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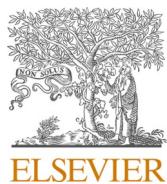
# The urban political ecology of 'haphazard urbanisation' and disaster risk creation in the Kathmandu valley, Nepal

Dilli Prasad Poudel [a,*], Sophie Blackburn [b], Rojani Manandhar [a], Binod Adhikari [a], Jonathan Ensor [c], Anushiya Shrestha [a], Netra Prasad Timsina [a]

[a] *Southasia Institute of Advanced Studies, Nepal*
[b] *University of Reading, UK*
[c] *Stockholm Environment Institute, Department of Environment and Geography, University of York, UK*

A B S T R A C T

This paper examines the impact of rapid urbanisation on the production of unequal disaster risk in Khokana, peri-urban town in the Kathmandu Valley (KV), Nepal. It brings together scholarships in disaster risk creation and urban political ecology (UPE), asking: (1) what are the roots of Khokana's specific urbanisation trajectory; (2) how is this trajectory altering geographies of hazard risks in Khokana; and (3) how is this risk unevenly distributed between social groups. The data reveal overlapping forms of risk and precarity affecting residents' (long-standing and migrants) everyday lives, in ways that disproportionately impact already-disadvantaged and marginalised groups. These unequal risk geographies are related to the specific forms and processes of urban growth occurring in Khokana, fuelled by three powerful, interconnected pressures: neoliberal capitalist expansion, internal migration, and a strong developmental state. We characterise the resulting form of urbanisation as 'haphazard': a patchwork of planned and unplanned developments, with inadequate attention to hazard risk, livelihood stability and essential services. The paper advances understanding of the place- and historically-specific ways that hazard risk intersects with social, political and economic forces to produce disaster risk in rapidly-urbanising centres. We extend calls for more situated UPE analysis and call for greater, more granular attention to forms of haphazard urbanisation and their uneven risk-producing qualities. We conclude an urgent need to reimagine urban development as a political and economic project, and for future urban planning to pay deliberate and deliberative attention to risk factors, both in KV and in other rapidly urbanising areas of the global South.

## 1. Introduction

This paper draws on extensive field research in Khokana, a rapidly-growing peri-urban town in the Kathmandu Valley, Nepal. In August 2021, while the research team were travelling for a meeting with members of the Khokana Ward Disaster Management Committee (WDMC),[1] our car broke down in muddy water. We consulted with nearby residents on whether this surface water appears frequently, and they reflected that it has become a regular phenomenon over the past decade or so. On later visits to Khokana in the

monsoon season, we witnessed landslides triggered by the increased outflow of the *raj kulo*[2] (royal canal - the local irrigation canal), another landslide near residential areas, and were told that both floods and landslides have become a frequent feature close to the Bagmati River which flanks Khokana. Residents further recounted that inundation in temporary settlements (*tahara basti),* where mostly migrant labourers reside, was a particular problem and was affecting those groups recurrently. Consistently, these observations and local narratives paint a picture of shifting geographies of hazard risk, and of uneven vulnerability, in and around Khokana.

This paper probes this shifting geography of risk in two ways, through an urban political ecology (UPE) lens. First, it asks why hazard exposure and vulnerability in this region is increasing over time. And second, it examines the drivers of unevenness and inequity in how these hazards are experienced. The answers lie in the particular forms and patterns of urbanisation occurring in Khokana, which are grounded in its specific historical and policy context. Although hazard risk is often portrayed as 'natural' (i.e. inevitable, irrespective of social processes, and depoliticised) in policy and popular discourse, the wider and multi-scale political and economic activities associated with urbanisation are equally implicated in the (re)production of disaster risk [1]. After Rios [2]; in this paper, we examine the intertwining of neoliberal urbanisation, associated socio-spatial and cultural changes, and shifting hazard risks, demonstrating how powerful interests are shaping urban trajectories in ways increase the hazard exposure and/or vulnerability of already-marginalised groups (such as migrant labourers). We draw on UPE and the political ecology of disasters to explain how processes of urban change are inscribing unequal power relations materially on the landscape in Khokana, through uneven geographies of exposure and vulnerability production (after [3,4].

We illustrate this in the case of Khokana, where large-scale development projects driven by national economic and geopolitical interests are transforming the physical landscape at an accelerated rate. Kathmandu Valley (KV) comprises Kathmandu, Lalitpur and Bhaktapur districts; with a total population of approximately 3 million [5], it is one of the top ten fastest urbanising areas in the world [6]. The valley has experienced rapid in-migration as a result of past development interventions (e.g. a new ring road) [7], political unrest and conflict[3] [8,9], displacement following the 2015 earthquake, and expanding employment opportunities [10,11]. As a result, the conversion of agricultural land into built-up areas has skyrocketed in the valley over the last three decades [12,13], and has rapidly expanded into the agricultural terraces of peri-urban areas. The built-up area of KV increased from 38 sq. km in 1990 to 119 sq. km in 2012 [14], expanding by 412% and converting 31% of agricultural land in the last three decades [13].

These historic and current trajectories have important implications for geographies of disaster, with urbanisation linked to growing exposure and vulnerability to a range of hazards [11–13,15–18,106]. In Khokana, the most significant hazards (as identified from prior research, local reports and research observations) are flooding, surface inundation, fire, earthquakes and landslides.[4] Data indicate that built-up areas in the 100-years return period for the KV floodplains will increase from 38 $km^2$ to 83 $km^2$ by 2050, and built-up areas in liquefaction-susceptible zones will expand by 13 $km^2$–47 $km^2$ over the same period [12]. This paper extends empirical accounts of how rapid and unplanned urbanisation is driving multi-hazard risk in the Kathmandu valley, by emphasising how these evolving risks are affecting communities unevenly and unequally – specifically, in ways that disproportionately impact low-wage migrant labourers and communities who rank lowest within the traditional caste system found in Khokana's Newari settlements.

Through stakeholder interviews and local accounts, the paper explores the concurrent emergence of new socio-spatial patterns (e.g. new settlements, market centres, industrial areas, and commercial farming), the conversion of ecologies for material benefits (e.g. land-use changes), and a shifting geography of hazard risks in Khokana. Khokana is distinctive for its deep cultural heritage (particularly the Newari) and also for the dynamic flux of its social and cultural make-up as a result of migration flows. The paper examines how urban change in Khokana is generating layers of intersecting contestation that are bound up in this place-specific cultural history: contestations over land and infrastructure, overlain with contestation over cultural claims to key heritage sites and routeways. The paper argues that these contestations constitute a form of social-political precarity that is bound up in and inseparable from other forms of everyday risk.

The paper brings into conversation scholarships in UPE and disaster risk creation [4,19,111], to thicken understandings of the urbanisation-risk nexus in rapidly growing urban and peri-urban areas of the global South or majority world.[5] We do this by developing the concept of 'haphazard urbanisation' – a term which captures a particular form and process of urban growth that emerges at the confluence of a strong developmental state, capitalist neoliberal forces, and place-specific local culture, norms and practices. By conducting UPE analysis of urban disaster risk creation in Kathmandu, the paper expands the empirical base for a more "situated" urban political ecology as called for by Lawhon et al. [21].

In the context of Nepal, we characterise Kathmandu Valley's development trajectory as 'haphazard' because it lacks risk-sensitive and pro-poor urban planning, resulting in new exposure to hazards (for people and infrastructure) and heightened vulnerabilities (indicated, for example, by overcrowding, poor access to essential services, and lack of compliance with risk-sensitive building regulation) [22]. Although the Nepali government began a process of planned urbanisation in Kathmandu in the 1960s, rapid in-migration and rising land prices have contributed to extensive unplanned construction at the same time. The paper demonstrates how disconnects between planned development projects, pre-existing hazard risk, unplanned or unregulated urban sprawl, and local socio-cultural dynamics are resulting in overlapping – and unequal – forms of precarity and risk in Khokana.

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[2] Throughout the paper we have used local and nepali language to describe particular placenames and phenomena that do not easily translate to english, and to enhance a sense of place. The meaning of these terms is indicated in text or footnotes.

[3] From 1996 to 2006, Nepal experienced maoist insurgency and civil unrest (see Lawati and Pahari, [9]).

[4] From here, the term 'hazards' or 'physical hazards' are used to encapsulate this group of hazards affecting Khokana. Note that river flooding is distinguished from surface inundation caused by extreme rainfall and lack of proper drainage.

[5] We propose that such urbanism may be particularly prevalent in – but not limited to – the majority world, owing to the rapidity of growth and confluent influences of colonial/neo-colonial legacies and global capitalism [20,107,110]. Whilst nepal was not formerly colonised, it has been subject to the political and economic influences of colonial and neo-colonial forces in south asia and the himalaya [108, 109].

This UPE analysis of 'haphazard urbanisation' advances conceptualisation of disaster risk creation in urban settings, by highlighting not only the role of political economy and gaps in regulatory implementation (already well documented in disaster risk reduction literature, including in Nepal e.g. [23], but also cultural and social dynamics at the neighbourhood scale. The paper demonstrates that disaster risk creation through urban transformations is uneven and unequal, cross-cut and compounded by multiple overlapping forms of precarity (physical, social, cultural, economic, etc). They are also fundamentally place-specific, contoured by the interaction of historical context, development discourse and current social-political-economic flows. The paper supports findings by Rumbach and Nemeth [111] that disaster risk creation, in its unevenness and inequities, has social justice implications.

Further, the paper has direct policy relevance. Its historical analysis identifies how powerful elite interests (central state departments, private investors) underpin current trajectories of urban growth and transformation in and around Khokana, the outcomes of which benefit some yet exclude and increase the vulnerability of others. Moving forwards, the paper calls for an alternative approach to urban planning: one that is pro-poor, risk-sensitive, and is both *deliberate* (i.e. risk reduction an integrated part of urban planning), and *deliberative* (i.e. inclusive).

