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Author: Randy
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Herbs

Author: Randy Sell, Research Associate, Department of
Agricultural Economics, NDSU

Series Editor: Dwight Aakre, Farm Management Specialist, NDSU
Extension Service

The term "herbs" means dried plant products, especially their green succulent parts, which are used for culinary purposes. Herb originated from the Latin word "herba," which means "green crops." Herbs are grown to add piquancy to cooking, for fragrance and decoration, and in a limited way for medicinal use. From 1981 to 1991, the volume of basil sold in the United States increased 187 percent, and the amount of oregano sold increased by 75 percent. Competition in producing and marketing herbs is very intense. Producers range from large corporations to small entrepreneurs and hobbyists. This publication introduces the types of herbs which may be produced outdoors in North Dakota, describes methods of producing and marketing herbs, and provides example economic and cash flow budgets to help producers determine financial returns of raising herbs.

Although herbs are not usually consumed in large quantities, some have measurable nutritional value. Fennel has relatively high levels of ascorbic acid (vitamin C) and 16 free amino acids. Parsley has a greater concentration of B-carotene than carrots.

In ancient times, herbs were not only produced for their effect on the palate, but for their medicinal and ritual uses. To the Greeks, oregano meant "joy of the mountain," and thyme was associated with courage and sacrifice. Romans thought thyme was a cure for coughs and hangovers. Bay leaves were once used to crown Olympic champions.

The herb industry in the United States is dominated by herbs used in preparation of various foods. Sage is used in making sausage, anise seed is used in candies and baked goods, dill is used in dill pickles, oils from mint are used as flavorings in confections and medicines, and chives impart a mild onion flavor to soups, salads and cottage cheese.

Types of Herbs

Herbs may be classified in the same manner as many other plants - as annual, perennial and biennial. Examples of annual herbs are borage, basil, dill and summer savory. In North Dakota, these annuals may be started indoors about four weeks before being transplanted outdoors. However, they can be started from seed if grown outdoors in late April or early May. Borage, basil and dill produce a large number of seeds and may start again the following year on a volunteer basis.

Perennial and biennial herbs that can survive North Dakota winters include parsley, spearmint, peppermint, fennel and horseradish. Spearmint, peppermint and horseradish can withstand

all but the most extreme of North Dakota winters. In fact, horseradish is so competitive that it can become an invasive pest if left unchecked. On the other hand, fennel and parsley should be protected as they may only survive a mild winter climate. Perennials generally take a longer period of time to begin full production. Herbs that are also classified as vegetables include garlic, peppers and mints. A listing of herbs that may be grown in North Dakota, and their uses and classification, is given in Table 1.

Planting

Nearly all herbs planted in North Dakota have small seeds. Soils must be tilled so there are not any large soil aggregates (greater than 3 inches in diameter). Large soil aggregates cause poor seed to soil contact and may reduce germination. The soil must also be firm to insure adequate seed to soil contact. Firming soil may be done with a roller packer. If a roller packer is unavailable, two trips across the plot with a press drill may do an adequate job. The first trip is to pack the soil and should be done perpendicular to the direction the crop is seeded. A properly prepared seedbed should not allow a person walking on the soil to settle into soil more than the width of a shoe sole.

Seeding depths for herbs will range from one-eighth to three-fourths of an inch, depending on moisture availability and seed size. Larger seeds can germinate from deeper planting, but the majority of all herbs should be planted at less than one-half inch in depth. Planting small herb seeds requires precise seed placement and depth control. Prospective producers are advised to check with local implement dealers to locate equipment that is suited to this task.

Weed Control

Weeds are normally controlled by manual and mechanical cultivation because very few herbicides are available to control weeds in herb plots. Thus, herbs are usually seeded in rows (22 to 30 inches) to allow mechanical row cultivation.

Fertilizer

No current research exists on the fertilizer needs of various herbs that can be produced in North Dakota. Producers are advised to take soil tests to determine the levels of organic matter, pH, nitrogen, phosphorus, potassium, calcium, magnesium, sodium, base saturation, zinc, copper, boron, iron, sulfur, manganese and soluble salts. T.J. Enterprises, Box 21, Buffalo, SD 57720, offers full soil consultation services for herb producers.

Irrigation

The need for irrigation depends on the types of herbs to be produced and the environment they are produced in. Irrigation in North Dakota is recommended for consistent production of top-quality herbs. Some perennial shrub-type herbs such as sage may not show a marked increase in production with irrigation in a clay soil. Others, such as basil, require more water than typically received in North Dakota and will have a substantial increase in yields with irrigation. The method of irrigation also depends on the type of herb to be grown. Subterranean drip irrigation may work well because it allows mechanical weed control and results in more efficient water use.

