March 8, 2016

 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Participant #: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**2016**North Carolina FFA

#### Farm Business Management – SENIOR DIVISION

Career Development Event

***Section II: Problem Solving (200 points)***

Read each problem carefully.  Check to see that you have 15 pages including the cover page.  You must transfer your answers to the provided answer sheet to get credit. You have 100 minutes to complete this section of the Career Development Event.

prepared by

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*in cooperation with*

Department of Agricultural and Extension Education

College of Agriculture and Life Sciences

North Carolina State University

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# Table 1. Statements of Net Worth

Resource Information for David Farm Business, as of 12/31/2013 and 12/31/2014

|  |  |  |
| --- | --- | --- |
|  | 12/31/13  | 12/31/14 |
| **Assets** |  |  |
| Current assets |  |  |
| Cash in farm account | 6,538 | 2,583 |
| Farm accounts receivable | 0 | 0 |
| Stored crops | 1,008 | 2,940 |
| Growing crops | 163,800 | 138,600 |
| Other current assets | 0 | 0 |
| **Total current assets** | **171,346** | **\*144,123** |
| Non-current assets |  |  |
| Machinery and buildings | 59,472 | 55,415 |
| Land | 437,850 | 481,250 |
| **Total Non-Current Assets** | **497,322** | **536,665** |
| **Total farm assets** | **\*668,668** | **680,788** |
| **Liabilities** |  |  |
| Current liabilities |  |  |
| Short term notes payable | 16,083 | 11,633 |
| Accounts payable  | 8,379 | 10,173 |
| Portion of machinery and land debt due | 26.682 | 24,014 |
| Accrued liabilities (taxes, rent) | 0 | 1,540 |
| Accrued interest | 0 | 0 |
| **Total current liabilities**  | **51,144** | **47,360** |
|  |  |  |
| Non-current liabilities |  |  |
| Non- current liabilities due after one year  | 65,632 | 59,861 |
| Land payment due after one year | 203,000 | 171,500 |
| **Total non-current liabilities** | **268,632** | **231,361** |
| **Total Farm Liabilities** | **319,776** | **\*278,721** |
| **Net Worth (Equity)** | **348,892** | **402,067** |

# Part 1 – Analysis of Balance Sheets

44 points

Questions 1 through 11 refer to Farm Business **Table 1. Statements of Net Worth** on **page 2**.

**Round ratios to two decimals.** Each question is worth 4 points.

1. What are the total farm assets on **December 31, 2013**?

 $668,668 (current assets + non-current assets)

1. What are the total current assets on **December 31, 2014**?

 $144,123

1. What are the total farm liabilities on **December 31, 2014**?

 $278,721 (total farm assets – net worth)

1. What is the net working capital on **December 31, 2013**?

 $120,202 (working capital = current assets – current liabilities)

1. What is the current ratio on **December 31, 2014**?

 3.04 (current ratio = current assets/current liabilities)

1. What is the debt-to-asset ratio on **December 31, 2013**?

 0.48 (debt-to-asset ratio = total liabilities/total assets)

1. What is the equity-to-asset ratio on **December 31, 2014**?

 0.59 (equity-to-asset ratio = equity/total assets)

1. What is the debt structure ratio on **December 31, 2014**?

 0.17 (debt structure ratio = current liabilities/total liabilities)

1. Name two ratios that can be used to analyze solvency of David Farm Business.

 Debt-to-Asset ratio

 Equity-to-Asset ratio

 Debt-to-Equity ratio

1. Name two ratios that can be used to analyze liquidity of David Farm Business.

 Current ratio

 Working capital

1. What percent of David Farm Business assets were financed by equity on December 31, 2014?

 59.06% (equity/total assets x 100)

