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Relationship between Profile of the Vegetable Growers and Hazardous Effects of Pesticides in Gujarat

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ABSTRACT

Vegetables are very important perishable higher nutritional valuable crops in India as well as in Gujarat. The present study was conducted in Banaskantha district of Gujarat, due to major vegetable producing area. Three talukas were selected purposively where potato and tomato crops were grown. Five villages from each taluka and ten vegetable growers from each village were selected randomly (five tomatoes and five potatoes growers). Thus, in total 150 respondents *i.e.,* 75 for potato growers and 75 for tomato growers selected for study. The data were collected from farmers through personal interviews conducted at their homes and farms. Statistical tools such as frequency, rank, arithmetic mean, standard deviation, and correlation coefficient (r) were used to derive the inferences. The study concluded that mostly respondents had medium to low level of knowledge about the hazardous effects of pesticides

Key Words: Pesticides, Knowledge, Vegetables, Hazardous and Farmer

INTRODUCTION

In India, agriculture contributes around 20.19 per cent to the gross domestic product (GDP) while providing employment to around 60.00 per cent of country's work force (Anonymous, 2020). The second largest producer of vegetables in the world is India. India shares almost 8.6 per cent of the world vegetables output from 2.00per cent of the cropped area in the country. During 2020-21, India produced 191.77 million Mt of vegetables on an area of 10.35 million hectares. India exported vegetables worth 4969.73 crores (Anonymous, 2020). Vegetable cultivation has become an important means for reducing poverty of small farmers in India. It helps to generate valuable income for farmers and labourers. Farmers training needs were playing a pivotal role in the widespread adoption of latest technology in awareness of health (Kumar *et al,* 2024). In the present study, knowledge refers to know about various hazardous effects of pesticides on environment, water, soil as well as human health possessed by the vegetable growers. Adequate knowledge about hazardous effects of pesticides is essential for vegetable growers for the optimum and safe use of pesticides. Therefore, it was essential to gather information from vegetable growers regarding their knowledge of the hazardous effects of pesticides.

Due to intense competition and high demand, many farmers are increasingly overusing organophosphate pesticides to boost their agricultural yields (Choudhary *et al*, 2014). As a result, pesticides have become indispensable in agro-ecosystems, despite the numerous problems associated with them (Dey *et al*, 2013). The use of pesticides in agriculture has led to several issues, including the death of beneficial insects, secondary pest outbreaks, the development of pest resistance, and significant human health problems.

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Table 1. Distribution of vegetable growers according to their knowledge level about the hazardous effects of pesticides. (n= 150)

Sr. No.	Category	Respondents	
		Frequency	Per cent (%)
1	Low	31	20.67
2	Medium	93	62.00
3	High	26	17.33
Total		150	100.00
Mean=37.49	SD=10.17		

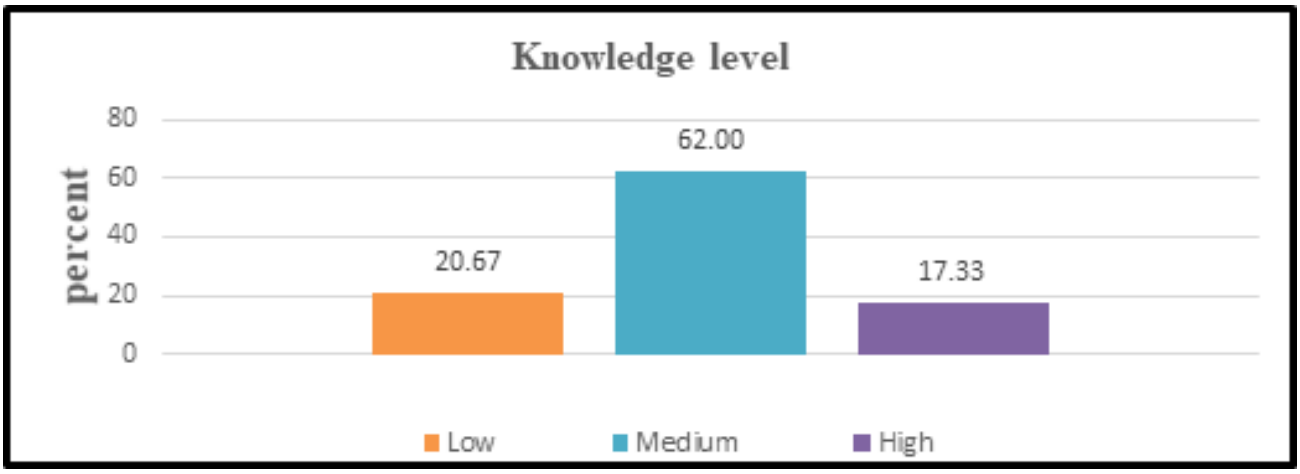

Fig. 1. Distribution of vegetable growers according to their knowledge level about the hazardous effects of pesticides

These health issues include both acute and chronic diseases, such as cancer, neuro-behavioral defects, congenital malformations, and other health risks like leukemia and neoplasms. Pesticides used in agricultural fields can spread into the environment and come into direct or indirect contact with humans.

