

## KNOWLEDGE OF RURAL WOMEN ABOUT IMPROVED STORAGE PRACTICES OF FOOD GRAINS

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### ABSTRACT

*The study was conducted in Navsari district of Gujarat to assess the knowledge of rural women about improved storage practices of food grains and to examine the factors influencing it. A total of 120 respondents were selected through three stage sampling and data were collected using a structured interview schedule. Results indicated that the majority of respondents were middle-aged, had secondary education, medium annual income, high economic motivation, high scientific orientation and medium material possession but exhibited low decision-making ability, mass media exposure, and extension participation. More than half (52.50%) of the women possessed a high level of knowledge, while 46.67 per cent had a medium level and only 00.83 per cent exhibited a low level of knowledge regarding improved storage practices. Correlation analysis revealed that education (0.421\*\*), scientific orientation (0.387\*\*), decision making ability (0.375\*\*), extension participation (0.361\*\*), annual income (0.345\*\*), innovativeness (0.316\*\*) and mass media exposure (0.264\*\*) were found to be positive and highly significant relationship with knowledge, while social participation (0.196\*) and age (0.194\*) were found to be positive and significant relationship with knowledge, wherever economic motivation (0.096<sup>NS</sup>) and material possession (0.079<sup>NS</sup>) were found non-significant relationship with knowledge about storage practices of food grains. Stepwise regression analysis identified six variables viz., education, extension participation, scientific orientation, age, decision-making ability and annual income which together explained 37.00 per cent variation in knowledge. The findings highlight the importance of strengthening extension efforts and capacity building of rural women to minimize post-harvest losses and ensure food security.*

**Keywords:** food grain storage, knowledge level, post-harvest losses, improved storage practices, socio-economic factors.

### INTRODUCTION

India is an agrarian economy where more than 50.00 per cent of the population depends on agriculture and allied activities for their livelihood (Vegad et al., 2021; Anonymous, 2023). A significant portion of the food grains produced in the country is stored by farmers themselves, especially in rural households. However, poor post-harvest handling and inadequate storage facilities continue to cause considerable quantitative and qualitative losses. According to various estimates, post-harvest losses in food grains range from 06.00 per cent to 10.00 per cent, primarily due to traditional and unscientific storage practices (Anonymous, 2015).

In this context, the role of rural women becomes critically important. In most Indian villages, women are the primary caretakers of stored food grains. They are actively involved in the processing, preservation and management of grains meant for household consumption and seed purposes (FAO, 2011). Despite playing such a crucial role, their knowledge and access to improved storage practices are

often limited due to traditional beliefs, lack of awareness, and minimal exposure to modern extension services (Reddy and Padmaja, 2020).

Improved storage practices such as, the use of metal bins, polythene-lined gunny bags, fumigation, moisture control, use of neem leaves or botanicals and pest-proof structures can significantly reduce losses and ensure better food security at the household level (Anonymous, 2015). Various government schemes and agricultural extension efforts have been introduced to spread awareness and improve the adoption of such practices among rural communities (GoI, 2020). However, the extent to which rural women are aware of and apply these improved methods remains an area of concern and inquiry.

Navsari district, located in the southern part of Gujarat, is known for its agricultural productivity, especially in crops like paddy, pulses, and millet (District Agriculture Office, Navsari, 2022). The district has a mix of tribal and non-tribal populations, and agriculture continues to be a

primary occupation. Women in this region are traditionally responsible for post-harvest activities, including grain storage. Assessing their knowledge of improved storage practices is not only relevant but essential for designing targeted interventions that can minimize post-harvest losses and improve food security (Sharma *et al.*, 2018).

This research study aims to evaluate the level of knowledge among rural women in Navsari district regarding improved food grain storage practices. It also seeks to identify socio-economic and psychological factors influencing their awareness, such as education level, age, income, extension contact, and training exposure. Understanding these aspects will help agricultural extension agencies, NGOs and policymakers develop more effective communication strategies and training modules tailored to the needs of rural women.

Furthermore, the study intends to explore the gap between traditional and improved practices, thereby helping in bridging this divide through community-based approaches and capacity-building programs. Empowering rural women with knowledge and resources can play a pivotal role in enhancing grain preservation at the grassroots level and promoting sustainable agricultural development (World Bank, 2019).

Hence, this paper addresses a critical issue intersecting food security, gender roles, and rural development, with a focused geographical lens on Navsari district, Gujarat. The findings are expected to contribute valuable insights into the formulation of inclusive and gender-sensitive extension strategies for improved grain storage.

