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Enhancing agricultural knowledge: The impact of maize seed rate and varieties videos on farmers learning and decision making

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Abstract

Among the most significant cereal crops in the world, maize, also known as *Zea mays* L., greatly contributes to both economic stability and food security. A significant part of Punjab, India's agricultural landscape is devoted to maize farming 60 farmers in total were chosen at random among the districts of Punjab State, the villages were Sahora, Hasanpur, Allahpur, Radiala and Ghataur the data were gathered using the personal interview technique and the relevant statistical tools were used for data tabulation and analysis. The study was carried out in 2023–2024 farmers understanding of maize, seed rate and varieties significantly increased following the viewing of the video the findings also show that 58% of those surveyed saw a medium-level increase in knowledge after watching a film on variety and seed rate, respectively the results showed that farmers used smartphones at a high frequency, which presents chances to use digital devices in agricultural extension activities. The majority of respondents, who fell into either general or OBC categories, were between the ages of 29 and 80, and the majority had completed up to class 12. Participants, both male and female, had more than 30 years of farming experience. Their primary occupation was agriculture, and they claimed an average annual income of up to 4-6 lakh. The male leader of the family possessed almost all of the land. Ultimately, the research offers insightful information that will help professionals in development and that would increase agricultural output, support sustainable livelihoods and guarantee food security for rural communities in the Punjab area as well as worldwide. As a result, a distinct change has been noted: the village's younger generation has travelled overseas. The land has become more fractured as a generation moves, and this appears to be a big worry. Youth involvement is lower. Considering plan, passion, interest, and soon this, to pursue farming as a company make the farming industry more lucrative. By using these techniques, farmers may lead prosperous lives.

Keywords: Maize, knowledge research, farmer, video

Introduction

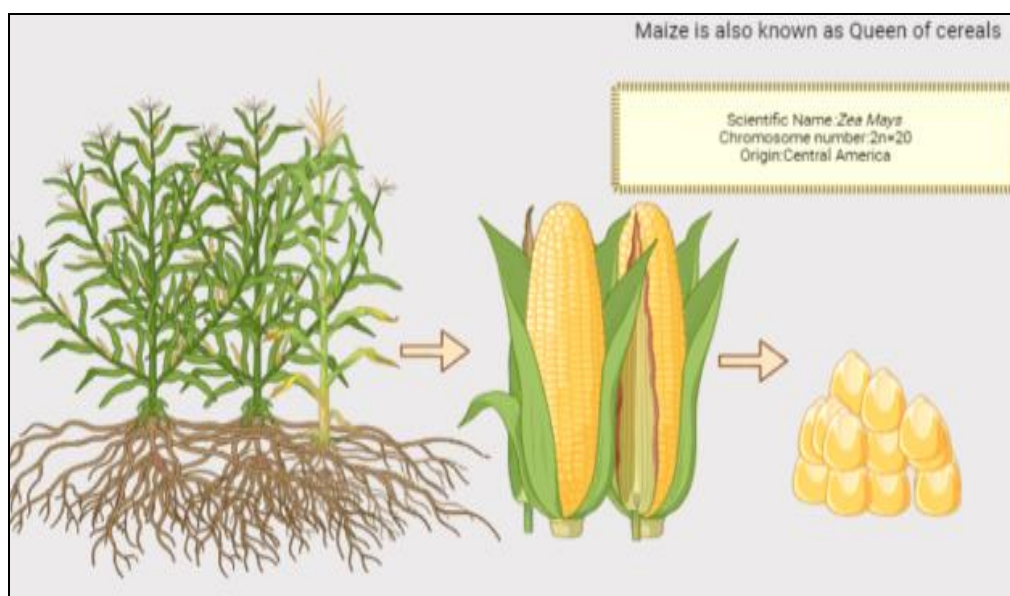
India is a nation founded on agriculture 80% percent of the population depends on agriculture making farmers the economic foundation of the country. Punjab's economy with agriculture as its foundation continues to be a prime example of one that is growing quickly initiating the movement toward sustainability in the nation the state has led the way in addition the state has developed remarkably in related fields including dairy, poultry, fisheries and fruit and vegetable production. Maize, or corn, holds significant importance globally as a staple food for millions and has a long history of cultivation originating in Mesoamerica. Recognized for its towering stalks and rows of large, edible kernels on cobs, maize is a versatile crop utilized for human consumption, animal feed, and various industrial purposes. Its diverse varieties cater to different climates and needs. The cultivation of maize has greatly influenced societies and economies worldwide, establishing it as a key crop with a global impact They are pressuring farmers to diversify since there are an abundance of these food crops in the state's program of agricultural diversification maize can have a significant impact. It is utilized in the production of corn flakes, starch and glucose as well as in animal and poultry feed ^[1]. In certain regions, maize is now being sown throughout the Rabi season in addition to its traditional use as a kharif crop. However, careful management techniques, such as variety and seed rate selection, are required to get the best possible production and quality.

