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RESEARCH ARTICLE



Examining vulnerability in a dynamic urban setting: the case of Bangalore's interstate migrant waste pickers

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ABSTRACT

Understanding the causality of vulnerability is difficult to do and consequently has received insufficient attention. Root causes of vulnerability need to be understood and addressed to support adaptation that addresses climate risk and inequality. This paper contributes to this by examining vulnerability from a structural perspective for the case of interstate migrants from West Bengal working as waste pickers in Bangalore's informal squatter settlements. It also throws light on how understanding structural vulnerability can help to emphasize social justice concerns while adapting to climatic risks. The research, using qualitative methods, examines complex intersections between a multitude of factors such as climate change, agrarian distress, exclusionary patterns of urbanization and the resultant lack of recognition that shapes and reshapes the vulnerability of a certain group of people. Our findings emphasize the compelling need for vulnerability and adaptation research to focus more on understanding inequality if improving justice is a concern. This focus on justice is insufficiently prioritized in climate change adaptation work.

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Climate change; justice;
Bangalore; urban;
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1. Introduction

The political economy of climate change in India depicts multiple and complex intersections with the current development paradigm and the emerging patterns of socio-economic inequality in the country (Bijoy, Ghosh, & Dutta, 2013; Michael & Vakulabharanam, 2016; Shrivastava & Kothari, 2012). The impacts associated with climate change differ significantly among different social groups, falling disproportionately on the working classes and the marginalized, reflecting highly nonlinear relationship between climate change and its outcomes. Understanding the causality and structure of vulnerability helps to focus on the larger social, political-economic and structural variables that shape capacity and underpin livelihoods security (Ribot, 2014). In this context, the paper uses the case of interstate migrants from West Bengal residing in informal squatter settlements¹ of Bangalore city to understand vulnerability from a structural perspective in order to address justice concerns in the context of climate change adaptation. These migrants work as waste pickers, and climatic factors intersect with their livelihood and living conditions exacerbating their vulnerabilities.

In neo-liberal India vulnerabilities associated with changes in climate are not just an outcome of the natural phenomena but a social construction conditioned by political and economic disparities, often falling on the working classes and the poor the greatest (Michael & Sreeraj, 2015). In most of the Indian cities social and cultural structures of inequality and identity-based exclusion often mimic those found in rural areas. Vulnerability associated with migrant workers in India needs to be

understood in the larger context of the rural–urban continuum in the country (Santha, Surinder, Ajmal, Kuashik, & Annu, 2017). Many of the neo-liberal reforms have been socially divisive leading to land dispossession, loss of livelihoods and decline of agricultural incomes in rural areas which have exacerbated poverty and inequalities (Shrivastava & Kothari, 2012). This period has been marked by increased distress in India's agrarian sector as there was a drastic reduction of public investment in agriculture and decreased state support for small and marginal farmers (Vakulabharanam, 2012). The agricultural sector has suffered severe setbacks during this period as is evident by the fall in consumption shares of marginal farmers, tenants and agricultural workers (Vakulabharanam, 2010). This has created an exodus of rural workers (agricultural and non-agricultural) into the cities (Shrivastava & Kothari, 2012). However, diminishing opportunities in the agrarian sector have not been compensated by improved opportunities for the migration of peasants and other working groups into the rest of the economy. Across Indian cities, there has also been a significant growth in informal squatter settlements and pockets of poor neighbourhoods that house the poorer recent migrants and the older urban poor. This process has resulted in Indian cities being 'highly unequal spaces economically, spatially, socially and culturally over the last two decades' (Vakulabharanam & Motiram, 2012, p. 44).

Cities provide a useful lens to capture important forms of differences where duties, benefits and the burden of addressing climate change intersect. The effects of climate change on urban

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working classes are more subtle as it often intersects with their livelihoods and living conditions altering them on a daily basis. Hence justice at the urban scale requires recognition of existing forms of inequality, rights and responsibilities and how climate change interventions exacerbate or redress underlying structural issues (Ziervogel et al., 2017).

Questions of justice have often been framed in the context of decision-making and planning for adaptation interventions at national and international level (Bulkeley, Carmin, Castán Broto, Edwards, & Fuller, 2013). Schlosberg (2012) argues that theories on justice in climate change literature have focused largely on the mitigation side and are often oblivious to the ways in which justice can be applied to the actual adaptation needs of various socio-economic groups on ground. Applying a justice lens focusing on people in a city can help bridge the gap between the climate science and social justice by addressing the climate challenges influenced by socio-economic processes, which again determines the conditions under which people become more or less vulnerable to hazards (Blaikie, Cannon, Davis, & Wisner, 2014; Jafry, 2016). Building on this, this paper depicts the complex intersections between a multitude of factors such as climate change, existing development paradigm, exclusionary patterns of urbanization and the resultant lack of recognition and participation that shapes and reshapes the vulnerability and adaptive capacity of a group of interstate migrant waste pickers in Bangalore city.

