

Profitable Fruit and Vegetable Production

Roger Hitchings

Net Cash Income

- **Net cash income per acre: Expenses, especially labour costs, can quickly eat into gross sales on a vegetable farm of any size. Net income matters most in terms of financial sustainability. The term 'net cash income' is used here to describe a farm's gross sales minus all current year cash expenses. In the growers' own words, they wanted to know “how much cash they had at the end of the season to provide for themselves and their households—and perhaps take a vacation.” Factors such as prescribed machinery use and land costs, depreciation and opportunity costs were not included. (CIAS report – see later for details)**

Does your system look like this?

Purchase	\$94,500	
Cash to Close	\$23,900	
<hr/>		
Monthly Rent	\$1325	
<hr/>		
Prop. tax	138	Income - Expenses
Ins	90	$1325 - 967 =$
PM	133	$\$358$
Mortgage	406	cash flow / month
HOA	—	
Vacancy (10%)	133	Cap Rate
Repairs (5%)	67	Annual net (minus mortgage)
<hr/>		
Total	\$967	Purchase
		$9168 / 94,500 =$
		9.7%
		Cash-on-Cash
		Annual net / cash invested
		$4296 / 23,900 =$
		17.97%

Or this?

[illegible]

Do you use crop planning tools like this

Weekly produce requirements - could be regarded as box scheme or market stall - for 50 customers													
Crop	Unit size	Quantity for 50 customers	Frequency	Sales period	Average weekly requirement	No of weeks	Total requirement	Total area in ha	Areas allowing for field factors	Rotation blocks	Area of rotation block	Full rotation including fertility building breaks	Rotation block areas rounded
									(times 1.5)			Option A	
Potatoes	1.5kg	75kg	weekly	Jul-March	75kg	40	3 tonnes	0.1	0.15	Potatoes		0.15 Grass/clover	0.17
												Grass/clover	0.17
Broccoli	400g	20kg	fortnightly	Jul-Oct	10kg	9	180kg	0.036	0.054	Brassicas		0.162 Potatoes	0.17
Cabbage(various)	1 head	50 heads	weekly	Sep-Mar	50 heads	32	1600 heads	0.06	0.09	Brassicas		Brassicas	0.17
PSB	300g	15kg	fortnightly	Feb-Mar	7.5kg	4	60kg	0.012	0.018	Brassicas		Alliums/cucurbits	0.17
												Roots/legs/sal	0.17
Onions	500g	25kg	weekly	Sep-Mar	25kg	32	800kg	0.04	0.06	All/cuc	0.176		
Squash	1no	50no	monthly	Aug-Dec	12no	11	550no	0.01	0.015	All/cuc		Option B	
Leeks	600g	30kg	fortnightly	Sep-Mar	15kg	16	480kg	0.04	0.06	All/cuc		Grass/clover	0.17
Courgettes	500g	25kg	fortnightly	Jul-Oct	12.5kg	8	200kg	0.027	0.041	All/cuc		Potatoes	0.17
												Alliums/cucurbits	0.17
Carrots	450g	22.5kg	weekly	Jul-March	22.5kg	40	900.0kg	0.025	0.038	Rts/leg/sal	0.157	Grass/clover	0.17
Lettuce(Gem)	twin pack	100 heads	weekly	Jul-Oct	100 heads	17	1700 heads	0.022	0.033	Rts/leg/sal		Brassicas	0.17
Beans (various)	500g	25kg	weekly	Jul-Oct	25kg	16	200kg	0.01	0.015	Rts/leg/sal		Roots/legs/sal	0.17
Spinach	450g	22.5kg	fortnightly	Jul-Oct	11.25kg	8	180kg	0.02	0.03	Rts/leg/sal			
Beetroot	bunch	22.5kg	fortnightly	Jul-Oct	5.5kg	8	180kg	0.009	0.014	Rts/leg/sal			
Parsnip	450g	22.5kg	fortnightly	Oct-Mar	11.25kg	14	315kg	0.018	0.027	Rts/leg/sal			
							TOTALS	0.429	0.645			0.645 A or B	1.02
A typical range of crops though this can vary according to the market	These are fairly typical but could vary	Simply multiplying unit size by 50	Another factor that will vary according to demand	This will depend on variety choice, storage, etc.	Customer quantity times in the frequency as a fraction	Weeks in the supply period	This total requirement assumes harvest success	Area needed in ideal terms (Ofmh data)	Realistic increase to take account of problems	Potatoes & brassicas clearly need own blocks	Actal areas allowing for field factors	There are merits in both options; combination blocks could vary	Rounding block sizes to even things out = ~1ha

Or this?