# Table 2. Income Statements

Resource Information for David Farm Business

|  |  |  |
| --- | --- | --- |
|  | **2013** | **2014** |
| **Revenue** |  |  |
| Wheat | 378,400 | 395,120 |
| Tobacco | 134,640 | 154,560 |
| Melons | 76,800 | 113,680 |
| Onions and Garlic |  72,930 | 48,480 |
| Farm service agency payments | 426 | 328 |
| **Total revenue** | **$663,196** | **$712,168** |
|  |  |  |
| **Expenses** |  |  |
| **Cash operating expenses** |  |  |
| Chemicals | 176,800 | 18,5645 |
| Fertilizer & Lime | 38,636 | 41,256 |
| Freight/Trucking | 17,015 | 17,148 |
| Gas, fuel, oil | 22,263 | 23,725 |
| Insurance | 66,816 | 75,616 |
| Crop insurance  | 17,795 | 21,145 |
| Labor hired | 96,570 | 120,627 |
| Machine hire | 5,431 | 5,690 |
| Repairs-mach | 16,620 | 18,516 |
| Repairs -bldg | 13,868 | 14,588 |
| Seeds/plants | 48,551 | 35,628 |
| Storage | 4,160 | 4,544 |
| Supplies | 12,413 | 14,162 |
| Taxes | 18,964 | 25,088 |
| Utilities – farm share | 5,900 | 8,328 |
| Miscellaneous farm expenses | 7,742 | 6,598 |
| ***Total Cash Operating Expenses*** | **$569,544** | **$618,304** |
|  |  |  |
| ***Inventory adjustments*** |  |  |
|  Accounts payable | 11,284 | 15,729 |
| Change in accrued taxes | 2,640 | 2,352 |
| Other accrued expenses | 1,656 | 1,776 |
| depreciation | 11,987 | 10,064 |
| **Total operating expenses** | **$597,111** | **$648,225** |
|  |  |  |
| Cash interest paid | 10,752 | 14,268 |
| Change in interest payable | 0 | 0 |
| ***Total interest expense*** | **$10,752** | **$14,268** |
| **Total Expenses** | **$607,863** | **$662,493** |
| **Net Farm Income From Operations**  | **$55,333** | **$49,675** |

# Part 2 – Analysis of Income Statements

30 points

Questions 1 through 5 refer to David Farm Business **Table 1. Statements of Net Worth** on page 2 and **Table 2. Income Statements** on page 5.Round your answers to two decimals. Each question is worth 6 points.

|  |
| --- |
| **Important Notes:** * **Opportunity Cost of Unpaid Labor is $25,000**
* **Opportunity Cost of Management is $4,000**
 |

1. What is the rate of return on assets in 2014?

 5.18 %

{(49675+14268-25000-4000)/[(668668+680788)/2]}\*100 **= 5.18%**

**([***NFI + Interest – Op. Cost of Unpaid Labor- Opp. Cost of Mgt) / [(Average Value of Asset])\*100*

1. What is the **rate of return on equity in 2014**?

 5.51 %

{(49675-25000-4000)/[(348892+402067)/2]}\*100 = **5.51**%

*([NFI – Opp. Cost of Unpaid Labor- Opp. Cost of Mgt] / [(Average Value of Equity])\*100*

1. What is the **asset turnover ratio in 2014**?

 105.55 %

712168/[(668668+680788)/2]}\*100 = **105.55%**

*([Total Revenue) / [(Average Value of Assets])\*100*

1. What is the **net** **farm income from operations ratio in 2013**?

 8.34 % or 0.08

55333/663196 = **8.34% or 0.08**

*(NFI / Total revenue)*

1. What is the **operating profit margin ratio for 2013**?

 5.59 % or 0.06

(55333 + 10752 -25000-4000)/663196 = **5.59% or 0.06**

*([NFI + Interest - Opp. Cost of Unpaid Labor- Opp. Cost of Mgt] / [(Total Revenue])\*100*

# Part 3 – Analysis of Cash Flow

36 points

Because cash revenue from farm operations varies widely from month-to-month, Mr. David wants to assess his cash situation by quarter. In this section, complete the information about David Farm Business cash flow based on the information given below.

