

The role of migration in enhancing resilience to climate change

How non-financial remittances through domestic migration corridors make the Vietnamese Mekong River Delta more resilient

Han Entzinger* and Peter Scholten 

Erasmus School of Social and Behavioural Sciences (ESSB), Erasmus University Rotterdam, 3062 PA Rotterdam, The Netherlands

*Corresponding author. Email: p.w.a.scholten@essb.eur.nl

Abstract

Migration out of areas affected by climate change has long been considered a common adaptation strategy. More recent studies, however, claim that migration should not exclusively be seen as an escape from areas under threat, but that it can also be understood as a powerful strategy towards change and innovation in those areas. This article examines the relationship between environmental stress and migration in the Vietnamese Mekong River Delta, one of the global hotspots of climate change. Based on an extensive survey among households and interviews with key actors, our study shows that indeed environmental stress is an important factor—though not the only one—behind the development of migration corridors, particularly to Ho Chi Minh City. Low-income households are more likely to have experienced migration than high-income ones. Low-income households also account for the largest group of recipients of financial remittances, which are mainly spent on basic household needs and health care, and not on longer-term investments. Our research also shows the important role of non-financial remittances in supporting climate resilience among vulnerable (low-income) households. Actually, in the Mekong Delta case, the transfer of knowledge and skills proves to be more prominent than the sending of cash. Such skills are brought along by returning migrants, and then passed on to others, leading to a diversification of local economies so that these become more resilient to environmental degradation.

Keywords: environmental migration, climate change, remittances, migration corridors, Viet Nam

<https://doi.org/10.1093/migration/mnac006>

Advance Access publication on 11 March 2022

© The Author(s) 2022. Published by Oxford University Press.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<https://creativecommons.org/licenses/by/4.0/>), which permits unrestricted reuse, distribution, and reproduction in any medium, provided the original work is properly cited.

1. Introduction

Climate change and, more generally, environmental degradation are seen by many as major determinants of migration (Warner 2010; Black et al. 2011a; Ionesco, Mokhnacheva and Gemenne 2017). Their impact is becoming particularly visible in certain ‘hot spots’, such as areas that suffer from deforestation or desertification, low-lying coastal regions hit by salinisation, and river deltas faced with rising sea levels. Globally, South and East Asia is the region most vulnerable to extreme natural events, accounting for the highest disaster-induced displacement figures (IDMC 2016). According to the long-term Climate Risk Index, between 1994 and 2013, Viet Nam was among the 10 countries in the world most vulnerable to extreme weather events (such as storms, floods, and heat waves), both in terms of fatalities and economic losses incurred (Melde, Laczko and Gemenne 2017: 23). The most vulnerable region in Viet Nam is the Mekong River Delta in the southernmost part of the country, which is confronting accumulated effects of sea level rise, melting water from the Himalayas and land degradation (ICEM 2013; Koubi et al. 2016). This has provoked the formation of various domestic migration corridors, particularly directed at Ho Chi Minh City (formerly Saigon), the country’s major economic hub. These migration corridors channel urban directed migration as well as various sorts of remittances—money transfers, but also social and cultural remittances in the form of skills and knowledge—the latter mostly in the opposite direction.

This article provides an empirical study of environmentally induced migration in southern Viet Nam. We are not only interested in why and how environmental degradation may spur migration, but also in what role migration plays in strategies for coping with such degradation, widely considered to be an effect of climate change. Various scholars have argued that migration can be seen as a climate change adaptation strategy (Black et al. 2011b; Bettini 2014; Adger et al. 2015; Gemenne and Blocher 2017; Luetz and Merson 2019; Schraven, Adaawen and Janoth 2021). Migration then becomes a strategy of abandoning places with high environmental risks and swapping these for places with lower risks or better opportunities for facing those. Migration of this type is usually ‘voluntary’, except in cases of sudden-onset events such as floods or cyclones. Some countries also set up organised relocation schemes and Viet Nam is an example of this (Chun and Sang 2012).

Considerable attention has been given in the literature to migration flows away from hot spots and to how the migrants concerned fare at their destinations. An aspect that has received less attention, at least until recently, is whether migration also facilitates the sending region to adapt to the consequences of environmental change. What is the relationship between migration and adaptation in areas that face environmental risks? Until about a decade ago environmentally induced migration was usually taken as a signal of failure to adapt to environmental changes (Foresight 2011). More recently, however, it has been acknowledged that, under certain conditions, this form of migration can also work as a powerful strategy towards change and innovation (Gemenne and Blocher 2017; Chazalnoël and Randall 2021: 245). This ‘radical change in the framing of environmental migration’, as Ionesco et al. call it, came about as a result of growing empirical evidence that migration was not necessarily a last resort for people faced with environmental changes (Ionesco, Mokhnacheva and Gemenne 2017: 10).

Our study of environmentally induced migration in the Mekong River Delta focuses on the relationship between migration and adaptation. It asks what economic, social, and cultural exchanges take place within (domestic) migration corridors and how these contribute to adaptation to environmental change in the Delta. We examine these corridors and their relation to environmental stress through a survey among households in a number of selected communes in that area that are affected by migration. In addition, we lean on interviews and focus groups with local experts from the Mekong River Delta. The case study presented here is part of a larger research project, funded by the European Union, carried out under the auspices of the International Organization for Migration (IOM). The project, called *Migration, Environment and Climate Change: Evidence for Policy (MECLEP)*, compared six countries across the globe: Dominican Republic, Haiti, Kenya, Mauritius, Papua New Guinea, and Viet Nam. Each of these suffer from different forms of environmental degradation that, in combination with other drivers, cause substantial displacements with varying impact on their areas of origin (Melde, Laczko and Gemenne 2017).

