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PROFITABILITY ANALYSIS OF SUMMER VEGETABLES BY FARM SIZE

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Management of land and other resources vary with size of landholding. The present study was designed to shed the light on the role of farm size in vegetable production. The role of farm size was evaluated by estimating profitability of various vegetables on the basis of farm size. Results indicated that the vegetable growers with small possession of landholding were obtaining higher amount of returns as compared to those having large farm size. However, the small farmers growing bitter gourd got higher net returns per acre with respect to their counterparts growing tinda gourd and muskmelon. The production of vegetables could be boosted up by providing financial resources to the small growers of vegetables.
Keywords: Summer vegetables; profitability; farm size; Punjab

INTRODUCTION

The size of landholding is facing a dilemma of diminishing size with the passage of time in Pakistan. Statistics indicate that there are above 90 percent farmers possessing small landholdings (Government of Pakistan, 2003). The reasons associated with decreasing landholding are division and subdivision of landholding, sale and resale of these holding and law of inheritance. Therefore, the decline in the farm income of the limited resource farmers and the economic well-being of the rural community has been a focus of extensive study for the last three decades.

The farmers possessing small chunks of landholding have limited financial resources and are not able to grow major crops like wheat, cotton, sugarcane and rice due to long gestation period of these crops Barett (1996). Such small chunks of landholdings are suitable for the cultivation of those crop enterprises having short gestation period and returns huge amounts of cash earnings to the resource poor farmers Borcz, (1992). Such enterprises are vegetables being short duration crops and fetching higher returns. Therefore, the main sources of farm income for small and limited resource farmers are the vegetables and non-vegetable crops.

Limited resource farmers in Pakistan grow a variety of vegetables (Chaudhary and Ahmad, 2000) and vegetable production has the potential to enhance farm income. The potential for increase in income from vegetable production depends on several factors-primarily availability of resources, management, and market availability. The trend of increasing revenues from vegetables gives some indication that vegetable production may provide a revenue source to the limited resource farmers. However, the profitability of each vegetable crop and vegetable mix must be investigated to facilitate the decision making process of those limited resource farmers considering vegetable production (Kebede and Gan, 1999).

The primary purpose of this study is to analyze the potential of vegetable production on farm revenue. Specific objectives are to compare the relative level of average cost and returns per acre of vegetable crops while considering farm size of the vegetable growers.

MATERAILS AND METHODS

The primary source of data for this study was a 2002-2003 survey carried out by Department of Environmental and Resource Economics (formally Farm Management), University of Agriculture, Faisalabad. The data included the information on management practice, input output practice, and labour use. The planned study was restricted to summer vegetables i.e. bitter gourd, muskmelon and tinda gourd. The farmers were categorized into small and large. A total of 46, 40 and 52 small farmers growing bitter gourd, muskmelon and tinda gourd, respectively were interviewed, while the respective large farmers interviewed were 44, 35 and 46.

Profitability of vegetables

Enterprise budget analysis was conducted to evaluate the net returns of the different vegetables on the basis of farm size. The vegetable growers were categorized into two groups namely small farmers having operational holding 10 and less than 10 acres and large farmers having operational holding more than 10 acres.

Average returns per acre were calculated from enterprise budget and the returns per acre were used to evaluate the relative potential of each vegetable crop to increase farm income. Cost and return data were computed using the methodology developed by Ahmad et al. (1994, 2003 and 2004) and Hassan, et al. (2005). Production cost used in the study included

purchased input costs (cost incurred on land preparation, seed, fertilizer, irrigation, plant protection measures and labour used for various farming activities including harvesting). Cost of land or land rent was estimated for each vegetable using the following procedure (Ahmad et al., 2004).

$$CRPINT = \frac{TOTCROP}{TOTCUL} * 100$$

Where
CRPINT = Annual cropping intensity for the particular respondent farm
TOTCROP = Total cropped area on the particular respondent farm
TOTCUL = Total cultivated area on the particular respondent farm

a) Estimation of per month cropping intensity

$$CROPMON = \frac{CRPINT}{12}$$

Where
CRPMON = per month cropping intensity
CRPINT = Annual cropping intensity for the particular respondent farm

b) Estimation of land rent for the vegetable

$$LDRENT = \frac{ANNREN}{CRPINT} * CRPMON * MONVEGET$$

Where
LDRENT = Land rent for the vegetable
ANNRENT = Annual rent per acre for the respondent
MONVEGET = Month of the vegetable in the field
CRINP and CRMON are the same as defined earlier
The gross income was obtained by multiplying the average yield with the price of the given product.

