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Vegetable production in peri-urban areas-documenting the evidences from Punjab, Pakistan

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Abstract

Vegetables are the important part of our food, essential for maintaining health. Vegetable consumption has shown increasing trend, however, per capita intake is still below the recommended level of World Health Organization (WHO). Due to their perishability, vegetable commodities have received greater attention and in developing world they are produced closer to their consumption area. Vegetable production has thus become concentrated in peri-urban zones in Asia. Vegetable production in Pakistan is very low because the research institutes and researchers have given it low priority and it has been inadequately addressed. Vegetable production can be enhanced by imparting training to the vegetable growers in specific areas enabling them to increase their net income. A well-structured interview schedule was designed to collect data from randomly selected208 vegetable growers, growing the major vegetables i.e. cauliflower, turnip and radish. The collected data were analyzed with the help of Statistical Package for Social Sciences (SPSS) to derive conclusions and formulate recommendations. Awareness was found less in all types of selected vegetables for fertilizer application followed by insect/pest/disease identification and management. The prominent information gap areas in turnip production were fertilizer application, seed rate and insect/pest/disease management falling in high and medium category. On the basis of research findings it was recommended that research departments should develop insect/pest/disease resistant varieties in order to get potential production of turnip in peri-urban areas.

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Introduction

Sustainable human health is associated with consumption of vegetables which are prime source of nutrition. Cultivation of different kinds of vegetable across the world and research and developmental efforts to increase production potential of vegetables is the evidence of their significance. Research also confirms vegetables as an important source of nutrition (Wargovich, 2000) and source of cancer and heart diseases reduction as well (Goldberg, 2003). Low production cost, high yield potential and abundant nutritional value reinforce the worth of vegetables. Affordability and increasing on-farm production of vegetables is not only feeding increasing mouths but also supporting livelihoods of millions of farm families. Pakistan Agriculture Research Council (2008) confirmed restricted production cost and overwhelm benefits in vegetable cultivation. As food security and poverty are the major issues of the developing world and the governments are planning to overcome food security and reduce poverty. In this regard, vegetable production seems an appropriate option which can help farmers in uplifting their economic status thus minimizing the threats like poverty and food insecurity (Ali and Hau, 2001). Peri-urban vegetable production is gaining importance across the world due to easy access to market and enhanced profit margin (Gockowski *et al.*, 2003). Low per acre yield associated with technical inefficiency and less area under vegetable cultivation are predominant obstacles of poor production (Shaheen *et al.,* 2008).

Similarly, Baksh *et al.* (2007) argue that inadequate trainings and poor technical efficiency are dominating barriers of low production. Training plays a central role in capacity building of farmers, raising awareness and offering latest knowledge to produce maximum (Al-Shadiadeh, 2007). Improvement in technical knowledge of farmers and on-farm productivity are confirmed in good order through trainings. It is indispensable to unveil specific spheres yet to be addressed and covered under trainings. Research on Training Needs Assessment (TNA) of farmers practicing vegetables cultivation in peri-urban areas is scanty in Pakistan.

TNA is a vibrant instrument to underpin gaps and may imply one resource and activity at one site while may consist of multiple and different resources and activities at others (Nickols, 2005). Several researchers rendered their efforts to probe training gaps among farmers requiring to be filled. Koffa *et al.* (2001) revealed that the provision of training to the farmers in aspects of pre and post nursery stages, green manuring, gathering marketing information, animal husbandry, entrepreneurial skills, agro-forestry management and effective processing techniques were essential and helpful in improving livelihoods. Roy (2003) argued that farmers necessitated trainings on almost entire production process. Increased information availability, timely access to information and authenticity of information are fundamental to vegetables outburst (Thompson and Sonka, 1997; Mbanda-Obura *et al.*, 2017). Keeping in view the significance of technical information to be possessed by vegetable growers regarding vegetable production, the present investigation was undertaken for the assessment of training needs of vegetables growers in peri-urban areas of Faisalabad with the assumption of unveiling room for further development.

Materials and methods

Study Area

Faisalabad is known as Manchester of Pakistan because of textile hub and 3rd populous city of Pakistan. Faisalabad lies in center of Punjab province and susceptible to mix farming operations. Hence, Faisalabad is hub for cultivation of major as well as minor crops including wheat, cotton, sugarcane, rice and vegetables. Vegetable are usually significant income supporter for the residents of Faisalabad. Fruit and Vegetables Development Project (F&VDP) was executed by the government of Punjab from 2005-2010 with aim to enhance quality production of vegetables. Faisalabad was also the core target of this project embarking numerous successes. In this scenario, present study was conducted in Faisalabad district of Punjab Pakistan. Main target area was peri-urban peripherals of study district.

