Towards a sampling strategy for the assessment of forest condition at European level: combining country estimates

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Abstract A correct characterization of the status and trend of forest condition is essential to support reporting processes at national and international level. An international forest condition monitoring has been implemented in Europe since 1987 under the auspices of the International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests). The monitoring is based on harmonized methodologies, with individual countries

being responsible for its implementation. Due to inconsistencies and problems in sampling design, however, the ICP Forests network is not able to produce reliable quantitative estimates of forest condition at European and sometimes at country level. This paper proposes (1) a set of requirements for status and change assessment and (2) a harmonized sampling strategy able to provide unbiased and consistent estimators of forest condition parameters and of their changes at both country and European level. Under the assumption that a common definition of forest holds among European countries, monitoring objectives, parameters of concern and accuracy indexes are stated. On the basis of fixed-area plot sampling performed independently in each country, an unbiased and consistent estimator of forest defoliation indexes is obtained at both country and European level, together with conservative estimators of their sampling variance and power in the detection of changes. The strategy adopts a probabilistic sampling scheme based on fixed-area plots selected by means of systematic or stratified schemes. Operative guidelines for its application are provided.

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Introduction

Forest resources in Europe amount to 1.02×10^9 ha, ca. 44.5 % of land area (FOREST EUROPE et al. 2011).