Soil Association

Cropping Tool for Community Agriculture Groups									
No of people per year	100	Yield Prediction	high						
Crop	Quantity per person per week	No of wks supply per year	Total Quantity per year	Price per unit	Total value	Rotation	Area (m²)	Area adjusted by yield	Standard Yields (kg per ha) Standard Yields (kg per m²)
Onions (kg)	0.5	52	2600	£1.40	£3,640	Allium	1300.0	975	2
Red onions (kg)	0.5	20	1000	£1.50	£1,500	Allium	500.0	375	2
Leeks (kg)	0.3	25	750	£1.80	£1,350	Allium Total Allium	625.0 2425.0	469 1818.8	1.2
Cauliflower (each)	1.0	10	1000	£1.50	£1,500	Brassica	724.6	543	1.38
Purple Sprouting Broccoli (kg)	1.0	5	500	£2.50	£1,250	Brassica	1000.0	750	0.5
Cabbage (kg)	1.0	10	1000	£1.20	£1,200	Brassica	500.0	375	2
Kale (kg)	0.0	10	0	£1.50	£0	Brassica Total Brassica	0.0 2224.6	0 1668.5	1
Broad Beans (kg)	1.0	5	500	£2.00	£1,000	Legumes	333.3	250	1.5
Green Beans (kg)	1.0	5	500	£3.00	£1,500	Legumes	1666.7	1250	0.3
Peas (kg)	1.0	3	300	£5.00	£1,500	Legumes Total Legumes	500.0 2500.0	375 1875.0	0.6
Sweetcorn (kg)	0.0	2	0	£1.50	£0	Other	0.0	0	3
Courgette (kg)	1.0	15	1500	£1.40	£2,100	Other	1500.0	1125	1
Lettuce (mixed / kg)	1.0	30	3000	£12.00	£36,000	Other	10000.0	7500	0.3
Chard (kg)	0.0	20	0	£2.00	£0	Other Total Other	0.0 11500.0	0 8625.0	1.2
Potatoes (kg)	1.0	52	5200	£1.00	£5,200	Potatoes Total Potatoes	2080.0 2080.0	1560 1560.0	2.5
Beetroot (kg)	1.0	20	2000	£2.00	£4,000	Roots	800.0	600	2.5
Celeriac (kg)	1.0	10	1000	£1.20	£1,200	Roots	500.0	375	2
Parsnip (kg)	1.0	15	1500	£0.90	£1,350	Roots	1000.0	750	1.5
Carrots (kg)	1.0	30	3000	£1.30	£3,900	Roots Total Roots	1071.4 3371.4	804 2528.6	2.8
				Total Crop Value	£68,190	Total area of site	18075.8		
						Fertility building / Green manures	4518.9		
						Crop failure	3615.2		
						Total Area of Site	26709.9		

Or this?

