Ag Decision Maker

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Evaluating a Land Purchase Decision: Financial Analysis

Buying farmland is the largest investment many farmers will make in their careers. For this reason a careful analysis of the decision is critical to long-term financial security.

There are two approaches to evaluating a land purchase decision:

1. **Economic analysis:** how much is the land worth based on its earning potential?
2. **Financial analysis:** will the land generate a positive cash flow after paying all operating and ownership expenses as well as debt payments?

This information file will discuss the financial analysis of a farmland purchase. For a discussion of the economic value of farmland see *AgDM File C2-76*, Evaluating a Land Purchase Decision: Economic Analysis.

Sources of Capital

Farmland is a unique asset that, if managed correctly, has an infinite productive life. However, purchasing farmland represents a large, one-time expenditure. The challenge that a would-be purchaser faces is how to access enough capital before the expected revenues are received. Two general types of capital can be utilized:

Equity: the purchaser's own funds that have been saved or inherited.

Debt: funds that the purchaser borrows from other entities or individuals.

Some purchases of farmland are made with 100 percent equity capital. The buyer may have to pull together funds from several different accounts or investments, or even sell some other assets. After the purchase is made, however, no further payments are needed.

The majority of farmland purchases involve a combination of equity and debt capital. Generally, a lender advances the debt capital and requires that a certain portion of the total purchase price come from the buyer's own resources, called a **down payment**. Some lenders require a fixed percent of the purchase price as a down payment, while others specify a minimum dollar value that they will loan.

The following lenders are the major sources of debt capital for farm real estate purchases:

- **Farm Credit System:** organized as regional cooperatives, it obtains funds from international money markets. It supplies approximately half the funds for purchasing farmland in the United States.
- **Commercial banks:** utilize deposits, owner capital and federal money markets to obtain funds. They have about a third of the national market for farmland loans.
- **Farm Service Agency:** uses federal appropriations to make direct farm ownership loans to low resource and beginning farmers. It also guarantees loans made by commercial lenders.
- **Insurance companies:** may work through financial intermediaries or be a secondary mortgage lender.
- **Farmer Mac:** acts as a secondary lender to commercial banks or the Farm Credit System for large loans.
- **Installment contracts:** the seller of the land agrees to accept a series of payments from the buyer over time rather than receive the full selling price at the time of sale.

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Determining the Loan Payment

Three factors determine the size of the payments a borrower must make to repay a land loan. The most important is the amount borrowed, or the **principal**. Second is the **term**, or the length of time over which the loan must be repaid. The third is the **interest rate**, or the cost of borrowing capital. Together they make up the **amortization** of the loan.

Most long-term farm loans are amortized as a series of equal payments. At the beginning, each payment is mostly interest plus a small amount of principal. The amount of interest due is always equal to *the outstanding principal x the annual interest rate x the fraction of a year since the loan was received or the most recent payment was made*.

Table 1 at the end of this file contains a series of amortization factors. For a given number of repayment periods and the interest rate per repayment period, the corresponding amortization factor from the table is multiplied by the number of dollars originally borrowed to find the total payment due each period.

Examples

1. $100,000 will be repaid in 10 annual installments at a 5% interest rate. The amortization factor is 0.12950, and the annual payment is $100,000 x .12950 = $12,950.

2. $200,000 will be repaid in semi-annual installments over 10 years (20 payments). The interest rate is 8% annually, or 4% per period. The amortization factor for 4%, 20 periods is .07358, and the semi-annual payment is $200,000 x .07358 = $14,716.

Some loans are amortized with a **balloon payment**, that is, a large portion of the principal is due at the end of the term. The purpose is to reduce the size of the payments before the balloon payment comes due. At the end of the term the borrower may have saved enough money to make the balloon payment, the remaining principal owed may be re-amortized over another term by the same lender, or the borrower may obtain funds from another lender to make the balloon payment. This last choice is a common practice when the balloon payment is part of a seller-financed installment contract.

