



The migration-sustainability paradox: transformations in mobile worlds

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Migration represents a major transformation of the lives of those involved and has been transformative of societies and economies globally. Yet models of sustainability transformations do not effectively incorporate the movement of populations. There is an apparent migration-sustainability paradox: migration plays a role as a driver of unsustainability as part of economic globalisation, yet simultaneously represents a transformative phenomenon and potential force for sustainable development. We propose criteria by which migration represents an opportunity for sustainable development: increasing aggregate well-being; reduced inequality leading to diverse social benefits; and reduced aggregate environmental burden. We detail the dimensions of the transformative potential of migration and develop a generic framework for migration-sustainability linkages based on environmental, social, and economic dimensions of sustainability, highlighting identity and social transformation dimensions of migration. Such a model overcomes the apparent paradox by explaining the role of societal mobility in achieving sustainable outcomes.

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Introduction

Theories of transformation explain how societies can potentially shift away from current trajectories of unsustainability. One of the limitations of these current models and concepts, however, is that they fail to systematically account for demographic shifts, notably migration. On the contrary, migration transition theories conceptualise migration as an intrinsic part of broader social transformations processes [1]. Hence, we argue that theories of transformation to sustainability will better explain current trajectories and potential leverage points if they incorporate contemporary dynamics as well as challenges and opportunities of migration and associated demographic shifts.

We propose that there is a migration-sustainability paradox: migration plays simultaneous roles as a factor of economic globalisation driving the unsustainability crisis, while at the same time being a potential force for transformative social and environmental change. In other words, migration has at the same time offsetting positive and negative effects on sustainability, leading to an overall effect that remains ambiguous. The migration-sustainability paradox can be explained and investigated through hypotheses and data at multiple spatial and temporal scales [2]. There is suggestive empirical evidence, for example, that migration increases global CO₂ emissions. Liang *et al.* [3] find that these international migration and CO₂ emissions are positively related,

although no primary causal link is established. Similarly, Shi *et al.* [4] find that internal migration in China and the emission of various air-pollutants are related, but migration can also contribute positively to all aspects of sustainable development in both source and destination regions.

Is migration visible within theoretical accounts of transformations for sustainability? Despite competing meta-theories, migration and sustainable development are rarely uttered in the same sentence. Most contemporary theories of transformation include common elements: the limitations of governance; missing institutions; dominant economic structures; and social norms and identities [5–8]. The movement of capital, along with overexploitation of finite natural resources, is frequently identified as one of the principal drivers of unsustainability [9]. Contemporary globalisation is implicated in rising economic inequalities, political instability, conflict, environmental degradation, and climate change. Thus, the discourse on contemporary globalisation is marked by an emphasis on the unregulated flow of capital, commodities and goods, and on the impact of free trade on sustainability [10,11,12^{*}]. In parallel, world systems models highlight that the same disruptions and dislocations inherent to the development of capitalism are also the principal factors underpinning migration processes [13]. Hence, in economic terms, migration promotes net increases in economic activity, which may or may not be itself sustainable. But migration is not simply a passive outcome of economic globalisation. Migration is rather, we argue, intrinsic to social transformation in the contemporary world.

Migration, as used here, is the movement of individuals in terms of their primary place of residence, whether internal (within countries) or international (between countries). Migration is transformative of the lives of those engaged in it and of the economies and societies that are, simultaneously, source and destination of migration flows [14^{*}]. Migration is intertwined with societal, technological, demographic, and ecological transformations, including processes of colonialism, over timescales of centuries [15]. In this sense, there are long shared histories of colonial and post-colonial movements between regions of the world. Contemporary realities and political contestation results from further transitions as populations in low-fertility destination areas across the world are gradually being replaced by both internal and international immigrants [16]. Furthermore, migration may not only alter the size of population growth, but also its composition, such as dependency ratios and age profiles.

