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An Urban Governance Framework for Including Environmental Migrants in Sustainable Cities

Ilan Kelman ^{1,2,3,*}  and Aaron Clark-Ginsberg ⁴¹ Institute for Risk & Disaster Reduction, University College London, London WC1E 6BT, UK² Institute for Global Health, University College London, London WC1E 6BT, UK³ Department of Global Development and Planning, University of Agder, 4630 Kristiansand, Norway⁴ Behavioral and Policy Sciences Department, RAND Corporation and Pardee RAND Graduate School, 1776 Main Street, Santa Monica, CA 90401, USA

* Correspondence: ilan_kelman@hotmail.com

Abstract: This article proposes an urban governance framework for including environmental migrants in sustainable cities. It outlines the links among environmental migration, vulnerability, and sustainability, showing how vulnerability and sustainability are not about the environment or the human condition as snapshots in space and time, but rather are long-term, multi-scalar, ever-evolving processes. This theoretical baseline is followed by a description of some practical approaches already applied for including environmental migrants in sustainable cities. The wide variety and lack of cohesion justifies the need for a framework, leading to three principal characteristics of a governance framework suitable for addressing vulnerability and environmental migration for urban sustainability: horizontally and vertically networked, inclusive, and evidence-based. As the framework's three dimensions represent principles or overarching structural solutions rather than presenting operational guidance, the concluding discussion covers the framework's limitations and a research agenda.

Keywords: cities; environmental migration; governance; migrants; sustainability; urban; vulnerability



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1. Introduction

Environmental migrants often overlap with policy imaginary, research, and public discourse for sustainable cities [1–3]. This work demonstrates that environmental (and all other) migrants ought to be included within governance frameworks as part of achieving sustainable cities. Where this does not occur, it leaves migrants marginalized, which in turn undermines and degrades a city's efforts for sustainability. To overcome these challenges and to avoid the known problems of excluding migrants, this article proposes an urban governance framework for including environmental migrants in sustainable cities.

No accepted definition exists for environmental migrants, but a standard working definition [4] is, effectively, the straightforward statement of referring to people leaving their homes for reasons involving environmental factors. Possible environmental factors include climate [5], hazards [6] such as earthquakes [7], pollution [8], and resource degradation [9]. The migration can be forced, voluntary, or (more commonly) a combination and tends to involve some societal reasons rather than being purely environmental [10,11].

In numerous governance discussions, environmental migrants are said to drive urbanization with significant concerns especially expressed about 'climate migrants' or 'climate change migrants' [12]. Yet directly attributing migration to climate change is contentious [5,6,13–15] with documented difficulties of counting and quantifying climate migrants [5,15–17]. For example, residents of Papua New Guinea's Carteret Islands were frequently highlighted as clear examples of migrants to urban areas due to climate change [18] until subsequent investigation generated evidence that other factors dominate their mobility-related decision-making [19].

Although prevalent throughout human history at some level, mainly small-scale and localized, both human-caused climate change [20] and urbanization [21] are said to have substantively accelerated and become global phenomena during the twentieth century. Their impacts sit at society's forefront now, for which impacts on migrants and migration are examined and sometimes witnessed, also revealing problems of defining, attributing, and tabulating the impacts of climate change, urbanization, and their interactions on migration and migrants [5,10–17,22]. As an example, migrants from rural Bangladesh to Kolkata do not move for lucidly traceable reasons that partition urbanization and climate change; instead, these two factors display an evidenced influence while being entangled within numerous other environmental and social changes [23].

In 1950, just under 30% of the world's population lived in urban areas with that figure rising to 55% in 2018 and projected to grow to 68% by 2050 [24]. Yet no clear definition or delineation of a city or of urban areas, or of their characteristics, exists beyond broad understandings as concentrations of people within a spatial area [21]. Some authors build on this baseline to suggest that such concentrations of people then produce extensive goods, services, cultures, and/or power, which thereby also characterize cities [25].

For city populations, some are given as 'City proper—Ville proprement dite' and some as 'Urban agglomeration—Agglomération urbaine' [26]. The definition of 'urban' varies as widely as 'Iceland: Localities of 200 or more inhabitants' to 'Japan: City (shi) having 50,000 or more inhabitants with 60 per cent or more of the houses located in the main built-up areas and 60 per cent or more of the population (including their dependents) engaged in manufacturing, trade or other urban type of business' [26]. Some descriptions, such as 'Brazil: Area inside the urban perimeter of a city or town, defined by municipal law' [26], are not quantitative while Maldives and Tonga name only one city within their country: The capital [26].

