P-ISSN 2322 - 0678 & E-ISSN 3048 - 9946
https://doi.org/10.56572/gjoee.2025.40.2.0006 Gujarat Journal of Extension Education Vol. 40 : Issue 2 : December - 2025

ADOPTION OF RURAL WOMEN IMPROVED STORAGE PRACTICES OF FOOD GRAINS

Axita A. Meghnathi[1], P. B. Khodifad[2] and B. N. Kalsariya[3]

1 Ph. D. scholar, Dept. of Agril. Extension Extension Education, College of Agriculture, JAU, Junagadh - 362001
2 Professor & Head, Dept. of Agril. Extension and Communication, N. M. College of Agriculture, NAU, Navsari-396450
3 Professor & Head, Dept. of Agril. Extension Extension, College of Agriculture, JAU, Junagadh-362001
Email: axitameghnathi@gmail.com

ABSTRACT

The present study was conducted to measure the adoption of improved food grain storage practices among rural women in Navsari district, Gujarat. An ex-post facto research design was employed and samples of 120 rural women were selected through a three-stage random sampling technique. Data were collected using a structured interview schedule and analyzed using frequency, percentage, correlation and stepwise regression. Results revealed that 97.50 per cent of respondents had medium to high adoption levels of improved storage practices, while only 02.50 per cent had low adoption. Correlation analysis showed that innovativeness (0.468**), education (0.404**), scientific orientation (0.401**), annual income (0.383**), decision making ability (0.348**), material possession (0.316**) and economic motivation (0.282**) were found to be positive and highly significant relationship with adoption, followed by extension participation (0.191*), mass media exposure (0.191*) and age (0.186*) were found positive and significant relationship with their adoption, while social participation (0.158^{NS}) was found non-significant relationship with adoption of storage practices of food grains. Stepwise regression indicated that innovativeness, education, scientific orientation, material possession and age together explained 38.20 per cent of the variation in adoption. Findings highlight that improving awareness, providing gender-sensitive training and promoting cost-effective technologies can enhance rural women's capacity for scientific grain storage. The study contributes to extension strategies aimed at reducing post-harvest losses and strengthening food and nutritional security in the region.

Keywords: *0ain storage, post-harvest losses, household grain management and empowerment.*

INTRODUCTION

India, being an agrarian economy, heavily depends on the efficient production and storage of food grains to ensure food and nutritional security. It is now realized the world over that in order to meet food requirement of the growing population and rapid industrialization, modernization of agriculture is inescapable (Prajapati *et al.,* 2011). Food is the symbol of life and prosperity and also food grain comprising of cereals, millets and pulses is the primary and staple food of majority of the population in India for fetching higher prices to the food grains in the market not only production of grains is important but storage of grains is very important (Rathava *et al.,* 2020). Although the country has made significant progress in increasing food grain production, a large quantity is lost in post post-harvest due to improper storage practices. According to the Food and Agriculture Organization (FAO), around 20.00–30.00 per cent of total food grains in developing countries are lost during post-harvest operations, with storage accounting for a major portion of these losses (FAO, 2013). These losses not only reduce farm income but also threaten national food security efforts.

In rural India, especially in Gujarat, women play a vital but often under recognized role in post-harvest operations, particularly in cleaning, drying and storing food grains (Patel *et al.,* 2018). In Navsari district, where agriculture is a principal livelihood source, rural women are traditionally responsible for food grain management at the household level. However, their practices are largely based on traditional knowledge, which may not always be sufficient to prevent losses from insects, rodents and moisture. With changes in climate patterns and increased demand for food safety, there is a growing need to adopt improved and scientific storage methods.

Improved storage practices such as the use of metal or PUSA bins, neem-based bio-repellents, fumigation, moisture control and structured sun-drying have shown promising results in minimizing storage losses and preserving grain quality (Singh *et al.,* 2016). However, the level of awareness, knowledge and adoption of these practices among

rural women remains inconsistent and influenced by various factors like education level, socio-economic status, extension contact, access to training, and availability of storage infrastructure (Chauhan and Singh, 2014; Vinaya and Tapan, 2023).

This study is aimed at assessing the knowledge and adoption level of improved storage practices among rural women in Navsari district. It also explores the socio-economic and psychological factors influencing their adoption behavior. Understanding these factors will help in developing effective extension strategies, designing gender-sensitive training modules and strengthening rural women's capacity in post-harvest grain management.

Navsari, located in the southern part of Gujarat, is known for the cultivation of paddy, pulses, and other cereals. The region's unique agro-climatic conditions, combined with high female participation in agriculture, make it an appropriate area to study the dynamics of food grain storage. The findings of study will contribute to extension education literature by identifying knowledge gaps, adoption barriers and opportunities for enhancing women's role in food security through improved storage practices.