APPENDIX A VEGETABLE REFERENCE CHARTS

CHART A2 – TRANSPLANTED CROP REFERENCE CHART

CROP	FAMILY	DTM	PLANTING FREQUENCY	ROWS PER BED	INROW SPACING		YIELD	
					FT	M	PER ROW FOOT	PER ROW METER
Basil	Labiataea	63	2 – 4 weeks	3	1	0.3	1 plant	3.3 plants
Broccoli	Brassica	49	2 – 4 weeks	2	1.5	0.45	0.67 heads	2.2 heads
Brussel Sprouts	Brassica	91	once	2	2	0.6	0.5 stalks	1.7 stalks
Cabbage, storage	Brassica	91	2 – 4 weeks	2	1.5	0.45	0.67 heads	2.2 heads
Cabbage, summer	Brassica	63	2 – 4 weeks	2	1.5	0.45	0.67 heads	2.2 heads
Cauliflower	Brassica	49	2 – 4 weeks	2	1.5	0.45	0.67 heads	2.2 heads
Celeriac	Umbel	98	once	3	1	0.3	1 roots	3.3 roots
Celery	Umbel	84	once	3	1	0.3	1 heads	3.3 heads
Chard	Chenopods	42	2 – 4 weeks	3	1	0.3	1.5 bunches	5 bunches
Chinese Cabbage	Brassica	49	2 – 4 weeks	3	1.5	0.45	0.67 fruit	2.2 fruit
Corn	Graminae	56	2 weeks	2	0.5	0.15	2 ears	6.6 ears
Cucumbers	Cucurbits	49	4 weeks	1	1.5	0.45	4 fruit	13 fruit
Eggplant	Solanacea	63	once	2	1.5	0.45	1.1 lbs	1.7 kg
Fennel	Umbel	63	2 – 4 weeks	3	1	0.3	1 heads	3.3 heads
Kale	Brassica	42	2 – 4 weeks	3	1	0.3	1.5 bunches	5 bunches
Kohlrabi	Brassica	28	2 – 4 weeks	3	1	0.3	1 heads	3.3 heads
Leeks	Alliums	77	once	3	*a	*a	1 bunch	3.3 bunches
Lettuce	Aster	35	1 – 3 weeks	3	1	0.3	1 heads	3.3 heads
Melons	Cucurbits	70	4 weeks	1	1.5	0.45	0.75 fruit	2.5 fruit
Onions	Alliums	91	once	3	*a	*a	1.5 lbs	2.2 kg
Parsley	Umbel	70	4 weeks	3	1	0.3	1.5 bunches	5 bunches
Pepper	Solanacea	70	once	2	1.5	0.45	2 fruit	7 fruit
Rutabaga	Brassica	77	4 weeks	3	1	0.3	1 roots	3.3 roots
Scallions	Alliums	63	2 – 4 weeks	3	*b	*b	2 bunches	6.6 bunches
Squash, summer	Cucurbits	42	4 weeks	1	1.5	0.45	6 fruit	20 fruit
Squash, winter	Cucurbits	84	4 weeks	1	2	0.6	1 fruit	3.3 fruit
Tomato	Solanacea	63	once	1	1.5	0.45	2.2 lbs	3.3 kg

a: planted every 10 cm (4 inches) or 3 plants every 30 cm (12")

b: planted every 5 cm (2 inches) or 6 plants every 30 cm (12")

c: plant 1 seed/cell or in open flat then pot up to larger size cell

d: tray size to pot up to

What about financial monitoring?

[illegible]

Notes: The calculated gross margin is detailed for field raised cauliflower, planted mechanically as module block, hand harvested into crates of 12 heads per crate. The margin does not include any infrastructure costs such as packing machinery or cold storage which may be required depending on market.

To use the tool and personalise the gross margin for your business change any number in the white boxes to align to your operation and costs. Alternatively use the quick calculator to calculate the gross margin for your enterprise based on the standard figures (Please note this calculation does not include commission)

From 'Crop Planning for Organic Vegetable Growers', Thériault & Brisebois, Canadian Organic Growers

APPENDIX

E

BRUCE AND HANNA'S DETAILED BUDGET

BRUCE AND HANNA'S BUDGET FOR THE FIRST YEAR

	\$	%		\$	%
INCOME	22,000	100%	Operation Expenses		
Farmers Market	10,000		SUPPLIES	1,650	8%
CSA Baskets	12,000		Fertilizers and amendments	250	
			Irrigation	250	
			Mulch	100	
EXPENSES	10,835	49%	Organic Pesticides	100	
Fixed Costs			Row Cover	250	
ADMINISTRATION	1,490	7%	Seeds – Cover Crop	150	
Bank Fees	240		Seeds – Crops	550	
Computer material, Website	200		GREENHOUSE	1,250	6%
Conferences	100		Heating fuel or space rental	750	
Memberships (union, groups, etc.)	100		Potting soil, containers, etc.	500	
Organic Certification	500		FIELD OPERATIONS	725	3%
Office supplies	150		Contract work	300	
Professional fees (accountant, agronomist, etc.)	200		Fuel - Machinery	75	
INSURANCE	500	2%	Machinery Maintenance	100	
Liability insurance	500		Small tools	250	
LAND AND BUILDINGS	1,900	9%	MARKETING	650	3%
Infrastructure maintenance	400		Advertisement	100	
Rent/business portion of mortgage	1,500		Market stall	300	
FINANCIAL AND OTHER	1,270	6%	Packaging, harvest	250	
Depreciation	780		VEHICLE	800	4%
Interest on loans	390		Mileage (fuel, repairs, registration, insurance)	800	
Taxes	100		OTHER	600	3%
			Farmer's Retained Earnings	11,000	50%
			Profit	165	1%