MATERIALS AND METHODS

The present study was conducted in Banaskantha district of North Gujarat region. This district was selected basis on highest (91405 ha) vegetable production (*Department of Horticulture, Banaskantha*). Banaskantha district consists of fourteen talukas. Three talukas were selected purposively in which potato and tomato crops grown on 65974 ha area (*Department of Horticulture, Banaskantha*). Five villages from each taluka were selected randomly. From each selected village ten vegetable growers were selected randomly, which were five tomatoes and five potatoes growers selected. Thus, in total 150 respondents *i.e.,* 75 for potato growers and 75 for tomato growers selected for study.

An interview schedule was developed to encompass all independent and dependent variables. Data regarding knowledge of the hazardous effects of pesticides and respondents' opinions on alternatives to pesticides were collected through personal interviews. The data from the interviews were then transferred to a master sheet. Statistical tools such as frequency, rank, arithmetic mean, standard deviation, and correlation coefficient (r) were used to draw inferences.

RESULTS AND DISCUSSION

Knowledge level of vegetable growers about the hazardous effects of pesticides

It was found that slightly more than half (62.00%) of the vegetable growers had medium level of knowledge about the hazardous effects of pesticides, followed by low and high level of knowledge with 20.67 per cent and 17.33 per cent , respectively.

It can be said that a large majority (82.67%) of the vegetable growers were found with medium to low level of knowledge about the

Table 2. Distribution of respondents based on socio-economic profile. (n= 150)

Sr. No.	Variable	Numbers	Per cent
A.	Age		
1.	Young age group (Up to 35 yr)	40	26.67
2.	Middle age group (Between 36 to 50 yr)	74	49.33
3.	Old age group (Above 50 yr)	36	24.00
B.	Education		
4.	Illiterate	25	16.66
5.	Primary education (1 st to 8thstd.)	50	33.33
6.	Secondary education (9 th to 10thstd.)	43	28.67
7.	Higher secondary education (11 th and 12thstd.)	19	12.67
8.	Graduation and Post -graduation and above	13	08.67
C.	Land Holding		
9.	Marginal (Up to 1.00 ha)	30	20.00
10.	Small (1.0 to 2.0 ha)	34	22.67
11.	Semi medium (2.0 to 4.0 ha)	74	49.33
12.	Medium (4.0 to 10.0 ha)	12	08.00
13.	Large (more than 10.0 ha)	00	00.00
D.	Annual Income		
14.	Up to Rs. 50000/ -	33	22.00
15.	Rs. 50001 to 100000/ -	71	47.33
16.	Above Rs. 100001/ -	46	30.67
E.	Social Participation		
17.	No membership	38	25.33
18.	Membership in one organization	64	42.67
19.	Membership in more than one organization	34	22.67
20.	Holding position in organization	14	09.33
F.	Farming Experience		
21.	Low level of farming experience	35	23.33
22.	Medium level of farming experience	82	54.67
23.	High level of farming experience	33	22.00
G.	Extension Participation		
24.	Low extension participation	29	19.33
25.	Medium extension participation	84	56.00
26.	High extension participation	37	24.67
H	Source of Information		
27.	Low source of information	22	14.66
28	Medium source of information	100	66.67
29.	High source of information	28	18.67
30.	Mass Media Exposure		
31.	Low mass media exposure	25	16.67
32.	Medium mass media exposure	96	64.00
33.	High mass media exposure	29	19.33
I.	Scientific Orientation		
34.	Low scientific orientation	29	19.33
35.	Medium scientific orientation	87	58.00
36.	High scientific orientation	34	22.67
37.	Risk Orientation		
38.	Low risk orientation	37	24.66
39.	Medium risk orientation	91	60.67
40.	High risk orientation	22	14.67

Table 3. Ranking of knowledge statement on the basis of mean per cent score.