The number of seed spread per unit area is known as the seed rate and it has a significant effect on plant establishment, population of plants and eventually, yield potential. In a similar vein, choosing cultivars that are appropriate for the local agroclimatic conditions is essential to maximize yield and guaranteeing resistance to both biotic and abiotic challenges. Videos have become an effective medium for teaching agricultural processes especially when it comes to sharing knowledge regarding crop production methods [2]. This study investigates how farmers learn by watching videos, with a particular emphasis on maize seed rates and types. The purpose of this study is to evaluate the performance of various varieties of maize in Punjab and investigate the best seed rates. Farmer-to farmer video has emerged as a novel technique in the last 20 years. The rural impoverished now have a greater ability to innovate because to the videos improved knowledge and abilities through the development of networks that facilitate the interchange of knowledge and resources farmer to farmer films have aided in the teaching and learning of farmers from one another [3]. Even if in person instruction is expensive and out of reach for the majority of rural residents' video has shown to be a successful means of democratizing information and including farmers literate or not in the changing agricultural industry. Its technique integrates with current, people-based extension systems in order to facilitate reporting and foster communication among internet communities of participants through the use of audio and video-based processes enhance their efficacy [6]. Farmers are encouraged to go on TV and are connected with specialists through local social networks. Ideas conveyed visually facilitate learning, and since 70% of human communication is nonverbal, visual aids can assist people overcome language and literacy obstacles. Videos centered around modern farming technology seem like a suitable extension resource even though variety selection and seed rate are crucial components of maize

cultivation, many farmers especially those in underdeveloped nations do not have access to reliable and current information on these topics. Because of resource and logistical restrictions, traditional ways of disseminating information, such training workshops and extension services, frequently fail to reach a large number of farmers [4]. Conversely, video material may help farmers overcome these obstacles by giving them easily accessible, comprehensible, and visually represented information. Videos may provide practical aspects of corn farming in an eye-catching and educational way, such calculating the seed rate and showcasing the traits of several types of maize the purpose of this study is to determine how much information farmers have gained which will aid scientists and extension agents working at various levels in using these kinds of films to organize research and extension effort to provide farmers with agricultural knowledge [5].

Materials and Methods

The research was carried out in Punjab SAS Nagar with a selection of five villages 60 farmers in all were chosen at random after consultation with specialists, an interview schedule was created for the purpose of gathering data. The interview was place in Punjabi, the regional tongue. Responses from the interviewees were immediately recorded once they were questioned at their farms or places of residence the survey was conducted during January and February of 2024. Depending on the participants' answers standardized questionnaires were completed during the interview. Utilizing statistical tools like Microsoft Excel, quantitative analysis of data was carried out. To give an accurate representation of the pattern of distribution of variables like ownership size, education level, assets, etc., measures like indicates that frequency ranges, and percentages were used



Results and Discussion

According to the study's findings Punjab's agroclimatic conditions have a considerable impact on maize yield and agronomic performance, depending on both seed rate and variety. Comprehensive insights into numerous socio-economic and agricultural issues among farmers in the investigated region are provided by the survey data obtained from respondents. The statistics revealed a wide range of educational achievement amongst farmers, with a considerable percentage having merely

finished elementary school (30%), senior secondary school (50%) and upper secondary school (20%) being the next most educated groups. This suggests that focused initiatives are required to improve access to postsecondary education and career training programs, with the goal of providing farmers with the know-how and abilities they need to implement sustainable farming methods and adjust to changing market need (Fig 1)