Harvest

Herbs may be harvested for fresh markets or dried in bulk and marketed as crude-dried bulk herbs. Crude-dried bulk herbs are dried and baled into small square bales. Herbs harvested for the fresh markets are extremely perishable. Harvest and postharvest handling of fresh herbs is much more labor intensive than crude-dried herbs. Because of the relatively high labor requirements, producing fresh herbs is usually done on a small scale. While producing and marketing fresh herbs may present unique opportunities for some individuals, this publication concentrates on herbs that may be harvested and marketed in bulk.

Harvest equipment for herbs depends on the type of herb produced. If the seed is all that is harvested from the plant, a combine can be used. If the herbaceous material (leaves and small stems) is needed, then a swather or mower is necessary. If the leaf material is marketed in bulk form, the plant must be dried indoors, shielded from sunlight. Fresh-cut herbs may be loaded onto a wagon for transport to a drying floor. A grain bin with a full dryer floor may be satisfactory for drying herbs. After harvested material is dried to 15 percent moisture, it should be baled or bagged and stored out of direct sunlight in a heated, rodent-proof building. Although there are differences among herbs, most can be stored in this manner for six to 12 months.

Market

The herb and spice trade is composed of more than 400 plant species. Of course, some of the markets are relatively small while others are quite large. Traditionally, herbs were not cultivated; instead, they were harvested where found growing

naturally. As demand increased, greater emphasis was placed on quality. Thus, harvesting wild herbs has declined in favor of cultivating them as a domestic crop. Cultivated herbs have higher yields and better quality standards. Availability of a uniform supply to process decreases processing costs, thereby delivering a higher-quality product to the consumer at a lower cost. Third World countries are able to harvest and supply herbs that are relatively inexpensive because of reduced labor costs. However, standards of hygiene tend to be lower and quality is variable. North Dakota producers may be able to economically produce some varieties of high-quality herbs.

Herb prices tend to be relatively variable predominantly because of fluctuating supplies. Also, because of a limited number of alternative uses for herbs, marketing excess production can be difficult. Producers without contracts for herbs may have to store production for an extended time. Some herbs have relatively short "shelf lives" which can make extended storage costly.

Market access can be difficult for a beginning herb farmer. Companies that currently import their necessary herbs may be reluctant to change suppliers because of concerns about supply, consistent quality and ability to reestablish a relationship with a previous supplier should new supplier fail. Producers interested in commercial herb production should find a market first and are advised to start small. T.J. Enterprises works with herb producers in North Dakota, South Dakota, Minnesota and Montana to produce and market their herb production.

Economics

An important key to success in the herb business is understanding the costs of producing and marketing the herbal crop. One tool,

which can be quite helpful in assisting potential producers in the decision-making process, is budgeting. Estimating an economic and cash flow budget for a specific herb allows potential producers to analyze profitability and cash flow of an alternative that investing capital. Upon analyzing several alternatives the producer may pick an alternative that makes the best use of their resource base. Producers should thoroughly investigate the herb they are interested in producing. An example of an economic and cash flow budget has been developed for a drip-irrigated, one-acre basil plot.

Performance criteria, production coefficients, equipment rental rates and selling prices used to develop enterprise budgets are shown in Table 2. This enterprise was assumed to be 50 percent leveraged. The interest rate on borrowed capital was 9.75 percent, while the opportunity cost of equity capital was 4 percent. Basil is an annual crop which is not tolerant of frost; it should be seeded into 70 F soil after danger of frost has past. Optimum quality and production results from about 18 to 36 inches of water during the growing season. For this reason, the basil plot was drip irrigated. Irrigated basil can yield between two to four tons per acre per year and is harvested two to three times during the growing season. Basil is swathed about 2 inches above the ground at the bud stage. Quality rapidly deteriorates at flowering; therefore, timing of harvest is critical. Basil was assumed to be dried indoors and baled in small square bales. Basil bales should be stored indoors to avoid exposure to elements that can cause quality deterioration.

A one-acre plot of basil can generate positive returns to labor, management and equity and a positive cash flow (Table 3). It is important to recognize that while returns per acre for basil are attractive, basil production is much more labor intensive than conventional irrigated crops and may be more risky.