## OBJECTIVES

- (1) To study the profile of rural women
- (2) To measure the knowledge of rural women about improved food grain storage practices
- (3) To ascertain the relationship between the profile of rural women with their knowledge of improved food grain storage practices

## METHODOLOGY

The study was undertaken to know the extent of knowledge of rural women about storage practices of food grains in Navsari district of Gujarat State, which falls under the jurisdiction of Navsari Agricultural University and is known for its diverse crops and predominantly agricultural livelihood.

The study was based on the positivist research philosophy, as it relied on observable and measurable data collected objectively through structured interviews to assess the knowledge level of rural women regarding food grain storage practices. A deductive research approach was followed,

beginning with theories and findings from previous studies to identify variables, which were then tested empirically. The research adopted a quantitative methodological choice, focusing on numerical data to measure and analyze the extent of knowledge and its relationship with selected variables.

The study employed an ex-post facto research design, as the variables of interest had already occurred and could not be manipulated. A survey method was used for collecting data personally from rural women through a structured and pre-tested interview schedule. The research was cross-sectional in nature, with data collected only once during the period from late February to late April 2025. Navsari district was selected purposively because it comes under the jurisdiction of Navsari Agricultural University and the researcher is well acquainted with its socio-economic and geographical conditions. A three-stage random sampling technique was employed for sample selection.

Out of six talukas in the district, three were randomly selected and from each taluka, two villages were chosen randomly. With the help of local authorities, a list of rural women was prepared and 20 women from each village were selected by the lottery method, making a total of 120 respondents. Data were collected personally through structured interviews and observations as well as symbolic opinions of the respondents were recorded to ensure unbiased responses. The collected data were analyzed using frequency, percentage, arbitrary method, correlation coefficient ( $r$ ) and stepwise regression analysis for meaningful interpretation and conclusion. Statistical analysis was carried out using Microsoft Excel and SPSS version 26.0 software.

## RESULTS AND DISCUSSION

### Profit of rural women

#### 1. Age

Based on their age, respondents were categorized into young (below 35 years), middle (35–50 years) and old (above 50 years) age groups. The data presented in Table 1 indicate that (58.34 %) of respondents were belonged to the middle age group, followed by 30.83 per cent in the old age group and only 10.83 per cent in the young age group. The similar findings have been reported by Rathod (2019), Rathava *et al.* (2020) and Bangari *et al.* (2023).

#### 2. Education

Respondents were classified into four educational levels: illiterate, primary, secondary, and graduate and above. The data presented in Table 1 showed that more than one-third (38.33 %) of respondents had secondary education, followed by 31.67 per cent with primary education. A notable 24.17 per cent of respondents were graduates and above, while only 05.83 per cent were illiterate. The similar findings have been reported by Padariya (2021).

**Table 1: Profile of rural women**

Sr. No.	Category	f	%
1	<b>Age</b>		
	Young age (below 35 years )	13	10.83
	Middle age ( 35 to 50 years )	70	58.34
	Old age (above 50 years )	37	30.83
2	<b>Education</b>		
	Illiterate	07	05.83
	Primary education (< 8 <sup>th</sup> standard)	38	31.67
	Secondary education (9 <sup>th</sup> to 12 <sup>th</sup> standard)	46	38.33
	Graduate and above (> 12 <sup>th</sup> standard)	29	24.17
3	<b>Annual income</b>		
	Low (Below ₹ 50,000/-)	17	14.17
	Medium (₹ 50,000 to ₹ 1,00, 000)	75	62.50
	High (Above ₹ 1,00,000/-)	28	23.33
4	<b>Economic motivation</b>		
	Low (< 14 score)	07	05.83
	Medium (14 to 22 score)	48	40.00
	High (> 22 score)	65	54.17
5	<b>Scientific orientation</b>		
	Low (< 14 score)	09	07.50
	Medium (14 to 22 score)	28	23.33
	High (> 22 score)	83	69.17
6	<b>Social participation</b>		
	No social participation (0 score)	69	57.50
	Member of one organization (1 score)	24	20.00
	Member of more than one organization (2 score)	17	14.17
	Position holding (3 score)	10	08.33
7	<b>Innovativeness</b>		
	Low ( 1 score)	35	29.17
	Medium (2 score)	48	40.00
	High (3 score)	37	30.83
8	<b>Decision making ability</b>		
	Low ( < 6.7 score)	84	70.00
	Medium (6.7 to 13.4 score)	31	25.83
	High (> 13.4 score)	05	04.17
9	<b>Mass media exposure</b>		
	Low (< 16.7 score)	99	82.50
	Medium (16.7 to 23.4 score)	17	14.17
	High (> 23.4 score)	04	03.33
10	<b>Extension participation</b>		
	Low (< 12 score)	108	90.00
	Medium (12 to 18 score)	08	06.67
	High (> 18 score)	04	03.33
11	<b>Material possession</b>		
	Low (< 12 score)	05	04.17
	Medium (12 to 24 score)	106	88.33
	High (> 24 score)	09	07.50

