SEMINAR 694 June 2017

Pages 50-54

Being green?

NEESHA DUTT

GLOBAL land transformation is recognized as one of the major components of environmental change, and urbanization is considered one of its chief agents. A frequently used term in recent times is the 'Anthropocene', which highlights the fact that humans are the main geological force in this era, responsible for changing the structure and function of the earth's ecosystems.[1] Over the past century urban population growth has surged, and although this has occurred in less than 3% of the global terrestrial surface, its environmental impact has been global. In addition, studies have pointed out that in the next 40 years, almost all of the net growth in global population will be in the cities of the developing world, where most of the mega-cities (>10 million by convention) are also situated.[2]

In cities of developing countries such as India, rapid urbanization and population growth have given rise to a number of associated environmental problems such as resource depletion, space constraints and ecological degradation and loss. However, in an increasingly globalized world, cities in developing regions of the world are also seen as centres of socio-economic development, cultural transformation and technological innovation.[3] Capitalizing on this trend, policy makers and city planners in India have encouraged the development of large-scale infrastructural projects such as enterprise parks, airports, malls, gated residential apartments and commercial complexes.

Bangalore is no exception to this trend, and its drive for global competitiveness has led to unprecedented urban infrastructural development across the city (Figure 1). Recent studies have also shown that urban expansion in Bangalore has been most rapid and extensive at the periphery of the city, which could be moving towards a polycentric growth pattern in which urban growth proliferates around multiple centres or hubs.[4] Such spaces are believed to be at the forefront of Bangalore's urban land transformation process. For example, several 'world city' projects – high-end residential and commercial complexes, and business campuses – have sprung up in the suburban belt of the city. Research further suggests that such real estate projects in peripheral areas are characterized by speculative investments and cater mostly to the city's high and middle income professionals.[5]

Figure 1: Urban development at the periphery. Pics. Neesha Dutt

Figure 2: Manicured office lawn space.

This kind of land use change due to urban sprawl and massive infrastructural development compels one to think about the environmental consequences that accompany such intense reshaping of the urban landscape. While it is worthwhile and relevant to focus on the larger and more acute environmental problems of resource depletion and environmental degradation that engulf a growing city such as Bangalore, this essay focuses on an understudied component of urban green space – turfgrass lawn ecosystems.

Lawn spaces are not uncommon in Bangalore – they are generally a key component of parks, gardens, sports fields and various establishments in the city that maintain some form of green space. However, the 'high-input', well designed and tended lawns that characterize urban development project landscapes stand in sharp contrast to the rest of the lawn spaces usually found in older establishments (with the exception of sports lawns, which require high inputs for their care). These lush green lawns are one of the principal components of urban development project landscapes in Bangalore. (Figure 2)

Though popular in western urban landscapes, it is noteworthy that resource intensive turfgrass lawns have proliferated only recently in cities such as Bangalore, where they have become a consistent if not significant feature. However, lawn ecosystems in India remain unexplored from both environmental and social perspectives. This essay contends that turfgrass lawns can provide a useful framework through which human-environment relationships can be unravelled, especially in terms of how human decisions (for example, lawn maintenance practices) affect the urban environment (for example, air and water quality).

In recent years, Bangalore has witnessed a number of environmentally motivated citizen groups voicing their disquiet about issues such as loss of green cover for road widening projects, tree felling, the encroachment and pollution of lakes, deforestation and waste disposal. Such civic activism illustrates the concern of city dwellers in conserving and protecting the 'Garden City's' much revered green spaces such as heritage lakes and parks, avenue trees, sacred trees and even kitchen gardens. While such efforts have immense potential to make citizens conscious of the environmental implications of their behaviour (for example, waste segregation and recycling), high input lawn ecosystems find little mention in public discourse and action.