'Sustainability' displays similarly long-standing and never-ending debates covering its meaning [27,28]. Many, although not all, converge on the idea of not overtaxing resources, but being able to sustain a way of living, locally and globally. Legitimate, current needs ought to be met without undermining the opportunities of such needs to be met in the future [29,30]. Bringing together the two definitional understandings, 'sustainable cities' thus means cities that will not undermine their own existence through their resource consumption—a situation that some suggest might be impossible to achieve [31,32].

Irrespective of the definitional debates swirling around each term, rapid growth can overburden a city and induce governance and sustainability challenges that compromise the ability of cities to produce and/or distribute goods, services, cultures, and power effectively [33]. Fleeing difficult situations with limited resources and ending up in places with minimal community connections and political clout, environmental migrants who are more forced than voluntary might lack opportunities and resources to adapt, thrive, and contribute. Instead, they end up stuck in poverty and vulnerability. Meanwhile, environmental migrants who are more voluntary than forced can sometimes become the elites, creating the city for themselves, excluding others, and driving up prices, so that locals end up as more-forced-than-voluntary migrants. This phenomenon is illustrated for Sanya, China where retirees from the north avoid the harsh winter in their origin by becoming mainly voluntary climate migrants to the south, failing to integrate, and displacing locals [34].

Irrespective of these challenges, migration has long been known to bring benefits—for the migrants and for the places where they settle, particularly cities [35,36]—as long as urban governance is set up to direct those benefits while supporting the migrants and the people already there. Like any other populations, environmental migrants bring with them skills, ideas, and resources that can and should be used for both supporting the migrants and achieving sustainable cities, including through generating and supporting livelihoods, jobs, and cultures. Migrants offer knowledge and abilities, including for providing services to everyone such as for health and well-being, education, and social support.

The urban governance framework proposed here draws on the advantages of including environmental migrants in sustainable cities in order to minimize the maladaptive elements. Governance refers to ‘development of governing styles in which boundaries between and within public and private sectors have become blurred’ [37]. It covers systems, processes, and actions regarding rules and regulations for administering and monitoring norms and expectations so that individuals can constructively function within the collective of society [38,39]. Governance is not merely government nor just about government authorities or processes [40]. While government entities can be and often are significantly involved, governance accepts that they are not the only ones with policy- and decision-making authority and power. Governance authority is instead a distributed, networked process contingent on the relative power and resources of those involved [41].

National and subnational governments including cities are typically part of it, with contextual levels of influence and control [42,43] and with varying governance cultures that lend themselves to biases. For instance, ideas of governance used here emerge from contemporary scientific publications with their mainly Anglophone cultural and linguistic focuses [44]. Not all governance norms are legislated, monitored, and consistently enforced, such as clan-based customs in Afghanistan, Albania, Iraq, and Chechnya [45] and chieftaincy in Zimbabwe for dealing with disasters [46]. Not all leadership is top-down or emanates from a single-person elite. As will be shown, collective leadership, self-organized governance, bottom-up leadership, and hybrid governance are present in cities, all of which include migrants to these cities, some of whom would be environmental. They feed into constructively shifting narratives on environmental migrants [16] to try to prevent and counter anti-newcomer and xenophobic approaches adopted by some when they see environmental migrants influencing cities [22].

As a mechanism for organizing disparate people and systems including and beyond the state, governance is used to address many issues including migration and sustainability. Lack of governance can produce so-called “failed” states [47] and their cities [48,49]. Successful governance for cities has been shown for forestry [50], water resource management [51], and emergency response networks [52] among many others. From these examples, cities concentrate varied institutional structures, cultures, industries, power networks, and other resources, so urban sustainability is a matter not just of absolute resource amounts and use, but also of how these resources are distributed and used. Governance can organize resource availability and distribution sustainably, which means with everyone, incorporating but not limited to migrants, thereby aligning disparate people and processes.

