

# **Simulations, Games and Experiential Learning Techniques:, Volume 1, 1974**

## **AN ORIENTATION TO THE OKLAHOMA FARM MANAGEMENT GAME**

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The general objectives of farm management instruction are to teach the student (1) to integrate concepts and information from the biological, physical and social sciences in making decisions and (2) to apply modern decision-making procedures to the problems of a farm business. Evolvement of large-scale, business-oriented farm firms has required emphasis on all managerial functions, but particularly planning, implementation and control. Introduction of gaming has increased opportunities for providing students experience in implementation and control, as well as planning.

The farm management profession emphasizes the application of the marginal theory of the firm to decision making on farms [2]. Thus, much educational emphasis has been on means of analysis to determine “whether additional revenue is greater than additional costs” for alternative decision choices. Although the term “expected” revenue and costs is used, it is difficult to fully convey the uncertain nature of the environment in which farm management decisions are made. Gaming provides an opportunity to practice decision making in an uncertain setting more like that the eventual farmer-decision maker must face.

The risks and uncertainties featured in the Oklahoma Farm Management Game [3] differ from those prominent in non-farm business games. The basic kinds of uncertainty in either decision setting could include (1) economic (e.g. prices), (2) technical (e.g. variation in production coefficients), (3) technological, (4) social (e.g. laws and regulations) and (5) human vagaries. Most business games stress competitive economic situations affecting price, along with some other aspects of change.

The farm firm represents an atomistic economic situation. Prices received and paid exhibit seasonal, cyclical, secular and random variation due to a multitude of local and external conditions. Technical variation can be reflected in crop yields, which change from year to year with climatic and other natural conditions. For example, in the geographic area for the Oklahoma Game, dryland wheat yields vary from 0 to 40 bushels and average 15 bushels per acre. Obsolescence of machinery is an example of a technological risk farmers face.

Since the 1930’s agriculture has had a wide range of farm programs affecting land use, prices and product sales. A change in program regulations sometimes transforms a cash grain farm into a livestock farm from one year to the next. Or, the value of land assets can be drastically affected by a stroke of the legislative pen. Thus, the “social” sector is a major source of uncertainty and managerial stress in farming.

Finally, the typical farm firm has heavy reliance on family labor and is quickly affected by variation in family member status. Changes

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in health, attitudes, goals, and family member relationships are not controllable or predictable. The same is true of actions of other individuals with whom the firm does business. It is clear that the Agriculture firm offers rich opportunities to those interested in gaming as a teaching technique.

### THE GAME SETTING

The Oklahoma Farm Management Game assumes that the students are owner operators of a 1920 acre farm in the Oklahoma Panhandle. The farm is “inherited” with a \$132,000 note and a .6 net worth ratio. Family labor is used but labor is also hired. Capital for operating and financing intermediate capital purchases (e.g. to replace machinery) can be borrowed at 10 percent per annum and long term capital costs 7 percent. Credit practices in the area are depicted to require a net worth ratio of not less than .35 and a land equity ratio of .4. The farm is bankrupt if short term losses cause those minimums to be reached. Family living expenses must average \$8,000 per year and cannot receive an allowance of less than \$6,000.

Yields of the 7 crop alternatives are variable from year to year.<sup>1</sup> Prices of crops are fixed, unless changed periodically by the game administrator. In contrast, technical relationships for livestock are not stochastic but prices vary with predetermined trends, cycles and seasonal variation and with constrained random shocks. No technological change is explicitly recognized in the game. Government programs are not changed between years and human uncertainty is not incorporated at this time.

The financial situation on the farm is dynamic. Items in the machinery complement depreciate and are replaced automatically. Annual capital requirements vary with farming plans chosen. Frequently, the farmer experiences short term losses which must be financed by borrowing. Payments must be made on land and machinery according to normal credit arrangements. Part of the managerial responsibility is to handle financial affairs of the farm.

### GAME PLAY

Two-person student teams take over operation of the “inherited” farm early in the semester, usually during the second hour of class time. The major role of the game in a senior level farm management course is to provide managerial experiences in applying concepts and using data developed in the course. The gaming experience serves as a reference point and provides illustrations for applying analytical techniques. For example, students use enterprise budgets, cash flow analysis and partial budgeting or linear programming in making decisions in the game farm. They implement

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<sup>1</sup> Internally the crop yields are randomly chosen from 30 sets of yields by means of a random number subroutine.

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the decisions in a subsequent year of the farm's operation. Analysis of the results and adjustments of later plans constitute the control phase of management.

