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POLICY BRIEF

Street trees contribute to urban sustainability in South African towns

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1. THE CONTRIBUTION OF TREES TO URBAN SUSTAINABILITY

Urban green spaces and trees are increasingly recognised as crucial elements in the quest for urban sustainability internationally, and for the promotion of urban liveability and quality of life in cities. So much so that many countries now have guidelines or regulations regarding either the amount of urban greenery that must be provided per capita, or the maximum distance that any dwelling can be from green spaces of stipulated sizes. For example, the European Union recently more than doubled its recommendation of 9 m^2 of public green per person to 20 m^2 per person.

BOX 1

Examples of ecological benefits of urban trees

- Reduce urban temperatures markedly, which will be increasingly important in a warming world.
- Tree leaves trap dust and absorb gaseous pollutants in the air.
- Absorb carbon dioxide from the air and so help mitigate against global warming.
- Tree roots aerate the soil which improves rainwater infiltration which reduces storm-water floods.
- Provide refuge, habitats and food to other animals and plants.
- Trees act as a noise buffer.

BOX 2

Examples of social benefits of urban trees

- Beautify the environment.
- Shade for resting, leisure and exercise, which increases local social cohesion.
- Provide places for relaxation and reduction of stress.
- Contribute to sense of place and identity.
- Contrary to many perceptions, treed environments frequently have lower crime rates.
- Treed environments improve cognitive stimulation and learning.
- Treed areas promote physical and psychological wellbeing of urban residents.

BOX 3

Examples of the economic benefits of urban trees

- Trees provide useful products such as fruits, nuts, wood and herbal medicines that can be used at home or sold for income.
- Buffering of building temperatures reduces energy costs for cooling or heating.
- Treed environments are usually regarded as more beautiful and so attract visitors and tourists, adding to local economies.
- The same results in higher property values and rents, increasing local authority revenues.
- Shoppers spend more time and spend more money in treed commercial areas and streets than non-treed ones

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Trees are important components of urban greenery because they deliver a range of benefits, often in greater quantities than do other green elements (such as lawns or flower gardens) and they are generally hardy and require less maintenance than other greenery. Consequently, trees are considered as vital cogs in the quest for urban sustainability worldwide. Some of the important ecological benefits of urban trees (see Box 1) include their ability to absorb some gaseous air pollutants and thus purify the air, absorb carbon dioxide which helps to combat climate change, and to cool urban environments by several degrees. This is particularly important in hot regions such as southern Africa. This benefit will be increasingly important as global warming advances, with many cities internationally planting trees to mitigate against future climate change impacts whilst also making pavements cooler and more pleasing to be on (e.g. Melbourne, Australia; Manchester, UK). Reductions of street and home temperatures by the shade of trees improve human wellbeing and reduce rates of heat stress and health complications exacerbated by high temperatures.

Paralleling the ecological benefits are a host of social benefits (see Box 2). Key among these are the higher physical and psychological wellbeing of residents in green and treed suburbs relative to those in less green environments, along with their significant contribution to sense of place and identity. For example, in a study across 101 schools in Michigan (USA), views of trees and shrubs from the classrooms were positively related to higher standardised test scores and graduation rates and a lower incidence of antisocial behaviours. Surveys and experimental research in Europe and North America have revealed strong positive associations between exposure to urban biodiversity and indicators of mental wellbeing.

Some of the social and ecological benefits can be translated into economic values (see Box 3). For example, the use of firewood collected from urban trees in some South African towns was valued in 2013 at R4,216 per household per year. Whereas the value of saved costs on air-conditioning in houses close to urban parks with trees in Harare (Zimbabwe) was calculated at US$835 per

household per year. Overall, from several examples around the world where both the costs and benefits of urban trees have been determined, the benefits have always been shown to outweigh the costs by 1.5 – six times. In other words, planting trees is a cost effective strategy contributing to urban sustainability

Fruit collected from urban trees in Vukani location, Grahamstown, Eastern Cape.