Any urban governance mechanisms for facilitating migration’s and migrants’ contributions to urban sustainability must center on overcoming vulnerability. Vulnerability refers to ‘the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard’ or other negatively impacting phenomena [53]. Decades of research on development, especially regarding the consequences of disasters [53–60], provide strong theory and evidence that it is not the environment that determines adverse or positive impacts on whether migration is adaptive or maladaptive for sustainability, nor whether sustainability is supported or impeded. Instead, long-term social conditions across any environment(s) create and maintain vulnerability by placing people in positions of harm with limited recourse to help themselves. Since vulnerability and its creation are not always admitted or redressed, many cities are still challenged to address environmental migration and sustainability together, further forcing vulnerability on urban dwellers, migrants and those already living there.

From this background, this article draws on these decades of research to outline the links among environmental migration, vulnerability, and sustainability. The material shows how vulnerability and sustainability are not about the environment or the human condition as snapshots in space and time, but rather are long-term, multi-scalar, ever-evolving processes. This theoretical baseline is followed by a description of practical approaches already applied, sometimes directly and sometimes peripherally, for including environmental migrants in sustainable cities. The wide variety and lack of cohesion

justifies the need for a framework, leading to three principal characteristics of a governance framework suitable for addressing vulnerability and environmental migration for urban sustainability: horizontally and vertically networked, inclusive, and evidence-based. The framework's three dimensions represent principles or overarching structural solutions rather than presenting operational guidance. Consequently, the conclusions cover the framework's limitations and a research agenda that are enfolded in how to move forward, especially to avoid separating science from the framework's application.

2. How Vulnerability Shapes Environmental Migration and the City

Vulnerability within sustainability and development fields has been foundationally described as a long-term process that is place-based and context-dependent [53,60]. Within this understanding, environmental migration to cities can be triggered by an acute change, such as an earthquake or hurricane, as well as by longer-term and slower ones, termed 'creeping changes' [61], such as soil degradation, desertification, and drought.

More sudden examples are Hurricane Katrina in New Orleans in 2005 [62] and an earthquake in Christchurch in 2011 [63], both of which triggered significant, short-term and long-term migration, changing each city's characteristics. As another example, during the night of 23 January 1973, the volcano comprising the island of Heimaey in the Vestmannaeyjar archipelago off Iceland's south coast started erupting, forcing most of the 5300 residents to leave immediately [64]. By the time the eruption finished after four months, 300 houses had been destroyed, up to six meters of ash covered the city (a city by Icelandic standards), and the harbor on which the population relied was nearly blocked by lava that the sea had cooled. Most of the residents then migrated back to rebuild with the new environmental resources: using the ash for paving, tapping into the geothermal heat, and accepting the lava in the sea as a breakwater which made the harbor more useable—as well as the tourism generated from the volcano. The same environmental phenomenon led to migration from and then back to the city.

Examples of long-term processes leading to significant outmigration are water resource depletion (a creeping environmental change) around the Aral Sea [65] and the removal of services supporting livability within the environment (a creeping social change) in the island community of St. Kilda, U.K. leading to its eventual abandonment [66]. Social and environmental changes cannot always be disaggregated, as further shown by the city of Kiruna, Sweden, parts of which are moving due to environmental changes from an iron ore mine that is socially accepted by much of the city's population [67].

As another example, Maldives in the Indian Ocean is an archipelago country of about 200 inhabited islands, of which the capital Malé is the only one that the country considers to be a city. Almost all the country's land is below two meters above sea level, making Maldives frequently touted as being in danger of disappearing due to sea-level rise under human-caused climate change. In the meantime, so many Maldivians migrate or want to migrate to Malé that the new island of Hulhumalé was built to provide housing for people nearby. When Maldivians are asked about migration [68], they are aware of possible environmental reasons such as climate change's impacts. They also describe the national government's decision to move rather than rebuild some communities destroyed by the 26 December 2004 tsunami. They highlight social reasons for moving to Malé or even away from Maldives: jobs, health, education, and services, although these are mixed with environmental reasons such as land unavailability for infrastructure and pollution from local and distant sources. Environmental and social reasons are intertwined for migrating internally and externally.

Environmental migration to cities can lead to new and exacerbated vulnerabilities, or to fewer vulnerabilities, for both migrants and those living there already, with the outcomes depending on governance. Governance means that vulnerabilities from and within an urban area can shape environmental migration. As urban areas grow, electricity demands and especially expectations for an uninterrupted supply can lead to a form of environmental migration when dam construction displaces people [69]. Similar situations arise when

people are forcibly displaced as their homes are expropriated for transportation—which is about both environmental and social reasons—for instance, an airport in Montréal, Canada [70] and a road in Bahir Dar, Ethiopia [71]. Such changes then lead to some people migrating out of cities to reduce their vulnerabilities by avoiding environmental factors of air and noise pollution, along with social factors including large crowds and perceptions of crime [72].