Such research becomes even more critical in the context of climate change and resource constraints, where minimizing post-harvest losses can have a direct impact on household food availability, farm profitability and national grain reserves (ICAR, 2020). It also supports policy recommendations for promoting low-cost, farmer-friendly storage technologies among rural women.

OBJECTIVES

(1) To measure the extent of adoption about improved food grain storage practices by rural women

(2) To ascertain the relationship between the profile of rural women and their adoption of improved food grain storage practices

METHODOLOGY

The study was carried out to assess the extent of adoption of improved food grain storage practices by rural women in Navsari district of Gujarat, which lies under the jurisdiction of Navsari Agricultural University. The study followed a positivist philosophy with a deductive approach and employed a quantitative survey under a cross-sectional time horizon. An ex-post facto research design was adopted, as the phenomenon under study had already occurred and could not be manipulated.

The Navsari district was purposively selected due to its agricultural importance and the researcher's familiarity with local conditions. A three-stage random sampling technique was employed. Out of six talukas, three were randomly selected, followed by random selection of two villages from each taluka. From each village, 20 rural women engaged in food grain storage were chosen, making a total of 120 respondents.

A structured interview schedule was developed with the guidance of experts and pre-tested to ensure clarity and reliability. Personal interviews were conducted to collect data in a comfortable setting. The data were coded, tabulated and analyzed using frequency, percentage, correlation and stepwise regression analysis with the help of SPSS version 26.0 and Microsoft Excel.

RESULTS AND DISCUSSION

Level of adoption about improved storage practices of food grains

Table 1: Distribution of the respondents according to their extent of adoption about improved storage practices of food grains (n=120)

Sr. No.	Level of adoption	*f*	%
1	**Low** (< 33.33 score)	03	02.50
2	**Medium** (33.33 to 66.66 score)	59	49.17
3	**High** (> 66.66 score)	58	48.33

It is apparent from Table 1 that 49.17 per cent of the respondents had medium adoption level about recommended food grain storage practices, followed by 48.33 and 02.50 per cent of them were found to have high and low level of adoption about recommended food grain storage practices, respectively.

Result can be interpreted that majority (97.50%) of respondents had medium to high level of adoption about storage practices of food grains. The probable reason of the result might be that majority of the respondents had medium level of annual income and material possession which might be the reason why majority of the respondents had medium adoption about storage practices of food grains. The similar findings have been reported by Sahu (2015) and Ahlawat and Singh (2020).

Relationship between profile of respondents and their adoption level

Table 2: Relationship between profile of respondents with their adoption of improved storage practices of food grains (n= 120)

Sr. No.	Independent variables	Coefficient of correlation (r)
X_1	**Age**	0.186*
X_2	**Education**	0.404**
X_3	**Annual income**	0.383**
X_4	**Economic motivation**	0.282**
X_5	**Innovativeness**	0.468**
X_6	**Scientific orientation**	0.401**
X_7	**Social participation**	0.158^{NS}
X_8	**Extension participation**	0.191*
X_9	**Decision making ability**	0.348**
X_{10}	**Mass media exposure**	0.191*
X_{11}	**Material possession**	0.316**

**Significant at 0.01 level of probability
*Significant at 0.05 level of probability
^{NS}Non-significant

The data manifested in Table 2 revealed that the innovativeness (0.468**), education (0.404**), scientific orientation (0.401**), annual income (0.383**), decision making ability (0.348**), material possession (0.316**) and economic motivation (0.282**) were found to be positive and highly significant relationship with adoption, followed by extension participation (0.191*), mass media exposure (0.191*) and age (0.186*) were found positive and significant relationship with their adoption, while social participation (0.158^{NS}) was found non-significant relationship with adoption of storage practices of food grains.

The above results revealed several key relationships between the profile characteristics of respondents and their adoption of storage practices of food grains. A significant positive correlation was observed between the age of respondents and their level of adoption, indicating that as age increases, adoption also tends to improve possibly due to the confidence and practical experience older women have in trying out and maintaining consistent practices. Furthermore, a highly positive correlation existed between the education of respondents and their adoption level, suggesting that more educated rural women are more likely to adopt improved practices. This finding was aligned with studies by Sahu *et al.* (2015). This may be attributed to their better understanding of technical information and a greater ability to assess the benefits of adopting new methods.

Annual income also showed a highly positive association with adoption, implying that higher income allows access to improved storage materials, structures and technologies, making it easier for women to implement recommended practices. This finding was in line of the finding of Gotyal *et al.* (2011).

