Timber Measurements Society
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Logging Utilization in Oregon and Washington 2011-2015

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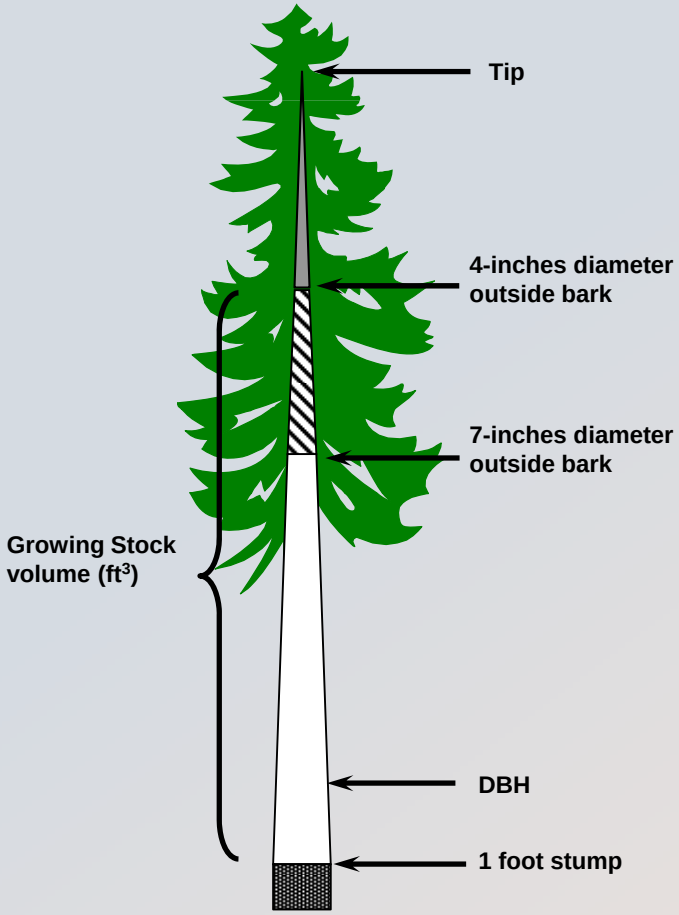
State Level Logging Utilization Objectives

The goal was to update logging residue data for Oregon and Washington. The study was designed to provide factors that are scalable to commercial timber harvesting operations at the state level. For this research, the logging residue factors were used to aid in quantifying feedstock supplies.

Objectives:

- Characterize harvest operations.
- Profile harvest by tree dbh.
- Develop residue ratios for calculating residue quantities based on harvest volume.