$$GI_i = Yld_i * P_{vi}$$

where GI is the gross income per acre of i-th vegetable, Yld is the yield per acre of i-th vegetable and P_{vi} is the output price of i-th vegetable where i ranges between one and three.
Gross margin was calculated in the following way

$$GM_i = GI_i - VC_i$$

GM is gross margin of i-th vegetable, GI is defined earlier and VC is variable cost per acre of i-th vegetable. Variable cost included all cost incurred on purchased inputs and labour except land rent and water charges.
Net income was calculated by the following formula.

$$NI_i = GI_i - TC_i$$

where NI is net income per acre, GI is defined earlier and TC is total cost per acre and i ranged from 1,2, 3.

RESULTS AND DISCUSSION

The present study was designed to estimate the profitability of small and large farmers. At first, cost of vegetables is discussed in detail in this section, followed by profitability.

Cost of growing vegetables

The costs and returns for bitter gourd, tinda gourd and muskmelon change from year to year as the input use, prices and product cost of inputs and market prices fluctuate. Cost of various inputs for different vegetables is detailed in Table I. The intensity of ploughing on large farms was found to be higher as more number of tractor hours was used as compared to small farmers. In vegetable cultivation land preparation is considered most important factor for getting better yield and especially for growing bitter gourd, tinda gourd and muskmelon require much care, because these vegetable are required to be planted on raised beds. In order to avoid confusion time consumed to prepare the beds was also included in the tractor hours. In case of small farmers, cost of land preparation is low for bitter gourd which is Rs. 840.10, than large farmers which is Rs 853.08 while for other vegetable there is no significant difference because a good land preparation is required for these mentioned vegetables. The selection of variety and its quantity is very essential to get good crop. Availability of good seed is always a big problem for the small farmer and it was observed that due to improper arrangements of seed storage small farmers have to bear heavy cost due to poor availability of resources. The costs involved in using the seed among both categories were different. In case of small farmers, high seed cost seed for bitter gourd and tinda gourd was observed (Rs 1015.12, 160.5 for bitter gourd and tinda gourd respectively) than large farmer (Rs 860.78, 177.72 for bitter gourd, tinda gourd respectively). While in case of muskmelon large farmers bears a high cost (Rs. 356.25) than small farmer (Rs. 339.18). For vegetable cultivation a well prepared and fertile soil which contains balanced proportion of micro and macro nutrients is required and at farm level farmyard manure plays a key role to maintain soil fertility in the long run by maintaining the organic matter in the soil. The costs involved in the applying the farm yard manure for large farmer is always high for tinda gourd and muskmelon which are Rs. 276.02 and 142.5 respectively due to heavy use of

FYM than small farmer which were 108.38 and 132.49 for tinda gourd and muskmelon respectively except muskmelon where small farmers has higher cost (Rs 386.45,) due to non availability of farm animals than large farmers (Rs 312.23). Due to poor information and improper extension services our farmer remained ignorant about the use of fertilizer and especially in use of nitrogenous fertilizer and this problem is observed in case of small farmers where a high cost is incurred in use of fertilizer. The cost involved in the applying fertilizer by small farmers was high (Rs. 2192.77, 637.68 and 3987.56 for tinda gourd, bitter gourd and muskmelon respectively) than large farmers (Rs. 1824.25, 544.18 and 2162.97 for bitter gourd, tinda gourd and muskmelon respectively) due some access to information. Sufficient and timely irrigating a crop improves the yield per acre of any crop (Ahmad et al., 2004). The cost involved in the application of irrigation by the small farmers was low for bitter gourd and tinda gourd (Rs. 1340.34, 428.40 respectively) than large farmers (Rs. (2850.91, 433.95) except muskmelon where irrigation cost higher (Rs.686.18) than large farmers (Rs.114.45) due to the nature of the crop.

tinda gourd and muskmelon respectively), than large farmer (Rs 2246.31, 610.16 and 1318.51 for the respective) because of poor resources utilization. Due to poor infrastructure, the cost involved in transporting the produce from farm to market is always high. The cost involved on the small farms for bitter gourd and tinda gourd was low (Rs. 1054.65, 240.42 respectively) than large farmer (Rs. 1931.86, 359.60 respectively) because of mode of transportation and packaging large farmer bears a high cost except the muskmelon where small farmers ears high cost (Rs. 1038.57) than large farmers (Rs. 927.07)due to transportation.