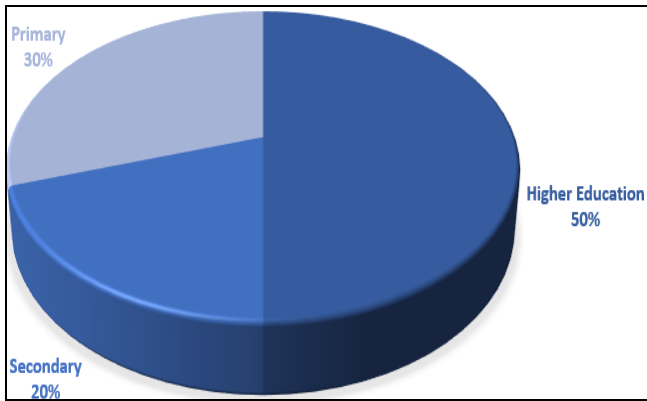


Fig 1: Education/Qualification

Table 1: Respondent distribution based on exposure to mainstream media

S. No	Mass Media	Category	Respondent(n=60)
1.	Newspaper	Yes	40(67%)
		No	10(17%)
2.	Magazine	Yes	30(50%)
		No	20(33%)
3.	Films	Yes	35(58%)
		No	15(25%)
4.	T. V	Yes	32(53%)
		No	16(26%)
5.	Radio	Yes	39(65%)
		No	12(20%)

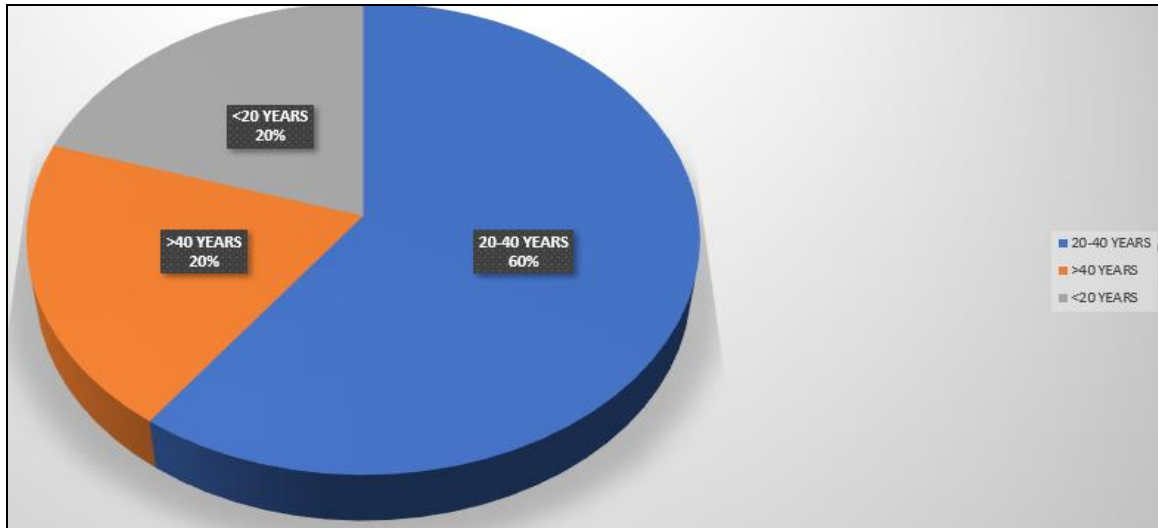


Fig 2: Farming Experience

The majority of respondents (60%) indicated that they had been farming for 20–40 years, demonstrating the depth of practical expertise and expertise inside the agricultural sector. However, it is significant that a significant portion of farmers (20%) had been farming for less than 20 years, indicating the emergence of a younger generation of farmers, and (20%) had been farming

for more than 40 years, corresponding to the experienced veterans of farming. This broad spectrum of experience levels highlights the significance of sharing knowledge and mentoring initiatives that promote the move of conventional wisdom and creative methods between generations (Fig. 2).