Terminology

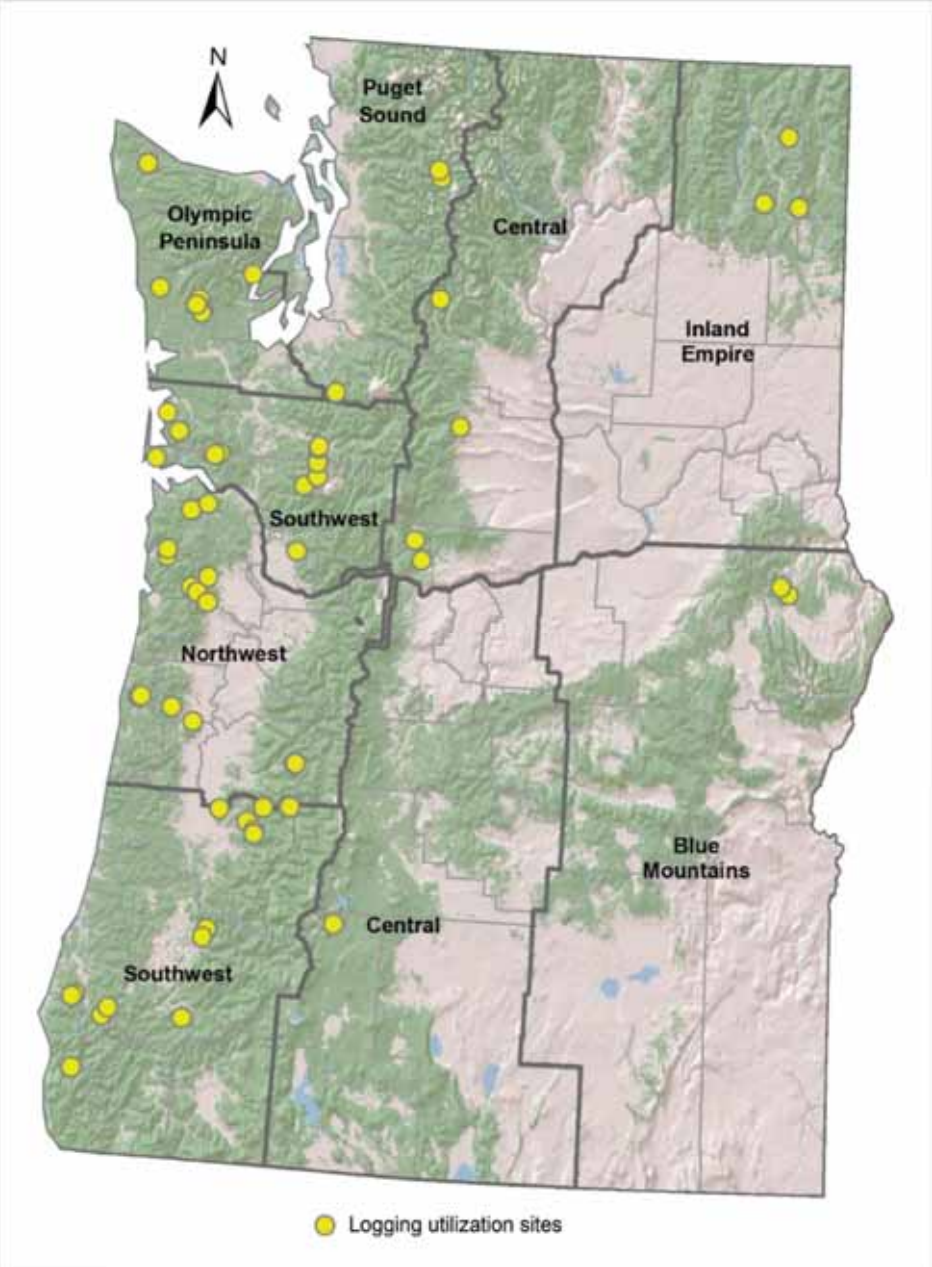


Growing stock vs. non-growing stock

Removals = volume cut

- **Timber products** = logs to mills
- **Logging residue** = left in woods, component of “slash”

Growing stock logging residue is from the bole portion of trees from the 1 ft. stump to the 4” dob and does not include tops and limbs.



Site selection

- Based on recent county level harvest volumes.
- Measurable felled trees & stumps.
- Commercial products
- Not salvage.
- Safe!

State	Sites	Trees
Oregon	34	835
Washington	30	726

Map courtesy of Chelsea McIver, Research Specialist in our program

Logging Utilization Methods

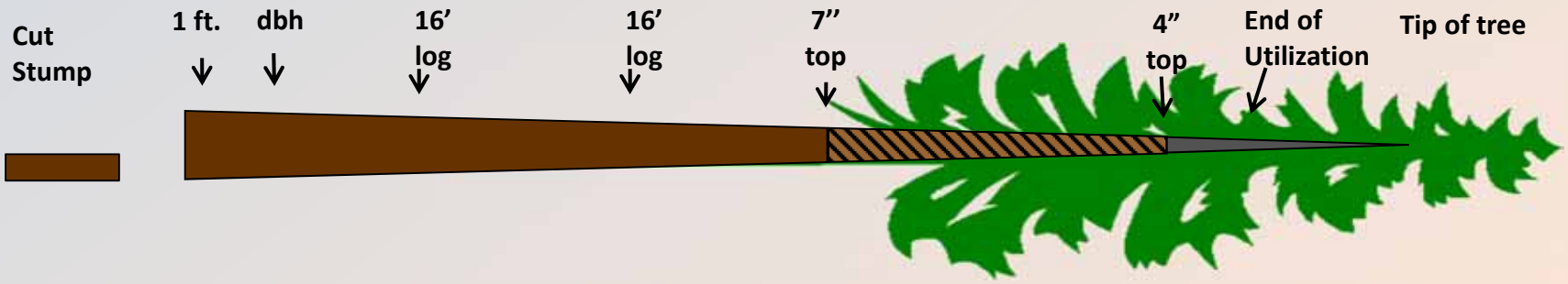
<u>Site information from loggers & foresters</u>

- Equipment & methods used.
- Products & receiving mill(s).
- Log lengths & small-end diameters.
- Cutting card was a utilization guide!
- Checked log decks and residue piles for top diameters.

