Determining Profitability of Alternative Crops
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Introduction
There are many alternative crops to consider. Evaluating which alternative crop or crops will be the best fit for a producer can be a daunting task. This fact sheet breaks down the process to a step-by-step review of individual crops to gauge which crops may be the most successful for a given producer.

Is the crop economically feasible (profitable)?
The most comprehensive way to determine if an alternative crop is economically feasible is to complete an enterprise budget. The enterprise budget is a projection of the manager’s estimates, and is a tool to estimate net profit by estimating revenues and subtracting operating and ownership costs associated with a particular crop. To create an enterprise budget, data must be compiled and entered into four spreadsheets: 1) an investment summary to show all real property used in the enterprise, 2) establishment costs (for perennial crops to capitalize start-up losses), 3) costs and returns to show annual income and expenses, and 4) a monthly cash flow to show monthly income and expenses. By familiarizing producers with these documents, Extension personnel can assist producers in gaining knowledge of tools that can be applied to other operations and can also be useful in obtaining loans or other assistance.

How is an enterprise budget created?
The first step in creating an enterprise budget is to determine what agronomic practices are associated with growing the crop in question. Some questions to answer include:
- What is the available acreage?
- What is the irrigation source?
- What land preparation is needed?
- What machinery or other methods will be used to prepare the soil?
- After completing soil testing, what amendments will need to be added?
- Is the crop an annual or a perennial?
- What is the optimal seeding rate?
- How much and what type of fertilizers are best for this crop?
- How much irrigation is required and at what intervals?
- What pest management issues are common with this crop?
- What weeds are problematic and what will be used to control them?
- Are there insects that are especially fond of this crop?
- Do vertebrate pests pose a problem?
- When is the crop harvested?
- What machinery will be used for harvesting?
- How much labor is necessary to grow and harvest the crop?
- How many operator hours will be required per acre?
- Should additional help be hired (either full-time or seasonal)?
- What are the average yields that can be expected for this crop in my area?

What is the next step after determining agronomic practices?
Each of the previous agronomic practices has an economic cost associated with it.
These costs fall into one of two categories, either ownership or operating costs.

**What are ownership or fixed costs?**
Ownership or fixed costs are expenses that occur and must be paid regardless of whether a crop is produced or not. These costs are categorized into cash and non-cash overhead costs. Some examples of both types of fixed costs are:
- **Cash overhead costs:**
  - Land (if leased)
  - Investment insurance
  - Investment taxes
- **Non cash overhead costs (capital recovery):**
  - Buildings, improvements and equipment (includes establishment costs)
  - Machinery and vehicles

**What are the operating costs or variable costs?**
These costs would be incurred only if the crop is produced. These expenses vary from year to year and are easily adjusted by changing practices. Included are costs associated with seeds, irrigation, fertilizers, insecticides and herbicides, and labor. In addition to these costs, some additional operating expenses are:
- Accounting and legal expenses
- Fuel, oil, and lube
- Repairs/maintenance
- Utilities
- Interest on operating capital
- Miscellaneous

**Investment summary**
The investment summary is a summary of all property used in the enterprise. This consists of all buildings, improvements and equipment, including the house, land, shops and any outbuildings, tools and implements, and perennial establishment costs. Also included on the investment summary spreadsheet are machinery and vehicles, such as tractors and other self-propelled or power take-off (PTO) equipment, pickups and ATVs. The values entered are used to calculate annual capital recovery (depreciation), annual insurance, annual taxes, annual repairs and annual fuel and lube expenses as a percentage of either the purchase price or the average asset value. The totals are carried to the establishment costs spreadsheet (if applicable) and the costs and returns spreadsheet.

**Establishment costs**
The establishment costs spreadsheet should be completed next if the crop under consideration is a perennial. Because perennial crops can take several years to establish and yield little or no production, first-year costs are usually much higher and returns are much lower than in subsequent years, resulting in net losses. The net returns for the first year as determined by the establishment costs spreadsheet allow for capitalization of any losses over the duration of the crop life on the investment summary.

**What returns can be expected?**
Returns can vary by region. Average prices for the crop of interest for any region can be established by consultation with Extension personnel. Average national prices for numerous crops and statewide prices for some crops are available online through the National Agricultural Statistics Services database at [http://www.nass.usda.gov/Data_and_Statistics/Quick_Stats/index.asp](http://www.nass.usda.gov/Data_and_Statistics/Quick_Stats/index.asp). These average prices can be used to consider if the desired sales price is within a reasonable range of current pricing.