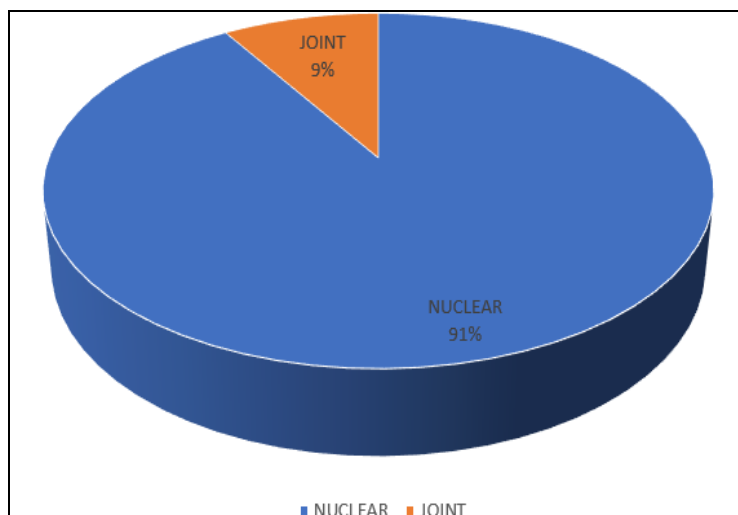


Fig 3: Family Composition

Joint families made up a lower percentage (9%), with nuclear families making up the majority of family configurations 91% (Fig 3). This demographic trend affects labor relations and

resource management in agricultural families and is a reflection of wider social movements towards nuclear family formations

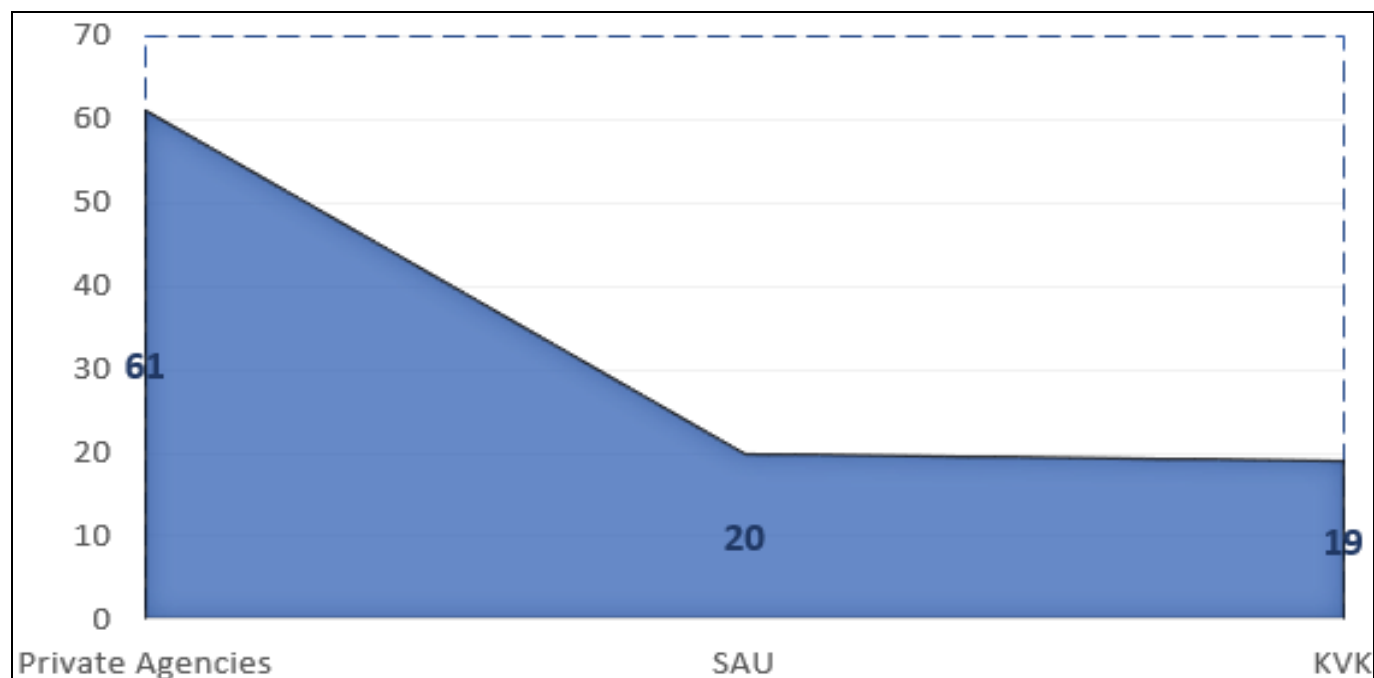


Fig 4: Extension contact

In offering agricultural consulting services and technology transfer, KVK, State Agricultural Universities (SAU), and commercial organizations made up 19%, 20%, and 61% of

extension contacts, respectively. This highlights the importance of institutional backing and private sector participation (Fig. 4).

