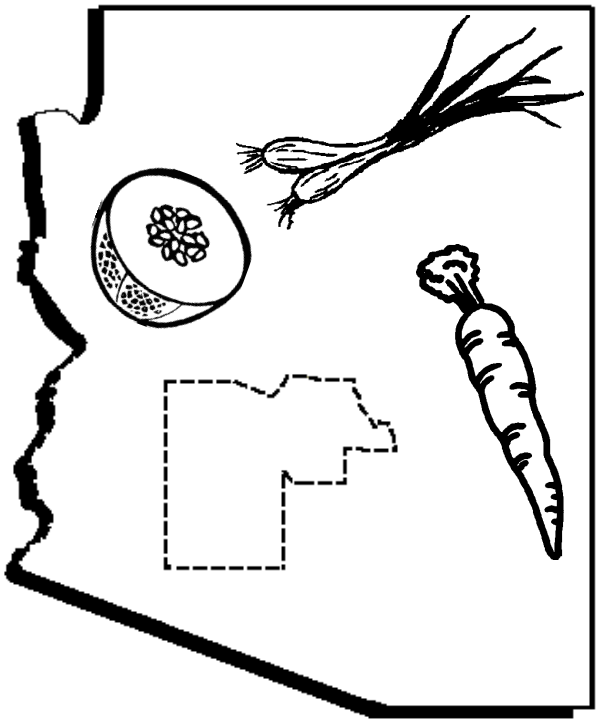

1998-99 Arizona Vegetable Crop Budgets

Central Arizona
Maricopa County

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Research Specialist

and

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Maricopa County

January 1999

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Abstract

This 1998-99 Vegetable Crop Budget Book is comprised of tables estimating the operating and ownership costs of producing vegetable crops in Central Arizona. The costs are computed for a representative farm using representative cropping operations and are not a statistical sample of farms in the area. These estimated costs are based on materials, custom services, labor, utilities, and machinery costs derived from surveys of input suppliers both within the county and throughout the state. Tables show individual operations required for producing the crop and estimate the cumulative costs of production. Monthly resource and cash flows are also estimated. Summary tables include information on the total operating and ownership costs of production.

Acknowledgments

The authors would like to acknowledge the cooperation of farmers, lenders, and input suppliers in providing information used in the cost estimates.

1998-99 Arizona Vegetable Crop Budgets

INTRODUCTION

The tables of this publication provide information on the costs of producing vegetable crops in Arizona. The crop production techniques and associated costs are to serve as general guides to the costs incurred by producers in the area. Operations and procedures vary with local conditions and farmer preference. Growers, lenders, and other users of this information should recognize the representative nature of these income and cost estimates. Some growers may be more efficient than others. Adjustments to yields, prices, and input requirements are probably needed to refine the estimates of income and costs for a particular grower and area within a county.

The remainder of this publication is divided as follows:

- *Descriptive narrative of budget tables,*
- *Tables of average yields and prices,*
- *Tables of farm descriptions,*
- *Budget tables for each crop, and*
- *Appendixes providing the support data for the cost estimates, including estimated costs of alternative water sources.*

This publication will not give the details of calculating each item within the budget since most calculations are evident.

The table descriptions that follow give clarifying definitions and assumptions where such information is needed.

DESCRIPTIONS OF BUDGET TABLES

The Arizona Crop Budgeting System provides five tables to describe the details of each crop production system and the costs of production. These tables are labeled as follows:

Table A.	**Income and Operating Cost Summary**
Table B.	**Allocation of Ownership Costs**
Table C.	**Variable Operating Costs**
Table D.	**Resource and Cash Flow Requirements**
Table E.	**Schedule of Operations**

All five tables are provided for each budgeted crop with the table number designating the budget and the following letter designating the table.

These tables are ordered to provide:

- *General summaries of cost,*
- *Detailed categorization of costs, and*
- *Technical information required to compute the costs.*

Each table is briefly described in the following paragraphs.

Table Headings

All tables have the same general heading immediately following the table number and title. This heading gives

Yield and Price Assumptions

Yield and price assumptions are very important in estimating the gross revenue of various cropping systems. For the purposes of this budget publication:

Budgeted yields are based, in so far as possible, on five-year county average yields using the most recent five years available.

Budgeted prices for each commodity are based on five-year state average prices since county level prices are not available. Due to the highly seasonal nature of most vegatable prices, particular caution is warranted in using these state level prices.

