ESTIMATING COSTS OF PRODUCTION

by James C. Wade, Lew Daugherty, Russell Tronstad[1]

This article describes some of the basics on how cost estimates are determined for The University of Arizona, Cooperative Extension Field and Vegetable Crop Budgets (Wade, et al.). An example for growing red chiles in the Kansas Settlement area of Cochise county is given. The cost estimates given are illustrative rather than a statistical estimate of growing costs for the Kansas Settlement area. Crop production techniques, operations, and procedures can vary with local conditions and farmer preferences.

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, others less so. Adjustments to yields, prices and input requirements may be needed to refine the estimates of income and costs in an actual situation.

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 Requirement and Cash Flow**
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 1) general summaries of cost, 2) detailed categorization of costs and 3) the technical information required to compute the costs. Each table is briefly described in the following paragraphs.

Income and 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 any subsidies. The income projection is followed by cost summaries for Labor, Chemical and Custom Application, Farm Machinery and Vehicles, Irrigation, and Other Purchased Inputs and Services. Subtotals are provided for Cash, Land Preparation and Growing Expenses, and Cash Harvest and Post Harvest Expenses. Estimates of Operating Overhead for Pickup use and Operating Interest are listed separately. These costs, including sales taxes where appropriate, are summed to provide an estimate of cash operating expenses. The final entry in the table provides an

