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HORIZONTAL EXPANSION OF GUJARAT ANAND DURUM WHEAT-3 VARIETY IN WHEAT FARMING COMMUNITIES IN GUJARAT, INDIA

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ABSTRACT

The study investigates the adoption of GADW-3, a high-yielding, disease-resistant durum wheat variety developed for Gujarat. A survey of 300 farmers across four districts shows that over 70% have adopted GADW-3. Adoption is positively linked to education, income, and credit access but remains lower among small and marginal farmers, indicating a need for targeted support. Farmers perceive GADW-3 as offering better yields, disease resistance, and water efficiency, though some face challenges in obtaining quality seeds and timely credit. Feedback from growers highlights the importance of improving seed availability and credit facilities. Overall, the findings enhance understanding of factors influencing adoption, emphasizing the need for tailored extension services to boost dissemination. These insights can inform future research, policies, and strategies to improve livelihoods and promote wider adoption of improved crop varieties among diverse farmer groups in Gujarat.

Keywords : Anand Durum Wheat-3, GADW-3, Horizontal Expansion.

Introduction

India is one of the largest producers and consumers of wheat in the world, with the state of Gujarat being a major contributor to the country's wheat production. The introduction of high-yielding and disease-resistant varieties of wheat, such as Gujarat Anand Durum Wheat 3 (GADW-3), has been significant development in the field of wheat research. GADW-3 is a durum wheat variety that has been developed by the Anand Agricultural University. The variety has shown promising results in terms of its yield potential, disease resistance, and adaptation to the local agro-climatic conditions for bhal region. Despite its potential, the adoption of GADW-3 among wheat growers has been limited, the factors influencing its adoption have not been fully understood. The adoption of new agricultural technologies, including crop varieties, is influenced by a complex array of factors, including the characteristics of the technology, the socioeconomic and demographic characteristics of the farmers, and the institutional and policy environment.

Understanding these factors is essential for promoting the widespread adoption of GADW-3 and other high-yielding and disease-resistant varieties of wheat. This study aims to explore the factors influencing the adoption of GADW-3 among wheat growers in Gujarat, India. Specifically, the study seeks to examine the relationship between the adoption of GADW-3 and the socioeconomic and demographic characteristics of farmers, as well as the institutional and policy environment that supports or hinders the adoption of the variety. The findings of this study are expected to contribute to a better understanding of the factors influencing the adoption of new agricultural technologies and inform strategies for promoting their adoption among farmers in Gujarat and other regions of India.

Objectives

1. To study the profile of durum wheat growers
2. To analyze the horizontal spread of Gujarat Anand Durum Wheat-3 among the durum wheat growers
3. To study the feedback of Gujarat Anand Durum

Wheat-3 growers about the varietal characteristics of Gujarat Anand Durum Wheat-3 and their technological traits as perceived by them

4. To identify the constraints faced by Gujarat Anand Durum Wheat-3 growers in the adoption of Gujarat Anand Durum Wheat-3
5. To explore the suggestions from Gujarat Anand Durum Wheat-3 growers to overcome the constraints

Materials and Methods

The list of 1223 farmers who were given FLD, OFT, demonstrations and adaptive trial of GADW 3 variety of durum wheat in Ahmedabad district were obtained from KVK and ARS, Arnej, ARS, Dhandhuka, and ATMA, Ahmedabad. Thus, out of a total of 1223 GADW 3 growers 300 durum wheat growers were selected randomly for the study. The Gujarati version of the pre-tested interview schedule was developed considering the objectives. *Ex-post-facto Research* design was used for the study. The collected data were tabulated, analysed, and interpreted by using appropriate statistical tools. The statistical tools were used: Frequency, Percentage and Mean Percent Score.

Results and Discussion

Profile of the durum wheat growers

Based on the extensive review of literature and discussion with experts, some important personal, economic, socio-communicational, and psychological characteristics have been selected for the present study.

Table 1: Profile of Durum Wheat growers n = 300

Sr. No.	Characteristics	Categories	Freq- uency	Per cent (%)
1.	Age	Young age (Up to 35 Years)	12	04.00
		Middle age (36 to 50 Years)	110	36.67
		Old age (Above 50 Years)	178	59.33
		Total	300	100.00
2.	Education	Illiterate	31	10.33
		Primary (Up to 8th Standard)	75	25.00
		Secondary (9th to 10th Standard)	106	35.33
		Higher Secondary (11th to 12th Standard)	88	29.33
		Graduate and above	00	00.00
		Total	300	100.00
3.	Experience of Farming	Up to 5 years	9	03.00
		6 to 10 years	11	03.67
		11 to 15 years	33	11.00