More widely, wanting to work but not live in a city for environmental (and other) reasons leads to daily, weekly, and seasonal migration. Conversely, environmental migration can remove people from cities temporarily such as the weeks-long decampment to summer cottages of many Nordic peoples [73]. Permanent movement from cities has been accelerated by COVID-19-related lockdowns and restrictions starting in 2020 making remote working more acceptable over the long-term [74].

Others choose or are forced to migrate to and stay in a city [75]. Proximity to services including health and education as well as amenities including entertainment, restaurants, and shops provide an attractive living environment for many who like it and can afford it, while they might not enjoy being close to the natural environment. Because they can afford the urban life, their vulnerabilities could be reduced due to livelihood and service options and nearness. Others feel forced to move to cities, often expanding informal settlements, for livelihoods—with their original jobs possibly undermined by environmental and natural resource changes—or for the expectation of better services. They can end up more vulnerable and then not be able to afford to leave the city.

Given these disparities—and again recalling the definitional challenges of all the terms used alongside the mixed reasons for migration—a governance framework must embrace all variations:

- Migration happens on a forced-voluntary continuum.
- Some migration influences are environmental (of which one subset is climate, with its own subset of climate change within which sits the subset of human-caused climate change) [20] sitting on a continuum with societal influences (especially since society and the environment are inseparable, such as society causing much of climate change today).
- Urban sits on a continuum through suburban and peri-urban to rural as well as a continuum of many different sizes of urban agglomerations (Figure 1, after ref. [76]). An urban area is not necessarily defined by only population numbers and densities [26], but might involve jurisdictional and administrative definitions, service and livelihood functionality, authority and power concentrations, and cultural identities and associations (ideas well-embedded in understandings of cities) [77].

Any governance framework must account for these continua and not presume the simplistic framework of environmental reasons pushing migrants as urban reasons pull them. In fact, any push/pull framework for migration must embrace the fact that both pushing and pulling occur simultaneously for both environmental and urban reasons in tandem [78]. The underlying baseline for all these influences is different levels and types of vulnerabilities epitomized by lack or availability of power, choice, and resources (the vulnerability process), for which urban governance should aim to do better over all time and space scales (the sustainability process).

A key point of the vulnerability process is people's perceptions and understandings of their own situations, including migrants [79]. A key point of the sustainability process is people's perceptions and understandings of what they seek for their own situations, including migrants [80]. No knowledge form is a panacea and local knowledges have clearly identified limitations [81], with actions needed to avoid supporting vulnerabilities or undermining sustainabilities. Some such actions have been undertaken, as illustrated through existing approaches to reduce vulnerability and include environmental migrants in sustainable cities.