The paper is structured as follows. Section 2 introduces urban political ecology as our theoretical lens on the interconnection between urbanisation and disaster risk production. This is followed by a review of historic and current urbanisation trends and the urban planning tradition in Kathmandu in Section 3, and an overview of data collection in Section 4. In Section 5, we will show how haphazard urbanisation is affecting the peri-urban geography and people of Khokana, shaping uneven risks to future disasters. In Section 6, we present a discussion focusing on unequal risk creation. Finally, Section 7 concludes this paper, summarising key contributions and policy recommendations. The paper draws on data collected as part of UKRI GCRF-funded project Tomorrow's Cities (see also [24,25]), which seeks to reduce disaster risk for the poor in rapidly urbanising cities of the global South.

## 2. Urban political ecology and disaster risk creation

Disasters are not 'natural' but intrinsically social-political phenomena [26]. They are a combined symptom of physical hazards and vulnerability, meaning socially-constructed sensitivity to hazard, and differential capacity to avoid, adapt, absorb, or control risk [27]. Power dynamics, cultural context and social relations result in geographies of risk that are locally specific, experienced diversely and distributed unevenly [26]. These diverse intersecting forces mean risk is inherently uncertain and complex [28]. Understanding risk and its (re)production demands attention to socio-economic and political environments [1], and to the decision-making norms and discourses through which vulnerability is produced and reproduced [29].

There is growing attention to 'disaster risk creation' as a constellation of active processes through which risk is produced and reproduced, both materially and as an immanent product of power, social and political relations. Disaster risk creation as a conceptual lens "focuses attention more squarely on human agency in the production and distribution of risk" [111], and on the governance decisions that "increase, or fail to decrease vulnerability'' [19]. The lens speaks directly to questions of accountability and responsibility in the root causes of risk [4] and to the social justice implications of this [111].

Aligning with this emergent scholarship, our paper examines how social, economic, political and cultural dynamics associated with rapid urbanisation are actively shaping and exacerbating geographies of risk and vulnerability in the context of Nepal. Disaster risk creation takes particularly complex forms in urban contexts, owing to cities' dynamic mesh of diverse cultures, powerful economic interests, diverse/competing knowledges and technologies, and complex governance arrangements [3]. Marxist human geographers argue that the material and social developments, cultural changes, market forces and the expansion of built-up areas associated with urbanisation are outcomes of political economic systems and historical processes of space production [21,30]. The production of space is socio-political [31] and cultural [32], reflecting histories of human interactions [33] ). The production of urban space incurs social-ecological transformations which are similarly and simultaneously shaped by the politics of class, gender, ethnicity, discourses and other power struggles [30].

In this paper, we adopt an urban political ecology (UPE) lens to investigate the historical processes giving rise to particular forms of urban change in the Kathmandu Valley, and in turn how these forms of urbanisation are affecting geographies of disaster risk. As an analytical lens, political ecology highlights the "choreographies of power" [34] that shape, and are shaped by, social-ecological processes, emphasising how unequal social-political relations are manifest in the landscape – often by analysing forms of social control over natural resources (e.g. [35–37]). Political ecology critically assesses how socio-political relations (individual, group or organisation) and individuals' positionalities (e.g. class, gender, access to resources, social networks, agency) shape actors' actions/practices and are brought into a position to stake claims, to have a voice, and to be recognisable by authorities [38] while accessing, accumulating and materialising/metabolising natural resources. Access to, control over and transformation of natural resources/landscapes is informed, influenced and appropriated differently by various actors and their inclination to certain knowledge, hence the conversion of space is shaped by the interests of actors which is not independent of the existing social structures and their differential socio-political positionalities. This paper's case site, Khokana, is transforming socially and physically as a dynamic mosaic of co-dwelling indigenous Newar and migrant communities, and economically with the co-existence of farmers (subsistence and commercial), factory owners, labours, and large-scale development projects, real estate and market activities. These co-dwellers have different socio-economic positionalities, vulnerabilities and capacities [39].

As a sub-discipline of political ecology, UPE analyses the dialectic relationship between urbanisation and ecological transformation [40]. UPE critically analyses how processes of capital accumulation[6] shape flows of people, resources and capital and the

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[6] Capital accumulation is a neoliberal force which appropriate and organize a city/place in favour of wealthy investors, builders and elites by influencing policy making and modifying land use, culture and social formation (Lawhon et al., [21]).

commodification of nature. To Heynen and Robbins [41]; neoliberal urbanism as a process is negotiated, dynamic, and environmental destructive. Swyngedouw [42] uses urban metabolism as a lens to unpack flows and processes of exchange, transformation, circulation, and appropriation in urban settings. UPE emphasises how power operates in urban settings and how infrastructures and urbanisation shaped by power relations reinforce capital relations and capital accumulation [21]. These analyses often focus on particular urban artifacts, such as the governance and/or privatisation of water management systems (e.g. [43–45], to open questions about equity and justice in how those systems are governed and accessed. Lawhon et al. [21 p.500] explain:

> UPE is concerned with the processes of the urbanisation of nature, or the social, cultural, and political relations through which material and biophysical entities become transformed in the making of often unequal cities. It contributes a historicised and politicised understanding of urban ecologies.

In this paper, we examine the exacerbation and uneven production of disaster risk as a product of interconnected urban politics and socioecological transformation. In the case of Khokana and KV, we find that haphazard urbanisation reflects an accelerated trajectory of neoliberal capitalism[7] [46,47]; see also [48]. UPE helps us examine how nature has become haphazardly urbanised historically, and how neoliberal policy-making has shaped risk in an agricultural peri-urban society. We analyse how new hazards and vulnerabilities are being built into Khokana's landscape at an accelerated rate through planned and unplanned urban construction. After [49]; the paper's methodological and analytical approach pays attention to the everyday messiness of urban life, and by extension, the production of disaster risk. The paper's empirical focus speaks to calls for a broadened conceptualisation and evidence base of urbanisation politics in the global South (e.g. [50–53]. This "more situated" urban political ecology, Lawhon et al. argue, "creates the possibility for a broader range of urban experiences to inform theory on how urban environments are shaped, politicized and contested" [21]). We propose further research on disaster risk creation in emergent urbanisms and peri-urban areas as an extension to these calls.

## 3. Urbanisation trends and flows in the Kathmandu Valley and Khokana

This section examines how the intertwining of political and cultural history, neoliberal economic policy, state-led infrastructure planning, and associated flows of people and capital, have culminated in place-specific trajectories and forms of urbanisation in the Kathmandu Valley, and in Khokana specifically. It ends with an outline of eight emergent socio-spatial patterns that arise from these interconnected trajectories, informing the subsequent analysis of emergent and uneven geographies of disaster risk creation in Khokana.

### 3.1. Historical drivers of urban expansion in Kathmandu Valley: a strong developmental state, neoliberal expansion, and internal migration

Despite the mix of communities and cultures living in Kathmandu Valley (KV) today, historically the area has been strongly associated with Newari culture. Indeed, until the late 1700s, KV was solely inhabited by Newar[8] communities [54] [2007]. However, following the defeat of the Malla King of Kathmandu by the King of Gorkha (western Nepal) in 1778, namely Prithivi Narayan Shah, there began an influx non-Newar groups from outside the valley, such as Brahman and Kshetri groups, and those who migrated with the Gorkha King as armies and priests. This migration flow continued from the 18th to mid-20th century, contributing to a cultural diversification of the area – although at this time there was minimal impact on the valley's urban morphology. Even into the early 1970s, when there were around 600,000 inhabitants in KV, more than half remained in smaller rural settlements in the periphery, depending fully on agricultural practices [55].

Urban growth began to accelerate after the Government of Nepal began a programme of systematic urban planning in the 1960s, starting with the formulation of the Town Development Committee Act, 1963 [56]. This act provided a legal basis to prepare the first physical development plan for KV in 1969, which followed a multi-nucleated regional growth strategy linking dispersed settlements by constructing road networks [57]. Subsequently, the Town Development Implementation Act in 1972 enacted the Kathmandu Valley Town Development Plan, of which a 28-km-long ring road was the major feature. Urbanisation in KV – consisting of Kathmandu, Lalitpur and Bhaktapur districts – accelerated in the mid-1970s after completion of the ring-road, with an accelerated flow of capital and labour alongside (see also [10,47,58]. The construction of the ring road increased the migration of people out of Kathmandu city centre, with people in the city core starting to buy land and settle in more towards lower-density, more peripheral areas (interview with urban planners, 2020). Proximity to Tribhuvan International Airport (TIA) (constructed in 1949[9]) helped facilitate the growing tourism industry and other associated businesses across KV.

Subsequently, in 1976, the Kathmandu Valley Development Committee categorised the valley into three zones: A (city core), B (city fringe), and C (planned settlements). Movement within and between these zones was facilitated by the construction of major trunk or arterial roads, with routes going north (Budhanilakantha), east (Nagarkot), west (Thankot) and south (Godawari) of the valley corners, in addition to the construction of the Bishnumati-Bagmati river corridor road and other feeder roads during the 1990s. These corridors have further expanded the city areas within the ring road, substantially increasing the mobility and connectivity of people and businesses.

Although various development plans have contributed to planned urban development in the KV, the Kathmandu Valley Urban

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[7] "Neoliberal capitalism is a political ideology that advocates private property, the privatisation of social resources, the flexibilisation of regulatory frameworks that might hinder free market values" [48].

[8] Although the term "newar" is actually a geographical concept, denoting anyone who lived in the valley (irrespective of his/her ethnic origin), it first came to be used to denote a distinct cultural identity during the 17th century [54] [2007] and continues to be used in that way today.

[9] Although the formal beginning of aviation in Nepal occurred in 1949, The Tribhuvan International Airport, which used to call *Goucharan* airport, was inaugurated in 15 June 1955 by the King Mahendra.

