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The Nitty-Gritty of Calculating Your Production Costs

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Agricultural and Consumer Economics

Topics

1. Concepts for calculating costs
   - Benefits of knowing your cost of production
   - Averages from FBFM
   - Basis for calculating costs
   - Procedures for allocating costs
2. Demonstration of enterprise allocation spreadsheet
3. Summary of FBFM farms allocating costs

Benefits

1. Useful in budgeting/planning
2. Close control loop
3. Less reliance on farm averages
4. Better information
5. Identify strengths and weaknesses
6. Marketing targets
7. Site specific farming

1. Useful in budgeting/planning

- **Complete cash flow and budgets**

1-2 Crop Costs — ***Total cost per acre for each land class***

Return | Help

Corn	Fertilizer	Herbicide	Insecticide	Seed	Dry & Store	Crop Insurance	Machine Hire	Cash Rent	Other
1. xxxxxxxxxxx	61.0	33.0	0.0	34.0	14.0	12.0	0.0	0.0	0.0

2. Close control loop

- **Many farmers do projected cash flows and budgets**

- **Need to compare projections to actual results to control business**

3. Less reliance on averages

Costs on farms vary

Per Acre Costs for Central Illinois Farms with High Quality Farmland, 2004.

	Low 1/3	Average	High 1/3
Total costs	$432	$390	$372

4. Better information

- Land purchases
- Land rental decisions
- Expand/quit livestock enterprises
- Crop rotations
- Machinery purchases

5. Identify strengths and weaknesses

- **Comparisons to budgets**
- **Comparisons to benchmarks**

Benefits

6. Marketing targets
   -- direct costs
   -- total costs
   -- profit level
7. Site specific farming
   -- need cost data to use this data

Per Acre Budgeted Values From FBFM

Actual and Projected Costs, FBFM, Central Illinois Farms

Total Non-land costs

Year	2000	2001	2002	2003	2004	2005P
Corn	$252	$260	$253	$251	$267	$278
Soybean	$183	$180	$175	$167	$176	$181

Expense Adjustments

- Note dramatic increase in costs since 2002
- Much of the increase in “energy” related costs
- Seed costs also have increased

Anhydrous Ammonia Prices, April

Year	Per ton	Per Acre
1999	$211	$19
2000	$231	$21
2001	$408	$37
2002	$232	$21
2003	$368	$34
2004	$387	$35
2005	$429	$39

Source: U.S.D.A.

Per acre based on 150 lbs actual N applied

Adjustments

- **Soybeans for corn (?)**
- **N rates**
- **“Higher” priced inputs**
- **Leasing terms**

Corn Returns - Soybean Returns

Year	North	Central	South
2000	$35	$35	$25
2001	11	20	10
2002	27	-10	-22
2003	84	68	-9
2004	40	45	50
2005F	-79	-35	-27
2006P	-11	-4	-22

Difficulties in Calculating Production Costs

- More than one enterprise
- Difficulty in allocating costs to more than one enterprise
- Difficulties in allocating overhead costs
- Requires detailed accounting records
- Uncertainties

Basis for Calculating Costs

Basis

Important for comparability

Across years -- should be consistent

Across farms -- should be consistent if you want correct comparisons

Need to know when looking at costs in press

Common Basis for Cost Calculation

1. **Cash flow**
   - Analyzes sources of cash flow
   - Useful for looking at cash flow position
   - Should not be used to analyze profitability
   - Includes IT and LT principal payments, unfinanced capital purchases, and family living withdrawals

Common Basis for Cost Calculation

2. Financial

- Returns and costs based on accrual accounting method
- No charges for unpaid labor or equity capital
- Includes depreciation

Common Basis for Cost Calculation

3. Economic

- Useful for making comparisons across farms
- Useful for analyzing long-run investment decisions
- Includes opportunity costs for capital and operator labor

Procedures for Allocating Costs

Procedures

1. Starting point
2. Determine enterprises
3. Unit of comparisons
4. Period of analysis
5. Adjustments
6. Allocating costs

1. Starting point

- **Total costs in categories for a year**

Examples:

-- Computer records

-- Paper accounting system

-- Schedule F

CASH FARM OPERATING EXPENSE TOTALS

	Interest Page LN-3	Labor Page L	Pesticides	Fertilizer	Seed	Machine Hire	Drying	Storage	Machinery Repairs	Farm Fuel and Oil
490	121	122	123	124	125	136	146	147	135	137
Crop Sales Deductions - Pg. C-1						+	+	+		
Cash Reimbursements - Pg. R-1			-	-	-		-		-	
Re: ACCOUNT TOTAL										

2. Determine enterprises

Tradeoff:

Detail	**versus**	**Accuracy**
Usefulness (?)		**Effort**

Examples:

Corn
Soybeans
Custom work

Corn -- farm 1
Corn -- farm 2

3. Unit of comparison

Examples:

Crops:

Total, Per tillable acre, Per operator acre, per bu.

