



## RESEARCH ARTICLE

### PERCEPTION OF CONSERVING BIO-DIVERSITY VIA LOCALLY ADAPTED PLANTS: A CASE STUDY IN SOUTH GUJARAT

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#### ABSTRACT

The paper focuses on landscaping of urban and rural environments through the use of locally adapted species. The research is embarked upon with a view that the loss of local vegetation and replacement with exotic landscaping is commonly recognized as a threat to biodiversity values and results in increased demand for water and nutrients (i.e. fertilizers). Discovered in the process, are the challenges and opportunities for the protection and enhancement of local natural resources. There is also increasing pressure being placed on local government to undertake activities in a sustainable way to preserve and enhance the natural amenity of their areas.

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## INTRODUCTION

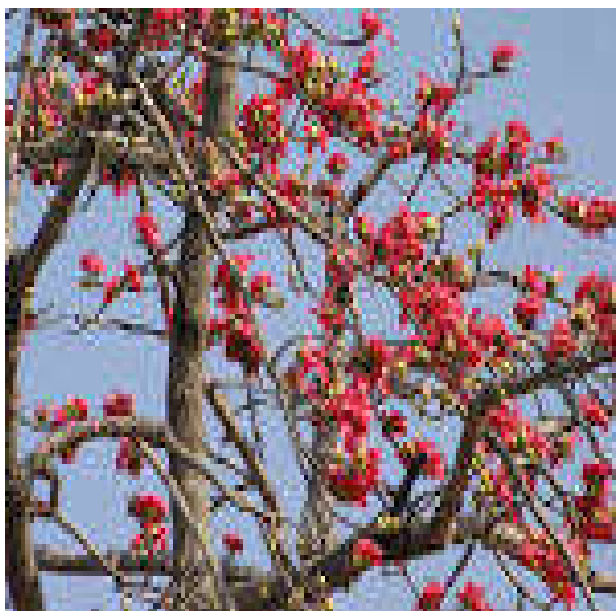
Trees are an essential feature of landscape garden, for road side planting, public parks, along railway lines, in school and colleges, government building and banks, historical and religious places and private home compounds. An orderly and well maintained planting scheme of both trees and accessory vegetation produces highest visual quality ratings for urban streets, shopping areas, parking areas as well as for city squares (Kathleen 2006). Pleasant view of greenery and flowers stimulate creativity and has soothing effect on body, mind and soul. Studies have indicated that exposure of green spaces reduce instances of aggression and violence (James, 2001). Cities with high numbers of parks (trees are the main components) battle obesity and diabetes well. Even relatively passive contact with nature such as viewing it from a window - lowers blood pressure and anxiety levels (Kathleen, 1998, 2006). Road side avenues offer a desired destination that prompts people to walk there and motivate people to explore once there. Thus, benefits of trees is infinite and with native species, ease in adaptation with sustainability and conservation

can be fulfilled. It is no surprise, that India with its 2.4% of world's landmass supports 8.1% of world's biodiversity. There are an estimated 45000-47000 species of plants and some 90,000 species of fauna that constitute respectively 11% and 7% of those recorded in the world. At least 166 species of crops that account for about 6.7% of the total crop species in the world and an estimated 320 species of wild relatives of cultivated crops are believed to have originated in India. It has 10 biogeographic zones representing different ecosystems as well as 91 eco-cultural zones, which are inhabited by more than 4500 community groups. (Project Guide BCRLIP, GOI, Ministry of Environment and Forest, 2011). The research emphasizes mainly on the South Gujarat region and is based upon a questionnaire, observation and related literature. The questionnaire design consists of questions which would identify people's preferred choice of the outside places (to overcome stress, bring peace of mind and relaxation along with biodiversity conservation). It also questions what is the people's opinion and expectations about the design elements which are placed in the outside places. Responses of the vast majority of the sampled population indicated a significant level of misconception in virtually every aspect of residential landscaping. This led to the recommendation that for effective public participation in the qualitative transformation of our cities, a re-orientation strategy be put in place to instill the

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culture of environmental landscaping in the psyche of the people.



### Landscaping and sustainable development

Sustainable Development “meets the needs of the present without compromising the ability of future generations to meet their needs.” “Landscaping” means the physical modification of outdoors to serve the needs of people by planting, altering the contours of the ground, and building structures and amenities such as pedestrian ways, paths and picnic areas. It is important, not just because it adds value to property but has many values - it links culture with nature and creates a sense of place. In it people reflect their own values and what matters to them in the spaces they occupy. Urban Landscaping should provide sustainable and environmentally sensitive, accessible, highly aesthetic, yet functional landscaping solutions that reflect the mood of the space, and create a welcoming environment. “Biodiversity” includes the variety of all life forms: different plants, animals and microorganisms, their genes and the ecosystem processes of which they are a part. “Locally Adapted Plants” means plants that are considered naturally adapted to a particular local area. They may be plants that have evolved in a particular locality and so are adapted to local

soils and climate. Local plants reflect those that are native to the botanic region of the local area, and preferably within the same local provenance. These species are better adapted to local conditions, and maintain the levels of natural diversity within the gene pool. This may have implications for sourcing of plants. Landscaping with local native species will enhance local biodiversity by providing food and shelter for local fauna as well as contribute to the retention of local character and a ‘sense of place’.