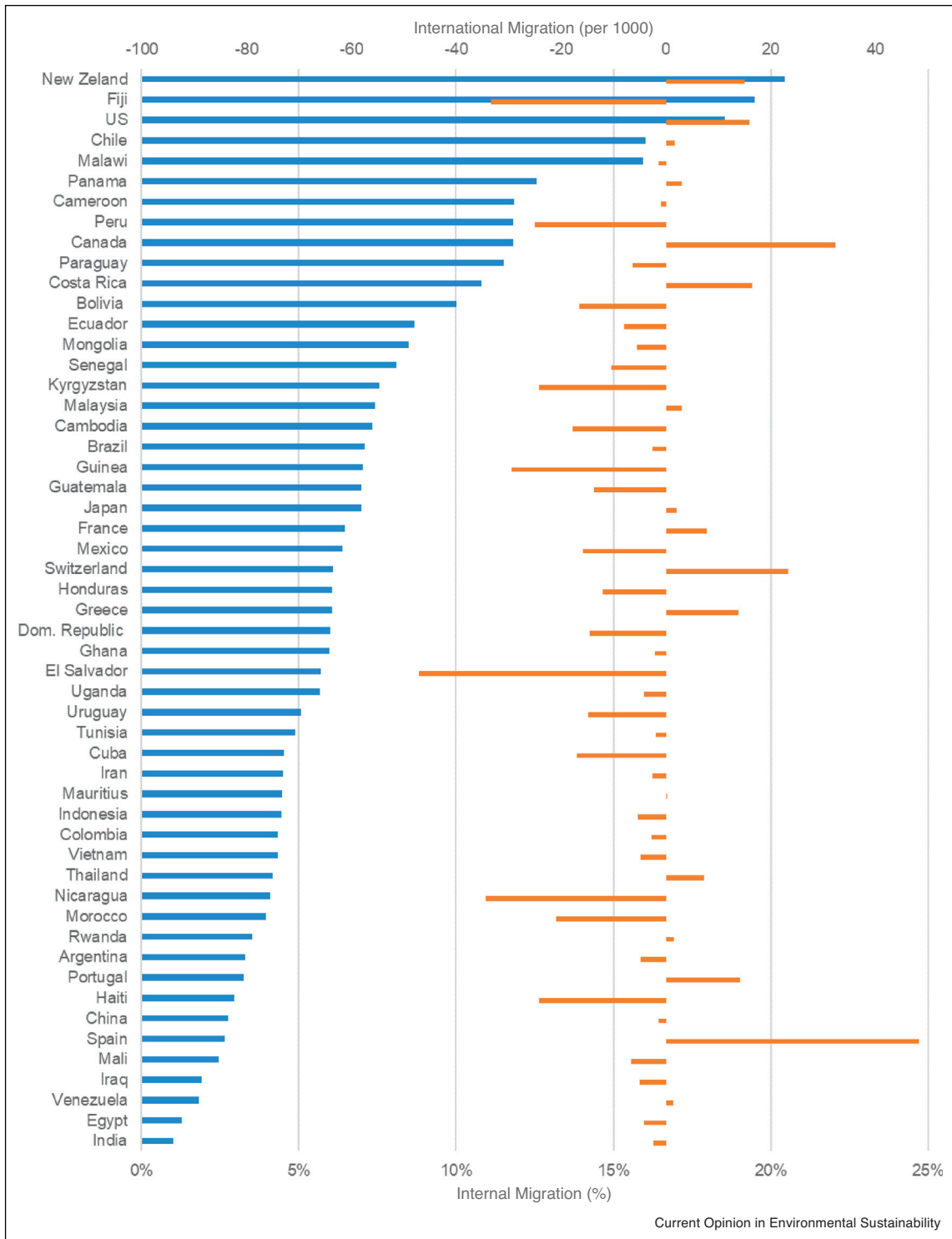
We conceptualise sustainability as the interaction of economic development, social cohesion, and maintenance of the integrity of environmental systems (Barbier

[17] and others). Thus, under what conditions does migration represent a transformation to sustainability? We hypothesise that transformations towards sustainability are facilitated by migration if it *simultaneously* improves the three dimensions of sustainability: (a) migration increases material wellbeing; (b) it reduces inequality in multiple spatial, economic, and health dimensions, thereby promoting diversity, political freedom and reduced insecurity; and (c) it lowers environmental burdens.

Migration, under the new mobilities paradigm, is a pervasive social norm throughout the world [18]. It underpins the efficient functioning of the global economy and is an integral dimension of livelihood diversification strategies [19,20]. Furthermore, migration is a key response mechanism to a range of external stressors, and is widely regarded as being integral to development [14,21,22]. At the individual level, migration is also instrumental in mediating life course transitions, such as family formation and upskilling, thus enabling individuals and families to achieve their goals and aspirations [23]. In this sense, it can be seen as an adaptation strategy where migrants alter their environments and investments in response to risks [24].