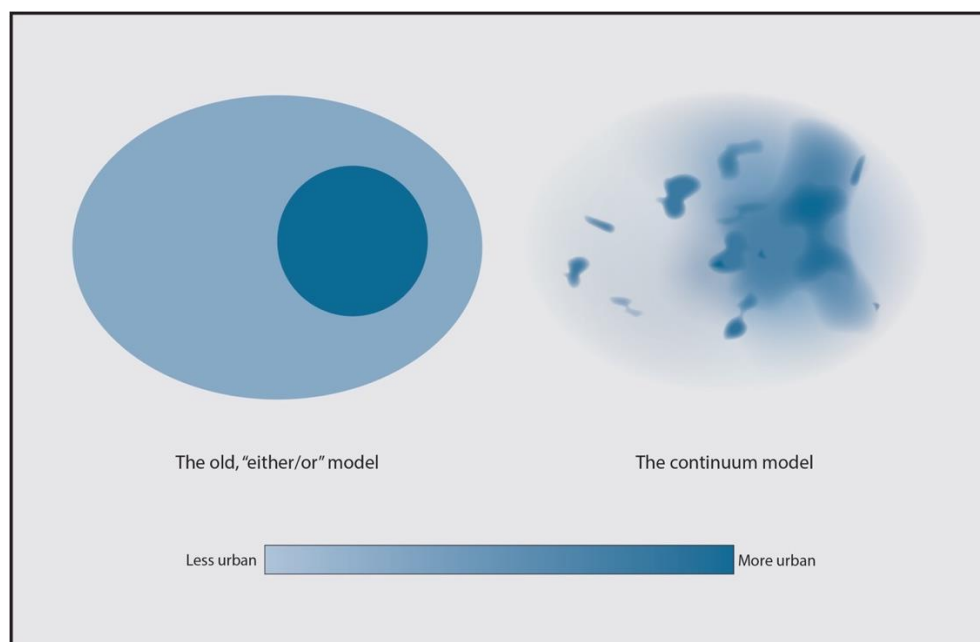


Figure 1. The challenges of defining and delineating “urban”, since it is a continuum (drawn by Jay Balagna after ref. [76]).

3. Existing Approaches to Reduce Vulnerability and Include Environmental Migrants in Sustainable Cities

Typical, non-exclusive, and overlapping approaches for governance—regulations, partnerships, and measures and measurement—can be used to reduce vulnerability and include urban migrants in sustainable cities. Since governance is context-specific and contingent on the people and institutions involved, there is no single recipe or algorithm for developing, selecting, and implementing approaches. They must be adapted to migrant- and city-specific vulnerabilities and abilities. In fact, governance-related work on environmental migrants is relatively nascent with broad and deep challenges identified regarding causes, effects, and connections [13–17] and limited cohesion among existing approaches [5,6,10,11].

Regulations are ‘intentional, goal-directed, problem-solving attempts at ordering undertaken by both state and non-state actors’ [82], being pervasive and powerful tools that are used to shape social processes [83]. Regulations underlie large systems [84] and can spur innovation and create new norms and knowledge [83–86]. While frequently associated with a governmental entity, both governmental and nongovernmental institutions develop and implement regulations and are impacted by regulatory decisions [85,87].

Regulations as a governance tool of urban environmental migration could be designed to allow for migrants to have a voice, access the services they need, and help the city benefit from the resources they proffer. Given the complex and contextual pathways of vulnerability creation and reduction, prescriptive regulations may be of only limited use for enhancing sustainability. More flexible risk-, performance-, or outcome-based regulations can be tailored to each situation [88].

Many partnerships have been proposed for addressing environmental migrants for sustainable cities. The Global Mayors Task Force on Climate and Migration [89] calls to partner ‘with migrants, displaced, and diaspora communities’ and with ‘national governments, international organizations, civil society, and the private sector’. In the US in 2021, the White House called for working with cities and communities to support environmental migrants [90].

Research on partnerships to tackle vulnerability and sustainability shows their efficacy in involving migrants in cities by harnessing existing resources and by supporting ownership and action [91,92]. Information failures, which underlie many coordination problems,

can be overcome through partnerships [93]. Effective partnership entails deep and committed engagement focused on developing mutual and sustained understanding of abilities, vulnerabilities, and goals, with few straightforward or consistent approaches [94]. For instance, partnerships have had some success in smart city development [95], have had mixed impacts for sustainable development in cities [96] and for tackling climate change [91], and have failed to account for power differentials in some community settings [60].

While measures and measurement have power, many suggest that major gaps exist in ensuring they improve effectiveness [97–99]. Research on measures and measurement largely focuses on issues of validity and reliability, assuming that the metrics will accurately and consistently represent the world, instead of considering their power to shape the world. For environmental migration and cities, large gaps remain in understanding how measures and measurement could facilitate or undermine vulnerability and sustainability. Climate migrants to and from urban areas present a particular challenge for measures and measurement [5,15–17].

Policy tools have a lifecycle and lifetime. Governance designs, implements, refines, alters, overrides, and revokes them continually. Using policy tools to realize the governance framework proposed here involves a connected process of co-design, co-implementation, and co-evolution. Given the interlinkages between vulnerability and sustainability, engagement with all groups including migrants (inclusivity) across all levels (networked) must be explicit and continual. Otherwise, policy will defer to tacit norms, procedures, and customs favoring the entrenched, often unevidenced, and vulnerability-creating, status quo.

Co-design involves the co-evolution of knowledge [100], leveraging that knowledge to define policy problems to be addressed along with co-implemented and co-evolving responses and solutions. Co-design and co-implementation have created support for sustainability interventions in cities for co-evolving policy tools [101–103]. Table 1 provides urban examples of policy and practice approaches for reducing vulnerability and including environmental migrants. The wide variety stands out with each effort not always explicitly seeking to connect to, learn from, or inform others, leading to a lack of cohesion despite all this useful work from around the world's cities.