2. Literature review

2.1. Climate change and cities

Vulnerability to climate change cannot be divorced from the social, economic and environmental challenges that cities are exposed to (Krellenberg, Welz, Link, & Barth, 2016). The majority of the literature on vulnerability and adaptation to climate change has focused largely on rural lives and livelihoods as they are directly at risk from climate change (Satterthwaite, Huq, Pelling, Reid, & Romero Lankao, 2007). As Pelling (2003, p. 46) notes, 'There is relatively little theoretical discussion of urban vulnerability or resilience to environmental risk'. Less attention has been placed on the vulnerability of marginalized and low-income urban households who bear the brunt of urban climate impacts. However, in urban areas, the effects of climate change on the working classes are more subtle as it often intersects with their livelihoods and living conditions altering them on a daily basis. Urban areas are often exposed to a range of climate hazards including urban heat-island effect, urban floods and human-induced water scarcity (Revi et al., 2014). These hazards intersect with the multiple dimensions of urban poverty and informality such as inadequate incomes, poor housing conditions and limited asset bases which increases the vulnerability of the urban poor.

While analysing risks that characterize urban areas the focus has largely been on the physical and ecological infrastructures and less on the people (Ziervogel et al., 2017). However, the processes of urbanization itself produce several forms of social, political and economic inequality. Bulkeley et al. (2013) argues that climate change is not just occurring to the city but composed through the city exacerbating uneven patterns of

development and urban inequality. Thus, any analysis of hazards and vulnerabilities linked to climate change in a particular city needs to capture the intricate links between existing environmental, economic, social and political stressors and how its effects are translated at the local level where people live and experience the city differently.

In the context of climatic risks, there has been a limited recognition of the differential experience of climate risks and what urban climate adaptation and justice might mean for different groups (Hughes, 2013). This gap is felt acutely in the context of cities in the Global South where there are high levels of inequality and poverty that demand a focus on justice. Addressing vulnerabilities in city space demands a justice orientation that recognizes both procedural and distributive implications. This also entails recognition of people's right to the minimum level of capabilities and opportunities (Sen, 1990).

Our intervention in this paper draws inspiration from the conceptualization of justice as stated in Ziervogel et al. (2017, p. 124), 'the fair distribution of social and material advantages; meaningful participation in decision-making processes; acknowledgement of social, cultural and political differences; and the right to minimum levels of capabilities and opportunities to achieve livelihood and wellbeing goals'. This definition of justice aligns with Harvey's depiction of justice as 'a just distribution justly achieved' (Harvey, 1973, p. 116). It requires acknowledging that existing institutions in a society inordinately benefits certain groups of the society and holds back rights and resources from certain others, and that historical patterns of institutionalized oppression create highly unequal playing fields. (Shi et al., 2016; Young, 1990). Such a conceptualization provides an ideal template to position urban justice in direct relation to structural vulnerability.

2.2. Reconceptualizing vulnerability from a structural perspective

The dominant literature on vulnerability and adaptation work has largely focused on impacts, for example, prioritizing the specific outcome of climate risk on socio-ecological systems (Wise et al., 2014). More recently, there has been growing support for better understanding structural vulnerability. Critics suggest that if adaptation responses are actually going to benefit those most vulnerable the underlying causes need to be adequately understood to develop sustainable adaptation responses. Pelling (2010) suggests that because there has been so much focus on proximate rather than structural causes, the solution space has been constrained and been unsuitable for supporting transformative change that might address the root causes of the problem. Although the vulnerability literature has unpacked local realities, there is limited understanding of the root causes of vulnerability (Pelling, O'Brien, & Matyas, 2014; Tschakert, van Oort, St. Clair, & LaMadrid, 2013). This acknowledges vulnerability and the capacity to adapt as a product of the processes through which climate risks coalesce with other stresses (e.g. water scarcity, inadequate governance structures) (Krellenberg et al., 2016).

Causality illustrates the larger social, political-economic and structural variables that shape capacity and 'enables or disables people's abilities to maintain their security' (Ribot, 2014). These

vulnerability scholars strongly advocate for vulnerability and adaptation research and practice to link back to justice to reduce some of the underlying structural vulnerabilities.

Future vulnerability analysis would benefit if two causal chains were better understood. The first would be better understanding what shapes access to assets and the second would look at the nature of 'access to influence within the political economy that shapes entitlements' (Ribot, 2014). Pelling (2010) argues it is critical to acknowledge that the process of development itself determines the root causes of vulnerability. For example, in an urban space, the city governance configurations itself entrench structural vulnerabilities through institutionalized processes of exclusion that denies recognition and participation of certain groups (Pelling, 2010; Ziervogel et al., 2017). There are changes needed in increasing the access to influence and access to assets that require the political economy to be understood at multiple scales such as national level, regional level, city level and local level as well their intersections.

2.3. Pressure and release model

One of the older approaches in vulnerability literature is the 'Pressure and Release Model' (PAR) presented by Blaikie et al. (2014) which inspired further research on social differentiation and the root causes of vulnerability. The PAR helps to examine vulnerability from a structural point of view by contextualizing disasters within the wider societal patterns and drivers (Wisner, 2016).

In the PAR model vulnerability is seen to include three key interlinked components namely root causes, dynamic pressures and unsafe conditions which connects the causal factor of disasters to pressures and processes (e.g. economic, social, political) (Blaikie, Cannon, Davis, & Wisner, 1994, 2014; Eakin & Luers, 2006). These pressures end up in disasters that result from the concatenation of hazard and vulnerability (Adger, 2006). Blaikie et al. (2014) argue that the root causes of vulnerability appear to be distant spatially, temporally and socially such that they remain impalpable but they play a key role in defining currently observed manifestations of vulnerability. 'The root causes are generally economic, social and political which tends to reflect the distribution of power in a society' (Blaikie et al., 2014, p. 53). The differential vulnerability is often determined by social systems and associated power relations (Blaikie et al., 2014). Dynamic pressures are those processes that explicate root causes into unsafe conditions spatially and temporally. Unsafe conditions are manifestations of the multiple ways in which vulnerability is expressed in time and space in concurrence with a hazard. These include people living in 'hazardous locations, being unable to afford safe buildings, lack effective protection by the state, having to engage in dangerous livelihoods, having minimum food entitlements or entitlements that are prone to rapid and severe disruption' (Blaikie et al., 2014).

