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COMPARATIVE STUDY AND ECONOMICS OF DIFFERENT VEGETABLES ORGANICALLY GROWN UNDER TUNNEL AND OPEN FIELD CONDITIONS

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ABSTRACT

An experiment was conducted to compare the growth and yield of different organic vegetables at National Institute of Organic Agriculture, NARC Islamabad during the year 2011. The revenue per acre under tunnels is highest from green onion production followed by coriander and spinach production. However the revenue per acre is minimum from okra production. The revenue per acre from radish and turnip production are rupees 70400 and 56320, respectively. The revenue per acre from cauliflower production are rupees 26720. The comparative analysis of revenue generated from open field grown organic vegetables during 2011 showed that revenue per acre is highest from broccoli production followed by the Kale (karram saag), turnip and radish production. The per acre revenue from ice berg, coriander and spinach production are rupees 54400, 42240 and 16000 respectively. However from open field production of crops per acre revenue is lowest (Rs. 7200/-) from china salad production.

Key words: Organic vegetables, winter season, Economics, Revenue, Islamabad

INTRODUCTION

In Pakistan, the vegetables crop production is gradually decreasing and the population is expected to rise to 191.7M by 2015, which is a great challenge for the researchers and policy makers. Without new strategies, it is not clear how Pakistan will tackle emerging challenges such as declining soil fertility, water availability and land degradation. Moreover, another threat of climate change is knocking at the doors Akbar, (2012). Around 60% of Pakistan is facing food insecurity. During 2010-2011, out of total 20.30M hectare arable land of Pakistan, the area under vegetable cultivation was 0.41M hectare (Govt. of Pakistan, 2011). Moreover, in Pakistan more than 36 varieties of vegetables are gown on large scale comprising potatoes, gourds tomatoes, cucumbers, lady fingers, turnips, cabbages, brinjal, cauliflowers etc. Condiments such as, seeds of cumin, onions, besides dry species are produced in Pakistan and are exported abroad. These are popular in their freshness, taste and nutritious value. Vegetable growing in Pakistan is an important industry and has been increasing in importance for many years. Research on organic production systems, which rely on mechanical weed management and the incorporation of green manures and FYM, have often shown increase in weeds and weed seeds as a result of viable weed seed return via incorporation of manures and reduced the efficacy of mechanical over chemical weed control during the transition (Huxham *et al*., 2005)

It has been identified by organic farmers as the number one barrier to long –term success during the transition to certified production systems, with soil fertility and quality a close second (Walz, 2004). The ecological relevance of organic vegetable species richness and population will vary based on landscape and organic practices, as biodiversity in agro-ecosystems (Weibull *et al*., 2003). During the transitioning from inorganic to organic vegetable production, where pest and disease pressure is high, conventional pest management tactics can be applied along with organic techniques to reduce pest and disease pressure (Henry *et al*., 2010). Shading of some organic vegetables, such as tomato from high light intensity, radiation, soil temperature improved yield of tomato under cheese cloth and maize crop increasing average fruit yield from 18.3t $ha^{-1}$to 21.0 and 27.0 t ha^{-1} respectively (Pino *et al.*, 1997). Vegetable growing is a profitable farming activity on the one hand and an essential part of the human diet on the other. Another important feature of the vegetables is that these can be grown on a small land holding for self-consumption as well as commercial purposes. Due to quick turnover the trend to grow more vegetables is increasing in the farming community (Zorarelli *et al*., 2007). The addition of stockpiled FYM to conventionally tilled systems significantly increased the percent of water stable aggregate gets compared with the same addition to a no-till system. Many studies show some what opposite; in general, no-till systems result in increased total water stable soil aggregation (Taboada *et al*., 2006; Zulfiqar *et al.*, 2005). The present study was aimed to find out the profitability of organic vegetables with low input and good quality food.

MATERIAL AND METHODS

The study was conducted in the experimental fields of National Institute of Organic Agriculture, NARC, Islamabad during 2011**.**Under the tunnels, seven different winter season vegetables, i.e. Radish, Turnip, Spinach, Green Onion, Coriander, Cauliflower and Okra were grown. However, Radish, Turnip, Spinach, China Salad, Coriander, Karram Saag, Cauliflower, Broccoli, Ice Berg and Brussel Sprout were organically grown under open field conditions. For the current study the data is collected from the organic vegetables consumers and in total 120 vegetable consumers were interviewed. For the survey a comprehensive questionnaire was designed and information on a number of variables was collected through field survey. The data regarding vegetables production was collected through comprehensive field trails during different season at National Agricultural Research Center (NARC), Islamabad, Pakistan. For analyzing the consumer preferences the probity model was employed. The vegetables comparative profitability analysis was also carried out to estimate that which organic vegetable more revenue is generating as compared to others.

