

URBAN FORESTRY ISSUES IN NORTH AMERICA: GLOBAL IMPLICATIONS

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ABSTRACT. *Urban forestry can address important environmental and social issues associated with urbanization in North America. Ecological, economic, and political constraints to urban forestry are presented and regional urban forest plans in "sister" watersheds are described as a promising implementation approach.*

Introduction

Urban forestry is the planning and management of trees, forests, and related vegetation within communities to create or add value. Urban forests add value to local communities because they are integral to land use planning, mitigating water and energy shortages, improving air quality, protecting global climate, enhancing public health programs, increasing land values and local tax bases, providing job training and employment opportunities, reducing costs of city services, and increasing public safety. In North America the urban and community forestry paradigm is shifting from a focus on beautification to one that encompasses all of the environmental, conservation, economic, and social benefits of community trees. This shift has been accompanied by increasing levels of local participation and new partnerships that link professionals, non-government organizations, industry, and government agencies.

Issues Associated with Urbanization

In 1995 North America's urban population was 294 million or 74% of its total population (Roberts, 1996). The number of people residing in urban areas is expected to increase to 430 million or 85% in 2025. Although the pace of urban growth will be slowing in North America as a whole, rapid urban growth will continue in the poorest regions and those undergoing the greatest economic change. In other areas, populations will shift away from vast sprawling metropolitan regions to small or intermediate-sized cities. The benefits of urbanization include higher incomes and literacy rates, as well as increased health. However, with urbanization has come a host of environmental and social problems. Some of these problems are associated with urban poverty (i.e., sanitation, disease, access to clean water, food, and fuel supplies) and others with economic growth or affluence (i.e., air and water pollution, congestion, loss of biodiversity). The problems of pollution, poverty, and environmental hazards facing North American cities are similar to but less extreme than those faced by much of the world's population in developing world cities.

The Role of Urban Forestry

Urban forests are important because of their geographic extent, their impact on local economies, and their proximity to people. Collectively, urban trees in the contiguous U.S. account for nearly one-quarter of the nation's total tree canopy cover – some 74.4 billion trees (Dwyer et al., 2000). The annual total impact of urban forestry on sales in California was \$3.8 billion, while the state's commercial forest products industry had sales of \$12.5 billion (Templeton and Goldman, 1996). Because of their proximity to people, urban forests can provide substantial environmental and recreational benefits to urban dwellers. Among their benefits:

Air Quality and Climate Protection: Although urban air quality has improved over the past two decades in most North American cities, worldwide, more than 1 billion people live in urban areas with unhealthful air. Rising motor vehicle use, reflecting the increasingly sprawling form of many cities, poses the greatest threat to air quality. Urban centers, where large quantities of energy are consumed are important sources greenhouse gases that pose a threat to the stability of global climate. Urban forests have a positive impact on air quality through deposition of pollutants to the vegetation canopy, sequestration of atmospheric CO₂ in woody biomass, and reduction of summertime air temperatures and associated ozone formation.

Urban Poverty: Urban poverty is a serious problem in the largest North American cities because the poorest groups face the greatest exposure to biophysical threats (e.g., inadequate water, housing, sanitation), biological hazards (e.g., infectious and parasitic diseases), and social ills (e.g., violence, substance abuse, unemployment) and have the least access to protective services. Greenspace resources are often inadequate in areas where they are needed most as a source of shelter, food, fuel, building supplies, and income-generating activities. In some cities urban gardening can contribute significantly to the food supply (Kuchelmeister, 1998).

Water Resources: Cities produce wastewater that requires treatment and polluted runoff that threatens human health, as well as the functioning of freshwater and coastal ecosystems. Although water is not scarce in North America, many large cities face water shortages. For example, Mexico City's rapid growth and dependence on groundwater

has led to aquifer depletion, ground subsidence, and implementation of water conservation measures. By reducing runoff from small storms, which are responsible for most annual pollutant washoff, trees protect water quality. Some cities own peri-urban forests that provide municipal drinking water, and others, such as New York City, have invested in conservation easements to protect watersheds instead of investing in new treatment facilities. Seattle owns a large tract of urban forest that it uses for land treatment of sewage wastes.