### Protection of biodiversity

The prime importance of landscaping lies in aesthetic developments and modernization of cities, town, countryside, roadways, airports, railway stations, railway lines, bus terminus, city parks and educational institutions against industrial fast growing population. Development often includes the clearing of local and native vegetation, through which significant local biodiversity values may be lost. However, development also creates an opportunity to add biodiversity value by incorporating local native plants into landscaping. Many introduced landscapes are designed almost exclusively around the use of exotic plant species that may add little biodiversity value to an area. In addition, exotic plants may indirectly contribute to the degradation of the environment through: greater demand for nutrient and irrigation and the increased risk of nutrient enriched runoff to groundwater and to local water bodies. The diversity of our native plant species is significant on a national and global scale. Landscaping of streets and other public open spaces by local governments, using predominately local plants, can be an effective way of linking isolated remnants of natural vegetation for habitat protection and extension in urban areas by creating ecological corridors. Many exotic plants require significant inputs of fertilizers and water to keep them healthy and sustain them over the summer period. The low fertility and nutrient holding capacity of most soils tend to leach nutrients not taken up quickly by plants. Nutrients such as nitrogen and phosphorus leach through the sandy soil profile into the groundwater which flows to water bodies such as wetlands and rivers.

### Education, awareness and capacity building

Initiatives to encourage greater use of local plants in landscaping also require promotion, demonstration, information, and raising awareness in the community to bring home a consistent message. Landscaping of public areas provides an important opportunity for local governments to enhance environmental amenity, civic pride and visual quality of their local areas. It can also be a major component of urban renewal programs providing a boost for the local economy by stimulating business. This work also considers the urban and rural area design which encourages the physical activities in life as well as its preventing elements. It considers which elements support the individual’s psychological health, which elements are a powerful support for social connection, and result in positive effects on urban and rural life.

### Landscaping with locally adapted plants

Parks, open space and other landscaped areas serve multiple functions including environmental and recreational uses that must be planned for and managed in a cost effective manner. Planning should occur on the basis of a sound knowledge of

what values exist; the functional uses of the space; operational constraints; and clear long-term management objectives.

Key strategic planning objectives for parks and open space and landscape areas should include:

- Maintain and enhance local native conservation areas and significant trees;
- Use local native plants as the first choice;
- Develop a network of ecological corridors providing linkages to isolated existing and potential natural areas;
- Create planting design on natural systems showcasing local species (e.g. *Alstoniascholaris*, *millingtoniahortensis*, *Toona ciliate*, *Madhucaindica*, *prosopisjuliflora*); it helps to promote awareness of their importance to the identity of an area.

### Plant selection

Local native and adapted plants are plants that are considered naturally occurring to a particular local area and are therefore important in terms of biodiversity value. These are plants that have evolved in a particular location and are suited to local soils and climate. Moreover, if they are not native to a particular region, they may be those which are adapted perfectly to the place. They also contribute to the natural character and amenity of an area. Local native species have natural heritage value because they may be uniquely linked to a particular geographic region. They may have cultural value particularly to indigenous people, as a source of food, medicine or spiritual significance. Because of so many government initiatives and awareness and also ecological stability, South Gujarat is rich in many plant species.

### Important local plant species

*Acacia auriculiformis*, *Albizialebeck*, *Alstoniascholaris*, *Azadirachtaindica*, *Bombaxceiba*, *Cassia fistula*, *C. marinata*, *C. javanica*, *C. renigera*, *C. siamea*, *Cithrexyton*, *Cordia dichotoma*, *Corouputaguinensis*, *Dalbergiasisso*, *Delonixregia*, *Erythrinavariegata*, *Eucalyptus citriodora*, *Ficusbenghalensis*, *F.benjamina*, *F.religiosa*, *Grevillea robusta*, *Jacaranda acutifolia*, *Lagerstroemia speciosa*, *Madhucaindica*, *Melia azedarach*, *Millettiaovalifolia*, *Millingtoniahortensis*, *Mimusopselengi*, *Peltophorumferrugineum*, *Plumeria alba*, *Pongamiapinnata*, *Prosopisjuliflora*, *Syzygiumcumini*, *Terminaliamicrocarpa*, *Tamarindusindica*, *Thevetiaperuviana*, *Toona ciliate*.

### Conclusion

The mass migration of people as a result of economic development and industrialization poses a threat to local flora so local plants should be considered as the first choice in landscaping because of the environmental benefits to biodiversity. With the growing urbanization, environmental landscaping has emerged as an important tool for improving the quality of the urban environment. The vegetation required

should be chosen according to the natural conditions and the plant material type. The harmful impacts of urbanization include reduced vegetation in urban areas, development of heat islands, increasing levels of air and water pollution, destruction of habitats owing to deforestation and loss of biodiversity and also loss of precious agricultural lands. Therefore, as a measure to combat these harmful effects, landscaping using local plant species should be adopted. However, more research in India in this direction is desirable.

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