreneurial and risk-taking spirit as compared to the average population.

Testing the climate change adaptation-migration nexus

Adaptation for whom?

Testing the effects of migration on adaptive capacities can gain insight from one of the three vantage points discussed above.

To explore adaptation of **the migrants themselves** is based on assessing migrants against various indicators of individual well-being. Many studies to-date have explored this vantage point using qualitative and quantitative methods, considering the process leading to migration as well as their relative success in the area of destination (c.f. Halliday 2006; Jager et al. 2009).

However, this one-sided view may overlook the adaptive capacities of non-migrants and the overall community. Concretely, migrants may inaccurately represent or be unaware of the situation of their potentially idealized community of origin. The migrant may feel they have made significant sacrifices and suffer poor conditions in the destination area, while unaware of or overlooking conditions for those left behind. Community members *unable* to migrate may be underrepresented though they are important in the adaption of the community overall (Black et al 2011).

Attention to **the community of origin** implies a methodological choice between communities affected by a high level of out-migration and on communities affected by environmental changes. One should assess the modality and use of remittance income. Remittance income has been shown to have direct effects on the resource base, economic well-being and resilience of a home community (Adger et al. 2002).

However, without seeking to take a normative approach to migration in validating certain types of migration over others (such as short-term versus long-term, internal versus international), for adaptation to climate change one must adopt a longer-term perspective. The scope and scale of adaptation assisted by migration should be longer-term, implying that use of remittances for *investment* in ways that use of remittance income for *consumption* does not. Many authors note that remittances used as an income source for short-term consumption leads to a widening of pre-existing income inequalities.

It would furthermore be important to determine whether an **adequate compensation of labour shortage and loss of skills exists**, in order to support the local economy**.** Tacoli (2011a) argues labour shortages and so-called "brain drain" caused by out-migration may be compensated by incoming financial flows from remittances. In a few instances the researcher assessed whether the magnitude of remittances allows, for example, the hiring of day labourers. These dynamics will also depend on the time the migrants spend away, and whether the community continues to build its adaptive capacity; the accrued experience of migrants and their community induces ever greater capabilities to respond to climate change.

Finally, it would be important to assess certain community attributes. These include the availability and viability of other coping strategies, meaning where and how migration is employed in relation to other household strategies important in understanding the holistic picture of a community adapting to climate change. The disparity of household income and well-being of non-migrant households with migrant households, and the overall community structure, are points of departure in this investigation (Adger et al. 2002). It is necessary to assess the non-migrants, both in migrant-sending households and households not sending migrants; to what extent have those who stay behind have chosen to do so, under what conditions does a non-migratory outcome indicate greater or weaker adaptive capacity. Understanding why people faced with similar macro-level factors move or stay, particularly those unable to support themselves there but unable to migrate to places of greater safety and opportunities, is important. Future research may help policymakers and practitioners assess the degree to which people need to move and their ability to avoid harm.

For testing the migration-adaptation nexus **for the community of destination**, a number of methodological and conceptual challenges arise. There are judgements to be made in terms of the number, location and characteristics of the communities of

destination to be studied. Multiple destinations may be areas of in-migration from the same areas of origin. This leaves scholars to choose between a focus on migrants from the same area of origin in one destination, or to investigate and compare multiple destinations. Conversely, emphasis could be placed on migrants who had faced similar drivers in their area of origin, irrespective of its location, or who are facing similar conditions in the destination community.

Testing migration for the community of destination presents itself in a way similar to that of the community of origin. First, the **contribution of migrations to the labour market** of the destination must be assessed, including the potential impact of entrepreneurship and skill set of the local community. Second, if it holds true that migrant remittances are used predominantly for the benefit of the migrant household (Stark & Taylor 1991), then the position of migrants in the destination community relative to similar segments of society must be assessed. Significant previous research has focused on the socio-economic conditions of migrants. Insight can also be taken from cultural studies.

Recommendations

Two main overall approaches can be taken. The first is to isolate migration flows related to environmental stress in areas

of origin. This approach belies a notable conceptual concerns related to the multi-causal nature of migration (noted above). The second possible emphasis is on migration at large. In this case, researchers consider areas affected by a high level of migration and focus on the interface of migration with adaptive capacities. A final, and critical, conceptual difficulty is labelling a community as an origin area or as a destination area; the majority of cases will have some elements of both. One notes that in studying migrants or destination communities (as such), the effects of migration on the adaptive capacities of the people *in situ* overlooked, while in studying the origin areas the consequences of migration on resilience and adaptation *ex post* is overlooked.

Combining the methods described above by studying both origin areas and destination communities provides an attractive possible avenue of research. The issue of classifying an area as a migration area of origin or of destination in itself requires methodological choices, a concern we escape with this approach. An important point of departure is in aiming to present the impacts and consequences of migration on adaption rather than the sources and causes of migration. The benefit of this approach lies in comprehensively addressing how host communities and migrants contribute to the adaptation of the community of origin as well as the community of destination.

These dynamics can be observed by exploring the creation of new social networks among migrants and between communities as well as through the transfer of knowledge, technology, remittances and other resources. Furthermore, how these resources are used in both communities of origin, whether to fulfil basic needs or enhance long-term stability is significant in the assessment of migration as adaptation. Finally, in areas of destination, it will be important to assess the modalities through which migration can contribute to the adaption of the communities. A possible solution is to focus on **migration corridors**, that is, to assess adaptive capacities in areas of origin along with those of the popular migration receiving areas to which they are linked. In order to avoid a potential selection bias in this approach, areas of destination and areas of origin could be chosen, and **links established *ex post***.

