Hybrid Poplar Profits

by Erik Streed

In order for agroforestry with hybrid poplar to be financially viable, it not only must result in a positive cash flow and compete with other crops...but also must produce a rate of return that makes it worthwhile.

Interest in hybrid poplar in Minnesota has been increasing in the last few years because of a confluence of a growing shortage of native aspen available for fiber production and advances in "hybrid" tree growing technologies such as hybrid poplar. This interest has been growing steadily since the early 1990s, when landowners first began planting this crop outside of a research-oriented setting. However, we are now at the end of the 1990s, and there are over 15,000 acres of hybrid poplar planted in the state. Yet there is still no consensus on what type of financial returns a landowner can expect from this crop. This publication outlines and summarizes the information available on the economics of growing hybrid poplar and provides information on expected financial outcomes from growing this crop under a variety of production scenarios.

The Effects of Land Productivity

As is the case with any business, the potential to make a profit depends on keeping the cost of inputs used to make the product below the revenues received when the product is sold. The costs of producing poplar, in terms of purchasing plant material, labor for planting, fertilization, weed control, etc., are pretty much uniform throughout Minnesota, and if wood transportation costs are excluded, the stumpage price paid to the grower is fairly uniform throughout the region. However, the cost of land and production rates for crops (and poplar) can vary greatly from region to region. Therefore, in this analysis we separated the state into three production scenarios that represent highly productive, moderately productive, and marginal agricultural lands. Highly productive agriculture land (class 1) averages 148 bushels of corn per acre, such as is commonly found in Nicollet County and other areas in south-central Minnesota. Moderately productive land (class 2) produces 119 bushels of corn (Stearns County and other land north of Minneapolis and south of Brainerd). Marginal agricultural land (class 3) averages 80 bushels of corn per acre and is commonly found in the northern half of Minnesota.

FIGURE 1: The Effect of Land Productivity

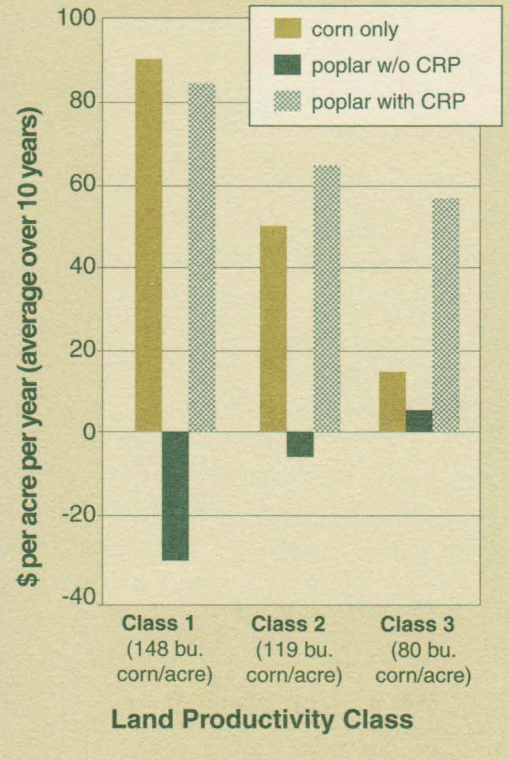


Figure 1 presents the financial implications of producing hybrid on the three different land classes described above.

The first and probably most important trend evident with this model (and illustrated in Figure 1) is that from a landowner's perspective, profits from hybrid poplar increase as land productivity for traditional crops goes down. It is important to note that this does not mean it is more profitable to produce poplar on marginal agricultural land than more productive land. From the perspective of a paper company, or investor who is not limited to land currently owned, it might be more profitable to produce poplar on moderate or highly productive land. However, from a landowner perspective, owners of marginally productive land

can increase their revenues more dramatically by incorporating poplar with their existing cropping systems than their counterparts can on more productive agricultural land. That said, this analysis will focus on hybrid poplar grown on "marginal" agricultural land that produces 80 bushels of corn per year, i.e., average nonirregated agricultural land in many parts of northern Minnesota, Wisconsin, or Michigan.

