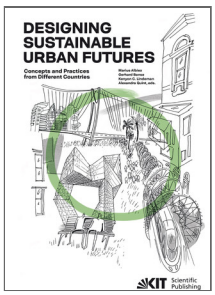

Marius Albiez, Gerhard Banse, Kenyon C. Lindeman and Alexandra Quint (dir.)

Designing Sustainable Urban Futures
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Peri-Urban Villages of Bangalore, India

Reclaiming the Commons to Cope with Climate Stress and Unsustainable Resource Utilization Systems

Appakuttan Damodaran and Tanushree Haldar

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Reclaiming the Commons to Cope with Climate Stress and Unsustainable Resource Utilization Systems

Appakuttan Damodaran, Tanushree Haldar

1 Backdrop

Mundur is a village spanning an area of 1,302 acres. This village is located towards the east of Bangalore, India, 26 km away from the city's centre. Prior to the 1980s, the village had a historically diverse set of common property resources and common grazing grounds, water bodies and tree groves accounting for roughly 27% of the village's geographic area. The village enjoys an average annual precipitation of about 720 mm and is vulnerable to periodic droughts. Traditionally, it was a symbiotic man-livestock relationship and a subsistence-based cropping system that had saved Mundur from the deprivation and impacts of droughts (cf. Damodaran 1993). The symbiotic relationship was enabled by a community-driven land use system that permitted the village livestock to be grazed in common grass lands during monsoons and water bodies during summer months and then over-harvested fields (belonging to farmers) during winter months. Thus, the grazing regimes available in the village included not only common property resources (CPR) but also private property resources (PPR).

The advent of commercial farming in the village in the 1980s and the externalities of solid waste pollution from Bangalore city by the turn of this century caused resource utilization systems to deviate from traditional land use systems which were based on sustainable utilisation of land resources.

The new resource utilisation modes that based commercial cropping on irrigation provided by deep bore wells led to declining ground water tables and the disintegration of traditional water body use that had provided surface water irrigation based on natural stream flows. This situation led to unsustainable resource utilisation systems that did not respect the limiting factor of water in semi-arid environments. More fundamentally, the spread of commercial farming based on horticultural crops led to enclosing of private agricultural lands and their reduced permeability to common usage by way of common grazing. This served to lower the 'adaptive capacity' of the village (cf. Abercrombie et al. 1997) and enhance the risk of accelerated depletion of natural

resources in the village, thus increasing its vulnerability to the risks of climate change. The solution is to look at means by which adaptation capabilities of the village can be rendered more robust.

2 Trajectory of the Tragedy of Commons in Recent Years

It is noteworthy that a large amount of common grazing lands of the village was converted into reserved forests (345 acres of a total of 545 acres of common grazing lands) in the year 1966, to green the degraded commons. The official machinery considered Mundur's grazing lands use, with its scattered trees and large chunks of grasslands, as unproductive and desired to re-stock the acquired lands with tree plantations. In the 1970s, the common lands that were taken over as reserved forests were planted with *Eucalyptus tereticornis*, a tree which had zero fodder value and poor fuel-wood quality. The only utility of the eucalyptus species was as pulpwood that catered to the raw material needs of the paper and pulpwood industry.

Dense plantations of *Eucalyptus tereticornis* replaced the local silvopastoral land use pattern that was in existence in these lands in the 1960s. The fodder base of Mundur narrowed as a result, resulting in the breakdown of the grazing cycle that was central to the sustainable pattern of natural resources management that existed in the village (cf. Damodaran 2001). Current estimates place the community lands of the village at less than 10% of its total geographical area.

The urban sprawl of Bangalore city had moved dangerously close to Mundur village by the year 2000, aided by the fact that, by the late 1990s, the city had emerged as the "Silicon Valley of Emergent India". The conspicuous consumption patterns noticed amongst the affluent rich and middle class of the city (cf. Damodaran/Haldar 2015) resulted in two trends:

(a) The quest on the part of the new elite to occupy peri-urban spaces of the city for habitation and gentrification;
(b) increasing pressure exerted by Bangalore's urban bureaucracy to convert common waste lands in nearby villages into solid waste dumping yards and landfills to store the large volume of urban wastes being generated by the city.

With its large geographical area and relatively high proportion of degraded common lands, Mundur was one of the ideal candidates for being urban Bangalore's landfill. Thus in the late 1990s urban solid waste from Bangalore found its way to a portion of Mundur's commons, which was in legal possession of the State Forest Department as Reserved Forests. This resulted in grave contamination of the ground water sources of the village due to leachates from the solid waste dump site in the village. Villagers protested against the developments to such an extent that in the year 2015 the State Government ordered the end of solid waste dumping in the village.

3 Adaptation Measures

Adaptation measures vary with the source of their action. Adaptation measures can be categorized into two types, "natural" (or "autonomous") and "planned" (cf. Damodaran 2012). While the former involves a natural adjustment process to short lived variability in climate factors, the latter involves conscious interventions on a larger scale to address "secular" changes in climate (cf. Damodaran 2012). Adaptation measures also vary in their source. Thus Robert Mendelsohn categorizes adaptation measures into "public", "private" and "joint" depending upon the agent/agents undertaking adaptation activities and/or receiving its benefits (cf. Mendelsohn 2000). Adaptation is "private" if the decision maker is the only executer and the sole beneficiary of adaptation action. "Joint adaptation", on the other hand, is a group activity whereby action taken by an agent involved affects the benefits other individuals receive. "Public adaptation" occurs when governments invest public financial resources on adaptation activities.