Logging Utilization Methods

Felled-tree measurements:

- **Species & cut stump height.**
- **Diameters along bole at key points & sections ≤ 16’ from ground to tip of main stem.**
- **Identify each bole section as used (product) or not (residue).**



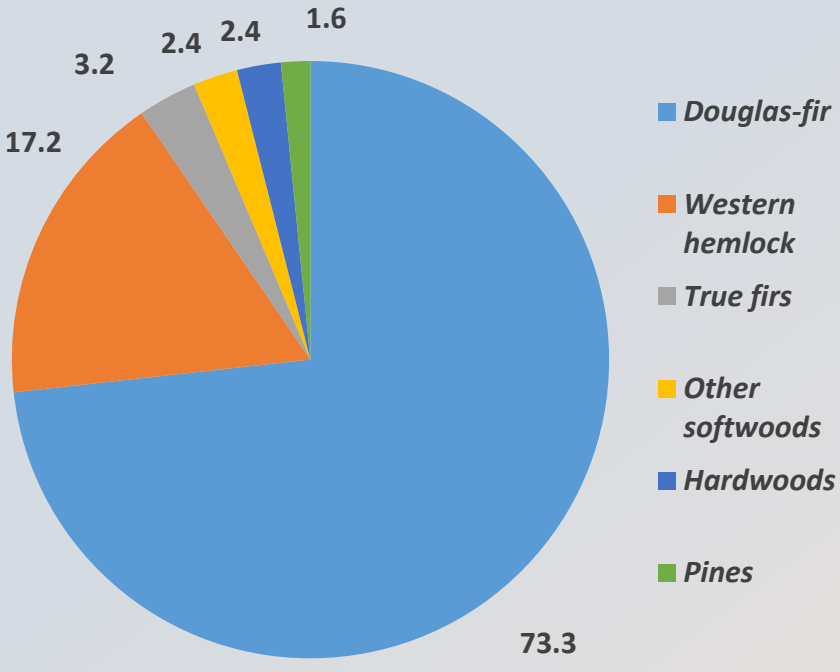
Results:

Logging systems

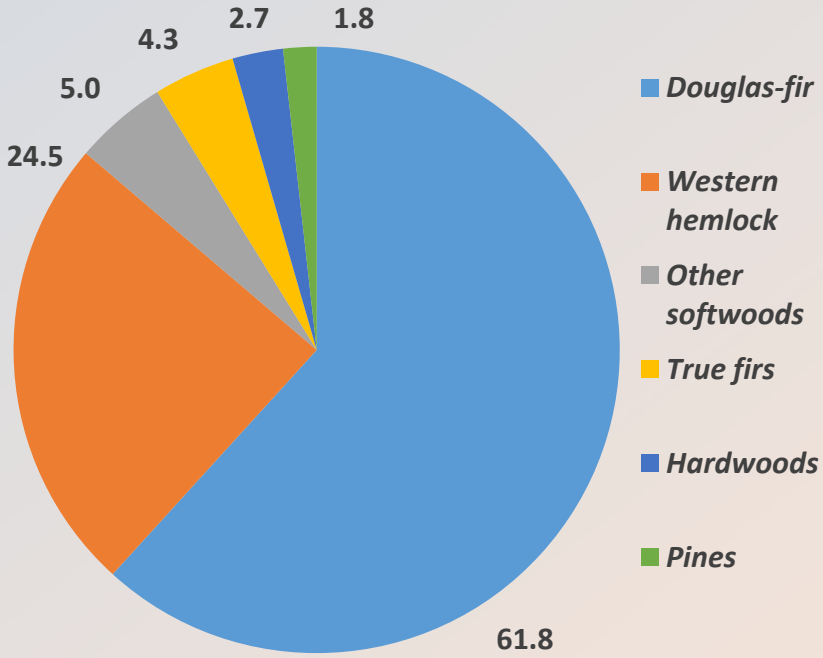
- 53% Oregon sites hand felled and cable yarded, Washington 53% mechanically felled with 73% ground based skidding.
- All but 2 of 64 sites were merchandised mechanically.
- On 97% of sites trees were yarded/skidded whole tree & merchandised at landings.

