Why It Is Difficult to Write a "Crop Budget" for Hardwood Timber

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Most farmers are familiar with "enterprise budgets" for livestock, such as cattle or goats, or field crops, such as corn or soybeans. These budgets are used to estimate revenue, production costs and the potential for profit. Many farmers also own some hardwood forestland from which periodic timber harvesting offers the potential for significant revenue. Thus, it is logical to ask, "Should landowners who own hardwood forests prepare budgets for their timber crops?"

This publication addresses this question by discussing the components of an enterprise budget and highlighting the significant differences between hardwood timber and other farm products. The challenges in predicting revenues, expenses and net profit will be examined. Clickable hyperlinks are provided to other publications that provide more information about the various topics.

NOTE: This publication focuses on hardwood forests, which are the most common timber type in Tennessee. Softwood (pine) forests are simpler systems, are harvested more frequently, and are more amenable to budget considerations. Information about pine plantations can be found in A Southern Pine Management Guide for Tennessee Landowners.

Revenue

Revenue is generated when products are sold. To estimate potential revenue, the number of units to be sold is multiplied by the price per unit. For corn, this calculation is fairly straightforward. A farmer might expect a yield of 150 bushels of corn per acre, and the per-bushel price is reported widely. For a beef cow-calf operation, estimating revenue may be a little more complicated because there is more than one product — cull cows, heifer calves and steer calves — with different prices and weights for each.

For hardwood timber, the potential revenue calculation is far more complicated. Some of the important variables include:

Long harvest intervals

Prices for row crop and livestock vary from season to season, which affects budgeting. However, hardwood harvests may occur only every 15 to 30 years (or more), so the normal fluctuations in price must be considered in combination with inflation and longer-term price trends. In addition, storms, disease outbreaks or insect attack can occur before harvest, reducing the value of the stand. The result is that it is very difficult to predict with much certainty the future value of a timber harvest.

Many species

More than 100 species of hardwood trees exist within Tennessee. Of those, approximately 30 have commercial lumber value and even within these there is a wide range of potential value. The Tennessee Division of Forestry publishes a Forest Products Bulletin that lists some of the prices for various species.

Wide range of tree quality

In addition to species, the grade of a hardwood tree is a key factor in its quality value. As explained in PB 1722: A Hardwood Log Grading Handbook, tree and log grade depend on many factors such as its size and the presence of defects such as knots.

Growth rate is highly variable

Growth rate affects both the amount and value of wood that will be added to trees each year, which is a complex relationship (see, for example, W 253: Are Fast-Grown Trees of Low Quality?). In addition, growth rate varies greatly by location (soil conditions, moisture availability, etc.), species and the genetics of the trees. This makes predicting the growth rate and the potential value of a particular forest stand very difficult.

Diversity of markets

Wood has many potential uses. This potential is a function of the species and quality of the tree and also is affected by the types of mills that are located within a reasonable distance of the harvest site. The Forest Products Bulletin shows some of the wide range of products and value. This diversity, which changes over time, further complicates predictions of future harvest revenues.

Intensity of forest managment

While most hardwood forests are not actively managed, activities such as planting desirable species or thinning poorly formed trees or low-value species can have a significant impact on the future value of the stand. Examples of these activities are described in SP 680: Treatments for Improving Degraded Hardwood Stands. These management actions can be inexpensive or costly, but are always site-specific, and, thus, their potential for creating future revenue is difficult to generalize.

These variables have very wide ranges and they interact with each other. The result is that, while general trends and tradeoffs can be identified, making a precise estimate of future hardwood value is not practical. See SP 677: Hardwood Plantations as an Investment for further explanation.

A Hardwood forests are rich in species diversity.
(Photo credit: David Mercker)

B Timber production varies with the intensity of forest managment and many other factors.
(Photo credit: Ben Myers)

C Hardwood tree grade (or quality) greatly influences potential value.
(Photo credit: David Mercker)

D The rings of this oak tree reflect that tree growth rate is highly variable.
(Photo credit: David Mercker)

Variable Expenses

With traditional enterprise budgets, the costs associated with establishing and tending a crop or raising the livestock are "variable" — the total expense will depend on how many acres planted or animals raised and which management activities the farmer chooses (e.g., irrigation, supplemental feeding). The costs of conducting the active business of farming tend to be ongoing and large relative to the potential revenue.

