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### Evaluating farmers' understanding of wheat diseases: A study utilizing survey

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#### Abstract

This study assesses the impact of an educational video on enhancing farmers' knowledge of wheat diseases, specifically targeting individuals in Punjab, particularly S.A.S Nagar. Using a randomized selection process, farmers participated in pre- and post-video assessments. The pre-video questionnaire established baseline knowledge levels, while the comprehensive video covered wheat diseases, including symptoms, triggers, and management strategies. Results revealed a significant improvement in knowledge across all age groups, with younger farmers experiencing substantial gains. The findings underscore the effectiveness of targeted educational interventions in empowering farmers to combat wheat diseases. This study emphasizes the importance of such initiatives for promoting sustainable agricultural practices and ensuring food security in farming communities, encapsulating its methodology, outcomes, and implications.

**Keywords:** Wheat diseases, disease management, agricultural extension, agricultural survey

#### Introduction

As the primary source of food, livelihoods, and economic stability for people all over the world, agriculture is the cornerstone of human civilization. Agriculture has played a significant role in communities ranging from the earliest agricultural societies to contemporary industrialized nations. Its significance extends beyond the provision of food and includes wider ecological, social, and economic aspects. The primary source of income for farmers in the studied regions is agriculture, which also plays a significant role in the district's economy <sup>[1]</sup>. Punjab's five villages-Sahauran, Hasanpur, Radala, Ghataur, and Allahpur-grow vegetables and other off-season crops together with wheat, mustard, paddy, maize, and sugar cane. Numerous insects, pests, and illnesses harm these crops, reducing their output. Using pesticides can reduce crop loss from pest assaults and enhance agricultural output by 25–50%. Crop pesticides are therefore crucial for ensuring the security of food and nutrition.

A crucial crop for both the agricultural economy and global food security, wheat is essential to both. However, several diseases pose a constant threat to wheat production and can seriously reduce yields and quality. Improving agricultural practices and guaranteeing sustainable crop production depends on an understanding of the effectiveness of educational interventions <sup>[2]</sup>. Here, we examine how a teaching film about wheat disease affects farmers' understanding at various age ranges. Farmers of all ages continue to rely heavily on agriculture, especially the production of wheat, for their living <sup>[3]</sup>. Disparities in formal education access and exposure to contemporary farming methods, however, can affect how successful educational

programs are through an analysis of the age-grouped farmers' pre-and post-watching responses to the educational video, we hope to clarify the varied effects of the intervention and its possible implications for enhancing wheat disease management techniques among different age groups of farmers. This analysis is important because it will help shape focused educational initiatives that are suited to the various requirements of farmers. This will promote sustainable farming practices and support initiatives aimed at ensuring food security <sup>[4]</sup>. Farmers' knowledge and awareness are vital in the fight against these diseases because they help to implement efficient prevention and management techniques.

This study report offers the results of an extensive survey meant to assess farmers' awareness and understanding of wheat diseases. This study aims to identify areas of strength and areas in need of improvement in disease management efforts by investigating farmers' knowledge, practices, and views regarding wheat diseases.

The survey covers a wide range of topics, including the identification of common wheat diseases, understanding disease cycles and symptoms, adopting disease-resistant varieties, and using preventive measures like crop rotation and fungicide application. The survey is conducted across diverse agricultural regions. This study attempts to offer important insights into the current level of farmers' awareness of wheat disease by a thorough analysis of survey responses supported by statistical tools. It is crucial to comprehend the obstacles and knowledge gaps that farmers have when developing focused interventions and extension services to improve disease management techniques <sup>[5]</sup>. Furthermore, it is imperative to provide farmers with the

most recent knowledge and resources possible so they may properly protect wheat crops considering the introduction of novel disease strains and changing environmental conditions.

The findings of this study have ramifications for agricultural policies and extension initiatives that go beyond specific farm operations. Policymakers and agricultural stakeholders can develop strategies to improve agricultural extension services, encourage information transfer, and develop resilient farming systems by clarifying the factors impacting farmers' awareness of wheat diseases.

The goal of this research is to improve wheat disease management strategies by offering evidence-based insights that can guide the creation of policies, the prioritization of research, and extension initiatives<sup>[6]</sup>. We can improve the resilience and sustainability of wheat production systems and guarantee food security for both the current and future generations by equipping farmers with the required knowledge and resources<sup>[7]</sup>.