Trees by species

Percent of mill delivered volume by species Oregon



Percent of mill delivered volume by species Washington

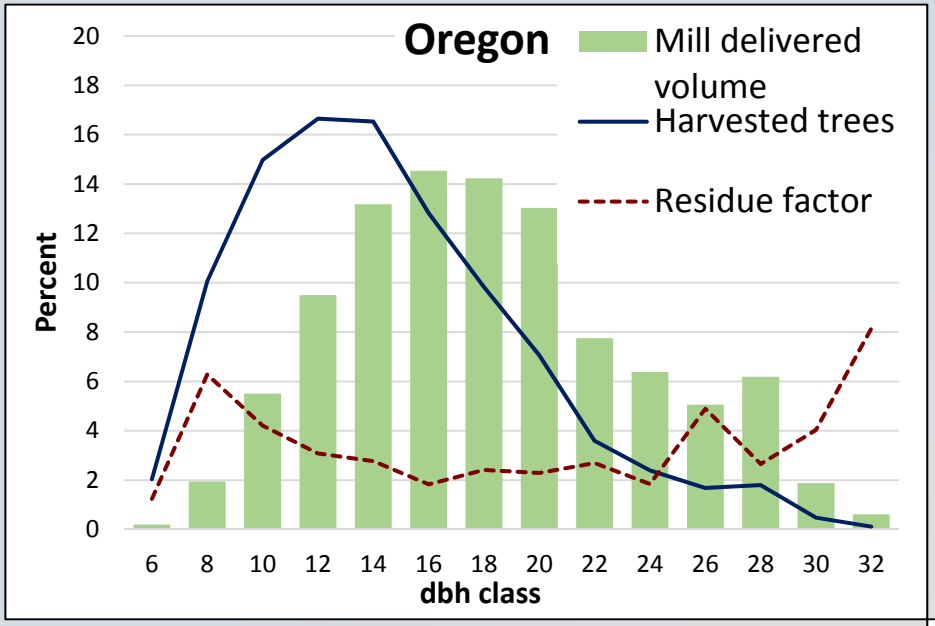


- **Douglas-fir and western hemlock comprised 90 percent of the delivered volume in Oregon and 86 percent in Washington.**
- **Hardwood volume was about the same in both states.**
- **Pines represented the lowest volume and were <2 percent of the delivered volume in both states.**

Trees by diameter

- 50% of trees OR/WA were ≤ 14 inches dbh produced about 17% of the mill delivered volume.
- Same trees produced 23% of residue in Oregon, 13% Washington.
- 50% of the mill delivered volume came from trees ≥ 18 inches dbh in both states.

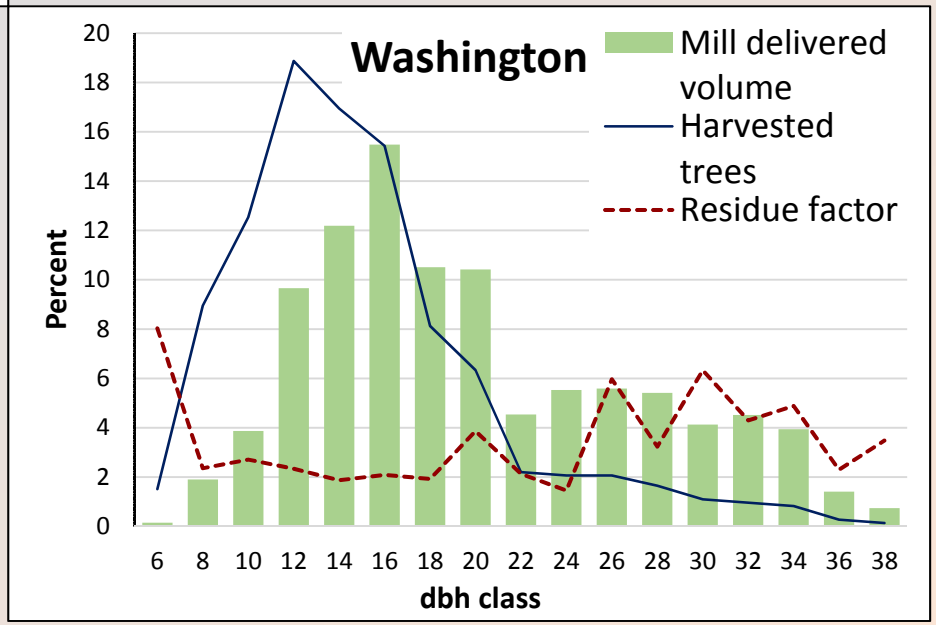
Proportions of mill delivered volume, harvested trees, and residue per mill delivered volume by tree dbh.