Table 1. Policy and practice approaches for reducing vulnerability and including environmental migrants in sustainable cities.

Approach	Co-Design	Co-Implement	Co-Evolve
Regulations	Regulations for urban common areas were co-designed by users working together in Malmö, Sweden [104], so any migrants who are users could be involved.	Co-implementation with residents of risk governance in Rostock, Germany helped to support a large migrant influx in 2015 [105].	US electricity reliability standards have a participatory standard setting, evaluation, and revision process, which ought to incorporate different worldviews and knowledges [85], so this process would need to include migrants in order to be complete and comprehensive.
Partnerships	Combining different participation techniques partners urban dwellers, irrespective of their origins, for governance [106], demonstrating how migrants could and should be part of co-design.	Informal, volunteer groups collaborate to respond to urban disasters, yet migrants can be excluded rather than incorporating them [107].	Characteristics are proposed to facilitate local partnerships for sustainability governance in four cities, with patterns of inclusion and exclusion forming an important part of the analysis [108].
Measures and measurements	City vulnerability reduction measures were developed with non-governmental organizations, academia, and community members [97], by definition ensuring that migrants are involved.	Consultations with people at the frontlines of risk governance must ensure representative respondents covering all risk experiences, showing that developing parallel local level monitoring processes can make up for limitations in top-down metrics [109].	Examining team formation and dynamics helps to solve urban sustainability problems in Austin, Texas with community members directly involved, including those who might provide services to or be migrants [110].

The wide variety and lack of cohesion justifies the need for a framework. Building on this extensive past work and foundational ideas across the intersection of the

three themes of migration, environment, and urban/cities, a governance framework for overcoming vulnerability to achieve sustainability emerges: horizontally and vertically networked, inclusive, and evidence-based. This governance framework explicitly brings together migrants to a city and people already in a city, noting that many in a city might wish to migrate but cannot for environmental (and other) reasons. They are often called ‘trapped populations’. A large body of work exists on the forced-voluntary continuum for immobility/non-migration, especially in the context of environmental changes [79,80,111]. Because this article focuses on including environmental migrants in sustainability for cities, reasons for city residents (often called ‘hosts’ in migration studies) already being there are not fully explored in this analysis, although they are and must be an integral part of the governance framework.

4. An Urban Governance Framework for Including Environmental Migrants in Sustainable Cities

This section presents the three characteristics of a proposed urban governance framework for including environmental migrants in sustainable cities: horizontally and vertically networked, inclusive, and evidence-based.

4.1. Framework Characteristic #1: Horizontally and Vertically Networked

Governance linked vertically means all scales connecting, from community or neighborhood to local or municipal to county to state or province to country and then international. Governance linked horizontally means considering jurisdictions nearby and beyond irrespective of the vertical scale. Local levels connecting is referred to as “translocal”. Translocal could be adjoining municipalities within a city—such as London boroughs—or could be city governments far from each other—such as the Global Parliament of Mayors and ICLEI which is Local Governments for Sustainability.

Meshing scales and considerations for environmental migrants becomes apparent near international borders. Borderlands studies demonstrate how fluid local-to-local and horizontal governance can be, irrespective of an international border. Kinshasa and Brazzaville, two capital cities separated by a river, are notorious for people smuggling between them [112] which is simultaneously a local (city-to-city) and national (capital-to-capital and country-to-country) issue. For the US and Mexico, migrant flows are continual between city pairs such as San Diego—Tijuana and El Paso—Ciudad Juárez [113] with governance scaling up to the national level through the US federal government patrolling and enforcing the border. Spain’s enclaves Ceuta and Melilla in Morocco epitomize the two countries grappling with local border crossings [114].

In making the best of horizontal and vertical links, cities offer creative ways of multi-level governance [115] for reducing vulnerability and including environmental migrants in sustainable cities. The ups and downs of local self-organization were demonstrated for informal and low-income areas of Valparaíso, Chile aiming to recover after a fire [116]. For Freetown in Sierra Leone, Monrovia in Liberia, and Dar es Salaam in Tanzania, a combination of state and non-state entities is shown to be the governance norm rather than being unusual [117], meaning that translocal as well as hyperlocal vertical and horizontal governance supports migrants and sustainability. For Barcelona, collective leadership pushing governance vertically upwards has reduced vulnerability of the most disadvantaged [118], a phenomenon also demonstrated through community gardening for local sustainability in Oslo and Bordeaux [119]. More generally for reducing vulnerability and increasing sustainability, complex networking is needed which melds horizontal and vertical governance [93]. Such horizontal and vertical linkages match governance literature, which ‘considers problem solving and opportunity-creation as a joint and interactive responsibility of all parties’ [120].