### Materials and Methods

A purposive sample strategy was employed in the survey of 60 farmers in various villages throughout Punjab, including Sahauran, Hasanpur, Radiala, Ghataur, and Allahpur, to guarantee representation from a range of agricultural regions. Farmers were picked at random from each hamlet that was considered, to reduce prejudice and guarantee a range of answers. To collect data on farmers' knowledge and awareness of wheat illnesses, a structured questionnaire including topics such as disease identification, symptoms, preventive measures, and access to agricultural extension services was created. Face-to-face interviews with participating farmers were done by trained enumerators, who ensured the accuracy and clarity of the responses<sup>[8]</sup>. Using a standard structured questionnaire in the vernacular language that the farmers speak and understand, the study was carried out in person with farmers at the location of their agricultural fields and residences<sup>[9]</sup>. All participants gave their informed consent after being assured of their anonymity and secrecy, and ethical concerns were of the utmost importance. Since it is critical to increase farmers' understanding of wheat diseases, we are offering this instructional film, which is designed to increase their knowledge and strengthen their defences against any threats. We explore the complex environments of wheat farming through this visual medium, revealing the subtle symptoms of illnesses that can be found among the golden fields. In addition, this film is a source of illumination, clarifying the preventive actions and integrated management techniques that are necessary to promote resilience in wheat farming. An assessment of farmers' current knowledge of wheat diseases is conducted before the video presentation. We can assess the audience's baseline comprehension with the help of this pre-video questionnaire, and we can adjust the

content accordingly. After that, the film takes viewers on a journey of exploration while clarifying the complexities of common wheat diseases and providing them with useful knowledge on diagnosing and treating these diseases. Once more, a set of questions is given to farmers to gauge the effectiveness of the learning intervention after the video presentation. To gauge the degree to which the instructional material has improved farmers' understanding and knowledge of wheat diseases, this post-video questionnaire acts as a benchmark. Through a comparison of the pre-and post-video responses, we can determine areas that require additional improvement and obtain important insights into the efficacy of the educational intervention.

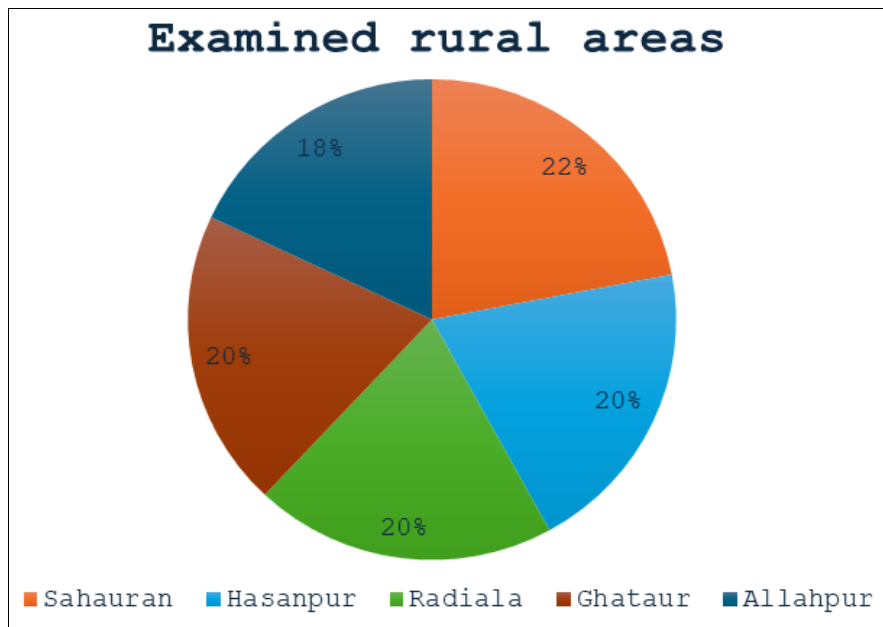
To find patterns and trends, the acquired data was carefully analysed utilizing comparative analysis methods and descriptive statistics<sup>[10]</sup>. To place the survey results within the context of its application and extent, limitations were addressed, such as possible self-reporting bias and regional specificity.

A total of sixty farmers-twelve from each village-were interviewed; the minimum age for farmers was 35, and the maximum age was 75.

The farmers were not given enough information to prevent biased reactions and to have a true understanding of farming techniques<sup>[11]</sup>. Ownership of the land divided these farmers. A household with more than ten acres was classified as a "Large Farmer," those with between four and nine acres as a "Medium Farmer," those with less than four acres as a "Small/Marginal Farmer," and those with no land as a "Landless Farmer<sup>[12]</sup>." The landless farmers rent a field to grow crops on, and they make money by selling the produce and taking care of their houses<sup>[13]</sup>. To gain a better understanding of farmers' pest management techniques in crop production, the labelled/unlabelled, pesticide composition, and intensity of application are considered. Research was done on farmers' methods of controlling pests, information sources about the usage of pesticides, and criteria for making decisions. Furthermore, the study site analysed data about sources of information on toxicity levels, storage, disposal, application techniques, sprayer maintenance, and safety precautions implemented<sup>[14]</sup>. To get useful conclusions, averages, and percentages were calculated and compared using SPSS (16.0 edition) and MS Excel<sup>[15]</sup>.

