



Competitiveness of Organic Vegetables in International Markets: Analysis of two Costa Rican Cases

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*Supporting the Diversification of Exports in the Caribbean / Latin American
Region through the Development of Organic Horticulture.*



✚ Background

✚ Criteria for case selection



The case of broccoli

☉ Area planted:

- ☒ Organic farm: 2,500 m²
- ☒ Conventional farm: 10,000 m² (1 Ha.)

☉ Price:

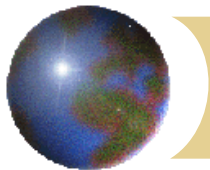
- ☒ In both cases, it was estimated at US\$0.504/kg; however, in the case of conventional broccoli, it fluctuated between US\$0.336/ kg and US\$0.462/kg

☉ Social taxes:

- ☒ Estimated at 26% of the cost of labor

☉ Cost of funding:

- ☒ Cost of funding was estimated at 6% for a three-month production cycle



Broccoli: One Hectare Operation

Comparative Costs (US\$^{1/})

	Organic	Conventional	Org/Conv (%)
Labor Costs	837.07	693.88	20.64
Material Costs	1,077.31	583.41	84.66
Other Costs	371.18	236.09	57.22
Total Costs	2,285.56	1,513.38	51.02
Cost per Kg.	0.112	0.106	5.66
Price per Kg.	0.504	0.504	
Production per Ha (Kg.)	20,400	14,250	43.16
Gross earnings	10,281.60	7,182.00	43.16
Net earnings (profitability)	7,996.04	5,668.62	41.06
Hand-labor costs ²	978.90	761.71	28.51
Conservation labor costs	475.73	211.68	124.74
Pesticide application costs		132.30	
Fertilizer application costs	144.24	52.92	172.56
Fertilizer costs	882.30	143.69	514.03
Other chemicals costs		177.22	
Hand-labor costs / Total costs (%)	42.83	50.33	(14.90)
Conservation costs / Total costs (%)	20.81	13.99	48.75
Fertilizer costs / Total costs (%)	44.91	12.99	245.73

NOTES:

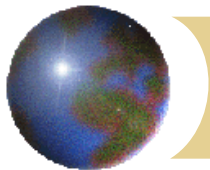
1/ Exchange rate:
1US\$ = ₡ 238,02.

2/ Includes social
taxes..



The case of cassava

- ✿ Area planted:
 - ✦ Organic farm: 3,000 m²
 - ✦ Conventional farm: 20,000 m² (2 Ha.)
- ✿ Price:
 - ✦ In both cases, it was estimated at US\$0.228/kg; however, in the case of conventional cassava it was US\$0.274/kg
- ✿ Social taxes:
 - ✦ Estimated at 26% of the cost of labor
- ✿ Cost of funding:
 - ✦ Estimated cost of funding for a nine-month production cycle was estimated at 18%.
- ✿ In the comparison of labor costs, in the case of organic production the cost of harvesting and packaging was left out.



Cassava: One Hectare Operation

Comparative Costs (US\$¹)

	Organic	Conventional	Org/Conv (%)
Labor Costs	722.19	322.99	123.60
Material Costs	71.40	131.02	(45.50)
Other Costs	333.18	167.28	99.18
Total Costs	1,126.77	621.29	81.36
Cost per Kg.	0.044	0.068	(35.29)
Price per Kg.	0.228	0.228	
Production per Ha (Kg.)	25,484.0	9,200.0	177.00
Gross earnings	5,810.35	2,097.60	177.00
Net earnings (profitability)	4,683.58	1,476.31	217.25
Hand-labor costs ²	581.92	351.39 ³	65.61
Conservation labor costs	169.24	84.67	99.88
Pesticide application costs		41.29	
Fertilizer application costs	150.70	44.45	239.03
Fertilizer costs	71.40	73.76	(3.20)
Other chemicals costs		57,24	
Hand-labor costs / Total costs (%)	51.64	56.56	(8.70)
Fertilizer costs / Total costs (%)	19.71	19.03	3.57
Conservation costs / Total costs (%)	15.02	13.63	10.20

NOTES:

1/ Exchange rate:
1US\$ = ₡ 238,02.

2/ Includes social
taxes..

3/ Value of harvest
was deducted for
comparability.



Main conclusions

- ❖ The cases discussed allow us to reach the following conclusions:
 - ❖ Organic agricultural practices are more competitive in local markets than conventional agricultural practices, despite higher costs of production.
 - ❖ Organic production is more expensive than conventional production, but it is also more profitable.
 - ❖ In the cases discussed, there is no reason for organic products to be more expensive than conventional products.