Profits at Current Pulp Prices

The results from the financial analysis, displayed in Figure 1, illustrates that at current average stumpage prices for pulpwood ($30/cd.), a corn price of $2.20 per bushel (an average price over the last 10 years) and a 3 percent discount rate, corn is more profitable than poplar. However, many land-owners who currently have plantations of hybrid poplar are involved in some sort of cost-share program. For instance, poplar incorporated into an agroforestry system, such as a riparian planting or a wildlife area, may qualify for the CRP Continuous Sign-up program. (The Farm Service Agency reviews specific applications for CRP payments, and criteria for qualifying may vary by year and county.) There are also a variety of companies within the forest products industry, as well as power generation companies, that currently have, or have had, programs that include an outside payment to the landowner for growing poplar. **So, we use CRP payments as an example to illustrate the dramatic effect that outside cost-share payments can have on the profitability of growing hybrid poplar.**

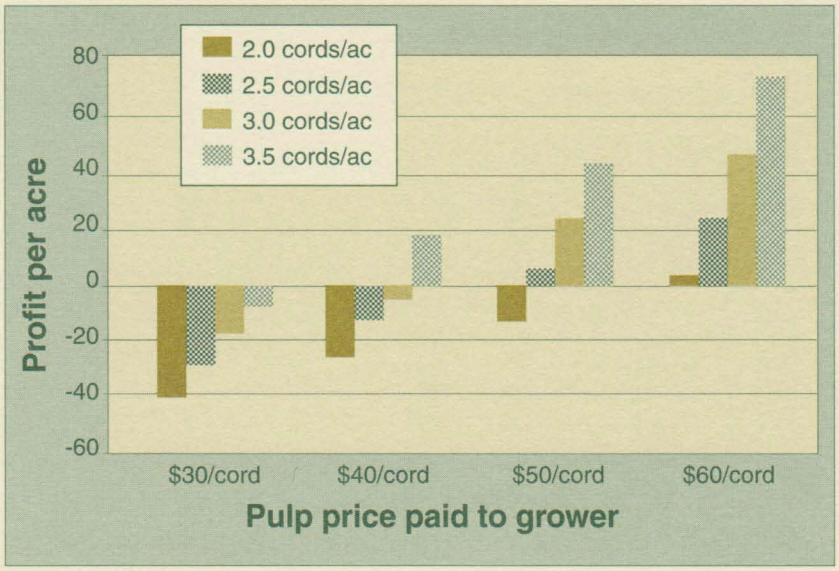
As illustrated on Figure 1, which includes results from practices with and without CRP/outside payments, poplar can produce a return of $57 per acre with CRP payments—using a discount rate of 3 percent.

In a nutshell, at current stumpage prices, hybrid poplar can make a profit on marginal farmland if the producer obtains cost-share payments and the landowner can obtain capital at a rate below 3 percent above inflation. At a 5 percent interest rate or above, returns from hybrid poplar do not match corn—even with CRP or some other cost share payment.

Now, lets look a little deeper into these numbers. Under existing conditions, growing poplar does not appear to be profitable, but in agriculture (and pretty much every other industry) one needs to anticipate the future when making business decisions. For instance, the yields achieved when growing poplar, and the price received when selling it, can dramatically affect the financial performance of the crop.

If pulp prices rise, or the yields increase, the profitability of growing hybrid poplar changes. Figure 2 illustrates the relationship between price, yields, and profits.

FIGURE 2: Effect of Yield and Price (without outside payments)

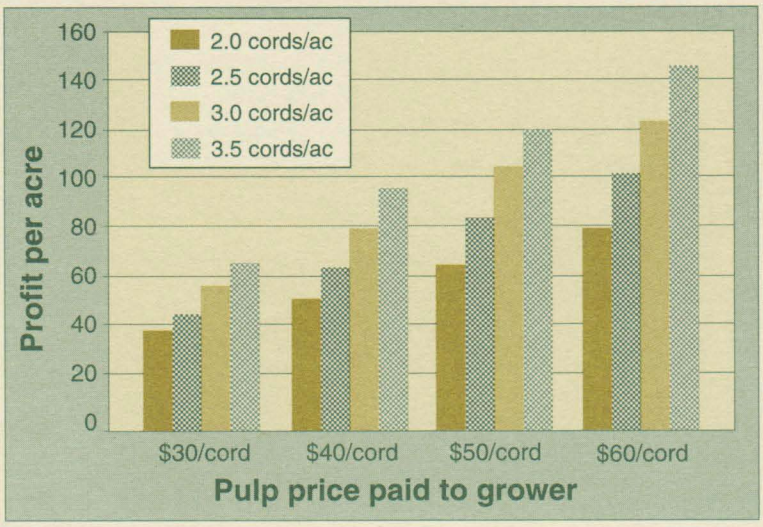


As you can see in Figure 2, without some sort of cost-share payment, under current prices ($30) a grower would have to be getting over 3.5 cords per acre just to break even. At 3.5 cords per acre you would have to get a stumpage price of $60 per cord in order to make over $60/acre per year.

