



# Comparison of a short rotation loblolly pine stand to a long rotation of longleaf pine with and without EQIP cost-share and pine straw income

David Dickens, *PhD, Forest Productivity Professor*, and Yanshu Li, *PhD, Forest Taxation and Economics Associate Professor*; UGA Warnell School of Forestry and Natural Resources

Many forest landowners are faced with deciding to plant loblolly or longleaf pine in the Coastal Plain region, an area spanning from southern Virginia southward to Florida and westward to eastern Louisiana. This paper addresses this decision from an economic stand-point.

For this analysis, we assume the following conditions:

Loblolly pine is grown to a 24-year rotation with a single thinning at age 15-years, with a growth rate of 6.25 tons/ac/yr. Longleaf pine is grown to a 45-year rotation, with two thinnings: age 20- and 32-years old with a clearcut at age 45-years, with a growth rate of 4.33 tons/ac/yr (31% less than loblolly's growth rate). A Natural Resource Conservation Service reforestation cost-share program called EQIP (Environmental Quality Incentives Program) is used for longleaf only reducing the total longleaf establishment cost by 50%. Also, longleaf gets an income of \$210/ac/yr from age 12- through age 20-years from annual pine straw harvests. Longleaf is favored over loblolly for EQIP cost-sharing, so longleaf only, gets EQIP cost-share. Loblolly is not commonly raked where there is an abundance of longleaf stands, so loblolly has no pine straw income. All costs and revenues are in constant dollars.

\*Net pine stumpage prices (net=after consulting fee+ county stumpage tax=10% of timber sale): pulpwood (trees with stem defects like forking and those trees with diameters from 4.6 to 9.6" = \$8/ton, chip-n-saw (trees with no visible stem defect and diameters from 9.6 to 12.6") = \$20/ton, sawtimber (trees with not visible stem defect and diameters from 12.6" and larger) = \$27/ton, and poles (longleaf only; assuming 20% of the tons of sawtimber/acre are poles at age 45-years – trees with no visible stem defect to 45 feet or more and diameters 14" or larger) = \$42/ton. Annual property taxes and other costs = \$10/ac/yr. The following tables show the establishment cost, wood flows and cash flows for loblolly and longleaf pine.

**Table 1: Loblolly and longleaf establishment costs per acre.**

|   | Site prep          | Seedlings       | Planting        | Total establishment costs |
|---|--------------------|-----------------|-----------------|---------------------------|
| Loblolly  | -\$110             | -\$54           | -\$100          | -\$264                    |
| Longleaf**  | -\$155 (-\$77.50)* | -\$120 (-\$60)* | -\$100 (-\$50)* | -\$375 (\$187.5)*         |
| *longleaf costs in parentheses are after EQIP cost-share –  |                    |                 |                 |                           |
| **longleaf site prep and seedling costs higher due to herb weed control and containerized seedlings use (loblolly bareroot seedlings) |                    |                 |                 |                           |

**Table 2: Loblolly pine harvested wood and income per acre at age 15- and 24-years.**

| Harvest year | Pulpwood | Chip-n-saw | Sawtimber | \$/ac income |
|--------------|----------|------------|-----------|--------------|
| 15           | 31       | 3          | 0         | 308          |
| 24           | 33       | 62         | 21        | 2071         |
| Total income |          |            |           | 2379         |

**Table 3: Longleaf pine harvested wood and income per acre at age 20-, 32- and 45-years.**

| Harvest year   | Pulpwood | Chip-n-saw | Sawtimber | Poles | \$/ac income |
|--|----------|------------|-----------|-------|--------------|
| 20   | 39       | 0          | 0         | 0     | 312          |
| 32   | 29       | 25         | 7         | 0     | 921          |
| 45   | 23       | 6          | 80        | 0     | 2464         |
| Total income (no poles)  |          |            |           |       | 3697         |
|  |          |            |           |       |              |
| *45  | 23       | 6          | 64        | 16    | 2704         |
| * Total income   |          |            |           |       | 3937         |
| *Longleaf with 20% of 45-yr tons of sawtimber/ac are poles at \$42/ton |          |            |           |       |              |