Development Plans and Programs [59], prepared in 1991, was particularly influential in shaping urban expansion towards peripheral areas. This plan made various strategic recommendations related to land use, environment, infrastructure, financial investments, and institutional aspects of the urban development in the valley [10,59–61]. This policy encouraged private sector real-estate development in KV, motivated by a dual desire to stimulate the KV economy and reduce population pressures in Kathmandu city-core. The urban expansion was focused on greater Kathmandu, extending beyond the ring road and the municipal boundaries.

This policy was a significant factor in a KV real estate boom which began in the mid-1990s, which further accelerated urban growth in KV and over time has contributed to deep transformations in the valley's formerly agricultural landscape. Land speculation spiked through individual brokers and companies buying portions of farm land, dividing and selling the smaller plots to lower/middle-class migrants (see also [47,58]. These brokers also commercialised housing plots by constructing access roads linking major trunk/arterial roads. By 2000, real estate became one of the most lucrative forms of investment in KV [62]. This was additionally fuelled by a proliferation of financial institutions together with an excess liquidity situation in the past [62]. According to Nepal Land and Housing Developers' Association[10], the current land price in KV has risen by 300% since 2003, and is one of the key drivers of land use change. The increasing number of middle-class migrants in the KV demand modern facilities such as housing sub-divisions and colonies with modern amenities (e.g. private parking, grocery stores, restaurants, etc.), which expanded towards the peripheries. Throughout the 2000s, the built-up areas continued to expand further along the major roads that link the outskirts of the five municipalities (Kathmandu, Lalitpur, Bhaktapur, Sanothimi, and Kirtipur).

The National Urban Policy 2007 [63] aimed to achieve balanced urban development and improve the livelihood of the residents by creating a land-use plan to manage urban growth and ensure a clean, safe and prosperous urban environment (clause 4.1.2). However, it also promoted private investment in infrastructural development (clause 4.1.6), further fuelling neoliberal urban developments that did not necessarily align with the aspirational values of the policy. Furthermore, the policy is silent on the risks originating from or exacerbated by new infrastructural construction. As a result, unfortunately, KV's urban planning policies have largely failed to address multiple urban risks arising from unplanned urban sprawl, including traffic congestion, poor water supply, pollution, and unplanned housing in the longer-term ([60]; IUCN, 1999 as cited in [56]). Furthermore, the focus of the National Urban Development Strategy 2017 is also to encourage economic activities in the peripheries [64], again creating space for capital accumulation for neoliberal economic activities and encouraging migration for job opportunities.

The sum effect of state-led infrastructural developments and the neoliberal growth they facilitated (both directly and indirectly), has been large-scale conversion from open agricultural land to enclosed, built-up urban space in KV. The availability of housing stock and increased desirability of KV among middle-class city dwellers, as well as expanded job opportunities for low-skill or working class laborers, have together fuelled a significant movement of people out of the city centre. Meanwhile, other drivers of internal migration are also very significant. The decade-long civil unrest that began in the mid-1990s generated a huge influx of internally displaced people to the valley [8]; see also [9]. In total, it is believed that more than 500,000 people were displaced during the Maoist insurgency period [11], most of them resettled in the periphery of KV [58,65]. Additional pressures arose following the 2015 earthquake[11] (see [66], which also caused mass displacement.

Through the combination of government policy, neoliberal urban expansion, and various migration pressures, KV saw 117% growth in built-up areas and increased economic activities during the period 1999 to 2009 [13]. In 2011, the valley population consisted 46% inter-district migrants, 74% of which were born in rural areas [14]. With 10% of the total population occupying less than 1% of the total land of the country [67], the valley accommodates 24% of the nation's urban population [14], hosts 40% of urban manufacturing, 25% of urban non-farm employment [14], and accounts for 31% of the total GDP [62].

After the federalisation of Nepal in 2008, several rural areas which were formerly part of the then lowest administrative unit of the Nepal government called Village Development Committees (VDCs) were converted into municipalities, which are considered urban in Nepal.[12] Khokana was one of them, merging with neighbouring VDCs to become Ward no. 21 of Lalitpur Metropolitan City (LMC) in March 9, 2017 – although Khokana itself retains many rural characteristics even today. Over the last two decades, the proportion of mixed residential and commercial areas in KV has increased by 524%, and that of residential areas has increased by 331% [14]. The majority of this expansion occurred in the periphery of Kathmandu, Lalitpur and Bhaktapur municipal areas. Planned development area in the southern part of Lalitpur (i.e. Bhainsepati/Shainbu Housing Area, see below), bordering Khokana, is an example of such expansion. The implementation of housing projects in Bhainsepati, as we analyse below, has a direct influence on changing socio-spatial patterns and the production of risks in Khokana.

### 3.2. Khokana culture and society

Our analysis now turns more specifically to our study site, Khokana: a medieval Newari town covering a total area of 3.2 sq. km, located in Ward no. 21 of Lalitpur Metropolitan City (LMC) (see Map 1), on the southern part of the Kathmandu valley. Khokana borders the Bagmati river[13] in the west and south, Chovar gorge (the only outlet of KV's rivers) in the north, Bungamati (a Newari town) in the south and Sainbu-Bhainsepati (the area's first planned settlement) in the east. The 2021 census records 1235 households in Khokana (with a population of males 2646, females 2628), however this figure excludes undocumented migrants. According to key

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[10] Further information available at: https://www.nlhda.org.np/[accessed 30.01.23].

[11] The 2015 earthquake with 7.8 (April) and 7.3 (May) on Richter scale killed about 9000 people, injured 22,300, destroyed 600,000 houses, and damaged 288,00 houses in Nepal [66].

[12] See https://www.mofaga.gov.np/[accessed 08.06.23].

[13] The Bagmati river flows out of the Kathmandu valley through the outlet in the Chobhar gorges and then from Khokana.
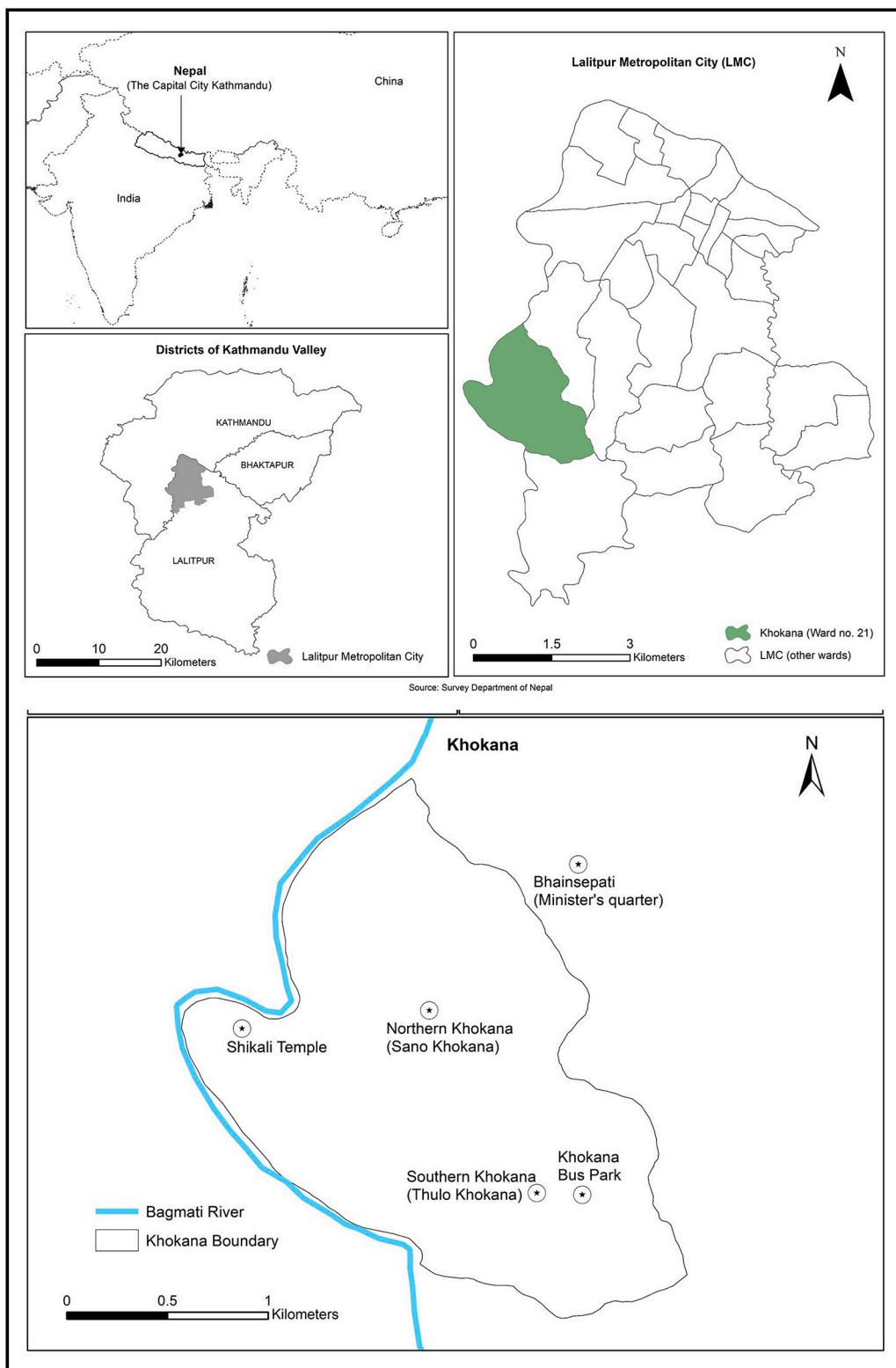
**Map 1.** Location map of the study area, Khokana

informants, migrants make up to 30% of the present Khokana population, and the total population may be closer to 1500 households.[14]

Within the long-standing Newari population in Khokana, the main groups are *Maharjan* and *Dangols*, both indigenous Newari (*Jyapu* or farmers) communities who moved several centuries ago from core Kathmandu to Khokana (south) and Sano Khokana or Chwekhona (north) set in the hillocks. A characteristic of Newari culture is the *Guthi* system, a traditional form of social organization which informs the role played by different groups (higher and lower caste) in the performance of various social and religious practices within the community. Like all Newari communities of KV, each and every Newari family within Khokana is associated with at least one of the two main types of Guthis, namely *Jatra* (festival) *Guthi*, and *Malami Guthi* (members facilitating funeral practice). Both *Guthis* are divided into several sub-*Guthis* (for instance, *Jatra Guthi* is divided into *Ta-Guthi*, *Sana-Guthi* and *Ja-Guthi*). By the virtue of their lineage, each household is responsible for performing specific tasks – such as organising various festivals, or managing funeral rituals. *Guthis* are gender exclusive, meaning only male members of a family can be a member of the *Guthi*.

