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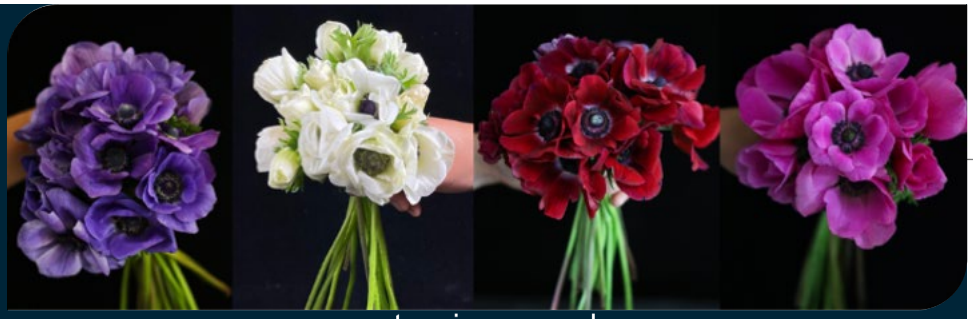

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Anemone Cut Flower Production Budget, One Field, Northern Utah, 2022

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This budget contains costs (preplant and site preparation, establishment and maintenance, and harvest and processing) and returns for the production and sale of anemone cut flowers that were grown in a field (14 feet by 40 feet). Production methods, yield, costs, and pricing were determined from Utah State University (USU) research trials, as well as feedback from Northern Utah producers. Typical production in Northern Utah is highly variable, with net returns influenced by labor costs, management practices, yield, stem length, and marketing success. Based on USU research trials, anemone has a low profit potential ($0.50 per square foot) when grown as a field cut flower crop in Northern Utah and sold at wholesale pricing. Growers should carefully consider their unique situation when determining whether anemone can be a viable part of their operation.

Farm and Production System

This publication assumes the use of one 14-foot x 40-foot field with two beds, each 4 feet x 36 feet and 6.5 feet apart from center to center (i.e., 288 square feet of production space), using color mixes of anemone 'Carmel' and 'Galilee' planted in native soil at a 6-inch x 6-inch spacing (994 total plants) with drip irrigation. Anemone tubers are soaked in water for 3 hours and fungicide for an additional hour, before being 'presprouted' (established in trays of moist potting mix for 2 weeks), planted in November, and insulated with straw mulch over the winter. A field this size uses less than 2% of one acre and is assumed to be on land already owned. However, $45 is used as a proxy for the land cost (1% of a $4,550 per acre lease) with the assumption that urban land rental is greater than rural (NASS, 2022).

Crop Pricing

Stem pricing was calculated based on wholesale market testing conducted with florists across Cache Valley and the Wasatch Front from April through July of 2021 and 2022. Average prices were used to calculate revenues in Table 1. Stems were harvested once blooms were fully colored and had opened and closed once. Marketable stems were straight, undamaged, and divided into two length categories: *quality* grade stems were at least 10 inches long, while *speculation* grade stems were between 8 and 10 inches long. *Cull* grade stems were shorter than 8 inches, deformed, or damaged. Quality grade stems were sold in bunches of 10 stems for $15.00 ($1.50 per stem) and ordered by florists in advance, while speculation grade stems were sold in bunches of 10 stems for $12.50 ($1.25 per stem) and purchased in person. Stems were sold through a local cut flower co-op located approximately five miles from the farm for a fee of 30% of revenue, which is calculated as 100% of quality grade and 50% of speculation grade stems sold. Labor and mileage for delivery to the co-op, as well as the co-op fee, which includes the cost of cold storage, are included in budget expenses.

Calculated Yield

A yield of 2.2 quality grade and 1.3 speculation grade stems per plant, equivalent to 218 quality grade bunches and 129 speculation grade bunches across a 10-week harvest period, was used to calculate the revenue in Table 1. This represented the average yield from the most productive management practices tested

in USU trials in North Logan, UT (see the Management Practices subsection of Net Returns and Other Considerations below for more information). On-farm field trials across the Wasatch Front resulted in an average marketable yield of 2.7 stems per plant, although growers defined marketability differently, with marketable stem length minimums ranging from 6 to 12 inches. The net returns associated with varying the quality grade yield from 1 to 5 stems per plant are presented in Table 2.

Supplies

Production supply costs were calculated for a pre-sprouted November planting with straw mulch to represent the highest-yielding field production scenario from USU trials. Costs were based on average prices available in Logan, UT, and online in summer 2022, and may vary across regions, suppliers, and time. All supplies must be purchased in year 1, but many last multiple years. Therefore, the cost of each input is annualized across the quantity used per year and the number of years until replacement.

