

THE INFLUENCE OF FARMERS' CHARACTERISTICS ON KNOWLEDGE OF ENVIRONMENTAL DEGRADATION

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ABSTRACT

Environmental degradation encompasses the decline of ecosystem health, resulting from both natural processes and human activities. Agriculture significantly contributes to this degradation through practices such as deforestation, excessive use of chemical fertilizers and pesticides, crop residue burning and unsustainable irrigation. These activities result in soil, air and water pollution and increased greenhouse gas emissions. Ex-post-facto research design was used. Researchers conducted personal interviews with farmers at their homes. For the study's sampling, four talukas were randomly selected from the Anand district. From each of these four talukas, four villages were then randomly chosen, resulting in a total of 16 randomly selected villages. Finally, ten farmers were randomly selected from each of these 16 villages. This systematic approach yielded a total sample size of 160 respondents. Keeping in view these facts, the present investigation entitled "The influence of farmer characteristics on knowledge of environmental degradation" was undertaken with the following objectives. The study revealed that nearly four-fifths (78.12%) of the respondents had high to moderate knowledge about environmental degradation.

Keywords: agriculture, environmental degradation, farmers, knowledge

INTRODUCTION

Environmental degradation refers to the deterioration of the natural environment resulting from both human and natural factors, posing significant threats to biodiversity, ecosystem health, and ultimately, human survival. Among the major contributors to environmental degradation is agriculture, especially intensive and industrial farming practices (Mehfuza and Patel, 2024 and Rathwa *et al.*, 2023). The widespread use of chemical fertilizers and pesticides leads to soil degradation, water pollution and loss of soil biodiversity (Omidire *et al.*, 2015). Rice residue burning, as a common agricultural practice, significantly contributes to air pollution and greenhouse gas emissions (Gupta, 2019). The district's main crops are paddy and tobacco, although the share of vegetables, flowers and banana has risen as well. This trend suggests that crops in the research area are becoming more diverse. Vegetable growers must have sufficient knowledge regarding the harmful effects of pesticides to utilize them safely and effectively. Over time, excessive use of heavy metals in synthetic fertilizers can accumulate in soil and enter the food chain, posing serious threats to human and animal health (Patidar & Patidar, 2015). As key stakeholders in the agricultural ecosystem, farmers are crucial to the development and mitigation of environmental degradation (Vinaya and Shivamurthy, 2021 and Vinaya and Tapan, 2023). However, there is a lack of proper understanding among the farmers

in this area regarding environmental degradation, because of which the problem of environmental degradation may get worsened causing threat to sustainability. Understanding farmers' knowledge of environmental degradation is crucial, as their practices directly impact ecological sustainability. This study aims to assess farmers' knowledge, examine the relationship between their profile and knowledge about environmental degradation, thereby informing future agricultural and environmental policies.

OBJECTIVES

- (1) To study the profile of the farmers
- (2) To assess the knowledge of farmers about environmental degradation
- (3) To ascertain the relationship between the profile of the farmers and their knowledge about environmental degradation

METHODOLOGY

This study used *an ex-post facto* research design, which is ideal for examining variables that can't be directly changed, as noted by Kerlinger (1976). Anand district was chosen purposively because of its intensive farming practices. Within Anand, we selected our sample of 160 farmers through a multi-stage random sampling process:

first, four talukas were randomly picked, then four villages were randomly chosen from each taluka, and finally, ten farmers were randomly selected from each village. Data were collected using a structured interview schedule prepared in Gujarati, covering farmers’ personal, socio-economic, communicational and psychological backgrounds, as well as their knowledge of environmental degradation. Before starting the main interviews, we tested the schedule with 20 farmers who weren’t part of the study to make sure the questions were clear and relevant. The interviews took place at the farmers’ homes or workplaces, creating a comfortable environment, and we explained the study’s purpose beforehand to build

trust and encourage honest, meaningful responses.

Age, education, farming experience, family size, cropping pattern, cropping intensity, input utilization pattern, social participation, landholding, annual family income, extension participation, social media exposure, scientific orientation, risk orientation and innovation proneness were considered as independent variables in the study. Knowledge of farmers about environmental degradation was taken as a dependent variable. The data of the profile of the farmers were gathered, processed and analysed to draw a meaningful conclusion. The statistical tools used for the analysis of the data were percentage, mean and correlation coefficient.