Table 2: Demonstrates the no. of correct answers before and after showing the video clip

S. N	Questions	Before n =60	After n =60
1.	Typical seed rate for maize planting (8-10 kg/acre)	45(75%)	50(83%)
2.	Have you noticed any difference in crop performance based on seed rate variations (Yes)	43(72%)	53(88%)
3.	Are there specific traits you prioritize when selecting maize varieties (The main factors for choosing a maize variety include maturity, yield potential and feed)	34(57%)	55(92%)
4.	How does PMH 14 perform in terms of yield compared to other maize varieties (PMH 14 is renowned for its great yield potential, outstanding standability, disease resistance)	26(43%)	49(82%)
5	Key characteristics and features of the PMH 14 maize varieties (The combination of PMH 14's high yield potential, disease resistance, and flexibility makes it valuable)	48(80%)	44(73%)
6	Are there governmental or industry initiatives promoting the cultivation and adoption of specific pearl corn varieties (Yes)	35(58%)	43(72%)
7	Are there specific agricultural practices or conditions that are well suited for PMH 11 cultivation (it is crucial to take into account the local soil, climate, pest, and disease challenges)	32(53%)	35(58%)
8.	Do you follow specific planting methods (Yes)	30(50%)	47(78%)
9.	Preferred type of maize (PMH 14, Baby corn, Pearl corn etc)	28(47%)	48(80%)
10.	Any challenges faced in sourcing the maize varieties (Certain types of maize, particularly those that are hybrid or modified, might not be easily accessible in every area)	33(55%)	52(87%)
11.	Are there specific challenges related to climate or soil conditions that influence choice of maize varieties (Too high or too low of a temperature can have an impact on the growth and development of maize. It is crucial to choose kinds of maize that are compatible with the temperature conditions in the area)	43(72%)	50(83%)
12	Decisions about adopting a new maize variety and what source of information rely on (Market analysis studies, agricultural cooperatives, and local markets are good sources of information on market demand.)	48(80%)	56(93%)
13	How do the climatic conditions in Punjab influence the choice of maize variety (The monsoon season, that can vary in strength from year to year, brings most of Punjab's rainfall. Water must be continuously available to maize during the growth season)	32(53%)	55(91%)
14	Are there any specific maize varieties in Punjab that are known for their high yields (Yes HM9, PHB 473, HM 4 etc)	44(73%)	58(97%)
15	Key characteristics of JC12 maize variety (high potential yield, flexibility, disease resistance)	40(67%)	51(85%)
16.	JC 12 or PMH 11 which one is better (JC 12 is better)	42(70%)	48(80%)
17.	Do certain baby corn maize varieties have better resistance to pests and diseases (Yes, Babycorn and Bonus)	27(45%)	44(73%)
18.	Climatic condition of Punjab sweet corn maize variety (Punjab's scorching summers offer ideal temperatures for growing sweet corn)	43(72%)	49(82%)
19	How does PMH 12 perform in terms of yield	30(50%)	52(87%)
20	Are there any specific agro climatic conditions that favour the cultivation of PMH 14 maize	34(57%)	53(88%)
	Mean	36.85	49.6
	Mean percentage	54.2	71.2
	Standard Deviation	17.48	15.51

We might infer from the preceding table that there has been a notable increase in knowledge the mean score was 54.2 prior to watching the video and 71.2 following it, according to the analysis done after watching the film. There appears to be a tendency towards greater seeding rates as the average seed rate for planting maize grew significantly from 45 to 50, the percentage of responders who saw an alteration in crop performance due to variations in seed rate increased noticeably from 72% to 88%, when choosing maize varieties, the proportion of respondents who gave particular qualities priority rose from 57% to 92% a marginal rise was observed in the

number of participants who recognized particular farming methods or environmental factors that are ideal for PMH 11 production in Punjab, knowledge of particular types of maize known for good yields rose dramatically from 73% to 97%. The perceived yield performance of PMH 12 increased marginally from 50% to 87%, the percentage of people who knew about certain agroclimatic conditions that were favourable for PMH 14 maize cultivation went from 57% to 88%. In general the intervention appears to have had a good effect on respondents' knowledge and habits related to maize cultivation in a number of areas.