The prevalent forms of migration involve international and internal movements. Between 1960 and 2017, the percentage of international migrants (defined as foreign citizens) has remained stable, oscillating between 2.7 and 3.3 percent of the global population [25^{*}]. Estimates of the number of internal migrants are inconclusive because domestic movement of people is measured in many different ways using various instruments and techniques [26^{**}]. The global stock of internal migrants in 2005, that is the number of migrants living outside their region of birth, was approximately 760 million people [27], around 12 percent of the global population. Thus, migration is a ubiquitous process that takes place at different rates at domestic and international levels. Figure 1 demonstrates that there is significant diversity, even between large population countries, with the US near the top ranked countries on internal migration rates, and India close to the bottom. Between 2005 and 2010, nearly 20 percent of the population in the US had moved internally, whereas the net international migration rate is 16 people per 1000 inhabitants. In contrast, Spain has an internal migration intensity of only 3 percent, but a net international migration rate of 48 per 1000 inhabitants. Migration can be permanent, which entails a change in usual locality of residence, or temporary involving moves of varied duration including seasonal and circular migration [28]. Furthermore, the COVID-19 pandemic represents, analogously to climate change, a factor that adds complexity to migration processes, whereby it would be expected to observe a sharp rise in migration rates just before the establishment of lockdowns around the globe.

Figure 1



Internal Migration Intensities [124*] (latest available figures – various years) and Net International Migration Rates [125*] (2005–2010). Internal migration measures represent a percentage of the population, whereas net international migration rates (NIMR) correspond to the difference between immigration rates and emigration rates per 1000 inhabitants. Therefore, a positive NIMR represents a net inflow, and a negative one represents a net outflow of people. The selection of countries corresponds to those with recent comparable available data on both internal and international migration.

An emerging science on migration-environment interactions has demonstrated how migration as a global social process is affected by environmental challenges and how migration alters patterns of vulnerability and adaptation [29–32]. For example, although most migration is domestic, significant numbers of people are also displaced through conflict and from natural hazards, some crossing international borders [33]. Future climate change will amplify current displacement trends projected, for example, by the World Bank to result in greater than 140 million additional people displaced within their own countries by weather-related extremes by 2050 [34]. Migration and urbanisation processes are intensifying globally, and particularly in low-income and middle-income countries because movement towards economic opportunities increases life chances and potential wellbeing [14]. Understanding the transformative potential of migration requires incorporation of all major migration trends and future transformations.

Social transformations are closely linked to major shifts in dominant economic, political, and strategic relationships [35••]. On a macro scale, they represent complexity, interconnectedness, variability, context, and multi-level mediations of change. Migrants have been recognised as agents of social transformation because they bring a discrete set of cultural behaviours that facilitate a step-change in which existing socioeconomic patterns are questioned and many are reconfigured [1]. Multicultural settings, therefore, have implications for consumption behaviour, ecological footprint or political representation as elements of economic, social, and environmental sustainability.

We conceptualise transformation processes to account systematically for the migration-sustainability interactions by incorporating migration transition dynamics. We build on theories of migration as social transformation [1] and migration as development [36]. Diverse aspects of sustainability as encapsulated in the United Nations Sustainable Development Goals (SDGs) require insights into the role of population movements [37••,38]. These include global trends, such as the impact of growing diversity on society in destination regions and countries. The conceptual framework also builds on insights from macroeconomics on the determinants of material wellbeing across countries [39–42]. Specifically, we examine how migration influences income at macro levels [36] and how the latter relates to poverty and inequality [43], as well as environmental burdens, such as carbon emissions, material footprint, and adaptive capacity [32,44].

Mechanisms and processes linking sustainability and migration

Demographic transformations are highly diversified across countries. In essence, established population transition theories show how societies progress from regimes

