Preface

Sustainability of forest soils

Forest soils play an important role in sustaining stand productivity and forest values by regulating water uptake, root environment and nutrient cycling processes. A judicious management of soils forms an important component of sustainable forest management (SFM). An international symposium was held at Vila Real, Portugal, from 18 to 22 September 2000 to address some of the pertinent soil management issues in relation to forest productivity and other forest values. These issues included: (1) changes in the nutrient and water-related processes and properties of forest soils with forest management, (2) soil changes in relation to forest productivity and biodiversity and the development and use of simple and practical methods of measuring such soil changes (soil indicators), (3) site factors, site classification and stand productivity and (4) soil management and ameliorative measures.

It is now generally realized that management of forests on a sustained basis needs appropriate care and maintenance of their soil resource and, in most cases, the replacement of lost nutrients. Recent international activities such as Montreal process have given further credential to the judicious use of soil resource under forests. Use of forest plantations to sequester CO₂ and to produce biofuels as an alternative or substitute for fossil fuels is expected to provide additional research activities in the field of forest soils.

Papers included in this issue can be grouped into four following themes:

1. Role of nutrients and nutrient cycling processes in soil sustainability—Studies using input–output balances of nutrients have been included from a number of forests ranging from highly productive Douglas fir stands to low productivity natural stands of oaks. In all cases the intensity and frequency of biomass removal are the crucial factors. Management of harvest slash, whether incorporated into the soil, heaped in windrows, left on the surface or burnt, is another important factor affecting organic matter decomposition and nutrient turnover. In eucalyptus plantations it was observed that despite the lack of clear differences in the decomposition of litter of varying quality, the release of nutrients was apparently different.

2. Indicators of soil changes—A number of indicators were assessed to study soil changes following management practices for their limitations and usefulness. The indicators included temporal or site-specific changes in soil organic C, composition of understorey plants, biodiversity parameters and humus status.

3. Relating site factors to stand productivity and site classification—Such relationships have long been considered by forest managers as important for
achieving sustained forest use, whereby a useful
definition of site remains a contentious issue
requiring future research. Extensive reviews have
been provided into recent advances on this topic,
which include an explicit acknowledgement of a
hierarchy of scales of spatial and temporal nature
that should be included in any site classification
system.

4. Soil management and amelioration practices—
Suitable practices to manage soils can maintain or
enhance forest productivity, biodiversity and other
values. However, significant research efforts will
be required to define suitable parameters to assess
significance of soil changes to achieve sustainable
management of forest land.

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