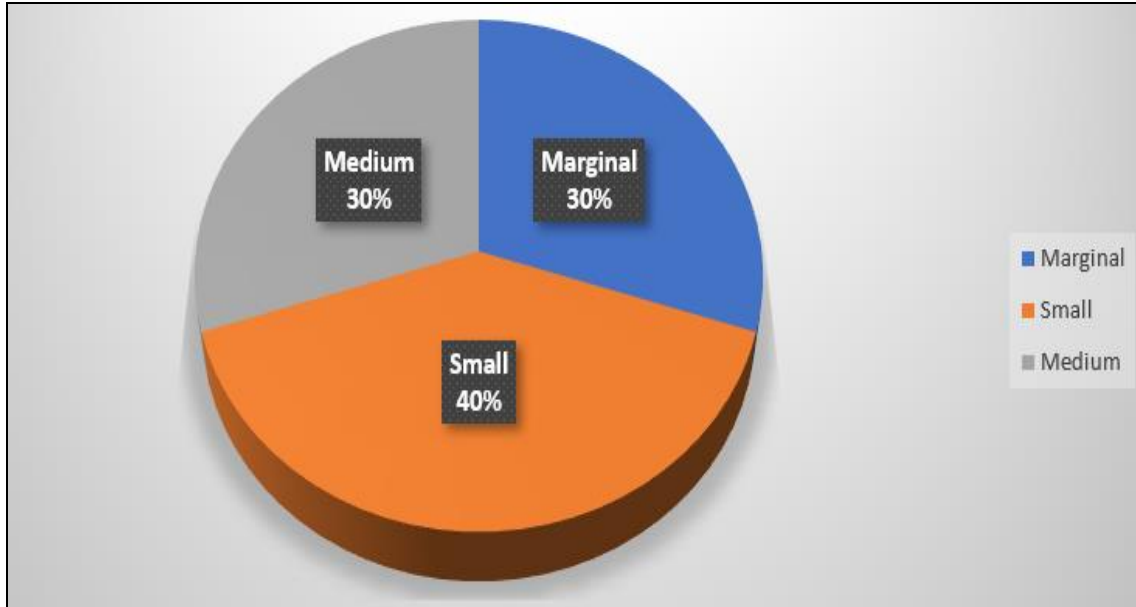


Fig 5: Landholding information

According to landholding patterns, farmers were divided into three categories: marginal farmers (30%), small farmers 40%, and medium farmers 30% (Fig.5). The socioeconomic environment of the agricultural community is diverse, as seen by

the difference in landownership. This emphasizes the necessity for focused support systems and policy interventions that are catered to the unique requirements of each group (Fig. 5).

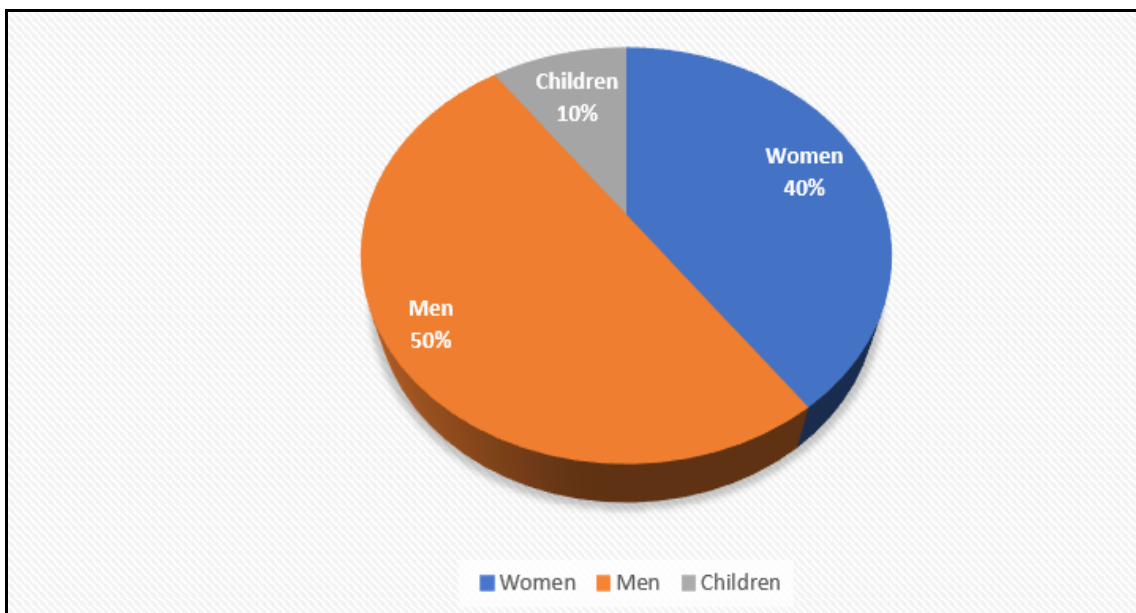


Fig 6: Gender Composition

The gender distribution of the respondents was balanced, with 50% of male and 40% of female farmers. Additionally, 10% of

the respondents reported having children, highlighting the importance of family in agricultural families (Fig. 6).