Student teams must evaluate the profitability of crop and livestock enterprises and develop a farm plan each year. The objective is to maximize income to owned resources, while assuring survival of the farm business in the face of uncertainty. The decision sheet (Table 1) submitted for each play of the game contains two kinds of decisions. First, the preceding year is closed out by making land and machinery payments and planning for family living for the next year. If land purchase is allowed as an alternative, the number of units of land purchased and the price are entered on the decision sheet. The land purchase alternative involves competition between teams in bidding for available land. Then, the crop and livestock plan for the succeeding year is recorded. In a normal sequence, students make decisions on Monday and receive results on Wednesday.

Results of each year of game play are provided as illustrated by Tables 2, 3 and 4. Table 2 shows enterprise decisions, (the acreage of each crop and number of head of each type of livestock), prices, yields, sales and costs. The amount of annual capital, hay and hired labor required by the plan are also listed in Table 2. The annual summary of cash income and cash expenses is presented in the farm financial summary (Table 3). Receipts are distributed to expense items, interest and income tax and the cash balance available to pay land and machinery loans and start a new year is calculated. Table 4 contains balance sheet information and a record of decisions and transactions across years. It can be used for analysis of the firm's performance and progress.

### **GAME CRITIQUE**

Classroom experiences at Oklahoma State University over a six-year period suggest that the use of gaming as a central focus for the course has the following benefits:

- (1) Gaming motivates the students to learn techniques such as partial budgeting and linear programming because they have an immediate need for them. It also encourages students to use these concepts throughout the semester rather than only on the exercise(s) assigned.
- (2) The game farm is an invaluable source of class examples to clinch teaching objectives. The student need not wonder for ever what expected values and variances have to do with enterprise budgets and choosing crop and livestock enterprises.
- (3) Diversification, flexibility, liquidity, insurance, reserves, and "sure" enterprises do not remain abstract words to the students. They can identify use of these strategies and their effects on operation of the game farm.
- (4) Planning, implementation, and control can all receive meaningful emphasis. For example, the relationship between a planning tool, such as a partial budget, and a control tool, such as a profit and loss statement, becomes clear as the

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Table 1

## Agriculture Economics 4403 Farm Management Game Decision

Description of Ending Balance from Previous Year	Team Number Year of Play
Ending Cash Balance (+ or -)	(1)
Payment on:	
Cow Loan	(2)
Machinery Loan	(3)
Land Loan	(4)
Total Payments (2+3+4)	(5)
Beginning Cash Balance for this (Calculated as (1)-(5))	

### Decisions for this Year's Operation

Living Allowance

Land Purchased (No=0, Yes=1)

    Number of parcels purchased

    Purchase Price per acre

Team Number

0

Crop Decisions (Acres) and Livestock Decisions (Head):

    Fallow

    Wheat

    Barley

    Grain Sorghum

    Small Grain Graze-out

    Sudan-Sorghum Graze

    Alfalfa Hay

Team Number

    Sudan Hay

    Sudan Grazing (set-aside)

Buy Cows, Sell all Calves, June

Buy Cows, Sell all Steers, September

Buy Stockers, November – March

Buy Stockers, November – May

Buy Stockers, November – May, Feedlot

Buy Stockers, April – September

Team Number

Sell Cows, Sell all Calves, June

Sell Cows, Sell Steers, September

Sudan Hay, tons to be stored from next summer's crop

Alfalfa Hay, tons to be stored from next summer's crop

Explanation of Decisions (Briefly discuss why you made these decisions)

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TABLE 2  
FINANCIAL SUMMARY OF ENTERPRISE OPERATIONS FOR YEAR 6 TEAM 22