Lawns are considered to be a problem only in water scarcity debates, with regard to excess water consumption in sports lawns such as golf courses, cricket fields and hockey turfs. For example, in popular print and social media, lawns have been described as 'water guzzlers'.[6] Not to underplay the importance of water scarcity problems in sports lawns, it should be noted that there is also a range of lawn types and sizes in the city – within gated residential communities, office parks and commercial complexes – where lawn and landscape management are important daily activities.

In addition to being 'water guzzlers', lawns have been described in scholarly literature as 'chemical treadmills',[7] a term that refers to the extensive use of pesticides and fertilizers to maintain lawns that weaken soil fertility which in turn necessitates further chemical inputs to maintain lawn health. (Figures 3 and 4) Thus, from an environmental action and policy perspective, changes or modifications in lawn management regimes may need more thought as they have deeper and wider environmental implications than just the question of water consumption and are more complex than they might first appear.

In what follows, I elaborate on two environmental implications for water and air quality with which lawns have previously been associated, but only in a developed country context. Thereafter, the essay explores the social dimensions of lawn landscapes in terms of 'green' notions that may underlie their popularity and continued prevalence in many real estate projects in the city. The concluding section emphasizes the integration of both environmental and social aspects of lawns, to fully understand human-environment relationships that can help direct policy initiatives for sustainable lawn management practices and alternatives.

Non-point source pollution from agricultural fields and urban runoffs which contain chemical residues are well known problems world-wide.[8] Given the scattered and diffuse nature of such pollution, research and policy initiatives struggle to tackle this problem. As agricultural lands are converted into urban uses, it is important to investigate lawn water run-off as a possible contributor of non-point source water pollution from urban development projects along the city's periphery. Research has shown that lawn chemicals like 2, 4-D, Dicamba, Glycophosphate and Chlorpyrifos, can contain water degrading elements.[9] Similarly, lawn fertilizers containing nitrate can leach into ground water or escape as surface water run-off if applied in excess.

In addition, reclaimed water from sewage treatment plants, which could be used for lawn irrigation, may already contain nitrogen and phosphorous which help fertilize the turf.[10] This may result in excessive nitrogen input as such lawns may have already been fertilized as part of their monthly fertilization routine. Given that some of the pressing problems of Bangalore's lake pollution, such as frothing, are being attributed to the presence of phosphates in the water, it is worthwhile to look at nitrogen and phosphorous levels in lawn water run-offs as well as groundwater.[11]

Lawns may also contribute to air quality problems. Changes in land use are an important driver of soil atmospheric emissions. Excessive use of nitrogenous fertilizers in lawn landscapes can result in the emission of a potent greenhouse gas called nitrous oxide.[12] Although studies have documented nitrogen emissions from farmlands, little is known about emissions from rapidly changing urban landscapes. Thus, it appears that lawn chemical usage on its own can contribute to both water and air quality problems. Although the ecosystem services provided by lawn spaces, such as oxygen regeneration, carbon sequestration, prevention of soil erosion, nutrient retention, recreation or aesthetics, are both beneficial and essential, the uneasiness about their use stems from their possible adverse consequences. Complete faith in lawn spaces as non-polluting surfaces is unwarranted; what is required is detailed investigation into the environmental dimensions of these chemical intensive spaces.

Figure 3: Lawn irrigation.

Figure 4: Lawn fertilisation.

The discussion above suggests that manicured turfgrass lawns in rapidly expanding development projects along the urban periphery could be potential contributors to water and air quality problems which, until recently, have been neglected though vital areas of research. But we also

need to ask questions about the social meanings of turfgrass lawns. The popularity of manicured green spaces in real estate development leads us to ask questions such as: What does being 'green' mean for lawn users, designers, builders, managers and gardeners? How do notions of 'green' attached to manicured landscapes guarantee the lawn a place in the sun, figuratively and literally? These are challenging questions with no straightforward answers, and a lack of research in this area in developing countries in general and specifically in India makes it more challenging. However, ongoing work on this topic provides some useful insights, as I detail below.[13]

Some of the fuzziness surrounding lawns owes to the fact that they are an outcome of a complex mix of social and environmental actions. The closely mown, well watered and fertilized lush green lawn is a culmination of a series of well organized efforts by human actors (ranging from real estate builders, developers, landscape architects, lawn managers, gardeners and landscaping companies) on the one hand, to the innate characteristics of non-human actors (such as grasses, weeds, soil, water and chemicals), on the other.

