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Profitability Analysis of Organic Cauliflower, Radish and Turnip Produce at National Agriculture Research Centre, Islamabad, Pakistan

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Abstract

Organic farming support is an effective and cost-efficient measure to reach sustainability objectives in agriculture policies. Organic farming having environmental and social concerns therefore it has a better market demand. The paper discuss the costs and returns structures in the production of vegetables (Cauliflower, Radish and Turnip) grown under the National Institute of Organic Agriculture (NIOA) at National Agriculture Research Centre. Therefore the aim of the paper is to determine the cost of production and estimate the profitability of different selected vegetables. The results indicate that yield of the vegetables was low but the prices of the vegetables were high. All the organic vegetables produce at the NIOA earn positive income without the land rent. In the production of the radish and turnip more labour used as compare to the cauliflower due to the picking of the vegetables. Cost –Benefit ratio was 1.43, 1.35 and 0.85 for turnip, radish and cauliflower respectively. The paper concludes that organic vegetables are profitable but less than the conventional vegetables. But it is hard to measure the profitability of organic vegetables due to the value of unseen indirect benefits.

Keywords: Organic vegetable, cost of production, profitability, cost-benefit ratio

Introduction

"Organic farming is an environmental friendly ecosystem management in which, use of all kinds of synthetic inputs are eliminated" (Farooqi, 2007). Organic farming is better because farmers are using the local resources and technologies and they have provision of better independence and control over the means of production. It also improve of soil biological activity, physical characteristics of soil, reducing nitrate leaching and increasing and improving wild life habitant which gives

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better impact on the environment (Panhwar, 2004).

Organic commodities are considered to be better in quality in contrast to inorganic produced commodities and it also preventing from different health hazards. Therefore organic products demand is increasing all over the world. Various Asian countries have involvement in the expansion of organic agriculture and different non government organizations support the producers for converting into organic agriculture from the conventional agriculture. But the large-scale and national programmes are still rare. India is the only country that develops the organic sector with a help of government programme (IFOAM, 2003).

According to the State Bank of Pakistan, 2001 in Pakistan, agricultural practices at some areas are near to the organic approach. The rainfed areas with their intact natural conditions can be develop for undertaking organic enterprise. Many farmers in Pakistan are already involved in production of organic commodities for their home consumption, they kept certain piece of land for producing the food crops there is no usage of chemical fertilizer and pesticides. However potential exist in certain areas/ecologies of Pakistan where organic farming is being practiced naturally that need to be identified and declared as organic farming producing areas (Farooqi, 2007). The country also exporting a large quantity of vegetables and fruits in the different part of the world. Therefore by launching a promotional marketing campaign in the world market it will be the supplier of organic commodities. It is a great opportunity for country to earn foreign exchange because organic food items having higher prices as compare to the inorganic vegetables (SBP, 2001).

Literature on production of organic vegetables and their marketing suggested that there are problems existing in marketing of these products. However, in Pakistan, the market for organic products is not well developed and no market statistics are available because there is lack of proper retail venues, no continuous supply of the product and quality of the product is very poor. Further, none of the marketers have adopted successful marketing strategies for the sustenance of the organic market in the country. Further, market features of organic products were showed that it was in the "introduction stage" of the product life cycle along with this there exit gap between the supply and demand of organic products.

The organic farming is promoting in the worldwide due to the environmental and economic sustainability of agricultural production. It is great challenged for agricultural researchers to build such systems with the different stakeholders through whom economic sustainability of agricultural production will be achieved. In less developed countries, very few studies have been conducted on the profitability of organic agriculture and none used farm budget-related data. Long-term studies are hardly existent: only about a dozen studies compared both yields and net income, mostly focusing on coffee and cotton.