### Results and Discussion

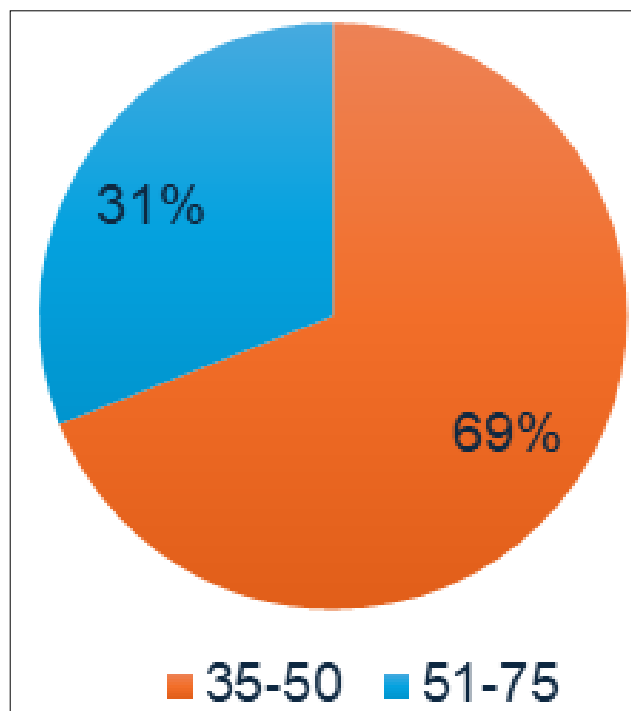
1. This survey-based study was conducted after farmers from various Punjabi farming areas (S.A.S. Nagar) were chosen at random. 22% of farmers from the village of Shauran were among the 60 farmers that were interviewed. 18% of farmers belonged to the village Allahpur, 20% were from Hassanpur, 20% were from Radiala, and 20% were from Ghataur Fig 1.



**Fig 1:** Examined rural areas in Punjab (S.A.S NAGAR)

2. We learned interesting things about the demographics of agricultural practitioners from the distribution of farmers in various age groups. In particular, the age range of 35 to 50 years old was found to be the largest group of farmers surveyed, making up a larger proportion than that of farmers surveyed between 51 and 75 years old. Indicative of a generational change in farming demography, this trend emphasises the importance of middle-aged farmers in the agricultural industry. The age distribution of farmers (35–50

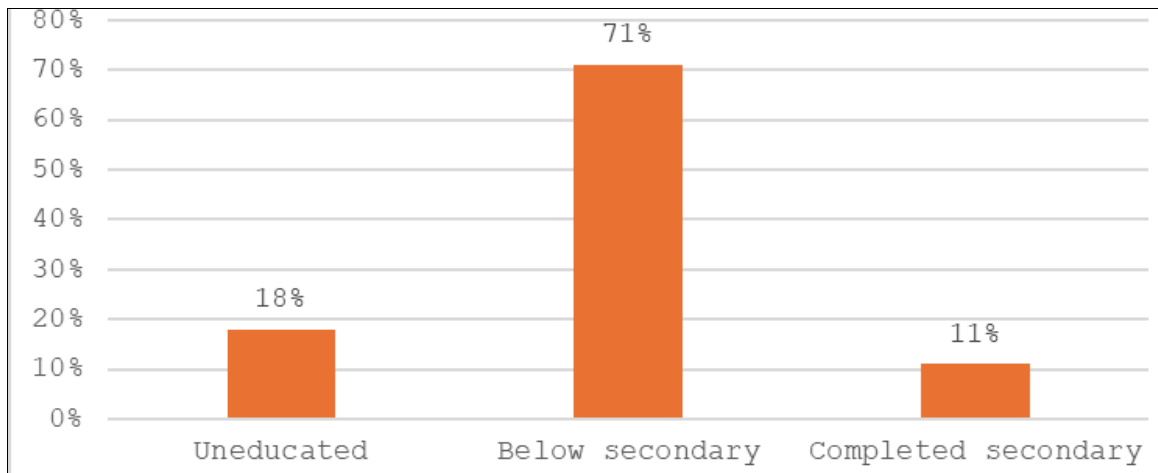
years old) indicates a shift in the agricultural workforce towards younger people. This shift may be due to a variety of variables, including changes in socioeconomic conditions, emerging technologies, and changing agricultural methods. The percentage of farmers between the ages of 51 and 75, on the other hand, represents a lower fraction of the farming population although still significant Fig 2.