2. Theorizing the relationship between migration and climate resilience

The relationship between environmental degradation and migration is complex. First of all, environmental degradation as a driver of migration includes a plurality of factors. These may relate to climate change, as in the case of flooding, sea level rise, or saturation, but also to local human actions such as deforestation and land depletion. They may include slow-onset developments, such as drought or erosion, as well as rapid-onset events, such as cyclonic storms, floods, and earthquakes. Especially in cases of rapid-onset events, migratory consequences tend to be highly visible and framed as ‘displacement’ (EACH-FOR 2009; Laczko and Aghazaram 2009). In case of slow-onset events, the connection between environmental degradation and migration is usually more implicit (Chazalnoël and Randall 2021). Secondly, environmental degradation as a driver of migration is deeply connected to other migration motives, such as a lack of economic opportunities or political instability. This makes it academically complex to speak of ‘environmentally induced migration’ as one single type of migration (Geddes et al. 2012).

To make sense of the complexity, a growing body of literature has focused on the relationship between environmental challenges and migration, and more specifically between climate change and migration (Gemenne 2009; Laczko and Aghazaram 2009; Warner 2010; Ionesco, Mokhnacheva and Gemenne 2017; Heslin et al. 2018; Cattaneo et al. 2019; Vinke et al. 2020; Chazalnoël and Randall 2021). This literature reveals that the impact of environmental factors on current migration flows is already very significant and is likely to become even more significant in the near future. Obviously, these flows, like any form of migration, have an impact not only on the areas of destination, but also on the areas of origin and the communities from which migrants originate. Contrary to what is often assumed, that impact is not always negative (EACH-FOR 2009). In several cases, migration has strengthened rather than weakened the resilience of the migrants’ communities of origin and improved their capacity to adapt to the consequences of environmental

change. Morocco provides an example of this: rising temperatures and increased rainfall variability in certain rural areas deprived members of the local population from their employment and forced them to move to the cities. There they found better-paid jobs, and with their earnings new and much more powerful pumps and irrigation systems could be installed, which gave a boost to agricultural production in their area of origin (De Haas 2003).

Migration, both internal and international, can thus be an essential catalyser in processes of economic development and modernisation. Policies aiming at curbing migration could even have a negative impact on the livelihood security or accelerate the overexploitation of natural resources (EACH-FOR 2009). Areas facing environmentally induced migration should not automatically be seen as having no future. Education and training of those who stay behind, along with an appropriate use of the remittances that migrants send home can help overcome the negative effects of environmental degradation and prepare the area for a new future (Ober and Sakdapolrak 2017). The nature of a response, of course, will vary according to the type of degradation. Sea level rise may require the construction of higher dikes or better pumping engines, with resettlement as an ultimate remedy, while droughts may ask for the installation of better irrigation systems—as the Moroccan example shows—and deforestation may necessitate a change in land ownership policies.

Importantly, the literature also acknowledges that there are ‘limits’ to migration as a strategy for climate adaptation (see also Gharbaoui and Blocher 2018). Due to the specifics of particular regions, the extent to which either adaptation or migration are possible at all varies. Vinke et al. (2020), for instance, show the limitations of adaptation for populations in mountainous Peru in the face of climate change consequences.

Thus, attention in the literature has shifted from the migrants leaving the vulnerable regions to the specifics of these regions themselves and the potential contributions of those migrants to enhancing the regions’ sustainability (Foresight 2011; Ionesco, Mokhnacheva and Gemenne 2017). The MECLEP project, of which our Viet Nam study was part, aimed to provide an in-depth analysis of how this process actually takes shape. Particular attention in MECLEP has been given to the role of remittances of an economic (money transfers) as well as a social or cultural nature. The latter may include knowledge and skills that are transferred to the sending region or the opening up of new social networks that help boost climate change resiliency.

The key theoretical aim of this article is to find out what economic, social, and cultural remittances result from migration as a climate change adaptation strategy, and how such remittances help high-risk regions adapt to the consequences of environmental degradation and, more generally, of climate change.

3. Environmental change and migration in the Mekong River Delta

The research presented in this article took place in the Vietnamese Mekong River Delta, a region that is particularly sensitive to the effects of climate change. With almost 18 million inhabitants, equalling 19 per cent of Viet Nam’s total population, it forms a large and

densely populated (433 inhabitants/km²) low-lying area, criss-crossed by numerous branches of the Mekong River. This river carries melting water from the Himalayas as well as rain water from upstream tributaries in China, Myanmar, Thailand, Laos, and Cambodia. Half of the population in the Delta area live at no more than 2 m above sea level, and even more live in direct proximity of rivers (Chun and Sang 2012; Lukyanets et al. 2015; Kouby et al. 2016; Dang, Leonardelli and Dipieri 2016; Nhuan et al. 2019).

Given its fertile soil, the Mekong Delta is strongly dependent on agricultural activities (rice cultures and fruit) and also on fisheries and aquaculture (shrimps) (Tran 2012). This, in combination with its high population density makes the region extremely sensitive to the effects of environmental challenges, both rapid-onset and slow-onset ones. On the one hand, the Delta faces sea level rise; Lukyanets et al. (2015) expect a rise of 30 cm in the next 20 years. In relation to that it also faces salinisation, especially in lower areas. On the other hand, it is confronted with various rapid-onset challenges, such as river flooding due to changing patterns of melting water coming from the Himalayas, but also an increasing presence of typhoons in the area. In recent years, the frequency and extent of flooding have increased (ICEM 2013; Nhuan et al. 2019).