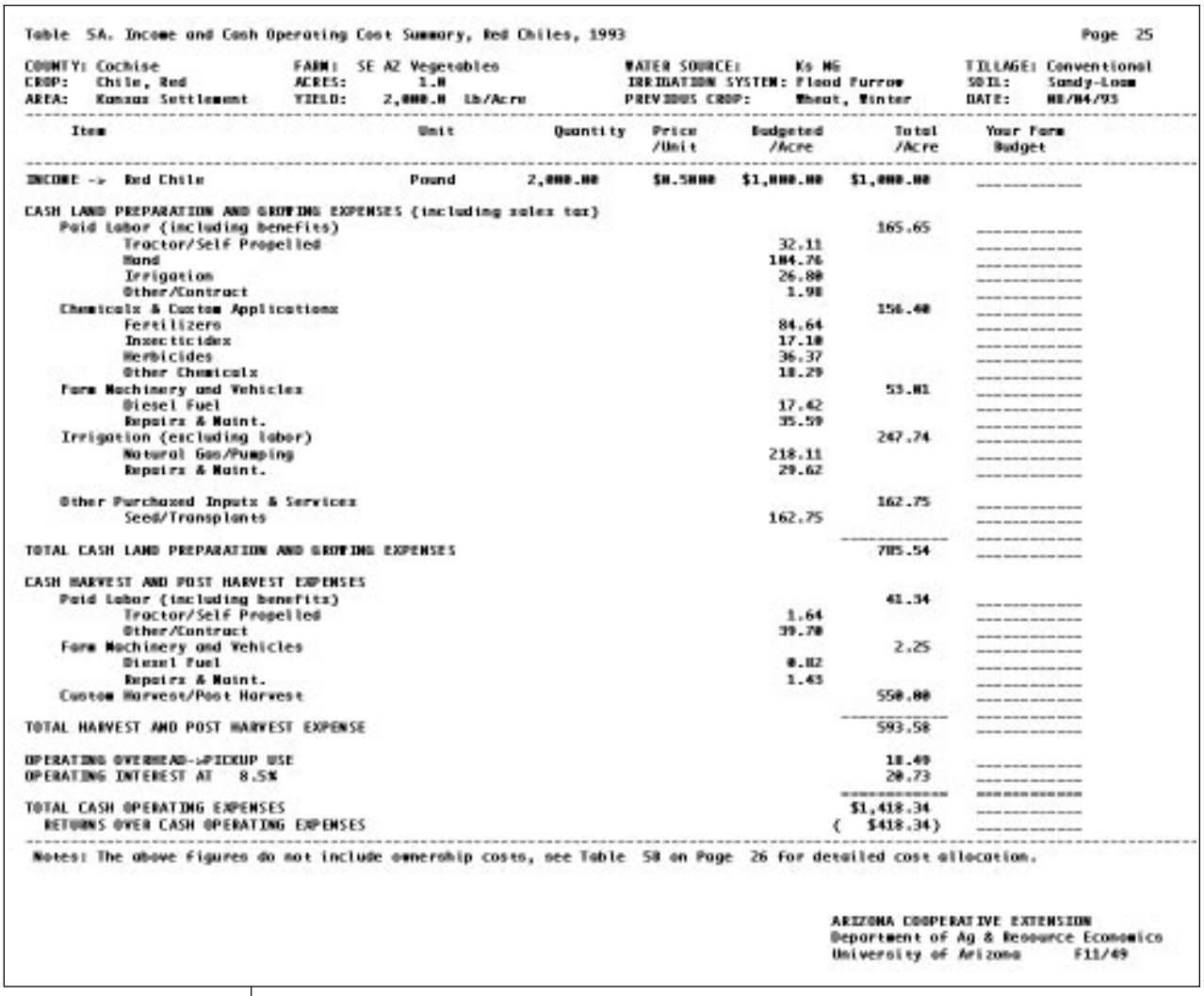

Table 5A. Income and Cash Operating Cost Summary, Red Chiles, 1993 — Page 25

COUNTY: Cochise — FARM: SE AZ Vegetables — WATER SOURCE: Ks MG — TILLAGE: Conventional
CROP: Chile, Red — ACRES: 1.0 — IRRIGATION SYSTEM: Flood Furrow — SOIL: Sandy-Loam
AREA: Kansas Settlement — YIELD: 2,000.0 Lb/Acre — PREVIOUS CROP: Wheat, Winter — DATE: 08/04/93

Item	Unit	Quantity	Price /Unit	Budgeted /Acre	Total /Acre	Your Farm Budget
INCOME -> Red Chile	Pound	2,000.00	$0.5000	$1,000.00	$1,000.00	
CASH LAND PREPARATION AND GROWING EXPENSES (including sales tax)						
Paid Labor (including benefits)					165.65	
Tractor/Self Propelled				32.11		
Hand				104.76		
Irrigation				26.80		
Other/Contract				1.98		
Chemicals & Custom Applications					156.40	
Fertilizers				84.64		
Insecticides				17.10		
Herbicides				36.37		
Other Chemicals				18.29		
Farm Machinery and Vehicles					53.81	
Diesel Fuel				17.42		
Repairs & Maint.				35.59		
Irrigation (excluding labor)					247.74	
Natural Gas/Pumping				218.11		
Repairs & Maint.				29.62		
Other Purchased Inputs & Services					162.75	
Seed/Transplants				162.75		
TOTAL CASH LAND PREPARATION AND GROWING EXPENSES					785.54	
CASH HARVEST AND POST HARVEST EXPENSES						
Paid Labor (including benefits)					41.34	
Tractor/Self Propelled				1.64		
Other/Contract				39.70		
Farm Machinery and Vehicles					2.25	
Diesel Fuel				0.82		
Repairs & Maint.				1.43		
Custom Harvest/Post Harvest					550.00	
TOTAL HARVEST AND POST HARVEST EXPENSE					593.58	
OPERATING OVERHEAD->PICKUP USE					18.49	
OPERATING INTEREST AT 8.5%					20.73	
TOTAL CASH OPERATING EXPENSES					$1,418.34	
RETURNS OVER CASH OPERATING EXPENSES					($418.34)	

Notes: The above figures do not include ownership costs, see Table 5B on Page 26 for detailed cost allocation.

ARIZONA COOPERATIVE EXTENSION
Department of Ag & Resource Economics
University of Arizona F11/49

estimate of the RETURNS OVER CASH OPERATING EXPENSES.

Important Assumptions: Several important assumptions are made in estimating the Operating Costs of Table A.