- Mill delivered volume **(green bars)** is the measure all other components are compared to create the ratios that are the factors **(residue volume/ delivered volume = logging residue factor)**.

- It takes considerably more small trees to equal the mill delivered volume of larger trees **(blue line vs green bar).**
- Smaller trees create proportionally more logging residue* **(red dotted line)**.

*Oregon 6” diameter class Washington 26-34”



Oregon and Washington removals factors

For every 1,000 cubic ft. (cf) of volume delivered to the mill in Oregon:

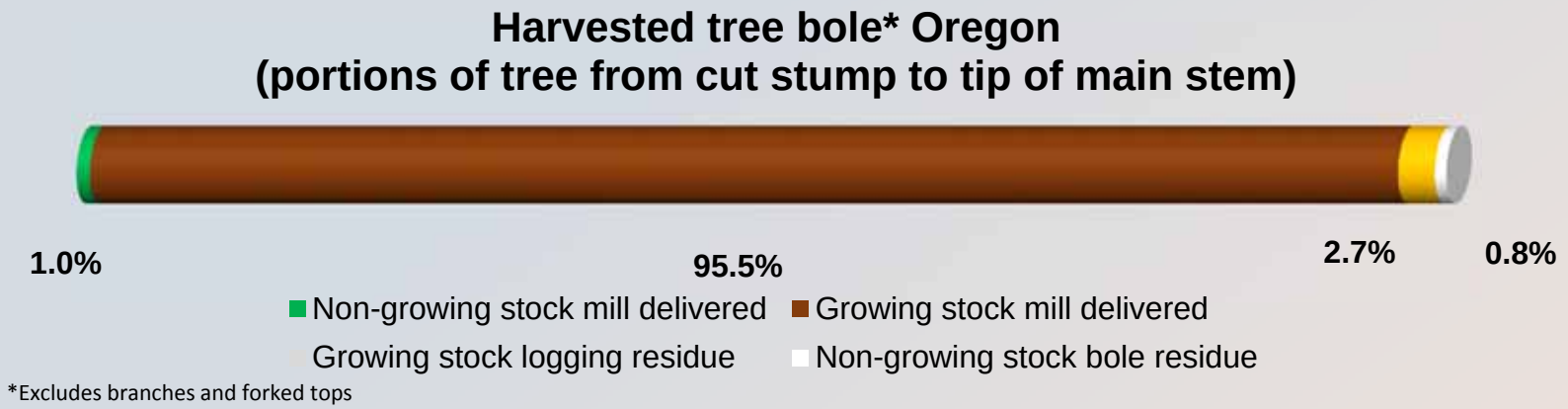
- 1,018 cf of growing stock (GS) is removed.
- 990 cf of GS is delivered to the mill.
- **28 cf of GS logging residue is created.**
- An additional 10 cf of non-GS (stumps and tops) is delivered to the mill.