The environmental challenges that the Mekong Delta has been facing over the last two decades have contributed to significant migration flows. The migration corridor between the Mekong Delta and Viet Nam's South Eastern Region (Ho Chi Minh City and surroundings) has seen by far the largest domestic migration flow in Viet Nam. Between 2004 and 2009 alone, for example, over 700,000 migrants left the Delta via that corridor (GSO 2009). Though it is often difficult to disentangle determinants for migration in a particular case, our research shows that environmental stress has been a key factor in this migration (also see Nguyen et al. 2019).

Most of these migrants arrive spontaneously, implying that they move at their own initiative. In Viet Nam, however, spontaneous domestic migration is also regulated. Under the so-called *ho khau* system, only migrants who have been permitted to register in another commune or province are able to have full access to local services, such as health care and education. This registration can be either temporary or permanent (Dang 2009). If registration is not possible, migrants must live without access to services or return to their commune of origin. Legislation has been passed to make the registration more efficient, but its impact has been limited (Chun and Sang 2012; Demombynes and Vu 2016). Ho Chi Minh City (generally referred to as HCMC) is one of the primary targets of spontaneous migration, not only from the Mekong Delta, but also from the north of Viet Nam. About 21 per cent of the city's population is made up of migrants, the majority of whom are domestic migrants (Dang, Leonardelli and Dipieri 2016). City dwellers can earn as much as five to seven times more than those engaged in agricultural activities, which, of course, needs to be offset against much higher living costs. Yet, there is evidence that migrant workers in the city are underpaid in comparison to local workers (Nguyen and Minh 2016).

More than other countries in comparable situations, the Socialist Republic of Viet Nam has been active in organising (domestic) migration in response to environmental stress. Since the late 1990s, various relocation schemes have been developed in the Mekong Delta—and also in other parts of the country—as a strategy of climate change adaptation, but also as a strategy to prevent people from moving to HCMC (Vo and Mushtaq 2011;

Miller and Dun 2019; Zickgraf 2019: 13). After the major floods in 2000, the government developed an integral approach called *Living with floods*, which combined efforts to alleviate environmental stress and to relocate groups from vulnerable areas. Between 2009 and 2013, over 90,000 households were relocated in the Mekong Delta alone (CCFSC 2009, 2012; UN Viet Nam 2014: 3). Relocation often takes place over relatively short distances, for instance towards a safer dike or a safer commune, while relocation over larger distances, sometimes to more inland provincial centres such as Can Tho and Ca Mau, also occurs. The relocation schemes involve voluntary programmes that provide households with a new place to live, but it is not always possible for the households concerned to preserve their livelihood, particularly not for fishermen who move further inland. Relocation over short distances allows the community to continue to rely on farming, agriculture, or fishing as their source of income, but does not enable income diversification. Vulnerability to the impact of hazards on livelihoods thus remains. At the same time, it has been reported that hardly any housing loans had been repaid, indicating that the relocation had created a new dependency on such loans (Chun 2014; UN Viet Nam 2014). Relocation tends to be more successful as more attention is being paid to education, training and the creation of employment opportunities in the new environment.

4. Research methods

The research we are presenting here looks at migration from the Mekong River Delta to HCMC. Distances in this migration corridor are relatively short: Can Tho, the gateway to the Mekong Delta, is at only 170 km from HCMC, while the Delta's southernmost tip is another 300 km further south. Transport facilities in the region are generally good, both by road and, deeper into the delta, also by boat.

Within the Mekong Delta, the research focuses on several migration 'sub-corridors'. These are all corridors between specific vulnerable areas and HCMC, either direct ones or via other cities in southern Viet Nam, such as Ca Mau or Can Tho. We selected four communes in two different provinces, one (Ca Mau province) near the sea in the southernmost part of the Delta, and one (Long An province) up the Mekong River, not far from the border with Cambodia, and relatively close to HCMC. These two provinces encounter a variety of environmental challenges. Irregular rains, riverbank erosion, and high tides are experienced as major environmental problems in the coastal communes in Ca Mau province, while the communes upriver in Long An province suffer primarily from floods and also irregular rains. Cyclones occur in all rural communes. In addition, the research also looks at two districts ('communes') in HCMC where many migrants from the Mekong Delta live. HCMC is less prone to environmental stress than the rural provinces, though low-lying parts of the city occasionally suffer from cyclones and heavy rainfalls. These research sites were selected as typical for the entire Delta after a literature review on climate change and migration in Viet Nam (Dang, Leonardelli and Dipieri 2016), a site visit by the research team, and explorative conversations with local and regional stakeholders meant to map migration corridors in southern Viet Nam.

To obtain an insight into the economic, social, and cultural exchanges that occur within the selected corridors, a survey was conducted among 1,232 households in all six

communes. The household was selected as the unit of research, since it is mostly at that level that economic as well as social and cultural exchanges take place. A household was defined as ‘a group of persons who share the same living accommodation, who pool some or all of their income and wealth and who consume certain types of goods and services collectively, mainly housing and food’ (Melde, Laczko and Gemenne 2017: 41).

