EXSYS Case Study

Planning and Design of Agroforestry Systems

United Nations University

The goal of the Agroforestry Knowledge Automation System (UNU-AES) is to assist land-use officials, research scientists, farmers and individuals. Use of the system maximizes benefits gained from applying agroforestry approaches to land management for sustainable production of food and fuel wood supplies by farmers. Agroforestry studies promote land use in which woody perennials are grown on the same land as agricultural crops and/or animals either in spatial arrangement or in sequence. The woody components interact ecologically and economically. Alley cropping is a type of agroforestry in which leguminous trees are planted in rows with food crops cultivated between them. Pruning minimizes shade, provides nitrogen-rich foliage, recycle nutrients and can provide fodder, mulch, and firewood thereby integrating crops and animal production.

The knowledge base in the system utilizes annual rainfall, number of rainy days, total rainy seasons, elevation, slope, soil texture, soil fertility, soil reaction data, and socioeconomic characteristics. Agroforestry practices such as fallows, plantation crop combinations, home gardens, soil conservation hedges are also considered. The knowledge automation system operates on portable computers, which enables demonstrations and use in developing countries. Though it handles very complex data, the application is simple enough so that end users can run the program and perform sensitivity analyses with minimum training time. The system displays customized screens, allows interface calls to external databases and programs, and has an explanation facility to assist the system user.