

INFLUENCE OF FACTORS DETERMINING ENVIRONMENTAL RISK LITERACY LEVEL ABOUT THE USE OF AGROCHEMICALS

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ABSTRACT

The overuse of agrochemicals threatens ecological balance by accumulating residues in the food chain, harming beneficial insects, degrading soil health and posing health risks through contaminated produce. Balancing their benefits and risks is essential for sustainable agriculture and ecosystem preservation. Keeping this view the present study was conducted with 150 farmers of five villages each from Anand, Borsad and Anklav talukas. The study found that 79.33 per cent of vegetable growers had high level of environmental risk literacy regarding agrochemical use. Variables such as scientific orientation, attitude towards organic farming, knowledge of eco-friendly agricultural technology showed significant positive correlations with growers' environmental risk literacy. However, factors such as age, size of landholding and frequency of social media use did not demonstrate a significant correlation with vegetable growers' environmental risk literacy regarding agrochemical use.

Keywords: environmental risk literacy, vegetable growers, relationship, agrochemicals setting criterion while granting loans to entrepreneurs

INTRODUCTION

“Pesticides may protect the crop, but they also poison the farmer.” – Ban Ki-moon

The reckless use of agrochemicals poses a significant threat to ecological balance, mainly due to the buildup of agrochemical residues in the food chain (Sasane & Jadhav, 2019). Excessive agrochemical application on crops like chilli, cauliflower, brinjal (eggplant) and okra disrupts ecological stability and increases farming costs (Kumar *et al.*, 2018). This overdependence on chemicals can destroy beneficial insect populations leading to greater pest resistance and necessitating even more agrochemical use in a harmful cycle. This imbalance also impacts soil health by reducing microbial diversity and hindering nutrient cycling both essential for sustainable farming (Vihariya *et al.*, 2017). Agrochemicals have multiple roles such as preserving produce, enhancing its appearance and extending shelf life. While they help reduce food waste by maintaining the quality and longevity of perishable goods thereby improving marketability and ensuring a steady food supply, they also pose health risks (Shammi *et al.*, 2020). Consumers may ingest residues from contaminated produce with chronic exposure linked to health issues like neurological disorders, endocrine disruption, and increased cancer risk (Patel *et al.*, 2017). Additionally, the environmental impact is severe,

with agrochemical runoff polluting water bodies, harming aquatic life, and disrupting entire ecosystems. Therefore, while agrochemicals are important in modern agriculture, their careful and regulated use is vital to protect human health and environmental sustainability. Balancing the benefits and risks of agrochemical use is crucial for maintaining long-term ecological balance and food security (Patel *et al.*, 2013).

OBJECTIVES

- (1) To study the environmental risk literacy about the use of agrochemicals among the vegetable growers
- (2) To find out the relationship between profile of vegetable growers and their environmental risk literacy level about the use of agrochemicals

METHODOLOGY

The current study was conducted in the Anand district located in middle Gujarat. Three talukas were chosen on the basis of highest area under vegetable cultivation, resulting in the selection of Anand, Borsad and Anklav. From each taluka, five villages were randomly chosen and from each village ten vegetable growers were randomly selected making a total of 150 respondents. The research employed an Ex-Post-Facto design. To find the overall risk literacy of vegetable growers about the use of agrochemicals a structured schedule was

developed. It consisted of total 38 statements concerning environmental risks which were classified into seven sub components (I) Soil (II) Water (III) Air (IV) Animals (V) Human beings (VI) Birds and beneficial insects (VII) Food chain. Each component consisted of statements showing relative impact of agrochemicals on respective component. Vegetable growers were requested to go through these statements and give their response regarding literacy about environmental risk in use of agrochemicals. The responses were collected in two categories *viz.* yes and no. For each item, zero score was given to incorrect answer and one score was assigned for right answer. Risk literacy was calculated by using the following formula:

$$RL = \frac{\text{Obtained score}}{\text{Maximum possible score}} \times 100$$

The data was collected through interview survey were coded, tabulated and analyzed using SPSS and Microsoft excel.