National Agriculture Research Centre has taken the lead role for introducing the Organic vegetables and producing different Organic vegetables in their farm area in winter, summer and off season and PARC Technology Company (PATCO) is a move in the direction and it ensures fast delivery of technologies (like Organic vegetable) generated by PARC and/or National Agricultural Research System (NARS) to their real end users. Hence it needs to be upscale through developing proper market linkages to target the potential consumer. Therefore the present study is designed with the objectives to calculate the economics of selected vegetables grown by National institute of organic agriculture at NARC and marketed through the PATCO. The specific objectives are

Objectives

- To determine the cost of production and net return of cauliflower, radish and turnip organically produce by NIOA at NARC
- To estimate the profitability of cauliflower, radish and turnip which organically produce by NIOA at NARC

Materials and methods

Three winter vegetables was selected namely turnip, cauliflower, radish. These vegetables were selected for the reason that National Institute of Organic Agriculture grown at their fields areas during the winter season 2012. The study was based on primary data which was collected from the National Institute of Organic Agriculture (NIOA) to calculate the detail cost of production of organic vegetable. Because economics/ cost of production will be help to identify the minimum price to cover the cost and premium for farmers that will help to decide price. All the operations and used inputs were recorded and based on these records, the production costs for each vegetable was estimated.

Data analysis

Data were analyzed on the Statistical Package for Social Sciences (SPSS) and Microsoft Excel. To carry out the profitability analysis following statistical tool were used (Ali, 2005).

(i). Net return from the selected vegetables

Net return of selected vegetables was estimated by deducting the total cost from gross income of each vegetable.

Net returns = Gross margin – Total cost of production

(ii). Revenue per crop day

Revenue obtained from the each day vegetable in the field is calculated by the following formula.

Revenue per crop day = Gross revenue (Rs. /Acre) / Crop duration (Days)

(iii). Revenue per rupee of input cost

Revenue per rupee of input cost = Gross revenue (Rs. /Acre) / Variable cost of input

(iv). Average cost per kg

Average total cost is the per unit cost which shows that how much cost is bear for producing one kilogram of vegetable. The formula is given below.

Average cost per kg = Total cost of production / Total unit produce

(v) Net Profit per Kg

Net Profit per Kg = Net return / Total unit produce

Results and discussion

This section deals with the production of selected organic vegetables grown at National Institute of Organic Agriculture. In the section there is estimated the cost of production, profitability, total output, net profit per kg, revenue per rupee of input cost, cost- benefit ratio , revenue per crop day, cost and sale price per kg and labour day utilization.

Budget of Selected organic vegetables grown at NARC

The data pertaining to the total cost and revenue per acre of cauliflower, radish and turnip produce organically at National Institute of Organic Agriculture, National Agriculture Research Centre are presented in Table 1. The vegetables are sown in the field area of NIOA on the 1.2 kannal, 1.8 kannal and 1.8 kannal respectively after that the data was converted on the one acre basis for the further analysis.

Table 1: Budget of organic vegetables (Acre/Rs.)

Item	Cauliflower	Radish	Turnip
Total Cost (without land rent)	19298	22478	22493

Total Cost (With land rent)	24298	27478	27493
Total Revenue	20760	37009	39291
Net Income (without rent)	1463	14532	16799
Net Income (with rent)	-3538	9532	11799

The total cost and net income with rent and without land rent was taken of all the selected vegetables. The results show that overall the total cost without rent was estimated for cauliflower (19298/acre), radish (22478/acre) and turnip (22493/ acre), among all the vegetables turnip got the high revenue followed by the radish and turnip. However the cost, revenue and net income per acre was slightly more of turnip. Regarding the net income without land rent per acre among all vegetables the highest return is estimated for turnip Rs. 16799 followed by the radish and cauliflower. But the cauliflower earn very low income without including the land rent and when including the land rent that shows that vegetable earn a negative profit. The detailed cost of production shows in the annexure

Table 2: Profitability, net profit and output of selected vegetables (Acre)