This multilayered networking within and among cities, with at least 64 city networks around the world devoted to helping arriving migrants [121], addresses multilayered vulnerability and sustainability including for environmental migrants and other often-

marginalized populations, using governance to create and address complexity [122]. It addresses complexity through governance by providing links, networks, and tools for public administration to reach vulnerability reduction and sustainability goals [123]. It creates complexity through the number of governance entities involved and their linkages, bringing in existing groups such as the C40 Cities Climate Leadership Group [124] which addresses some climate-related aspects of sustainability while trying to avoid marginalizing specific groups or individuals living in a city. These efforts lead to the next characteristic, inclusivity.

4.2. Framework Characteristic #2: Inclusive

Governance must involve and serve everyone in a city, including environmental migrants. People who are left out of decisions and services must nonetheless meet their day-to-day needs despite this vulnerability. Without formal support or governance, informal settlements with ad hoc infrastructure and services emerge. Typical difficulties are limited waste management and disease vector control, few opportunities for proper hygiene, high risk of fire and fire spread, inadequate shelter from the elements, and poor crime prevention. As was pointed out at the beginning of the COVID-19 pandemic in 2020, basic measures for avoiding the disease pose significant challenges in migrant settlements lacking resources [125]. People living there become excluded from health, education, sanitation, clean water, and other basic services [126].

These settlements create vulnerabilities and so are neither socially nor environmentally sustainable. Instead, they marginalize migrants, reduce equity and equality, and reinforce exclusion, as documented in cities around the world [127,128]. Exclusion, though, is not always forced onto environmental migrants, since some of them improve their own quality of life by excluding local residents. More affluent climate migrants choose to live seasonally in gated communities, such as Ontarians and New Yorkers who spend the winter in Florida as ‘snowbirds’ (also noted earlier for China) [34]. These choices are understandable at the individual level, yet consequences include pricing locals out of their own city which denies the right to the city [129] and so increases vulnerability and inhibits sustainability.

For inclusivity, a standard response then becomes ‘participatory processes’, seeking to involve all inhabitants in governance, including for reducing vulnerability through ‘people’s science’ [130] in which knowledge from those who are most vulnerable is integrated into decisions to support sustainability. While this work and a baseline suite of techniques started out as ‘participatory rural appraisal’ [131], it was soon applied to all contexts including cities [132], then evolving into ideas and activities applicable for participation in urban risk governance [133]. Implementation of knowledge ‘co-production’ [100,134] meant that the strengths of everyone’s contributions could be pooled to collaborate for action on sustainability.

These ideals were not without critics pointing out that inclusivity and participation which are forced or are done for box ticking achieve little and can augment vulnerability [135]. A response followed [136], suggesting ways to avoid the pitfalls, with empirical evidence supporting the limitations of local knowledge [81]. Migrants, in particular, have a high likelihood of not having deep local knowledge since they have not lived in a location for a long time. This situation does not preclude the value of the migrants’ knowledge—often complementing, supplementing, and enhancing what exists already—but its transferability must always be examined closely, preferably though including and exchanging among migrants and others.

Nonetheless, even when inclusivity is achieved to a significant degree, urban governance for sustainability might not improve. The city of Cochabamba, Bolivia demonstrates that participatory governance does not overcome a culturally engrained ideal that risk reduction is more of an individual household than collective responsibility [137]. In such cases, the fully open, participatory process might reach an inclusive decision that increases vulnerability and decreases sustainability. A third characteristic, ensuring that policy and

actions are evidence-based, is needed for the framework so that knowledge is not lost by using participation and inclusivity.

4.3. Framework Characteristic #3: Evidence-Based

Seeking an evidence basis for urban sustainability has long been advocated, such as in the UK [138] and for tackling poverty [139]. A wide swathe of evidence is needed, since environmental migrants are not a homogenous group. As noted in the introduction, reasons for environmental migration to (and from) urban areas vary widely, as do the resources, skills, and vulnerabilities that the migrants bring with them. Some urban migrants claim and are given refugee status, having never been in their destination country before. Others already speak the local language, have the country's citizenship, and are building on their existing networks.