RESULTS AND DISCUSSION

Environmental risk literacy about the use of agrochemicals among vegetable growers refers to the level of awareness and understanding that vegetable growers possess regarding the potential environmental hazards linked to the use of agrochemicals (including pesticides, fertilizers, and herbicides) in their agricultural activities. The findings along with relevant discussion are presented below in Table 1.

Table 1: Distribution of vegetable growers according to their environmental risk literacy about the use of agrochemicals (n=150)

Sr. No.	Risk literacy	Frequency	Per cent
1	Very low	00	00.00
2	Low	00	00.00
3	Medium	21	14.00
4	High	119	79.33
5	Very high	10	6.67

Table 1 indicated that majority (79.33 %) of the vegetable growers had high environmental risk literacy about the use of agrochemicals, followed by medium (14.00 %) and very high (6.67 %). Thus, it can be established that a vast majority of the vegetable growers had medium to very high environmental risk literacy about the use of agrochemicals. Probable reasons might be better access to information including extension services, social media and peer networks, adopting Integrated Pest Management (IPM) techniques and employing organic farming method may all contribute to this

trend of result. This finding is in line with that of Ratna *et al.* (2020); Vinaya *et al.* (2022).

Relationship between the profile of vegetable growers and their environmental risk literacy level about the use of agrochemicals

The correlation between the personal, socio-economic, psychological and communicational factors of the respondents and their environmental risk literacy level about the use of agrochemicals was determined and tested with the help of Karl Pearson's correlation coefficient test and results obtained is presented in Table 2.

Table 2: Relationship between the profile of vegetable growers and their environmental risk literacy level about the use of agrochemicals

(n=150)

Sr. No.	Independent Variables	' r 'value
X ₁	Age	0.019
X ₂	Educational qualification	0.180*
X ₃	Social participation	0.177*
X ₄	Extension participation	0.192*
X ₅	Size of land holding	0.081
X ₆	Total annual income	0.192*
X ₇	Area under vegetable cultivation	0.232**
X ₈	Scientific orientation	0.243**
X ₉	Economic motivation	0.197*
X ₁₀	Risk orientation	0.213**
X ₁₁	Attitude towards IPM	0.180*
X ₁₂	Attitude towards organic farming	0.238**
X ₁₃	Knowledge about eco-friendly agricultural technology	0.229**
X ₁₄	Extent of use of social media	0.134

** Significant at 0.01 level of probability

* Significant at 0.05 level of probability

(1) Age and Risk Literacy

The age of the vegetable growers and their environmental risk literacy associated with the use of agrochemicals showed a positive and non-significant relationship ($r = 0.019$), as shown in Table 2. It can be claimed that vegetable growers' environmental risk literacy was seen as average to good irrespective of their age.

(2) Educational Qualification and Risk Literacy

Table 2 illustrates that there was a positive and significant correlation ($r = 0.180^*$) between the education

level of vegetable growers and their environmental risk literacy concerning agrochemical use. This suggests that literate vegetable growers had higher literacy of the environmental risks associated with using agrochemicals.

(3) Social Participation and Risk Literacy

The data presented in Table 2 signifies that social participation had a positive and significant correlation ($r = 0.177^*$) between with environmental risk literacy concerning agrochemical use. This indicates that social participation offers individuals opportunities for organized interaction, leading to the acquisition of knowledge.

(4) Extension Participation and Risk Literacy

It is clear from the data illustrated in Table 2 that extension participation of the vegetable growers had a positive and significant correlation ($r = 0.192^*$) with their literacy regarding environmental risk in use of agrochemicals. The possible reason for this finding might be that the interaction between extension personnel and progressive vegetable growers who attended extension activities such as group meetings, demonstrations, trainings etc enabled them to visualize and adopt eco-friendly agricultural technology and also enhanced their knowledge and skills.

(5) Land Holding and Risk Literacy

The data illustrated in Table 2 reflect that land holding of the vegetable growers had positive but non-significant association ($r = 0.081$) with their environmental risk literacy about the use of agrochemicals. So, it concludes that the size of landholding does not affect vegetable growers' perception of environmental risk associated with the use of agrochemicals.

(6) Annual Income and Risk Literacy

The data depicted in Table 2 revealed that there was a positive and significant correlation ($r = 0.192^*$) between annual income of the vegetable growers and their environmental risk literacy about the use of agrochemicals. Therefore, vegetable growers with higher annual incomes possess greater financial resources to invest in improved agricultural practices and latest technologies. This enables them to become informed and aware of this topic.