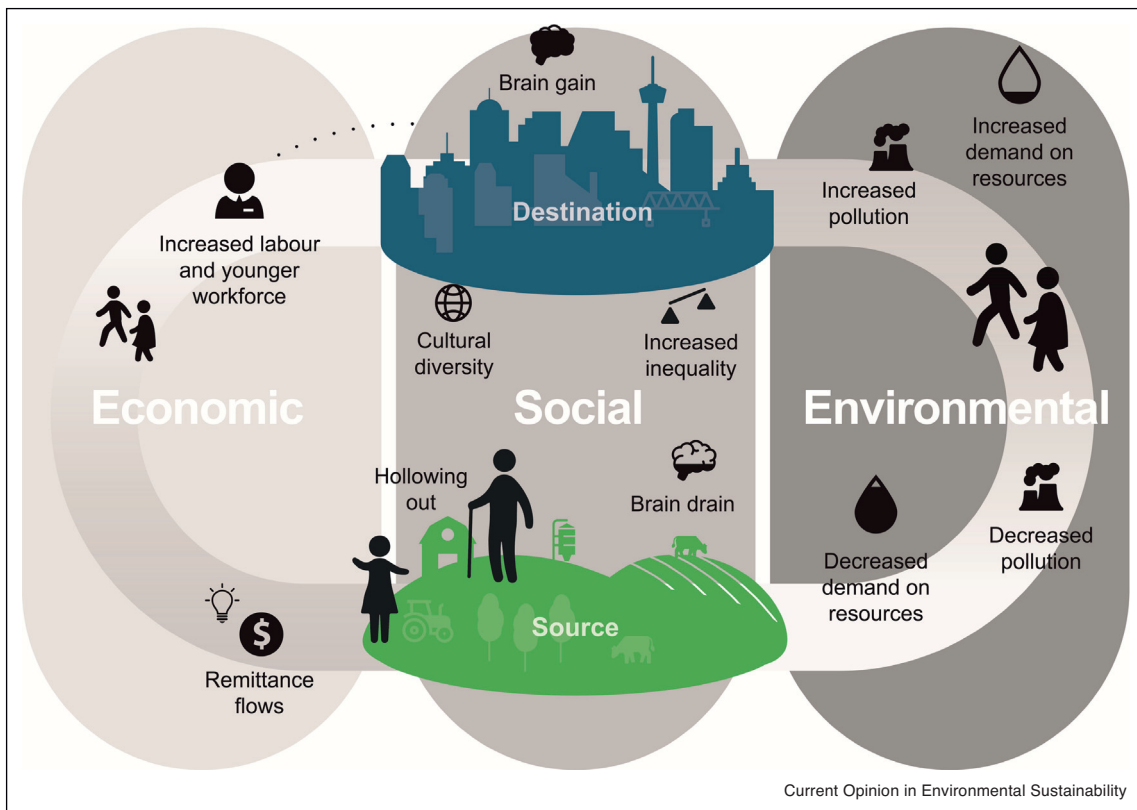
of high fertility and high mortality to a post-growth state in which both fertility and mortality rates are low [45]. The three principal components of population change are fertility, mortality, and migration, and the socioeconomic, cultural, institutional and political contexts of countries reflect different stages of transition [46–48]. Transition theory explains how demographic structures across the world evolve and alter their configuration through ageing populations, changing household composition, urbanisation and migration [49–51]. This diversity in the composition of the population residing in a given country can yield to a process of social transformation. In turn, as countries move through the different phases of their mobility transitions, certain migration patterns become more prominent ranging from urban to rural moves to diversify livelihoods through to transnational and trans-local lifestyles [50–53].

The overall effects of migration on source and destination areas depend on the size, composition and nature of migration flows, as well as the specific context from which migrants are drawn, and the timing of their migration. The interaction between migrants from different socio-cultural backgrounds and the places where they move to inevitably results in different levels of engagement with the environment, consumption behaviour, urban equipment, and other socioeconomic mechanisms and processes underlying sustainability. As a result, migration is a key element driving sustainable outcomes [12,54], although it may have both positive and negative effects, resulting in an ambiguous overall outcome. The relationship between migration and development is inevitably highly contested, based on different analytical tools, conceptual frameworks, and political stances [55]. Evidence across disciplines shows that migration has, on aggregate, significant benefits at the individual level [56,57]. Yet, migration brings about a complex set of demographic, socioeconomic, and environmental challenges including labour market impacts, brain drain, brain gain, resource demand, and the effects of remittances [58–60]. [Figure 2](#) therefore summarises these social, economic, and environmental implications of migration for sustainability.

Links between migration and sustainability outcomes in source and destination areas through remittances are well-established [57,61–63]. Migration is also linked to upward social mobility at destination [64–66]. Previous research suggests that emigration reduces labour supply overall and, more specifically, the supply of particular categories of emigrating workers [59]. As a result, if the unemployed are more likely to migrate, then migration may diminish unemployment pressures and demand for social security programmes in source areas [67,68].

