ZIBELINE INTERNATIONAL™ PUBLISHING

ISSN: 2682-7786 (Online)
CODEN: BDAIDR

Big Data in Agriculture (BDA)

DOI: http://doi.org/10.26480/bda.02.2025.117.122

RESEARCH ARTICLE

ADOPTION STATUS OF IMPROVED WHEAT VARIETIES IN KAILALI, NEPAL

Sudarshan Rokaya and Prem Pandey*

Faculty of Agriculture, Far Western University, Tikapur, Kailali, Nepal
**Corresponding Author Email: prempandey2053@gmail.com*

ARTICLE DETAILS

Article History:

Received 19 March 2025
Revised 25 April 2025
Accepted 22 May 2025
Available online 14 June 2025

ABSTRACT

Wheat is an important staple crop widely cultivated throughout Nepal, from Terai to hill regions. However, the potential for greater production through high-yielding varieties is hindered by socioeconomic and institutional factors. This study aimed to identify the adoption status of improved wheat varieties as well as factors that influence adoption and challenges to adoption in the Kailali district. The study area was selected purposively, which included Ghodaghodi Municipality (ward no. 11) and Kailari Rural Municipality (ward no. 8). The sample size was 93 farmers, selected using simple random sampling techniques, and they were interviewed using a semi-structured questionnaire. Data were analyzed using MS Excel and SPSS software. Descriptive statistics, index ranking, and a binary logistic regression model were used for data analysis. The study indicated that 64.5% were adopters and 35.5% were non-adopters of improved wheat varieties. Vijay (21.5%) had the highest area coverage, followed by Gautam (13.9%), Banganga (10.7%), and Aditya (6.5%). The binary logistic regression results showed that membership in organizations, access to credit, and extension services had a positive and statistically significant effect on the adoption of improved wheat varieties at the 5% level. Education level, training, and subsidies were also positively significant at the 10% level, while landholding size exhibited a negative and statistically significant effect at the 10% level. The most critical problem in improved wheat adoption was the high cost of seeds, with an index value of 0.76, followed by the unavailability of seeds on time (0.65) and poor quality of improved varieties (0.60). The survey results suggest addressing the high cost and timely availability of quality seeds, enhancing farmer education, improving access to credit, providing subsidies, offering regular advisory and extension services, and implementing participatory training programs to increase the adoption of improved practices.

KEYWORDS : High-yielding varieties, Adopter, Non-adopters, Socioeconomics factors, Binary logistic model

1. INTRODUCTION

Wheat (*Triticum aestivum* L.) is a member of the Gramineae family, is the most extensively grown cereal crop worldwide (Devkota et al., 2020). In Nepal, ten wild relatives and numerous landraces of wheat have been reported by (Mudwari, 1999). The growth in wheat production across the country became notable in the mid-1960s, largely due to the introduction of dwarf high-yielding varieties. NARC reports that international collaboration, particularly with CIMMYT and USAID provided access to many exotic varieties (Joshi et al., 2006). Wheat, a staple food for 35% of the world's population, provides approximately 20% of global food calories. It is a versatile grain used in various culinary applications, including bread, pasta, and pastries, and plays a critical role in global food security (Ghimire and Magar, 2017). In addition to its culinary value, wheat plays a critical role in maintaining global food security.