RESULTS AND DISCUSSION

Table 1 : Distribution of the respondents according to their personal, socio-economic, communicational and psychological characteristics (n=160)

Sr. No.	Variable	Category	Frequency	Percent
Personal Variables				
1	Age	Young group	22	13.75
		Middle group	81	50.63
		Old group	57	35.62
2	Education	Illiterate	11	06.88
		Primary education (1 st to 8 th std)	33	20.62
		Secondary education (9 th and 10 th std)	71	44.38
		Higher secondary education (11 th and 12 th std)	36	22.50
		Graduation and above	09	05.62
3	Farming experience	Very low	19	11.88
		Low	42	26.25
		Medium	53	33.12
		High	40	25.00
		Very high	06	03.75
4	Family size	Small (up to 4 members)	26	16.25
		Medium (5 to 8 members)	96	60.00
		Large (more than 8 members)	38	23.75
5	Cropping pattern	Paddy-Tobacco	53	33.12
		Paddy-Wheat-Bajra	63	39.38
		Paddy-Chilli-Bajra	44	27.50
6	Cropping intensity	Low (<125%)	20	12.50
		Moderate (125% to 150%)	46	28.75
		High (150% to 175%)	32	20.00
		Very high (>175%)	62	38.75
7	Input utilization pattern	Poor (up to 6.25)	23	14.37
		Average (6.26 to 9.71)	112	70.00
		Good (Above 9.71)	25	15.63

Sr. No.	Variable	Category	Frequency	Percent
Socio-Economic Variables				
8	Social participation	Poor social participation (up to 1.10)	37	23.12
		Average social participation (1.10 to 3.94)	82	51.25
		Good social participation (above 3.94)	41	25.63
9	Landholding	Marginal farmer	92	57.50
		Small farmer	40	25.00
		Semi-medium farmer	25	15.63
		Medium farmer	03	01.87
		Large farmer	00	00.00
10	Annual income	Up to ₹ 2,50,000	104	65.00
		₹ 2,50,001 to ₹ 5,00,000	31	19.37
		₹ 5,00,001 to ₹ 7,50,000	16	10.00
		₹ 7,50,001 to ₹ 10,00,000	05	03.13
		Above ₹ 10,00,000	04	02.50
Communicational Variables				
11	Extension participation	Very low (up to 06.00)	57	35.62
		Low (06.01 to 12.00)	93	58.13
		Medium (12.02 to 18.00)	07	04.37
		High (18.01 to 24.00)	02	01.25
		Very high (above 24.00)	01	00.63
12	Social media exposure	Very low (up to 04.80)	37	23.12
		Low (04.81 to 09.60)	49	30.63
		Medium (09.61 to 14.40)	54	33.75
		High (14.41 to 19.20)	15	09.38
		Very high (above 19.20)	05	03.12
Psychological Variables				
13	Scientific orientation	Very low (up to 25.20)	04	02.50
		Low (25.21 to 36.40)	48	30.00
		Medium (36.41 to 47.60)	106	66.25
		High (47.61 to 58.80)	02	01.25
		Very high (above 58.80)	00	00.00
14	Risk orientation	Very low (up to 18.00)	01	00.63
		Low (18.01 to 26.00)	15	09.37
		Medium (26.01 to 34.00)	73	45.63
		High (34.01 to 42.00)	69	43.12
		Very high (above 42.00)	02	01.25
15	Innovation proneness	Very low (up to 14.40)	00	00.00
		Low (14.41 to 20.80)	27	16.88
		Medium (20.81 to 27.20)	54	33.75
		High (27.21 to 33.60)	71	44.37
		Very high (above 33.60)	08	05.00

