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# Reshaping Urban Green Spaces

M SOUBADRA DEVY, SAVITHA SWAMY, ARAVIND N A

Urban biodiversity and the associated ecosystem services have been ignored and undervalued because ecologists have focused only on pristine habitats and rare species. However, with rapid urbanisation the challenge is to build the native biodiversity within the urban landscape. This could be done by involving multiple stakeholders like the local municipality, architects and, most importantly, citizens in the neighbourhood. We also need to follow the concept of adaptive co-management.

Urbanisation, like climate change, has been identified as a major threat to biodiversity (Srinivasulu 2008). By 2030 more than 60% of the world's population is expected to live in cities (Dietz et al 2007). Cities depend on nature and a wider hinterland from where they draw a variety of inputs and also flush their outputs, thus leaving behind a large ecological footprint. By 2015, the human ecological footprint is expected to be 34% more than it is at present (ibid).

Cities also depend on services rendered by greenspaces and the associated biodiversity. However, urban biodiversity and associated ecosystem services have remained neglected and are undervalued only because pristine habitats and rare species appeal greatly to ecologists and conservation biologists. Although the urban green spaces hold "ordinary nature" which comprise common species, they might still provision a certain level of ecosystem services which could be highly valuable for cities. Studies in India so far have only focused on the response of particular taxa such as birds, butterflies and ants across gradients of urbanisation (Ingallahikar et al 2001; Kunte 2001; Savitha et al 2008). Since the focus is only on biodiversity, a holistic approach which understands the functioning and processes of these urban green spaces and the biodiversity they hold, is totally lacking.

It has been argued that having a higher number of species increases the number of potential community organisations that can withstand perturbation, which, in turn, is said to make the system resilient and more useful (Millennium Ecosystem Assessment 2005). Since the process of urbanisation cannot be arrested, the challenge is to build the native biodiversity within the urban landscape to maintain an optimum level of ecosystem services. To understand the process and functioning of these vital habitats, it is important that we explore the scope and mechanism to build back the biodiversity. Here, we review the opportunities and challenges

of building biodiversity in our dynamic urbanscape.

## Institutional Pathway

The management of urban ecological systems for biodiversity of high conservation value can be extremely complex as compared to non-urban systems, as the former serve as nodes of high interaction between humans and nature (Barthel et al 2005). Thus, it is pertinent only for bringing back "ordinary nature", which is resilient to such interactions. In order to gain the support of the larger public, we need to strategise to offer opportunities for meaningful interaction with nature, in places where people work and live (Rosenzweig 2003). However, this could be daunting in the Indian scenario as the community represents diverse socio-economic structure, culture and belief which will have a bearing on the attitude towards nature. Also our urban areas now have a generation which has delinked from nature a few generations ago.

The spatial spread of the existing green spaces is daunting since they are scattered small islands within the city. They come under the purview of diverse management regimes and therefore require a pluralistic approach at multiple levels involving diverse institutions. For instance, a small homeowner might help in the conservation of native trees in his garden space. On the other hand, collective action by the entire neighbourhood could help conserve larger number of vagile species such as birds and bats with large area requirements, which can hop between these green islands and find their required resources. This can be achieved only by networking among home gardeners and bringing them under some common institutional arrangement.

On a larger scale, parks within cities have always been managed and maintained by the urban governing body (UGB) whose main agenda is planning, management and administration. Conservation of urban green space thus remains of peripheral interest. This is also applicable to India where urban green space management is given low priority. Over the years, this attitude has led to the deterioration of green spaces which seems to have a cascading effect on the environmental and ecological conditions. For any growing city the

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challenge lies in preventing these conditions from reaching the “no return condition”. There is an urgent need to strengthen the capacity of the UGB to understand and evaluate the conditions of the city, to make the right decisions and implement them to conserve green spaces, and enhance biodiversity and the associated ecosystem services.

In Bangalore, the UGB which is the Bruhat Bengaluru Mahanagara Palike (BBMP) has been the only large body bound by a common jurisdictional framework. Over the years it has dissolved into several bodies with independent frameworks (parastatal bodies). This has led to the latter controlling and managing several services such as water and electricity supply, and infrastructure with varied jurisdiction across all these sectors (Sudhira et al 2008). Also, the UGB has time and again focused on development and services as a result of which green spaces have been neglected. Hence, laws pertaining to green spaces are not strictly adhered to and remain only on paper. For instance, the tree division which is a small unit within the forest department, requires that a minimum of two trees be planted within every residential compound. Similarly, the Bangalore Development Authority (BDA), which is one of the governmental organisations, has a comprehensive development by-law which states that 40% of every residential site should be dedicated garden spaces and residential complexes should have 65% to 80% open space. However, these laws are often violated mainly due to lack of environmental consciousness among the citizens (<http://www.bdabangalore.org/pdfs/compreplan.doc>).