The survey involved a fully structured questionnaire of no less than 95 questions. The questionnaire included some standard questions developed for all six MECLEP countries in order to allow for comparisons, while other questions related more specifically to the local situation in Viet Nam. The questionnaire consisted of three sections. Section 1 collected information on the make-up of the household and focused on its socioeconomic profile. Section 2 collected the full migration history of all present and absent members of the household who contributed to or relied upon the resources of that household in the past 10 years. Finally, Section 3 focussed on the perceived overall financial, economic, and social impact of migration at the household level. This section also looked at financial remittances and their use, as well as at the type of skills migrants learned at the destination and whether they used them and/or taught them to others upon return.

The actual fieldwork was carried out during the final months of 2015 by a team of local researchers from the Can Tho University School for Social Research. The samples of roughly 200 household interviews per commune were selected randomly and spread over different zones in each of the communes concerned. Prior to each interview the purpose of the survey was explained to the respondent(s) and their approval was granted. The random sampling for each of the communes concerned was compared with population data from Viet Nam’s General Statistical Office, which included socioeconomic data and data on (internal) migration. For all communes, a minimum of 95 per cent confidence level and a maximum of 5 per cent error margin were achieved, so the sample can be considered representative for the communes surveyed.

To better understand patterns emerging from the survey, we also held a series of interviews and organised a number of focus groups. A total of 36 semi-structured interviews were held with key informants from the selected communes and provinces (8 in Long An, 16 in Ca Mau, and 12 in HCMC). In addition, four focus groups were arranged with stakeholders from these provinces.

5. Main results

Among the 1,232 households interviewed, 801 (65 per cent) had migration experience. This means that at least one member of that household went to live in another place for a period of three months or more during the 10 years prior to the survey. In certain cases, these migrants have returned after some time, but they may also still live elsewhere, or they may have been commuting over longer periods between their original commune and another place. Altogether, we identified 1,676 cases of migration in our survey, which means that, on average, in households with migrants just over two members actually had experienced some form of migration. An overwhelming majority of the movements recorded in the survey (74 per cent) was long term (more than one year) or even permanent. Just under 10 per cent of these long-term moves were moves abroad. Only 8 per cent

of all recorded movements occurred in the context of a relocation scheme and 17 per cent involved short-term or recurrent movements. In the following, we will first analyse to what extent this migration correlates with experienced environmental stress. Subsequently, we will look at the implications of this migration not only for the households themselves, but also for the regions affected by environmental stress.

5.1 Motives for migration

Analysis of the survey data revealed a positive correlation between specific forms of environmental stress—particularly erosion, cyclones, and floods—and migration. By contrast, natural disasters such as storm surges, riverbank erosion, and landslides correlated less clearly with migration. It is possible that such forms of environmental change deprived households of the means to migrate. Earlier research in the area found that the latter types of environmental stress affected households that were more at risk anyway and that did not possess the means to migrate (Chun 2014). This would leave the poorest households trapped in circumstances of environmental and often also economic deprivation. However, the households concerned might also have seen these stress factors as stand-alone events that did not warrant moving. As we will see later, our survey findings contradict this thesis: lower income households showed a higher probability to migrate than the ones with higher incomes.

Table 1 presents the outcomes of a multinomial logistic regression. It makes clear that most of the migration movements recorded in the survey are for at least one year, if not for good. The probability of long-term migration, however, varies considerably per stress factor. Households affected by rains, floods, and cyclones are more inclined towards long-term or permanent migration than households affected by landslides, storm surges, or riverbank erosion. Actually, migration as a consequence of riverbank erosion is a special case. In comparison to other types of environmental stress, riverbank erosion often leads to permanent relocation of the local population in the immediate environment of the original location, or to assisted returns after improvements have been made. Riverbank erosion was reported as a major stress factor in just two of the communes selected for the survey. Actually, one of these (Tan An in Ca Mau province) was chosen deliberately because it had been the scene of a relocation project. Another relocation project took place in Vinh Loi in Long An province.

Our survey findings showed that the incidence of migration among households that had experienced no environmental challenges was significantly higher than among those that claimed to have experienced one or more of such challenges (also see Nguyen et al. 2019). This suggests that, besides environmental stress, other migration drivers also play a role at the household level. Important for the focus of this study is the relationship between economic and environmental factors. The survey indicates that households with a relatively weak economic status are more likely to have experienced migration than those with a stronger economic position. Only 27 per cent of the households with migrants owned a piece of land, as against 40 per cent of those where no one moved. Only 64 per cent of the migrant households claimed to have sufficient access to food (against 75 per cent of the non-movers), while 17 per cent reported security problems (against 9 per cent

Table 1. The probability of different forms of migration by types of environmental stress experienced (probabilities range between 0 and 1)

	Short-term movement (3–12 months)	Long-term or permanent movement (at least one year)	Recurrent/seasonal movement (3–12 months back and forth)	Relocation/assisted return decided by the government authorities
Irregular rains	0.09	0.76	0.07	0.06
Landslides	0.21	0.59	0.01	0.16
Floods	0.10	0.78	0.01	0.11
Cyclone	0.11	0.78	0.01	0.10
Storm surge	0.22	0.59	0.02	0.17
Riverbank erosion	0.08	0.39	0.01	0.48
Other (incl. high tides)	0.21	0.67	0.01	0.11
None	0.13	0.69	0.01	0.17

of the non-movers). We also found that poor housing construction was associated with an enhanced likelihood of migration, even in the absence of a climatic event.