There is also well-established evidence that migration changes family composition and child outcomes,

Figure 2



Impacts and challenges of migration flows on economic, social, and environmental dimensions of sustainability in source and destination areas.

including, for example, in terms of health and education [69,70]. For instance, in the late 20th century, international migration from Bangladesh led to the dissolution of the left-behind households, and the reasons for this varied by gender in a way that migration exacerbated gendered roles in the household [71]. However, migration also has the force to transform pre-existing values and norms. The phenomenon of left-behind husbands is currently common in Bangladesh, with new routes for female migration to work in garment manufacturing and other sectors: left-behind men abandon traditional gendered division of labour and engage in housework [72]. Thus, migration has offsetting effects on social cohesion, integration, adaptation, cultural identity, and gender relations [73–76].

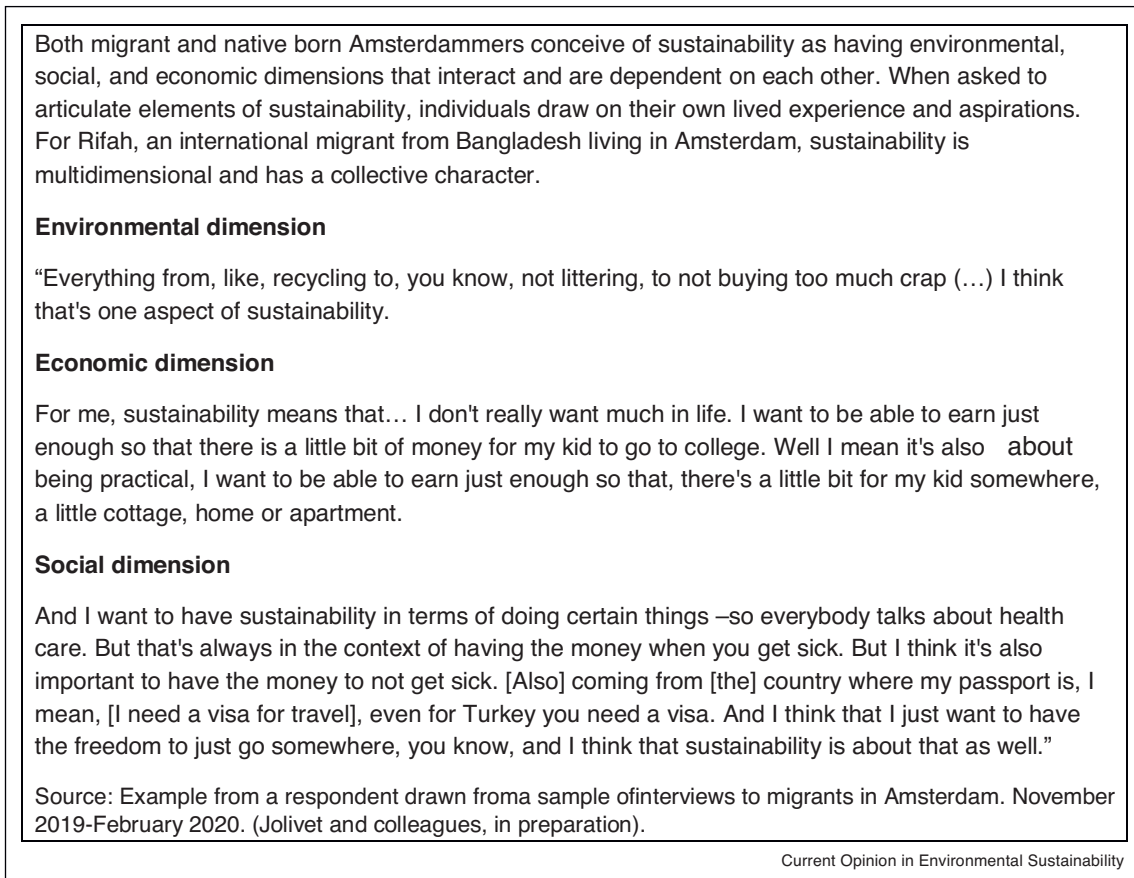
Research on migration and natural resources has shown that population movements impact on the resilience of individuals and communities, as well as on the sustainability of the underlying resource base [77,78*]. Population pressure, including impacts derived from migration, bring about a range of consequences for agricultural land and natural resources. On one hand, population size and growth rates influence resource availability and demand. On the other hand, migration changes the distribution of

residents with direct consequences on population density and land use [79–81].