Important Assumptions for Operating Costs

1) A charge is included for all labor services (except management) including "non-paid" operator and family labor.
2) An interest charge is calculated for all operating costs irrespective of the source of operating funds (loan or equity funds).
3) Yields are estimated using historical averages and trends for the appropriate crop and technology.
4) Crop price estimates are based on commodity trend and outlook information.
5) Costs of individual input items are derived from extensive data surveys and are reported in the appendixes of this document.

location and crop-specific descriptions that define the crop being budgeted. The data provided include information on the location, soil type, irrigation water source, and crop yield.

Income and Cash Operating Cost Summary (Table A)

Table A for each budget provides a summary of the estimated income and operating costs incurred in producing the specified crop. The total income estimate is the sum of the contributions toward projected income of all products produced by the cropping system, including possible subsidies.

Income estimates are based on five-year county averages for yields for most crops and five-year state averages for commodity prices. These estimates are shown in Table 1.

The income projection is followed by a summary of operating cost in several categories:

Labor,
Chemical and Custom Application,
Farm Machinery and Vehicles,
Irrigation Water, and
Other Purchased Inputs and Services.

These items are subtotaled as **Total Cash Land Preparation Growing Expenses.**

In addition, itemized harvest costs are:

Labor,
Chemical and Custom Application,
Farm Machinery and Vehicles,
Custom Harvest/Post Harvest,
Crop Assessments, and
Other Materials.

These items are subtotaled as **Total Harvest and Post Harvest Expenses.**

Estimates of **Operating Overhead for Pickup Use** and **Operating Interest** are listed separately.

Operating costs, including sales taxes where appropriate, are summed to provide an estimate of cash operating expenses. The final entry in the table provides an estimate of the **Returns Over Cash Operating Expenses.**

The costs of this table are detailed in Table C described in a following section.

Allocation of Ownership Costs (Table B)

Table B provides a summary of the allocation of ownership costs and the resulting expected returns of the enterprise. The first three lines of this table are summaries of the information from Table A.

Two sets of columns provide information on a "Cash Basis" and on a "Total Cost Basis." The distinction is important. The long-term profitability of the enterprise requires that all cost (not just cash cost) be paid.

An overview of the table shows that **Cash Overhead Expenses** include estimates for:

Taxes, Housing, and Insurance on Farm Machinery (including vehicles),
Taxes, Housing, and Insurance on Irrigation Equipment (excluding ditches),
General and Office Overhead, and
General Farm Insurance.

The last two items are estimated as percentages of the Total Operating Expenses. Estimating procedures for Taxes, Housing, and Insurance are more complex and

are documented elsewhere.[1] This group of costs is designated as "cash costs" since they are generally paid in cash during the cropping year.

CAPITAL ALLOCATIONS are designated on a "Total Cost Basis" since they may or may not be paid during the cropping year depending upon the equity/debt structure of the farm and the capital replacement strategy used. Farmers often replace capital equipment with large "lump sum" purchases. New equipment is then depreciated for tax purposes and replaced when sufficiently worn out or when personal tax strategy calls for replacement. The funds for such purchases will be borrowed capital, equity capital, or a combination of the two. Interest will be cash interest on borrowed capital and/or opportunity interest on equity capital. Capital Replacement estimates and interest costs for Farm Machinery, Vehicles, and Irrigation Equipment are shown in Table B.

Land costs are either cash in the form of Rent, Lease, or Taxes; or non-cash in the form of Opportunity Interest on Equity Investment in Land. Thus, land charges are considered on both "Cash" and "Total Cost Basis." Management Services are estimated on "Total Cost Basis" by taking a percentage of Total Operating Cost as is the common practice of professional farm management farms, since these costs may or may not be paid by the grower depending upon the farm's organization. Most owner- or renter-managed farms will not pay these costs directly. Assessments made by irrigation districts, which must be paid whether or not a farm is producing, are charged as land costs. If the budgeted crop is part of a "double crop" sequence, one-half of the land costs are attributed to each crop of the sequence.

Table B also provides estimates of net returns at various levels of allocation of ownership costs. The level of net returns depends on whether one examines costs on a "Cash Basis" or a "Total Cost Basis." Returns Over Cash Operating Expenses, Returns Over Cash Operating Expenses and Overhead, Returns to Land, Management and Risk, Returns to Management and Risk, and Returns to Risk (Profits) are all listed in Table B.

RETURNS OVER CASH OPERATING EXPENSES are the differences between Total Income and the Cash Operating Expenses. If positive, these returns represent the funds available to pay overhead, ownership expenses, land expenses, and management services plus profits.

RETURNS OVER CASH OPERATING EXPENSES AND OVERHEAD are the residual funds available after Cash Operating and Cash Overhead expenses are paid (excluding cash land costs). These funds are available to pay for equipment capital usage, land usage, and management services. These returns are identical to **Returns to Land, Capital, Management and Risk**.