The front yard lawn is a well known American leisure landscape with its origins in Europe. In the case of Bangalore, well watered lawn grass has its own history – it has long been part of the city's traditional green spaces such as parks, colonial bungalows, public institutional gardens, heritage buildings and so on. However, the freshly trimmed, chemical intensive, neat and orderly emerald green lawn space that closely resembles the American lawn can only be seen in *uber chic* developmental projects associated with urban expansion.[14] In these establishments, the presence and maintenance of manicured lawn spaces become unquestioned environmental decisions as they become part of a development trajectory that is considered both environmentally sustainable and aesthetically pleasing.[15]

However, there are several contradictions and uncertainties surrounding the idea of 'environment friendly' lawns in India which partially contribute to the fuzziness attached to this issue. For example, turfgrass lawns require twice as much time, effort and resource inputs to equal their American or European counterparts. This is because non-native lawn grasses such as Kentucky blue grass which is used in such lawns are suited for temperate climates such as in Europe and North America. Further, lawn grasses naturally follow a growth cycle of dormant/fallow periods and growth periods. But in India, as an aesthetic product, it is essential for lawns not to go dormant, and thus lawns tend to be maintained all year round. Nevertheless, despite all these difficulties, water guzzling and chemically driven lawns thrive in most of Bangalore's real estate development projects. In fact, it may only be natural that these lawns evoke a sense of pride and accomplishment in people who maintain them.[16] This sentiment maybe comparable with that of concerned citizens who hold themselves responsible for their environmental actions and take pride in advocating and influencing change.[17]

In addition to being popular and resource intensive, manicured lawns in high-end project landscapes are part of globally recognized and accepted values of 'green' design and aesthetics. Everything from the choice of turfgrass species to the type of maintenance regimes and lawn design, mirror globalized landscapes around the world that ensure familiarity and acceptance.[18] Furthermore, lawns replace traditional and natural habitats such as lakes, wetlands and natural vegetation, actions that incur their own environmental cost.

Even then, one might argue that in India, the extent of green space and, more so, of turfgrass lawn area, is so minimal that 'it doesn't matter' what it ends up doing to the environment. However, it would be an oversight not to look into such spaces, not only because these spaces have been understudied, but also because turf-grass may now occupy a larger space in our 'minds' than we acknowledge, which may further allow us to replicate resource intensive lifestyles comparable to the West where turfgrass is now the largest irrigated crop.[19]

To conclude, environmental data currently available are insufficient to draw any conclusions on how to address the ecological problems mentioned in this essay, or even to understand the magnitude of the problem. Organic manure or mixed vegetation landscapes with unmanaged grass cover are seemingly benign alternatives and a step in the right direction; but as yet, here too, their extent and impact are unrecorded. In addition, the contradictory notions that surround lawn landscapes hint at the complexity associated with these social and environmental systems. A comprehensive understanding of their associated problems is possible only when one integrates both the social and environmental aspects, which can then shed light on human-environment interactions more fully.

* This essay is based on research carried out with funding support from the National Institute of Advanced Studies, Bangalore as part of my doctoral research project. I thank Professors Vinay Gidwani, Carol Upadhya and Dilip Ahuja for their useful comments and suggestions on early drafts.

Footnotes:

1. P. Crutzen and E. Stoermer, 'The Anthropocene', *Global Change Newsletter* 41(1), 2000, pp. 17-18.

2. N. Grimm, S. Faeth, N. Golubiewski, C. Redman, J. Wu, X. Bai and J. Briggs, 'Global Change and the Ecology of Cities', *Science* 319(5864), 2008, pp. 756-60.