For Further Information:

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Table 1. Herbs Which may be Produced Outdoors in North Dakota, Classification and Comments

Herb_Growing_In_North_Dakota_1995.txt

Name	Classification	Comments
Basil	Annual	Used for the clove scent from leaves; works well with tomato dishes, especially pizza and spaghetti sauces.
Borage	Annual	Easily cultivated, good for making honey. Leaves and blooms have a subtle cucumber flavor when seeped in water.
Dill	Annual	Seeds are used as flavor for dill pickles. Popular in Germany. Seed harvest in North Dakota is difficult because seed shatters from head when ripe.
Fennel	Perennial	Licorice flavoring adds zest to fish and vegetable dishes; seed also said to work as appetite suppressant.
Horseradish	Perennial	Strong flavoring for meats and oysters. Root is harvested for use; limited market potential.
Mints	Perennial	Both spearmint and peppermint are used to enhance teas, garnish lamb dishes and general flavor enhancement.
Oregano	Perennial	Strongly aromatic, earthy, minty

Herb_Growing_In_North_Dakota_1995.txt
character, used with any tomato
dish, especially pizza and sauces.
Good market potential but difficult
to raise in North Dakota on a
commercial scale.

Parsley	Biennial	Garnish for all foods, also adds flavor to soups and stews. Only herb to have a herbicide labeled for use.
Sage	Perennial	Silver-gray, spear-shaped leaves of small shrub. Prized for aromatic, piney, slightly medicinal character; leading use is flavoring pork sausages.
Savory	Annual	An excellent meat seasoner used in stews and soups. Second to parsley as (summer) a garnish. May be difficult to harvest because of limited plant height.
Thyme	Perennial	Gray-green leaves give a pungent warmth to chowders, seafood and vegetable dishes. Small woody shrub; commercial harvest may be difficult because of extremely small leaves.

Portions adapted from unpublished work by Ronald C. Smith, North
Dakota State University Extension Horticulturist.

Table 2. Production Coefficients a Drip Irrigated Basil Plot
Using Rented Field Equipment, North Dakota, 1993

Land value/acre	\$350
Acres	1
Seeding rate (lb/acre)	3
Seed price (\$/lb)	\$38
Seeding depth (inches)	1/8-1/4
Irrigated yield (lbs/acre)	3,000
Soil temperature for germination	70 F
Water requirements (inches during growing season)	27
Number of cuttings	2
Bale weight (lbs)	75
Number of bales per acre	40
Selling price per ton	\$1,000
Spread fertilizer [1] (\$/acre)	\$2.42
Planter rent [1] (\$/acre)	\$6.12
Row cultivator rent [1] (\$/acre)	\$3.75
Number of row cultivations	4
Field cultivate [1] (\$/acre)	\$3.70
Number of field cultivations	2
Chisel [1] (\$/acre)	\$4.68
Number of chisel cultivations	1
Swather rent [1] (\$/acre)	\$4.21
Baler rent (\$/bale including twine)	\$0.34
Nitrogen per acre per year	\$8.49
Phosphorus per acre per year	\$17.42
Manual weeding per acre per trip	\$23.10
Irrigation-operating costs/acre	\$150
Drip irrigation-total fixed investment	\$1,698
Hoes and spades	\$100
Storage shed	\$5,000

[1] Average custom farm work rates as reported in North Dakota
Agricultural Statistics, 1992.

Table 3. Economic and Cash Flow Budgets for an Irrigated Basil
Plot, Selling Crude-Dehydrated Basil Square Bales, North Dakota,
1993

	Economic Budget	Cash Flow Budget
	-----	-----
Returns	Per Plot	Per Plot
Crude-dehydrated, basil bales	\$1,500.00	\$1,500.00
	-----	-----
Gross Revenue	\$1,500.00	\$1,500.00
Variable costs		
Seed	\$114.00	\$114.00
Fertilizer	25.92	25.92
Manual weeding	46.20	46.20
Field operations	57.64	57.64
Irrigation and electric costs	150.00	150.00
Interest	27.07	19.20
	-----	-----
Total Variable Costs	\$420.83	\$412.95

Herb_Growing_In_North_Dakota_1995.txt

Fixed costs

Land ownership cost and property taxes	\$26.81	\$19.81
Depreciation on fixed assets	679.80	xxx.xx
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Total Fixed Costs	\$706.61	\$19.81
 TOTAL LISTED COSTS	 \$1,127.44	 \$432.76
Returns over variable costs	\$1,079.17	\$1,087.05
Returns to labor, management and equity	\$372.56	xxx.xx
Cash flow (debt service, family living)	xxx.xx	\$1,067.24

The economic budget is generated by charging market rates for all resources needed for production. It helps answer the question "Is this enterprise profitable?" The bottom line represents a return to labor and management.

The cash flow budget is an estimate of the out-of-pocket cash needed to run the enterprise, including not only direct costs but indirect cash costs such as principle and interest payments, insurance and taxes. It helps answer the question "Can I meet my cash obligations if I go into this enterprise?" Total cash expenses are subtracted from total cash receipts to calculate the net cash which is available for family living and other needs.

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