Item	Cauliflower	Radish	Turnip
Output(Kg)	692	5287	5613
Net Profit(Rs/ kg)	2	3	3
Labour Days	32	46	47

The Table 2 indicates the profitability, net income and output per acre of selected vegetables. The total output that National Institute of Organic Agriculture produce and sale at PATCO is 692 kg for cauliflower and 5287 kg for radish and 5613 kg for turnip. Evidence from the studies analyzed showed that yields in well-established organic farms are most often lower than conventional, to varying degrees. Most European studies including cereals, vegetables and mixed farming systems produced somewhat lower yields (BMELF, 1991-1998; Nieberg and Offermann 2000).

The turnip and radish got the same net profit per kg and cauliflower got the low profit as compared to the other vegetables. When calculated the total labour days for the vegetables than radish and turnip having the high labour days because picking of these vegetables required more labour days.

Table 3: Revenue and cost-benefit ratio and prices of selected vegetable (Acre)

Item	Cauliflower	Radish	Turnip
Revenue Per Crop day(Rs.)	189	274	271
Revenue per Rupee of input cost(Rs.)	1.08	1.65	1.75
Cost- Benefit Ratio	0.85	1.35	1.43
Cost Price (Rs/kg)	28	4	4
Farm Gate Price(Rs/kg	30	7	7

The revenue per rupee, revenue crop day and cost-benefit ratio computed for the selected vegetable shown in tables 3. The revenue per crop day was Rs. 189, Rs. 274 and Rs. 271 for cauliflower, radish and turnip respectively. This means that all the vegetables earn high revenue per day. The revenue per rupee of input cost of vegetables is rupees 1.08 for cauliflower, 1.65 for radish and 1.75 for turnip. In other words the inputs used in growing all the three vegetables proved that productive in radish, and turnip as compared to the cauliflower. The benefit–cost ratio computed for all the

vegetables. The cost benefit ratio is same for the cauliflower is 0.85, 1.35 for radish and 1.43 for turnip. The cost Rs/Kg which National Institute of Organic Agriculture bear for producing the cauliflower is Rs. 28, selling on Rs/30 of the sale point and earn Rs.2 for one kg. The turnip and radish cost price is the Rs.4/Kg and their sale point is the Rs.7/Kg.

Table 4: Shares in revenue of selected vegetable marketed through PATCO

Item(Rs/Acre)	Cauliflower	Radish	Turnip
NIOA share	14532	25906	27504
PATCO share	6228	11103	11787
Total Revenue	20760	37009	39291

The vegetables are produce by the national institute of organic agriculture but the vegetables are marketed through the PATCO (sale point). Hence the above table shows the share in revenue for all the selected vegetables of the institutes. In the year 2012 the total revenue in the cauliflower was Rs. 20760. The share was the Rs.14532 and Rs.6228 for NIOA and PATCO respectively. The radish revenue was Rs. 37009 and NIOA and PATCO share was Rs. 25906 and Rs. 11103 respectively.

Conclusion and recommendation

As the above results shown that organic yield was smaller, but the prices was higher. Radish and turnip earn higher revenue per crop per day. Turnip earns the higher revenue per rupee of input. But it is hard to calculate the economics of organic vegetables due to value of certain indirect benefits e.g. the soil structure will be improve, decreasing the risk related with the pesticide use.

Furthermore organic agriculture faces an unfair competition in the marketplace due to: the current situation that in the favour traditional production. Besides directing much more research and extension investments into organic agriculture and shifting the bulk of public support from polluting activities to sustainable practices to give an equal footing to profitability studies, such studies need to take the differences in external costs and benefits into account to capture the real and multiple profits of agriculture.

However the potential are exist in certain ecologies of Pakistan. There is also need to create consumer awareness about organic food. Furthermore, consumer expectation and product quality mainly determine the market potentials. Hence there is need to create awareness among the consumer.