The PAR Model as a conceptual framework has been largely employed to understand vulnerability in rural context or focusing largely at a country level (Awal, 2015; Frantzova, Mardirosovian, & Ranguelov, 2008; Santha & Sreedharan, 2010; Twigg, 2001). In this paper, we make an important contribution by employing Pressure and Release model to examine the

vulnerability of a group of urban residents incorporating cross-scalar issues. The PAR model as an analytical framework is highly valuable in an urban setting especially in the context of emerging issues like escalated migration of rural working groups into the cities. The PAR model through its focus on structural vulnerability helps to understand the processes that has led to the development and exclusion of certain groups. Thus the PAR model has the potential to link the justice element in vulnerability literature. In this paper, we highlight the lack of recognition or lack of voice as a critical element of justice. Schlosberg (2012) argues that recognition as an element of justice needs to look at the range of experiences of the vulnerable and the process through which this vulnerability is produced. While the unsafe conditions depicted in the PAR model throws light on the distributional implications of vulnerability the root causes and dynamic pressures articulates the processes through which lack of recognition is produced.

3. Methodology

This research contributes to a larger study that focuses on understanding the differential vulnerability of informal settlement dwellers in Bangalore. Four informal settlement clusters within the city were identified as research sites using the following criteria: (a) topographical low lying areas, (b) infrastructural corridors corresponding with rapid land cover and land use changes in the past decades and (c) demographic factors including high population density.²

The study used a combination of secondary and primary data to identify and understand the impacts of differential vulnerability, adaptive capacity and coping measures. This paper primarily focuses on 2 out of the 32 surveyed informal settlements, namely Hebbal and Marathahalli (refer to Figures 2 and 3, respectively). These two sites are located on landfill sites which have predominantly interstate migrants, from West Bengal, primarily engaged with garbage collection. Hebbal settlement houses around 200 households and Marathahalli settlement comprises of around 500 households. The settlement dwellers use their social networks to find opportunities in the city and also to organize themselves within the settlement. There is a strong presence of a community lead, called thekedar, who manages about 20–30 families and also interacts with the landowner in terms of the monthly rent (8–10k depending on the size of land they use).

A mixed method approach (quantitative and qualitative research methods) was used to capture in-depth household information and community dynamics. A quantitative survey was carried out in 70 randomly sampled households in these 2 settlements (50 in Marathahalli and 20 in Hebbal). The data were used to quantify measurable variables (e.g. behaviour and attitudes) and uncover patterns and trends. Additional qualitative research methods were used including 2 transect walks, 15 semi-structured interviews and 5 focus group discussions with the waste pickers. These tools helped to capture socio-economic relations, norms and power structures among others as well as help to understand the quantitative findings better.

Based on the findings from the study an extensive literature review was conducted to look at existing research frameworks that explains the observed phenomena. The PAR model



Figure 2. Picture depicting the location of Hebbal Settlement alongside an open drain.

developed by (Blaikie et al., 2014) provided an ideal analytical template to examine the causality of vulnerability from a structural perspective. All variables analysed in the study (outlined in Figure 1) emerged from interactions with the community members including semi-structured interviews and focus group discussions. A problem tree³ (see Figure 1) is used as an allegory to represent the findings from the study using the

PAR model. The current issues of most concern faced by a community are represented by the trunk of the tree which aligns with the dynamic pressures in the PAR model. Factors that influence these main issues are depicted by the roots of the tree which is similar to the root causes and the outcomes are represented by the leaves which depict unsafe conditions in PAR model (ODI, 2009).



Figure 3. A Glimpse inside the Marathahalli Settlement.