1). **That all labor costs are paid including allocations for employee benefits.**

2). **Interest on operating loans is assumed paid.**

3). **Yields are estimated using historical averages and trends for the crop and technology considered (5 year averages).**

4). **Crop price estimates are based on commodity trend and outlook information (5 year averages).**

5). **Costs of individual input items are derived from extensive data surveys and are reported in the appendixes of each crop budget.**

The costs of this table are detailed in Table C and 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

Table 5B. Allocation of Ownership Costs: Red Chiles, 1993 Page 26

COUNTY: Cochise FARM: SE AZ Vegetables WATER SOURCE: Ks MG TILLAGE: Conventional
CROP: Chile, Red ACRES: 1.0 IRRIGATION SYSTEM: Flood Furrow SOIL: Sandy-Loam
AREA: Kansas Settlement YIELD: 2,000.0 Lb/Acre PREVIOUS CROP: Wheat, Winter DATE: 08/04/93

Item	-- CASH COST BASIS ($/ACRE) - Income & Costs	Net Returns	- TOTAL COST BASIS ($/ACRE) - Income & Costs	Net Returns
TOTAL INCOME at $ 0.5000/Lb	$1,000.00		$1,000.00	
TOTAL OPERATING EXPENSES	1,418.34		1,418.34	
RETURN OVER CASH OPERATING EXPENSES		($418.34)		($418.34)
CASH OVERHEAD EXPENSES				
Taxes, Housing & Insur., Farm Machinery	4.96		4.96	
Wells & Irrig. System	13.13		13.13	
Gen. & Off. Overhead (5% of Tot. Oper. Exp.)	70.91		70.91	
General Farm Maint. (3% of Tot. Oper. Exp.)	42.55		42.55	
Total Cash Overhead Expenses	131.55		131.55	
Total Cash Oper. & Over. Cost	1,549.89		1,549.89	
RETURNS OVER CASH OPER. & OVER. EXPENSES.		(549.89)		(549.89)
CAPITAL ALLOCATIONS (100% Equity)				
Capital Replacement, Machinery & Vehicles			26.61	
Wells & Irrig. System			53.55	
Interest on Equity, Machinery & Vehicles			15.53	
Wells & Irrig. System			33.51	
Total Capital Allocations			129.20	
RETURNS TO LAND, CAPITAL, MANAGEMENT & RISK		(549.89)		
RETURNS TO LAND, MANAGEMENT & RISK				(679.89)
Land Cost...Rent or Lease	45.00		45.00	
Total Land Costs	45.00		45.00	
RETURNS TO MANAGEMENT, CAPITAL & RISK		(594.89)		
RETURNS TO MANAGEMENT & RISK				(724.89)
Management Services (6% of Tot. Oper. Exp.)			85.10	
TOTAL OWNERSHIP COST	176.55		390.85	
TOTAL COST	$1,594.89		$1,889.20	
RETURN TO MANAGEMENT, CAPITAL & RISK		($594.89)		
RETURN TO RISK (PROFITS)				($889.20)
BREAK-EVEN PRICE TO COVER OPERATING COST (PER Lb)		$0.70		$0.70
BREAK-EVEN PRICE TO COVER OWNERSHIP COST		$0.08		$0.19
BREAK-EVEN PRICE TO COVER TOTAL COST		$0.79		$0.90

ARIZONA COOPERATIVE EXTENSION
Department of Ag & Resource Economics
University of Arizona F11/49

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 <u>that all costs</u> (not just cash costs) be paid.

Cash Basis includes all costs that are paid in cash to laborers, materials vendors, and custom operators, including those costs and interest paid to lending agents. Land rent, land taxes, and irrigation assessments are assumed to be paid in cash if applicable for the budgeted farm.

Total Cost Basis includes (in addition to those cash items described previously) allocations for costs which may or may not be paid in cash, but which are normally <u>not</u> paid in cash. These costs include allocations for capital replacement of farm equipment, opportunity interest on farm equipment and farm land, and non-paid labor and management.

An overview of the table shows that CASH OVERHEAD EXPENSES include estimates for Taxes, Housing, and Insurance on Farm Machinery (including vehicles) and Irrigation Equipment (excluding ditches). General Overhead and General Farm Maintenance are estimated as percentages of the Total Operating Expenses. Estimating procedures for Taxes, Housing, and Insurance are more complex and are documented elsewhere. 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 crop-

ping 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 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 is based on an average year utilization of the equipment. Capital replacement estimates and interest costs for Farm Machinery, Vehicles and Irrigation Equipment are shown in Table B (Daugherty and Wade).

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" or "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.

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. Each requires a brief explanation.