Preplant and Site Preparation

- Tiller rental. One, half-day rental annually.
- Urea fertilizer (46-0-0): Each year, 2 pounds of a 5-pound bag are needed, so one 5-pound bag is purchased every two years.
- Triple super phosphate fertilizer (0-45-0): Each year, 1.4 pounds of a 5-pound bag are needed, so one 5-pound bag is purchased every three years.
- Muriate of potash fertilizer (0-0-60): Each year, 1.2 pounds of a 5-pound bag are needed, so one 5-pound bag is purchased every four years.
- Drip irrigation kit: Each year, 320 feet of dripline will be used and replaced from a kit with 1000 feet of dripline. A new kit is purchased every three years.

Establishment and Growth

- Anemone plant stock: Assuming all tubers are replaced annually, 994 tubers are needed each year.
- Captan fungicide: Each year, 2 ounces of an 8-ounce bottle are needed, so one 8-ounce bottle is purchased every four years.
- Plastic trays (1020 size): For presprouting, 25 trays are needed, as each tray holds 40 tubers. Trays are replaced every five years.
- Potting mix: Each tray requires 0.3 cubic feet of potting mix for pre-sprouting, so 9 cubic feet are needed to fill all the trays. Three, 3.8-cubic-foot bags are purchased each year for pre-sprouting.
- 5-tier shelving unit: This serves as a proxy to estimate the cost of the space needed to store the trays of tubers while they are pre-sprouting.
- Water usage: One field requires 16 irrigation events, with 128 gallons of water applied per event, resulting in the use of 2,000 gallons of culinary water from March through June. However, irrigation frequency and amount are dependent on month and environmental conditions. The price of water per 1,000 gallons varies across Utah, and a mean residential rate of $2.48 per 1000 gallons is used here (Utah Division of Drinking Water, 2015).
- Straw mulch: Six straw bales are used to mulch the soil after planting to a depth of approximately 6 inches to protect tubers from below freezing temperatures over the winter. Mulch is removed when temperatures begin to warm in the spring, typically within the first two weeks of March.
- Low tunnel frames for shade: Initial low tunnel frame construction costs for two, 36-foot beds (see Rauter et al., 2021) were divided by the number of years until materials need to be replaced to determine the annual cost.
- Shade cloth: The south side of the low tunnel frames are covered with 30% shade cloth to reduce heat stress and increase stem length. One, 6-foot x 100-foot shade cloth piece is cut in half to cover two beds. New shade cloth is purchased every eight years.
- Ant bait: One package contains 24 bait stations, and six packets are used each year. One package is purchased every four years.

Harvest and Processing

- Harvest snips: One pair is replaced after two years.
- Buckets: Six, 5-gallon buckets are needed each year and should be replaced every four years.
- Floral preservative: Each year, 1 pound of a 5-pound package is used, so one package is purchased every five years.
- Rubber bands: One, 1-pound bag is purchased and used each year.
- Bouquet sleeves: Bunches are wrapped before sale based on florist preference. One square of brown kraft paper can be cut in half to wrap two bunches of flowers; one bundle of 2200 kraft paper squares is purchased every four years.

Hired Labor

Labor was priced at $16.80 per hour ($15.00 per hour plus employer-related costs), per feedback from local growers and within the mid-range of non-supervisory wages reported by the ERS (2022). Labor costs vary depending on region and experience and are the largest component of the total cost of anemone cut flower production. Because the total labor hours to produce anemone can be difficult to estimate, a labor cost sensitivity is included in Table 3. Net returns are positive for anemone assuming low- and mid-cost scenarios for labor (50 to 90 total labor hours) but become negative if labor costs increase to a high-cost scenario (130 total labor hours). The most time-consuming tasks are weeding (when no landscape fabric is used), harvesting, and bunching stems (processing), making streamlining these steps the most critical to reduce labor costs.

Net Returns and Other Considerations

Using the assumptions above, the net returns from a 14-foot x 40-foot field are $280.49 ($0.50 per square foot) for the harvest period (Table 1). Based on these costs, a minimum yield of four quality grade stems per plant and 75% sold would be required to break even (Table 2). Multiple factors may significantly impact net returns, including yield, pricing differences across sales outlets and geographical areas, management practices, and labor costs. Some of these factors are discussed below.

Markets and Yield

Anemone yields are highly variable, with reported total yields in the US ranging from 3 to 10 stems per plant (Rauter et al., 2023). In Northern Utah, field yields are limited by a narrow window of optimal temperatures, with risk of cold injury until May and heat after May causing flower production to stop by early July. While grower feedback from the Wasatch Front indicates total yields up to 7 stems per plant are attainable in the field with ideal conditions and management, many growers struggle to obtain marketable stem lengths and yield is highly influenced by year-to-year weather variability.

