

Developing a biomass and carbon accounting system in China

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2017-08-16

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Background

- Increasingly, governments worldwide attach considerable importance to estimating biomass and carbon storage of forest ecosystems in the context of global climate change.
- To help countries conduct national greenhouse gas inventories, forest biomass estimation, and carbon stock assessment, the Intergovernmental Panel on Climate Change (IPCC) provided such carbon accounting parameters as biomass expansion factors (BEF) and root-to-shoot ratios (RSR) for estimating different geographic zones.
- However, it probably has great uncertainty to apply these parameters for biomass estimation. Developing individual tree biomass models and parameters for national monitoring and assessment of biomass and carbon storage of forest ecosystems has become fundamentally important.

Framework

- To develop a biomass and carbon accounting system in China, the National Forest Biomass Modeling Program in Continuous Forest Inventory (NBMP-CFI) has been implemented since early 2009, which was funded by the State Forestry Administration of China.
- According to the general framework, the biomass and carbon accounting system covers 6 large scale geographic regions (Northern, North-Eastern, North-Western, Southern, South-Western, and Tibetan regions), includes 34 tree species or species groups (20 coniferous and 14 broadleaved), and involves about 70 modeling populations.

Methods

■ Two parts are involved: data collection from destructive sampling, and methodology for biomass modeling.

➤ The sample size for each modeling population is 150, of which about 1/3 sample trees need to collect both above- and below-ground biomass data.

➤ The modeling methods include nonlinear error-in-variable simultaneous equations, mixed-effects modeling, dummy variable modeling, and segmented modeling approaches. Also, logarithmic regression and weighted regression are involved, and goodness evaluation and precision analysis of biomass models are included.

Achievements

- More than 20 papers on modeling individual tree biomass have been published;
- 2 ministerial standards of technical regulations on sample collection and methodology for tree biomass modeling;
- 13 ministerial standards on biomass models and carbon accounting parameters for thirteen tree species (*Larix*, *Picea*, *Abies*, *Quercus*, *Betula*, *Cunninghamia lanceolata*, *Cryptomeria fortunei*, *Pinus massoniana*, *P. tabulaeformis*, *P. yunnanensis*, *P. elliotii*, *Schima superba*, *Liquidambar formosana*) have been published and approved for application, which cover about 64% growing stock of forests in China.

Perspectives

- In the next 3 years, about 10 ministerial standards for ten tree species (*Populus*, *Tilia*, *Ulmus*, *Eucalyptus*, *Cupressus*, *Pinus densata*, *P. khasya*, *P. armandiis*, *P. sylvestris* var. *mongolica*, *P. taiwanensis*) will be finished and published, which will cover about 13% growing stock of forests in China.
- In the near future, maybe in 5-10 years, other ministerial standards for remaining tree species groups, covering about 23% growing stock of forests in China, will be finished. Then, the whole system for biomass and carbon accounting in China will be established.

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Thank you!

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