Selection of Study Area

The reason behind selection of peri-urban was "ignorance" narrowly focused by researchers and intention was to unveil the huge potential intact with peri-urban areas. According to Food and Agriculture Organization (2000:10) the peri-urban area is neither entirely urban nor purely rural in the traditional sense; it is almost the partly urbanized rural area. According to geographic distribution of district "the Faisalabad Bypass is constructed around the city to sustain traffic flow without interference from local traffic and is almost 15-20 km away from the main city was considered as the end point of peri-urban area. This widely prevailed area around the city served as study area for the sample selection. This per-urban area is blessed with fertile soil and vegetables cultivation is major focus of inhabitants. Though, vegetables cultivation is mainly on small area.

Population for study

Those small vendors and vegetables producers were assumed targeted population for the study. Population was known and homogenous in nature, hence, complete list of vegetables growers was obtained from the office of Fruit and Vegetable Development Project (F&VDP), Faisalabad. This list served as sampling frame and laid foundation of simple random sampling technique execution.

Selection of Respondents

Prior selection of respondents, type of respondents was "the farmers who are registered with F&VDP were defined.

There were total 400 registered vegetables growers of F&VDP. From these 400 farmers, 208 farmers were selected as respondents using simple random sampling technique. Simple random sampling technique reduced the biasness as equal chance of selection was available for each and every farmer. Sample size was determined according the standards of Fitz-Gibbon and Morris (1987) table for determining the sample size.

Data collection

Questionnaire was adopted as research instrument to collect data. Questionnaire was designed in line with study objectives from synthesis of literature, consultation of previous research studies, peer reviews and discussion with experts. Validity was assessed through face validity technique. Distinguished Professors from the Department of Horticulture, University of Agriculture Faisalabad, crosschecked the contents of questionnaire. On next stage, questionnaire was pre-tested on 20 vegetables growers other than sample size. After incorporation of gaps, questionnaire was finalized for data collection. Data were collected through face to face interview technique followed by qualitative discussion and observation technique. Face to face interview is the most appropriate data collection method for getting information (Radhakrishna, 2007). Data collection was carried out from November 2015 to March 2016. The data collected from the study are useless if not arranged in the form of conclusion in an understandable and comprehensive manner that can only be obtained by appropriate data analysis technique.

Data Analysis

The raw data were arranged and analyzed through computer software Statistical Package for Social Sciences (SPSS). Data were quantitative in nature; hence descriptive statistics was applied for the interpretation of data.

Results and discussion

Awareness level of vegetable growers regarding production technologies of turnip

According to the data depicted in Table 1,'Desi Surkh' appeared as top known variety to a large majority (78.8%) of the respondents followed by 'Golden' which was known to about 60% respondents. While 'Purple Top' was the least known variety to growers. Land preparation practices were known to a vast majority of the respondents. Only about 40% respondents were familiar with recommended seed rate. Lower level of awareness infers that farmers were not applying recommended seed rate. Sowing time was known to almost all the respondents.

Recommended sowing method was known to about half of the respondents. A vast majority (88%) of respondents was aware of application of water immediately after sowing while recommendations regarding subsequent irrigations were known to only 44.2% respondents. Regarding fertilizer application, each and every farmer knew the importance of fertilizer in crop production.

However, the recommended doses of nitrogen and phosphorus were known to only about one third of the respondents followed by about one fourth respondents who knew the recommendation about potash. This enhanced awareness could be enjoyed through effective extensions services (Dhehibi *et al.,* 2017*).*

Table 1. Distribution of respondents according to their awareness about recommended production technologies of turnip.

Recommended technologies	Awareness			
	Yes		No	
	f	%	f	%
Varieties				
DesiSurkh	164	78.8	44	21.2
Purple Top	79	38.0	129	62.0
Golden	124	59.6	84	40.4
Land preparation				
2-ploughing+2-planking	173	83.2	35	16.8
Leveling	199	95.7	9	4.3
Seed rate				
2-2 $^{1/2}$kg/acre	83	39.9	125	60.1
Sowing season				
August-November	198	95.2	10	4.8
Spacing				
Row-row distance (75cm)	104	50.0	104	50.0
Plant-plant distance (8cm)	100	48.1	108	51.9
Irrigation				
1st irrigation at the time of planting	183	88.0	25	12.0
Subsequent irrigations at interval of 4-5 days	92	44.2	116	55.8
Fertilizer application				
Application of FYM (10-15 tons/acre) during land preparation	65	31.3	143	68.8
Nitrogen (25 Kg/acre) 1/3 during land preparation, 1/3 before flowering stage, 1/3 after flowering stage	69	33.2	139	66.8
Phosphorous (20 Kg/acre) during land preparation	61	29.3	147	70.7
Potash (25 Kg/acre) 2/3 during land preparation and 1/3 after flowering stage	54	26.0	154	74.0
Diseases				
Scab	61	29.3	147	70.7
Early blight	120	57.7	88	42.3
Late blight	134	64.4	74	35.6
Insect/pests				
Army worm	179	86.1	29	13.9
Cabbage butterfly	164	78.8	44	21.2
Diamond back moth	71	34.1	137	65.9
Mustard saw fly	62	29.8	146	70.2
Semilooper	34	16.3	174	83.7
Cabbage borer	101	48.6	107	51.4
Painted bug	43	20.7	165	79.3
a. Insecticide				
Emamectin EC-1.9 (200ml/acre)	129	62.0	79	38.0
Indoxacarb EC-150 (175ml/acre)	51	24.5	157	75.5
Cypermethrin EC-10 (250ml/acre)	21	10.1	187	89.9
Carbosulfan EC-500 (20ml/acre)	143	68.8	65	31.3