Alongside the main groups outlined above, there are also a number of more socio-economically marginalised Newari groups, including *Kapali* (musicians), *Kushle* (swipers), *Napit* (nail cutters) and *Shahi/Kasai* (butchers). These lower-caste groups traditionally serve the *Dangol* and *Maharjan* (considered higher caste communities) during festivals, and otherwise are mostly employed as laborers on *Dangol* and *Maharjans*' land. Making up approximately 4% of the total population of Khokana (2011 census), these groups generally reside on the edges of the core settlements. Although these lower-caste groups play important supporting roles in the community, they are not considered part of the *Guthi* system and generally experience a marginalised position within Newari society.

As outlined in the previous section, the expansion of industrial and other commercial activity (including commercial agriculture) across KV has also attracted an increased number of migrant workers, including low-skill/low-wage laborers and some factory owners. These groups are generally considered 'outsiders' from traditional Newari society, lack social ties and political connections locally and often have reduced access to spaces of decision-making (e.g. not being invited to participatory governance activities). Migrant workers typically live in previously cultivated areas, prone to inundation, either renting land, living in temporary shelters or in newly constructed houses.

### 3.3. Why Khokana for planned urban developments?

Khokana occupies a highly strategic location, and has attracted the attention of the Government of Nepal for intensive development for several reasons. First, being the first town to be electrified in 1911, it was not only the major junction for valley dwellers visiting out of the valley and across the Bagmati river in the past, but it was also an international trade-route juncture to enter KV during the Rana regimes (1846–1951). The present emergence of large-scale developmental and constructional projects in and around Khokana is influenced by this history, owing to the *trans*-border trade route. Second, it is the nearest location to the southern plain (or Tarai) region of Nepal, which borders India, offering possibilities to connect two densely populated areas of Nepal (i.e. KV and Tarai, and beyond the Tarai, across the border to India). Third, it has a residual huge chunk of open space in the form of agricultural land, which is changing rapidly due to the effect of urbanisation and where the government has plans to develop a 'smart city' in the future.

The above factors mean the central government has identified Khokana as the focus for several strategic, large scale and multi-billion rupees construction projects, which are being funded by the federal government, international organisations such as the Asian Development Bank (ADB) and private business companies. The ongoing major development projects of Khokana include: (i) a 72.5 km long "fast track" road project to connect KV with Tarai [68], (ii) the smart cities project [69], as part of plans to develop smart cities in all four corners of KV [70], (iii) the 72 km outer ring road project to connect peri-urban settlements and planned smart cities [71], and (iv) the high-tension transmission line project to fulfil the increasing demand of power supply in urbanising KV [72]. Except the outer ring road, all of these projects pass via Khokana and use its land. The effects of these intensive development projects are felt in the local Newari livelihoods and culture [73], and are generating new socio-spatial patterns of urban growth or change that are altering exposure to hazards. These shifts to date remain unexplored, and are a focus of this paper.

Governmental interventions for urban expansion in the area were informed by the adoption of neoliberal policies in the early 1990s. In 1991, the government commissioned Bhainsepati-Sainbu as a new housing area in the vicinity of Khokana, aiming to develop it as a nucleated urban site [10]. Completed in 2002, this is a popular residential area for Kathmandu's political and business elites. Presently, the government is constructing new residential buildings for various parliamentarians and ministers in this area. Our respondents recalled, that until three decades back, the farmers of Khokana owned the land in Sainbu Housing and primarily cultivated maize and millet in the area. By early 2000s, however, the land of this area was completely occupied by the housing companies and land brokers, displacing locals. The trend of buying land for high-end real estate and housing is, increasingly, spilling over to Khokana which has experienced an unprecedented level of urban growth in the last two decades.

### 3.4. Socio-spatial changes in and around Khokana since 2000

This section examines the specific form that urban change is taking in Khokana, informing the analysis of uneven/unequal exposure and vulnerability to hazards in subsequent sections.

The government land pooling policy in the 1990s stimulated a rapid acceleration of city expansion in KV, with concomitant phases of land speculation and a real estate boom. As a result, Khokana has experienced three decades of continuous urban sprawl, with rampant conversion of productive farmland into built-up areas, and the commercialisation of cultural and historical sites as tourism has expanded. We observed eight sites of socio-spatial change (these are listed in Fig. 1, items a – h) arising from this period of rapid change (including two old settlements, Khokana and Sano Khokana). Each of these is addressed in-text below. Key trends overall include shifts in market centres, residential areas, commercial farms and factories, and modernising traditional settlements.

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[14] The government has not published all the population census 2021 data yet, so we had to rely on key informants.
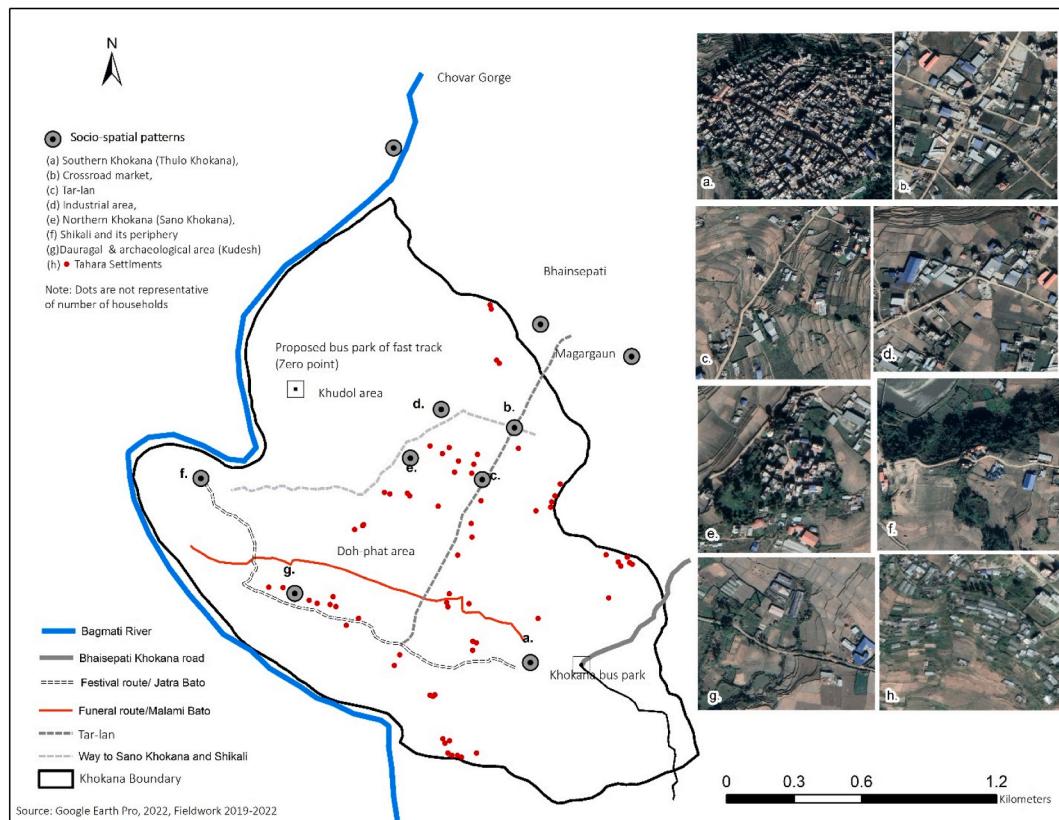
**Fig. 1.** Emerging socio-spatial patterns in Khokana.

Compared to northern Khokana (or Chwekhona), **southern Khokana (a)** is bigger in size and population density (90%), with the 17th century Rudrayani temple in the middle of the four traditional settlements (namely Thalachhi, Kwelachhi, Ta-Jhya and Baha-liune) and numerous other cultural/communal spaces. Historically, Khokana lay on the medieval Indian-Tibetan trade route ascending from India to the Bagmati river, then entered Patan or Lalitpur city through Khokana [74]. While the core settlements of southern Khokana have remained relatively intact, maintaining their cultural identity as homogenous traditional societies, the periphery areas are on the verge of rapid transformation. In particular, there are rapidly increasing built-up areas around the Khokana bus park in southern Khokana, and an in-migration of wage labourers in agriculture, construction activities and light manufacturing factories (see Fig. 1). This growth has accelerated the construction of new residential buildings and temporary houses known as *taharas. Tahara* literally refers to a temporary house, built from zinc-coated steel, bamboo, or iron which are built in farmland and scattered in and around Khokana. Many *taharas* were constructed by the local victims of the 2015 earthquake. In addition to new constructions, these houses are now occupied/rented by people with low economic status (particularly, low-wage migrant laborers), but are not equivalent to informal settlements in the sense they are (generally) built on legitimately acquired land (Photo 1). The expansion of *tahara* residential areas is reflected in the growing number of migrant students (60%) in a local school.

The rate of inward migration has been higher, however, in **northern Khokana (e)** (i.e. Chwekhona or Sano Khokana), triggered by multiple factors including its flat geography, proximity to Bhainsepati (a local market centre with high-class residents), and to ongoing large scale development projects such as the fast track road and high tension transmission line, thereby increasing the value and rate of land transaction in the area. Northern Khokana is rapidly transforming into a more heterogenous (socially and economically) urban society.