RETURNS OVER CASH OPERATING EXPENSES are the difference 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 & 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 & RISK.

RETURNS TO LAND, MANAGEMENT & 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 & 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."

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.

Table 5C. Variable Operating Costs; Red Chiles, 1993 — Page 27

COUNTY: Cochise — FARM: SE AZ Vegetables — WATER SOURCE: Kx NG — TILLAGE: Conventional
CROP: Chile, Red — ACRES: 1.0 — IRRIGATION SYSTEM: Flood Furrow — SOIL: Sandy-Loam
AREA: Kansas Settlement — YIELD: 2,000.0 lb/Acre — PREVIOUS CROP: Wheat, Winter — DATE: 08/04/93

No.	First Month	Operation	Hours * Machine	Hours * Labor	Operating Costs ($/Acre*) Fuel/Rps.	Labor	Cust/Ser.	Materials	Total	Times	Tot. Cash Expense	Class
1	Jan	Plow	0.321	0.357	6.18	2.83			8.93	1.0	8.93	L
2	Feb	Disk	0.225	0.250	3.45	1.98			5.43	2.0	10.86	L
3	Feb	Laser Level	0.900	2.000	12.09	14.56			26.65	0.3	8.00	L
4	Feb	Landplane	0.225	0.250	3.82	1.98			5.80	0.5	2.90	L
5	Feb	List	0.180	0.200	2.83	1.59			4.42	1.0	4.42	L
6	Mar	Apply Herbicide/Ground	0.150	0.167	2.87	1.33		36.37	39.77	1.0	39.77	G
7	Mar	Suck Rows	0.823	0.825	8.24	0.20			8.44	5.0	2.10	G
8	Mar	Preirrigate		0.424	25.63	2.81			28.44	1.0	28.44	G
9	Mar	Disk Ends	0.822	0.825	8.18	0.20			8.38	4.0	1.53	G
10	Mar	Apply Fert/Ground	0.150	0.167	2.50	1.33		27.81	31.64	1.0	31.64	G
11	Mar	Mulch	0.225	0.250	3.00	1.98			4.98	1.0	4.98	L
12	Apr	Plant	0.225	0.250	3.85	1.98		173.48	179.31	1.0	179.31	L
13	Apr	Irrigate		0.279	17.89	1.85			18.94	12.0	227.28	G
14	May	Cultivate	0.200	0.222	2.38	1.76			4.14	5.0	20.71	G
15	Jun	Thinning		16.667		104.76			104.76	1.0	104.76	G
16	Jun	Apply Fert/Ground	0.225	0.250	4.26	1.98		29.57	35.81	1.0	35.81	G
17	Jun	Apply Fungicide/Air					4.71	6.10	10.81	3.0	32.43	G
18	Aug	Irrigate/Run Fertilizer		0.279	17.89	1.85		27.26	46.20	1.0	46.20	G
19	Aug	Apply Insecticide/Air					4.32	2.04	6.36	1.0	6.36	G
20	Sep	Prepare Ends	0.822	0.825	8.31	0.20			8.51	1.0	8.51	H
21	Oct	Pick 2000.0 lb					500.00		500.00	1.0	500.00	H
22	Oct	Load Produce		6.000		39.69			39.69	1.0	39.69	H
23	Oct	Haul, Custom 1.0 Tn					50.00		50.00	1.0	50.00	H
24	Dec	Cut Stalks	0.164	0.182	1.94	1.44			3.38	1.0	3.38	P
25	Dec	Disk Residue	0.129	0.143	2.14	1.14			3.28	1.0	3.28	L
		Pickup Use 80 Mi/Ac	2.678		18.49						18.49	O
		Operating Interest at 8.50%					20.72				20.72	O
		TOTAL CASH OPERATING EXPENSES:			$321.55	$207.03	$589.18	$314.83			$1,418.34	T

* NOTES: Machine and labor hours and operating cost are for one time over the designated acreage. The "Tot. Cash Expense" column and the "TOTAL CASH OPERATING EXPENSES:" row include all operations, all times over. Classes are defined below.

