

Internship proposal

Accuracy of estimators from the French National Forest Inventory

Context

The French National Forest Inventory (IFN) is a continuous survey which aims at quantitatively describing the situation, the evolution over time and the potentialities of the French forest (<https://inventaire-forestier.ign.fr/>).

The survey is carried out according to an innovative multi-phase sampling design. The territory is first paved with a regular grid, which is systematically sampled at the first phase using a photointerpretation of the ground cover. Some points are then drawn in the selected cells, and field measurements are performed inside circles centered on these points. The survey benefits at each phase from a very rich auxiliary information, with continuous and high resolution spatial information layers, produced in particular by remote sensing.

Sampling has a central place in the inventory. The estimation methods developed aim at limiting the bias regardless of the variables of interest, and at providing the best possible accuracy from a limited sample size. The large databases of IFN collected for 15 years make it possible to test alternative approaches on very large homogeneous samples.

Goals

The purpose of this internship is, first of all, to master the sampling and estimation methods currently used by the NFI, with the help of the supervisors and using the existing documentation.

Meanwhile, the work involves making use of the NFI databases to assess the accuracy of the estimates currently produced by the NFI, including small areas. This work may be carried out via analytical variance computation, resampling techniques (e.g., Bootstrap), or Monte Carlo simulations.

Another possible line of work will be to assess the sensitivity of the estimators to the current specification of the sampling design (sampling rates at each phase, level of detail in the stratification and in the post-stratification). Depending on the spatial domain and/or the variable of interest, the sensitivity to the sample size may vary significantly. The very detailed and large databases of IFN will be used for the analysis.

The internship may be followed by a PhD, which is already funded by the National Institute of Geographical and Forest Information (IGN).

The internship is intended for a student following a Master's degree in Statistics or Applied Mathematics, or a student following a Master's degree in Forestry or Agronomic Sciences. Prior knowledge of sampling would be an asset, but is not essential.

Start date

March 2020

Duration of contract

4-6 months

Remuneration

Around 577 € / month.

Location

Forest Inventory Laboratory (LIF), IGN, 54000 Nancy

or

National School of Statistics and Information Analysis (ENSAI), Bruz

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