Solid Waste: Approximately 20% of the urban solid waste stream is yard (organic material from lawns, shrubs, and trees) and wood waste. Recycling of this green waste can reduce the environmental and economic costs associated with landfill disposal. Returning green waste to the soil can benefit plant growth and conserve water. Portable mills are being used in pilot programs to create lumber that is used for products such as picnic tables, park benches, flooring, and veneer.

Mental Health and Well-Being: City life is stressful. However, visiting green areas in cities can counteract stress, renew vital energy, and speed healing processes. The urban forest is where most people experience and learn about forests. Involvement in tree planting, management, and restoration of urban forests is, in itself, an important form of outdoor recreation with significant individual and community benefits.

Loss of Biodiversity: Urban areas affect biodiversity through conversion of land to urban uses. Many cities are rapidly expanding outward, reducing and fragmenting habitat. Expanding urban forests can serve as reservoirs for alien plant species that threaten native forest flora (e.g., *Acer platanoides*, *Cytisus scoparius*, *Rhamnus spp.*).

Constraints to Urban Forestry

Although there is potential for urban forests to mitigate a variety of impacts associated with development, there are also a number of obstacles to overcome before significant urban forest benefits can be realized. Resolving these limitations will require coordinated efforts among cities, regions, and countries (Meza, 1992; Nilsson et al., 2000; Valencia, 2000).

- Loss of Greenspace: Available growing space is limited in city centers and this problem is compounded by pressure to convert greenspace, parks, and vacant lots into building sites (Glickman, 1999).
- Inadequate funding for municipal tree-care programs. Resources needed to respond to natural catastrophes (e.g., ice storms, hurricanes), conduct urban forest inventories, develop management plans, enforce ordinances, and monitor tree health are lacking.
- Overuse of park and natural spaces.
- Harsh growing conditions that make tree survival an achievement.
- Lack of information on the tolerances of urban tree cultivars to environmental constraints such as de-icing salts.
- Poor tree selection that creates maintenance problems.
- Poor nursery stock and failure to provide adequate care after planting.
- Many municipal urban forests are dominated by relatively few species and genetic diversity is limited.
- Poor tree care practices by citizens and untrained arborists.
- Too few communities have working tree inventories and very few have urban forest management plans.
- Limited adoption and enforcement of ordinances that regulate street tree removal and types of species planted, protect trees during construction, preserve heritage trees, and require planting with new development.
- Jurisdictional complexity that frequently results in agencies working at cross-purposes or duplicating each other.
- Limited outreach to professionals and residents.
- Limited grass-roots participation in tree planting and stewardship.
- Lack of public awareness about the benefits of healthy urban forests.

Regional Urban Forest Plans

Leadership and vision that soars above jurisdictional boundaries is needed to realize the many environmental, social, and economic benefits urban forests can provide. Implementation of regional urban forest plans can foster multifunctional regional greenspace systems with connecting corridors and easy access. More efficient delivery of tree care services can result from greater collaboration among agencies. Multiple sets of policies, ordinances, standards, and specifications can be merged. Developing a shared awareness of the benefits healthy trees can produce among the business, utility, and public works communities can generate support for coordinated regional urban forest inventory, maintenance, and health monitoring programs.

One way to implement regional plans is through collaborative watershed restoration projects (Lipkis, 2000). For example, "sister" watersheds could be studied, one each in Canada, Mexico, and the U.S. Watersheds or catchments provide a definable organizing structure for study of a region's ecosystem. Questions that this initiative could address are:

- How does the quality of water, air, soil, vegetation, and wildlife habitat change as one travels from the headwaters of rivers to their confluence with downstream water bodies?
- What are the Best Management Practices for sustaining healthy watersheds in urban, suburban, and rural lands?
- How can international, national, and state resources be best applied to facilitate local efforts to create landscapes for sustainable living?"

Conclusion

There is need for coordinated efforts between: countries; research and academic entities; public and private sectors; volunteer groups; and individual citizens to implement regional initiatives. In return, this will improve the knowledge base, strengthen institutional capabilities, encourage local participation, and promote more integrated urban forest planning and management.

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