All this suggests that households that are economically better off are more resilient in the face of climate change, a finding later confirmed for the same region by [Nguyen et al. \(2019\)](#). The probability of migration proved to be particularly high among households that earned less than VND 1 million (about EUR 40 or USD 44) a month. Once the monthly income rose above that sum, the probability of migration dropped precipitously. However, since 80 per cent of respondents report a monthly income above VND 1 million, this inverse relationship is important, though only about 10 per cent lie above the VND 10 million (EUR 400 or USD 445) threshold. [Figure 1](#) gives a quadratic logistic regression on the probability of migration by (previous) income, along with an estimated income distribution.¹ In sum: the higher the monthly income, the lower the likelihood of migration. For the 10 per cent of all households earning more than VND 10 million migration became very unlikely.

5.2 Implications for households and for sending regions

In determining the impact of migration on households as well as on the migrants' areas of origin, remittances play a key role (also see [Gemenne and Blocher 2017](#): 342). For Viet Nam, the importance of internal as well as international remittances has increased significantly over the past decades. Overall, the number of households receiving internal remittances far outnumbers those receiving remittances from abroad, though the latter remittances tend to be of considerably higher monetary value than the former ([Cuong and Linh 2018](#)). Remittances are mostly intended for the household from which the migrant originates or for the wider family. However, remittances that are being invested in

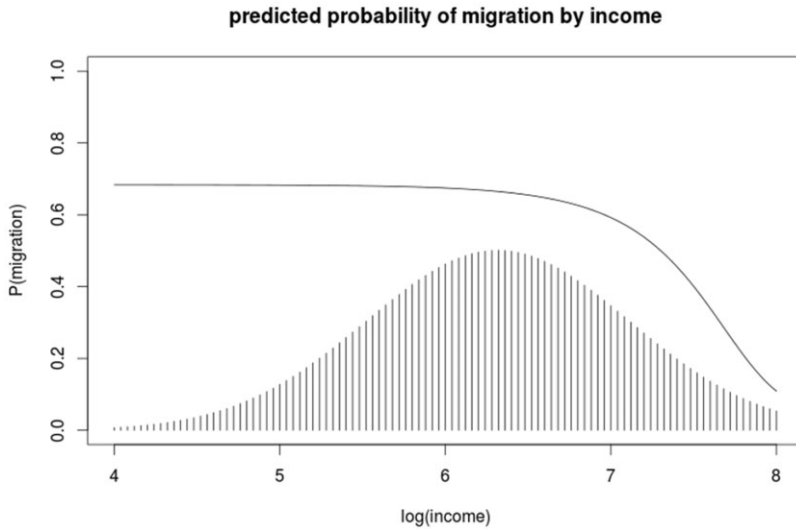


Figure 1. The probability of migration by income.

the broader economy have increased, particularly those by migrants living abroad (of which only small numbers are included in our survey). [Dang, Leonardelli and Dipieri \(2016\)](#) also signal a growing trend of remittances being used not only to improve the livelihood of individual households, but also to boost education or to cope with risks posed by environmental stress.

Although migrants usually send remittances to those who have stayed behind, the opposite also occurs. If, for example, a migrant has little or no income in the new location, members of the household who stayed behind may transfer money to the migrant, rather than the reverse. Our random samples of households in all six locations included households that had seen some of their members depart, but also households that had newly arrived in a location, or that had taken in relatives who had migrated from elsewhere. Consequently, for each of the 1,676 cases of migration that the survey identified we asked the household whether the migrant concerned had either sent or received remittances.

Our findings, reported in [Table 2](#), show that in more than half of all cases of migration registered in the survey (911 cases, or 56 per cent) no remittances were sent in either direction. Only one in four households (25 per cent) received remittances, while just over half that number (13 per cent) answered that they had sent remittances to household members who had migrated elsewhere. Perhaps the most surprising finding is that in HCMC households that sent remittances only slightly outnumbered households that received remittances, while more than two in three households neither sent nor received remittances. Given that HCMC clearly lies at the receiving end of the migration corridor, one would have expected higher numbers of households sending remittances to their relatives back home. This may reflect the economic risks taken by migrants who decide to move to this metropolis and, of course, the high costs of living there.

Table 2. Financial remittances sent or received by households (as a percentage of all cases of migration reported)

Province	Commune/district	Received (per cent)	Sent (per cent)	None (per cent)	Don't know/no answer (per cent)
Ho Chi Minh City	Binh Thuan	13	16	62	8
	Tan Phu	10	12	75	3
Long An	Vinh Thanh	27	14	53	7
	Vinh Loi	15	12	71	3
Ca Mau	Tan An	25	22	47	5
	Dat Mui	53	10	21	17
Total		25	13	56	7

Low-income households accounted for the biggest group of recipients of remittances. Of all households in the lowest income quintile 33 per cent received remittances, as against only 10 per cent of all households in the highest quintile. This difference can only partly be explained by the fact that low-income households have a higher migration incidence than their high-income counterparts. The large number of recipients among low-income households may explain why remittances were primarily spent on very basic household needs (food and consumer goods) and on health care. It is not unusual among lower income households to spend remittances in this manner, but the effects of such investments on long-term local and regional development are limited. Households with higher incomes tend to opt for longer-term investments, which may eventually be more beneficial to adaptation strategies. Yet, we also found that one in three households invested at least part of the remittances in housing, and one in four in education. This indicates that, at least to some extent, remittances are also used for longer-term investments intended to facilitate coping with future risks, even among middle and lower-income groups.

In addition to the economic benefits of (financial) remittances, migration can have a social or cultural impact on households (Levitt 1998). Migrants may acquire certain knowledge and skills that they can transfer to those who stayed behind or bring back upon returning home after their migration. Such social and cultural 'remittances' can also be seen as benefits of migration and may contribute to making the populations in the areas of origin more resilient to environmental challenges, for example by enabling the local population to diversify their livelihood. Diversification of skills will increase job opportunities and enable rural households to diversify their sources of income and thus to improve their living conditions (Nguyen et al. 2017: 17).