The returns in Table 1 are based on selling 100% of 2.2 quality grade stems per plant and 50% of 1.3 speculation grade stem harvested per plant in a wholesale market. The percentage of stems sold was based on local grower feedback that indicates that florists will place advance orders for quality stems but will only buy speculation stems as an impulse purchase to fill day-to-day needs. Both the number of marketable stems and percentage that can be sold will vary. Table 2 shows the returns associated with altering the percent of quality grade stems sold from 50% to 100% and yield from 1 to 5 stems per plant, assuming no speculation stems are sold. The return is positive with a yield of at least four quality stems per plant and a minimum of 75% sold. Lower yields or lower percentages sold would result in low or negative returns, while the ability to sell any speculation stems would increase returns.

There are other items that can affect net returns. Some cut flower farms sell directly to the final customer, such as at farmers markets or through subscriptions. Selling flowers as arrangements or adding on-farm experiences are other ways that farms may increase returns. Direct-to-consumer sales outlets are a good choice for anemone, since short stem lengths often limit wholesale marketability. This budget is meant to look at anemone production only and does not consider these alternatives.

Management Practices

Management practices, such as cultivar selection, planting date, winter insulation, and presprouting, can also influence net returns. Based on USU research trials in North Logan, UT from 2020 to 2022, planting pre-sprouted tubers under straw mulch in November was the only combination of management practices with yields high enough to generate positive economic returns. All other combinations of management practices resulted in economic losses. Table 4 shows the net losses associated with the other combinations of management practices tested.

Summary

Based on USU research trials, anemone has a low profit potential ($0.50 per square foot) when grown as a field cut flower crop in Northern Utah and sold at wholesale pricing. Labor costs, management practices, yield, stem length, and marketing success are the major variables influencing net returns for Northern Utah field production. Trialing a small number of anemone plants in the field to determine yield potential before growing a full field is recommended to minimize economic losses. Other considerations, such as direct marketing, may increase profit potential, but growers should carefully consider their unique situation when

determining whether anemone can be a viable part of their operation.

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Table 1. Anemone cut flower production budget based on one, 14-foot x 40-foot field (May to July harvest). Costs are based on a pre-sprouted, mid-November planting of tubers insulated with straw mulch over the winter.

REVENUES						
	Output	**Units**	**Total Bunches**	**% Sold**	**Price/Unit**	**Total**
	Quality grade	Bunches	218	100%	$15.00	$3,270.00
	Speculation grade	Bunches	129	50%	$12.50	$806.25
TOTAL REVENUES						**$4,076.25**

OPERATING EXPENSES						
Supplies	**Input**	**Units**	**Price/ Unit**	**Quantity**	**Years to Replacement**	**Annual Expense**
Preplant & Site Preparation	Tiller rental	Half day rental	$50.00	1	1	$50.00
	Urea fertilizer (46-0-0)	5-pound bag	$16.00	1	2	$8.00
	Muriate of K fertilizer (0-0-60)	5-pound bag	$16.00	1	4	$4.00
	Triple super phosphate fertilizer (0-45-0)	5-pound bag	$16.00	1	3	$5.33
	Drip irrigation kit	Kit	$170.00	1	3	$56.67
Establishment & Maintenance	Anemone tubers, 5-6 cm	100 tubers	$50.00	10	1	$500.00
	Captan fungicide	8-ounce bottle	$16.00	1	4	$4.00
	1020 trays	10 pack	$12.00	3	5	$7.20
	Potting mix	3.8-cubic-foot bag	$38.00	3	1	$114.00
	5-tier shelving unit	2 pack	$210.00	1	5	$42.00
	Water usage	1000 gallons	$2.48	2	1	$4.96
	Straw mulch	Bale	$9.00	6	1	$54.00
	Low tunnel frames for shade	36-foot low tunnel	$27.00	2	1	$54.00
	Shade cloth	6- x 100-foot cloth	$125.00	1	8	$15.63
	Ant bait	24 pack	$26.00	1	4	$6.50
Harvest & Storage	Harvest snips	Snip	$22.00	1	2	$11.00
	Buckets	Bucket	$5.00	6	4	$7.50
	Preservative	5-pound bucket	$22.00	1	5	$4.40
	Rubber bands	1-pound bag	$10.00	1	1	$10.00
	Kraft paper sheets	1 bundle (2200 sheets)	$86.00	1	4	$21.50
Total Supply Expenses						**$980.69**

