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The five-year ASSAR project (Adaptation at Scale in Semi-Arid Regions, 2014-2018) uses insights from multi-scale, interdisciplinary work to inform and transform climate adaptation policy and practice in ways that promote the long-term wellbeing of the most vulnerable and those with the least agency.

KEY POINTS

- In Karnataka, vulnerabilities are shaped by climatic and non-climatic factors across the rural-urban continuum.
- Migration is a key coping strategy, yet the migration of the rural working classes to the cities often results in the replication of the vulnerabilities experienced in rural areas. On the other hand, the outcomes of daily commuting (rather than permanent migration) may help to improve household-level well-being.
- In rural areas, environmental hazards like droughts, erratic rainfall, extended dry spells, and depleting groundwater directly impact the livelihoods based on natural resources.
- Climatic impacts manifested through localised flooding, elevated temperatures and water availability affect the urban poor more subtly than the rural poor, as they intersect with multiple dimensions of urban poverty and informality. This is evident in the case of Bangalore's informal settlement dwellers.
- Socio-economic marginalisation along the lines of caste and class are key determinants of structural vulnerability in urban and rural areas.

The high growth regime in India during the last two decades has been widely critiqued for its apparently exclusionary development process that has rendered agrarian livelihoods untenable. When combined with climatic stressors – like changing rainfall and increasing temperature – this unviability of rural agrarian livelihoods has led to increased out-migration to the cities. However, the lack of opportunities in agriculture has not been compensated by increased quality job opportunities in urban areas. This structural imbalance has created a mass exodus of rural workers necessitated to engage in precarious city jobs.

The process of urban development in India has been highly exclusionary with the impetus on developing world class cities attractive to global finance often denying the basic human rights of a certain set of people living in informal settlements around the city.

Semi-arid regions are doubly vulnerable: people and systems here face dynamic climatic and non-climatic risks, and deeply embedded structural vulnerabilities constrain effective, widespread and sustained adaptation.

Within this context, ASSAR's India team is examining "hotspots of vulnerability", defined as places where environmental and socio-economic vulnerabilities intersect. In our work on how vulnerability is socially differentiated, we use migration to investigate two key questions:

- How do vulnerabilities vary among social groups?**
- How are vulnerability patterns changing, and why?**

Drivers of vulnerability: Rural Karnataka

Kolar falls in the eastern dry agro-climatic zone in southern Karnataka and is situated 70km away from the centre of Bangalore.

The region is marked by erratic rainfall, low soil moisture, high groundwater exploitation, and rapid land use change.



Gulbarga/Kalaburagi, situated 600km north of Bangalore is one of the most backward districts in the state. One of the hottest and most arid regions of Karnataka, Gulbarga has historically witnessed out-migration to Bangalore as well as to neighbouring states of Andhra Pradesh and Maharashtra.



Livelihoods in these districts are predominantly driven by agriculture which in turn is dependent on the natural environment.

Therefore, drought, water scarcity, depleting groundwater, unseasonal rainfall, increasing temperature and rapid natural resource degradation are key challenges to agrarian livelihoods here. In both these districts, exposure to climatic risks and associated vulnerabilities are higher for the Schedule Castes (SC; an officially designated group of historically disadvantaged people). Households with larger land holdings and sources of water for protective irrigation, are better equipped to deal with these climatic stressors.

For the landless and socially marginalised, migration is a key strategy for coping with climatic and non-climatic stressors. Non-migrant households are typically landowners with better adaptive capacity and social standing.

Within Karnataka, we observed two types of movements: (1) seasonal or permanent migration from chronically drought-prone regions such as Gulbarga in north Karnataka, and (2) daily commuting from water-scarce and relatively well-connected regions such as Kolar. In both cases, the experiences of moving and the outcomes of these decisions, offer insights into what drives and perpetuates vulnerability.

Daily Commuting

In Kolar, those with less land or high debt (often due to repeated borewell digging) tend to be increasingly commuting to nearby industrial areas such as Narsapura Industrial Area near Hoskote, or commuting to Bangalore where they work as construction labourers, painters, carpenters, gardeners, drivers and cooks.

While the drivers of commuting are falling returns from agricultural livelihoods and better access to Bangalore through cheap monthly railway passes, remittances are seldom used to accumulate assets, but rather to pay off debt and supplement family incomes.

However, in some cases, where educated youngsters move into skilled jobs, household material well-being has increased.

Seasonal or Permanent Migration

In Gulbarga, recurring drought – along with the lack of irrigation to tide over dry spells – has meant that migration is a key rural livelihood strategy. Large landowners with wells are typically able to resist moving, while people belonging to SC category tend to migrate seasonally or permanently into jobs in brick kilns (Maharashtra), construction labour (Bangalore and Mumbai), or agricultural wage labour as available.