Once flanked by agricultural fields, **_Tar-lan_ (c)**, a historical route extended from Bhainsepati to the southern part of Khokana (see Fig. 1c), and the **crossroad market (b)** settlements (a newly emerged market centre between Bhainsepati and northern Khokana, locally called *Bhewakwe*) have experienced an increased pace and expanse of urban sprawl. A migrant resident of the crossroad settlement explained, *"the vast open and reasonable land value/rents and the low population density attract the factory investors and the commercial farmers in Khokana. Also, proximity to the market centres at the city cores* [i.e. Bhainsepati, Kathmandu and Lalitpur] *makes Khokana a fascinating site for operating busiesses"*. Plans for the fast track road are particularly significant in encouraging new industries in this area, since it will reduce travel distance from Kathmandu to Tarai, and subsequently, to India, and hence increase the market possibilities. These factors have contributed to several small-scale manufacturing industries[15] becoming established in Khokana,

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[15] These include, for example, manufacturing of clothes, shoes, ironwork, tobacco, soap, raincoat, hoarding boards, furniture, building materials, plastic & plastic bags, sacks, etc.

**Photo 1.** View from Northern Khokana (foreground) to Southern Khokana (background). New industrial activities (factories) and tahara settlements are visible in the area in between. [Photo: December 21, 2021].

mostly operated on rented land. These are located primarily along the road from the crossroad towards northern Khokana, while others sit along the *Tar-lan* to southern Khokana.

Associated with these new/expanded economic activities, numerous ***tahara* settlements (h)** are visibly mushrooming in between the mosaic of terraced farmlands, nearby existing settlements and the **industrial area (d).** New restaurants and hotels have also been established, transforming the land between southern and northern Khokana into lively commercial spaces. ***Dauragal and Ku-desh***[16] **(g),** located in the southwest part of the *Doh-phat*[17] area (i.e. agricultural field) (see Fig. 1), are also transforming with an increasing number of *taharas* housing labourers in commercial vegetable farming and animal husbandry. A local teacher explained that the major "pull" factor for these activities are affordable land rent, open public land for grassing (i.e. *Ku-desh*), easy access to water (near Bagmati river) and markets (city centres in Kathmandu and Lalitpur).

Finally, **Shikali (f)** – a hillock with a historic temple atop, located on the bank of Bagmati river – is rapidly emerging as a touristic hotspot with the flow of visitors for recreational and commercial purposes, especially during weekends and holidays. This location is increasingly a preferred site for video makers and cyclists, yet also holds historic and cultural significance as an important holy place for religious pilgrimage. Various hotels and restaurants have opened along the route from northern Khokana to Shikali, with substantial increase in the land trading and speculation around the Shikali area during the last few years. These factors have contributed to the conversion of agricultural land close to Shikali and the interruption of traditional pilgrimage routes (further outlined below), contributing to changes in the appearances and values of Shikali from a cultural site to a commercial space.

## 4. Data collection and local engagement

Data were collected over three phases of fieldwork, using a mix of qualitative and semi-ethnographic methods: household and key stakeholder interviews; focus group discussions; participatory hazard mapping; workshops; and observational transect walks. Full consent and the right to leave the research process at any time were discussed and agreed with participants prior to data collection.

Phase 1 commenced in Khokana in July 2019, and focused on understanding the changing socio-spatial patterns of urbanising Khokana (as summarised above). We conducted interviews with community respondents via household interviews, and expert stakeholder interviews with urban planners, migration experts, and disaster management authorities in Kathmandu city and the Kathmandu Valley Development Authority. In this phase of fieldwork, we adopted accidental and snowball sampling at the community level and used our network while selecting experts and institutional heads at the city core.

Subsequently, Phase 2 was conducted in Khokana in 2020. It focused on understanding local geographies of vulnerability and risk creation through socio-economic hierarchies, differential and unequal capacity of community members to respond to risks, and haphazard urbanisation. This phase built on our engagements during the first phase, which aided us in selecting and interviewing differently positioned households such as households from socially marginalised communities, migrant groups, commercial farmers and factory owners.

Phase 3, in 2021, adopted group and co-learning methods to further explore community experiences of risk and resilience (see [75,

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[16] *Ku-desh* is an archaeological site of Khokana where the first settlers of the present Khokana and Chwekhona (i.e. northern Khokana) used to live. Douragal is the lowest part in *Doh-phat* – the agriculture land (see the next footnote).

[17] *Doh-phat* is a vast and extended agriculture land between Khokana (south) and Chwekhokna/Sano Khokana (north) where rampant constructional activities are going on.

76]. We deployed focus group discussions (FGDs) and workshops with a diverse community group and representatives from the Ward and Ward Disaster Management Committee (WDMC). The researchers sought a sample of community participants that reflected the cultural, economic and social diversity of Khokana, with strong representation from marginalised groups. The goal was not only to collect information but also share findings and seek local verification of these. Through a series of workshops with the WDMC, and building on Phase 2, we identified five sub-groups who represent the differential socio-economic positionalities of Khokana, from which to seek disaggregated views on risk production. The sub-groups were: women and marginalised households,[18] migrants,[19] wealthy households[20], the people from the high-risk *Ta-jhya* settlement (particularly exposed to fire risk), and the people from northern Khokana (called Sano Khokana or Chwekhona).[21] Re-formed in 2021, the WDMC was deemed a suitable advisor given the committee is made up of community members and itself prioritises inclusive representation in its membership. FGDs were held with each of these groups separately, with the objective to explore their experience and perceptions on how disasters were caused by rapidly urbanising Khokana, decreasing agricultural activities, increasing incidence of hazards, ongoing constructional activities, and development projects. We used a common interview guide for these discussions.

Building on this disaggregated FGD data, we organised a Participatory Hazard Mapping (PHM) workshop in August 2021. In consultation with WDMC and the members of the above mentioned five disaggregated groups, we selected key informants from disaggregated groups, victims of hazards (i.e. farmers), and other local stakeholders. The PHM exercise aimed to locate existing, observed and experienced hazards in a sketched boundary map of Khokana provided by the researchers. The PHM provides our base document from which to analyse the shifting geography of hazards and disasters in Khokana (see Fig. 2). It identifies and illustrates the history of hazards in the area, increasing hazards due to modernisation and neoliberal development, and new risk-prone communities (both local and migrants). Additionally, we conducted several observational transect walks during periods of fieldwork, to observe new social patterns, identify and witness active hazards, conduct ground verification of hazard sites identified by participants, and conduct informal *ad hoc* discussions with people we met along the way. We also held a community visioning session, exploring how community members imagine what 'future Khokana' will look like in the years ahead. The findings from this workshop are beyond the scope of this paper and are not presented in detail, however they provided added contextual detail on local priorities and values and hence are listed in Table 1.

Data were collected in Nepali. After each visit and interview, we wrote detailed fieldnotes to capture initial reflections. Interviews and focus groups were later translated and transcribed in English for analysis. All data were analysed thematically using standard coding techniques. During write-up, we sought consistently to select representative voices for quotation [113], reflecting the differential experiences of diverse groups.

**Table 1**
Data collection, July 2019 – March 2022.

| Dataset number | Individual interviews | Number of interviews | Gender of respondents |
|---|---|---|---|
| 1 | Interview (household and key informants) | 22 | 16 M + 6 F |
| 2 | Interview with Ward officials | 3 | 2 M + 1 F |
| 3 | Interview with municipality officials | 3 | 3 M |
| 4 | Expert stakeholder interviews (planners, and Disaster Risk Reduction and migration experts including the head of Kathmandu Valley Development Authority and Ministry of Home Affaires ex-Disaster Management head) | 8 | 8 M |
| **Total** | | **36** | **29 M + 7 F** |

| Dataset number | Group methods | Number of group sessions | Gender of respondents |
|---|---|---|---|
| 5 | Focus Group Discussion with community and local stakeholders (drawn from a mix of high-income households, marginalised households, migrants, households from Ta-Jhya *tole*/settlement and northern Khokana, WDMC members) | 6 | 32 M + 14 F |
| 6 | Workshop with WDMC | 5 | 47 M + 19 F |
| 7 | Participatory Hazard Mapping (PHM) | 1 | 6 M + 1 F |
| 8 | Visioning Workshop (VW) | 1 | 21 M + 6 F |
| **Total** | | **13** | **106 M + 40 F** |

[18] Since *Kushle*, *Kapali*, *Napit* and *Shahi* communities within Newari society have low socio-economic and political positionalities in Khokana and who also considered as low caste community in the past, we have categorised them collectively as a marginalised group. Women are also included here and clearly there are intersections between these forms of marginality and exclusion. Unfortunately, a gendered analysis was beyond the scope of the paper – this warrants further investigation.

[19] This category includes low-wage laborers, tenant farmers, and factory owners.

[20] Wealthy households are defined as local Newar families with more than 5 ropani (0.25 ha) of agricultural land.

[21] Being the smallest (10% of the total population) and separately settled ancient town, and to have different perspectives, we categorised the northern Khokana separately throughout our engagements in Khokana. This was also recommended by the WDMC.

## 5. Forms of haphazard urbanisation and their impacts on disaster risk creation in Khokana

The UNDP published in 2010 [112] that the unplanned expansion of cities to accommodate rapid population growth, combined with inappropriate land-use planning and the failure of urban authorities to regulate building standards and policies, contributes to the increased vulnerability of urban dwellers. The new Constitution of Nepal 2015 and, subsequently, the Disaster Risk Reduction and Management Act 2017, ostensibly called for greater attention to disaster risk management in the aftermath of the 2015 earthquake, making provision for a range of new risk governance structures – however there are questions over the adequacy of their implementation [23]. In practice, urban planning still too often does not adequately consider the differentiated and locally specific experiences of vulnerability as a core element of decision-making – demonstrated as follows in the case of Khokana.