OPERATING EXPENSES CONTINUED					
Labor	**Input**	**Units**	**Quantity**	**Wage**	**Annual Wage**
Preplant & Site Preparation	Soil tillage	Hours	2	$16.80	$33.60
	Apply fertilizer	Hours	0.5	$16.80	$8.40
	Install irrigation	Hours	1	$16.80	$16.80
Establishment & Maintenance	Pre-sprouting labor	Hours	6	$16.80	$100.80
	Planting labor	Hours	5	$16.80	$84.00
	Pesticide applications	Hours	0.5	$16.80	$8.40
	Hand weeding	Hours	20	$16.80	$336
	Install mulch	Hours	1	$16.80	$16.80
	Install shade	Hours	5	$16.80	$84.00
	Remove mulch	Hours	2	$16.80	$33.60
Harvest & Marketing	Harvest	Hours	18	$16.80	$302.40
	Processing	Hours	18	$16.80	$302.40
	Delivery to co-op	Hours	10	$16.80	$168.00
Total labor expenses					**$1,495.20**

Delivery Fees	**Description**	**Units**	**Quantity**	**Revenue**	**Fee**	**Total Cost**
	30% delivery charge from co-op	Bunches	283	$4,076.25	30%	$1,222.88
	Mileage to co-op	Miles	100		$0.52 per mile	$52.00
TOTAL OPERATING EXPENSES						$3,750.76

OWNERSHIP COSTS	
Land	$45.00
TOTAL OWNERSHIP COSTS	**$45.00**

TOTAL COSTS	**$3,795.76**
NET PROJECTED RETURNS (per 14-foot x 40-foot field)	**$280.49**
NET PROJECTED RETURNS (per square foot)	**$0.50**

Table 2. Stem yield and marketing sensitivity on net projected returns for anemone cut flowers grown in a field. Net returns were calculated by adjusting the percent sold and yield of quality-grade stems (>10-inch length) per plant.

	Net Projected Returns[a] (per square foot)				
Yield / % Sold	1	2	3	4	5
	quality-grade stems per plant[b]				
50%	-$3.66	-$2.73	-$1.80	-$0.87	$0.06
75%	-$3.20	-$1.80	-$0.40	$1.00	$2.39
100%	-$2.73	-$0.87	$1.00	$2.86	$4.72

[a] Calculations assume a price of $15 per bunch of 10 stems. Returns were calculated as shown in Table 1, except that speculation grade stems (8- to 10-inch length) were excluded.

[b] For comparison, the average anemone yield from two years of on-farm field trials across the Wasatch Front was 2.7 marketable stems per plant, although growers defined marketability differently, with marketable stem length minimums ranging from 6 to 12 inches.

Table 3. Labor sensitivity on net projected returns for anemone cut flowers grown in a field. Costs are based on a pre-sprouted, mid-November planting of tubers insulated with straw mulch over the winter. The minimum, most likely, and maximum estimates of total labor hours represent low-cost, mid-cost, and high-cost scenarios, respectively.

	Low-cost scenario	Mid-cost scenario	High-cost scenario
Total labor hours[a]	50	90	130
Total labor expenses[b]	$840.00	$1,512.00	$2,184.00
Net projected returns (per square foot)[c]	$1.67	$0.47	-$0.73

[a] Total labor hours represent the sum of all labor steps required to grow anemone cut flowers included in Table 1, from field preparation through delivery to the co-op.
[b] Total labor expenses = total labor hours × $16.80 per hour wage
[c] Net projected returns were calculated with the same yield and all costs (except labor) as Table 1.

Table 4. Management practice sensitivity on net projected returns for anemone cut flowers grown in a field. Management practices included planting dates of November, March, and April for tubers that were directly planted (-PS) or pre-sprouted (+PS) and either left bare or covered with straw mulch, a fabric low tunnel, or a fabric low tunnel and straw mulch over the winter. Cells for March and April plantings with mulch are left blank since the mulch was removed before spring plantings.

	Net Projected Returns[a] (per square foot)							
Planting Date	No insulation		Mulch		Low tunnel[c]		Low tunnel and mulch	
	-PS	+PS[b]	-PS	+PS	-PS	+PS	-PS	+PS
November	-$2.81	-$2.83	-$0.76	$0.50	-$0.45	-$0.62	-$1.06	-$1.66
March	-$1.84	-$1.83	-	-	-$0.76	-$0.38	-	-
April	-$2.24	-$1.94	-	-	-$1.68	-$2.09	-	-

[a] Returns were calculated using the same inputs as Table 1, assuming 100% of quality grade stems were sold at a price of $15 per bunch of 10 stems and 50% of speculation grade stems were sold at a price of $12.50 per bunch of 10 stems, with yield and labor costs adjusted based on Utah State University research trials from 2020-22.
[b] Pre-sprouted tubers were soaked and established in trays of moist potting mix for 2 weeks before planting.
[c] Low tunnels consisted of AG50 frost fabric over conduit hoops from planting until late April.