Although we found evidence to suggest that generations inherit their household's historical patterns of social marginalisation, some visible progress was seen in Scheduled Tribes (ST) such as the Lambanis. A traditionally nomadic tribe, the Lambanis have benefitted from several corrective government measures (e.g. subsidised education, capacity building), and in Nrupathanaga village we saw how Lambani youngsters are using these measures to enter skilled jobs (e.g. in IT companies in Bangalore and USA).

Drivers of vulnerability: Urban Karnataka

Bangalore is located in the southeast dry zone of Karnataka, and is characterised by a semi-arid climate. Here our study is focused on informal settlements in and around the city, a large number of which are inhabited by rural working classes from within and outside Karnataka. Since most of these settlements have been established on low lying or marginal lands and landfill sites, they are extremely prone to flooding and associated health hazards. Water scarcity, uneven rainfall patterns, depleting groundwater tables, urban flooding and rising temperatures affect the informal settlement dwellers severely.

Although people here used migration as a means of escaping destitution in their native places, we noticed that they were exposed to the same vulnerabilities in their new location. The following cases from our research illustrate this.



The informal settlement near the Rachenahalli lake, north of Manyata tech park in Bangalore, houses 5000 people. The majority of these people are distress-migrants from north Karnataka, who have come from the Yadgir, Gulbarga, Bijapur, Bellary, Raichur, Haveri and Koppala districts. In these districts, drought and inadequate governmental support to deal with ever-increasing climatic risks has led to severe failure of agriculture. This failure affects hundreds of thousands of lives whose sole source of income is agriculture. As a response, these people migrate to cities like Bangalore, Mumbai and Hyderabad and inhabit settlements like the one in Rachenahalli.



In this settlement, the land is privately owned and the dwellers are subject to ludicrously strict rental rules. Clean water is available in limited quantities and there is no access to electricity or sanitation. The dwellers resort to using the polluted waters of the Rachenahalli Lake for domestic purposes and open defecation is prevalent. Further, they lack access to ration shops, hospitals and government schools. A striking line of social differentiation that has emerged in this case is that 84% of the dwellers in Rachenahalli belong to SC category while 11% belong to ST category, pointing out the persistence of historical patterns of marginalisation in rural areas reinforcing themselves in the city.

The informal settlement in Hebbal primarily comprises Muslim interstate migrant workers from West Bengal working as waste pickers. This migration has been an outcome of climatic factors, including erratic rainfall patterns, floods and cyclonic storms, as well as non-climatic factors associated with agrarian distress and oppressive socio-economic divisions on the lines of class, caste and income.

However exclusionary urbanisation patterns in Bangalore limits these migrants to only accessing livelihoods that have severe implications on their health and identities. In addition, the migrants reside in extremely hazardous zones amidst heaps of garbage where erratic rainfall further compromises their health and incomes.

Interstate migrants are additionally vulnerable due to the language disconnect, with their lack of any sort of negotiating power in the city leading to social isolation. Even though existing social networks facilitated their migration, the migrants often lack the power and agency to ascertain their rights in the city.



Finally, marginalisation along the line of caste and religion play an important role in determining livelihood vulnerabilities and access to services.

Conclusions

- Rural and urban vulnerabilities across India have multiple dimensions and are reinforced by existing socio-economic stratifications.
- Socio-economic marginalisation is a key driver of vulnerabilities across the rural-urban continuum, and influences access to resources and exposure to climatic and non-climatic stresses.
- Vulnerabilities vary among social groups. For instance, in rural areas migration is a key coping strategy for the landless and socially-marginalised while non-migrant households typically have better adaptive capacity. Further, migrants living in informal settlements in Bangalore (who are typically from historically-marginalised groups) are more vulnerable and have poorer access to basic services and infrastructure than non-migrants.
- Although vulnerability patterns vary in space and time, migration tends to perpetuate vulnerabilities, and highlights the structural nature of the problem.

Recommendations

- For urban development policies to be effective and inclusive, they require a deeper understanding of the nature of informal settlements — one that recognises the various actors involved, and the roles of social networks and social cohesion.
- To develop this understanding, vulnerability assessments should be strengthened, and fine-grained datasets that include the missing people (especially migrants living in informal settlements) should be generated.
- Infrastructure, road and transport facilities should be improved to enable people to commute to their workplaces, thereby easing the absorptive capacity of the cities.
- Viable employment options in rural areas should be developed through the strengthening of rural livelihoods and/or the natural resource bases upon which these livelihoods depend.



ABOUT ASSAR

ASSAR uses insights from multiple-scale, interdisciplinary work to improve the understanding of the barriers, enablers and limits to effective, sustained and widespread climate change adaptation out to the 2030s. Working in seven countries in Africa and South Asia, ASSAR's regional teams research socio-ecological dynamics relating to livelihood transitions, and the access, use and management of land and water. One of four consortia under the Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA), ASSAR generates new knowledge of climate change hotspots to influence policy and practice and to change the way researchers and practitioners interact.

For more information go to www.assaradapt.org or email kmichael@cariaa.net



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