9 Economic Aspects

From previous chapters, we have seen that urban trees are the main components of urban forestry. Indeed, in our days, urban forestry represents a synthesis of policy, planning, landscape architecture and environmental science. Urban trees which add important beauty to our cities and everyday life exist in many towns over the world and have been planted from several centuries ago. As noted in the United States (www.ci.golden-valley.mn.us), "trees are a 'low-tech' solution to energy conservation".

Beside aesthetic considerations, the range of other benefits which come with urban trees, such as environmental, economic and social, is of equal importance. The list of environmental benefits induced by urban and suburban forests is extensive and can include the capacities of trees to remove pollutants from the atmosphere and to contribute to removing greenhouse gasses from the atmosphere. The canopies can act in providing cooling shade, slowing storm water and reducing runoff. The extensive root areas control soil erosion.

Over time, urban trees produce direct and indirect economic benefits. Direct benefits are related to saving energy for cooling homes and increasing property value, as well as reducing airborne emissions from automobiles and other mobile sources. Reducing the air temperature in residential areas in the summer time by several degrees is a well known effect of large shade trees. Wind speed can be reduced, as well as smog. Computer simulation indicates reducing heating costs by 10–30 %.

Indirect benefits are associated with benefits for the commercial sector and retail businesses. A previously cited source noted a rental increase of 7%, an increase of 3–5 % in the sale price of a single family house, an increase in tax revenues and income levels and an increase in the number of jobs and worker productivity. Shady streets are associated with high quality, amenity and comfort; and they enhance economic stability by attracting business and tourists. Treed automobile parking persuades customers to pay a better price. The duration and frequency of visits of these parking places increase. The American Forestry Association (2004) noted that an acre of trees (0.4 ha) can store 2.6 tons of carbon (pollution) annually and generate enough oxygen for 18 people.

Models show (http://envirstudies.brown.edu/classes) that, in 50 years, one tree can generate U.S. $ 30,000 in oxygen, recycle U.S. $ 35,000 in water and

remove U.S.$ 60,000 of air pollution. Another indirect benefit is related to stress reduction in the working place and a speed recovery for patients in hospitals.

Helliwell (1967, 1984) was the first to draw attention to the factors which can determine the economics of woodlands and of each stand or tree composing the woodlands. These factors are:

- the quality of the site, its soil and climate, which determine a certain quality of timber produced;
- the value placed on wild life and amenity;
- the quality of present and past management;
- the incidence of taxes.

The woodlands which have existed for a long time (centuries) without significant interruption form the richest habitats for wild plants and animals. Trees provide habitats for birds, mammals, insects, lichens, mosses, etc. As noted by Helliwell (1984) "a mix of oak, ash, lime, maple woodland of fairly open and varied structures is likely to be of high value for nature conservation, and a dense even-aged plantation of exotic evergreen trees is likely to be of relatively low value, but if the evergreen plantation were of more open structure and containing a small proportion of native deciduous trees, its value would probably be much enhanced".

The presence of particular tree species is often less important than the overall structure and management of a woodland. The silvicultural system can even be aged, with clear felling and replanting or with natural seeding, or uneven aged with a two-storied forest – main species or different species in each storey, or with a selection system. The most important factors for the silvicultural systems are:

- the diversity of tree species and type of mixture, including deciduous and evergreen trees;
- the existence of a well developed vertical layer which gives niches for the wild life, together with the presence of old rotten trees that provide habitats for birds, insects, fungi, etc.

To estimate the amenity value of woodlands and trees, Helliwell (1967) proposed a scale going from 1 to 4, which takes into account the following factors: the crown area, the life expectancy, the importance of position in the landscape, the presence of other trees, the form of the species in relation to the setting and the special historical value. This model was refined and enriched by other foresters and scientists, as noted by Bary-Lenger and Nebout (2002), in Europe, Canada, USA, Australia and New Zealand.

The reader interested in detailed calculations of the amenity value of woodlands and trees can refer to: Bary-Lenger and Nebout (2002), Dolwin and Gloss (1993) and Helliwell (1967, 1984).

Arboricultural societies can also be useful, e.g.:

- Europe: the European Arboricultural Council, http://www.eac-arboriculture.com
- USA: http://www2.isa-arbor.com/consumer/value.html
- New Zealand: http://www.rnzih.org.nz/pages/notable.html
- Canada: http://www.Fihoq.qc.ca/html/siaq.html

Table 9.1 lists the benefits produced by trees in urban areas.

Table 9.1. Some benefits produced by trees in urban areas (data from the American Forestry Association, www.ci.golden-valley.mn.us)

Benefit	Beneficial effects of trees	Evaluated costs
Air quality	Leaves absorb carbon dioxide and other atmospheric gases and replenish the air with oxygen for breathing	In 1 year, a mature tree absorbs 26 pounds (11.8 kg) of carbon dioxide and cleans up pollution created by a car driven 11,300 miles (ca. 18 200 km). The same tree also provides enough oxygen for a family of four to breath during an entire year
Water quality	Reduce the impact of rain, diminish soil erosion and runoff into storm sewers. Glare reduction	In 50 years, one tree can recycle U.S.$ 35 000 of water. Reduces storm water run-off by 2%
Energy	Reduce air conditioning and heating needs and increase windbreak protection and shield homes	Reduction of 30% for air conditioning and 25–50% for heating houses
Property economics	Increase property value. Increase the shopping time along tree-lined streets. Apartments and offices in urban wooden areas are rent quicker and have longer leases	Increase property value by 10–20%, increase tax revenues, income level, faster real estate sales, increase the number of jobs
Noise pollution	Absorb sounds, reduce noise intensity	100 foot (30.5 m) width of trees can absorb about 6–8 dB sound intensity
Ecological contribution	Visual screening. Create wildlife diversity. Provide flowers, cones, foliage for decorative and pharmaceutical purposes. Trees are renewable, biodegradable and recyclable. Reduce human stress	Average community tree contribution is U.S.$ 270. Provide habitat for small animals and birds. Increase human productivity in workplaces and offices; and speed recovery in hospitals
Symbolic value	Aesthetics	National heritage