Washington:

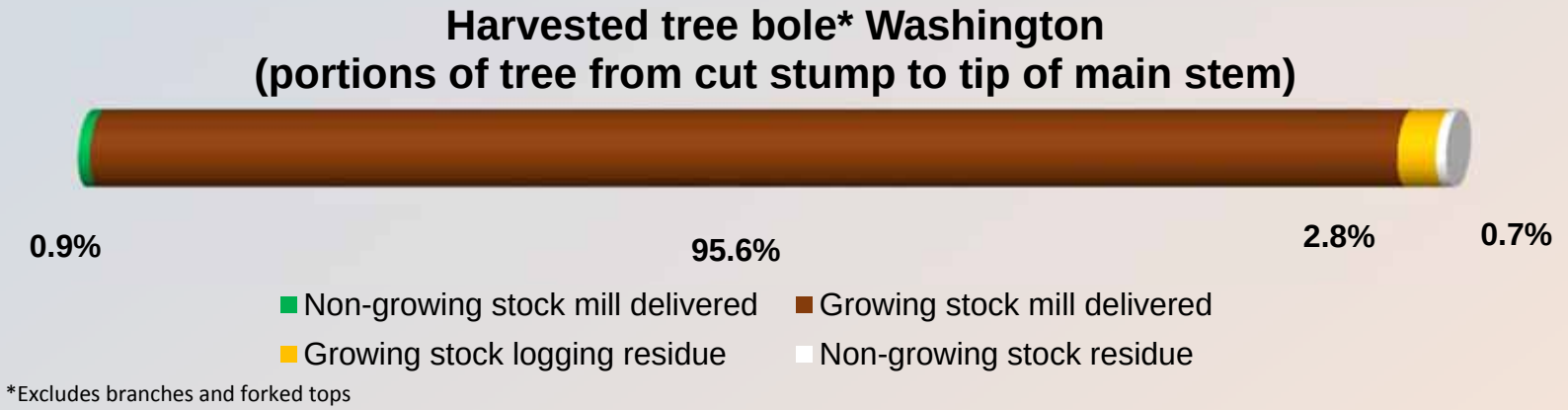
- 1,020 cf of growing stock (GS) is removed.
- 991 cf of GS is delivered to the mill.
- **29 cf of GS logging residue is created.**
- An additional 9 cf of non-GS (stumps and tops) is delivered to the mill.

Even if the mill is across the ocean.

Oregon and Washington harvested tree bole utilization



*Excludes branches and forked tops



*Excludes branches and forked tops

In Oregon and Washington , 3.5% of the harvested bole volume (plus limbs & tops) remains in the woods as logging residue.

Thank you and see you in the woods!

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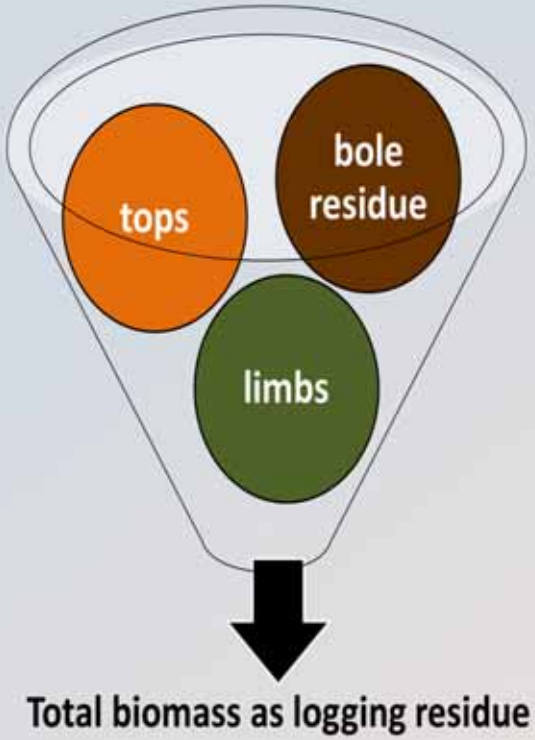
Uses for this information



- Removals factors.
- Whole tree volume equations for tops and limbs.
- Mill study data.
- Scalable to harvest.

2.07 green tons of residue per MBF of commercial harvest Oregon (2013 TPO data) and 1.89 Washington (2014 TPO data).

Northwest Advanced Renewables Alliance (NARA)

Washington State University, Oregon State University, Idaho State University, University of Washington and The University of Montana

- The answers will not be the same for
- Methodologies may be useful
- Supply chain
- Logistics
- Life cycle analysis (carbon accounting)
- Socio-economic analysis
- Quantifying residues (already partially done with this study)

http://nararenewables.org/