

# The Enhanced National Forest Inventory Design and Its Role for Carbon Estimation in Korea

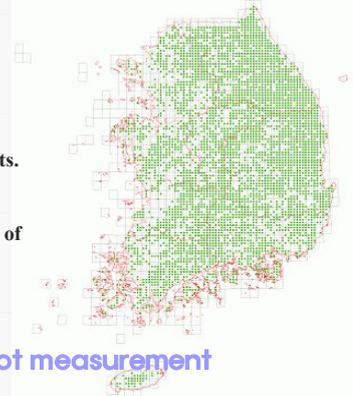
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## Overview of the 5<sup>th</sup> National Forest Inventory Program

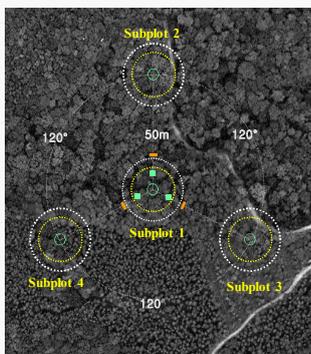
- Survey cycle is 5 years (10 years in the past NFIs)
- Field plot design is a cluster plot of 4 subplots.
- New measurement variables for biodiversity, forest health, biomass, carbon stock, etc.
- Interagency collaboration : Forest Service, Forest Research Institute, National Forest Cooperatives Federation(NFCF)
- New systematic layout of 4,000 permanent plots(4 x 4km)
- Re-measurements of ground plots every 5 years

### Sampling design

The population of the inventory is the total land of Korea. The first phase of the sampling design is a stratification of potential sample points into forest and non-forest plots, superimposing a 4×4km grid on digital orthophoto map for all of Korea. Each grid point is examined to decide whether it is located on forests or not. In this way, about 4,000 sample plots have been systematically distributed all over the forests. The sampling design of the 5<sup>th</sup> NFI adopted permanent sample plot(PSP) for continuous monitoring of forest resources and ecosystem. The sample plots are divided into five panels. One panel per year is measured for five consecutive years. Each panel will be re-measured every five years. At the second phase of the sampling, about 1,000 PSPs are systematically subsampled out of the total plots. More intensive measurement is conducted in these plots, including vegetation, litter and soil carbon survey.



### Ground plot configuration



- Permanent Sample Plot**
- A cluster plot consists of 4 subplots.
  - Subplot design is a tri-areal plot.
    - . Large tree plot(16m, 0.04ha)
    - . Basic tree plot(11.3m, 0.04ha)
    - . Young tree plot(3m, 0.003ha)
  - Subsampling 25% of ground plots
    - . Vegetation plot(1m x 1m)
    - . Soil carbon plot(0.3m x 0.3m)
  - only in subplot 1(center subplot)

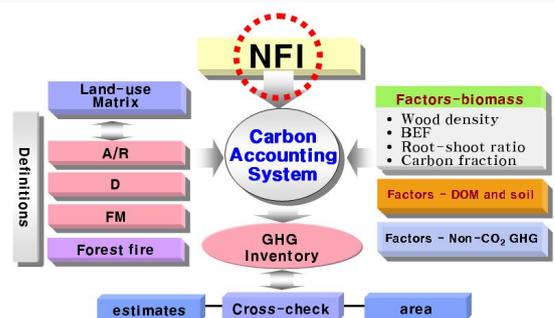
### Field plot measurement



## Role of National Forest Inventory for Carbon Estimation

### What NFI can support for carbon estimation

National forest carbon accounting system for GHG inventory consists of various components and data sources; forestry activity data, NFI and emission/removal factors. The 5<sup>th</sup> NFI plays important role in the system as a primary data source providing reliable plot-based data related to the estimation of 5 carbon pools at national level. The NFI data will be combined with forest activity and emission/removal data from other survey and research project. Moreover re-measurement strategy will make it possible to estimate carbon pool changes every 5 years.



### Possibility of estimating five carbon pools with NFI data

5 carbon pools	Previous NFIs	5 <sup>th</sup> NFI
Above-ground biomass	O	O
Below-ground biomass	x	O
Dead wood	x	O
Litter	x	O
Soil organic matter	x	O



## Conclusion

National Forest Inventory of Korea has been traditionally providing forest resource information. Recently the role of NFI became more important with increasing international reporting requirement. In order to meet internal and external pressure, the 5<sup>th</sup> NFI program was enhanced moving from periodic to annual system to assess and monitor the status of forest resources and change of forest ecosystem over time. The enhanced NFI design will provide accurate and timely forest information. In specific, it will play important role in the national forest carbon accounting system, reducing uncertainty and raising tier level of GHG inventory reporting under UNFCCC.