### 3. Annual income

Annual income was categorized into low (below ₹50,000), medium (₹50,000–₹1,00,000), and high (above ₹1,00,000). As shown in Table 1 majority of respondents (62.50 %) had a medium annual income, followed by 23.33 per cent in the high-income category, and only 14.17 per cent in the low-income category. The similar findings have been reported by Suramwad *et al.* (2016).

### 4. Economic motivation

Respondents were categorized based on their level of economic motivation into low, medium and high. The data revealed in Table 1 that more than half (54.17 %) of the respondents had high economic motivation, followed by 40.00 per cent with medium motivation and 05.83 per cent with low motivation. The similar findings have been reported by Singh *et al.* (2021).

### 5. Scientific orientation

Scientific orientation was measured and grouped into low, medium and high categories. The data indicated in Table 1 that majority (69.17 %) of rural women had a high level of scientific orientation, while 23.33 per cent and 07.50 per cent had medium and low orientation, respectively. The similar findings have been reported by Purohit (2022).

### 6. Social participation

Social participation was categorized as no membership, member of one organization, member of more than one organization, and position holder. It is apparent from Table 1 that the majority (57.50 %) of respondents did not participate in any social organization, whereas 20.00 per cent were members of one organization, 14.17 per cent were members of multiple organizations, and 08.33 per cent held positions. The similar findings have been reported by Sahu (2015).

### 7. Innovativeness

Innovativeness was classified into low, medium and high levels. Table 1 show that 40.00 per cent of respondents had medium innovativeness, followed by 30.83 per cent with high innovativeness and 29.17 per cent with low innovativeness. The similar findings have been reported by Chandravadia *et al.* (2018), Govind *et al.* (2018), Singh *et al.* (2021) and Patel and Bhatt (2022).

### 8. Decision-making ability

Decision-making ability was grouped into low, medium and high categories. The data revealed in Table 1 that majority (70.00 %) of respondents had low decision-making ability, followed by 25.83 per cent with medium ability and only 04.17 per cent with high ability. The similar findings have been reported by Challa (2024).

### 9. Mass media exposure

Mass media exposure was categorized into low, medium and high levels. The results showed in Table 1 that the vast majority (82.50 %) of respondents had low exposure to mass media, followed by 14.17 per cent with medium exposure and only 03.33 per cent with high exposure. The similar findings have been reported by Saikia *et al.* (2018).

### 10. Extension participation

Extension participation was measured and grouped into low, medium and high categories. Data presented in Table 1, explains that 90.00 per cent of the respondents had low participation in extension activities, while 06.67 per cent and 03.33 per cent had medium and high levels of participation, respectively. The findings of the study are supported by the findings of Sahu (2015) and Challa (2024).

### 11. Material possession

Material possession was categorized into low (below 12 score), medium (12–24 score), and high (above 24 score). The results showed in Table 1 elaborate that majority (88.33 %) of respondents had a medium level of material possession, while 07.50 per cent had high and 04.17 per cent had low possession. The findings of the study are supported by the findings of Sharma *et al.* (2017), Kalita (2020); Chakrawarty *et al.* (2022); Choudhary *et al.* (2025); Meena *et al.* (2024); Pandey *et al.* (2024); Vegad *et al.* (2021);

### Knowledge of rural women about improved food grain storage practices

In this study, knowledge regarding improved food grain storage practices was measured using a structured schedule and respondents were classified into low, medium and high knowledge categories based on their knowledge index. For categorization arbitrary method was used.

**Table 2: Distribution of the respondents according to their knowledge about improved food grain storage practices (n=120)**

Sr. No.	Level of knowledge	f	%
1	Low (< 33.33 score)	01	00.83
2	Medium (33.33 to 66.66 score)	56	46.67
3	High (> 66.66 score)	63	52.50

It is apparent from Table 2 that the majority of rural women 52.50 per cent had a high level of knowledge, 46.67 per cent had a medium level, while only 00.83 per cent exhibited a low level of knowledge on food grain storage practices.