OPERATING COST SUMMARY BY CLASS

Land Preparation (L)	$222.68
Growing (G)	577.18
Harvest (H)	598.19
Post Harvest (P)	3.37
Marketing (M)	0.00
Operating Overhead (O)	39.21
Total (T)	$1,418.34

SENSITIVITY OF NET REVENUES OVER TOTAL CASH EXPENSES ($/Acre)

Prices ->		-25%	-10%	Budgeted	+10%	+25%	
Yields		$0.37	$0.45	$0.50	$0.55	$0.62	Break-even
-25%	1,500.0	-721.68	-609.18	-534.18	-459.18	-346.68	0.85
-10%	1,800.0	-698.22	-563.22	-473.22	-383.22	-248.22	0.76
Budgeted	2,000.0	-682.57	-532.57	-432.57	-332.57	-182.57	0.71
+10%	2,200.0	-666.93	-501.93	-391.93	-281.93	-116.93	0.67
+25%	2,500.0	-643.47	-455.97	-338.97	-205.97	-18.47	0.63
Break-even Yield		18,727.27	5,476.09	4,128.78	3,313.44	2,556.28	

ARIZONA COOPERATIVE EXTENSION
Department of Ag & Resource Economics
University of Arizona — 711/49

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 Cost (Table C)

Table C provides the detail costs of each operation required to produce the crop. 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 as either Land Preparation (L), Growing (G), Harvest (H), Post Harvest (P), Marketing (M), or Overhead (O). The total cost for each of these categories is presented at the end of the table. A sensitivity of Net Revenues over Total Cash Expenses examines changes in net returns with changes in price and yield of the produced commodities.

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 Tables 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, Table C includes a sensitivity (break-even) table of net returns over Total Cash Expenses.

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

Table 5D. Resource and Cash Flow Requirements: Red Chiles, 1993 — Page 28

COUNTY: Cochise — FARM: SE AZ Vegetables — WATER SOURCE: Ko NG — TILLAGE: Conventional
CROP: Chile, Red — ACRES: 1.0 — IRRIGATION SYSTEM: Flood Furrow — SOIL: Sandy-Loam
AREA: Kansas Settlement — YIELD: 2,000.0 lb/Acre — PREVIOUS CROP: Wheat, Winter — DATE: 08/04/93

Month *	Number Irrig.	Water Applied (Inches)	Total Labor (Hrs)	Operating Cost ($/Acre): Purchased Water	Fuel, Oil & Repairs	Labor	Chemicals	Other Purchases	Services	Total
JAN C			0.85		13.00	6.00				19.01
FEB C			0.92		8.37	6.95				15.31
MAR C	1.0	6.0	0.93		32.11	6.85	64.18			103.14
APR C	1.0	4.0	0.67		22.60	5.02	10.73	162.75		201.10
MAY C	3.0	12.0	1.10		54.07	7.70				61.77
JUN C	3.0	12.0	18.24		60.71	116.20	35.67		4.71	217.29
JUL C	3.0	12.0	1.33		56.45	9.46	6.10		4.71	76.72
AUG C	3.0	12.0	0.83		51.27	5.54	35.40		9.03	101.24
SEP C			0.02		0.31	0.20				0.51
OCT C			3.60			23.82			330.00	353.82
NOV C			2.40			15.88			220.00	235.88
DEC C			0.32		4.00	2.50				6.66
Pickup Use 80 Mi/Ac					10.49					10.49
Operating Interest at 8.5%									20.73	20.73
Total	14.0	58.0	31.26		321.55	206.99	152.00	162.75	589.10	1,410.34
%					22.07	14.59	10.72	11.47	41.53	100.00

TOTAL RESOURCES REQUIREMENTS(/Acre)

Total N	256.1 lbs
Total P	106.0 lbs
Total K	0.0 lbs
Total Labor	31.2 Hrs
Total Water	58.0 AI

TOTAL ENERGY REQUIREMENTS(/Acre)

Diesel Fuel	20.4	Gal
Regular Gas	0.0	Gal
NonLead Gas	0.0	Gal
Natural Gas/Pumping	469.0	Therms
All Direct Energy	50.7	M BTU

EQUIPMENT REQUIREMENTS(/Acre)