b. Fungicide				
Mencozeb (2g/kg as seed treatment)	177	85.1	31	14.9
Mencozeb (2.5-3g/L of water and spray after every 10 days)	59	28.4	149	71.6
Cultural control				
Crop rotation	123	59.1	85	40.9
Insect resistant varieties	99	47.6	109	52.4
Cultivation of soil	75	36.1	133	63.9
Improved drainage	84	40.4	124	59.6
Timely planting	72	34.6	136	65.4
Removal of crop residue	41	19.7	167	80.3
Harvesting				
After 55-60 days of sowing	101	48.6	107	51.4

Data further indicate that diseases of turnip i.e. scab, early blight and late blight were known to 29.3, 57.7 and 64.4% farmers, respectively. Such a low awareness is insufficient to meet the standard approach of controlling diseases. Regarding awareness of insect/pests among respondents, army worm was the prominent insect known to 86.1% respondents followed by cabbage butterfly which was known to about 79% respondents and cabbage borer which was known to 48.6% respondents.

Following the control measures, awareness of recommended insecticides appeared prominent in case of 'carbosulfan' and 'Amamectin' as reported by 68.8 and 62.0% respondents, respectively. Findings are similar to those of Yassin *et al.* (2002) who reported that a very small number of insecticides and pesticides were known to farmers. The reason could be the availability of number of alternative chemicals of different local as well as multinational companies or illiteracy on the part of respondents.

Table 2. Information gap regarding production technology of turnip.

Parameters	Information gap					Rank
Turnip	Very low 1-20%	Low 21-40%	Medium 41-60%	High 61-80%	Very High 81-100%	
Fertilizer application				(70.08)		01
Seed rate			(60.1)			02
Insect/pest/disease management			(56.98)			03
Insect/pest/diseases identification			(53.42)			04
Harvesting			(51.45)			05
Spacing			(50.97)			06
Varieties			(41.19)			07
Irrigation application		(33.88)				08
Land preparation	(10.58)					09
Sowing time	(04.85)					10

Awareness about Mencozeb was the highest (85.1%) among the respondents. Crop rotation as a cultural control appeared prominent being known to 59.1% of respondents followed by sowing of resistant varieties. Removal of crop residues was the least known cultural practice. Slightly less than half (48.6%) of the respondents were aware of recommended time of harvesting.

During informal discussion it was revealed by the farmers that harvesting of produce is subjected to market demand.

Information gap regarding recommended production technologies

Average productivity of vegetables is very low in Pakistan.

A wide gap exists between obtained yield and potential yield and potential yield can be obtained by lessening the information gap of vegetable growers (Sahu *et al.*, 2009; Worku, 2017).In order to determine the existing knowledge, awareness of individual respondent about all recommended production technologies was calculated and divided by the total number of recommended production technologies. The obtained value was multiplied with 100 to get percentage of existing knowledge. In order to determine the training needs, the existing knowledge of vegetable growers was subtracted from 100 to get the information gap. The data obtained were then divided in five categories i.e. very low (0-20%), low (21-40%), medium (41-60%), high (61-80%) and very high (81-100%).

Respondents were asked to highlight information gap regarding production technology of selected vegetables and data in this regard are presented in Table 2. In turnip production, seed rate, insect/pest/disease management, insect/pest disease identification, harvesting, spacing and selection of varieties were the aspects where respondents had medium level of information gap. Land preparation fell into very low category of information gap followed by sowing time.

Recommendations

Study summarized poor awareness of recommended production practices of turnip vegetable among growers. Scanty familiarity regarding insect/pests and diseases appeared prominent. Non-availability of insect/pests resistant and high yielding varieties were the leading reservations perceived by the growers. Study recommends that extension field staff should diversify their working and disseminate latest information on plant protection measures among vegetables growers.

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