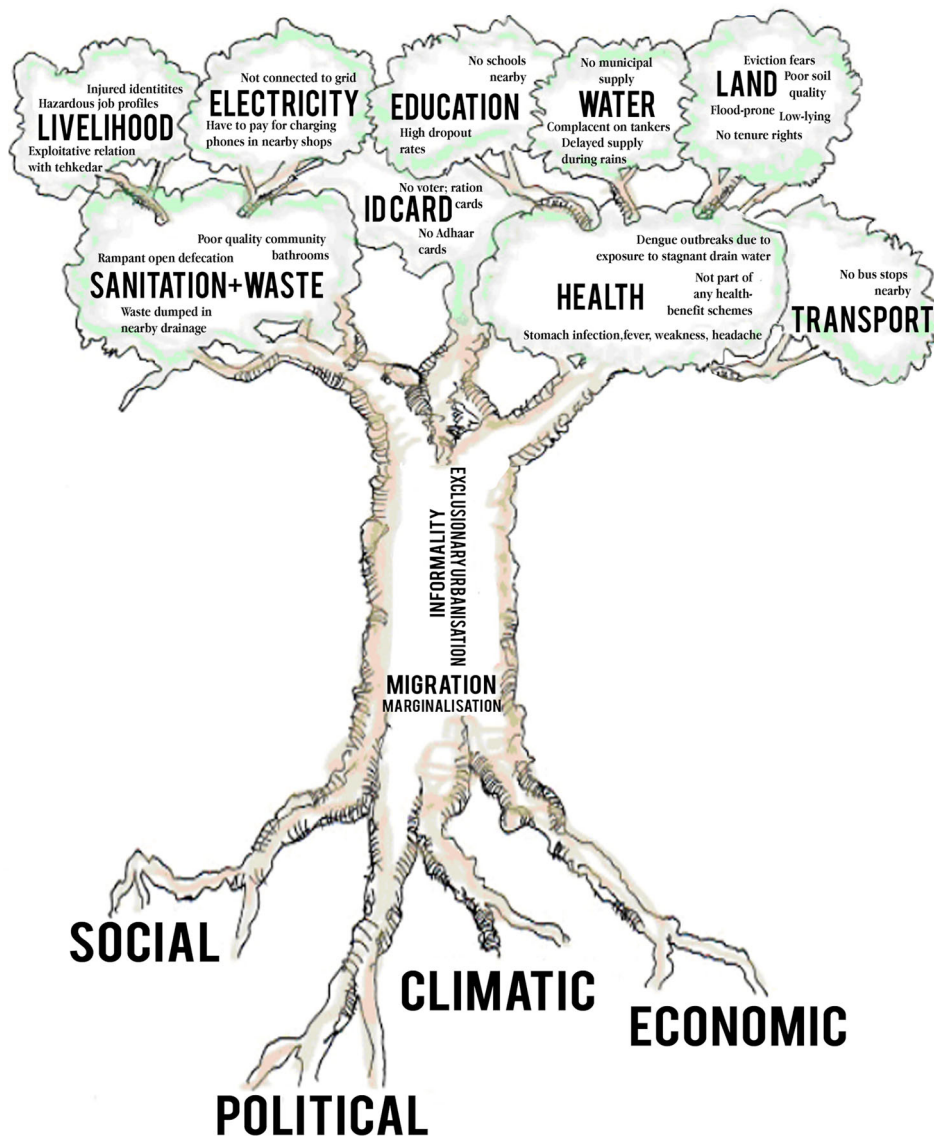


Figure 1. Problem tree depicting vulnerability from root causes to dynamic pressures and unsafe conditions.

4. Findings

The PAR model can be constructed in either direction of causality from root causes to unsafe conditions or from unsafe conditions to root causes. In this study, we started by understanding residents' specific unsafe conditions through qualitative and quantitative research and then worked backwards to understand the dynamic pressures and root causes that had led to these conditions.

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4.1. Unsafe conditions

Unsafe conditions are expressed in terms of livelihood and living conditions. The leaves of the problem tree in Figure 1 lists out the

various unsafe conditions the settlement dwellers are exposed to. As waste pickers, they have to scavenge through waste to find salvageable things that can be re-sold or recycled. Work hours vary between 5 and 9 h where people travel on their bicycles between 25 and 40 km (back and forth) a day and sort waste after returning to their settlements. This work is filthy, dangerous, discriminatory, with no guarantees of a secure income.

Out of the 70 households surveyed most of the male members work as waste pickers. Women do not work as waste pickers but help in the processing of waste. A lot of women work as domestic workers, which provides a steady source of income for them. The settlement dwellers routinely experience occupational hazards and spatio-temporal injustice, most of which they are oblivious to. As depicted in Figures 2 and 3 they live in the midst of garbage they collect exposing them to health hazards. This is illustrated by one respondent who said, 'I don't know why we fall sick so often' (Respondent A, Semi-structured Interview, Marathahalli Settlement, 16 June 2016).

A group of waste pickers are organized under a leader called a 'thekedar.' The relation between the thekedar and the waste

pickers is very transactional and often they end up paying exorbitant interest rates. The pickers also have no awareness of where the waste is sold and the value of the resource.

As one of the respondents mentioned

Here we are facing several problems, and there is no one to solve our problems. If we have water for one day, we don't have it for the next seven days. Thekedaar doesn't pay for anything; doesn't help in anything. We have to buy water from tanker. Whenever he gives a loan, he collects it back with huge interest. (Respondent B, Focus Group Discussion, Hebbal Settlement, 27 June 2016).

This quote rightly sums up the precarious livelihoods these waste pickers are exposed to.

As illustrated by the leaves of the problem tree in [Figure 1](#) the unsafe conditions experienced by these waste pickers are:

1. The lack of access to basic services provided by the local government is one of the major challenges experienced by the waste pickers, leading to further marginalization. Communities have no form ID cards such as ration cards, aadhar card and voter ID, which curtails their access to the public distribution system, restricts movement in terms of waste collection and also impedes them from accessing bank accounts and loans.
2. Sanitation is a major contributor to vulnerability in the Marathalli settlement since most of the dwellers resort to open defecation due to the absence of community toilets. The Hebbal settlement fares slightly better due to the presence of some community toilets. However, most of them remain non-functional. The respondents in both these settlements reported regular outbreaks of Dengue.
3. These settlements are disconnected from the networked water supply, formal power grid, and have no waste disposal facilities. This has led to reliance on more expensive water supply sources such as private water tankers, pollution of neighbouring drain due to the garbage disposal and rampant open defecation.
4. Households resort to firewood for cooking and none of them have access to LPG, indicating their fuel security challenges.
5. Both settlements have comparable housing conditions. The majority of people live in temporary blue tent houses.
6. Access to resources such as education, health and land is poor. Local schools are very expensive resulting in high dropout rates.
7. Exclusion from health benefit schemes has resulted in forced dependence on private hospitals which are expensive.
8. Most of the dwellers do not possess any forms of tenureship rights. Hence there is a limited investment in improving their surroundings. When land values rise the settlement dwellers are subjected to the constant threat of eviction. This leaves them with antagonistic feelings towards the sites accompanied with a constant fear of eviction.