**Round to the nearest dollar.** Each question is worth 3 points.

**Important note: Mr. David must maintain a minimum cash balance of $3,000.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **1st quarter** | **2nd quarter** | **3rd quarter** | **4th quarter** |
| Projected Cash Inflows | 297,920 | 87,780 | 91,210 | 306,460 |
| Projected Cash Outflows | 271,950 | 174,090 | 97,230 | 205,520 |
|  |  |  |  |  |
| Cash difference | 25,970 | \*(86,310) | \*(6,020) | \*100,940 |
| Beginning cash balance | 20,230 | 46,200 | 3,000 | \*3,000 |
| Cash position | 46,200 | \*(40,110) | (3,020) | \*103,940 |
| Money borrowed this Period | 0 | 43,110 | 6,020 | 0 |
| Payment on Loan | 0 | 0 | 0 | 49,130 |
| Ending cash balance (before interest payment) | 46,200 | 3,000 | \*3,000 | \*54,810 |

17. What is the cash difference in the 2nd quarter? (86,310)

18. What is the cash difference in the 3rd quarter? (6,020)

19. What is the cash difference in the 4th quarter? 100,940

20. Which quarter has the largest cash inflow? 4th

21. Which quarter has the smallest cash inflow? 2nd

22. Which quarter has the largest cash outflow? 1st
23. Which quarter has the smallest cash outflow? 2nd

 24. What is the cash position in the 2nd quarter? (40,110)

25. What is the cash position in the 4th quarter? 103,940

26. What is the beginning cash balance in the 4th quarter? 3,000

27. What is the ending cash balance in the 3rd quarter? 3,000

 28. What is the ending cash balance in the 4th quarter? 54,810

# Part 4 – Enterprise Budgeting

6 points

Identifying variable and fixed costs is important in planning and developing an enterprise budget. For the following costs, identify whether each item is a variable cost or a fixed cost. **Write a “V” in the blank if the item is a variable cost. Write an “F” in the blank if the item is a fixed cost.** Each blank is worth 1 point.

\_\_F\_\_ Depreciation on machinery

\_\_V\_\_ Hourly labor

\_\_F\_\_ Salary labor

\_\_V\_\_ Feed purchases

\_\_F\_\_ Insurance for machinery and equipment

\_\_V\_\_ Custom harvesting expenses

\_\_F\_\_ Interest on loans

**Part 5 – Enterprise Budgeting**

24 points

# Below is the enterprise budget for corn for David Farm Business for 2014. Use this table to answer the next 8 questions. Each question is worth 3 points.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Unit** | **Quantity** | **Price** | **Amount (value $)** |
| Revenue |  |  |  |  |
|  Corn revenue | bu | 110 | $4.80 | 528.00 |
|  Gross revenue |  |  |  | \*528.00 |
| Operating expenses |  |  |  |  |
|  Seed  | thousands | 30 | $2.95 | 88.50 |
|  Seed treatment | acre | 1 | 9.70 | 9.70 |
|  Fertilizer: Nitrogen | lb | 145 | 0.50 | 72.50 |
|  Phosphorus | lb | 62 | 0.50 | 31.00 |
|  Potash | lb | 62 | 0.45 | 27.90 |
|  Micronutrients | acre | 1 | 9.70 | 9.70 |
|  Lime (prorated) | tons | 0.34 | 33.00 | 11.22 |
|  Pesticide | acre | 1 | 27.50 | 27.50 |
|  Machinery Variable costs | acre | 1 | 33.46 | 33.46 |
|  Labor | hr | 2.1 | 11.00 | 23.10 |
|  Crop insurance | acre | 1 | 26.00 | 26.00 |
|  Interest (operating expenses for 6 months) | $ | 176.94 | 6.0% | 10.62 |
|  Drying and hauling | bu | 110 | 0.48 | 52.80 |
|  Total operating expenses |  |  |  | \*424.00 |
|  |  |  |  |  |
| Ownership expenses |  |  |  |  |
|  Machinery depreciations | acre | 1 | 10.00 | 10.00 |
|  Machinery interest | acre | 1 | 9.20 | 9.20 |
|  Machinery taxes & insurance | acre | 1 | 3.00 | 3.00 |
|  Land charge | acre | 1 | 65.00 | 65.00 |
|  Miscellaneous overhead | acre |  | 3.50 | 3.50 |
|  Total ownership expenses |  |  |  | 91.00 |
| Total Expenses |  |  |  | \*515.00 |
| Profit (return to management) |  |  |  | $13.00 |

1. What is the expected yield of corn per acre?

 110 bushels

1. What is the expected price for corn?

 $4.80 per bushel

1. What is the expected gross revenue per acre?

 $528

1. What are the total expected expenses?

 $515.00 (total operating expenses + total ownership expenses)

1. If David Farm Business is planning for 2,000 acres of corn, what is the expected profit?

 $26,000 ($13\*2,000)

1. If the price of corn remains at $4.80 per bushel and all costs remain unchanged, what is the breakeven yield per acre to cover total operating costs? Round answer to nearest whole number.