Previous studies theorise migration-sustainability interactions from a biophysical, ecological and behavioural perspective, cultural and sociolinguistic, or policy and development perspectives [12,82]. New population movements have implications for social, economic, and environmental aspects of sustainability. In Figure 3, these dimensions are articulated by recent international migrants to Amsterdam, demonstrating the perceived integration of social, economic, and environmental elements. Moreover, they typically perceive sustainability to be integrative of social goals, aspirations, and a liveable city.

The pathways through which migration may affect sustainability, as discussed above, are summarised in Figure 4. Like all models, Figure 4 is a simplified version of reality, in this case representing the economic, social, and environmental dimensions of sustainability outcomes as being mediated through labour and human and physical capital. The model is scale neutral: the nature of the relationships of interest hold, we suggest, for individuals and households as well as for economies and societies as units of analysis. For

Figure 3



Sustainability perceived as multidimensional by international migrants in destination cities.

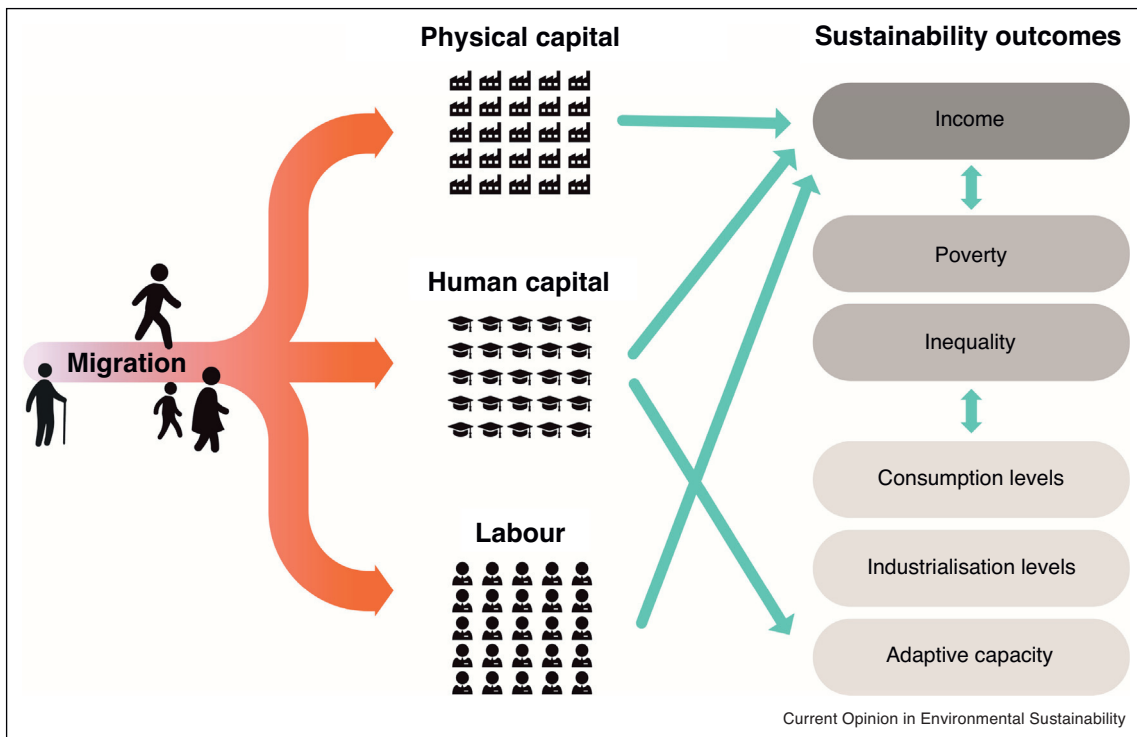
example, both the decision to migrate (household level) and migration flows (country level) might have an impact on sustainability in the same direction since the former may affect pro-environmental behaviour, while the latter may affect the country's material footprint. Documenting the relationship between migration and sustainability outcomes for countries using established indicators would shed light on how migration could contribute to the achievement of the SDGs. Such a framework focuses mainly on the short-run: many of the mediating relationships, such as relative stocks of human capital and the state of the economy, have been shown to change over long time periods turning, for example, countries and regions from net out-migration to net in-migration places.