A respondent summed up their current situation like this, 'There is no extra facility here. For poor people, conditions are same everywhere. We have to work hard everywhere to earn food. Even if there is a problem, no one is going to help anyway' (Respondent C, Focus Group Discussion, Hebbal Settlement, 27th July 2016).

4.1.1. How climate affects their livelihoods?

At times the impacts from climate variability and change on urban areas have nuanced undertones and are difficult to distinguish from risks arising from uneven development and urbanization trends. At other times climate events catalyze and exacerbate existing vulnerabilities. In the case of waste pickers, climate impacts on their health in both direct and indirect ways. High temperatures provide no respite to the waste pickers. Despite the scorching heat, the waste pickers continue their daily journey on bicycles in search of waste, increasingly experiencing heat strokes and associated issues including headache, dehydration, fatigue and dizziness. Majority of the respondents noted that increase in temperature has affected their earning capacity. During the semi-structured interviews and focused group discussions the respondents noted that the change in temperature and precipitation patterns as well as close proximity to drains has also resulted in increasing mosquito populations leading to dengue outbreaks affecting their livelihood activities. The qualitative and quantitative data also points out that flooding is a major issue in the settlement that affects their earning capacity. During the rainy seasons, storage facilities are exposed to water which soaks the waste and leads to significant loss of income. A respondent mentioned that 'In rains the waste and waste collection points become even more dirty and we get little less for our collection. If it rains we may decide not to go. It is dirty and may give more diseases'. Similarly, another respondent stated that 'When it rains the amount of waste is less, and the price also goes down' (Respondent D, Semi-structured Interview, Marathahalli Settlement, 1st October 2016).

4.2. Dynamic pressures

The above mentioned unsafe conditions can be directly attributed to the dynamic pressures. Bangalore, like most metropolitan cities of India, is characterized by rapid and unplanned urbanization leading to phenomenal increase in built-up area for commercial and residential purposes, decline in tree cover and water bodies, along with tremendous pressure on resources. As depicted by the trunk of the problem tree in [Figure 1](#) the urbanization pattern in Bangalore is highly exclusionary and vast majority of the poor and the marginalized find suitable employment options only in the informal sector. In the process of developing Bangalore as a world-class city, the city government has actively engaged in land speculation and active dispossession of land from the informal settlement dwellers thereby proliferating inequality and unequal access to services (Krishna, Sriram, & Prakash, 2014). Many of the people dispossessed of land find refuge in the burgeoning slums and informal settlements scattered throughout the city. Furthermore, many settle on marginal lands such as landfill sites or near drain channels that expose them to hazardous living conditions.

Following the neo-liberal reforms in 1990 as well as the IT explosion the need for Bangalore's transformation as a world-class city was increasingly felt to cater to the entry of transnational corporations (Basu & Bazaz, 2016; Goldman, 2011; Krishna et al., 2014). The mega city projects executed under the new schemes such as Bangalore–Mysore Infrastructure Corridor (BMIC), the IT corridor, and the Bangalore

International Airport Limited (BIAL) and its surrounding development area clearly indicates the role of government as well as parastatal agencies as active agents of land speculation and active dispossession of the poor and the marginalized (Goldman, 2011). Agricultural land was taken over on the southern and eastern side of the city and the city's landscape was reshaped for the entry of transnational corporations (Goldman, 2011). This growth process was highly exclusionary benefitting only the highly skilled labour employable in these new firms (Basu & Bazaz, 2016; Goldman, 2011).

However, the widespread agrarian distress prevailing across the country attracted a lot of rural distress migrants from various parts of Karnataka and other states to Bangalore. The inflow of unskilled migrants into Bangalore city was often beyond the city's absorptive capacity and there were hardly any viable livelihood options for the marginalized groups which include the recent migrants and the urban poor in general (Basu & Bazaz, 2016). These group of people found refuge in the burgeoning informal settlements across the city (Revi et al., 2015). Furthermore, many settle on marginal lands such as landfill sites or near drain channels that expose them to hazardous living conditions. These areas usually do not fall under the jurisdiction of formal planning mechanisms leading to exclusion of dwellers from institutional support to manage risks (Revi et al., 2015).

Unskilled and economically disadvantaged migrants are compelled to adopt a variety of insecure jobs in the marginal informal sectors such as waste picking and construction. The informal sector provides a temporary holding space for rural-urban migrants who pursue varied insecure livelihoods with the anticipation of getting absorbed in the formal sector (Gidwani & Maringanti, 2016). These informal sectors present low entry barriers, no education, require minimal skills and capital, and no taxes or effects of labour legislation, thereby being a viable option for many (Viljoen, Blaauw, & Schenck, 2016). Furthermore, waste pickers are defined as small-scale, self-employed people who are predominantly active in the urban informal economy; and waste is a livelihood for the unemployed (Viljoen et al., 2016). The poor migrant urban community is therefore doubly exposed to both climate-induced risks and new exposure and risks characterizing urban regions (Revi, 2008). As depicted by the trunk of the Problem tree in Figure 1 The migrant waste pickers from West Bengal have been victims of the discriminatory pattern of urbanization and the resultant precarious and informal livelihoods prevalent in Bangalore.