From this finding, it can be concluded that nearly half (52.50 %) of respondents had high level of knowledge about storage practices of food grains. The probable reason might be that most of the respondents were educated and experienced so they could easily understand and acquire skills about storage practices of food grains. During the survey, respondents highlighted that they learned from their ancestors and society or other women to know the store practices of food grains for use throughout the year with taking proper care.

**Relationship between profile of rural women with their knowledge about improved food grain storage practices**

**Table 3: Relationship between profile of rural women with their knowledge about improved food grain storage practices (n= 120)**

Sr. No.	Independent variables	Coefficient of correlation (r)
X <sub>1</sub>	Age	0.194*
X <sub>2</sub>	Education	0.421**
X <sub>3</sub>	Annual income	0.345**
X <sub>4</sub>	Economic motivation	0.096 <sup>NS</sup>
X <sub>5</sub>	Innovativeness	0.316**
X <sub>6</sub>	Scientific orientation	0.387**
X <sub>7</sub>	Social participation	0.196*
X <sub>8</sub>	Extension participation	0.361**
X <sub>9</sub>	Decision making ability	0.375**
X <sub>10</sub>	Mass media exposure	0.264**
X <sub>11</sub>	Material possession	0.079 <sup>NS</sup>

\*\*Significant at 0.01 level of probability

\*Significant at 0.05 level of probability

<sup>NS</sup>Non-significant

The data manifested in Table 3 revealed that the education (0.421\*\*), scientific orientation (0.387\*\*), decision making ability (0.375\*\*), extension participation (0.361\*\*), annual income (0.345\*\*), innovativeness (0.316\*\*) and mass media exposure (0.264\*\*) were found to be positive and highly significant relationship with knowledge, while social participation (0.196\*) and age (0.194\*) were found to be positive and significant relationship with knowledge, wherever economic motivation and material possession were found non-significant relationship with knowledge about storage practices of food grains.

The above results revealed several key relationships between the profile characteristics of respondents and their knowledge of storage practices of food grains. A significant positive correlation was observed between the age of respondents and their knowledge, indicating that as age increases, knowledge about storage practices also tends to improve, possibly due to accumulated experience over time. Furthermore, a highly positive correlation existed between the education of respondents and their knowledge about storage practices of food grains, suggesting that more educated rural women possess greater knowledge, likely due to better comprehension and access to information. This finding was aligned with studies by Rathod (2019). Annual income was also highly positively associated with knowledge, implying that higher income enables better access to information, improved storage facilities, or participation in relevant programs. In contrast, economic motivation did not show a significant relation with the knowledge, indicating that a strong desire to earn or save money alone may not necessarily lead to improved knowledge of storage practices. This may be since motivation without access to resources or information may not result in actual knowledge gain. However, innovativeness exhibited a strong positive correlation, suggesting that rural women who are open to trying new ideas and practices tend to be more knowledgeable. Such women are likely more proactive in seeking information, experimenting with modern storage techniques, and adopting recommended methods.

A strong and highly significant positive correlation was observed between scientific orientation and knowledge of food grain storage practices, indicating that rural women who possess a higher level of scientific orientation tend to have greater awareness and understanding of improved storage methods. Scientific orientation reflects an individual's tendency to seek logical, evidence based explanations for phenomena, along with a willingness to accept new ideas that are supported by scientific reasoning and research. As far as social participation is concerned, it also played a significant role in enhancing knowledge because women who are actively involved in social groups, self-help groups, or

community activities tend to exchange ideas and learn from others, thus improving their understanding of good storage practices. This finding was in conformity with Borkar and Gohad (2016).

Extension participation showed a significant influence, highlighting the crucial role of extension services and training programs in spreading awareness and technical know-how among rural women. Participation in such programs allows them to learn directly from experts and adopt recommended practices. A notable positive relationship was also observed with decision making ability, suggesting that women who are more confident and capable in making decisions especially related to agriculture and household management are more knowledgeable about food grain storage. Effective decision-making often requires awareness, analysis, and understanding of different options, which is closely tied to knowledge. Mass media exposure was another influential factor, where greater engagement with media translated into higher knowledge due to the media's role in disseminating information and enhancing awareness. This finding was in line of the finding of Borkar and Gohad (2016).

A correlation study of material possession shows that non-significant relation with knowledge about storage practices of food grains. This finding was in line of the finding of Antim *et al.* (2016). This is because the ownership of physical assets such as household appliances, farm tools, storage equipment, etc., does not directly contribute to increased knowledge among rural women regarding proper storage methods. While it might be expected that women with more material resources would have better access to improved technologies or facilities for storage, the findings

indicate that possession alone does not necessarily translate into awareness or understanding of the best practices. This could be because material assets often reflect economic status or household wealth, but not necessarily exposure to technical knowledge.