		NO OF			GROSS	CASH COSTS	ANNUAL
WHEAT	GRAIN	830.00	10.64	2.05	18103.95	5511.20	2755.60
	GRAZING	830.00	0.20	12.50	2075.00	0.0	0.0
BARLEY	GRAIN	0.0	14.15	1.13	0.0	0.0	0.0
	GRAZING	0.0	0.20	12.50	0.0	0.0	0.0
GRAIN SORGHUM	GRAIN	0.0	4.98	2.34	0.0	0.0	0.0
	GRAZING	0.0	0.12	4.00	0.0	0.0	0.0
GRAZE OUT	NOV-FEB	295.00	0.40	12.50	1475.00	1849.65	1268.50
	MAR-MAY	295.00	0.80	12.50	2950.00	0.0	0.0
SUDAN-SORGHUM	GRAZING	0.0	0.53	4.00	0.0	0.0	0.0
ALFALFA HAY	JUNE	500.00	0.64	45.00	14363.98	7697.09	8600.00
	JULY	500.00	0.35	45.00	7980.00	3606.72	0.0
	AUG	500.00	0.24	45.00	5335.71	2908.63	0.0
SUDAN	HAY	0.0	0.24	30.00	0.0	0.0	0.0
	GRAZING	0.0	0.09	4.00	0.0	0.0	0.0
FALLOWED	ACRES	0.0	0.0	12.50	0.0	0.0	0.0
SET ASIDE GRAZING		0.0	0.30	4.00	0.0	0.0	0.0
NATIVE PASTURE		265.00	0.43	4.00	451.14	0.0	0.0
COW-CALF A	COW	0.0	9.85	372.78	0.0	0.0	0.0
	HEIFFER CALF	0.0	4.60	46.51	0.0	0.0	0.0
	STEER CALF	0.0	4.85	51.22	0.0	0.0	0.0
COW-CALF B	COW	0.0	9.85	37.78	0.0	0.0	0.0
	HEIFFER CALF	0.0	4.60	46.51	0.0	0.0	0.0
	STOCKER STR	0.0	6.00	49.67	0.0	0.0	0.0
STOCKER	NOV-MAR	0.0	5.65	44.87	0.0	0.0	0.0
STOCKER	NOV-MAY	320.00	6.70	44.62	94717.81	77870.06	31867.83
STOCKER-FEEDER	NOV-MAY-OCT	0.0	10.50	43.36	0.0	0.0	0.0
STOCKER	APR-SEPT	0.0	6.00	48.44	0.0	0.0	0.0
FEEDER		0.0	0.0	0.0	0.0	0.0	0.0
HAY PURCHASES		198.71	0.0	0.0	0.0	10768.24	5384.12
PASTURE SURPLUS-DEFICIT:	O-M	-228.00	0.0	12.5	0.0	0.0	0.0
	A-M	-148.00	0.0	12.50	0.0	0.0	0.0
	NAT	-47.22	0.0	4.00	0.0	0.0	0.0
LABOR SURPLUS-DEFICIT:	J-M	90.20	0.0	3.00	0.0	0.0	0.0
	A-J	-251.70	0.0	3.00	0.0	755.10	377.55
	J-S	-215.00	0.0	3.00	0.0	645.00	322.50
	O-O	152.00	0.0	3.00	0.0	0.0	0.0
TOTALS					147452.56	111611.50	50576.09
STOCKER BUYING PRICES	NOV	47.54					
	APR	46.88					

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TABLE 3

FARM FINANCIAL SUMMARY	YEAR	TEAM 22
6, GROSS RECEIPTS		\$ 147452.56
OPERATING CASH COSTS		\$ 111611.50
ANNUAL CAPITAL COSTS		\$ -1540.62
LAND AND EQUIPMENT TAXES		\$ 1806.02
INTEREST PAYMENTS		\$ 8790.74
BUILDING AND FENCE EXPENSES		\$ 120.00
MISCELLANEOUS EXPENSES		\$ 600.00
CASH AVAILABLE BEFORE TAXES		\$ 26065.00
INCOME TAXES		\$ 4605.84
FAMILY LIVING ALLOWANCE		\$ 8000.00
MACHINERY DEPRECIATION		\$ 4538.10
BEGINNING CASH DEFICIT		\$ 0.0
BEGINNING AVAILABLE CASH		\$ 65982.25
ENDING POSITIVE BALANCE		\$ 79441.38
ENDING NEGATIVE BALANCE		\$ 0.0