 88 acres (total operating costs/price = 424/4.80 = 88.33 rounds to 88)

1. If total ownership expenses increase by 10%, what would be the new total expenses?

 $524.10 [new total ownership expenses (91+9.10) + total operating
 expenses (424)]

1. If total ownership expenses increase by 10%, what would be the new profit per acre?

 $3.90 [gross revenue (528) – new total expenses (524.10)]

# Part 6 – Partial Budgeting

20 points

Use the Partial Budget below to determine if David Farm Business should convert 500 acres of non-irrigated cotton to irrigated cotton (Each question is worth 4 points).

|  |
| --- |
| Partial Budget |
| Alternative: Convert 500 acres of dryland cotton to irrigated cotton |
| **Additional Costs:** | **Reduced Costs:** |
| **Fixed costs** |  | Variable costs |  |
| Depreciations | $16,500 | Fertilizer | 44,440 |
| Interest | 9,725 | Fuel and chemicals | 25,000 |
| Insurance  | 3,875 | Irrigation variable costs | 2,083 |
| **Variable costs** |  |  |  |
|  Fertilizer | 57,240 |  |  |
|  Fuel and chemicals | 28,500 |  |  |
| Irrigation variable costs | 31,200 |  |  |
| Interest on variable costs | 3,508 |  |  |
| **Reduced Revenue** | **Additional Revenue** |
| Dry Cotton Production | $194,000 | Irrigated Cotton Production | $286,200 |
|  |  |  |  |
| **A. Total additional costs and reduced revenue** | **\*$344,548** | **B. Total additional revenue and reduced costs** | **\*$357,723** |
| **Net change in profit (B – A)** |

1. What is the net change of irrigation variable costs in this proposed change from non-irrigated cotton to irrigated cotton?

 $ 29,117 *[31,200-2,083]*

38. What is the value for total additional costs and reduced revenue (A)?

 $ 344,548

39. What is the value for total additional revenue and reduced costs (B)?

 $ 357,723

 40. What is the net change (B – A) in profit in this proposed change?

 $ 13,175 *(Net change in profit (B – A) =357723-344548)*

41. Should the operation pursue the given alternative? Circle the correct response.

 YES NO

# Part 7 – Agricultural Markets

10 points

Match the terms on the right with their correct descriptions. Write the correct letters in the blanks provided. (Each question is worth 1 point).

|  |  |
| --- | --- |
| \_\_D\_\_ Ask Price | A. Fees charged by brokers including exchange and clearing fees to buy or  sell futures and options contracts |
| \_\_F\_\_ Bid Price | B. An investment to reduce the risk of adverse price movements in an asset |
| \_\_G\_\_ Speculator | C. A position which involves the obligation to buy a standardized good for an  agreed upon price at a specific date |
| \_\_C\_\_ Long Futures | D. This price represents the minimum price that sellers are willing to take  for a product |
| \_\_A\_\_ Transaction Cost | E. A market where small supplies and/or strong demand cause prices to rise |
| \_\_I\_\_ Arbitrage | F. This price represents the maximum price that buyers are willing to pay for  a product |
| \_\_E\_\_ Bull Market | G. A market participant who buys and sells futures and/or options in hopes  of making a profit – adding liquidity to the market |
| \_\_B\_\_ Hedge | H. The price specified in an option contract |
| \_\_J\_\_ Long Call | I. Simultaneous purchase and sale of the same quantity of the same  commodity in two different markets |
| \_\_H\_\_ Strike Price | J. A position which involves the right, but not the obligation, to buy some  underlying instrument at a specific price before a specific date |