Example: $100,000 will be repaid in 10 annual installments at a 5% interest rate, but the loan will be amortized as if it were to be repaid over 20 years. The amortization factor is 0.08024, and the annual payment is $100,000 x .08024 = $8,024, considerably smaller than when the same amount was completely amortized over 10 years. After making the tenth payment the borrower will still owe $61,961 of principal, however.

Analyzing Repayment Capacity

There are two approaches to estimating the **net revenue** from a tract of farmland that will be available for servicing debt:

- returns to an owner-operator
- returns to a non-operating landowner

Owner-operator. Net revenue to an owner-operator of farmland is the sum of the expected gross revenue from all the products that can be produced on it, minus the cash variable costs of producing them, minus the cash costs that occur from owning the land.

Gross revenue is the number of acres of each crop that will be grown on the land in a reasonable long-term crop rotation, multiplied by the expected yield of each crop, multiplied by its expected selling price. Expected yields and prices should be based on averages obtained on similar land in recent years or long-term projections, not on current values.

There may be other sources of income tied to the land beside sales of crops. These include sales of secondary products such as straw or corn stover, payments for being enrolled in Conservation Reserve (CRP) or Wetland Reserve (WRP) Programs, payments from other government programs, rental of buildings or dwellings, royalties received for mineral production, and payments for easements for wind turbines, pipe lines or other uses. Possible

crop insurance indemnity payments should not be included in expected income, because they would be received only in years in which yields and/or prices are below expectations.

Production costs include standard inputs such as seed, fertilizer and pesticides, machinery and labor costs, crop insurance premiums, miscellaneous costs such as soil testing and crop scouting, and marketing expenses. Short-term interest costs on funds tied up in crop expenses should also be included if operating funds are borrowed, but not if equity capital is utilized to pay them. Average farm custom rates can be substituted for machinery and labor costs if those costs are not well known on a per acre basis, or if the land will be farmed under a custom farming agreement. Note that the opportunity costs of the operator's own labor and capital should not be included, because these do not represent cash costs. However, if a certain amount must be withdrawn to meet nonfarm expenses such as family living and income taxes, this value should be included.

Certain costs that come about just by owning the land should also be included. These include real estate taxes, insurance, and upkeep of terraces, tile lines, fences, and buildings. Depreciation costs should not be included, however, as they are not cash expenditures.

The expected net income from the land available for debt servicing is the sum of the expected gross revenue per acre minus variable costs for each crop, multiplied by the expected acres of that crop, plus any other sources of income, minus cash land ownership costs and any other cash outlays. Keep in mind that not all acres in a tract of land will be suitable for producing crops, that is, estimates of revenue and expenditures should be based on **tillable acres and pasture**, only, even though a buyer will have to pay for all the acres.

expected gross revenue from crops per acre
- variable costs per acre
x expected crop acres
+ other sources of income
- land ownership costs
= expected net income to land

Non-operating Owner. Sometimes farmland will be purchased as investment and rented to a tenant operator. The simplest way to estimate revenue from renting land is to look at current cash rental rates for farms of similar quality in the same geographic area. Keep in mind that if current price levels are above or below long-term averages, current rental rates may have to be adjusted upward or downward to reflect long-run prospects. Survey information about cash rental rates is available from several sources, including *AgDM File C2-10,* Cash Rental Rates for Iowa Survey. The estimated rental rates per bushel or per CSR2 index value can be used to adjust county average rents to a reasonable value for a specific tract. Keep in mind that rent is typically received only for the tillable acres or acres in pasture.

Subtract the same ownership costs as discussed before from the estimated gross rent. If a professional farm manager will be employed to manage the property, the fee that will be charged for this service should be deducted, as well.

Some landowners prefer to rent their land under a crop-share lease, or hire a custom operator to perform machinery and labor operations. In those cases the net revenue accruing to the landowner can be estimated by including only the share of income received by the owner and only the share of production costs paid by the owner. Any of these arrangements can be analyzed using *AgDM Decision Tool C2-70*, Farmland Purchase Analysis.