The socio-economic profile of the farmers revealed that a majority of respondents were middle aged (50.63%) and a significant portion had attained secondary education (44.38%). In terms of household and experience, three-fifths (60.00%) of the respondents had a medium-sized family, while nearly one-third (33.12%) possessed a medium level of farming experience. Regarding their agricultural practices, the predominant cropping pattern was paddy-wheat-bajra (39.38%), which was pursued with a very high cropping intensity by a similar number of farmers (38.75%), even as a large majority (70.00%) maintained average input utilization. More than half (51.25%) of the respondents had average social participation. Economically, nearly three-fifths (57.50%) were marginal farmers and almost two-thirds (65.00%) reported an annual income of up to ₹2,50,000. The results are in line with the findings of Mehfuza and Patel (2024), Rathwa et al. (2023) Vinaya et al. (2025), Vinaya and Shivamurthy (2021) and Vinaya and Tapan (2023).

Furthermore, a majority of farmers (58.13%) showed low participation in extension activities, and approximately one-third (33.75%) had moderate exposure to social media. Although most farmers demonstrated a medium level of scientific orientation (66.25%) and risk orientation (45.63%), it is noteworthy that a comparable portion (44.37%) displayed a high degree of innovation proneness. These findings align with the findings of Gajera and Patel (2022), Rathwa and Patel (2023).

Knowledge of farmers about environmental degradation.

Knowledge is the understood information that a person possesses. Understanding something makes it easier for people to adopt it. Environmental degradation is a process that decreases biological diversity and the ecosystem’s overall health by disturbing the environment’s integrity in some way. The teacher made test was utilized for the assessment of knowledge. A total of 23 questions to test the knowledge of the respondents on environmental degradation and each scored 1 for an appropriate answer and 0 for an inappropriate answer. Thus, the possible obtainable score ranged from 0 to 23. Finally, based on the received scores, the respondents were arbitrarily classified into following five groups.

Table 2: Distribution of the respondents according to their knowledge about environmental degradation (n = 160)

Sr. No.	Categories	Frequency	Per cent
1	Very low (Up to 04.60)	00	00.00
2	Low (04.61 to 09.20)	04	02.50
3	Moderate (09.21 to 13.80)	48	30.00
4	High (13.81 to 18.40)	77	48.12
5	Very high (Above 18.40)	31	19.38

As obvious from data, nearly half (48.12%) of the respondents had high knowledge, while 30.00 per cent and 19.38 per cent of them had moderate and very high knowledge regarding environmental degradation. Only 2.50 per cent of respondents had low; while none of the respondents was found with very low level of knowledge. It can thus be inferred that nearly four-fifths (78.12%) of the respondents had high to moderate knowledge about environmental degradation. This aligns with the findings of Yarazari et al. (2019).

The relatively high knowledge about environmental degradation is encouraging because it suggests that farmers are likely to be more conscious of adopting eco-friendly farming methods, such as crop rotation, organic fertilizers and water conservation techniques. To put this information into practice in the field, however, further work is required. Strengthening training programs and awareness campaigns, alongside providing incentives for sustainable farming, can further enhance farmers’ commitment to environmental protection and long-term agricultural sustainability.

Table 3: Relationship between the profile of the farmers and their knowledge about environmental degradation (n=160)

Sr. No.	Independent variables	Correlation coefficient (r)
X ₁	Age	-0.263**
X ₂	Education	0.211**
X ₃	Farming experience	-0.160*
X ₄	Family size	0.043
X ₅	Cropping pattern	0.138
X ₆	Cropping intensity	0.104
X ₇	Input utilization pattern	0.336**
X ₈	Social participation	0.203*
X ₉	Landholding	0.113
X ₁₀	Annual income	0.168*
X ₁₁	Extension participation	0.192*
X ₁₂	Social media exposure	0.173*
X ₁₃	Scientific orientation	0.324**
X ₁₄	Risk orientation	0.175*
X ₁₅	Innovation proneness	0.166*

* Significant at 0.05 level of probability
 ** Significant at 0.01 level of probability

Out of fifteen independent variables, the variable education had a positive and highly significant (0.211**) correlation with knowledge about environmental degradation, showing that higher education plays a crucial role in a farmer’s ability to access, understand and act upon environmental information. Input utilization pattern showed

a positive and highly significant (0.336**) correlation, suggesting that farmers with greater environmental knowledge tend to use agricultural inputs more judiciously and sustainably. Scientific orientation also had a positive and highly significant (0.324**) correlation, indicating that farmers with an analytical and evidence-based mindset have a better understanding of ecological balance.