Tractor, 125 PTO HP, MFWD	1.46 Hrs	Moldboard Plow, 4-16 2 Way	0.32 Hrs	Offset Disk, 12'	0.45 Hrs
Drag Scraper, 10'	0.27 Hrs	Laser Receiver, Mast System	0.27 Hrs	Laser Trailer	0.27 Hrs
Landplane 12'X 45'	0.11 Hrs	Lister, 7 Bottom	0.10 Hrs	Tractor, 100 PTO HP, MFWD	2.20 Hrs
Rolling Cultivator, 6 Row	1.30 Hrs	Saddle Tk Sprayer, 2 Tk 8 Row	0.15 Hrs	Rowbuck, 10'	0.12 Hrs
Tractor, 40 PTO HP, MFWD	0.09 Hrs	Offset Disk, 16.5'	0.24 Hrs	Fert. Side Dress Unit, 4Row	0.30 Hrs
Power Mulcher, 4 Row	0.23 Hrs	Bed Shaper, 6 Row	0.23 Hrs	Planter, Drill Type, 6 Row	0.23 Hrs
Rotary Stalk Cutter, 4 Row	0.16 Hrs	Pickup Truck, 1/2 Ton	2.67 Hrs		

MATERIALS REQUIREMENTS(/Acre)

Napropamide	4.00 Lb	Water, Pump	58.00 AI	11-53-00, Dry	200.00 Lb
Chile Pepper Sd (OP)	5.00 Lb	Carbofuran	7.00 Lb	46-00-00, Urea 46	250.00 Lb
Copper Hydroxide	6.75 Lb	32-00-00, URAN 32, Lqd	28.00 Gal	BT	0.15 Lb

LABOR REQUIREMENTS(/Acre)

Tractor	4.25 Hrs	Other	2.30 Hrs	Irrigators	4.05 Hrs
Hand Weeders	16.67 Hrs	Produce Loader	2.00 Hrs	Melon Stomper	2.00 Hrs

* NOTE: P = Previous Year C = Current Year N = Next Year

ARIZONA COOPERATIVE EXTENSION
Department of Ag & Resource Economics
University of Arizona F11/49

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 are listed in detail, including the first month in which the operation is performed, the number of times the operations are 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 on the following pages.

Table 5E Schedule of Operations; Red Chiles, 1993 Page 29

COUNTY: Cochise FARM: SE #2 Vegetables WATER SOURCE: Ks HG TILLAGE: Conventional
CROP: Chile, Red ACRES: 1.0 IRRIGATION SYSTEM: Flood Furrow SOIL: Sandy-Loam
AREA: Kansas Settlement YIELD: 2,000.0 Lb/Acre PREVIOUS CROP: Wheat, Winter DATE: 08/04/93