The evidence from Mundur points to the importance of reclaiming the commons from commercialization trends and the adoption of policy solutions that link adaptation-friendly agriculture with traditional knowledge based on CPR-PPR synergies. Thus policies that emphasize food and nutritional self-sufficiency, if coupled with climate action plans that seek to enforce the symbiotic nexus of PPR and CPRs can go a long way in ensuring that sustainable development fits well with the task of increasing the availability of food and nutrients to the peri-urban poor.

4 Enhancing Adaptation Capabilities in the Village

The chief lesson that can be gleaned from the traditional resource management systems in the village practised until the 1980s (prior to the advent of bore wells), has been on the importance of utilising private property resources in tandem with common property resources. This means observing and maintaining the delicate balance in traditional man-livestock relations that was based on energy, manure and protein linkages (cf. Damodaran 2001).

It is conceded that the symbiotic state of ecosystem management did not free the village from the scourge of poverty. Landless labourers, particularly groups of which depended exclusively on dry-land agricultural operations for their employment opportunities, were vulnerable to food scarcities during the off-cultivation seasons. However, the symbiotic mode of resource management created conditions for providing a diversified consumption base (comprising of legumes and cereals) to the marginal sections of the village community which in turn helped them to meet the livelihood requirements of landless labourers and small-scale, marginal farmers on a

sustainable basis (cf. Damodaran 2001). Today, the marginal farmers in the village who practised dry-land agriculture in the past, have reduced access to quality natural resources (including access to potable water). Since financial institutions provide credit and loans on the basis of collateral instruments such as land titles and also on the basis of likely market rates of return from activities for which loans are sought, it is difficult for traditional vocations and systems of resource management to find support from these institutions.

5 The Blueprint for Reclaiming the Commons

Community structures, institutional arrangements, technological interventions, and public policies are considered critical factors that determine the process and condition by which human communities adapt to climate change (cf. Downing et al. 1997). Brian Hurd, Mac Callaway, Joel B. Smith, and Paul Kirshen highlight the importance of market and non-market adaptation measures in the estimation of impact costs (cf. Hurd et al. 1997). Damodaran notes the absence of financing measures for high-end adaptation measures such as artificial recharge of depleted aquifers and evolution of low transpiration plant varieties that could have helped farmers in peri-urban villages of semi-arid India cope with climate stress (cf. Damodaran 2015). The unsustainable situation created by urban sprawl on rural peripheries in developing countries has been highlighted as one of the challenges towards attaining the ideal of inclusive and sustainable cities (cf. Damodaran/Haldar 2015).

Given the patterns described above, the following measures are proposed for reclaiming the commons in terms of their quality and contribution to enhanced adaptation capabilities. Five steps are important to address this issue:

- The *starting point* for reclaiming the commons in the village is to re-vest property rights over common lands and water sources with the village community and its economically weak sectors both by way of legal rights to ownership and 'possession' rights over dry-lands and traditional common property resources including grazing lands and wetlands.
- The *second step* requires a massive effort to clean up the polluted water streams and aquifers.
- The *third step* is to undertake participative hazard analysis and societal risk assessment systems that reflect the local community's perception of the pollution problems facing the village, rather than a solution that is techno-managerial and top-down in approach and looks towards centralized and uniform technical solutions to pollution and other related sustainability problems faced by villages.
- The *fourth step* is to have participative resource mapping. No programme of eco-restoration of village ecosystems can be sustainable unless it is inclusive and par-

ticipative in nature. Villagers also need to be involved in natural resources accounting systems that recognize the ecosystem services rendered by different elements of the village ecosystem. This element normally escapes the attention of centralized resource categorisation and mapping systems. A case in point is the propensity of centralized resource mapping systems to focus on large water bodies and groves, and ignore ecosystem benefits and services provided by small ponds and isolated patches of trees. Only in the event of "minor ecosystem services" being recognised by resource mapping systems would valuation of resources be objective, and sustainable development plans be of relevance to local communities. Thus centralized systems which focus on large and obvious elements and ignore "small" but significant factors that are critical to the livelihood needs of the local communities, need to be given up in favour of local community resource mapping and survey systems.

– The *fifth step* is to ensure flow of finances as it is critical for reclaiming the commons of the village. The traditional system of governmental grants for development activities in the village has proved to be inadequate to the real needs of the village. Local self-government needs to have dedicated financial resources to undertake eco-restoration works and establish management systems to conserve resources. The need is for capital resources to undertake the mammoth tasks of resource rehabilitation. This can be achieved by floating debt instruments like local community "bonds" that can be subscribed to by members of the public. These bonds can be issued on the strength of the monetary value of ecosystem services identified by the community resource mapping systems. If further underwritten by the State, the same bonds would augment flow of capital resources to the village. This will render the task of reclaiming the commons realistic and robust.

To summarize, peri-urban villages which are threatened by urban sprawl reflect one of the greatest threats to ensuring inclusive, sustainable cities in countries like India. These villages which were blessed with commons are threatened by the growing demand from the urban core to open them up for dumping of solid wastes emanating from the city and other top-down actions. Indeed the disappearance of the commons is accompanied by a decline in adaptation capacities, increased hazards to humans and livestock, and grave societal risks. Actions to restore rights over common resources to communities, adoption of clean up measures to eliminate contaminated sites, coupled with hazard analysis, and participative mapping of resources and ecosystem services, will go a long way to achieving the goal of reclaiming the peri-urban commons and enhancing the adaptation capabilities of peri-urban villages in Bangalore and similarly placed cities of India. Organising appropriate financing and institutional mechanisms that aid the process will offer greater possibilities of attaining these goals within a reasonable time period.

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