For most hardwood timber owners in Tennessee, the variable costs are small and infrequent. Most of the forestland consists of naturally regenerated trees that receive little active management as they grow. Thus, the costs of establishment and follow-up management are small. Pine plantations are different (see, for example, PB 1466: Tree Crops for Marginal Farmland: Loblolly Pine) in that they have more active management and higher variable expenses, such as planting, thinning and fertilizing.

For most forest landowners, the largest variable expense is logging costs. Because of the specialized equipment and expertise required, some farmers subcontract the harvest and transportation of the wood "crop" to a logger. As described in PB 1607: A Landowner's Guide to Timber Sale Contracts, the variable expenses of the logging job can be directly accounted for if the logger is paid directly from a timber sales contract. Although it is not a recommended practice, loggers will sometimes split the revenue of the job with the landowner; in this case, the variable expense of the logging job is a part of the logger's "share."

A professional consulting forester may be hired to manage a timber sale or to help evaluate and plan the management of the forest. A forester's fees for developing an inventory or creating a management plan are often based on a per-acre rate. When foresters handle a timber sale, their fee is usually a percentage of the sale price. Finally, stand improvement tasks, such as thinning, generally are a cost to the landowner. Thinning may have some value on the market, and cost share from government can help reduce the cost of stand improvement.

Fixed Expenses

Fixed expenses are those bills that must be paid regardless of how many head of cattle are raised, acres are planted, or timber acres owned. They include equipment payments, property taxes and insurance. Since most forest landowners do not harvest their own timber and, thus, would not have the associated harvesting expenses, the major fixed costs are property taxes, land payments and insurance. Refer to PB 1691: Setting Up the Books: A Forest Owner's Guide to Capital Accounts and Record-Keeping for Federal Income Tax Purposes for more information.

Break-even Analysis

Enterprise budgets usually include a table listing product *prices* that would be needed to pay for the fixed and variable costs of several yield scenarios. The analysis may also be presented in terms of the *yields* required to cover the expenses, given certain price scenarios. In either case, the intent is to arrive at the production or price point at which the business is paying for itself. Then, any extra yield, higher prices or lower costs result in profit, meaning that the business of farming is "worth it." Of course, there are potential rewards for farming other than making a profit — the satisfaction of running an independent enterprise or of providing products to the community.

The "other potential rewards" appear to be especially important for many forest landowners (see, for example, Who Owns America's Forests). As discussed above, the fixed and variable costs associated with growing trees are usually small and the potential revenue is infrequent and uncertain. For these reasons many landowners consider their forests less as actively "farmed" land and more as places to hunt or get away, or as rainy-day savings accounts. Finally, the land itself may increase in value over time, regardless of whether timber crops are harvested.

Hardwood Timber Crops Are a Different "Enterprise"

Hardwood timber is different from cattle or corn, and so too are the budgets. Although revenues may be infrequent and hard to predict, there is a potential for large periodic returns from harvesting timber. Attempts to evaluate and even improve the timber "crop" may be worth the additional costs, but calculating a precise enterprise budget for hardwood timber is highly variable because of the uncertainty associated with long harvest intervals and the unpredictability of markets, revenues and expenses over several decades. Although hardwood timber has fundamental differences from other farm crops, hardwood forests can benefit greatly from management. As mentioned above, many factors can affect the future value of a timber harvest. One of the best predictors is knowing the number, species, size and quality of trees you have (i.e., PB 1780: Conducting a Simple Timber Inventory).
Preparing a management plan can also aid in the prediction and enhancement of future harvest values. PB 1679: Forest*A*Syst: Self Assessment to Prioritize Your Forest Uses introduces this topic, but consulting foresters are often hired to help with this work.

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