	COSTS Org/Conv	PROFITABILITY Org/Conv
Broccoli	51.02%	41.06%
Cassava	81.36%	217.25%



Main conclusions

- Greater competitiveness of organic products is explained to a large extent by higher levels of productivity in this activity (production/hectare). This productivity manifests itself through greater density of planting (plants/hectare), as in the case of broccoli, or higher yields per plant (weight/plant), as in the case of cassava.

	Productivity Org/Conv
Broccoli	43.16%
Cassava	177.00%

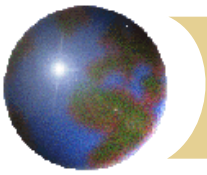


Main conclusions

- ❏ Cost of labor is not necessarily the highest cost in organic production. What is true is that organic production requires more labor than conventional production.

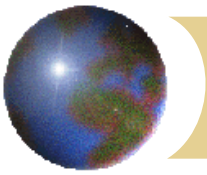
	Labor force employed			Cost of labor/ Total Cost	
	Organic (m.h.)	Conventional (m.h.)	Org/Conv (%)	Organic (%)	Conventional (%)
Broccoli	746 m.h.	584 m.h	27.74%	42.83%	50.33%
Cassava	503 m.h	332 m.h	51.51%	51.64%	56.56%

NOTE: To ensure comparability of labor in cassava production, in the case of organic production harvesting activities are not included.



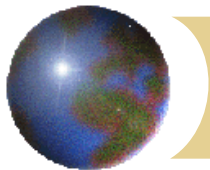
Main conclusions

- ❖ Based on the greater local-market competitiveness of the organic products discussed, we may infer that organically developed products are also more competitive in international markets. However, to make this statement the following assumptions are required:
 - That there is a well-defined international market for those products (broccoli and cassava).
 - That the conventional products discussed show competitiveness in those markets.



Main conclusions

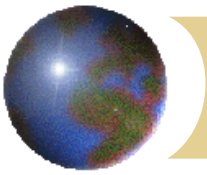
- That post-harvest handling and processing costs are the same for organic and conventional products. This would involve the existence of post-harvest handling and processing techniques which do not lead to those products no longer qualifying as organic, and that their cost is the same or less than for conventional products.
- That transport, shipping, and insurance costs are the same for organic and conventional products.
- Competitiveness of organic products in international markets should increase insofar as there is a well-defined market with differentiated prices.



Impact on Employment

✚ Workers employed

Indicator	Persons
Labor force (LF) of the Costa Rican agricultural sector 1996	259.000
LF*1.277	330.743
Additional expected LF	71.743
Rural unemployment	39.918
Total unemployment	75.963



Final Remarks

- ✦ Based on the cases discussed and results obtained, evidently it is possible to attain greater competitiveness of organic products vis-a-vis conventional ones. However, these results should be considered reference data. One must take into account that organic agriculture does not apply a “technological package”, and therefore specific experiences cannot be replicated overnight. Competitiveness attained in this activity increases gradually as relations with Nature are rediscovered and replicated in productive activities.



Final Remarks

- ✦ In light of what has been said, competitiveness shown for cases discussed can be matched or improved upon by other producers. This will depend on farm management levels, and especially those of the soil, as well as resources available to the producer and economies of scale which can be attained.



ANNEXES



Supporting the Diversification of Exports in the Caribbean / Latin American Region through the Development of Organic Horticulture.

Annex 1

Broccoli: Operation costs for the production of one organic hectare.
Density: 40,000 plants. (US\$)

Symbols:
 L.h. = Labor hour
 Lt. = Liter
 Mt. = Metric tons

Concept	Units	Amount	Price	Cost
A. Labor				
Seed bed preparation		21	1.06	22.26
Seed bed attention	L.h.	31.5	1.06	33.39
Transplants preparation	L.h.	8	1.06	8.48
Transplants carrying	L.h.	5	1.06	5.30
Cutting the grass	L.h.	60	1.06	63.60
Rasping	L.h.	80	1.06	84.80
Fertilizer transportation	L.h.	28	1.06	29.68
Fertilizers	L.h.	80	1.06	84.80
Shoveling	L.h.	66	1.06	69.96
Shoveling (m.e)	L.h.	7.6	7.14	54.26
Sowing	L.h.	125	1.06	132.50
Hilling around	L.h.	99	1.06	104.94
Crops	L.h.	108	1.06	114.48
Carrying	L.h.	27	1.06	28.62
Total Labor				837.07
B. Materials				
Seeds	1.000Units	43.01	3.57	153.55
Seed bed fertilizers	Kg.	492	0.08	39.36
Water	Lt.			2.10
Fertilizers	Mt.	30	29.41	882.30
Total Material				1,077.31
C. Others				
Transplant transportation		7	0.48	3.36
Fertilizers transportation		41	0.48	19.68
Carrying Transportation		21	0.48	10.08
Certification				12.60
Social Security (26%labor force)				196.09
Financial Cost (6% operationcost)				129.37
Total Others				371.18
TOTAL				2,285.56

Source: Prepared by Author.