Finally, a special dual case of interest to researchers are the so-**called climate change 'hot spots,'** defined as regions that are particularly vulnerable to current or future climate impacts, and where human security may be at risk (de Sherbinin, 2014). While these areas are traditionally understood to be sending areas for migrants, they may increasingly become, as noted above, destination areas. This is of significance for researchers as migration towards urban centres is expected to increase with climate stress, including to burgeoning megacities in low-lying

areas. Climate hotspots provide the opportunity to take a deeper look at the factors contributing to the line demarcating those who stay in their community, even if objectively at risk, and those who are mobile.

In Table 1 we summarize a number of the advantages and challenges of each of the approaches described above.

[INSERT TABLE 1 HERE]

TABLE 1: Positive points and challenges to focusing on each vantage point, or combinations

Vantage Point	Positive points	Challenges	Points of measurement in general
Migrants	Align with significant completed empirical projects (e.g. EACH-FOR and Where the Rain Falls) Most commonly adopted and	Conceptually and methodological difficulty to identify migrants who faced significant environmental drivers	Migrant well-being, socio-economic conditions, and share of needs that goes towards remittances

	straight-forward method	Low information quality related to and neglect of the fate of the community of origin Small samples; significant resources would have to be invested	
Community of origin	Straight-forward method Most aligned with NELM approach	Conceptually and methodological difficulty to identify households who faced significant environmenta	Remittances and modality of use, role of networks and diaspora, vulnerabilities of

		l drivers Questions on information quality of the fate of migrants, due to their absence	migrant-sending households, community structure, immobile peoples
Community of destination	Innovation potential, fewer studies take this approach Looks directly at impacts rather than causes	Methodological and conceptual challenges related to the difficulty in identifying environmental factors in causes of mobility Judgements on number, location and characteristics	Contributions of migrants, structure and needs of host communities, and economic, social and cultural integration

		of the communities of destination to be studied - questions of efficiency of resources Methodological difficulties due to lack of information or misinformation about community of origin	
Combining communities of destination and of origin	Innovation potential Comprehensiveness of the approach	Technical challenges related to connecting the community of origin and the community of	Combine points above

		destination Internal validity is a key issue for migration corridors and climate hot spots **If through recalled migration histories:** challenges related to informant accuracy and the questionable value of retrospective data [ii] **If tracking**	

		migrants: questions on the efficiency of resources for numerous destinations, and potential for dropout	

Conclusion

The current body of literature provides insight into the testing of the adaptive capacity of migrants themselves, communities of origin, and communities of destination. Interestingly, scholars' opinions appear to diverge over whether the adaptive benefits of migration outweigh the "costs" to the home communities. In migration studies to-date there have been challenges to subjectivity, where methodological choices may have inadvertently led to inaccuracies as interview and survey participants produce false assumptions about their counterparts in the migration process. Additional challenges arise, for example, distinguishing the effects of migration on areas that may be, in some cases, both sending and receiving migrants,

poses distinct conceptual challenges that are difficult to untangle. These dynamics clearly demonstrate that the all vantage points of the migration process should be weighed objectively and comprehensively in investigating migratory outcomes. In order to advance the field of migration and the body of knowledge around the migration-environment nexus, it is necessary to develop a better appreciation of how migration employed as a strategy to respond to climate change affects the adaptive capacities of migrants, communities of origin, and communities of destination.

In the sections above, we attempted to respond to the methodological and conceptual challenges surrounding these questions. A persisting concern is presented by explicitly relating environmental factors to migrants and seeking to identify them *in situ*, due to the multi-causality of migration phenomena and the role of individual perceptions and motivations that. In addition, focusing on 'environmental' migration may overlook the role of other forms of migration in increasing adaptive capacities of participating communities. In studying migration in general without seeking to embed definitions, complications of pursuing this area of study may be adequately managed while still providing a reference group against which to compare results; whether it be the non-migrants of the migrant sending households, members the

households not sending migrants, other migrants, or the host community.

In our final section we argue that studies should, where possible, investigate the role of migration in the adaptive capacities of communities faced with environmental and climate change sending migrants as well as those of migrant destination areas. Future empirical studies should provide a means to consider modalities of facilitating the positive contributions of the three vantage points presented above in order to maximize the benefits and minimize potential, unintended harm of migration. In echoing the suggestions of previous papers reviewing approaches to migration, we also reiterate that more empirical evidence and micro-level studies are needed to fill the gaps in current knowledge. An understanding the role of migration phenomena in the environment and climate change adaptation process is needed for the conceptual development of the climate change adaptation-migration nexus, and to develop common approaches to promote adaptation. Researchers must ultimately inform decision makers on the formulation and implementation of development, disaster risk reduction, adaption, and migration policies.

This will further work to dispel assumptions and negative

attitudes surrounding migration which impose normative judgments on changes in migration flows as having some standard form of impact, positive or negative, on either or both the communities of origin and destination communities. This is critical to progressing in the academic discourse and political dialogue surrounding migration, which is a precursor to developing measures to assist migrants and non-migrants as they adapt to changing conditions.

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[i] Most current empirical studies follow a *New economics of Labour Migration* approach end take the household as the unit of analysis, assessing the impact of migration on household resources overall.

[ii] There is some evidence to suggest that retrospective migration histories can be of sufficient accuracy for most research purposes (Smith & Thomas 2003).