Carrots				£/ha		(£/ac)
Marketable yield	36 t/ha	(14.4 t/ac)	@	290 £/t	10440	(4176)
Total output	75% of gross yield. Gradeout:		10% farm	15% packer	10440	(4176)
Seed	2 M/ha	(0.8 M/ac)	@	730 £/M	1460	(584)
Fertilisers	Applied on rotational basis, see p.96				50	(20)
Flame weeding	1 pass, see notes		@	117 £/ha	117	(47)
Brush weeding	2 passes, see notes		@	84 £/ha	167	(67)
Casual labour - weeding	250 h/ha	(100 h/ac)	@	7.60 £/h	1900	(760)
- harvest & grade	48 t/ha	2 h/t	@	7.60 £/h	182	(73)
Transport/bulk	43 t/ha	(17.2 t/ac)	@	42 £/t	1806	(722)
Other	See notes				40	(16)
Total variable costs					5723	(2289)
Gross margin					4717	(1887)
<i>Adjustment for wholesale sales</i>						
Marketable yield/output	43 t/ha	(17.2 t/ac)	@	400 £/t	17200	(6880)
less commission @	15%				2580	(1032)
Additional casual labour	43 t/ha	1 h/t	@	7.60 £/h	327	(131)
Packaging	43 t/ha	80 bags/t	@	24 p/bag	826	(330)
Additional transport	43 t/ha		@	42 £/t	1806	(722)
Gross margin (wholesale)					5939	(2376)
Sensitivity analysis	For explanation, see p. 97					
	<i>Change in value (+/-)</i>	<i>Change in gross margin</i>	<i>Value range</i>		<i>Gross margin range</i>	
			<i>Low</i>	<i>High</i>	<i>Low</i>	<i>High</i>
Marketable yield	1 t/ha	219 (88)	15	50	111 (45)	7788 (3115)
Packer price	10 £/t	360 (144)	0	0	-5723 -(2289)	-5723 -(2289)
Casual labour	10 h/ha	76 (30)	150	750	1647 (659)	6207 (2483)

Parsnips				£/ha		(£/ac)
Marketable yield	18 t/ha	(7.2 t/ac)	@	430 £/t	7740	(3096)
Total output	75% of gross yield. Gradeout:		10% farm	15% packer	7740	(3096)
Seed	5 kg/ha	(2 000/ac)	@	100 £/kg	500	(200)
Fertilisers	Applied on rotational basis, see p.96				50	(20)
Flame weeding	1 pass, see notes		@	117 £/ha	117	(47)
Brush weeding	1 passes, see notes		@	84 £/ha	84	(33)
Casual labour -weeding	150 h/ha	(60 h/ac)	@	7.60 £/h	1140	(456)
- harvest/grade	24 t/ha	2 h/t	@	7.60 £/h	365	(146)
Transport	20 t/ha		@	42 £/t	840	(336)
Other	See notes				40	(16)
Total variable costs					3135	(1254)
Gross margin					4605	(1842)
<i>Adjustment for wholesale sales</i>						
Marketable yield/output	20 t/ha	(8.0 t/ac)	@	540 £/t	10800	(4320)
Less commission @	15 %				1620	(648)
Additional casual labour	20 t/ha	1 h/t	@	7.60 £/h	152	(61)
Packaging	20 t/ha	80 bags/t	@	24 p/bag	384	(154)
Additional transport	20 t/ha		@	42 £/t	840	(336)
Gross margin (wholesale)					4669	(1868)
Sensitivity analysis	For explanation, see p. 97					
	<i>Change in value (+/-)</i>	<i>Change in gross margin</i>	<i>Value range</i>		<i>Gross margin range</i>	
			<i>Low</i>	<i>High</i>	<i>Low</i>	<i>High</i>
Marketable yield	1 t/ha	359 (144)	10	30	1730 (692)	8917 (3567)
Packer price	10 £/t	180 (72)	0	0	-3135 -(1254)	-3135 -(1254)
Casual labour	10 h/ha	76 (30)	150	700	790 (316)	4970 (1988)