Khokana is exposed to a range of physical hazards including earthquakes, fire, inundation, flooding and landslides. According to interview respondents and participatory hazard mapping (PHM) sessions, whilst earthquake and fire only pose occasional threats to Khokana, incidences of flooding, surface inundation and landslide are recurrent during the monsoon season. These events are reported to have increased in tandem with the increased rate of urban expansion, particularly the government's planned developments in Sainbu-Bhainsepati which pushed urban sprawl in the direction of Khokana. Earlier, Section 3 highlighted the powerful state and private sector forces driving urban expansion and densification in Khokana. The following sections outline the manifest forms and characteristics of haphazard urbanisation arising in Khokana, and their role in shifting geographies of disaster exposure and vulnerability.

### 5.1. Urban densification

The first risk-producing feature of Khokana's rapid expansion is the densification of its existing settlements. Densification in already congested settlements with narrow alleys and streets has exacerbated its susceptibility to fire hazards in particular. The area has experienced three significant fire events in the past [39]. A female participant in a focus group discussion recalled the incidence of fire in her house 25 years ago as follows: *"due to the narrow alleys, it was impossible to reach for the fire brigade, and the community put out the fire using the water stored in large earthen pots* (called Ghyampo) *and from the nearby well"*. As a preparedness measure or immediate response mechanism, the ward has installed 200 m long water-hose pipes in a local pond (called *De-pukhu*) in 2019, and arranged emergency kits in two places. However, considering the rapidity of densification in both existing and new settlements in Khokana, locals believed these arrangements are not adequate to tackle future hazards. According to the WDMC member representing Nepal Police noted: *"these trainings and drill exercises that happened once in a while, are not enough and effective during the actual events which usually demands timely and effective rescue, relief and assistance. Lack of trained human resources to monitor and use them in case of emergency usually backfire the response procedure"*. The data suggest that the densification of existing and new Khokana settlements – including *tahara* settlers – needs to be closely monitored and regulated to ensure adequate communication and access for emergency response and evacuation.

### 5.2. Undue attention to known hazard risks

Our stakeholder and community interviews, participatory hazard maps and transect walks collectively indicate that development interventions planned by the Government of Nepal and private investors are not sufficiently sensitive to – or, are being implemented in spite of – known, existing hazard risks. There are various examples of this (Fig. 2).

First is the expansion of construction and commercial activities close to the Shikali Hillock: a vibrant and emerging hub for local tourism, located at the edge of the Bagmati river. Water levels in the river soar during the monsoon, and the adjacent areas have experienced continuous bank erosion and landslide issues for more than three decades. A tree plantation program conducted around 25 years ago went some way to slow the rate of erosion and landslide events on the west and north side. However, according to a ward representative, the total area of Shikali has nevertheless shrunk from 4.78 ha to 4.17 ha. Consequently, whilst once located in the middle of the hillock, the Shikali temple has now shifted along the edges, mostly eastwards. Furthermore, a crack of approximately 60m (running east-west, around 10 m north of Shikali temple), induced by the 2015 earthquake (see Fig. 2, c1), has aggravated the landslide risk. Discussions with the Ward chair revealed that the monsoon-induced flooding and landslides along the Bagmati river present an annual threat to culturally valuable crematorium sites belonging to different caste groups, including the crematorium for infants, which are located on the edges of the Bagmati river on the south-western sides of the Shikali hillock (see Fig. 4, G1 and G2).

Despite these known risks, construction and commercial tourism activities continue apace around Shikali (Photo 2), threatening not only the Shikali temple itself but also the sociocultural values associated with it. An article titled "Our land is us and we are our land" (as spoken by a Khokana activist) clearly highlights the close emotional and cultural connection between traditional Khokana society and the landscape. This close connection is threatened by the expanse of the ward targeted with development projects [77]. As a marginalised male from the Kushle community shared, *"the present alignment of the fast-track ran through our cremation ground and if it does not consider this, we will be alienated culturally. Also, the increasing land speculation increases the land encroachment of these crematorium sites and add more risk to our culture and tradition"*. In a workshop (March 2022), another respondent added, *"the high-tension transmission line that passes through northern Khokana will not only have compelled farmers to leave a swath of 25 m of their land on its line* [NB: farmers are not allowed to sell land but can cultivate]*, but also affects the aesthetics of local culture and scenic beauty of place"*. Locals reported that they suggested the government should take a forest route instead, which the government officials refused on the grounds it will impact on wildlife and natural habitats. One male informant responded passionately with, *"so wildlife and their habitat should not be threatened but our lives can be"*. These data indicate a growing feeling of disconnection and alienation for Newar communities, and the felt precariousness of preserving cultural life.

In terms of the production of risk through new construction, one key site is the new bus park proposed as part of the fast-track
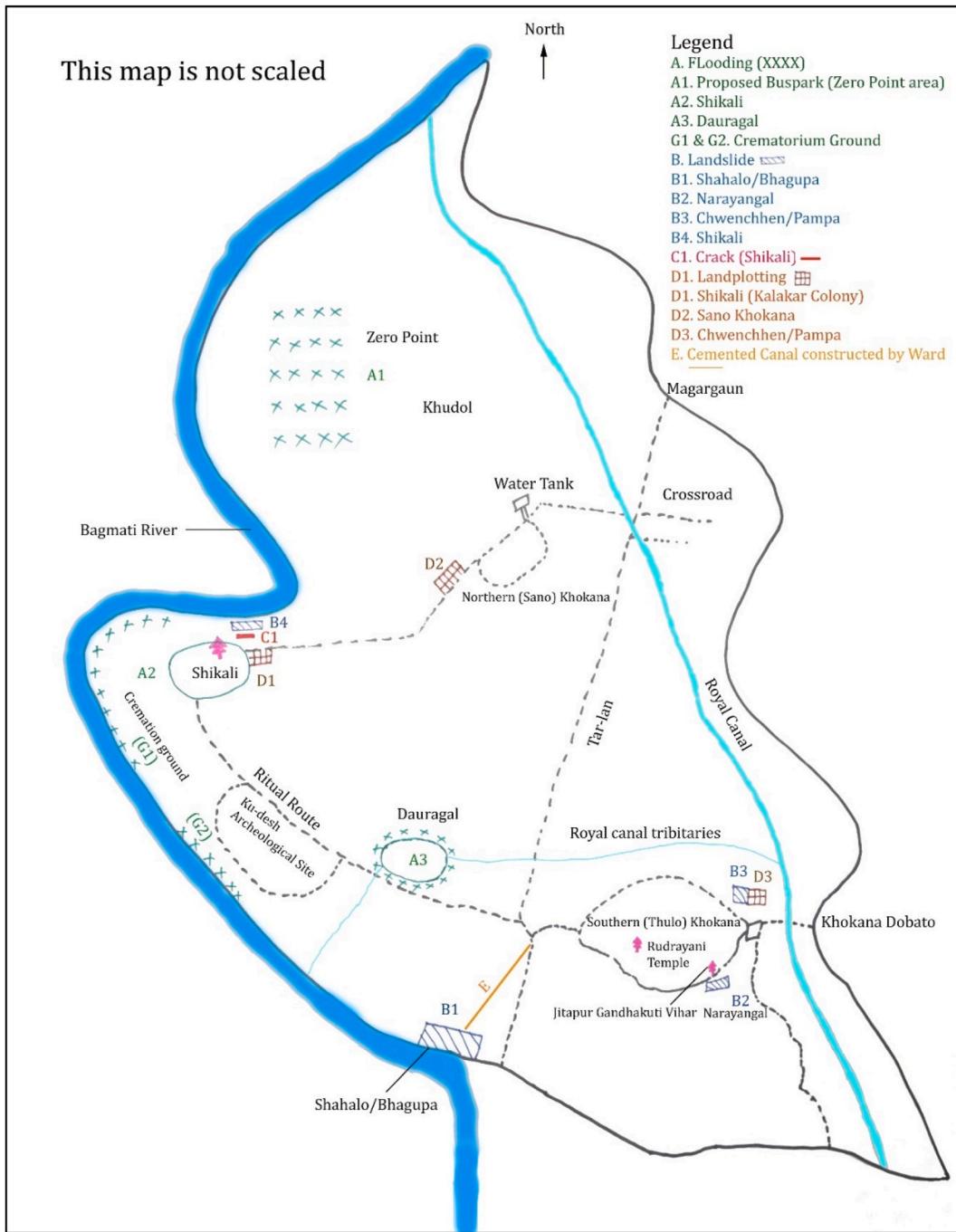
**Fig. 2.** Participatory hazard mapping (PHM) of Khokana.

project (called "zero-point") (Photo 3), on the *Khudol* plain (see Fig. 2, A1; and Photo 3). Located north of Shikali hillock, this site is also at ongoing risk of inundation from the Bagmati river. According to our informants, the area has experienced two significant flood events over the past 60 years. However, as Khudol has previously been used solely as a farmland, to date these inundations have not been linked to human casualties. If plans for the bus park go ahead, this represents a direct form of new risk creation – exposing new infrastructure and passengers to flood hazard. Furthermore, the area is increasingly being rented by *tahara* settlers, as well as commercial farmers, which disproportionately increases the risk to the lives and livelihood of those socio-economically vulnerable groups in the future.

A second known hazard that is being exacerbated through haphazard urban expansion is landslides in the Narayangal area (see Fig. 2, B2), close to the existing bus park in southern Khokana. This area experienced a landslide event in July 2021, close to the

**Photo 2.** View of the Shikali Temple hilltop, dropping to the Bagmati river valley behind. [Photo: December 21, 2021].



**Photo 3.** Location of the proposed end of the fast-track road and new bus park ("zero point"), on the banks of the Bagmati River. [Photo: November 2, 2022].