Economic motivation although significantly related, may suggest that while the desire to earn or save more can encourage adoption, it alone may not be sufficient without accompanying resources and support. This finding was aligned with studies by Antim *et al*. (2022). Further, innovativeness exhibited a strong positive correlation, indicating that women who are open to new ideas are more willing to experiment with and implement improved storage practices. Such women tend to be proactive, responsive to change, and ready to adopt modern techniques that promise better outcomes.

A strong and highly significant positive correlation was also observed between scientific orientation and adoption, indicating that women who value scientific reasoning and logic are more inclined to follow recommended, research-backed storage methods. This finding was aligned with studies by Gotyal *et al.* (2011). These women are more likely to trust scientific recommendations and make informed decisions based on proven results.

As far as social participation is concerned, though it was not significantly correlated, it may still contribute indirectly; however, its non-significant status implies that mere involvement in social activities may not always lead to actual implementation unless those platforms provide relevant technical exposure or support. This finding was in line of the finding of Sahu *et al.* (2015); Bansal and Shaikh (2024); Shahlas et al. (2024); Thakor and Joshi (2024); Vinaya and Tapan (2023).

Extension participation exhibited a noteworthy positive relationship, emphasizing the important contribution of extension services and on-ground training in encouraging adoption. Such initiatives provide rural women with practical experience and boost their confidence to apply the practices they have acquired. This finding was in line of the finding of Rathod (2019). Similarly, a notable positive relationship with decision making ability suggests that women who are more assertive and confident in making choices especially regarding household or farm-related matters are more likely to adopt improved storage techniques. Adoption often involves selecting among alternatives, evaluating risk and committing to action, all of which are facilitated by strong decision making skills.

Mass media exposure also significantly influenced adoption, as greater interaction with media platforms

increases awareness, encourages change and exposes women to success stories, innovations and expert advice.

However, material possession, though significantly correlated, may not directly drive adoption. This could be because having storage equipment or tools does not guarantee their correct usage. Possession might reflect economic status, but actual implementation depends on the user's knowledge, skill and motivation to use these assets effectively.

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 adoption

Table 3: Stepwise multiple regression analysis of independent variables and adoption of storage practices of food grains (n=120)

Sr. No.	Independent variables	Partial regression coefficient (b)	Standard error	Multiple correlation coefficient 'R'	Adjusted
	(Constant)	19.392	6.410	0.639	0.382
X_5	**Innovativeness (X_5)**	3.844**	1.276		
X_2	**Education (X_2)**	3.134**	1.093		
X_6	**Scientific orientation (X_6)**	0.595**	0.194		
X_{11}	**Material possession (X_{11})**	0.628**	0.219		
X_1	**Age (X_1)**	3.956**	1.429		
**Significance at 0.01 level probability					

Table 3 revealed that out of eleven independent variables, five variables namely innovativeness (X_5), education (X_2), scientific orientation (X_6), material possession (X_{11}) and age (X_1) were accounting influence on the adoption of respondents regarding storage practices of food grains. These five independent variables together accounted for 38.20 per cent variation as indicated by the adjusted R^2 value.

Based on field observations, other relevant variables that could be studied in future research include risk orientation, training exposure, access to extension services, social participation, communication behaviour, and economic empowerment of rural women. These factors appeared to have a considerable influence on the adoption of food grain storage practices but were not included in the present study. Incorporating these variables may help future researchers to better explain the remaining unexplained variation (61.80%) and provide a more comprehensive understanding of adoption behaviour among rural women.

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

$$Y = 19.392 + (3.844)X_5 + (3.134)X_2 + (0.595)X_6 + (0.628)X_{11} + (3.956)X_1$$

Where,

Y = Adoption

A = The intercept i.e., 19.392

bi = Regression coefficient

i = 1,2,3…..,n

X_5 = Innovativeness

X_2 = Education

X_6 = Scientific orientation

X_{11} = Material possession

X_1 = Age

CONCLUSION

It can be concluded that the majority of the rural women possessed medium level of adoption about improved food grain storage practices.

Innovativeness, education, scientific orientation, annual income, decision making ability, material possession and economic motivation had positive and highly significant relationship with adoption, whereas extension participation, mass media exposure and age had positive and significant relationship with adoption, while social participation had non- significant relationship with adoption of improved storage practices of food grains.

The study further reveals that five independent variables namely innovativeness, education, scientific orientation, material possession and age were accounting influence on the adoption of improved food grain storage practices.

IMPLICATIONS

(1) The findings of the study can assist in designing effective training and extension programmes to enhance adoption of improved food grain storage practices among rural women.