#### **Extent of variation caused by independent variables on the dependent variable**

The relationship between dependent variable and independent variables was expressed in terms of correlation coefficient (r). However, in behavioural sciences, no dependent variable can be influenced by any single independent variables. It is found to be influenced by more than one independent variable jointly through their reciprocal and interactive relationship. In order to assess the amount of contribution of each independent variable to dependent variable, the effect of other was held constant. In this situation Efroymson (1960) advocated stepwise regression. It has an advantage that at each stage of analysis, every variable is subjected to an examination for its predictive value. The stepwise regression was carried out with the help of SPSS software. The content of the tables showed that the variables were introduced stepwise is succession depending upon the contribution of each of the independent variables in explaining the variation in the dependent variables.

#### **Stepwise multiple regression analysis of independent variables and knowledge**

Stepwise multiple linear regression analysis with eleven independent variables and knowledge as a dependent variable was carried out. The data regarding stepwise multiple regression are presented in Table 4.

**Table 4 : Stepwise multiple regression analysis of independent variables and knowledge about improved food grain storage practices** (n=120)

Sr. No.	Independent variables	Partial regression coefficient (b)	Standard error	Multiple correlation coefficient 'R'	Adjusted
	(Constant)	30.532	5.551	0.634	0.370
X <sub>1</sub>	<b>Education</b>	2.960**	1.088		
X <sub>2</sub>	<b>Extension participation</b>	0.697**	0.283		
X <sub>3</sub>	<b>Scientific orientation</b>	0.437**	0.188		
X <sub>4</sub>	<b>Age</b>	3.503**	1.381		
X <sub>5</sub>	<b>Decision making ability</b>	0.574**	0.233		
X <sub>6</sub>	<b>Annual income</b>	3.235**	1.498		
**Significance at 0.01 level probability					

Table 4 revealed that out of eleven independent variables, six variables namely education (X<sub>2</sub>), extension

participation ( $X_8$ ), scientific orientation ( $X_6$ ), age ( $X_1$ ), decision making ability ( $X_9$ ) and annual income ( $X_3$ ) were accounting influence on the knowledge of respondents regarding improved food grain storage practices. These six independent variables together accounted for 37.00 per cent variation as indicated by the adjusted value. This indicates that while these variables had a considerable influence, the remaining 63.00 per cent of variation may be due to other factors not included in the present investigation, such as access to training programmes, availability of improved storage infrastructure, extension contact or exposure to digital sources of agricultural information. Hence, future studies may incorporate these variables to develop a more comprehensive and explanatory model.

As a result of stepwise regression analysis, the following model was obtained:

$$Y = 30.532 + (2.960)X_2 + (0.697)X_8 + (0.437)X_6 + (3.503)X_1 + (0.574)X_9 + (3.235)X_3$$

Where,

Y = Knowledge

A = The intercept *i.e.*, 30.532

bi = Regression coefficient,

i = 1,2,3.....,n

$X_2$  = Education

$X_8$  = Extension participation

$X_6$  = Scientific orientation

$X_1$  = Age

$X_9$  = Decision making ability

$X_3$  = Annual income

## CONCLUSION

It can be concluded that the majority of rural women in Navsari district belonged to the middle age group with secondary level education, medium annual income and high economic motivation. They generally possessed a high level of knowledge regarding improved food grain storage practices, supported by high scientific orientation and medium innovativeness. The study revealed that education, scientific orientation, decision-making ability, extension participation, annual income, innovativeness and mass media exposure had a positive and significant relationship with knowledge, while social participation and age also showed a significant association. However, economic motivation and material possession were found non-significant. Stepwise

regression further indicated that six variables *viz.*, education, extension participation, scientific orientation, age, decision-making ability and annual income contributed significantly to knowledge level.

These findings highlight the importance of strengthening educational and extension initiatives to improve rural women's technical knowledge, media exposure and participation in developmental activities. Enhancing these areas can empower them to adopt improved storage technologies effectively, reduce post-harvest losses and contribute to greater household food security.

## IMPLICATIONS

- (1) The findings of the study can help in designing effective training and extension programmes to improve the knowledge of improved food grain storage practices among rural women.
- (2) The results can be utilized by policymakers, NGOs, and extension agencies to develop women-centric strategies and interventions for safe and sustainable storage of food grains.
- (3) The study highlights the need to strengthen women's decision-making ability, extension participation and media exposure, which can be incorporated in future extension policies.

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## CONFLICT OF INTEREST

This is to declare that there is "No conflict of interest" among researcher.

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