**Table 4: Longleaf pine straw prep costs and cash flows from pine straw.**

| Time (after establishment phase=time 0) | Activity           | Cost (-\$/ac) | Revenue (+\$/ac) |
|---|--------------------|---------------|------------------|
| 3                                       | mow (between rows) | -\$50         |                  |
| 6                                       | mow                | -\$50         |                  |
| 9                                       | mow                | -\$50         |                  |
| 12                                      | herbicide          | -\$60         |                  |
| 12                                      | mow                | -\$50         |                  |
| 12-20                                   | pine straw income  |               | +\$210/year      |
| Total                                   |                    | -\$260        | +\$1890          |

## Comparison of a short rotation loblolly pine stand to a long rotation of longleaf pine with and without EQIP cost-share and pine straw income

The net (returns – costs) revenues for one 24-year rotation for loblolly pine is \$2150 (\$2379 - \$264). The net revenues for one 45-year longleaf pine rotation is \$5139.50 ((\$1890 in pine straw over 9 years + \$3697) - (\$187.50 + \$260)) for the no poles scenario and \$5379.50 for the 20% poles scenario (an increase of \$240/ac by having 15% poles). Since we are using today's dollars but the costs and returns are today and 24 to 45 years from now and there are two different rotation ages for loblolly and longleaf, a fair economic comparison is to use the Bare Land Value (BLV) economic decision-making tool. It is the net present value of a stream of revenues and costs from land in perpetual timber production. Bare land value allows the user to determine financially what rotation age and scenario is the best and decide whether to invest in specific silvicultural activities. In this loblolly versus longleaf scenarios comparison a 5% real discount rate is used to bring back (discount all future costs and returns in the years that they occur).

In comparing the loblolly 24-year rotation without pine straw income and without EQIP reforestation cost-share to the longleaf 45-year rotation with pine straw income and EQIP reforestation cost-share; longleaf's BLV of \$1035/ac (no poles scenario) is almost twice as high as loblolly's \$563/ac BLV. Even without longleaf having EQIP cost share, that BLV is \$825/ac. Adding 20% poles in the longleaf scenario harvested at age 45-yrs improves BLV w/ EQIP and with EQIP cost-share by \$30/ac.

**Table 5: Bare Land Value (BLV) for a 24-year, one thin loblolly rotation (no pine straw income or EQIP reforestation cost-share) and for a 45-year, two thin longleaf pine rotation (with pine straw income from age 12– through 20-years with and without EQIP cost-share) using a 5% discount rate.**

| Pine species        | BLV \$/ac |
|---------------------|-----------|
|                     |           |
| Loblolly            | 563       |
|                     |           |
| Longleaf (w/o EQIP) | 825       |
|                     |           |
| Longleaf (w/ EQIP)  | 1035      |

So longleaf can outperform loblolly financially, when annual pine straw income is realized with or without EQIP reforestation cost share, even when loblolly grew over 30% more wood than longleaf on a rotation almost ½ as short as longleaf's rotation.

The pine straw raking period from canopy closure to first thinning is considered the least wildlife-friendly part of a pine species' life span or rotation age. In the longleaf 45-year rotation case, pine straw raking time prior to the first thin is 20% of the life of the longleaf pine stand. For many forest landowners that have many other acres in pines, mixed pine-hardwood and hardwood stands, the longleaf acres in pine straw may be only 1%, 5%, 10% or 20% of their total land holdings at any point in time. In Georgia, longleaf pine stands are commonly not raked after thinning, thus, forest landowners can renew prescribed burning and practices that may better support wildlife, aesthetics, recreation, and other outdoor activities following the first thinning.

The University of Georgia Warnell School of Forestry and Natural Resources offers educational programs, assistance, and materials to all people without regard to race, color, national origin, age, gender, or disability.

The University of Georgia is committed to principles of equal opportunity and affirmative action.