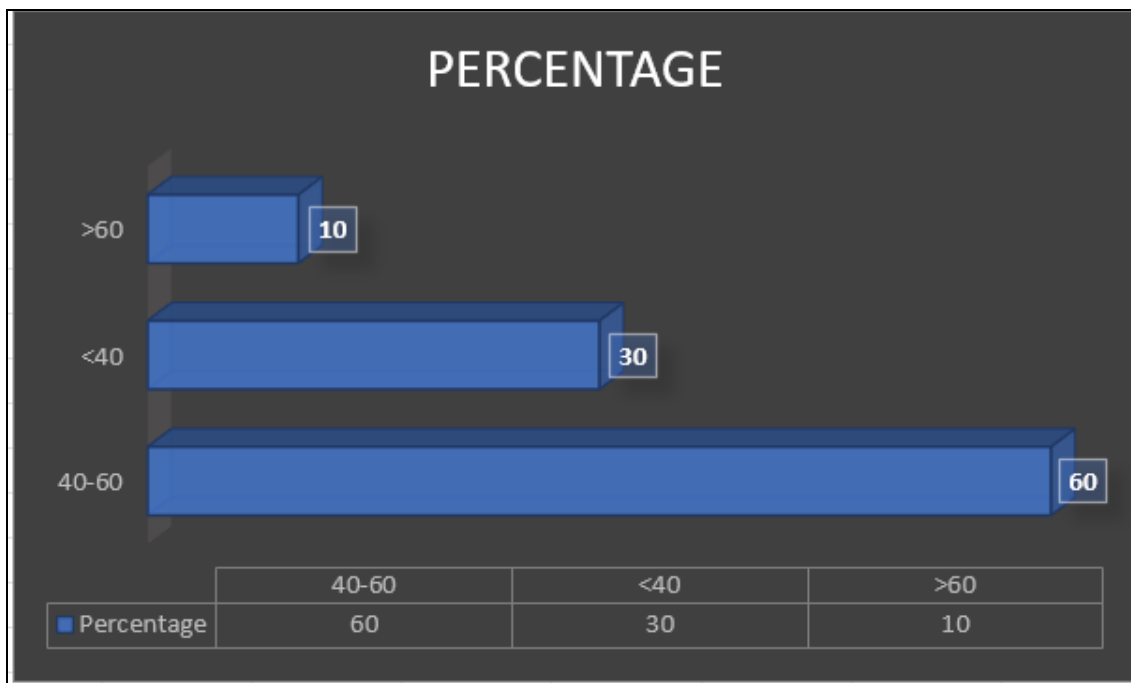


Fig 7: Age Composition

A mature agricultural population was indicated by the age distribution, which showed that most farmers (60%) were in the 40–60-year age range, while a sizable fraction (30%) were over 60 years old, and a smaller percentage (10%) were under 40

years old. The generational shift taking place in farming communities is reflected in this age distribution, which has consequences for current farming techniques and succession planning (Fig. 7).