**Fig 2:** Farmers age bracket

3. This survey-based research was conducted by randomly selecting farmers from Punjab, specifically from S.A.S Nagar. Out of the 60 farmers interviewed, 18 percent had not undergone any formal education, 71 percent had

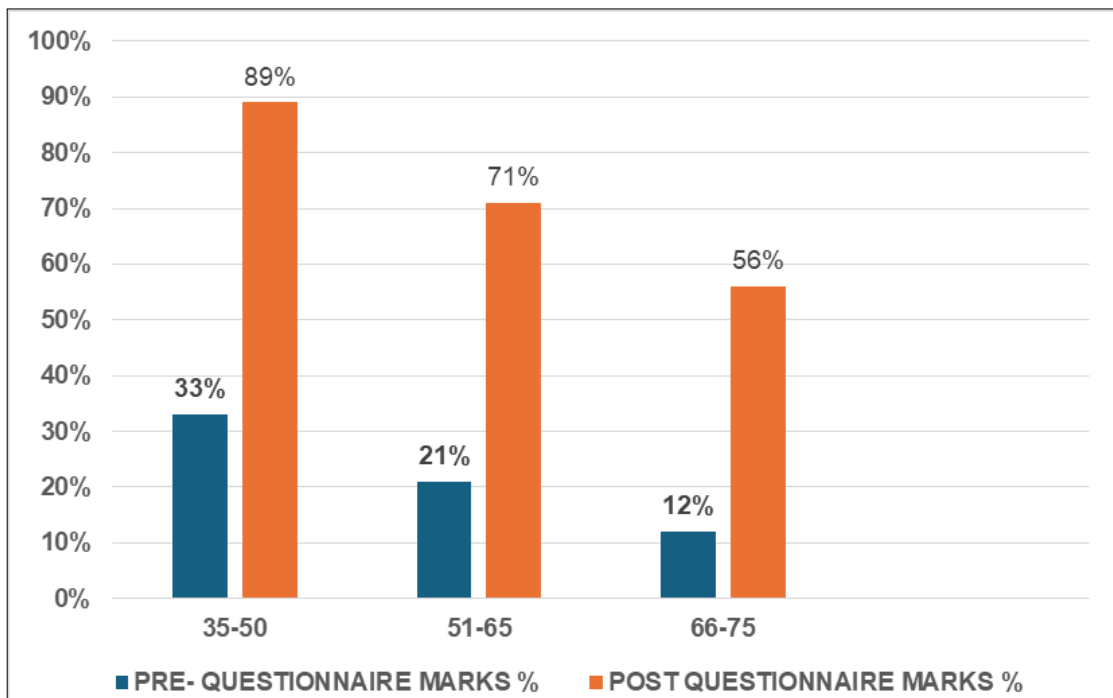
received education below the secondary level, and 11 percent had completed education up to the secondary level. The age range of the interviewed farmers varied from 35 to 75 years on average Fig 3.



**Fig 3:** Academic background of farming communities

4. After the educational movie on wheat disease was screened, an analysis was done to see how it affected farmers' knowledge in various age groups. All age groups showed significant gains in knowledge, according to the research. Younger farmers (35–50 years old) had a notable improvement in understanding, as seen by a considerable rise in accurate answers on the post-video questionnaire as compared to the pre-video evaluation. In a similar vein, farmers between the ages of (51 and 65 years) showed

notable progress, demonstrating a firm understanding of disease diagnosis and management techniques following intervention. Even in the elder age range of (66 to 75 years) there was a noticeable increase in knowledge, if not a very significant one. These results demonstrate how well the educational film fills in knowledge gaps among a range of age groups in the farming community and how it may equip farmers of all ages with the necessary know-how to protect their wheat harvests Fig 4.



**Fig 4:** Scores in percentage achieved by farming community

**Conclusion**

In conclusion, the findings of this study underscore the transformative potential of educational interventions in enhancing farmers' knowledge and understanding of wheat diseases, particularly across different age groups. The significant increase in knowledge observed among farmers following the viewing of the educational video signifies the effectiveness of such interventions in bridging knowledge gaps and equipping farmers with essential skills for disease

management. Importantly, the analysis revealed that farmers across all age groups experienced improvements in comprehension, albeit to varying degrees, highlighting the universal applicability of educational initiatives in agriculture. Moreover, the prevalence of younger farmers within the surveyed demographic suggests a shifting demographic landscape in agriculture, emphasizing the importance of catering to the evolving needs and preferences of this cohort. By leveraging targeted

educational programs tailored to the diverse demographics of farmers, stakeholders can foster a culture of continuous learning and innovation, thereby bolstering agricultural productivity and resilience. Moving forward, sustained efforts to expand access to educational resources and promote knowledge-sharing platforms are essential for empowering farmers of all ages and ensuring the long-term sustainability of agricultural systems.

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