A respondent talked about their insecure lives along these lines,

I am not sure how long will I work here. There will be an apartment here soon, it is already sanctioned. They gave us 6-month notice, the notice period is already over. The owner of the land had told us about this. We don't know where we will be relocated. (Respondent E, Focus Group Discussion, Marathahalli Settlement, 16th June 2016)

As illustrated in the above quotation the lives and livelihoods of these waste pickers are often uncertain with constant threats of evictions. It also points to the complete apathy of the government officials in catering to the housing needs of the

marginalized groups. Livelihood options in the informal economy of the city especially for these migrant waste pickers are highly uncertain as evidenced by the following words.

I would walk for hours in search of khattas (reference to garbage 'blackspots where the city's official waste picking mechanism doesn't reach' in their local language – Bengali) when I started to work as a waste picker. I would lose my way back to rickshaw, or to the 'jhuggi' (place of residence'); frantically asking for help. I have cried on so many days in frustration. But, with time we figure out a route for ourselves. (Respondent F, Semi-structured Interview, Hebbal Settlement, 27 June 2016)

As Pelling (2003) argues, even though informal settlements serve as a means of survival for the marginalized masses it hardly serves to move people out of poverty.

4.3. Root causes

The root causes of vulnerability in accordance with Blaikie et al. (2014) can be attributed to the socio-economic conditions and exercise and distribution of power in the society. According to Figure 1 the social, political, environmental and economic dimensions are the root causes of vulnerability or the influencing factors leading to marginalization and inter-regional displacement or migration of these waste pickers. These factors are discussed in detail below.

Most of the residents in the Hebbal and Marathahalli settlements migrated from Nadia or Murshidabad district in West Bengal. Figure 4 illustrates the migration path of these settlement dwellers. While some of them migrated directly to Bangalore some others migrated to Delhi first. However, they noted that they were unhappy with the employment prospects in the waste sector in Delhi and hence they moved on to Bangalore. The presence of their community members also attracted them to Bangalore. Our engagement with these communities suggested that this migration was largely an outcome of both push and pull factors, although the push factors dominated. This is captured by some of the residents' responses:

It is difficult to stay away from home, but we have to do it for money. We don't like to live in a foreign land, but we have no option. We have to do it for money. (Respondent G, Focus Group Discussion, elderly man, Hebbal Settlement, 13 July 2016)

Poor people have several things to worry about (money, job, etc). Job is not secure in the village; I might get work for one day and no work for next three days. Here the work is more secure. The economic condition has improved here, that is why I am staying here. Otherwise, why would I stay in foreign land (2200 km away from my home)?

The money earned here is the only motivation (Respondent H, Semi-structured Interview Marathahalli Settlement, 24 September 2016).

The decision to migrate was triggered by a combination of factors. As the roots of the problem tree in Figure 1 portrays a combination of social, political, climatic and economic factors lead to their marginalization in their homelands. It is evident from the following quotations that these migrants were among the most marginalized socio-economic groups in their villages.

In our villages we weren't earning enough to sustain ourselves. There is no one poorer than us. If we had opportunities in our villages we would have stayed back. Those who are associated or linked with political parties enjoy benefit. We are poor and we will remain poor. (Respondent I, Semi-structured Interview, Hebbal Settlement, 1 October 2016)

We were agricultural labourers, we used to work on other people's farms, we didn't own farms. (Respondent J, Focus Group Discussion, Marathahalli Settlement, 24 September 2016).

These migrants were landless agricultural laborers. Farm work was seasonal and scarce and so income was irregular and low.

Another striking feature was that 99% of the respondents were Muslims. There is a sizeable amount of literature about the marginalization of Muslims in West Bengal. Dasgupta (2009) argues that 'exclusionary state policies are drawing lines between the majority and minority communities in West Bengal'. The Sachhar Committee report⁴ in 2005 noted that the overall conditions of Muslim Other Backward Castes are poor, which is evident by their abysmally low representation in public and private sector jobs, education and political arenas and the benefits of entitlements meant for backward classes are yet to reach them (as cited in Dasgupta, 2009).

Climatic conditions in Nadia and Murshidabad were reported as one of the factors that resulted in severe livelihood shocks. Unexpected rainfall, hail storms, and rising temperatures affected agriculture and destroyed crops; sometimes the loss was so severe that people just burn the crops rather than harvest. Parts of Murshidabad and Nadia are also prone to floods.⁵ Most of the respondents recalled a major flood in 2002 that wreaked severe havoc on their livelihood and living conditions.

One of the respondents said,

There was a big flood in 2002, but it isn't regular event. But then, one time is enough for consequences. There was no food in our village at the time. There was food thrown for us from the sky, to the terraces. Some would get it, some wouldn't. The weather has

been extreme in Nadia since I remember. (Respondent K, Semi-structured Interview, Marathahalli Settlement, 1st October 2016)

This marginalization is also an indicator of people's social standing in the community given the fact that the majority of them are Muslims. Marginalization in migrants' homeland, attributed to the social, economic, political as well as climatic factors, pushed them to extreme poverty and destitution in their homeland and they had to retort to migration as a coping strategy. Although Bangalore offers better economic opportunities, new vulnerabilities arise that residents need to find ways to live with.