No.	First Month	Times	Operation	Equipment/Custom Oper. HP	Equipment/Custom Oper. Self-Prop./Implem.	Job Rate Acres/Hr	Material Use & Cost Name	Material Use & Cost Appl. Rate	Material Use & Cost $/Unit	Service Cost $/Unit	Labor Type
1	Jan	1.0	Plow	125	Moldboard Plow, 4-16 2	2.80					Tractor
2	Feb	2.0	Disk	125	Offset Disk, 12'	4.00					Tractor
3	Feb	0.3	Laser Level	125	Drag Scraper, 10'	1.00					Tractor
					Laser Receiver, Mast Sy						Other
					Laser Trailer						
4	Feb	0.5	Landplane	125	Landplane 12'X 45'	4.00					Tractor
5	Feb	1.0	List	125	Lister, 7 Bottom	5.00					Tractor
6	Mar	1.0	Apply Herbicide/Ground	100	Rolling Cultivator, 6 R	6.00	Napropamide	4.00 Lb	8.66 Lb		Tractor
					Saddle Tk Sprayer, 2 Tk						
7	Mar	5.0	Back Rows	100	Rowbuck, 10'	40.00					Tractor
8	Mar	1.0	Preirrigate			2.36	Water, Pump	6.00 Al	51.25 AF		Irrigator
9	Mar	4.0	Disk Ends	40	Offset Disk, 16.5'	40.00					Tractor
10	Mar	1.0	Apply Fert/Ground	100	Fert. Side Dress Unit,	6.00	11-53-00, Dry	200.00 Lb	264.86 Tn		Tractor
11	Mar	1.0	Mulch	100	Power Mulcher, 4 Ro	4.00					Tractor
12	Apr	1.0	Plant	100	Bed Shaper, 6 Ro	4.00	Chile Pepper Sd (D	5.00 Lb	31.00 Lb		Tractor
					Planter, Drill Type, 6		Carbofuran	7.00 Lb	1.46 Lb		
13	Apr	12.0	Irrigate			3.58	Water, Pump	4.00 Al	51.25 AF		Irrigator
14	May	5.0	Cultivate	100	Rolling Cultivator, 6 R	4.50					Tractor
15	Jun	1.0	Thinning			0.06					Hand Weed
16	Jun	1.0	Apply Fert/Ground	100	Rolling Cultivator, 6 R	4.00	46-00-00, Urea 46	250.00 Lb	225.32 Tn		Tractor
					Fert. Side Dress Unit,						
17	Jun	3.0	Apply Fungicide/Air		CST Air Spray, 7 Gal Mi		Copper hydroxide	2.25 Lb	2.50 Lb	4.71 Ac	
18	Aug	1.0	Irrigate/Run Fertiliz			3.58	Water, Pump	4.00 Al	51.25 AF		Irrigator
							32-00-00, URAM 32,	28.00 Ga	167.67 Tn		
19	Aug	1.0	Apply Insecticide/Air		CST Air Spray, 5 Gal Mi		DT	0.15 Lb	12.98 Lb	4.32 Ac	
20	Sep	1.0	Prepare Ends	100	Offset Disk, 16.5'	40.00					Tractor
21	Oct	1.0	Pick		CST Pick Red Chiles					0.25 Lb	
22	Oct	1.0	Load Produce			0.50					Produce L
											Melon Sta
											Other
23	Oct	1.0	Haul, Custom		CST Haul Red Chiles					50.00 Tn	
24	Dec	1.0	Cut Stalks	100	Rotary Stalk Cutter, 4	5.50					Tractor
25	Dec	1.0	Disk Residue	125	Offset Disk, 16.5'	7.00					Tractor
			Pickup Use 80 Mi/Ac		Pickup Truck, 1/2 Ton	0.38					

* NOTE: Machine times, labor times, and material rates are for one time over the designated acreage.

Column Headings	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 displayed for sequencing purposes.
Times	The number of times an operation is performed is identified. An operation name may occur several times in a sequence of budget operations, but 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. See Table 1 for a list of these abbreviations.
Equipment/Custom Operation	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./Implem.	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 fewer 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 broader 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). Insofar 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 physical descriptions of the cropping operations provide the documentation of the cropping system for which cost estimates are being made.

Summary

Putting together your own cost of production estimates as was illustrated for red chiles is not an easy task. One may be tempted to pencil out just the main cash expenses and revenues. But this approach could lead to disaster if you realize that not all of your costs are being covered after a few years of operation. Taking the time to figure our your break-even price for covering variable costs, all costs, and cash costs is a vital component for pricing decisions and economic viability. If your break-even price (after covering all costs) is higher than the existing competition, then you need to consider growing something else or become innovative at lowering your costs of production. Taking the time to pencil out a detailed crop budget like the one illustrated is the first thing direct marketers should do when starting out and update at the beginning of every year. Unfortunately, a detailed budget often doesn't happen until the money crunch is on and the financial losses are too great to recover from.

References

Daugherty, L., and J.C. Wade, 1993 Arizona Farm Machinery Costs, Extension Bulletin No. 193001, Cooperative Extension, University of Arizona, Tucson, AZ, January 1993.

Wade, J.C., L. Daugherty, R. Call, and M. Schneider. 1993-94 Arizona Vegetable Crop Budgets Southeastern Arizona, Extension Bulletin No. 193007, Cooperative Extension, University of Arizona, Tucson, AZ, August 1993.

[1] *Wade is Acting Associate Director of Programs for Cooperative Extension. Daugherty and Tronstad are Research Specialist and Assistant Specialists , respectively in the Department of Agricultural and Resource Economics, The University of Arizona, Tucson, Az.*

FROM:

Direct Farm Marketing and Tourism Handbook.