		16 to 20 years	49	16.33
		Above 20 years	198	66.00
		Total	300	100.00
4.	Total Land Holding	Marginal (Up to 1 ha)	00	00.00
		Small (1.01 to 2 ha)	07	02.33
		Medium (2.01 to 4 ha)	27	09.00
		Semi medium (4.01 to 10 ha.)	176	58.67
		Large (Above 10 ha)	90	30.00
		Total	300	100.00
5.	Land Holding Under GADW 3	Up to 1 ha.	01	00.33
		1.01 to 2 ha.	28	09.33
		2.01 to 3 ha.	59	19.67
		3.01 to 4 ha.	39	13.00
		More than 4 ha.	173	57.67
		Total	300	100.00
6.	Yield (Quintal/Ha) (GADW 3) (Unirrigated)	Up to 10.00 qtl/Ha	242	80.67
		10.01 to 20.00 qtl/Ha	58	19.33
		Above 20.00 qtl/Ha	00	00.00
		Total	300	100.00
7.	Yield (Quintal/Ha) (Restricted irrigation)	Up to 10.00 qtl/Ha	102	34.00
		10.01 to 20.00 qtl/Ha	198	66.00
		Above 20.00 qtl/Ha	00	00.00
		Total	300	100.00
8.	Yield (Quintal/Ha) (other than GADW 3)	Up to 10.00 qtl/Ha	6	02.00
		10.01 to 20.00 qtl/Ha	6	02.00
		Above 20.00 qtl/Ha	288	96.00
		Total	300	100.00
9.	Annual Income	Up to Rs. 1.0 lakh	3	01.00
		Between Rs. 1.01 to Rs. 2 Lakh	0	00.00
		Between Rs 2.01 to Rs 3 Lakh	16	05.33
		Between Rs 3.01 to Rs 4 Lakh	44	14.67
		Above Rs. 4 Lakh	237	79.00
		Total	300	100.00
10.	Extension Contact	Very low (Up to 14 score)	133	44.33
		Low (Between 14.01 to 18.00)	153	51.00
		Medium (Between 18.01 to 22.00)	12	04.00
		High (Between 22.01 to 26.00)	2	00.67
		Very high (Above 26.00 score)	0	00.00
		Total	300	100.00
11.	Mass Media Exposure	Very low (Up to 5.4 score)	242	80.66
		Low (Between 5.41 to 10.8)	35	11.67
		Medium (Between 10.81 to 16.2)	23	07.67
		High (Between 16.21 to 21.60)	0	00.00
		Very high (Above 21.60)	0	00.00
		Total	300	100.00
12.	Training Received	Yes	300	100.00
		No	00	00.00
		Total	300	100.00

13.	No. of Training Received	Nil	3	01.00
		Up to 2	134	44.67
		03 to 04	145	48.33
		Above 04	18	06.00
		Total	300	100.00

The results revealed that the majority of respondents (59.33%) belonged to the old age group and most had secondary level education (35.33%). A large proportion of farmers (66.00%) had more than 20 years of farming experience. Regarding land holding, most respondents belonged to the semi-medium category (58.67%), followed by large farmers (30.00%), and more than half (57.67%) cultivated over 4 ha under the GADW-3 variety.

In terms of yield, the majority of farmers obtained up to 10 q/ha under unirrigated conditions (80.67%), while under restricted irrigation, most (66.00%)

obtained 10–20 q/ha, indicating the positive effect of irrigation on productivity. However, 96.00 per cent of farmers reported yields above 20 q/ha from varieties other than GADW-3. Most respondents (79.00%) had an annual income above Rs. 4 lakh. The findings also indicated low extension contact and very low mass media exposure among farmers, although all respondents had received training, with nearly half attending three to four programmes. These results in line of Chikkalaki *et al.* (2024) and Singh (2024).

Horizontal spread of GADW 3 among the Durum Wheat growers

Horizontal spread of Gujarat Anand Durum Wheat 3 variety refers to the diffusion of a specific Gujarat Anand Durum Wheat 3 variety within the Ahmedabad district or among a peer group of farmers.