Profitability

- **How do you assess profitability**
 - ◆ **As ‘net cash income’ i.e. what’s left after all costs covered?**
 - ◆ **As whole enterprise, by market outlet, by crop?**
- **If by crop are there different ways of assessing profitability?**
 - ◆ **In time**
 - ◆ **Or in space?**

From 'Crop Planning for Organic Vegetable Growers', Thériault & Brisebois, Canadian Organic Growers

APPENDIX A VEGETABLE REFERENCE CHARTS

CROP	POTENTIAL PROFITABILITY	GREENHOUSE	TRAY SIZE	SEEDS PER	SEEDS PER
	PER ACRE	DAYS		CELL	GRAM
Basil	high	28 – 42	72	2	560
Broccoli	low	28 – 42	72	2	220
Brussel Sprouts	low	28 – 42	72	2	250
Cabbage, storage	low	28 – 42	72	2	250
Cabbage, summer	low	28 – 42	72	2	250
Cauliflower	low	28 – 42	72	2	285
Celeriac	medium	84	72 ^{*d}	PU ^{*c}	2400
Celery	medium	84	72 ^{*d}	PU ^{*c}	2400
Chard	high	35 – 42	72	1	65
Chinese Cabbage	low	28 – 42	72	2	330
Corn	low	14	50	2	5.5
Cucumbers	low	21	24	2	38
Eggplant	medium	56	50 ^{*d}	PU ^{*c}	220
Fennel	medium	35 – 42	72	2	250
Kale	high	28 – 42	72	2	250
Kohlrabi	medium	28 – 42	72	2	230
Leeks	medium	56	72	3a	350
Lettuce	medium	28 – 42	72	3	800
Melons	low	21	24	2	40
Onions	medium	56	72	3a	230
Parsley	high	42	72	3	500
Pepper	medium	63	50 ^{*d}	PU ^{*c}	140
Rutabaga	medium	28 – 42	72	2	330
Scallions	high	56	72	6 ^{*b}	450
Squash, summer	medium	21	24	2	6 – 10
Squash, winter	low	21	24	2	6 – 15
Tomato	medium	42	50 ^{*d}	PU ^{*c}	350

Information adapted from Johnny's Selected Seeds Catalog
and la Ferme Coopérative Tourne-Sol farm records

Profitability in space

- **Which crops take a lot of space for little return and which are profitable for the space**
- **Useful for:**
 - ◆ **Comparing varieties**
 - ◆ **Identify crops where improvements are needed**
 - ◆ **Decide whether crops should be discontinued**
- **Can be expressed as profitability per unit area or profitability per unit bed length**

Profitability in time

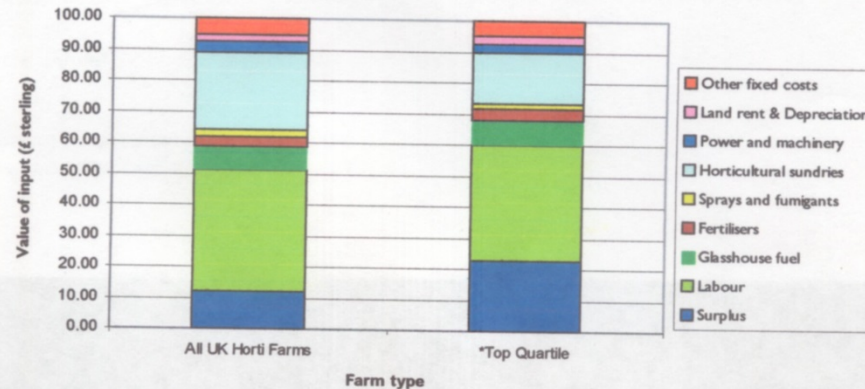
- **Is the time put into a crop in all its stages of production worth it?**
- **Allows all stages to be critically assessed especially harvesting techniques**
 - ♦ **E.g. is it worth going in for every last head of lettuce, cauliflower, etc.**
- **Can be useful for calculating hourly rates of return or pay**

Increasing profitability

- **Reduce costs – often easier said than done but still worth a look – see next slide re cost of sundries**
- **Increase efficiency – closer spacing of crops, reduce labour inputs**
- **Cut some crops out of the ‘offer’ – very difficult if a box scheme or CSA**
- **Increase prices – can the market stand it?**

From 'A Case Study Analysis and Overview of the UK Horticultural Production Industry and its Future over the Next 10-20 Years' Promar for the National Horticultural Forum

Figure 4
Overview Horticultural Input Costs per £100 Net Output
UK Growers, Average Grower vs Top Quartile 2003



*The Top Quartile of FBS horticultural farms are estimated on the basis of returns to tenant-type capital.

