14.12: Bamboo - Ancient Material for the Future

Bamboo is a term given to large, fast-growing woody grasses including 1250 species within 75 genera ranging from small grassy plants that can substitute for lawn grass to giant bamboo or tree bamboo with stems 30 cm thick and comparable to trees in size. Bamboo has been used since ancient times and has approximately 1,500 applications, especially in Asia. These include structural and reinforcing fiber materials, paper, textiles, food, and fuel. Bamboo is a very strong material with a tensile strength comparable to that of steel. Bamboo textiles are now being used as substitutes for cotton. Although the separation from bamboo of fibers suitable for fabrics is a challenge, the fact that bamboo produces these fibers at a rate several times that of cotton makes bamboo fabrics very attractive as a cotton substitute.

Bamboo propagates primarily by rhizomes, underground stems that grow horizontally and that produce shoots and roots as they spread (good for reproduction but not desirable for neighboring areas where bamboo growth is not wanted). After harvesting, bamboo re-grows from its underground rhizome structure. Bamboo plants typically increase in biomass by 10-30% per year compared to 2-5% annually for trees. The annual yield of bamboo wood is about twice that of loblolly pine, a tree noted for its high productivity. The growth rate of some bamboo varieties under favorable conditions can be spectacular, exceeding 20 meters per year in some cases. Bamboo stalks sequester significantly more carbon dioxide and release correspondingly greater amounts of oxygen compared to trees of the same size.

Bamboo almost certainly has a bright future for sustainability as an attractive renewable source of biomass for materials and energy. There are several reasons for this related to the unique and diverse properties of bamboo, its high productivity, and the relatively short cycles over which bamboo can be produced. The production cycle of bamboo is generally much shorter than that of trees and the bamboo is generally harvested after 5-7 years of growth. Arguably, the greatest contribution that bamboo can make is for erosion control because of the dense underground soil-anchoring rhizome systems possessed by some of the more prominent bamboo varieties. Haiti, especially, could benefit from widespread growth of bamboo on eroded slopes denuded of once abundant forests to provide for firewood for cooking.