3. J. Wu, 'Urban Ecology and Sustainability: The State-of-the-Science and Future Directions', *Landscape and Urban Planning* 125, 2014, pp. 209-21.

4. H. Nagendra, S. Nagendran, S. Paul and S. Pareeth, 'Graying, Greening and Fragmentation in the Rapidly Expanding Indian City of Bangalore', *Landscape and Urban Planning* 105(4), 2012, pp. 400-406.

5. M. Goldman, 'Speculative Urbanism and the Making of the Next World City', *Inter-national Journal of Urban and Regional Research* 35(3), 2011, pp. 555-581.

6. ‘Lawns that Guzzle Water’, *The Hindu*, March 2009.

7. P. Robbins, *Lawn People: How Grasses, Weeds, and Chemicals Make Us Who We Are*. Temple University Press, Philadelphia, 2012.

8. Non-point source pollution refers to dispersed pollution whose source cannot be traced back to a single location but which enters the environment from diffuse locations. For example, rainwater run-off over the ground and into water bodies may contain pollutants from farmlands as well as urban areas. See: S.R. Carpenter, N.F. Caraco, D.L. Correll, R.W. Howarth, A.N. Sharpley and V.H. Smith, ‘Nonpoint Pollution of Surface Waters with Phosphorus and Nitrogen’, *Ecological Applications* 8(3), 1998, pp. 559-68.

9. P. Robbins, A. Polderman and T. Birkenholtz, ‘Lawns and Toxins: An Ecology of the City’, *Cities* 18(6), 2001, pp. 369-80.

10. American Society for Horticultural Science, ‘Nitrogen in Reclaimed Water can Benefit Turfgrass’, *Science Daily*, January 2015.

11. K.V. Bharadwaj, ‘Froth in More Lakes’, *The Hindu*, 6 November 2016.

12. J. Kaye, I. Burke, A. Mosier and J. Pablo Guerschman, ‘Methane and Nitrous Oxide Fluxes from Urban Soils to the Atmosphere’, *Ecological Applications* 14(4), 2004, pp. 975-81.

13. The field research conducted for this study involved open-ended semi-structured interviews with relevant stakeholders and personnel associated with lawn and landscape design and management in development projects across the city. Through interviews I tried to understand socially driven aspects of lawn usage and maintenance. The insights from fieldwork discussed are drawn from interviews with landscape architects, developers, residents, gardeners, nursery owners and lawn managers, carried out over a period of five months in 2013.

14. According to nursery owners, the largest turfgrass or lawn establishment orders come from gated residential projects and sprawling IT campuses. They mention that the rise in turfgrass demand in the last 10-20 years coincided with the IT boom in the city.

15. Field data indicate that aesthetics and sustainability are priority areas for landscape management. However, without an understanding of the possible harmful implications of lawn chemicals, their unsupervised usage in lawns get justified as being part of maintaining a healthy green environment and are hence overlooked.

16. Developers, landscaping companies, housing societies, site managers and gardeners positioned in real estate projects consider themselves responsible for how such manicured landscapes ‘look and feel’. They actively participate in trying to create an environment that is at once globally attractive, comfortable, luxurious and one that is also considered environmentally sustainable (insight based on field research and respondent interviews).

17. See: M. Anantharaman, ‘Networked Ecological Citizenship, the New Middle Classes and the Provisioning of Sustainable Waste Management in Bangalore, India’, *Journal of Cleaner Production* 63, 2014, pp. 173-83.

18. Respondents agree that there is a ‘globalization of landscape’ where manicured urban green spaces become aspirational goals for people and where lawns are a ‘showpiece’ that convey ideas of western living in these communities. These ideas also seem to conform to the ‘global city’ image that Bangalore is often associated with (from field notes).

19. See: C. Milesi, S.W. Running, C.D. Elvidge, J.B. Dietz, B.T. Tuttle and R.R. Nemani, ‘Mapping and Modeling the Bio-geochemical Cycling of Turf Grasses in the United States’, *Environmental Management* 36(3), 2005, pp. 426-438.