The impact of CRP (or some other cost-share payment) is illustrated on Figure 3. This chart shows that 3.5 cords per acre can return profits of over $60 per acre—even at existing pulp prices, when CRP payments are incorporated.

Now that we can see what the profits of hybrid poplar would be under different price and yield scenarios, we need to analyze the evidence, and see which scenario makes the most sense, as a basis for our decision to plant or not plant poplar. Estimates for yields for hybrid poplar can come from a variety of places. Unfortunately, at this stage these are only estimates, because we are still in the early stages of growing this crop on a large scale, and only a very few nonresearch trial plantations have been harvested. However, according to most studies, 3.0 cords/acre/year is a reasonable expectation for lands in the northern part of the state, and 3.5 cords/acre/year could be expected on the more productive agricultural lands in the southern part of the state.

FIGURE 3: Effect of Yield (with CRP/outside payment)



However, there is reason to believe that even if pulp prices stay the same, prices for farm-grown pulp will be higher than for pulp grown in a more traditional forest environment. Farm-grown pulp is easily accessible, there are no road construction costs, and environmental concerns (and associated costs) are generally less for trees harvested from a field—compared to harvesting from a traditional forest setting. Furthermore, and perhaps most importantly, there are no seasonal constraints for harvesting farm-grown trees, so the timber can be sold when the mills need it most. If all these factors hold true, the price for pulp grown in agroforestry systems will increase, even if the price of standard pulp does not.

Projecting the price that a landowner will recieve for pulp also depends on what happens between planting and when the plantation is harvested. Before making projections based on the effect that pulp price increases would have on the financial viability of producing hybrid poplar in agroforestry systems, let's first discuss some scenarios that might lead to higher pulp prices.

Projections for Pulp Price

Pulp prices increased an average of 5 percent per year in real terms between 1977 and 1997. This increase was so dramatic because prior to ten or fifteen years ago, pulp fiber from aspen was not utilized in the paper industry to the extent that it is today. There is very little evidence that suggests that a 5 percent per year increase in price can be expected to continue. However, the Minnesota Department of Natural Resources (DNR) predicts an "age class imbalance" that will likely lead to a reduction in aspen available for harvest in the state between 2008 and 2020. Furthermore, the demand for non-timber uses for forests is increasing. Consequently, timber industries in Minnesota and other Lake States are actively seeking alternative sources for fiber.

As with all commodities, any estimate of future pulp prices is purely speculation. Nobody knows what will happen in the future. Some people believe that if pulp prices for locally grown pulp get much higher, paper companies will begin buying pulp imported from other countries (e.g., eucalyptus from Brazil, aspen/birch from Canada, etc.). Others believe that if the price of pulp gets too expensive, fiber from other sources (hemp, straw, recycled fibers, etc.) will be substituted for fiber grown from trees. The fact of the matter is, no one knows what trees planted today will be worth when they are harvested.

It is also possible that the grower could increase the revenues generated by hybrid poplar by harvesting and delivering the wood to the gate. Some poplar growers believe that wood can be delivered to the gate for $20 per cord. (Producer cooperatives could also allow growers to share production and harvest costs and strengthen their leverage in the market, which could also make it easier and more economical for producers to deliver the wood and get a higher price.) Since the gate price is generally double the stumpage price, the delivered price can be calculated by subtracting $20 from the gate price. This means that at the current stumpage price of $30 and gate price of $60, a grower could increase his revenue by $10 per cord (25 percent) by delivering the product to the gate. Table 1 lists a variety of scenarios that could affect pulp price, and the

TABLE 1: Scenarios of Returns from Different Pulp Prices

Potential Scenarios Affecting Pulp Price	Projected Stumpage Price	Projected Gate Price	Per Acre/ PerYear Returns
Existing stumpage price	30	—	7
Existing stumpage price plus 25% bonus for farm grown	37	—	25
Existing price w/o CRP/outside payment and delivered to gate	40	80	31
Price increase of 2% per year	37	—	24
Stumpage price increase of 4% per year	44	—	41
Stumpage price increase of 4% per year, plus 25% bonus for farm grown trees	55	—	67
Price increases of 4% and delivered to gate	44	88	98

projected stumpage and gate prices that could be expected from these scenarios. Table 1 also lists the per acre per year returns that would result from the respective prices.

