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## PERIURBAN SPACES AS RISKSCAPES

Periurban spaces are zones in transition at the urban fringes or close to expanding agglomerations. They are often considered as geographical patchwork spaces characterized by diverse functions (food and water security, provision of livelihoods, ecosystem services, etc.), a mosaic of land uses with rural and urban features, a multiplicity of stakeholders sometimes with diverging interests, and overlapping governance structures. These features create diverse opportunities, but also expose periurban spaces to deep transformations and make them challenging to govern

### Policy Recommendations

- Risk management and disaster preparedness need to become a priority in periurban governance. This requires capacity building on the local and regional level.
- A coherent, multi-sectoral, data driven disaster risk management needs to be established on the district level.
- Planning needs to secure protected areas that have specific functions for disaster risk reduction (e.g., retention areas) and keep disaster prone areas (slopes, floodplains) free from human use.
- A new form of learning to live with risk is needed. It can be inspired by traditional systems that have to be adapted to today's needs and governance structures.
- Detailed data for risk assessment is needed. This includes elevation models, hydrological data, meteorological data, information on soils. Models based on this information then have to inform planning processes.
- Science and local administrations have to enter into a fruitful dialogue, for which it is necessary to overcome "language barriers".

### Periurban riskscapes

Currently the nature of the periurban transformation in India results in an increasing vulnerability towards disasters. Periurban spaces are prone to multiple risks and have limited coping capacities. Prominent examples are flooding events that devastated several Indian metropolitan regions in the last decades e.g., the Hyderabad floods in October 2020. Yet, periurban spaces are also the cradle of other man-made disaster or society-environment disasters, such as droughts, industrial accidents, fires, landslides etc. which affect the larger metropolitan areas in which they occur. These emerging vulnerabilities concern the built environment, the socio-economic fabric and ecological aspects.

### Root causes for risk in periurban areas

The first root cause of the increasing vulnerability is unplanned development – the dominant mode of periurbanisation. It increases the disaster vulnerability through:

- The intensification of land use and landscaping through new infrastructures and housing. This logically results in more people and more assets being exposed to potentially hazardous events. In addition, intensification can actively produce new risks, too e.g., not considering disaster risk exposure when new housing or infrastructure are built in risk prone areas.

- Necessary infrastructures are built often after development takes place. Thus, local authorities have to provide infrastructure not in a forward-looking but mainly in a reactive way. Known hazards can then not be adequately included in the planning process and the chance to smartly design housing and infrastructure to increase resilience is lost.
- A lack of finances causes an aggravation of infrastructural deficits. Often, local authorities lack the means to provide very cost effective measures. Small interventions – like underground drainages – have the potential to significantly decrease the exposure to events or increase coping capacities.
- Spaces that could provide valuable functions for disaster risk reduction cannot be preserved. For an effective flood management, retention areas are needed that can absorb flood peaks. Often these areas are transformed into more

intensive land use, which increases the exposure to flooding and the severeness of flooding events. Encroachments of first and second-order drains amplify the flood height after extreme rain fall events.

The second root cause is the weak periurban governance. It is characterized by an overlapping of several governance systems at different scales. Traditional governance structures erode, while new ones are not yet in place e.g., existing traditional water management systems are discarded without new ones being put in place instead. Also, collective work on maintaining traditional protective measures, such as terraces that provide protection from landslides, is likely to erode in the process of periurbanisation without new institutions effectively taking on these tasks. Governance shortfalls are inter alia caused by and cause at the same time deficits in the availability of data. Data gaps concern ecological aspects, built structures, infrastructures and social systems. Informed decision making is often not possible under these circumstances and increases the disaster risk.

The third root cause is social restructuring. An influx of relatively poor populations from the core of the respective agglomerations and from other cities can be observed. Both streams of movement result in an accumulation of a vulnerable population, which lacks the capacity to cope with hazards.

How these three root causes exactly manifest in periurban areas is highly diverse and space specific. This makes it a challenging task for decision makers on the ground, yet ignoring them is not an option. Research needs to develop consistent frameworks on the drivers of change in the periurban and how they shape the periurban riskscape.

## Policy interventions

Policy interventions need to address two perspectives: (1) Periurban areas need to be developed in a way that reduces risk while at the same time (2) disaster management skills need to be developed.

## Risk management

Risk management is a cross-sectoral activity. It has to be based on a robust assessment of risk. For this adequate data is needed. This includes information about the physical geography, including elevation models, soil models, climate data etc., the built infrastructure and social structures. Data needs to cover the serviced area holistically, including informal settlements. A rigorous assessment of risks needs to inform the planning process for future developments. Even more important is the risk reduction in built up areas, where ex-post interventions need to be established in socially acceptable manners.

An important part of risk management is the dialogue with local populations. They often have in-depth knowledge about risks. Further traditional risk management systems, which have been developed locally can provide cost-effective and ecological means of managing risks.

## Disaster management

Disaster management structures need to be put in place on a regional level. Most important in this regard are clear responsibilities and communication rules. It further includes rapid response forces that can be activated for intervention in case of a disaster. In case of a disaster, the most vulnerable infrastructure needs to be protected. Thus, for different scenarios, intervention plans need to be designed in advance. Most important is in the case of a disaster the prevention of risk cascades – the emergence of secondary or tertiary risks. These can be for example health risks emerging in the aftermaths of a flooding event because access to the sanitary infrastructure is limited.

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