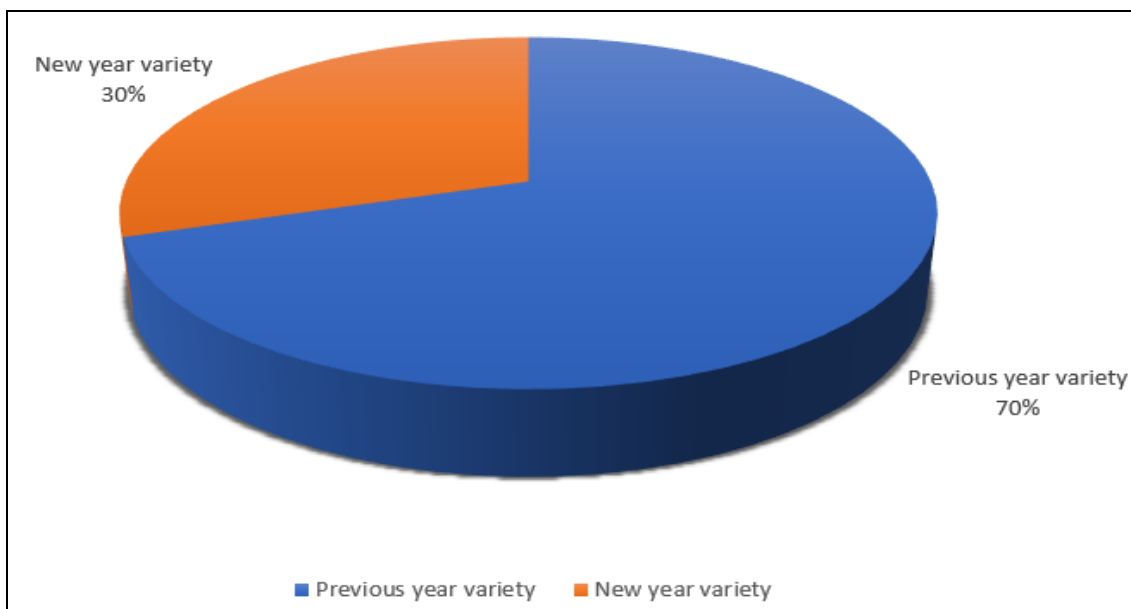


Fig 8: Varieties

Even with the rise in knowledge, farmers preferred to sow seeds from the previous year (70%) over the recently released varieties (30%). This shows how important it is to address factors like farmer preferences, affordability, and seed availability in order to encourage the implementation of new varieties (Fig. 8). These results offer insightful information about the socioeconomic and agricultural conditions of the studied area, enabling a more complex comprehension of the opportunities and problems that farming communities face. In order to improve agricultural production, support sustainable livelihoods, and guarantee adequate nutrition for rural populations, the statistics highlight the significance of adopting comprehensive

and context-dependent approach to agricultural growth and policy formation.

Maize Varieties: Among the well-liked kinds are:

- **HM4:** renowned for having a high production potential and being appropriate for the spring
- **Dekalb 9121:** Known for its strong disease resistance, high yield, and high-quality grain.
- A well-liked hybrid maize cultivar with outstanding result in potential and adaptability is Bio seed 315M.
- A hybrid maize variety with a strong yield and excellent grain quality is Bio seed 807.

- **Pioneer 32B10:** Known for its robustness against both biotic and abiotic stressors and good yield.
 - **NK 6240:** This hybrid variety of maize is well-known for its excellent yield and versatility in a range of agroclimatic circumstances. Punjabi farmers like these types because they may generate high yields and are adapted to the agroclimatic conditions of the region.
 - **DKC 9090:** Farmers in Punjab are fond of this high-yielding hybrid maize variety. It is renowned for both its great yield potential and its excellent adaptability to the local agroclimatic conditions.
 - **PHB 473:** Farmers in Punjab like PHB 473, another hybrid corn variety. It is renowned for performing well in the local environment and for being resistant to typical illnesses that affect maize.
 - **HM4:** Known for its excellent grain quality and potential for high production, HM4 is a well-liked hybrid maize in Punjab. It can withstand heat stress and drought as well.
 - **HM8:** HM8 is a hybrid maize that thrives in Punjab's agroclimatic conditions. It is renowned for having a high potential yield and being highly adaptable.
 - **HM9:** Farmers in Punjab like the maize hybrid known as HM9. It is renowned for doing well in the local environment and having a high yield potential.
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Conclusion

The study concludes by showing the important role that visual content more especially, videos play in improving farmers' understanding of maize seed rates and types. The results imply that viewing videos can be a useful tool for agricultural extension services, giving farmers information and practical insights to enhance their farming methods. Leveraging multimedia tools such as movies can help close the knowledge gap between conventional and contemporary agricultural practices. The cross-sectional survey carried out in five rural villages in the Punjab area gave researchers a thorough grasp of the farming methods and dynamics of farmer knowledge. The demographic profile showed a population of mostly adult farmers, with a balanced distribution of genders, and a range of academic backgrounds and degrees of farming experience. The increasing use of smartphones and the dependence on progressive farmers and peer networks for agricultural information brought to light the rapidly changing technology landscape and the significance of social networks in the sharing of knowledge. The maize variety video presentation improved farmers' understanding and illustrated the value of using multimedia techniques in agricultural extension

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Competing Interests

According to the authors, there aren't any competing interests exist.

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