The economy of Nepal is heavily dependent on agriculture, which contributes approximately 24.12 % of the GDP and only wheat contributes 5.7721% of GDP from agriculture (MoALD, 2022). Wheat is cultivated in 21% area of land and accounts for 17% of total cereal production in Nepal (Devkota et al., 2020). In terms of acreage and production, wheat ranks third among the cereal crops in Nepal, behind rice and maize (MoALD, 2022). In the fiscal year 2020–2021, Nepal's wheat area, productivity, and production were 711,067 ha, 2,127,276 tons, and 2.99 tons/ha, respectively. Kailali with a productivity of 3.58 tons/ha, which is higher than the national average of 2.99 tons/ha, making it the second-highest producing district in Nepal, following Dhanusha (MoALD, 2022). According to the study wheat is cultivated in Nepal as a major winter cereal crop, with over 80% of the crop falling under the rice-wheat cropping system (Kandel et al., 2018). For various ecological zones (the terai region has 26 recommended varieties, while the hills have 17, NARC has released and suggested 43 enhanced varieties of wheat. However, according to the study only thirty wheat varieties are being grown, while thirteen have been denotified (Timsina et al., 2018). Among the most popular varieties is Vijay, which covered approximately 21% of the wheat-growing area in Nepal in 2014 (Timsina et al., 2018). Recently introduced varieties like Borlaug 2020 aim to increase wheat production and resilience to climate 1 change. Biofortified varieties such as Zinc Gahun-1 and Zinc Gahun-2, rich in zinc, are part of efforts to combat micronutrient deficiencies in the population. Additionally, Banganga is noted for its high yield and resistance to leaf rust and stem rust. These improved varieties have significantly contributed to enhancing wheat production and food security in Nepal (NARC, 2019).

Kailali has the potential to emerge as a prime district for the commercialization of the wheat subsector (Bhatt et al., 2020). The adoption rate of better wheat production practices among wheat growers is problematic, which is sometimes linked to a lack of technical experience, awareness, and understanding about the resource element, a lack of access to a reliable package of information, and a variety of socioeconomic issues (Poudel et al., 2021). Farmers' adoption levels were influenced by factors such as education, machinery ownership, irrigation water supply, capacity-enhancement efforts, and profit-driven behavior (Mariano et al., 2012). Various studies have been undertaken globally to promote the use of improved crop production technology (Nazu et al., 2021).

To ensure the continued growth and sustainability of wheat production in Nepal, it is crucial to address the barriers to the adoption of improved practices. They suggest strengthening extension services, improving farmer education and training, and increasing access to agricultural inputs and technologies (Bhatta et al., 2022). By creating an enabling the environment for farmers, Nepal will increase wheat productivity and

Quick Response Code	Access this article online	
	Website: www.bigdatainagriculture.com.my	DOI: 10.26480/bda.02.2025.117.122

Cite The Article: Sudarshan Rokaya and Prem Pandey (2025). Adoption Status of Improved Wheat Varieties in Kailali, Nepal. *Big Data in Agriculture, 7(2): 117-122.*

contribute to national food security and economic success.

2. Research Methodology

2.1 Study Area

The study was conducted in Kailali District, located in the Terai region of Sudurpaschim Province, Nepal, between 28°41′ to 29°23′ N latitude and 80°06′ to 81°18′ E longitude. Kailali was purposively selected due to its designation as a wheat superzone under the Prime Minister Agriculture Modernization Project (PMAMP) and its prominence in national wheat production (Yadav et al., 2022)