Knowing who the migrants are, where they are from, why they are migrating, and what they do and do not bring with them is part of the evidence basis required in order to ensure urban governance for sustainable cities. An example of an evidence-based framework was developed for Boston [140], focusing on vulnerability as one part of understanding sustainability and covering everyone although easily focused on migrants as needed. For urban informal settlements around Latin America and the Caribbean, an analysis uses qualitative and quantitative approaches to examine evidence in reports for the New Urban Agenda [141] regarding governance for basic services [142]. Another approach systemizes a technique for understanding specific sustainability dimensions of communities in order to build up a comparative evidence-basis for governance decisions [143].

Evidence, though, is not a single coherent entity. Contributions include and bring together formalized science, local knowledge, indigenous approaches, vernacular techniques, and informal exchanges. For Manila, expert and elite knowledge proved to create a narrative untenable with flood-affected people's actual experiences [144] demonstrating the importance of not relying on a single approach to evidence. More generally, creating spaces and participatory processes that link different urban people(s) can support more evidence-based (and inclusive and networked) governance [106], as shown for self-organized groups in three European countries for reducing vulnerability to climate change [145]. Kolkata illustrates that evidence on migrants' knowledge is necessary for successful governance in all these sustainability areas [146].

Compiling evidence from across knowledge forms gives a level of power for governance, provided that an evidence basis is accepted, hence the need for this framework characteristic. Within governance theory [147], three main pathways are suggested for constructively applying evidence as power. First, those with power use it for positive large-scale change. Second, those in power change, leading to improvements in large-scale initiatives. Third, irrespective of who has power and the changes to those in power, small dispersed changes aggregate to large-scale change. These three pathways are analyzed within studies on smart city governance and vulnerability, with the evidence-based conclusion being that governance for sustainability is about people and institutions rather than technology [148]. Environmental migrants interact with institutions and so must be included in these processes, meaning that evidence can be obtained from them to contribute to governance, as was done in China [149].

5. Conclusions

The proposal here for the urban governance framework for including environmental migrants in sustainable cities could not be exclusive to specific numbers of migrants. The characteristics apply everywhere, recognizing that including everyone means one migrant or a million. The limitations of the governance framework apply similarly.

The main limitation, perhaps, is lack of specificity, which is also a strength. The framework's three dimensions are almost principles or overarching structural solutions rather than presenting operational guidance. Due to the contextuality of governance

and vulnerability processes, the sustainability process also becomes contextual, a major component of which revisits the continua that framed this article:

- Migration happens on a forced-voluntary continuum.
- Migration happens within the inseparability of environmental and societal influences.
- Urban and non-urban are not clearly delineated.

Specific governance tools and techniques are needed for a location's particular positionings within these three non-independent dimensions. An Icelandic urban area with the minimum requirement of 200 people would deal with 50 flood- or pollution-forced migrants differently than a Japanese urban area with the minimum requirement of 50,000 people [26]. Consequently, the academic theories underpinning this urban governance framework, notably with respect to vulnerability, require policy and practice input for effective co-design, co-implementation, and co-evolution.

The main future research direction would be participatory and action-oriented work determining how to refine the framework for application in specific contexts. This application would, in turn, inform and improve the theory and principles by extracting similarities and differences across contexts. What might apply to megacities (however defined) and hamlets considered to be urban? How much do population numbers and densities impact the urban influence on vulnerability and sustainability compared to other characteristics defining urban-ness or city-ness such as authority, power, service, identity, and culture? How much do terminology and labelling matter—whether migrant, host, or trapped; whether urban, suburban, peri-urban, non-urban, or rural; and whether environmental, climate, climate change, social, or combinations? Most important would be participatory and action-oriented research led by the migrants and hosts being studied, while accounting for the known limitations in enveloping local perspectives into the operationalization of the governance framework.

For reducing vulnerability and achieving sustainability, any urban governance framework must incorporate and respond to all voices. An urban governance framework can help in countering such narratives on a multidimensionally networked, inclusive, and evidence basis given that environmental migrants are known to support sustainable cities. They must be part of research, policy, action, and public discourse on governing urban environments under the massive social and environmental changes being witnessed that are challenging sustainability.

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