Our findings show that in the Mekong Delta case, the transfer of social and cultural 'remittances' was more prominent than the sending of cash. No less than 72 per cent of all households with a migration experience reported having acquired certain skills as a result of migration, such as tailoring, cooking, or electrical repair skills (see Table 3). These skills, however, were not always applied, and were even less often passed on to others.

Table 3. Skills acquired elsewhere and applied or taught at home (as a percentage of all cases of migration reported)

	Acquired (%)	Applied (%)	Taught (%)
Tailoring	21	15	11
Cooking	17	17	10
Electrical repair	16	14	11
Other	14	9	6
None	28	42	61
No answer	4	3	1
Total	100	100	100

Nevertheless, four in ten respondents (39 per cent) claimed that they had taught the newly acquired skills to others, which still suggests a considerable multiplier effect.

Finally, when asked to assess the importance of migration for different aspects of their lives, households were generally quite positive. Almost 60 per cent of the households with migration experience reported that migration had been beneficial to them, while only 17 per cent were of the opposite opinion. The perceived benefits included that migration had led to higher incomes and better employment opportunities. Respondents were least positive about migration offering greater opportunities in the field of trade, investments, and credit. This indicates that the impacts perceived as positive are primarily immediate or short-term: for example, providing income, food, and employment. Potential longer-term benefits, such as education, trade, investments, and credit stood out much less clearly. This suggests that the current dependence of the Mekong Delta on migration and remittances is likely to continue, while, as a consequence, migration pressure on HCMC will mount (Haugton, Loan and Linh 2010).

It should also be noted, however, that roughly half of all respondents with migration experience did not see migration as having had a major impact on their lives. Migration certainly was the answer for some in coping with environmental stress, but it was not a panacea and certainly not for everyone. Yet, when asked about the overall impact of migration on the socio-economic conditions of their household, 57 per cent of all households with migration experience were positive, 35 per cent saw no impact, and only 7 per cent were negative.

6. Conclusions

The analysis presented in this article on environmental change, migration, and adaptation in the Mekong River Delta aims to contribute to the broader literature on migration and climate change adaptation. Traditionally, migration out of areas affected by environmental degradation has been considered as an adaptation strategy. In the past decade, however, the idea has gained momentum that migration should not exclusively be seen as an 'escape' from an area under threat, but that it can also be an instrument to enhance climate resilience of the populations in these areas (Geddes et al. 2012; Vinke et al. 2020).

The densely populated low-lying Mekong Delta represents one of the key hot spots of climate change in the world. Therefore, it provides an important case study for revisiting this thesis.

This study, largely based on a survey among 1,232 households in six different locations in southern Viet Nam, partially substantiates the central thesis. It shows that environmental stress has indeed been an important driver for migration away from the Mekong Delta, in particular towards Ho Chi Minh City. A true migration corridor has developed between the Delta and this relatively nearby metropolis, which also serves as a channel for transferring financial remittances, skills, and know-how. These enable household members who have stayed behind to relieve some of the consequences of environmental stress, for example by improving their housing situation, by investing in education as a basis for better and more diverse employment perspectives, and, more generally, by making their communities more resilient. However, the scale of these remittances appears to be limited and there is also a clear evidence of monetary transfers in the opposite direction, which suggests that the livelihood prospects of migrated household members are not always that positive.

The study also reveals that different forms of environmental stress impact differently on the propensity to migrate. We found a positive correlation between certain rapid-onset events (erosion, cyclones, and river flooding) and the incidence of migration, a finding in line with comparable research by [Koubi et al. \(2016\)](#). Slow-onset events such as droughts and salination were of less importance, though their significance is growing and they may soon become major challenges to the livelihood of people in the Mekong Delta. Natural disasters such as storm surges and high tides, by contrast, did not lead to more migration, possibly because households affected by such disasters may have perceived them as once-only events, rather than as symptoms of environmental change. Actually, many households with migration experience did not refer at all to environmental challenges in the survey, but rather to a wish to improve their living conditions. This confirms a widespread idea in the migration literature that environmental degradation should be seen as one among many drivers of migration ([Wood 2001](#); [Black et al. 2011a](#)).

In fact, the propensity to migrate proved to be significantly higher among households with lower incomes and poorer housing. Poorer households might be more likely to inhabit the places and areas most vulnerable to environmental stress, and be keener on improving their economic situation. Therefore, they might be readier to move somewhere else in search of an alternative livelihood. On average, those who stayed behind appeared to have better housing, higher incomes, and more land, all of which made them more resilient to the consequences of environmental degradation. Thus, those who stayed behind were better off than those who left, a finding that confirms other survey outcomes in the same region ([Chun 2014](#); [Nguyen et al. 2019](#)). Yet it should be noted that most households with migration experience tended to be quite positive about it. They reported that migration had been beneficial to them, primarily because it had led to higher incomes and better employment opportunities for themselves and for household members who had stayed behind. These are medium-term benefits, while potential longer-term benefits such as better education or higher trade or investment rates appeared to stand out less clearly.