Sr. No.	Statement	Mean Score	MPS	Rank
1	Do you know excessive use of pesticides causes harmful effects on human health?	2.90	96.66	1
2	Do you know about use of agro chemicals such as pesticides can contaminate vegetables?	2.86	95.55	2
3	Do you know use of pesticide causes hazardous effects to soil?	2.78	92.88	3
4	Do you know best time of application of pesticides	2.76	92.22	4
5	Do you store your loose pesticides container at right place?	2.60	86.66	5
6	After spraying, do you wash your body surface?	2.60	86.66	5
7	Do you know use of pesticides causes hazardous effect in water?	2.56	85.55	7
8	Do you generally wash your cloth after application of pesticides?	2.53	84.44	8
9	Do you dispose your unused or expired agro chemicals?	2.33	77.77	9
10	Do you cover your nose mouth with any cloth?	2.30	76.66	10
11	Do you read the literature (14 languages) given with pesticides container?	2.26	75.55	11
12	Do you know the topics given in the literature?	2.20	73.33	12
13	Do you perform the following operations – rinsing, filling, washing for spraying?	2.12	70.66	13
14	Do you know any hazardous effects of pesticides on environment?	2.10	70.00	14
15	Did you ever hear about botanical pesticides?	1.86	62.22	15
16	What is the result of improper, excessive and careless use of pesticides?	1.63	54.44	16
17	Do you know the meaning of antidotes?	1.56	52.22	17
18	Do you know, after spraying of pesticides it goes to where?	1.46	48.88	18
19	Do you cover your hand with gloves?	1.40	46.66	19
20	Do you re-use pesticides container for household purpose?	1.26	42.22	20

hazardous effects of pesticides. The probable reason for above finding may be due to their primary to secondary level of education, they can't proper understand the literature given with pesticides container regarding time, dose and other operation related to the application method. Another reason might be due to unreadable of instructions about safe waiting period of pesticides and unaware about self-protection from pesticides. This result was in line with the findings of Adhikary (2012).

Socio-economic profile of farmers

The data (Table 2) illustrate that a significant portion (49.33%) of the middle-aged group (Jhansi and Kalal, 2022) predominantly possessed primary education (33.33%), followed by secondary education (28.67%) (Shinde *et al,* 2021). The majority (49.33%) of respondents were semi-medium landholders (Chaudhary, 2013; Dhepe, 2014). According to the data, 47.33% of respondents earned up to 50,000/- annually. Social participation among respondents indicated membership in one organization (42.67%), followed by no membership (25.33%). A majority (54.67%) of respondents had a medium level of farming experience (Rabari, 2006). Additionally, more than half (56.00%) of vegetable growers exhibited a medium level of participation in various extension activities (Chaudhary, 2010). The study concluded that two-thirds (66.67%) of vegetable growers had medium sources of information (Shinde, 2017), while nearly two-thirds (64.00%) had medium exposure to mass media (Chaudhary, 2010; Upadhyay, 2010). The majority (58.00%) of vegetable growers displayed a medium level of scientific orientation (Choudhary, 2010), and over half (60.67%) demonstrated a medium level of risk orientation (Patel *et al*, 2012).

Relationship between Profile of the Vegetable Growers and Hazardous Effects

Table 4. Relationship between profile of respondents and their level of knowledge

Sr. No.	Variable	r value
(I)	Personal characteristics	
1	Age	-0.1130^{NS}
2	Education	0.1858**
(II)	Socio economic characteristics	
3	Annual income	0.1848**
4	Land holding	0.1502*
5	Farming experience	0.1553*
(III)	Communication characteristics	
6	Extension participation	0.1492*
7	Source of information	0.1514*
8	Mass Media exposure	0.1274^{NS}
9	Social participation	0.1562*
(IV)	Psychological characteristics	
10	Risk orientation	0.1887**
11	Scientific orientation	0.1533*

*Where, NS = non-significant, * = significant at 0.05 and ** = significant at 0.01 level of probability.*