Buddhist religious site of Jitapur Gandhakuti Vihar. Narayangal has seen significant housing construction (formal and informal) in recent years, and is also adjacent to the proposed Khokana ring road. Some preventive measures have been taken, including a gabion wall constructed alongside the drainage stream running from the bus park area. Nevertheless, the risk of recurring landslide is considerable since the gabion wall is located far from Jitapur Gandhakuti Vihar and the nearby settlements. Respondents reported landslides being triggered between the gabion wall and settlements where new houses are being constructed and the local ring road passes through – again, indicating a case of planned (the ring road) and unplanned (*tahara* housing) urban expansion in an area of known hazard risk.

The Shahanlo/Bhagupa area (see Fig. 2, B1) on the south-western side of Khokana, is at risk of both landslides and flooding – the authors observed this directly during field visits. Landslides have been exacerbated by the replacement of an open canal with cemented pipes to manage the drainage system of Khokana (to be discharged into Bagmati river later). The construction of these pipes has not only destroyed the traditional route *De-lan*[22] (that connects to festival route near Dauragal), making mobility difficult during the monsoon, but also interrupted local farmers from using the canal water for irrigation which restricts the productivity of cultivation

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[22] *De*-means god in Newari language and *lan* refers to path/route, meaning the path of God. It is the historical route (horse trail) to travel to settlements across the Bagmati river.

during dry periods. Traditionally, the canal provided irrigation and manure for the farmers. The implications of the canal's concretisation for hazard risk were summarised by a female farmer, concerned with shared how her fertile area is facing a dual-threat during the monsoon: *"firstly, the overflow of the irrigation through cemented drainage canal is flooding my fertile land, and, secondly, the raging Bagmati river downstream is continuously eroding the banks and triggering the landslides"*. Respondents estimated that land owned by 10 households in the Shahanlo/Bhagupa area, representing more than 1.2 ha, has already been eroded by the continuously shifting Bagmati river.

Haphazard concretisation, construction and encroachments are similarly causing inundation of agricultural land and inundation close to the royal canal (i.e. *raj kulo*) and its tributaries. This is particularly aggravated in places where the canals have been damaged during construction work. The resultant run-off and flooding is disproportionately affecting poor households living in the *tahara* settlements. As shared by one migrant farmer, *"we stay awake whole night in fear that the runoff/flood might enter our shelters and farms, and destroy our crops and livestock"*.

Compounding the physical precarity experienced as a result of flood and landslide risks, and the socio-cultural precarity of at-risk heritage sites, repeated inundation of land has also sparked conflicts between migrant groups, long-standing residents and the local government – constituting a form of socio-political precarity. This is felt most keenly by groups who occupy the most marginal or hazardous land and also hold less power and influence over urban planning decision-making – in Khokana, those being migrant labourers and marginalised Newari groups. During a workshop (October 2021), a migrant voiced his concerns over local flood risk but was met with consternation from the ward official. The official alleged him saying, *"how can you blame the ward for inundation if you buy the land near the royal canal and its tributaries?"*, indicating a gap in perceived accountability for hazard risk. Conflict has also arisen where locals (whose lands are generally located at lower elevation than the land rented by migrants), during monsoon, alleged the migrant farmers are channelling excess water towards their land causing flooding and destroying their crops. A male migrant renting land in terraced farming shared, *"we cannot defend or resist the locals as they come in a group and threaten us"*. These contestations speak to underlying relations of power and marginalisation which, whilst pre-existing, are being surfaced and heightened through fear of exposure to hazards. These contestations speak to the diverse and differentiated ways that haphazard urbanisation feeds compound environmental and social risks.

### 5.3. Lack of regulatory enforcement

In addition to fire, floods and landslides, Khokana is also exposed to earthquakes [78]. According to the ward office records, the 2015 Gorkha earthquake killed nine people and destroyed almost 80% of the buildings in Khokana. Many reconstructions post-earthquake are still ongoing. Unfortunately, despite the existence of detailed regulatory structures [79,80], many reconstructions do not comply with the National Building Code and/or ignore the ward committee's efforts to maintain its traditional facades. This is because, according to PHM participants, many households have limited budget and congested spaces in which to reconstruct their houses according to the building code norms. Some also experienced difficulties in accessing the housing reconstruction grants[23] due to a lack of land ownership documents. As a result, many are simply rebuilding as per their individual preferences and household budget limitations, in addition to spreading *tahara* settlements – which clearly has implications for Khokana's earthquake resistance in the future. As articulated by one elderly female respondent, *"we survived the 2015 earthquake but we are not sure if we will survive another one due to the nature of the buildings being built. Although the buildings were totally damaged in 2015, the human casualties were very few but if the reinforced cement concrete (RCC) structures collapse, it will claim more lives with more physical and economic losses"*.

Lack of hazard-sensitive regulatory enforcement also applies to road construction. The combination of planned developments and urban sprawl across Khokana has significantly increased the road networks, however many have not been properly finished or black-topped. As a result, inundation is an ongoing issue for earthen roads including in the emerging crossroad settlements, the adjoining *Tarlan* and the road of northern Khokana to Shikali, as well as on recently opened tracks including the Khokana ring road. Particularly during the monsoon but also on periodic rainy days, episodes of road blockade due to flooding causes mobility challenges and impacts on local livelihoods. This was highlighted on the first day of the Visioning Workshop (December 2021), when it had rained heavily all night, and two participants called to inform us that, *"either pick us up or we won't attend the workshop"*.

### 5.4. Compound risks: precarious livelihoods, land tenure and housing

As highlighted in Section 3 and above, rising land values and interlocking pressures for urban expansion (state-led infrastructural developments, displacement as a result of conflict and the 2015 earthquake, migration from Kathmandu city core, and property price spikes prompted by land pooling policies) have resulted in rapid conversion of agricultural land to built-up areas and residential plots. Local perceptions are that private and elite interests, rather than local priorities and needs, are the driving force for this. Commenting on this, one migrant commented: *"the land use plan of Khokana is being made by land brokers but not by the local government or the planners"*. In a focus group, one male respondent whose 0.203 ha (4 *ropani*) of land has been already been acquired by developers, whispered that *"our land is being flooded by the development projects rather than the water"*. The pain of a felt loss of control, combined with growing land occupation by real estate and development projects, resonated in his voice. Participants estimated that to date some 5.09 ha of land has been acquired by development projects, real estate companies, factory owners and renters.

Additional pressure for land conversion came following the 2015 earthquake, which compelled many victims to sell agricultural land to raise funds to rebuild their houses. Whilst helping to reconstruction, it has reduced local resilience in the case of future disasters. One female respondent expressed, *"in case the future earthquake destroyed our house again, we won't have any other resources to*

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[23] Further information on the National Reconstruction Authority and its activities here: http://www.nra.gov.np/en [accessed 30.01.23].

*sell and build back again as the land has already been sold"*. Loss of households' agricultural land to private investors was found to be a particular threat to women and elderly people, who traditionally are the most engaged with agricultural practices in Khokana.

Owing to rising land values, many locals have chosen to rent formerly agricultural land as a lucrative alternative to labour-intensive farming activities. One male interviewee shared, *"in the past, the community would think of people as lazy or stupid if the land is left abandoned - but now people think it is stupid those who are doing traditional farming"*. As a result, there has been a decline in traditional farming practices, including collective agriculture and shared land ownership, and an associated increase in livelihood and food insecurity in this once self-sustaining village. Whilst multiple land ownership remains prevalent in Khokana,[24] it has caused added complexity when it comes to land rental. There have been rising incidences of confrontation between tenant factory owners and commercial farmers, with tenants facing unexpected problems such as threats from unknown landlords.

The unequal effects of land conversion are felt more keenly still by those with no land ownership to begin with – in particular, migrants living in *tahara* settlements. The migrant households – predominantly working as agricultural labourers – near Dauragal (see Fig. 2), a low-lying agricultural area near the *Ku-desh* archaeological site, are at high risk of inundation; yet its proximity to the highly fertile *Doh-phat* agricultural area has led to the rapid expansion of *tahara* settlements. The area is one of the main sites of food production serving the growing population nearby, especially to Sainbu-Bhainsepati. Being low-lying, Dauragal functions as a store and outlet to drain water and wastewater from southern Khokana to the Bagmati river. During the monsoon, runoff from the terraced fields as well as the drainage or tributary canals of upstream settlements (i.e. southern Khokana and adjoined *tahara* settlements) turns this lowest part into a swampy area (see Fig. 2, A3). In this area, migrants' livelihood and housing precarity is compounded by high exposure to flood/inundation hazard – together making this group at disproportionately high risk.

## 6. Discussion: uneven and unequal disaster risk creation

In Section 5, we analysed how shifting socio-spatial patterns, shaped by wider political economic processes, are altering local exposure to disaster risk. This section unpacks the consequences of these changes for an increasingly unequal geography of disaster risk in Khokana.

The above sections have illustrated the form and impact of haphazard urbanisation on evolving flows and patterns of human settlement, local economy, land use and socio-cultural practices in Khokana. We emphasise the ongoing impact of planned and unplanned land conversion, gentrification, and large-scale development projects on accelerated urban growth and change, and the combined drivers of top-down state-led developments, neoliberal capitalism, and population displacement and migration which underpin these. The concentration of large-scale development and infrastructure projects in and around Khokana constitute an accelerated metabolism of nature and the re-making of socioecological space [21,42]. In this respect our findings support Madden's [103] argument that neoliberal urbanisation *is* a disaster waiting to happen. Further, we find the acceleration of urbanisation in the Kathmandu Valley (KV) is occurring without proper, systematic, risk-sensitive land use plans. This finding is in-line with Bhattaral and Conway [22] who found urban vulnerabilities of KV are the result of poor planning.