Though perhaps less outspokenly than we had expected, migration does play a role as a strategy for adapting to environmental change for many residents of the Mekong Delta. In particular, our research signals the importance of non-financial remittances in boosting resilience of the communities affected by environmental stress. We found, in the Mekong Delta case study, clear migration corridors in which a variety of non-financial remittances were transmitted, including knowledge and skills to support economic resilience in general and climate resilience in particular. Therefore, along with in situ adaptation and relocation, the relevance of migration should be recognised by the authorities as a means, not only for coping with climate change, but also for promoting social and economic development, including a much-needed diversification of the local economies. In spite of serious environmental challenges, there is a future for the Mekong River Delta and migration can positively contribute to it, directly as well as indirectly.

Note

1. Income distribution is estimated based on a fitted log-normal distribution, as per common practice. The actual distribution of respondents' estimates is heavily distorted by rounding effects, but supports the fit.

Acknowledgements

We wish to thank Dr Tran Thi Phung Ha and Dr Nguyen Hong Tin and their team of the School for Social Research of Can Tho University for supervising the data collection for this article and Joshua Barratt for processing and analysing part of these data. We are also grateful to Susanne Melde and her colleagues of IOM, who enabled the focus group meetings and participated in some of those during our stay in Viet Nam.

Funding

The study reported in this article was part of the Migration, Environment and Climate Change Project (MECLEP), funded by the European Commission (Project ID: DCI-MIGR/2013/326-064). The International Organization for Migration (IOM) and the participating research institutes co-funded the project.

Conflict of interest statement. None declared.

References

- Adger, W.N. et al. (2015) 'Focus on Environmental Risks and Migration: Causes and Consequences', *Environmental Research Letters*, 10/6: 060201.

- Bettini, G. (2014) 'Climate Migration as an Adaption Strategy: De-securitizing Climate-Induced Migration or Making the Unruly Governable?', *Critical Studies on Security*, 2/2: 180–95.
- Black, R. et al. (2011a) 'The Effect of Environmental Change on Human Migration', *Global Environmental Change*, 21: S3–S11.
- et al. (2011b) 'Climate Change: Migration as Adaptation', *Nature*, 478/7370: 447–9.
- Cattaneo, C. et al. (2019) 'Human Migration in the Era of Climate Change', *Review of Environmental Economics and Policy*, 13/2: 189–206.
- CCFSC (Central Committee for Flood and Storm Control). (2009) *Implementation Plan of the National Strategy for Natural Disaster Prevention, Response, and Mitigation to 2020*. Hanoi: Government of Viet Nam.
- CCFSC (Central Committee for Flood and Storm Control). (2012) *Living with Floods Program*. Hanoi: Government of Viet Nam.
- Chazalnoël, M.T. and Randall, A. (2021) 'Migration and the slow-onset impacts of climate change: Taking stock and taking action', in McAuliffe, M. and Triandafyllidou, A. (eds) *World Migration Report 2022*, pp. 233–252. Geneva: International Organization for migration.
- Chun, J. (2014) *Vulnerability to Environmental Stress: Household Livelihoods, Assets and Mobility in the Mekong Delta, Viet Nam*. Geneva: IOM.
- and Sang, L.T. (2012) 'Research and policy dialogue on climate change, migration and resettlement in Viet Nam'. *Final Report*. Hanoi: UN Viet Nam.
- Cuong, N.V. and Linh, V.H. (2018) 'The Impact of Migration and Remittances on Household Welfare: Evidence from Vietnam', *Journal of International Migration and Integration*, 19/4: 945–63.
- Dang, N. A. (2009) 'Household Registration System and the Well-Beings of Rural-to-Urban Migrants', *Vietnam's Socio-Economic Development*, 59: 75–80.
- Dang, N.A., Leonardelli, I. and Dipieri, A.A. (2016) 'Migration, environment and climate change: National Assessment Vietnam'. *MECLEP Report*. Geneva: IOM.
- De Haas, H. (2003) *Migration and Development in Southern Morocco: The Disparate Socio-Economic Impact of Out-Migration on the Todgha Oasis Valley*. Amsterdam: Amsterdam University Press.
- Demombynes, G. and Vu, L.H. (2016) *Viet Nam's Household Registration System. World Bank Group and Viet Nam Academy of Social Sciences*. Hanoi: Hong Duc Publishing.
- EACH-FOR. (2009) *Environmental Change and Forced Migration Scenarios. Synthesis Report*. EU 6th Framework Programme, Project 044468. Brussels: European Commission.
- Foresight (2011) *Migration and Global Environmental Change. Final Project Report*. London: Government Office for Science.
- Geddes, A. et al. (2012) 'Migration, Environmental Change, and the 'Challenges of Governance'', *Environment and Planning C: Government and Policy. GovPolicy*, 30/6: 951–67.
- Gemenne, F. (2009) 'Environmental Change and Migration Flows: Formative Frameworks and Policy Responses.' Doctoral thesis, Sciences Po Paris—University of Liège.