In response to the lack of attention towards conservation of green spaces, several non-governmental organisations (NGOs) have been formed with the common objective of protecting green spaces though with varied approaches. The efforts of these NGOs get dissipated either because only a small group of conscious people are part of them or the short-term initiatives lack the involvement of citizen groups, governmental agencies and other line departments. Thus, it is important to bring all stakeholders onto a common platform to scale up the efforts and build consciousness amongst the citizenry about the role and importance of green spaces within the city.

For instance, a preliminary survey of parks that involve citizen groups in three BDA planning districts in Bangalore, showed that only a few wards involved the residents through a welfare association (Figure 1). When compared to the parks managed by the UGB, parks that involved the residential welfare associations (RWA) showed a higher involvement of people living in the neighbourhood. The parks are also well maintained in partnership with the BBMP and through the welfare associations hold cultural activities for children, yoga classes and laughing clubs for the older generation. Thus, these parks apart from providing ecological services also have high recreational value with the residents showing a well-developed sense of stewardship towards them. This window of opportunity, where the residents and the BBMP can collaborate, has been tapped by very few residential groups. Our interviews also revealed that few RWAs can help scale up the value of the small green spaces to further enhance biodiversity and other related services through the capacity building programmes.

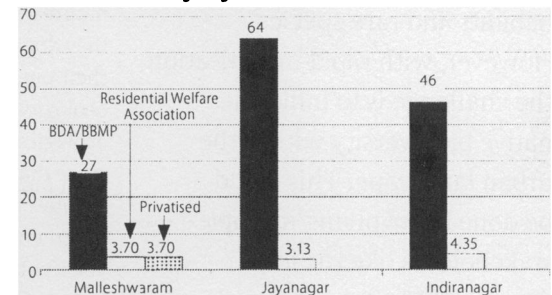
Urban biodiversity build-up should be undertaken by a consortia through a form of cooperation between agents through public and private partnerships (Olsson et al 2004). The players should have a network for policy development and action which does not follow the traditional administrative or governmental framework. An institutional pathway should be forged which will include all actors and stakeholders of urban green space through a common policy. While development is a definite part of any growing city, the challenge is to retain the ecological conditions and move towards making cities resilient and sustainable.

### Community Catalyst

Even with effective institutional frameworks in place what might be required is a trigger factor for collective thinking towards a common goal. Sometimes, a charismatic individual could drive the change. For instance, birdwatching was made immensely popular by Salim Ali, the Bird Man of India. Or it could be some charismatic taxa such as the tiger which is today a symbol of conservation, and links

institutions within and outside the country enjoying tremendous support from the citizenry. In the urban context, each city has to identify a taxa or a unique ecosystem, for example, the Sanjay Gandhi (Borivali) National Park in Mumbai and the Bannerghatta National Park in Bangalore to bring citizens together or a popular body which could act as a catalyst to bring conservation into focus. Apart from building a

**Figure 1: Involvement of the Residential Association in a Few Planning Districts in Maintaining Neighbourhood Parks**



stewardship of citizens towards the natural area that occurs in close proximity, it is imperative to find means to improve the ecological conditions of the green spaces that are located within cities. One example of this is the way in which the disappearance of the Bald Eagle, the national bird of the United States, was dealt with. Due to the overwhelming response of the people and through the legislation that was passed an attempt was made to revive the bird population in American cities (<http://www.sdgfp.info/Wildlife/Diversity/bead/index.htm>). Yet another example is the innovative thinking of Dusty Gedge, an avid birdwatcher and former London street performer who has taken to the roofs of London. He is campaigning for the conversion of up to 400,000m<sup>2</sup> of skyscraper and condominium rooftops into “living roofs”, where biodiversity can bloom and rare bugs and birds can find sanctuary (Bazilchuk 2006).