5. Vulnerability across multiple scales and landscapes in India

The case study of interstate migrant waste pickers in Bangalore city is used as an example to produce a deductive framework that conceptualizes vulnerability across the rural–urban continuum in India. As Figure 5 depicts, we examine the flow of vulnerabilities at the national, regional and city level. Access to assets and entitlements for different groups of people are determined at multiple levels and landscapes. Thus understanding vulnerability of the marginalized in the cities requires an understanding of how vulnerabilities are shaped across the rural–urban continuum in the country.

At the national level, the new economic policies post-1991 have exacerbated inequalities between various socio-economic classes in India with purchasing power concentrating among the elites and the middle classes (Patnaik, 2009; Vakulabharanam, 2010). This period in India has also been marked by sectoral imbalances with the performance of the agricultural sector raising severe food security concerns (Balakrishnan, 2017). With a country highly dependent on climate-sensitive sectors like agriculture, climate adaptation is a priority area which



Figure 4. The map depicts the migration path of the waste pickers.

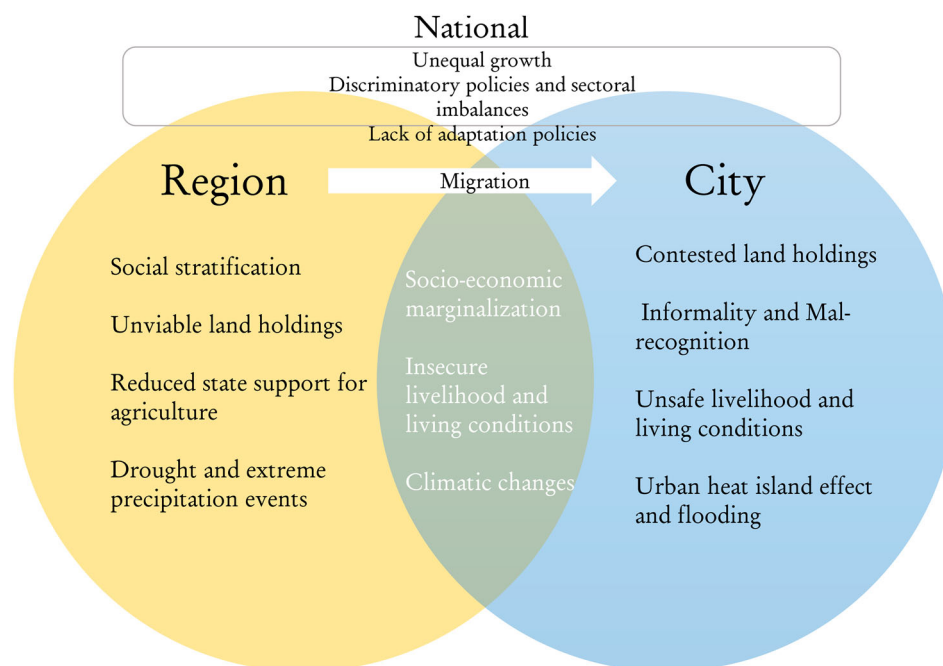


Figure 5. Framing vulnerability across rural-urban continuum in India.

has to happen irrespective of the mitigation target. However, as Dubash and Khosla (2015) reiterate, the adaptation dialogues have failed to give due visibility to vulnerable sectors and regions in different state action plans. The overarching growth regime and the policy framework in the country trickle down to the regional and city level.

At the regional level intersection of climatic and non-climatic factors have resulted in agriculture becoming an unviable option for the rural poor. There is a progressive decline in the average farm size due to fragmentation. Shrivastava and Kothari (2012) argue that during the current reforms, the poor are losing control of the only asset they own, which is land. This is happening in both urban and rural settings and is called displacement and eviction, respectively. However, migration as a coping strategy of the rural working classes to the cities is only resulting in replication of the vulnerabilities experienced at the source. According to the *India Exclusion Report 2016* around 35–40 million casual labourers outside the agricultural sector are seasonal migrants to urban areas (Mander, 2016). This huge inflow of distress migrants puts enormous pressure on the city's infrastructure and is often beyond the absorptive capacity of the city in terms of providing essential services such as drinking water, sanitation and basic housing needs.

New reforms in urban sector that have been launched through various policy changes have focused on a more marketized approach to governance over issues such as access to water supply, urban land and housing (Banerjee-Guha, 2009). All these processes together have coalesced in such a way that the urban poor have become invisible, highlighting the fact that the social and economic milieu of Indian cities is becoming more fragmented (Banerjee-Guha, 2009).

As argued above the poor migrants find refuge in the informal settlements of the city and take up insecure and hazardous livelihoods. The illegality of these settlements renders them invisible to the city's planning mechanisms and service

delivery. These marginalizations are accentuated along the lines of socio-economic stratifications in the societies. Thus as illustrated in Figure 5 socio-economic marginalization, insecure livelihoods and living conditions as well as climate-related vulnerabilities are experienced by the vulnerable in the city as well in their native places. Thus, vulnerabilities at origin and destination repeat itself, emphasizing the need for addressing these issues across the rural-urban continuum in the country.