RETURNS TO LAND, MANAGEMENT AND RISK further reduce the funds available by extracting the costs of equipment capital usage through Capital Allocations. These include the costs of Capital Replacement and opportunity interest on equipment. The grower is assumed to have 100% equity in all equipment. Thus, these costs are considered non-cash and are allocated on a "Total Cost Basis" only. These costs might be partially cash as noted above in the category **Capital Allocations**.

RETURNS TO MANAGEMENT AND RISK are the returns remaining after charges for land usage have been extracted. Land clearly represents a dilemma in the allocation of costs since it can be cash in the form of rents or leases, or can be partially cash and partially "economic" cost. For 100% equity ownership of lands, the cash costs are for taxes. However, opportunity interest on land ownership is charged for the "Total Cost Basis."

Definition - Cash Basis

Cash Basis includes all costs for labor, materials, custom services, and an interest charge. Land rent, land taxes, and irrigation assessments are assumed to be paid in cash if applicable.

Definition - Total Cost Basis

Allocations for costs which may or may not be paid in cash, but which are normally not paid in cash are considered in addition to the cash items. These costs include allocations for capital replacement of farm equipment, opportunity interest on farm equipment and farm land, and a charge for management.

[1] Teegerstrom, T, 1998-99 Arizona Farm Machinery Costs, Extension Bulletin No. 198026, Cooperative Extension, The University of Arizona, Tucson, AZ, February 1998.

RETURNS TO RISK (PROFITS) further reduce the net returns for the costs of Management Services. This charge is made on a "Total Cost Basis" only, since many farmers do not directly pay the cost of such management services. Returns to Risk represent the purest level of profits after all resources have been allocated an appropriate portion of the returns. If an investment is risk-free and all inputs, including management, are paid an appropriate amount equal to their contribution, then net economic profit will be zero in a comptetitive industry (such as agriculture).

Table B concludes with an estimate of the break-even prices of the primary output considering all of the costs previously described and the assumed yield. Break-even prices are those commodity prices below which all resources will not be paid.

Variable Operating Costs (Table C)

Table C provides the detail costs of each operation required to produce the crop (some operations are performed more than one time). The operations are listed sequentially, with the machine and labor hours required to produce one acre displayed in the first two columns after the operation name. The next five columns give the Machine, Labor, Custom, Materials, and Total Costs for completing the operation one time. The next column gives the number of times the specific operation will be performed. The final cost column gives the Total Expense (Cash) for the total number of times the operation is performed. The final column classifies the operation:

Land Preparation (L),
Growing (G),
Harvest (H),
Post Harvest (P), or
Marketing (M).

The total cost for each of these categories is presented at the end of the table.

All Costs presented in this table are variable operating expenses. No ownership costs are presented. A line entry (if appropriate) following the last operation describes the assumptions for pickup truck usage.

Operating Interest is included as the last line of the table and represents the interest paid on the cash operating expenses excluding pickup truck costs. Total Cash Operating Expenses summarizes the total cost for each category for the total number of times the operations are performed. The specific physical details of operations are presented in Table E, including assumed job rates, materials, applications rates, equipment requirements, labor requirements, and custom costs.

Table C also includes a summary of cost by Class of Operation:

Land Preparation (L),
Growing (G),
Harvest (H),
Post Harvest (P),
Marketing (M), and
Operating Overhead (O).

Finally, a sensitivity of Net Revenues over Total Cash Expenses examines changes in net returns with changes in price and yield of the produced commodities.

Resource and Cash Flow Requirements (Table D)

Resource and Cash Flow Requirements are summarized in Table D by month where the abbreviations P, C, and N represent Previous Year, Current Year, and Next Year, respectively. The Current Year is defined as the calendar year in which harvesting of the output takes place. Summary columns give information on the number of irrigations, water applied, and labor required in each month. Variable (cash) operating expenses are subdivided into Water, Machine, Labor, Chemical, Other Purchases, and Services for each month. The last column gives the Total Cash required to pay variable

Water Costs

Arizona is a patchwork of irrigated farms which receive irrigation water from many different sources. This document estimates costs of production for each crop based on one assumed water source. Producing the crop in some other area of the county or state likely uses water from different sources. To use these estimates for areas other than their original ones, new water cost estimates should be made. New water cost estimates can be made by removing the water costs from the original budget and replacing it with the cost of irrigation water in the new area.

expenses in each month. These dates all are based on the schedule and calendar of operations described in Table E.