Examples

Table 2 shows an example of how a prospective buyer who intends to farm a tract of land would estimate its net cash flow. The tract has 160 acres, of which 150 are tillable, and the expected rotation is half corn, half soybeans. The buyer uses typical average yields for the area and conservative long-term selling prices of $4.00 per bushel for corn and $9.00 per bushel for soybeans. No other sources of revenue are anticipated. Expected gross revenue is $92,475 annually. Variable cash costs of production are estimated at $48,000, and the cost of real estate taxes and upkeep is estimated at $6,500 annually,

leaving net revenue to the owner-operator of $37,975. If the land can be purchased for $7,500 per acre, or a total of $1,200,000 for 160 acres, and the lender will finance 60% of the purchase, the amount borrowed will be $720,000. If the loan is to be repaid over 25 years at a 6% annual interest rate, the annual payment will be $56,326. The potential purchaser would have a negative net cash flow from the land of $18,351. The deficit would have to be made up with cash generated from the existing farming operation or off-farm income.

However, if the borrower could qualify for a beginning farmer loan with a 4% interest rate and a 40-year amortization, for example, the annual payment would be only $36,374, and the projected net cash flow would be a positive $1,601 annually, making the purchase financially feasible.

Table 3 shows an analysis of the same tract of land, assuming it will be purchased and rented out for $280 per tillable acre. Gross rent to be received by the owner will be $42,000 per year. The owner will still have ownership costs of $5,000 for real estate taxes and $1,500 for upkeep of improvements. In addition, a management fee equal to 8% of the cash rent is included ($3,360), leaving $32,140 available for servicing the debt. After subtracting the annual loan payment of $56,326, the net cash flow to the owner is estimated to be negative $24,186.

Assume the purchaser has $480,000 available for a down payment, or $3,000 per acre. If the purchase price could be negotiated down to $6,000 per acre, only half of it would have to be borrowed, or $480,000. The annual loan payment will drop to $37,549. In addition, if the cash rent can be raised to $300 per acre and the owner can manage the land without help, the net cash flow available will be $45,000 - $6,500 = $38,500, enough to make the payment without supplementing it from other sources of income.

Summary

The financial feasibility of purchasing farmland depends not only on the price paid for the land, but on how much of the purchase price must be borrowed, and at what term and interest rate. In addition, the purchaser's need to withdraw revenue for nonfarm expenditures, or ability to subsidize the purchase from other sources of revenue, will have a large impact on whether the net cash flow from the purchase is positive or negative. Most of these factors depend on the financial situation of the specific borrower rather than the characteristics of the land itself, and do not affect the economic value of the land. Finding the right combination of purchase price, financing and tenure arrangement makes investing in farmland an interesting challenge.

For a discussion of the economic considerations for purchasing farmland, see *AgDM File C2-76,* Evaluating a Land Purchase Decision: Economic Analysis. For an electronic spreadsheet tool for analyzing land purchases see *AgDM Decision Tool C2-70,* Farmland Purchase Analysis.