(7) Area Under Vegetable Cultivation and Risk Literacy

It is apparent from the Table 2 that there was a positive and highly significant correlation ($r = 0.362^{**}$) between area under vegetable cultivation and their environmental risk literacy about the use of agrochemicals. The probable reason is that areas with larger vegetable cultivation might

have a greater reliance on agrochemicals like pesticides and fertilizers. This could lead to greater literacy about the potential risks associated with these agrochemicals, thereby enhancing environmental risk literacy.

(8) Scientific Orientation and Risk Literacy

The data presented in Table 2 signifies that the scientific orientation of the vegetable growers and their environmental risk literacy about the use of agrochemicals was positively and highly significantly correlated ($r = 0.243^{**}$). It can be concluded that vegetable growers with a higher scientific orientation may be more likely to adopt best practices in agriculture, including integrated pest management, organic farming methods, or the use of alternative, less harmful agrochemicals.

(9) Economic Motivation & Risk Literacy

It is apparent from the Table 2 that economic motivation of the vegetable growers had a positive and significant correlation ($r = 0.197^*$) with their environmental risk literacy about the use of agrochemicals. Vegetable growers who are economically motivated are likely to invest in environmentally friendly practices or technologies if they perceive long-term benefits such as improved soil health or reduced input costs.

(10) Risk Orientation and Risk Literacy

It is clear from the data illustrated in Table 2 that risk orientation of the vegetable growers and their environmental risk literacy about the use of agrochemicals had a positive and highly significant correlation ($r = 0.213^{**}$). It can be inferred that vegetable growers who are more risk-oriented may adopt a precautionary approach to agricultural decision-making.

(11) Attitude Towards IPM and Risk Literacy

The data presented in Table 2 clearly shows that vegetable growers' attitude towards IPM and their environmental risk literacy about the use of agrochemicals had a positive and significant correlation ($r = 0.180^*$). Growers focusing on IPM prioritize long-term effects on soil, water, biodiversity and ecosystem health. They understand various pest management methods and agrochemical risks enhancing their environmental risk literacy and commitment to sustainable farming.

(12) Attitude Towards Organic Farming and Risk Literacy

The data presented in Table 2 demonstrates that vegetable growers' attitude towards organic farming and their environmental risk literacy about the use of agrochemicals had a positive and significant correlation ($r = 0.238^{**}$). It can

be concluded that growers who practice organic farming often view themselves as stewards of the environment, committed to preserving soil health, water quality, and biodiversity.

(13) Knowledge about Eco-friendly Agricultural Technology and Risk Literacy

It is obvious from the data depicted in Table 2 that vegetable growers' knowledge about ecofriendly agricultural technology and their environmental risk literacy about the use of agrochemicals had a positive and highly significant correlation ($r = 0.229^{**}$). It can be concluded that knowledgeable growers are likely familiar with alternative pest management strategies and technologies that can reduce reliance on agrochemicals.

(14) Effects of use of social media and Risk Literacy

A perusal of data presented in Table 23 clearly indicated that there was non-significant association ($r = 0.134$) between effects of use of social media among vegetable growers and their environmental risk literacy about the use of agrochemicals.

CONCLUSION

The result revealed that majority (79.33 %) of the vegetable growers had high environmental risk literacy about the use of agrochemicals. Among the different personal, socio-economic, communicational and psychological variables, viz., scientific orientation, risk orientation, area under vegetable cultivation, attitude towards organic farming, risk literacy of the vegetable growers, relationship between profile of vegetable growers and their environmental risk literacy level about the use of agrochemicals, knowledge about eco-friendly agricultural technology had positive and highly significant correlation with environmental risk literacy level about the use of agrochemicals among vegetable growers. Whereas, educational qualification, social participation, extension participation, total annual income, economic motivation, attitude towards integrated pest management had positive and significant correlation. Remaining variables, age, size of land holding and extent of use of social media failed to show any significant relationship with the environmental risk literacy about the use of agrochemicals among vegetable growers.

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CONFLICT OF INTEREST

The authors of the paper declare no conflict of

interest.

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