2. THE LACK OF STREET TREES IN PARTS OF MANY SOUTH AFRICAN TOWNS
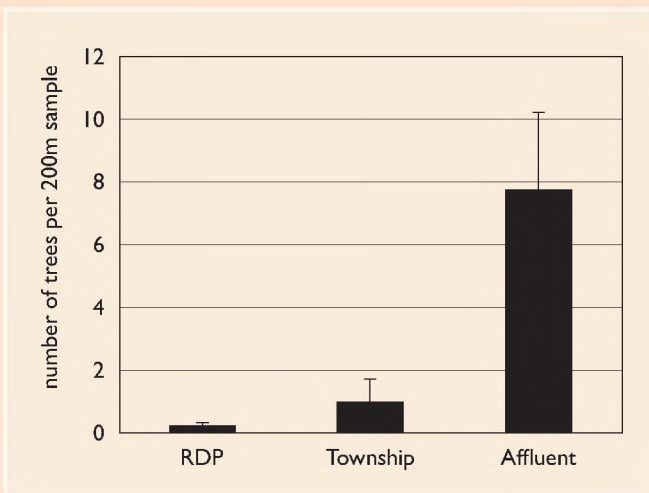
Having recognised that trees make meaningful contributions to urban sustainability and human wellbeing in many settings, opportunities need to be sought to optimise the planting of trees in appropriate places. This needs to take into account the environmental and social contexts, be in consultation with local residents and be within the financial means of the local municipality. However, much evidence exists to show that such opportunities are being missed in many South African towns, especially the small and medium-sized ones. Indeed, in many towns there are marked disparities in the distribution of trees in public parks and streets, with the poorer sections having the least, and the newer RDP suburbs faring the worst.

For example, a recent survey in ten Eastern Cape towns revealed that for eight of the towns the RDP areas had no street trees at all, and for the other two towns, the number of street trees per street was starkly lower in the RDP areas than the affluent or township areas (see Figure 1). This echoes earlier work in three towns, where the RDP areas were found to have no or few street trees, the affluent areas a lot of street trees and the township areas being intermediate. The same situation applies with respect to public urban green space, where the mean area across ten towns was 3.5 m^2 per person in RDP areas, 18.9 m^2 per person in townships and 57.2 m^2 per person in affluent areas. This is in comparison to the increasingly recognised international recommendation of 20 m^2 per person of public urban green space.

The reasons for such disparities between and within towns in South Africa vary. However, common ones include:

- A historical legacy of neglect and inequity inherited from the apartheid era. Thus, public investments were disproportionately channelled to the relatively affluent suburbs reserved for white South Africans whilst townships, reserved for black South Africans, did not receive investments in public greening, along with a lack of investments in infrastructure and local economic development. However, the post-1994 democratic government has done little to address this, with many government-designed and built social housing developments (RDP projects) having no tree plantings at all in public spaces.
- Poor urban planning resulting in insufficient space for planting of trees along streets. In some places the width of the roads and associated pavements are too narrow to accommodate the planting of trees down at least one side. This could be easily addressed in all future plans for low-cost residential areas.
- Weak or absent sustainability visions in local municipalities. Extensive work in the Eastern Cape and Limpopo provinces has revealed that many local municipalities lack staff with appropriate qualifications and expertise regarding environmental management, urban sustainability and tree management. Therefore, the planting of street trees is not motivated from within the local authority. Consequently, municipal vision statements and plans lack mention of, or commitment to, urban greening as a core component of development plans to

The general lack of trees in RDP suburbs compared to other suburb types, especially due to the prevalence of livestock in Tsolo, Eastern Cape.

promote the wellbeing of local residents.

- Lack of constant communication and coordination between the various departments within a municipality who are expected to contribute to the establishment of suburbs. This leads to individual departments fulfilling only their respective mandates with little to no consideration of what is meant by 'integrated' or sustainable development.
- Insufficient financial and human resources for urban greening and street trees. The budgets of many local municipalities for urban greening and trees are quite limited. This is because of many other pressing needs such as infrastructure and service delivery, but it is also because few officials or councillors are aware of the full array of benefits from urban trees and the positive benefit to cost ratios from planting trees in streets and urban places.
- Negative local perceptions of street trees. In some regions there are negative perceptions against street trees based on concerns that they obscure signage and visibility and provide hiding places for criminals. Yet, international research indicates the opposite, with lower crime levels in more treed areas.