Economic development in Figure 4 is represented by the level of income per capita, the total activity of the national economy [83]. Social domains of sustainability are represented by measures of social cohesion as a source of political stability, security, and wealth. Solidarity and social cohesion are central to sustainability, and from an economic perspective, social division is costly in terms

of increased public expenditure [84]. Levels of poverty and inequality could be included as measures of social exclusion. Environmental elements from the SDG framework include carbon emissions [85]. The adaptive capacity of a society to external shocks indicates how countries are sensitive to such shocks and how they cope and recover without major shifts in the demand for migration [86].

The relationship between migration and sustainability is mediated by changes in the stocks of physical capital, human capital, and labour. Specifically, in the short-run migration may affect physical and human capital and labour (grey arrows in Figure 4). First, a permanent increase in migration flows may have a negative impact on income per capita due to physical capital dilution: the fact that the amount of capital must be spread more thinly over the population due to high population growth [39]. Second, migration may affect stocks of human capital depending on the selectivity of migrants in relation to their level of education [87]. Third, the impact of migration on the labour force is less conclusive and it depends

Figure 4



Migration affects environmental, social, and economic dimensions of sustainability through capital and labour pathways.

on the selectivity of migrants with respect to their demographic structure [88], as well as on the degree of substitutability between migrants and natives [89], among other factors. These three forces, in turn, influence income per capita, represented in economic models through a standard aggregate production function [36,90], as shown by arrows from each of them towards economic dimensions of sustainability.

Changes in economic activity are central to social and environmental dimensions of sustainability. In particular, changes in income per capita may affect the levels of poverty [91,92] and inequality [43], depending on structural factors in economies. Levels of income have direct effects on the levels of material footprint and carbon emissions [32,93]. The extent of the environmental burdens are compounded by the levels of poverty and inequality or cumulative adversity [94^{*}]. It is also likely that material footprint affects the level of carbon emissions. Finally, income may also affect the adaptive capacity of communities since both income and poverty explain differentials in responses before, during, and after disasters [95]. In addition, we posit that human capital may also affect directly adaptive capacity since education is found to reduce disaster-related mortality [44].

In effect, the model presented in Figure 4 suggests that migration moves measures of sustainability in the right direction, but under specific sets of circumstances. Migration is an intrinsic part of broader development processes, and 'represents a vital resource rather than a desperate response' [14]. Hence, it increases aggregate wellbeing, although this only represents a sustainability transition if it lowers environmental burdens: such burdens are spatially uneven and structural. Cities, as migration destinations, are in effect the crucibles of the sustainability challenges [96]. Further, transitions are only sustained if they reduce inequality in multiple spatial, economic, and health dimensions, and if they reduce insecurity at individual levels.

Political economy of migration–sustainability interactions

Transformations to sustainability are a matter of political economy: vested interests, entrenched ideas, and cultural framing. These are apparent in the migration-sustainability paradox where migration policies largely frame migration as a problem to be managed, and migrants as a labour resource. Migrants become scapegoats in times of economic downturn, for driving down wages, placing demand on public services, and reducing social cohesion [97]. Transformative change therefore requires, paraphrasing

Scoones *et al.* [7], societies to build on diverse knowledges, to recognise migration as a resource and pathway to sustainability, and to engage with the inherently political nature of both sustainability and mobility. The onus for transformations should not, therefore, be the responsibility of vulnerable groups [6], but should capitalise on the ability of migrants to participate on transformations to sustainability.

Migrant populations bring with them diverse knowledge, perspectives, and experiences of sustainability, yet their voices are often excluded from discussions and formal planning processes for sustainability [98]. There is growing evidence that when diverse perspectives are integrated into inclusive knowledge systems, the result is inclusive and transformative action [7]. Thus, migrant social networks in the communities of origin and destination alter the consequences of migration management policies [99]. The restrictiveness of entry and integration policies directly affect the capabilities of migrants as individuals in contributing to sustainability transitions [57,100,101]. These capabilities are also known as migration infrastructure, that is, the ‘systematic interlinked technologies, institutions and actors that facilitate mobility’ [102].

Given there are multiple potential pathways to sustainability, the conceptual model presented here has diverse outcomes in terms of social, environmental, and economic dimensions, that are context specific and historically specific. Migration flows are necessarily heterogeneous: predictive models of aggregate flows, for example, show that more migrants are moving from high to low climate vulnerability regions [103], yet climate risks are also trapping the most vulnerable populations in hazardous places [104,105]. Migration flows and shifting migration dynamics will have an impact on the landscape of sustainability, and the choice of sustainable development pathways will certainly have an impact on migration.