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Annexure I:

Cost of Production Cauliflower

Operation	Units	Qty/Acre	Price/Unit	Cost/Acre
Duration of the crop	Days	110		
Deep Ploughing	No	1	1500	1500
Ploughing	No	1	1200	1200
Ploughing & Planking	No	1	1200	1200
Ridge making	No	1	1200	1200
Manual hoeing	Man Days	5	350	1750
Seedling cost	Plants	7500	0.34	2550
Ridge sowing	Man Days	3	350	1050
Irrigation interval (after 10 days)	Days	11	0	0
Labour cost for irrigation	Man Days	6.6	350	2310
Organic fertilizer (Enriched Compost)	No bag	8	50	400
Labour cost for fertilizer	Man Days	0.75	350	262.5
Manual weeding	No	4		0
Labour cost for weeding	Man Days	12	350	4200
Insecticide	Bottle	2	50	100
Labour cost for insecticide	Man Days	0.5	350	175
No of Picking	No	2		0
Labour cost for picking	Man Days	4	350	1400
Land rent for 6 months@833 per month	Rs	0	0	5000
Total cost without land rent	Rs	0	0	19298
Total cost with land rent	Rs	0	0	24298
Total value of sale	Kg	692	30	20760
Net income without Rent	Rs	0	0	1463
Net income with Rent	Rs	0	0	-3538

Annexure II:

Cost of Production Radish

Operation	Units	Qty/Acre	Price/Unit	Cost/Acre
Duration of the crop	Days	135	0	0
Deep Ploughing	No	1	1500	1500
Ploughing	No	1	1200	1200
Ploughing & Planking	No	1	1200	1200
Ridge making	No	1	1200	1200
Manual hoeing	Man Days	4	350	1400
Seed	Kg	3.5	250	875
Ridge sowing	Man Days	3	350	1050

Irrigation interval (after 15 days)	Days	9		0
Labour cost for irrigation	Man Days	5.4	350	1890
Organic fertilizer(Enriched Compost)	No bag	7	50	350
Labour cost for fertilizer	Man Days	0.75	350	262.5
Manual weeding	No	3		0
Labour cost for weeding	Man Days	9	350	3150
No of picking	No	2		0
Labour cost for picking	Man Days	24	350	8400
Land rent for 6 months@833 per month	Rs.	0	0	5000
Total cost without land rent	Rs.	0	0	22478
Total cost without land rent	Rs.	0	0	27478
Total value of sale	Kg	5287	7	37009
Wastage	Kg	59	7	413
Total income	Rs.	0	0	37009
Net income without rent	Rs.	0	0	14532
Net income with rent	Rs.	0	0	9532

Annexure III:

Cost of Production Turnip

Turnip	Unit	Qty/Acre	Price/Unit	Cost/Acre
Duration of the crop	days	145	0	0
Deep Ploughing	No	1	1500	1500
Ploughing	No	1	1200	1200
Ploughing & Planking	No	1	1200	1200
Ridge making	No	1	1200	1200
Manual hoeing	Man days	4	350	1400
Seed	Kg	1.2	625	750
Ridge sowing	Man days	3	350	1050
Irrigation interval (after 15 days)	days	10		0
labour cost for irrigation	Man days	5.8	350	2030
Organic fertilizer (Enriched Compost)	No bag	7	50	350
Labour cost for fertilizer	Man days	0.75	350	262.5
Manual weeding	No	3		0
Labour cost/weeding	Man days	9	350	3150
no of picking	No	2		0
labour cost for /picking	Man days	24	350	8400
Land rent for 6 months@833 per month	Rs.	0	0	5000
Transportation cost	Rs.	0	0	0
Total cost without land rent & Transportation cost	Rs.	0	0	22492.5
Total cost with land rent & Transportation cost	Rs.	0	0	27493
Total value of sale	Kg	5613	7	39291
Net income without Rent	Rs	0	0	16799
Net income with Rent	Rs	0	0	11799