RESULTS AND DISCUSSION

Consumers Awareness Regarding Organic Vegetables in Pakistan

Consumers' awareness regarding organic vegetables in Pakistan is presented in Table 1. The dependent variable is dummy 1 if consumers have awareness regarding organic vegetables and 0 otherwise. A large number of independent variables are included in the model. The education coefficient is positive and significant at 1 percent level of significance indicating that educated farmers have awareness regarding organic vegetables and vice versa. The family size coefficient is positive and significant at 5 percent level of significance indicating that large family size households have more awareness regarding organic vegetables and vice versa. In the model the house ownership was also included as dummy variable and the empirical results indicates that house ownership coefficient is negative and non significant. The household income coefficient is positive and significant at 5 percent level of significance indicating that higher income households have more awareness regarding the organic vegetables in Pakistan. The employment was also included as dummy variable and the coefficient is positive and significant at 5 percent level of significance. The vehicle was also included as dummy variable and the coefficient is positive and non significant. The R^2 value is 0.17 indicating that 17 percent variation in the dependent variable is due to independent variables that LR $\chi 2$ value is 128 and is highly significant at 1 percent level of significance indicating the robustness of the variables included in the model.

Table 1. Consumers Awareness Regarding Organic Vegetables (Non Linear Regression).

Variable	Coefficient	t-values
Education (years)	0.125***	2.74
Family Size (number)	0.146**	2.05
House (dummy)	-0.112	-1.16
Income (rupees)	0.101**	2.19
Gender (dummy)	0.092	1.02
Employment (dummy)	0.120**	2.13
Vehicle (dummy)	0.135	1.02
R^2	0.17	
LR $\chi 2$	128.42	
Prob>LR $\chi 2$	0.000	

Comparative Analysis of Revenue Generated from different Organic Vegetables grown under tunnel farming

The comparative analysis of revenue generated from different vegetables from tunnel farming is presented in table 2. The revenue per acre is highest from green onion production followed by the coriander and spinach production. However the revenue per acre is minimum from okra production. The revenue per acre from radish and turnip production are rupees 7400 and 56320 respectively. The revenue per acre from cauliflower production are rupees 26720.

Table 2. Comparative Analysis of Revenue generated from Tunnel growing of Organic Vegetables during 2011 at NARC research station.

S. No.	Name of Vegetable	Area per acre	Yield per acre per kg	Price per kg in rupees	Revenue per Acre in rupees
1.	Radish	0.015	8832	8	70400
2.	Turnip	0.015	7040	8	56320
3.	Spinach	0.03	12896	6	77440
4.	Green Onion	0.066	1440	80	115200
5.	Coriander	0.03	1440	60	86400
6.	Cauliflower	0.03	2960	9	26720
7.	Okra	0.036	1600	10	16000

Table 3. Comparative Analysis of Revenue generated from Open field growing of Organic Vegetables during 2011 at NARC research station.

S. No.	Name of Vegetable	Area per Acre	Yield per Acre in kgs	Price per kgs in rupees	Revenue Per Acre in rupees
1.	Radish	0.187	50	10	30000
2.	Turnip	0.187	53	10	331800
3.	Spinach	0.187	10	10	6000
4.	China Salad	0.125	0.75	60	2700
5.	Coriander	0.062	4.4	60	15840
6.	Karram Saag	0.187	11	50	33000
8.	Broccoli	0.162	8.7	90	46980
9.	Ice Burg	0.071	4.25	80	20400
10.	Brussel Sprout	0.072	0.64	110	4200

Comparative Analysis of Revenue generated from Open field growing of Organic Vegetables during 2011 at NARC research station

The comparative analysis of revenue generated from open field growing of organic vegetables during 2011 at NARC research station is presented in table 3. The revenue per acre is highest from broccoli production followed by the karram saag, turnip and radish production. The per acre revenue from ice berg, coriander and spinach production are rupees 20400, 15840 and 116000/- respectively. However from open field production of crops per acre revenue is lowest (Rs. 2700/-) from China salad production.

CONCLUSION

It is concluded from this study that green onion generated highest revenue per acre (Rs. 115200/-) grown under tunnels. However, organically grown vegetable broccoli gave highest revenue per acre (Rs. 125280/-) under open field conditions. It is recommended that these two vegetables are more profitable under tunnel farming and open field conditions in Pothowar region.

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