We characterise the forms of urbanisation in Khokana as 'haphazard', meaning it is ongoing in a patchwork of planned and unplanned land conversions, without foresight and due attention as to the ramifications for geographies of risk and social equity. Urbanisation processes have deeply political undertones, speaking to the complex power struggles by a range of actors that make up the urban landscape [81]. The central Nepali government's powerful drive toward large-scale, cross-boundary infrastructure projects speaks to an underlying 'urbanisation as development' discourse, accordant with a dominant view of urbanisation as "the best way to sustainable development" (see [82]). In our collective global moment of "planetary urbanisation" [83], urbanisation often (if not always) is uncritically framed as synonymous with "development" (see [82]). In Khokana, the government continues to push several large development projects, despite these being located in known hazardous areas. These projects are prioritised over other forms of development (e.g. progressive social policy, access to essential services), indicating a discursive disconnect between disaster risk and urban development – perhaps due to an assumption that risks will reduce over time, or conversely that nothing can be done to avoid them. Either way, further research is warranted on the values, knowledges and political subjectivities underpinning KV's current urbanisation trajectory.

Haphazard urbanisation in and around Khokana was found to be particularly risky for low-caste Newar communities and migrant labourers, particularly those living in *tahara* settlements, who are already marginalised due to compound social, economic and political inequalities. For these groups, emergent and worsening exposure to hazards is exacerbating the existing forms of vulnerability and precarity they face. Although Khokana is a historical and cultural place, and from the outside may appear to be relatively socially homogenous in terms of its Newari heritage, it is socio-politically divided. Lower caste groups within Newar communities (see section 3.2) tend to depend on either communal land or land owned by high-income and higher caste Newar households. These low-caste groups are at risk of losing their agriculture-based livelihood practices, as surging commercial value of land and real estate business booming in the neoliberal urban development have tempted landowners to sell the land, thereby stripping low-caste Newars of their livelihood. Poor access to education, landlessness, limited political capital and entrenched caste-based hierarchies make these groups largely dependent on wage labour and shared-cropping for their livelihoods, with limited adaptive capacity. These factors heighten low-caste Newars' vulnerability, at a time their hazard exposure is simultaneously increasing.

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[24] Traditionally, Newar farmers (called *Jyapu*) do not divide land/property among family members/brothers; instead they divide rooms/floors of houses and farm the land collectively. This has occurred for generations, however multiple land ownership is becoming increasingly complicated in modern times (e.g. accessing government facilities, and bank loans). Recently, the ward government has started managing this problem so that if a family comes to them with a decision of land division, the ward government will provide an ownership document.

Migrant labourers, meanwhile, also experience high social-economic vulnerability – and additionally occupy some of the most hazard-exposed areas of Khokana and surrounding areas (i.e. the cheapest land). Rural-urban migration flows, driven variously by conflict, unemployment and post-disaster displacement, give rise to large migrant populations in many urban centres in Nepal that are frequently at risk [84]. The social landscape of KV is a caste/ethnic mosaic due to this high concentration of migrants [85]. However, in Khokana, migrants often live in the poorest conditions: in temporary shelters (*taharas*) lacking basic services, in housing they rent or constructed themselves, located close to irrigation canals or on agricultural land. Both of these places are prone to inundation during the annual monsoons, hence migrant labourers are not only living in precarious geographies but also their economic activities (many affiliated to agriculture) are highly precarious.

Compounding this, many migrants lack access to proper channels of representation and accountability via the local political system – a challenge shared by other marginalised groups worldwide [86]. Since they are beyond the constituency of the local government and cannot participate and vote in the election, they are often considered as secondary citizens (illustrated, for example, during the Covid pandemic when they were poorly supported and advised to go 'to their own place'). Lack of political voice amongst marginalised groups compounds vulnerability because the needs of those most at-risk are not represented [87,88]. Poor migrant groups also tend to be weakly embedded within local social structures (see [89]). Social capital is closely linked to vulnerability (e.g. [90]) and disaster recovery [91]. Hence the migrants' social marginalisation compounds the multiple other forms of marginalisation and precarity they face: economic, physical, and political.

Understanding compound and complex form of risks and precarity is vital for equity and justice in local policy making [92–96], particularly in the sense of more complex interplay between land, livelihood, identity, culture, and vulnerability and insecurity – as seen in the threats to cultural sites (e.g. Shikali) and farming land that combine to undermine income, sense of place and perceived resilience, and arise from inundation/flooding, land market expansion and speculation, and state development projects. It is this combination of materiality and meaning that creates lived, everyday patterns of risk and disadvantage.

This paper demonstrates the huge richness of understanding that comes from unpacking risk geographies in granular detail at the scale of households and neighbourhoods. Such understanding can only come through qualitative, participatory data collection with the goal of surfacing subjective local values, experiences and voices. This is required *alongside*, and integrated *with*, more traditional physicalist, quantitative forms of hazard mapping and modelling – which, whilst also vital, tend to extrapolate data points (particularly in regions that are research funding-poor) and fail to capture the richness, diversity and complexity of human experience and local knowledges [97–100]. Without scrutinising the roots of unequal access to resources, precarious livelihoods and political representation, such as those facing marginalised and migrants households of Khokana, local risk management is in danger of dealing with symptoms rather than underlying causes of disaster risks [101].

This analysis of haphazard urbanisation in KV further demonstrates that in spite of the region's known hazardousness – and despite the existence of detailed policy guidance and regulation on hazard management – disaster risk remains siloed from mainstream urban development planning and activity [39]. The neoliberal priorities driving the direction of development policy and investment in and around Khokana stem from political economic interests that – so far – are disproportionately benefitting elite groups, to the detriment of more vulnerable and marginalised groups who are experiencing heightened risk as a result of those developments. Taking the above points in combination, we argue that risk-sensitive, pro-poor urban planning for future-cities needs to be both deliberate (meaning planned, an automatic/integrated consideration, not haphazard) and deliberative (meaning inclusive, in dialogue with at-risk communities, drawing on and respecting local experiences, values, priorities, observations).

## 7. Conclusion

This paper has applied an urban political ecology (UPE) lens to unpack the roots and impacts of 'haphazard urbanisation' on uneven disaster risk creation. Over the past three decades, the peri-urban town of Khokana in the Kathmandu Valley (KV) has undergone radical change: socially, demographically, economically and culturally. These changes are manifest in new socio-spatial geographies and associated new, uneven and unequal geographies of disaster risk. The patterns of settlements and design of the houses have changed, more land-use differentiations have occurred, and a large proportion of open farmland has been converted into settlements and other commercial activities. Likewise, cultural and historical places have been modified through the commodification of space, new economic activities have emerged such as commercial farming, and light manufacturing industries are growing rapidly. Consequently, new societies of labourers, migrants, and investors with new settlements and marketplaces have formed. Mobility and economic networks have become multifaceted and interconnected. This transformation will accelerate still further once planned development projects such as the fast track road, outer ring road, transmission line, smart city project and Bagmati corridor road are completed.

The paper has scrutinised these historic and current urbanisation processes in Khokana and connected them to the emergence of new hazard exposure and vulnerability. We find that urban expansion in KV has been accompanied by economic growth and diversification but at the expense of many, particularly the poor and socio-politically marginalised. The paper demonstrates how haphazard forms of urbanisation occurring in Khokana are both exacerbating existing hazards, and generating new ones. This analysis of haphazard urbanisation makes three key contributions at the confluence of disaster risk geographies and UPE.

Firstly, the analysis thickens understandings of the overlapping, multi-scale, multi-temporal and multi-faceted processes of disaster risk creation in rapidly growing urban settings. The paper shows that alongside the rise in exposure to inundation, landslide and fire hazards, urban changes in KV are simultaneously driving increased socio-economic risks (precarious livelihoods and housing), sources of social-political risks in terms of conflict, both within communities and between local residents and state actors (e.g. over land ownership, and contestation over who is responsible for hazard creation and management), and risks to cultural heritage and place

attachment (e.g. planned construction near or on sites of archaeological, religious or spiritual significance). These impacts are experienced as interconnected forms of everyday risk and precarity facing local communities. These findings from Khokana echo demands that our understanding of risk production must be anchored in the complex "richness of local experience" [86].

Secondly, the analysis demonstrates that although the whole of Khokana is at risk of hazards, the risks are unevenly and unequally distributed. We find that marginalised low-caste Newar groups and migrant labourers experience the highest level of risk, through the compound effect and interaction between multiple environmental, social, political and economic forces. In particular, the haphazardness of urban expansion is a critical factor in this unequal geography of risk creation, in the various ways outlined in Section 5. UPE was key to understanding this, by focusing attention on the underlying political economic forces driving state and private sector-led urban transformations [31,40], and the diverse forms of control (both tacit and overt) over how different social groups inhabit, experience and utilize urban space and environments [35–37]. UPE shows how urbanisation processes appropriate urban ecologies alongside and as part of transformations in socio-economic and political relations [81,102,103]. The case of Khokana helps expand the evidence base for a more "situated" UPE (after Lawhon et al. [21]), grounded in the specificity of local histories and social relations, and for greater focus on risk creation as an essential dimension of urban transformation.

Thirdly, the paper has direct policy implications. Under the current trajectory, the production of risk is likely to further accelerate in tomorrow's KV, "the hub of Nepal's urbanisation" [104]. We conclude therefore that there is an urgent need to understand and reimagine urbanisation as a development project, both in KV and in other rapidly urbanising regions of the world. The local, municipal and national governments all have a role to play if they are to prioritize, categorize and channel ongoing, planned, and future developmental and constructional activities in ways that respect local cultural history and contemporary diversity, and that reduce risk and give rise to equitable and resilient development. The range of large-scale planned infrastructure projects in and around Khokana look set to aggravate the production of risks if disaster risk management is not embedded into planning: both deliberately and deliberatively, incorporating local social-economic-political experiences, visions, values and knowledges. We, therefore, echo Delgado-Ramos's [105] call for progressive urban development that is "proactive, imaginative, and based on an integral metabolic planning". Inclusive, pro-poor and risk-sensitive urban planning demands attention to the interplay between history, politics, culture, equity and environment in tandem, in order to meaningfully reduce risk in tomorrow's cities.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

The data that has been used is confidential.

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