- and Blocher, J. (2017) 'How Can Migration Serve Adaptation to climate change? Challenges to fleshing out a policy idea', *The Geographical Journal*, 183/4: 336–47.
- Gharbaoui, D. and — (2018) 'Limits to Adapting to Climate Change Through Relocations in Papua-New Guinea and Fiji', in Leal Filho, W. and Nalau, J. (eds) *Limits to Climate Change Adaptation, Climate Change Management*, pp. 359–79. Springer International Publishing, Cham: Switzerland.
- GSO (General Statistics Office of Viet Nam). (2009) *Viet Nam Population Census*. Hanoi: General Statistics Office.
- Haugton, J., Loan, L.T.T. and Linh, N.B. (2010) *Urban Poverty Assessment in Ha Noi and Ho Chi Minh City*. Hanoi: UNDP Viet Nam.
- Heslin, A., Deckard, N.D., Oakes, R. and Montero-Colbert, A. (2018) 'Displacement and resettlement: Understanding the role of climate change in contemporary migration', in Mechler, R., Bouwer, L., Schinko, T., Surminski, S., and Linnerooth-Bayer, J. (eds) *Loss and Damage from Climate Change: Climate Risk Management*. Cham: Springer. https://doi.org/10.1007/978-3-319-71063-1_46-1
- IDMC (Internal Displacement Monitoring Centre). (2016) *Global Report on Internal Displacement (GRID)*. Geneva: IDMC.
- ICEM (International Centre for Environmental Management). (2013) *USAID Mekong Adaptation and Resilience to Climate Change*. Bangkok: USAID Regional Development Mission for Asia.
- Ionesco, D., Mokhnacheva, D. and Gemenne, F. (2017) *The Atlas of Environmental Migration*. Abingdon: Routledge.
- Koubi, V., Spilker, G., Schaffer, L. and Bernauer, T. (2016) 'Environmental Stressors and Migration: Evidence from Vietnam', *World Development*, 79: 197–210.
- Laczko, F. and Aghazaram, C. (eds) (2009) *Migration, Environment and Climate Change: Assessing the Evidence*. Geneva: IOM.
- Levitt, P. (1998) 'Social Remittances: Migration Driven Local-Level Forms of cultural diffusion', *International Migration Review*, 32/4: 926–48.
- Luetz, J.M. and Merson, J. (2019) 'Climate change and human migration as adaptation: Conceptual and practical challenges and opportunities', in Leal Filho, W., Azul, A., Brandli, L., Özuyar, P., and Wall, T. (eds) *Climate Action. Encyclopedia of the UN Sustainable Development Goals*. Cham: Springer. https://doi.org/10.1007/978-3-319-71063-1_46-1
- Lukyanets, A.S. et al. (2015) 'Influence of Climatic Changes on Population Migration in Vietnam', *Geography and Natural Resources*, 3/36: 313–7.
- Melde, S., Laczko, F. and Gemenne, F. (eds) (2017) *Making Mobility Work for Adaptation to Environmental Changes. Results from the MECLEP Global Research*. Geneva: IOM.
- Miller, F. and Dun, O. (2019) 'Resettlement and the Environment in Vietnam: Implications for Climate Change Adaptation Planning', *Asia Pacific Viewpoint*, 60/2: 132–47.
- Nguyen, C.V., Grote, U. and Sharma, R. (2017) 'Staying in the cities or returning home? An analysis of the rural–urban migration behavior in Vietnam', *IZA Journal of Development and Migration*, 7/1.
- and Minh, T.P. (2016) 'Are Migrants in Large Cities Underpaid? Evidence from Vietnam', *IZA Journal of Migration*, 5/1.

- Nguyen, H.K., Chiong, R., Chica, M., Middleton, R.H. and Dhakal, S. (2019) Agent-based modeling of migration dynamics in the Mekong Delta, Vietnam: Automated calibration using a genetic algorithm. *IEEE Congress on Evolutionary Computation (CEC)*, Wellington, New Zealand, pp. 3372–3379, doi: 10.1109/CEC.2019.8790008.
- Nhuan, M.T. et al. (2019) ‘The Scientific and practical foundations for sustainable development and climate change response in Mekong Delta, Vietnam’, *Vietnam Journal of Hydrometeorology*, 3: 1–11.
- Ober, K. and Sakdapolrak, P. (2017) ‘How Do Social Practices Shape Policy? Analysing the Field of “Migration as Adaptation” with Bourdieu’s “Theory of Practice”’, *The Geographical Journal*, 183/4: 359–69.
- Schraven, B., Adaawen, S. and Janoth, J.N. (2021) ‘Migration as Adaptation’, in Brears, R.C. (eds) *The Palgrave Handbook of Climate Resilient Societies*. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-030-32811-5_18-1
- Tran, T.P.H. (2012) ‘Fishery livelihoods and adaptation under the threat of ecological uncertainties’, in CTU, IOM and UNDP (Eds.), *Climate Change Adaptation and Migration in the Mekong Delta. Proceedings of Workshop*. Can Tho: Can Tho University, 37–49.
- UN Viet Nam. (2014) *Migration, Resettlement and Climate Change in Viet Nam. Reducing Exposure and Vulnerabilities to Climatic Extremes and Stresses through Spontaneous and Guided Migration*. Hanoi: UN Viet Nam.
- Vinke, K. et al. (2020) ‘Migration as Adaptation?’, *Migration Studies*, 8/4: 626–34.
- Vo, T. D. and Mushtaq, S. (2011) ‘Living with floods: An evaluation of the resettlement program of the Mekong Delta of Viet Nam’, in Steward, M.A. and Coclanis, P.A. (eds) *Environmental Change and Agricultural Sustainability in the Mekong Delta*, pp. 181–204. Dordrecht: Springer.
- Warner, K. (2010) ‘Global Environmental Change and Migration: Governance challenges’, *Global Environmental Change*, 20/3: 402–13.
- Wood, W.B. (2001) ‘Ecomigration. Linkages between Environmental Change and Migration’, in Zolberg, A.R. and Benda, P.M. (eds) *Global Migrants and Global Refugees*, pp. 42–61. New York: Berghahn.
- Zickgraf, C. (2019) ‘Keeping People in Place: Political Factors of (Im)mobility and Climate Change’, *Social Sciences*, 8/228.