6. Discussion and conclusion

The distributional implications of climate change and environmental degradation are juxtaposed on the existing coalitions of power and wealth generated by 'the normal workings of international political economy' generating divisions along the lines of class and caste among others (Szasz & Meuser, 1997, pp. 11–112). Vulnerabilities observed at individual, household and community level are manufactured through a combination of interwoven local, national, regional and global political-economic relations (Adger, 2006; Marino & Ribot, 2012; Ribot, 2010; Watts, 1983; Watts & Bohle, 1993). Using the case of interstate migrant waste pickers in Bangalore city, our study emphasizes that the impacts of climate change are distributed along lines of social risk positions that also coincide with the existing coalitions of inequalities and power differences (Newell, 2005).

The vulnerability associated with the interstate migrant waste pickers studied here has been driven through the exclusionary development process in the country that sidelines the poor and marginalized. The impacts of climate change on Indian cities should be seen in the light of emerging patterns of inequality in the city and concerns that these trends might exacerbate urban poverty even further. Our findings indicate that while the root causes of the vulnerability of these migrant workers can be traced back to the socio-economic and ecological

conditions in their homeland, exclusionary urbanization patterns in Bangalore result in livelihood and living conditions that have severe implications on their health and identities.

Whilst waste picking as a livelihood provides an opportunity to earn an income, it is also accompanied by substantial risks, social isolation because of prevalent societal stigmas and exposure to significant health hazards (Beall & Kanji, 1999). Gidwani and Maringanti (2016) note that waste pickers are part of the 'infra economy' which they describe as

an economy that is denied recognition by state and civil society (and is seen only at moment of crisis, an object of condemnation or reform) and yet is an economy that is vital to the production of urban space such that it is conducive for capital accumulation.

They also argue that the areas where these waste pickers dwell are toxic sinks that encapsulate the externalities which are an inevitable part of the capitalist consumption and production practices (Gidwani and Maringanti, 2016). Importantly, these workers also provide an essential ecosystem service to the city from a waste and mitigation perspective by handling and processing a large amount of waste generated by the city. Unfortunately, this service remains invisible in the eyes of the city supporting Tschakert et al.'s (2013, p. 343) view that the multiple manifestations of vulnerability created by inequalities and power structures are often not recognized and hence acted upon.

With increasing urbanization of poverty and growing inequality levels it is critical to address development and universal rights in cities across scales from the macro environmental down to the individual and household scale. The growing focus on the 'right to the city' provides an important contribution by supporting the development of a city that meets the needs of the people living in it and surfaces the pervasive marginalization of certain groups (Parnell & Pieterse, 2010). If more attention could be paid to understanding what 'the right to the city' means for dwellers such as the waste pickers in Bangalore, pathways of adaptation could be developed that might start to address inequality and urban resilience. In the background of the 'New Urban Agenda', an action-oriented document adopted at the Habitat III Conference, the Sustainable Development Goals (SDGs) and the Paris Climate deal there is an increased appetite for rethinking the way 'we build, manage, and live in cities' (Boonyabanha, 2016).

The SDGs have introduced the goal of reducing inequality in addition to no poverty which is critical in actively responding to climate change as articulated in Goal 13. This overlay of ambitious goals makes it hard to keep all of them in sight. But inequality and environmental unsustainability reinforce one another and it is impossible to address one without tackling the other (ISSC, IDS and UNESCO, 2016). Climate change is poised to aggravate and create new forms of inequality in the city triggering dynamic social consequences (Laurent, 2014).

This suggests a shift is needed in how things are done. Not just tokenistic inclusion, but a recognition of historical injustices and a shift in power, where multiple voices are heard and valued. The need for a justice lens in cities has been clearly articulated in the case of Bangalore's interstate migrant waste pickers where historic structures of marginalization played out itself at origin and destination undermining the effect of

migration as a coping strategy. Bulkeley, Edwards, and Fuller (2014) argue that without recognizing existing inequalities and injustice it is hard to start addressing injustice and understand how climate change responses might further contribute to or reduce the root causes. There are a growing number of suggestions for how to include local voices. Hughes (2013) lays out three criteria for justice in urban adaptation namely: (1) Inclusiveness: ensure adequate representation of vulnerable groups in the adaptation planning processes, (2) Prioritization: integrate the needs of vulnerable groups explicitly in priority setting and (3) Impacts: assure that the end results of adaptation process strengthens the assets of vulnerable groups in the city. Hence bringing such a justice lens to the city will help in formulating a transformative inclusive development strategy that incorporates issues of identification and recognition of the vulnerable and the way climate change affects and alters their daily lives 'individually, socially and culturally' (Schlosberg, 2012).

As momentum to plan and implement urban climate change adaptation grows, we are at a critical juncture for more actively inserting discussions about addressing structural inequalities and injustice (Bulkeley et al., 2014). Dissatisfaction with many of the current adaptation responses has been voiced by those who argue that more radical social transformation is needed to address the underlying root causes of vulnerability and engage in more systemic change that includes a focus on power and justice (O'Brien, 2012; Pelling et al., 2014).

Notes

1. Informal settlements: squatter areas with informal housing located in geographically and environmentally hazardous locations, lacking basic services and infrastructure (UN-Habitat, 2003).
2. Topographical information has been sourced from the SRTM (Shuttle Radar Topography Mission) satellite imagery and the location of flood prone areas was sourced from the Karnataka State Natural Disaster Management Cell (KSNDMC).
3. The problem tree depicts the interconnections between multiple aspects of a problem. It allows understanding of the root causes of the problem and the consequences (Oxfam, 2012).
4. The Sachar Committee report Chapter 12, p. 213.
5. West Bengal Disaster Management Department website: <http://wbmdm.gov.in/Pages/Flood2.aspx>

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