

## **Design-unbiased multi-source inventory**

Juha Heikkinen  
Finnish Forest Research Institute  
Unioninkatu 40 A, FIN-00170 Helsinki, Finland  
juha.heikkinen@metla.fi

**Abstract.** k-Nearest Neighbours predictions are based on an implicit nonparametric regression model. This implies that the unbiasedness of small-area estimators aggregated from k-NN predictions can only be claimed under the assumption that this model is valid over the entire area from which the neighbours are searched. More generally, the assessment of accuracy of k-NN estimators is inherently model-based. However, design-based estimators can be obtained by utilizing k-NN predictions as auxiliary data. McRoberts et al. (2002, *Rem. Sens. Envir.* 82) demonstrated this in the case of stratified estimation. The aim of this talk is to present other ways of utilizing k-NN predictions in design-based estimation and assess their usefulness in the case of Finnish National Forest Inventory.