Annex 2

Broccoli. Costs for the production of one conventional hectare. Density: 25,000 plants. (US\$)

Source: Prepared by Author.

Symbols:

L.h.= labor hour
T.h.= tractor hour
Lt.= Liter
GL= Gallon
Kg. = Kilogram
qq= Quintal

Concept	Units	Amount	Price	Cost
A. Labor				
Calcium application	L.h.	5	1.05	5.25
Breaking up new ground	T.h.	4	20.17	80.68
Shoveling	L.h.	40	1.05	42.00
Plants transportation	L.h.	5	1.05	5.25
Transplant	L.h.	60	1.05	63.00
Fertilization	L.h.	40	1.05	42.00
Hilling around	L.h.	120	1.05	126.00
Pesticide application	L.h.	100	1.05	105.00
Crops	L.h.	214	1.05	224.70
Total Labor				693.88
B. Materials				
Plants	1,000 Units	25	10.50	262.50
Calcium	qq	10	2.02	20.20
Fertilizers	bags	7	13.44	94.08
Folifort	GL	1	21.01	21.01
Ecoun	GL	1	29.41	29.41
Disis 500 cc	Lt.	1	13.28	13.28
Tocuti3n	Lt.	1	20.46	20.46
Javelin	packets	5	8.40	42.00
Benlate	packets	3	3.87	11.61
Kilol	Lt.	2	13.86	27.72
Lazo	Lt.	1.5	11.18	16.77
Calcium compresal	Lt.	1.5	8.40	12.60
Adherent	Lt.	1	8.40	8.40
PH controller	Kg.	0.5	6.72	3.36
Total Materials				583.41
C. Others				
Seed bed		4	0,48	1,92
Social Security (26% labor force)				148,51
Financial Costs (6% operation costs)				85,66
Total Others				236.09
TOTAL				1,513.38

Annex 3

Cassava. Operation costs for the production of one organic hectare. Density: 8,500 plants. (US\$)

Concept	Unit	Amount	Price	Cost
A. Labor				
Soil preparation	L.h.	-	-	-
Raking	T.h.	2	42.01	84.02
Hilling around	T.h.	1	42.01	42.01
Seeds preparation	L.h.	84	0.92	77.28
Sowing	L.h.	142	0.92	130.64
Organic fertilizer preparation	L.h.	10	0.92	9.20
Organic fertilizer application	L.h.	120	0.92	110.40
Cutting the grass	L.h.	146	0.92	134.32
Cropping. packing	L.h.	146	0.92	134.32
Total Labor				722.19
B. Materials				
Animal blood	bags	5	12.60	63.00
Fruits fertilizer				8.40
Total Materials				71.40
C. Others				
Transport				6.30
Social Security (26% labor force)				155.00
Financial costs (18% operation costs)				171.88
Total Others				333.18
TOTAL				1,126.77

Symbols:

L.h.= labor hour
T.h.= tractor hour

Source: Prepared by Author.

Annex 4

Cassava. Operation costs for the production of one conventional hectare. Density: 9,500 plants. (US\$)

Symbols:

L.h.= Labor hour
T.h.= Tractor hour
Lt.= Liter
GL= Gallon
Kg. = Kilogram
qq= Quintal

Concept	Unit	Amount	Price	Cost
A. Labor				
Soil Preparation	L.h.	-	-	-
Raking	T.h.	1.5	29.41	44.11
Seeds preparation	L.h.	95	0.84	79.80
Sowing	L.h.	62	0.84	52.08
Fertilizer application	L.h.	42	0.84	35.28
Calcium application	L.h.	9	0.84	7.56
Pesticide application	L.h.	27	0.84	22.68
Fungicide application	L.h.	12	0.84	10.08
Leave fertilizer preparation	L.h.	5	0.84	4.20
Cropping	L.h.	72	0.84	60.48
Manual cutting sprouts	L.h.	8	0.84	6.72
Total Labor				322.99
B. Materials				
Fusilade	GL	0.5	37.81	18.91
Randol	GL	0.5	33.61	16.81
Paraquat	GL	0.5	16.39	8.20
Danso	Lt.	1	5.46	5.46
10-30-10	qq	2.5	16.39	40.98
15-3-31	qq	2	16.39	32.78
Poliflor	Kg.	1	2.10	2.10
Calcium	qq	2.5	2.31	5.78
Total Materials				131.02
C. Others				
Social Security (26% labor force)				72.51
Financial costs (18%)				94.77
Total Others				167.28
TOTAL				621.29

Source: Prepared by Author.