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Table 4

### ANNUAL FARM TRANSACTIONS AND ORGANIZATIONS AND NET WORTH STATEMENT, TEAM 22

	0	1	2	3	4	5	6	7	8	9
GOVERNMENT PAYMENTS	0.0	0.0	8226.39	1375.92	1375.92	0.0	0.0			
HAY STORE: ALF TONS	0.0	0.0	121.67	529.67	750.40	0.0	0.0			
HAY STORE: SUDAN TONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
PASTURE OCT-MAR + -	0.0	385.00	-280.00	-112.00	-4.00	-84.00	-228.00			
PASTURE APR-MAY + -	0.0	222.00	-57.00	-128.00	-66.00	-101.00	-148.00			
FAMILY LIVING ALLOW	0.0	8000.00	9000.00	7000.00	8000.00	8000.00	8000.00			
CASH BALANCE DEFICIT \$	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
CASH BAL FOR DISTRBTN	2000.00	56330.08	37099.00	30098.69	40020.25	72582.25	79441.38			
ANN. OPER. CAPITAL \$	0.0	33100.34	37193.43	36781.58	36556.03	43911.54	50576.09			
LIVESTOCK LOANS	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
MACHINERY LOANS	0.0	0.0	3825.00	3825.00	7875.00	9600.00	13987.50			
LAND MORTGAGE LOANS	132000.00	132000.00	125400.00	118800.00	112200.00	105600.00	105600.00			
PAYMENTS: LIVE. LOAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
PAYMENTS: MACHINERY	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
PAYMENTS: LAND MORT.	0.0	0.0	6600.00	6600.00	6600.00	6600.00	6600.00			
INTEREST: SHORT-TERM	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
:OPER CAPITAL	0.0	0.3110.030	-1913.69	628.26	1305.73	1049.13	-1540.62			
:COW LOAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
:MACH. LOAN	0.0	0.0	382.50	382.50	787.50	960.00	1398.75			
:LAND MORT.	9240.00	9240.00	9240.00	8778.00	8316.00	7854.00	7392.00			
REAL ESTATE TAXES	1510.60	1510.47	1510.47	1510.47	1510.47	1510.47	1510.47			
WHEAT ACRES	625.00	750.00	750.00	750.00	750.00	750.00	830.00			
BARLEY ACRES	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
GRAIN SORGHUM ACRES	205.00	210.00	210.00	210.00	210.00	210.00	210.00			
GRAZE CUT ACRES	180.00	100.00	100.00	165.00	165.00	165.00	165.00			
SUD. SORG. GRAZE ACRES	150.00	0.0	65.00	0.0	0.0	0.0	0.0			
FALLOWED ACRES	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
ALFALFA HAY ACRES	220.00	500.00	500.00	500.00	500.00	500.00	500.00	500	500.	500.
SUDAN HAY ACRES	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
NATIVE PASTURE ACRES	265.00	265.00	265.00	265.00	265.00	265.00	265.00			
SET ASIDE ACRES	245.00	65.00	0.0	0.0	0.0	0.0	0.0			
TOTAL LAND VALUE \$	290475.00	290475.00	290475.00	290475.00	290475.00	290475.00	290475.00			
INVENTORY VALUE COWS	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
INVENTORY VALUE MACH	39057.00	36672.36	36510.27	32523.16	32306.21	29688.22	29555.12			
INVENTORY VALUE HAY	0.0	0.0	5475.00	23834.99	33967.94	0.0	0.0			
TOTAL ASSETS \$	331532.00	383477.69	362959.25	370331.75	389969.38	386145.44	0.0			
LIABILITIES \$	132000.00	132000.00	129224.94	122624.94	120074.94	115199.94	0.0			
NET WORTH \$	199532.00	251477.69	233734.31	247706.81	269894.44	270945.50	0.0			
NET WORTH RATIO	0.60	0.66	0.64	0.67	0.69	0.70	0.0			
LAND EQUITY RATIO	0.55	0.55	0.57	0.59	0.61	0.64	0.0			
DOMESTIC WHEAT ALLOT	810.00	810.00	810.00	810.00	810.00	810.00	810.00			
FEED GRAIN ALLOTMENT	150.00	150.000	150.00	150.00	150.000	150.00	150.00			
NO. COWS-CALF A	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
NO. COWS-CALF B	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
NO. COWS A SOLD	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
NO. COWS B SOLD	0.0	0.0	0.0	0.0	0.0	0.0	0.0			

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- student “operates” the farm through time. Additionally, the effects of financial constraints and variable receipts on ability of the farm to survive and grow are illustrated.
- (5) Students receive the equivalent of elementary farm management experience. Evidence of management experiences is reflected by student discussion in and out of the classroom, by performance on examinations designed to test the student’s reactions to new situations in the game operation. Because the game includes uncontrollable events, the student is not graded on game results.

Experience also indicates these benefits can easily be lost if:

- (1) The game emphasizes computations more than management. Repetitive computations should be computerized.
- (2) The game is not developed progressively. Additional enterprises, development of irrigation, land rental, and land purchase are successively introduced into the game after a few years of game farm operation to maintain interest and introduce new considerations.
- (3) The game is unrealistic. Students accept abstractions such as indefinite farm locations, but resist outdated farm programs, prices, and production practices.

### REFERENC ES

1. Boehije, Michael, Vernon R. Eidman and Odell L. Walker, “An Approach to Farm Management Education,” *Am. J. Agri. Econ.* 55:192-197, May 1973.
2. Case, H. C. M. and D. B. William, Fifty Years of Farm Management, Urbana: University of Illinois Press, 1957.
3. Eidman, Vernon, H. D. Jose, C. E. Roush and M. D. Boehije, “A Game for Management Instruction: The Oklahoma Panhandle Farm Version,” *Oklahoma Agri. Exp. Sta. Research Report P-685*, Oklahoma State University, May 1973.