The relationship between migration and sustainability is clearly a matter of political economy in its economic, social, cultural, and demographic dimensions. Transformations depend on who does them, and where and how they come about. Who will be affected, and where, depends on whether actors stand to lose or gain from transformations [106–108]. How transformation processes come about depend on actors and their constructions of frames and narratives. These include diverse interpretations of what the problem is, how change comes about, how uncertainty is understood, and belief in incommensurate values [108–110]. Populist framings on migration depict new migrant populations as a threat to existing order, thus, introducing a level of uncertainty or ambiguity into political and security discourses. Such narratives often emphasise the need for strong borders, limited

movement, and anti-globalisation perspectives [111]. Climate change advocacy commonly raises migration as a threat to social order and the nation state in destination areas [112], with the securitisation of both climate and migration discourses [113]. Similarly, the COVID-19 pandemic has been framed as an issue of biosecurity [114] putting migration in the spotlight: the COVID-19 virus is perceived as coming from ‘somewhere else’, brought to each locality by travel and movement of people. For instance, new migrants were considered the ‘hidden flaw’ in Sweden’s lock-down policy, stating that not all ethnic groups had access to expertise [115]. Widespread economic shutdown and travel restrictions highlighted how human mobility initially enabled the spread of the virus globally. It is evident that the public health response affects marginalised populations, including migrant populations, in specific ways of stigma and blame: fear of the virus spreading and of international or local disease transmission.

Asymmetric power is a major barrier to the transformative potential of migration [6,116]. Immigration and welfare policies, for example, limit the capacity to migrate and access to state-provided welfare, health care, and education. Similarly, regulations on the internal movement of people act as a barrier for social progress. For instance, in China, rural-urban migration of children and the elderly is constrained by their lack of access to basic welfare provisions in cities due to household registration and budget allocation policies [117]. Political participation is also restricted when migrants lack the citizenship of the country of residence to access voting rights. Furthermore, research on conservation and urban planning policy has shown that the lack of recognition also affects migrants with the citizenship of the country of residence. For instance, when their belonging to the place of residence is contested, they are stigmatised or when they experience language barriers [118,119].

Across horizontal and vertical dimensions of governance, there are major blind spots when it comes to the consideration of migration within sustainability policies and programmes, and, to an even greater extent, the consideration of sustainability dimensions within migration and integration policies and programmes. The Millennium Development Goals failed to mention migration at all [120]. In this sense, the SDGs represented progress by explicitly referring to various aspects or forms of migration in a limited number of goals and targets [37,121]. At the same time, the International Organization for Migration has advocated for the design and implementation of sustainable reintegration pathways for returning migrants [122]. International, national, and local governance approaches to integrating migration into sustainability planning remain, for the most part, siloed along traditional policy domains despite the intrinsic links between them.

Conclusions

If migration flows increase aggregate net wellbeing, decrease inequality, and do not increase overall environmental burden, they have the potential to be a major force of positive societal transformations towards sustainability. Such movements of people would dispel the apparent paradox of migration and sustainability: that migration affects positively some of its dimensions, but also affects others negatively, in such a way the net effect remains ambiguous. We have described the economic, social, and environmental dimensions of sustainability and how they can be altered with migration processes that transform the lives and life chances of individuals, often in ways that contribute to the greater good and even to sustainability.

Migration is a process for development, but one that is managed through the nation state, in policies that affect different regions within countries, and through regulating the international flow of people. We suggest here that the sustainability and transformation dynamics of migration can be incorporated into policy and public decision-making. Migration that increases aggregate wellbeing; reduces inequality and, hence, disparity between places, regions and sectors of society; and that reduces environmental burdens, overall would contribute to sustainability transitions.

Current common framings of transformation for sustainability fail to recognise the complexities of how migration changes the dynamics of societal change and economic imperatives. They tend to conceive migration as a temporary state, measured by flows between and stocks within bordered, sedentary forms of political, economic, and social organisation. Most people's lives are on a spectrum of mobility: neither wholly mobile nor wholly sedentary, and at times constrained by immobility [123]. We propose here more integrative models of migration and transformation that de-emphasises national status in individual movement decisions and focuses on the migratory experience, linkages between places, the potential for innovation, and the contribution of collective action and community resilience.

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Conflict of interest statement

This study did not generate any new data.

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