(2) The results can serve as a valuable input for policymakers, NGOs and extension agencies in formulating women-centric strategies and interventions for safe and sustainable grain storage.

(3) The study underscores the need to strengthen rural women's decision-making ability, extension participation and media exposure, which may be effectively integrated into future extension policies.

ACKNOWLEDGEMENT

The authors acknowledge the support of the Department of Agricultural Extension and Communication, N. M. College of Agriculture, Navsari Agricultural University, Navsari, Gujarat for this study. Special gratitude is extended to the rural women who served as respondents and cooperated in the survey.

CONFLICT OF INTEREST

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

REFERENCES

Ahlawat, S. and Singh, S. (2020). Knowledge and adoption level of grain storage technologies among farm women of Deesa taluka, Gujarat, India. *Int. J. Curr. Microbiol. Appl. Sci.,* 9(3): 2323-2330.

Anonymous (2013). Summary Report. Food Wastage Footprint: Impacts on Natural Resources. Rome: Food and Agriculture Organization of the United Nations.

Antim, Doharey, R. K. and Kumar, M. (2022). Adoption level of rural women about storage structure and practices for storing grains. *Asian J. Agric. Ext. Econ. Sociol.,* 40(11): 352-359..

Bansal, R. and Shaikh, A. S. (2024) Agricultural labor dynamics in gujarat: a comparative study of tribal and non-tribal districts. *Gujarat Journal of Extension Education,* 38(1):29-34. https://doi.org/10.56572/gjoee.2024.38.1.0006.

Chauhan, N. M. and Singh, A. K. (2014). Adoption of improved food grain storage practices by rural women in India. *Indian j. ext. educ.*, 14(3): 65–69.

Efroymson, M. A. (1960). "*Multiple regression analysis*", Mathematical Methods for Digital Computers, Wiley, New York, pp. 191-203.

Gotyal, S. H., Aski, S. G., Patil, M. B. and Hanumanaikar, R. H. (2011). A study on adoption of scientific storage practices of food grains. *Ag. Update,* 6(1): 142-144.

ICAR (2020). *Vision 2050 – Indian Council of Agricultural Research*. New Delhi: ICAR. Retrieved from: https://icar.org.in/en/vision-2050.

Patel, D. D., Parmar, R. S. and Solanki, K. D. (2018). Role of rural women in grain storage and post-harvest management. *Guj. J. Ext. Educ.*, 29(1), 105–110.

Prajapati, M., Solanki K. D. and Prajapati, A. (2011). Extent of agricultural modernization among the tribal and non-tribal farmers. *Guj. J. Ext. Educ.*, 22(1): 46-50.

Rathava, S. G., Chovatia, J. V. and Patel, P. H. (2020). Constraints faced by farmers in adoption of grain storage practices. *Guj. J. Ext. Educ.*, 31(1): 44-46.

Rathod, R. (2019). Knowledge and adoption of farmers about grain storage practices in Navsari district of Gujarat state. *M. Sc. (Agri.) Thesis*, N.A.U., Navsari.

Sahu, G. (2015). A study on storage practices of food grains among the farmers of northern hills agro- climatic zone of Chhattisgarh state. *M. Sc. (Agri.) Thesis,* Indira Gandhi Krishi Vishwavidyalaya, Raipur (Chhattisgarh).

Sahu, G., Shrivastava, K. K. and Chaturvedi, B. K. (2015). Adoption of storage practices of food grains among the farmers of northern hills of Chhattisgarh, India. *Plant Arch.,* 15(2): 813-815.

Shahlas, B. T., Kumar, A. A. and Smitha, K. P (2024) Relationship between profile characteristics and attitudes of tribal and non-tribal rice farmers toward sustainable rice farming. *Gujarat Journal of Extension Education,* 38(1):213-218. https://doi.org/10.56572/gjoee.2024.38.1.0034.

Singh, P., Sharma, R. and Yadav, A. K. (2016). Evaluation of improved storage structures for food grains. *Agricultural Engineering Today (AET)*, 40(2): 15–20.

Thakor, R. F. and Joshi, P. J. (2024) Impact of climate resilient technologies on socio economic development of tribal farmers. *Gujarat Journal of Extension Education,* 37(2):43-46. https://doi.org/10.56572/gjoee.2024.37.2.0008.

Vinaya K. Hebsale Mallappa and Tapan B. Pathak (2023). Climate smart agriculture technologies adoption among small-scale farmers: A case study from Gujarat, India. Frontiers in Sustainable Food Systems, 7: 1202485. https://doi.org/10.3389/fsufs.2023.1202485

Received : September 2025 : Accepted : November 2025