# Part 8 – Labor Management

30 points

The following is the labor estimate worksheet for David Farm Business for 2015. Each question is worth 3 points.

|  |  |  |
| --- | --- | --- |
|  | Total hours for year | Distribution of hours |
| December-March (Q1) | April-June (Q2) | July-August (Q3) | September-November (Q4) |
| 1 | Operator 1 (or Partner no.1) | 2,950 | 850 | 725 | 650 | 725 |
| 2 | Partner no. 2 |  |  |  |  |  |
| 3 |  |
| 4 | Family labor | 1,250 | 150 | 325 | 450 | 325 |
| 5 | Hired labor |  |
| 6 | Custom machine operators |  |
| 7 | Total labor hours available | 4,200 | 1,000 | 1,050 | 1,100 | 1,050 |
|  | Direct labor hours needed by crop and animal enterprises |  |
|  | Crop enterprises | Acres | Hours/acre |  |  |  |  |  |
| 8 | Wheat | 700 | 1.78 | 1,250 | 10 | 100 | 740 | 400 |
| 9 | Sorghum | 300 | 2.13 | 640 | 0 | 400 | 0 | 240 |
| 10 | Alfalfa | 200 | 6.3 | 1,260 | 0 | 400 | 720 | 140 |
| 11 |  |  |  |  |  |  |  |  |
| 12 |  |  |  |  |  |  |  |  |
| 13 | **Total labor hours needed for crops** | **3150** | **\*10** | **\*900** | **\*1460** | **\*780** |
|  | Animal Enterprises | No. Units | Hours/unit |  |  |  |  |  |
| 15 | Beef cows | 250 | 6.0 | 1,500 | 600 | 500 | 200 | 200 |
| 16 | Background | 400 | 0.25 | 100 | 50 | 0 | 0 | 50 |
| 17 |  |  |  |  |  |  |  |  |
| 18 |  |  |  |  |  |  |  |  |
| 19 | **Total labor hours needed for animals** | **1,600** | **650** | **500** | **200** | **250** |
| 20 | **Total labor hours needed for crops and animals** | **4,750** | **660** | **1,400** | **1,660** | **1,030** |
| 21 | Total hours of indirect labor needed | 600 | 200 | \*150 | \*100 | \*150 |
| 22 | Total labor hours needed | 5,350 | 860 | 1,550 | 1,760 | 1,180 |
| 23 | Total available (line 7) | 4,200 | 1,000 | 1,050 | 1,100 | 1,050 |
| 24 | Additional labor hours required (22-23) | 1,150 | -140 | 500 | 660 | 130  |

1. How many labor hours are needed for both crops and animals for the year?

 4,750

1. How many labor hours are available for both crops and animals for the year?

 4,200

1. According to the distribution of labor, which quarter will need the highest number of labor hours for crops?

 Q3

1. Which crop needs the highest labor hours per acre?

 Alfafa

1. How many indirect labor hours are needed for the year?

 600

1. Which quarter needs the highest number of indirect labor hours?

 Q1

1. Which quarters need additional labor hours?

 Q2, Q3, Q4

1. Which quarter has the excess labor hours available?

 Q1

1. If a labor hour is paid $12, what is the labor cost for crops for the year?

 $37,800 (3,150\*$12 = $37,800)

1. If a labor hour is paid $12, what is the labor cost needed for crops and animals for the year?

 $57,000 (4,750\*$12 = $57,000)

**End of the 2016 NC FFA Farm Business Management SENIOR Exam**

**Make sure all of your answers have been transferred to the answer sheet!**

|  |
| --- |
| NC FFA Farm Business Management Junior |
|  |  | Possible Points |  Contestant’s Points |
| Part 1 | Analysis of Balance Sheet | 44 |  |
| Part 2 | Analysis of Income Statements | 30 |  |
| Part 3 | Analysis of Cash Flow | 36 |  |
| Part 4 | Enterprise Budgeting | 6 |  |
| Part 5 | Enterprise Budgeting | 24 |  |
| Part 6 | Partial Budgeting | 20 |  |
| Part 7 | Agricultural Markets | 10 |  |
| Part 8 | Labor Management | 30 |  |
| Total | 200 |  |