Source: Farm Business survey 2003

It is of interest that of all the cost categories, horticultural sundries⁴ appear to show the most significant difference between the average grower and the top quartile, accounting for 26% of the input costs for the "All" UK grower profile compared to 15% for the top quartile. Variation in labour costs, which remains a key input cost, represented just 2% difference between the two groups.

⁴ Horticultural sundries as far as the FBS data are concerned consist of: the Horticultural Sundries code from the FBS farm return (these are specific to horticultural holdings only - they are not marketing costs or packing - they include propagation pots, HDC levy, grading, peat, fleece etc., plus seeds and young plants).

Resources

- **Seems to be much better provision in the US and Canada**
- **Veggie-Compass is a very detailed whole farm management approach for diversified fresh vegetable growers.**
- [Veggie-Compass-April-2014-Version1.xls](#)
- [Veggie-Compass-April-2014-Version1.xls](#)

2014 Organic Crop Planning Guide



The Organic Crop Planning Guide is produced to help producers estimate their costs of producing various crops.

Please remember that the Guide is an estimate and does not represent actual provincial average cost of production figures. The figures are meant to be used as a guide.



Government
— of —
Saskatchewan



Grower to grower: Creating a livelihood on a fresh market vegetable farm

John Hendrickson, CIAS Outreach Specialist
University of Wisconsin-Madison College of Agricultural and Life Sciences

October, 2005

As part of the BOBL project, OCW and ORC are doing a small project on developing a “fit-for-purpose” horticultural costings system, mainly aimed at small growers and market gardens. This quick survey will give us some information on what systems are used at present.

How are you recording the following in your business? General questions										
What system do you use for accounts/tax returns?	Cash book or paper based <input type="checkbox"/>		Spreadsheet <input type="checkbox"/>		Accounts package <input type="checkbox"/> Which?					
Do you find your records useful for forward planning?	Yes <input type="checkbox"/>		No <input type="checkbox"/>		Sometimes <input type="checkbox"/>					
What unit do you use most, when planning your business? <i>Tick the most relevant</i>	hectare <input type="checkbox"/>	acres <input type="checkbox"/>	m ² <input type="checkbox"/>		Any other <input type="checkbox"/>					
If other, please list										
Crop planning										
What categories do you use for forward planning?	Individual crops <input type="checkbox"/>	Place in rotation <input type="checkbox"/>	Plot <input type="checkbox"/>	Other <input type="checkbox"/>						
If other categories, please list										
How is income from sales recorded?										
What recording system do you use?	Cash book or paper based <input type="checkbox"/>		Spreadsheet <input type="checkbox"/>		Accounts package <input type="checkbox"/>					
At what frequency	Daily <input type="checkbox"/>	Weekly <input type="checkbox"/>	Monthly <input type="checkbox"/>	Yearly <input type="checkbox"/>	Don't know <input type="checkbox"/>					
According to sales channels?	Yes <input type="checkbox"/>			No <input type="checkbox"/>						
If yes, please list which sales channels you record										
Are you recording according to some crops or crop categories? If so, which?	No <input type="checkbox"/>	Individual crops <input type="checkbox"/>	Place in rotation <input type="checkbox"/>	Where grown <input type="checkbox"/>	Other <input type="checkbox"/>					
If other categories used, please list										
Costs										
What recording system do you use?	Cash book or paper based		Spreadsheet		Accounts package					
At what frequency	daily	weekly	monthly	yearly	Don't know					
Do you attribute costs to crop categories?	yes			no						
If yes, please describe how										

The questions for discussion

- **Do you use any specific tools for assessing profitability?**
- **What level of detail do you record?**
- **If you recorded absolute detail would you use something like Veggie-Compass?**
- **What do you think of the concepts of profitability in space and profitability in time? Helpful?**
- **Or see the BOBL questionnaire or raise your own questions.**