Likewise, butterflies could be the catalyst taxa for Bangalore as there is scope to build biodiversity using its aesthetic appeal. The recently opened butterfly park in Bangalore (it is the biggest park of its kind in Asia), in collaboration with the Zoo Authority of Karnataka, the University of Agricultural Science (UAS) and the Ashoka Trust for Research in Ecology and the Environment (ATREE), Bangalore, could serve as a mascot of the city around which

a range of activities can be woven. Bangalore is known to support over 154 butterfly species along with other interesting fauna (Karthikeyan 2000). There is a widespread assumption that conservation is only about rare species but putting "ordinary nature" back can also be critical in the case of urban green spaces. Butterflies may be better adapted than other organisms because of their vagility which helps them to hop between the fragmented urban habitats. Thus, they can be effectively used to increase the aesthetics and the ecological conditions of the cityscape.

Our survey around Bangalore showed that people have an innate fondness for butterflies and birds. Through several initiatives a small team in ATREE, Bangalore, has developed programmes by using butterflies as the flagship species and the activities have been woven around the Bannerghatta Butterfly Park, Bangalore. One of the most popular ones is promoting butterfly-friendly gardening and landscapes within the city which could slowly build tolerance to other taxa also (Devy and Savitha 2005). Promoting butterfly-friendly gardens requires eco-friendly and organic approaches which will benefit other biodiversity and provide better environmental conditions of neighbourhoods. Many of the host plants of tropical butterflies have medicinal value and hence can provide urban households with herbal remedies. In general, communities at large tend to seek things that have "utilitarian value" even from nature (Kellert 2004). Sometimes, just the "utilitarian value" may not help in conservation, and hence we need to strike a balance between the aesthetic value, the economic value as well as the utilitarian value (McCauley 2006). Considering all three values, we have introduced a "Butterfly Kit", with a set of eight medicinal cum ornamental plants which are basically a mix of both larval and adult host plants. The whole kit comes in a basket made from an obnoxious weed *lantana camara* which has taken over large areas of Indian forests. We were able to demonstrate that there is scope for "green" livelihood option for the peri-urban community. Though there was a demand for this product its economic viability remains unexplored. This enterprise can enhance the rural-urban link and with the creation of a market for it be an example of how urban green efforts can enhance

household income and reduce the weeds in forest areas.

### Sustainable

Lifestyles consumerism is growing in all our cities and there is an enormous increase of malls and supermarkets. The farmers' markets (*santhe*) which used to be a common feature even within Bangalore are slowly disappearing from our peri-urban areas, as urban sprawls are engulfing these green spaces that grow fruits and vegetables. These areas also served as the city's green lungs and supported local biodiversity. In recent times, resorts and hotels are replacing the peri-urban agriculture lands. These resorts create greeneries such as turfs and lawns which are intensively managed and are devoid of biodiversity due to heavy pesticide use. Also, the disappearance of urban agriculture in cities has left a larger ecological footprint. Beijing, an Asian mega-city has developed a comprehensive plan to promote and regulate urban agriculture ([http://www.idrc.ca/uploads/user-S/11502208271CRA\\_WUF\\_ENG\\_FINAL.pdf](http://www.idrc.ca/uploads/user-S/11502208271CRA_WUF_ENG_FINAL.pdf)) which has proven to be a powerful economic force. It has improved living standards by generating employment and income for migrant urban farmers.

The concept of "living roof" is being adopted in many cities across the globe in order to reduce the city's carbon footprint and conserve biodiversity. Also, with vertical farming in mind, local fruits and vegetables are grown on rooftops of high rise buildings for local consumption. This is popularly termed the "Locavory" movement ([http://www.heraldtribune.com/article/20081117COLUMNIS7/811170306/2274/OPINION?Title=Taking\\_farming\\_downtown](http://www.heraldtribune.com/article/20081117COLUMNIS7/811170306/2274/OPINION?Title=Taking_farming_downtown)). In a city like Bangalore which has high rise buildings and farmers' markets, adapting and implementing the concept of vertical farming through a farmer private/corporate partnership could transform the city into a sustainable city. Even though vertical farming has several disadvantages, working around this concept could lead to other appropriate sustainable concepts that could suit the identity and conditions of individual cities.

### Towards Urban Science

In conclusion we want to emphasise that urban biodiversity build-up cannot be the domain of ecologists alone but needs the

collaboration of social scientists and practitioners of other disciplines to solve the problems that come up (McIntyre et al 2000). Also, the challenge is to bring in the larger citizenry representing all age groups. The stakeholders and actors need to arrive at a common vision. Urban green space conservation could ideally work under the framework of adaptive co-management. This would mean involving multiple stakeholders like the local municipality, architects, academic institutions, and many other sectors, absorbing their pluralistic views to build a futuristic image for green spaces and working towards it in a phased manner enabling feedback and correction mechanisms.

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