Returns from vegetable cultivation

Average per acre yield of vegetable produced on small farms was more than that of large farms. There was a considerable variation in the yield of vegetables between both categories (Table II). Gross income from the cultivation of the bitter gourd was higher on large farms as compared to small farms, whereas small farmers growing tinda gourd and muskmelon obtained higher gross income per acre. Gross incomes received by the small farmers were Rs. 2005.49, 8059.78 and 15022.77 for bitter gourd, tinda gourd and muskmelon

Table I. Cost of various inputs in vegetable cultivation (Rs./acre)

Items/vegetables	Bitter gourd		Tinda gourd		Muskmelon	
	Small farms	Large farms	Small farms	Large farms	Small farms	Large farms
Land preparation	840.10	853.08	1260.00	1104.00	1245.91	1285.33
Seed	1015.12	860.78	160.50	177.72	339.18	356.25
Farmyard manure	386.45	312.23	108.38	276.02	132.49	142.55
Fertilizer	2192.77	1824.25	637.68	544.18	3987.56	2162.97
Irrigation	1340.34	2850.91	428.40	433.95	686.18	1114.45
Plant protection	1836.85	2042.09	267.58	317.45	2187.69	1197.85
Labour	2729.35	2246.31	851.30	610.16	2324.32	1318.51
Transportation	1054.65	1931.86	240.42	359.60	1038.57	927.07
Land rent	2600.00	2515.35	1950.25	1875.65	2000.00	1945.10
Water charge	115.14	115.14	115.14	115.14	115.14	115.14
Total cost	14110.77	15552.00	6019.65	5813.87	14057.04	10565.22
Variable cost	11395.33	12921.51	3954.26	3823.08	11941.90	8504.98

Vegetables are very much sensitive to insect and disease attacks. The cost involved in applying pesticide on the small farms was low in case of bitter gourd and tinda gourd (Rs. 1836.45, 267.58 respectively) than he large farmer (Rs. 2042.09, 317.45 respectively) except muskmelon where small farmers bears high cost (Rs.2187.69) than large farmer (Rs.1197.85). Harvesting and marketing costs per acre vary with yield. With higher yield, the production cost per 40 kg decreases while harvesting and marketing cost per 40 kg remained the same. The costs involved in the use of labour on the small farms were higher (Rs. 2729.35, 851.30 and 2324.32 for bitter gourd,

while in case of the large farms; the gross income was Rs. 21020.45, 7251.86 and 13166.15 for respective vegetables. The net income per Kg was Rs 2.01, 0.78 and 0.32 rupee for respective vegetables in case of small farmers, while in case of large farmers, the net income per kg was Rs. 1.96, .62 and 0.83 for respective vegetables. Cost per kg is estimated to determine efficient use of resources available to vegetable growers. It was found that small farmers growing bitter gourd and tinda gourd were making efficient use of available resources as indicated by small values of cost per kg. However, cost per kg was higher on small farms compared to large farms in muskmelon (Table II).

Table II. Output and returns in vegetable cultivation by farm size (per acre)

Particular/vegetables	Bitter gourd		Tinda gourd		Muskmelon	
	Small farmers	Large farmers	Small farmers	Large farmers	Small farmers	Large farmers
Output (kg)	2954	2780	2622.00	2322.40	2971	3132
Gross income (Rs)	20052.49	21020.45	8059.78	7251.86	15022.77	13166.15
Gross margin (Rs)	8657.16	8098.94	4105.52	3428.78	3080.87	4661.17
Net income (Rs)	5941.72	5468.45	2040.13	1437.99	965.73	2600.93
Net income (Rs)/kg	2.01	1.96	0.78	0.62	0.32	0.83
Cost (Rs)/kg	4.78	5.59	2.30	2.50	4.73	3.37

SUMMARY AND CONCLUSIONS

The vegetables, such bitter gourd and muskmelon are sensitive to diseases and insects attacks. Diagnosis of disease and insect attack at the right time is one of the crucial farm management practices to enhance production and profitability in vegetable production. Development of high yielding and disease and insect resistant varieties is the need of the time to increase vegetable supply in the country. Such varieties will increase profit in vegetable production on one hand, and reduce cost of production on the other hand due to less use of plant protection measures. Returns in tinda gourd production were higher and water requirements were less compared to bitter gourd and muskmelon. Income of the small farmers could be increased by providing necessary information regarding tinda gourd production. Vegetable growers possess small chunk of landholding, therefore, they have lack of financial resources. So, these farmers need immediate attention of financial institutions.

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