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Technological infusion and the change in private, urban green spaces

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ABSTRACT

Despite the fact that the multifaceted values of urban green spaces in the public and private domain constitute the core of urban sustainability, their importance is not adequately investigated in the context of developing countries. We undertook a survey of homegardens on private properties in Kozhikode, a city located in the state of Kerala, India. Our investigation reveals a substantial loss of private green spaces, defined in terms of the added economic value homegardens provided to households during the last decade. We hypothesise and validate empirically that this loss, over time, is negatively associated with technological infusion at the household level, which we measure by assessing the increase in the number of personal computer(s) possessed by households. We provide an economic framework to discuss the implications of our proposition. We conclude that the nature of positive externalities associated with private, urban green spaces demands policy intervention by the State.

Introduction

There is a growing realisation that urban green spaces are necessary for creating sustainable urban centres. The contribution of green spaces covered with trees, shrubs and ground vegetation in improving the micro-climatic conditions of urban areas (Avissar, 1996; Givoni, 1991; Miyawaki, 1998; Georgi and Dimitriou, 2010) and other ecosystem services is well documented. Urban green spaces enrich urban communities aesthetically and add recreational avenues for city dwellers (Attwell, 2000; Konijnendijk et al., 2006). Green spaces are also positively associated with greater perceived general health of residents (Maas et al., 2006). Most importantly, green spaces further reinforce the process of carbon sequestration in urban areas to mitigate the effects of climate change (Nowak and Crane, 2002; Jenkins and Riemann, 2003; Escobedo et al., 2010). There is no lack of literature extolling the multifaceted values of urban green space in the context of urban sustainability. In general, green spaces in urban areas fall into two categories based on the nature of ownership – private or public. There are, however, significant external benefits of urban green spaces regardless of ownership.

What needs to be further explored is the likelihood of the loss of urban green spaces due to rapid urbanisation, changing urban lifestyles and culture, and technological advancements, particularly in the context of developing countries like India and China. Thus, there is good reason to undertake research in a variety of relatively unexplored urban landscapes to provide a better understanding of the reality of urban green spaces. The Indian urban landscape context, which is going through a large make-over in the post-economic reform era (1991–), provides this research opportunity. The changing urban landscape and deteriorating urban environment has, now, become an issue of considerable significance to the environmentalists and urban planners in India. The primary challenge is to conserve green spaces and withstand the unprecedented pressure to alter scarce public land resources for expanding public infrastructure, business centres and housing, all of which is gaining momentum due to the twin processes of technological progress and modernisation.

Private green spaces are somewhat undervalued compared to public green spaces, though they both provide vital protection against environmental losses that would happen otherwise. Though India has a long tradition of private green spaces in the form of domestic gardens, backyards, and home gardens, there has been a noticeable change in recent years. Currently, green spaces in urban India are rarer compared to most other Asian countries (Kuchelmeister, 1998). In general, greenery and its conservation once played a central role in the Indian culture. It is well grounded in the philosophical approach of the ancients to nature, which was characterised by subordination, cooperation and participation (Kerr and Swarup, 1997). The ancient religious traditions – within and beyond scriptures – reinforce this view. The question is how much of this ancient culture still exists in modern India, particularly around environmental themes in the urban context? The existence of private green spaces in urban agglomerations presents the opportunity to unravel the genesis of possible change in private green spaces over time and the factors that have influenced that

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change. We undertake a case analysis of homegardens, a form of private green space with multi-storeyed tropical vegetation in the city of Kozhikode, located in the state of Kerala, India.

'Homegardens' constitute the predominant form of urban and semi-urban private green spaces in Kerala. Homegardens are considered one of the most important multifunctional land use systems in the managed ecosystems of the tropics (Kumar and Nair, 2006). Our survey records the private possession of homegardens by Keralan households along with other demographic and socio-economic variables. This survey reveals a substantial decline in homegardens between 2000 and 2010, measured in terms of economic value added to sample households. In view of this, we attempt to evaluate the role of technological infusion in a household in changing the magnitude of homegardens measured in terms of the added household economic value produced by the homegarden. We employ regression analysis to identify the significance of technological infusion at a household level in reducing the extent of homegardens, measured in terms of their economic value added to the household.

Given the significance of technological infusion in the decline in homegardens, we propose an economic framework to study the relationship between changing resource endowments and management of the landscape within the periphery of the private domain. Even though homegardens are not a public good per se, there are positive externalities associated with them; that is, they benefit the society at large, not just owners. On the other hand, the conservation of green spaces still remains of peripheral interest to the urban governing bodies, which are entrusted with planning, management and administrative affairs in India (Devy et al., 2009). It is in this context that we explore the possible role of the State in mitigating homegarden decline. We also use our economic framework to examine the historical role of the cultural ethos in bridging the gap between the private and the collective assessment of the economic value of homegardens.