Table 2: Horizontal spread of GADW 3 among the peer group of Durum Wheat growers in the *Bhal* region of Gujarat
n = 300

Registered Number of Farmers						1223	
Total Numbers of Farmers						300	
		Adoption of Variety GADW 3 within Village		Adoption of Variety GADW 3 Outside Village		Total Farmers	Total Area
No. of Farmers	Area (Ha)	No. of Farmers	Area (Ha)	No. of Farmers	Area (Ha)		
300	1665.82	1924	15023.80	1689	10325.32	3613	25349.12
Increase in Percentage		641.33%	901.88%	563.00%	619.83%	1204.33%	1521.72%

The data revealed that initially 1,223 farmers obtained GADW-3 seeds or participated in FLD, OFT, demonstrations and adaptive trials conducted by KVK and ARS centres, among which 300 farmers cultivated GADW-3 on 1,665.82 ha of land. Observing the performance of the variety in farmers' fields, 1,924 farmers within the same villages adopted the variety covering 15,023.80 ha, while 1,689 farmers from outside the villages adopted it over 10,325.32 ha. Consequently, a total of 3,613 farmers cultivated GADW-3 on 25,349.12 ha of land. It is also concluded by Sebastian & Jeyalakshmi, 2019 and Singh *et al.*, 2018.

This indicates a substantial horizontal spread of the variety, with the number of adopting farmers increasing by 641.33 per cent within villages and 563.00 per cent outside villages. Similarly, the area under GADW-3 increased by 901.88 per cent within villages and 619.83 per cent outside villages. Overall, the total number of farmers increased by 1204.33 per cent and the cultivated area by 1521.72 per cent, reflecting a 12.04-fold increase in farmers and 15.21-fold increase in area under GADW-3 in the *Bhal* region of Gujarat.

The data depicted in Table 3 revealed that the area under cultivation of Durum wheat-3 in *bhal* region of Gujarat within and outside the village is accounted for 22,500 ha and 35,000 ha, respectively. Moreover, the total area under cultivation of the GADW-3 variety within and outside the village accounted for 1665.82 ha and 15023.80 ha, respectively. The total area under GADW-3 Variety within and outside the village together is 16689.62 ha. Thus, the total GADW-3 variety share in percentage within and outside the village is 74.17 per cent and 29.50 per cent, respectively. This is inline of Pichapillai, 2020.

Explore the suggestions from Gujarat Anand Durum Wheat 3 growers to overcome the constraints faced by them in adoption of GADW 3

An attempt was also made to ascertain suggestions from farmers to overcome various problems faced by them in the adoption of the GADW 3 variety of wheat. The suggestions offered by the farmers are presented in Table 9.

The result in Table 9 indicates major suggestions given by the farmers were; Fix MSP on durum wheat(100.00 %) long, medium and short term

forecasting system for weather situations should be developed and the information should be available to the farmers at right time (96.33 per cent, timely quality seed supply should be ensured (90.00 %), popularize stem borer practices should be ensured (30.66 per cent) and popularization of soil reclamation practices to tackle problematic soil (53.33 %), respectively.

Table 3: Horizontal spread of Durum Wheat on the basis of share in percentage among peer group

Sr. No.	Area (Ha)	Cultivation of Durum Wheat Varieties in Ha	Cultivation of GADW 3 Variety in Ha	Share in Percentage
1.	Total area of GADW 3 covered within the village	22,500	1665.82+15023.80 =16689.62	74.17 %
2.	Total area of GADW 3 outside the village	35,000	10325.32	29.50 %

Table 4: Suggestions from GADW 3 growers to overcome the constraints faced by them in adoption of GADW 3
n = 300

Sr. No.	Suggestions	Frequency	Per cent
1.	Fix MSP on durum wheat	300	100.00
2.	Long, medium- and short-term forecasting system for weather situations should be developed and the information should be available to the farmers at right time	289	96.33
3.	Timely quality seed supply should be ensured	270	90.00
4.	Popularize stem borer practices should be ensured	92	30.66
5.	Popularize soil reclamation practices to tackle problematic soil	160	53.33

Conclusion

The findings revealed that the majority of durum wheat growers belonged to the old age group with secondary level education, more than 20 years of farming experience, and land holdings above four hectares. Most farmers obtained up to 10 q/ha yield, had annual income above Rs. 4 lakh, possessed low extension contact and very low mass media exposure, and had attended one to two training programmes. The horizontal spread of GADW-3 variety was remarkable, as the number of farmers and cultivated area increased by 12.04 times and 15.21 times, respectively. The adoption of GADW-3 increased 6.41 times among farmers within villages and 5.63 times outside villages, while the area under the variety increased 9.01 times and 6.19 times, respectively. The share of GADW-3 cultivation was 58.56 per cent within villages and 24.38 per cent outside villages. Overall, farmers rated the varietal and technological traits of GADW-3 from fair to excellent. However, major constraints faced by farmers included vagaries of monsoon, abiotic stresses such as cloudy weather, waterlogging and moisture stress, low productivity, and non-availability of certified seeds. Farmers suggested fixing MSP for durum wheat, developing reliable weather forecasting systems, and ensuring timely availability of quality seeds.

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