Livestock:

Total, Per pig sold, Per cwt. sold

Custom work/farming:

Total

3. Unit of comparison

Operator acre.

Weights acres by share of revenue.

Why? Places costs on standard basis across rental arrangements.

Operator acre

1 owned or cash rent acre = 1 operator acre

1 share rent acre (50%) = .5 operator acre

Owned or Cash rent	Share Rent	Operator Acre
1,000		1,000
	1,000	500

4. Period of analysis

For crops, usually one year

5. Adjustments

- **Cash settlements -- share-rent landlord costs (e.g., farmer pays $1,000 for seed but share-rent landlord pays his share of $500, need to reduce seed expense by $500)**

5. Adjustments

- **Accounts payable -- Costs already incurred but not paid for**

- **Prepaid expense -- Items paid for but related to next year's production (e.g., Apply and pay for 2006 fertilizer in 2005)**

5. Adjustments

Item	Cash Operating Expense	B.O.Y. Ac Pay.	E.O.Y. Ac Pay.	B.O.Y. Prepaid	E.O.Y. Prepaid	Cash Settle-ments	Expense
Interest	15045	1850	3550				16745
Labor	12927		1000				13927
Pesticides	22431			6500	9250		19681
N fertilizer	9062			4500	6500		7062
Other fertilizer	12700			10500	7500		15700
Seed	20712			7500	11750		16462
Machine hire	7855						7855
Drying	4637	1500					3137
Storage	3686						3686
Machine repair	14548						14548
Fuel	8790			1000	1000		8790

6. Allocate costs

Methods:

1. **Direct -- know the cost for each category (e.g. fertilizer expense to corn)**

2. **Indirect -- can not directly allocate costs. Need to use some allocation method (e.g., machinery and overhead expenses)**

Suggested indirect allocation methods for crops

1. Per tillable acre -- machinery expenses
2. Per operator acre -- perhaps for overhead expenses
3. Budget -- based on estimated percentages from Illinois crop budgets
4. Percent of total revenue
5. Percent of direct expenses

Demonstration of Enterprise Allocation and Analysis Spreadsheet

Cost Allocation Spreadsheet

Available at *farmdoc*

www.farmdoc.uiuc.edu

(in FAST tools section)

FBFM Farms Allocating Costs

- Data from 1997 through 2003
- Full report "Corn Returns Versus Soybean Returns: Do Farms Differ" Illinois Farm Economics: Facts and Opinions (January 2005) (www.farmdoc.uiuc.edu/manage/newsletters/fefo05_01/fefo05_01.html)

Questions Examined

- **Do farms have differences in corn and soybean returns?**
- **What causes differences?**
- **Evaluated by examining "corn returns minus soybean returns"**

Corn Minus Soybean Returns by Year

Year	Difference
1997	-$54
1998	-$22
1999	-$12
2000	-$4
2001	-$13
2002	$4
2003	$40

Distribution of Corn Minus Soybean Returns

	2000	2003
< -$100	3%	3%
-$100 to -$50	11	9
-$50 to $0	32	15
$0 to $50	42	23
$50 to $100	10	33
> $100	2	17

Factors Causing Differences

- **Divide into three group: high soybean profits, mid, high corn profits**

- **Examine factors across groups**

Differences Between Groups

	High Soybeans	Mid	High Corn
SPR	81	83	84
Tillable acres	940	990	934
Corn yield	146	157	162
Soybean yield	49	48	46
Corn crop costs	$151	$142	$130
Bean crop costs	$66	$71	$81

Summary

- **Between 1997 and 2003, corn returns increased relative to soybean returns**
- **Higher productivity farmland favors corn production**
- **Some farmers may be better corn producers than soybean producers and vice versa. One year of results is insufficient to know.**

Summary

- **Spreadsheet allows for easy comparisons**
- **Differences exist across farms**