Table 1. Amortization factors for loan repayment

Number of Periods	Interest Rate per Period										
	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%
1	1.02000	1.03000	1.04000	1.05000	1.06000	1.07000	1.08000	1.09000	1.10000	1.11000	1.12000
2	0.51505	0.52261	0.53020	0.53780	0.54544	0.55309	0.56077	0.56847	0.57619	0.58393	0.59170
3	0.34675	0.35353	0.36035	0.36721	0.37411	0.38105	0.38803	0.39505	0.40211	0.40921	0.41635
4	0.26262	0.26903	0.27549	0.28201	0.28859	0.29523	0.30192	0.30867	0.31547	0.32233	0.32923
5	0.21216	0.21835	0.22463	0.23097	0.23740	0.24389	0.25046	0.25709	0.26380	0.27057	0.27741
6	0.17853	0.18460	0.19076	0.19702	0.20336	0.20980	0.21632	0.22292	0.22961	0.23638	0.24323
7	0.15451	0.16051	0.16661	0.17282	0.17914	0.18555	0.19207	0.19869	0.20541	0.21222	0.21912
8	0.13651	0.14246	0.14853	0.15472	0.16104	0.16747	0.17401	0.18067	0.18744	0.19432	0.20130
9	0.12252	0.12843	0.13449	0.14069	0.14702	0.15349	0.16008	0.16680	0.17364	0.18060	0.18768
10	0.11133	0.11723	0.12329	0.12950	0.13587	0.14238	0.14903	0.15582	0.16275	0.16980	0.17698
11	0.10218	0.10808	0.11415	0.12039	0.12679	0.13336	0.14008	0.14695	0.15396	0.16112	0.16842
12	0.09456	0.10046	0.10655	0.11283	0.11928	0.12590	0.13270	0.13965	0.14676	0.15403	0.16144
13	0.08812	0.09403	0.10014	0.10646	0.11296	0.11965	0.12652	0.13357	0.14078	0.14815	0.15568
14	0.08260	0.08853	0.09467	0.10102	0.10758	0.11434	0.12130	0.12843	0.13575	0.14323	0.15087
15	0.07783	0.08377	0.08994	0.09634	0.10296	0.10979	0.11683	0.12406	0.13147	0.13907	0.14682
16	0.07365	0.07961	0.08582	0.09227	0.09895	0.10586	0.11298	0.12030	0.12782	0.13552	0.14339
17	0.06997	0.07595	0.08220	0.08870	0.09544	0.10243	0.10963	0.11705	0.12466	0.13247	0.14046
18	0.06670	0.07271	0.07899	0.08555	0.09236	0.09941	0.10670	0.11421	0.12193	0.12984	0.13794
19	0.06378	0.06981	0.07614	0.08275	0.08962	0.09675	0.10413	0.11173	0.11955	0.12756	0.13576
20	0.06116	0.06722	0.07358	0.08024	0.08718	0.09439	0.10185	0.10955	0.11746	0.12558	0.13388
25	0.05122	0.05743	0.06401	0.07095	0.07823	0.08581	0.09368	0.10181	0.11017	0.11874	0.12750
30	0.04465	0.05102	0.05783	0.06505	0.07265	0.08059	0.08883	0.09734	0.10608	0.11502	0.12414
35	0.04000	0.04654	0.05358	0.06107	0.06897	0.07723	0.08580	0.09464	0.10369	0.11293	0.12232
40	0.03656	0.04326	0.05052	0.05828	0.06646	0.07501	0.08386	0.09296	0.10226	0.11172	0.12130

Table 2. Owner-operator example: tract of 160 acres, 150 acres tillable, corn/soybean rotation. Purchase price of $1,200,000, with 60% borrowed at 6% annual interest rate, amortized over 25 years.

	Corn	Soybeans	Total
Number of planted acres	75	75	
Expected yield, bushels per acre	180	57	
Expected sale price, $ per bushel	$4.00	$9.00	
Gross revenue from crop sales per acre	$720	$513	
Total expected gross revenue from crops	$54,000	$38,475	$92,475
Other cash income expected			0
Total gross revenue			$92,475
Cost of seed, fertilizer, pesticides per acre	280	150	
Cost of machinery fuel and repairs per acre	65	30	
Cost of drying, hauling and handling per acre	50	6	
Crop insurance premium	15	10	
Miscellaneous costs per acre	10	6	
Interest on variable costs (5% for 9 months)	12	6	
Total variable costs per acre	$432	$208	
Total variable costs on all acres	$32,400	$15,600	$48,000
Real estate taxes and insurance			$5,000
Upkeep of improvements			1,500
Total ownership expenditures			$6,500
Expected net cash revenue from land ($92,475 – $48,000 – $6,500)			$37,975
Annual loan payment ($1,200,000 x 60% x .07823)			$56,326
Net cash flow			-$18,351

Table 3. Cash rent example: tract of 160 acres, 150 acres tillable under a cash rent lease

Expected cash rent: $280 per tillable acre x 150 acres	$42,000
Other cash income expected	0
Total gross revenue	$42,000
Ownership costs	
Real estate taxes and insurance	$5,000
Upkeep of improvements	$1,500
Management fee (8% of cash rent)	$3,360
Total ownership costs	$9,860
Expected net income from land ($42,000 - $9,860)	$32,140
Annual loan payment ($1,200,000 x 60% x .07823)	$56,326
Net cash flow	-$24,186

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