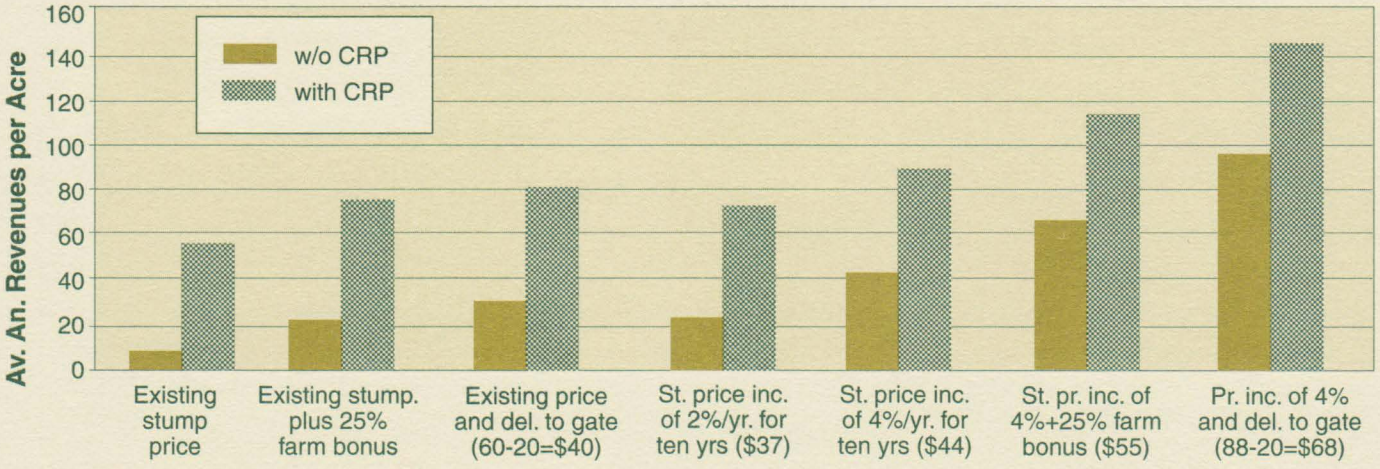
Figure 4 outlines some circumstances under which increasing pulp price may affect the financial viability of hybrid poplar. These calculations are generated from a farming scenario that involves harvesting the trees in 10 years. The trees are planted on land that currently rents for $30 per acre and produces 80 bushels of corn (i.e., marginal agricultural land in Minnesota, Wisconsin, and Michigan). Figure 4 also illustrates the affect that the changes in price described above would have on the per acre returns of hybrid poplar—both with and without CRP payments.

Summary

So what do all these numbers mean? Well, they can mean a lot of different things. They show that according to the production costs and prices for corn and hybrid poplar that we believe represent a good average, corn is more profitable than hybrid poplar unless the landowner receives some sort of cost share/CRP payments for the land planted in trees. Even if pulp prices rise 2 percent per year for the next 10 years, revenues from hybrid poplar will not exceed corn unless some form of cost-sharing is involved.

However, if an agroforestry practice with hybrid poplar is eligible for cost-share payments, and the price of poplar increases by 2 percent per year, a 20 acre piece of land could make $12,400 over ten years, compared to $2,400 with corn. Our model shows that if you believe that pulp prices will increase by 4 percent over corn prices in real terms, you are eligible for CRP payments, and you believe that you can deliver your wood to the gate for $20 per cord, you should plant poplar now because your profits would be 1,138 percent more than from the corn you are currently growing.

FIGURE 4: The Effects of Price and Outside Cost-Share Payments



For more information on . . .

- agriculture in Minnesota, contact the University of Minnesota Extension Service, **www.extension.umn.edu**
- the economics of producing poplar, contact the Center for Integrated Natural Resources and Agricultural Management (CINRAM) at the University of Minnesota, (612) 624-7418 or 624-4299, fax (612) 625-5212.
- growing poplar, contact the Agriculture Utilization Research Institute (AURI), **www.auri.org**
- joining a cooperative to produce poplar, contact the Minnesota Agro-Forestry Cooperative/WesMin RC&D, (320) 763-4733

Author

Erik Streed, Research Fellow, CINRAM, University of Minnesota, (612) 624-4299

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