Social participation was found to have a positive and significant (0.203*) correlation. Engagement in social groups, cooperatives or community organizations encourages knowledge sharing, which significantly enhances awareness about environmental issues and sustainable practices among farmers. Extension participation (0.192*) was positive and significantly important, as these activities provide access to updated, relevant information. Social media exposure showed a positive and significant (0.173*) correlation. Platforms such as WhatsApp, YouTube, and Facebook have become powerful tools for spreading agricultural and environmental awareness, allowing farmers to learn from diverse sources in real-time. A farmer's psychological attributes, including risk orientation (0.175*) and innovation proneness (0.166*), were significant because those with these traits are more open to adopting newer, environmentally friendly practices. Finally, annual income (0.168*) was positively correlated, as wealthier farmers have the financial capacity to invest in long-term sustainable solutions.

In contrast, the analysis revealed two variables with a significant negative relationship to knowledge. A highly significant negative correlation was observed with age (-0.263**), indicating that older farmers may rely more on traditional practices and be less receptive to new environmental information. Paradoxically, farming experience (-0.160*) also showed a negative correlation, likely because this experience is often rooted in the post-Green Revolution era, which prioritized productivity over sustainability.

Family size had a positive but non-significant (0.043) correlation. A larger household does not necessarily ensure greater knowledge, as the level of education and interest in environmental issues may vary among family members. Knowledge flow within the family is not always uniform or directed toward environmental topics. Cropping pattern showed a positive but non-significant (0.138) correlation. Farmers often choose cropping systems based on market demand, tradition or water availability, rather than environmental considerations. Without specific education on sustainability, they may not understand the ecological implications of their cropping choices. Cropping intensity also had a positive but non-significant (0.104) correlation. While high cropping intensity might indicate better land

use, it can also lead to resource overexploitation. Unless accompanied by sustainable practices, it does not guarantee better environmental awareness. Land holding had a positive but non-significant (0.113) correlation. Larger landholdings reflect the scale of operation but not necessarily greater environmental knowledge. Both small and large farmers rely on their access to education and extension services to build awareness about degradation issues. These align with the findings of Parikh and Chauhan (2021), Jalu *et al.* (2022) & Chaudhary *et al.* (2022).

CONCLUSION

The majority of the respondents belonged to middle age group and medium sized family, had secondary to higher secondary level of education, medium farming experience and followed paddy – wheat – bajra cropping pattern. Likewise, majority of them had very high cropping intensity, average level of input utilization, membership in more than two organizations and less than 1 ha of land. Further, the majority of them had an annual income up to ₹ 2,50,000 and low extension participation. Moreover, a larger number of farmers had medium social media exposure, medium level of scientific orientation, medium to high level of risk orientation and high level of innovation proneness. With concern to the overall knowledge of farmers about environmental degradation, majority of the respondents had high level of knowledge, followed by moderate and very high level of knowledge.

Out of fifteen independent variables, the variables viz., education, input utilization pattern and scientific orientation of respondents had positive and highly significant correlation with their knowledge about environmental degradation. Social participation, annual income, extension participation, social media exposure, risk orientation and innovation proneness of respondents had positive and significant correlation with their knowledge about environmental degradation, whereas variables age and farming experience of respondents had a negative and significant correlation with their knowledge about environmental degradation. Moreover, family size, cropping pattern, cropping intensity and land holding had positive but non-significant correlation with their knowledge about environmental degradation.

RECOMMENDATIONS

- (1) Since extension participation showed a positive and significant relationship with farmers' knowledge, enhancing the reach and quality of extension services can play a crucial role in increasing knowledge about environmental degradation.
- (2) Farmers with higher education levels had better

knowledge of environmental degradation. Therefore, training programs can initially focus on educated and younger farmers who can later influence others in their communities.

- (3) As risk orientation, scientific orientation and innovation proneness were positively associated with knowledge, training modules should be designed to include practical, science-based and innovative approaches that appeal to progressive farmers.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest related to the research presented in this article.

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