Additional summary information totals all the requirement columns and provides plant nutrient, water, labor, and purchased energy (fuels) summaries.

Finally, detailed lists of all of the equipment, labor, and material requirements for the enterprise are provided.

Schedule of Operations (Table E)

The Schedule of Operations (Table E) provides the underlying information for the budgeted costs. The physical requirement and description of each operation is listed in detail, including the first month in which the operation is performed, the number of times the operation is performed, the tractors and implements required, the job rate (acres per labor hour) of each operation, the required materials (quantity, price, and units), the prices and units of required custom (or hired) services, and the labor type used to complete the operation.

Since this table is very important in defining the physical elements of the budgeting process, each column is described in some detail in the table below. The physical descriptions of the cropping operations provide the documentation of the cropping system for which cost estimates are being made.

List of Column Headings for Table E

Column Heading	Description
No.	The sequence number of each operation is provided for the ordering of operations.
First Month	The first month in which each operation is to be performed is identified. An operation name may occur several times in a sequence of budget operations, but usually if all elements of the operation are identical (e.g., job rate or quantity of materials) then the operations will be combined into a single entry.
Operation	The operation name is identified. Some abbreviations are necessary to fit the limited space available in the table.
Equipment/ Custom Oper.	This general heading identifies either 1) the combination of equipment required to accomplish the operation, or 2) the custom or hired service activity. This entry may be truncated. If questions arise about the actual material, refer to the alphabetical entries in Appendixes A and B.
HP	The horsepower rating of the tractor used in this operation is identified. If no tractor is used, this entry is blank.
Self-Prop./ Implement	The implement column identifies 1) the descriptive name of an implement used in the operation, 2) the descriptive name of the self-propelled implement used in the operation, or 3) the descriptive name of a custom activity used in the operation (preceded by the abbreviation CST). Multiple lines may be required for identification of implements towed behind tractors or vehicles.
Job Rate	Job Rate (Acres/Hr) is defined as the number of acres that can be completed per hour of labor. Machinery hours are usually less than labor hours. The budgeting program adjusts all job rates to provide labor and machine hours, as shown in Table C.
Material Use & Cost	Under this broad heading all materials applied during a specific operation are identified using the following information.
Name	The name or names of any fertilizer, chemical, seed, water, or miscellaneous materials used in crop production are listed (one per line). In so far as possible, the names used are generic, non-trade names. This entry may be truncated. If questions about the actual material arise, refer to Appendixes A and B.
Appl. Rate	Each material application rate is identified with the appropriate application unit.
$/Unit	This column specifies the cost of the material with the appropriate units at which the material is purchased.
Service Cost	The cost and purchase unit ($/ unit) of any custom operation identified in the Self-Prop./Implem. column is noted here with the appropriate purchase unit.
Labor Type	The type of labor used in the operation is identified.

THE BUDGET TABLES

The results of the cost of production estimates are included in a series of Tables A through E for each crop as noted in the Table of Contents. To aid the users of this publication, a table of the abbreviations is presented below. Background data for these estimates are provided in Table 2, Representative Farm Description for Budget Estimates, and Appendixes A and B. Appendix A identifies those data groups uniquely specified by each county while Appendix B identifies the input items where state average prices were used.

Chemical materials provide a unique challenge for these estimates since each material is identified by its common generic name. However, in order to avoid confusion some (most) items are also identified, insofar as possible because of limited printing space, by trade names. Some identifiers are truncated because of space limitations.

Table of Abbreviations

ai	Active ingredient
Appl	Applications
CST	Custom
Defol.	Defoliant
Fld	Field
G	Granules
Gnd	Ground
Gr	Graded
Herb	Herbicides
Insur	Insurance
Irrig	Irrigation
L	Liquid
Oper.	Operating
Over.	Overhead
Prop.	Propelled
Rw	Row
Sk	Shank
Spr	Spray
W/	With
X	Times
#	Number

Units of Measure

AF	Acre-Foot
Al	Acre-Inch
Ac,AC	Acre
Ba	Bale
Bn	12 Bun
CW, CWT	100 Pounds
Cl, Cwl	100 Pounds Lint Cotton
Ct, Ctn	Carton
DB	1 Dozen Bunches
Ea	Each
Er	12 Ears of Corn
Fn	Feet/Ton
Ft	Feet
Ga, Gal	Gallon
Gm	Gram
HD	Head Days
Hr, Hrs	Hours
Lb, Lbs	Pound
Lg	Lug
M	Meter
MI, Mi	Miles
Mu	Module
Qt	Quart
Sk	Sack
TF	Thousand Feet
Th	Thousand
Tn, T	Ton
Tp	Tarp