3. TRANSFORMING BARE, TREELESS STREETS TO LIVING LANDSCAPES IN SOUTH AFRICAN TOWNS

To address the issue of the absence or low density of street trees in many South African towns or particular parts thereof, the following policy and action recommendations are proposed:

1. Urban planners need to ensure that planned streets (and associated infrastructure) are sufficiently wide to accommodate trees down the centre or at least one side of the street, if not both. For example, this has been done in many low-cost housing areas in Gauteng province where there is ample space between the houses and the road verges

2. The national Department of Agriculture, Forestry and Fisheries needs to develop a stronger focus on urban forests as part of its mandate, including having (i) more qualified and skilled urban foresters to proactively work with under-resourced municipalities, and (ii) development of urban forestry and greening information resources for different bioclimatic and linguistic regions of the country. Since this overlaps with the urban greening mandate of the Dept of Environmental Affairs, appropriate synergies and budgeting could be developed.

3. District municipalities should provide guidelines and targets for local municipalities with respect to what proportion of the linear length of streets should have trees. Support or advice can be provided by urban forestry officers in the Department of Agriculture, Forestry & Fisheries, Department of Environmental Affairs, the parks and recreation departments of metropolitan municipalities, the secretariat of the Institute for

Sufficient space between built infrastructure and the road where urban trees can be planted on atleast one side of the road in the West Rand RDP suburbs, Gauteng.

Environmental & Recreation Managers of South Africa, some local universities, or the authors of this brief.

4. Local municipalities should mandate ward counsellors to engage with ward committees, residents and interested parties to facilitate public participation processes to determine what species to plant and where, along each street. This can be achieved through a series of community meetings, environmental awareness programmes, and workshops where participants will be equipped with knowledge and skills for tree planting (where, when, how many, species and maintenance schedule). Such dialogues are ideal vehicles for situating tree planting as a Key Performance Area in the Integrated Development Plans of the municipality.

5. The consultation process should, where possible, also seek to identify one or more 'tree champions' (individuals, businesses or organisations) per block willing to lead planting activities and report problems (such as death of a tree, large dead branches posing a hazard, livestock damage or vandalism). Examples can be found in Mangaung municipality.

6. A wide diversity of tree species should be planted, including fruit/nut species, suitable to the region. A rule of thumb used in some regions is that no more than 30 % of trees in a specific area (such as a street, block or suburb) should be from the same family, 20 % from the same genus and 10 % from the same species.

7. Preference should be provided to planting indigenous tree species because they support a greater diversity of local birds, animals and insects and some have higher cultural values than non-indigenous species. However, there is need for a degree of pragmatism in this regard, based on local preferences, local growing conditions and available stock.

8. In towns or parts of towns where livestock are prevalent, newly planted trees should be sufficiently large (> 3 m tall and 10 cm stem diameter) to minimise the probability of livestock damaging or killing the tree. While this will translate into fewer trees planted because of the higher prices of large trees, the higher survival rate means this is a better course of action. However, suitably robust protective structures should also be provided for at least the first two years (where possible these should be made by local entrepreneurs to stimulate local skills and business). Attention might also be given to planting species that are unpalatable to livestock.

9. A register/database should be developed and maintained to record all plantings (date, location, species, size, whether support or protection was provided). These records will then help guide in decisions for future plantings, such as which species do well in different parts of each town, which do badly, the best time for planting, damage rates in specific areas, etc.). Such a database can also provide the basis for a maintenance schedule.

10. Where there are sufficient human resources, a municipality should, over time, develop an inventory of all the street trees per town. At a minimum, this should include species, location, tree size (qualitative ranking in one of five size classes (<2 m tall; 2.1 – 4 m; 4.1 – 8 m; 8 – 15 m: >15 m), general condition and the extent of interference with utilities or distortion of roads/pavements. The inventory can be used for future planning with respect to promoting species and size diversity in each street, identifying unhealthy trees for replacement or deformed trees for maintenance. Such an inventory should be merged with the inventory of new plantings.

Further reading

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