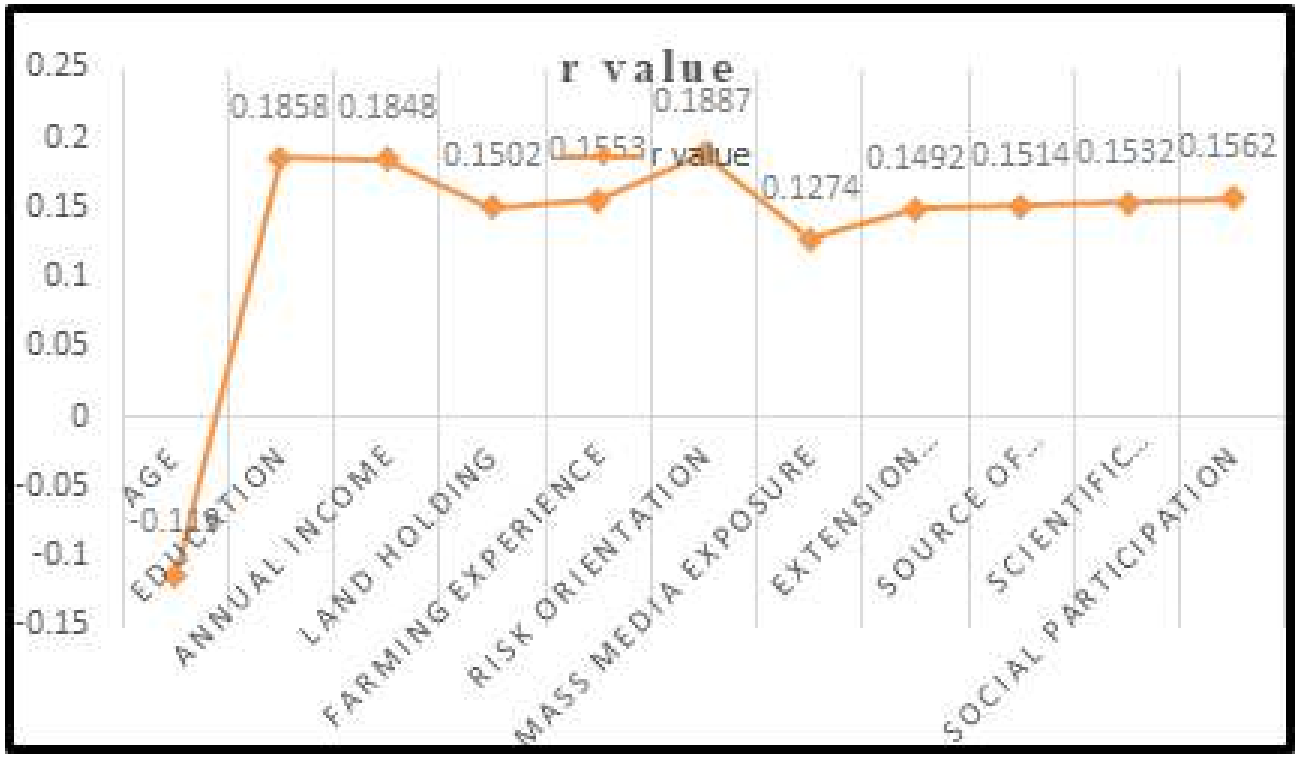

Fig.2. Relationship between profile of vegetable growers and their knowledge level about hazardous effects of pesticides

Ranking of knowledge statement on the basis of mean per cent score

The data indicated that the farmers had very good amount of knowledge in four aspects. The finding was in concurrence with the findings reported by Rijal *et al* (2018).

Relationship between profile of respondents and their level of knowledge

The relationship between profiles characteristics of the vegetable growers with level of knowledge were worked out with the help of coefficient of correlation. The regarding relationship between variables are given in table 4 and diagrammatically depicted in fig. 2.

The independent variables viz; age (r = -0.1130), supported by Kumar *et al* (2016), mass media exposure (0.1274) of respondents were non-significant (at 0.05 and 0.01 level of significance), the similar findings have been reported by Dodia (2015). The ages of respondents were negative correlated but mass media exposure was having positive correlation with knowledge. The other variables such as education (r = 0.1858),the similar findings have been reported by Muhammad *et al* (2019)**,** annual income(r = 0.1848) the similar findings have been reported by pole (2018), land holding (r = 0.1502) the similar findings have been reported by Desai (2016), farming experience(r = 0.1553) the similar findings have been reported by Hasan *et al* (2021), extension participation(r = 0.1492) the similar findings have been reported by pole (2018), source of information(r = 0.1514) the similar findings have been reported by Atar (2012), social participation(r = 0.1562) the similar findings have been reported by Desai (2016), risk orientation(r = 0.1887) the similar findings have been reported by Nale (2014) and scientific orientation(r = 0.1858) the similar findings have been reported by Salunkhe and Pandey (2017) were highly significant and positively correlated with respondents knowledge (at 0.05 and 0.01 level of significance)level about hazardous effects of pesticides.

CONCLUSION

The study facilitates in knowing the characteristics of the vegetable growers which would help to guide for the programmers and extension agencies to planning and implementing programme related to promote safe and efficient use of the pesticides for increase vegetable production and reduce hazardous effects of pesticides on water, soil, human health and environment. The distribution of the respondents showed that majority of the vegetable growers fell under medium category with respect to personal, socio economical, communicational and psychological characteristics studied. The farmers had very good amount of knowledge of, excessive use of pesticides causes harmful effects on human health, use of agro chemicals such as pesticides can contaminate vegetables, pesticide causes hazardous effects to soil and best time of application of pesticides It implies that the vegetable growers of Banaskantha district are in transitional state of advancement. Hence, the intensity of extension efforts should be modified in best possible way to bring desired behavioral changes in farmers. The farmer's back ground factors which impact knowledge of vegetable growers about the hazardous effects of pesticides must be reckoned with in any best programme of planned communication. The study also revealed that personal and socio-economic variables like education and annual income had contributed highly significantly to the prediction of knowledge of vegetable growers about hazardous effects of pesticides. It therefore, implies that efforts should be prepare for considering the training should be arranged for pesticides dealers for imparting better knowledge about safe and balance use of pesticides.

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