**What if a producer is growing an annual crop and doesn’t have establishment costs?**
If the crop the producer is considering is an annual or if the producer has completed an establishment costs spreadsheet for a perennial crop, the next spreadsheet to complete is costs and returns. This spreadsheet is a summation of all returns, variable costs and fixed costs.
**What is the purpose of the monthly cash flow spreadsheet?**
The monthly cash flow spreadsheet enables producers to take a comprehensive look at their projected cash flow from month to month throughout the year. This will help producers anticipate during which months of the year it will be necessary to use savings or obtain operating loans to be able to meet expenses, and during which months revenue will exceed expenses. This spreadsheet is a valuable document and will be requested by any banker in order to determine the need for an enterprise’s operating capital. This spreadsheet is only necessary if the net profit from the cost and returns spreadsheet is sufficient to warrant further inquiry.

**How much should net profit be to consider an alternative crop?**
The net profit per acre of a proposed alternative crop should be compared with the net profit per acre of current enterprises, as well as possible other alternative crops. This allows the producer to “make mistakes” on paper rather than in practice. Enterprise budgets for numerous crops are available online through Extension. It is perhaps easier to modify an existing budget than to create a budget from scratch. Malt barley, wine grapes, Great Basin wildrye, onions, lettuce, switchgrass and teff are some alternative crops that were evaluated for their potential in Nevada. Not all of these crops were potentially profitable. The enterprise budgets for these crops and others are online and are accessible at http://www.unce.unr.edu/publications/search/details.asp?searchby=keywordsearch&searchtext=costs.

**How can the bottom line (net profit) be increased?**
After finding a potential alternative crop, if net profits are close to, but below a desirable range, they can possibly be increased by increasing yields or by reducing costs.

**How can yields be increased?**
Yields are determined by soils, climate and irrigation practices. After amending the soil and choosing the optimal time to plant for the prevailing climate, the largest determining factor to increase yield is when and how much to irrigate.

**What costs can be reduced?**
In most situations, there is usually a way to reduce variable costs. These expenses vary from year to year and are easily adjusted by changing practices. Irrigation costs, both amounts of water and utilities costs, are examples.

**How can water costs change by changing practices?**
Changing from a flood or furrow irrigation system to a center pivot system or drip system greatly increases the efficiency with which water is delivered and reduces the amount of water used. One of the advantages of either center pivot or drip irrigation is the system’s ability to uniformly distribute the water. The importance of distribution to yield has been shown by studies of sprinkler irrigation, where yields increased with increased uniformity of distribution (Li, 1998). By using center pivot technology, it has been found that 95 percent to 98 percent of the irrigation water pumped is delivered to the crop (New and Fipps, 2000). These systems have lower energy consumption and consequently lower pumping costs. Additionally, chemicals and fertilizers can also be applied through the system, which has the effect of lowering labor costs (Robinson, 2007).

Drip irrigation systems have been proven performers in increasing yields and both net and total water productivity, while decreasing net water applied (O’Neill et al., 2008). Subsoil drip irrigation has been found to be especially water-saving and new innovations are being developed to increase the longevity and efficiency of these systems (Barth, 1999). While it may seem obvious that drip irrigation systems
are more efficient than other systems, they can also be costly and are not appropriate for all crops, such as those that utilize machine harvesting prior to the removal of the drip system. Changing irrigation systems may result in both increased yields and decreased costs, helping to increase net profits.

How can utility costs be reduced by changing practices?
If groundwater is the irrigation source, it may be beneficial to investigate whether changing the source of power for the pump, upgrading to a newer pump with an increased efficiency, reducing the pressure needed to run the irrigation system, or reducing the pump horsepower will result in reduced utility costs.

Are there risks specific to the chosen alternative crop?
When considering an alternative crop that is unfamiliar to the producer, there are additional questions that need to be answered with regard to risk, including:
- How have/will prices vary from year to year?
- How does price vary when there are variations in quality?
- Is a contract needed with the buyer prior to planting?
- Can existing equipment be modified to meet the needs of the new crop?
- Are there added operating costs that are particular to this crop?
Risk occurs in several categories, including production (loss of crops or animals), marketing (sales outlets and competition), financial (debt-to-asset ratio and liabilities) legal (insurance and regulations), human (safety and relationships) and general (knowledge, skills and goal setting) risk. Assessment tools and further education for all categories can be accessed at the Western Risk Management Library online at http://agecon.uwyo.edu/RiskMgt/.

References


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