Study area

We provide a case analysis of the city of Kozhikode (formerly Calicut) in the state of Kerala, which is located in peninsular India. Kozhikode, an old coastal city, was chosen due to its location, size, history and cultural backdrop. One of the remarkable features of Kerala, a state bestowed with an abundance of greenery (Forest Survey of India, 2009), is the presence of traditional homegardens in almost every household. Kumar and Nair (2004) point out that the homegardens in Kerala are thought to be at least 4000 years old. This contributes to the high tree cover in Kerala compared to other states in India (Forest Survey of India, 2009). Heritage and culture is very important in Kerala. It has a thriving Ayurveda system (Harilal, 2009), even in the urban centres. (Ayurveda is a system of complementary and alternative medicine. See Chacko (2003) on the efficacy and practice of Ayurveda.) Even though homegardens are centuries-old components of the rural landscape in Kerala, they are also found in small-scale and varied forms in the urban landscape. Despite Kerala's relatively high population density (859 persons/km^2 in 2011), attributed to growing urbanisation, the homegardens are still a part of the urban landscape.

Despite its history, there is growing concern over the loss of urban green space in Kerala (our emphasis) that has become more evident since the increase in construction activity from mid-2001 to mid-2004 – the post-economic reform era (the economic reforms in Kerala picked up momentum in 2001 when the state government initiated a number of measures to accelerate economic growth) – resulting in higher growth (6.2%), and by 2003–2004, it became a larger income generating subsector than the manufacturing sector (Jeromi, 2005). There are other environmental (Korakandy, 2000) and societal concerns (Gopikuttan, 1990) arising from the construction boom in Kerala, all of which are particularly relevant for the city of our focus, Kozhikode. Once known as the laidback city of Kerala, Kozhikode is now expanding horizontally and vertically. The history of Kozhikode shows its evolution from a small rural community to a modern city. It now constitutes the third largest urban agglomeration in the state of Kerala. This growth led to a building boom, with the construction of residential apartment buildings and shopping malls in Kozhikode, which was a response to the emergence of a new class of highly demanding consumers looking for quality living space, the demand for space by retailers, and the establishment of two new Information Technology (IT) parks (Sanandakumar, 2008). Evidently, this wave of urbanisation may lead to a decline in green space coverage.

Survey and methodology

We selected three localities, namely Ashokapuram (1810 households), West Hill (1686 households), and Govindapuram (3615 households), situated within the limits of the Kozhikode Municipal Corporation, which is divided into 75 localities called wards. Our selection of localities was based on their position with respect to Mananchira Square, the centre of Kozhikode city: Ashokapuram is located in the northern part of the city, while West Hill and Govindapuram are located in the north-west and north-east, respectively. Ashokapuram is closest to the city centre, within a distance of 1 km. West Hill is situated near the periphery of the Kozhikode Municipal Corporation. Govindapuram is situated somewhere in between in terms of distance from the city centre.

A sample of 50 households was chosen from each of these three localities. Given the lack of resources, it was not possible to undertake a complete enumeration of all households. Hence, we could not evoke a random sample using a random number generator. However, all efforts were made to choose the sample households from each locality in a non-selective manner. We selected at least one household from each of the small streets in each locality and multiple households from different points on bigger streets. The random nature of our sample is manifested through various descriptive statistics as elaborated in the Results.

We undertook a preliminary survey of five households in each of the three localities to pre-test our structured questionnaire. To negate information bias during the collection process, services of a native and professional field investigator were employed. The structured questionnaire solicited information about each household, including demographic details, economic condition, the details of vegetation in the homegarden, land utilisation pattern divided into two categories (built-up and homegarden area), income accrued from the homegarden, utilisation pattern of homegarden products, and management attributes of the homegarden. The relevant information came from two points in time, the present (2010) and a recollection of the same variables ten years ago (2000).

Based on annual income, we categorised the sample households into three categories: low income, with an annual income of Indian Rupees (INR) 100,000 (approximately US$ 2250; US$ 1 = INR 45 in 2010) or less; middle income, between INR 100,000 to 200,000; and high income, with more than INR 200,000. We observed three kinds of vegetation in the homegardens: 'trees', 'shrubs' and 'climbers'. We included only the cultivated plants in our sample, that is, we excluded weeds. Woody plants more than 2 m high were classified as trees and those woody plants less than 2 m were classified as shrubs. Finally, non-woody plants were classified as climbers. All three kinds of vegetation in homegardens constitute our definition of urban green space. Furthermore, we used the economic value of homegarden products – consumed at the household level and/or sold by the household in the market – obtained from these three