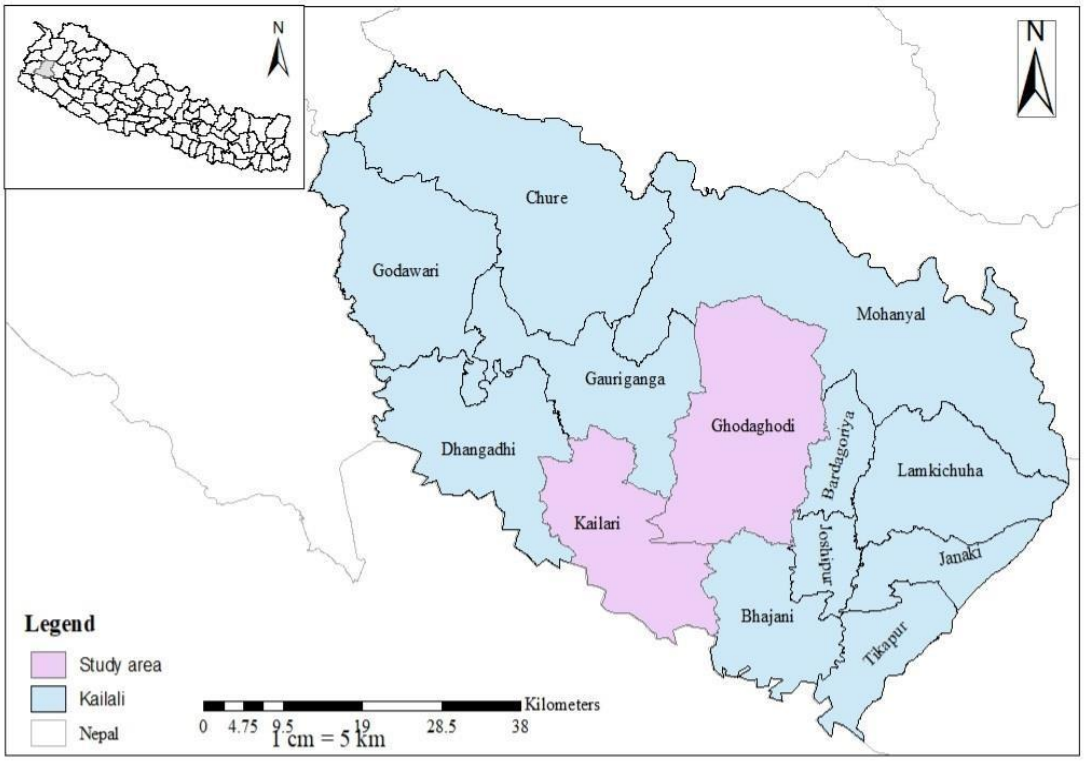

Figure 1: Map of study area

2.2 Sample Size and Sampling procedure

Within Kailali District, Ghodaghodi Municipality (Ward No. 11) and Kailari Rural Municipality (Ward No. 8) were purposively selected based on their high concentration of wheat cultivation and accessibility for field research. Farmers were categorized into two groups: adopters (users of improved wheat varieties) and non-adopters (users of traditional or other varieties). A simple random sampling technique was employed to select respondents. From a population of 2,700 wheat-farming households registered under the Prime Minister Agriculture Modernization Project (PMAMP), a sample size of 93 was determined using the Raosoft sample size calculator at a 95% confidence level and a 10% margin of error.

2.3 Data Source and Types

2.3.1 Primary data

Primary data were collected from direct interviews, household surveys, focus group discussion and key informant interviews.

2.3.1.1 Household survey

Data collection was conducted using a household survey using a semi-structured questionnaire which includes both closed-ended and open-ended questions.

2.3.1.2 Focus group discussions (FGD)

To triangulate the information via collecting information, FGD was organized. Among the villagers who cultivate wheat as their major crop were gathered and discussion was conducted. The discussion was focused on improved varieties of wheat, production, productivity and problems that were seen previously.

2.3.1.3 Key informant interviews (KII)

In the same way, at least 2-5 key informant interviews were organized. It included key experts in the survey to collect their problems and opportunities regarding improved wheat varieties.

2.3.2 Secondary data

Secondary data was obtained through a detailed review of literature relevant to the research topic. Annual reports of PMAMP, journal articles, publications of NARC, LIBIRD, and MoALD, reports from authentic organizations like CBS, etc., and relevant books and newsletters were used as secondary sources of data.

2.4 Data analysis and techniques

The quantitative and qualitative data collected during the survey were analyzed separately. The quantitative data collected from household surveys were coded, categorized, tabulated and transferred to computers for further descriptive and inferential analysis of the study's variables were conducted using MS-Excel and SPSS (version 27.0). The respondents' socio-demographic and farm characteristics, such as age, gender, education level, farming experience, land holdings, adoption status of improved wheat varieties, and problems faced by farmers while adopting improved wheat varieties, were analyzed using descriptive statistics, including frequency, percentage, mean, standard deviation, charts, and diagrams.

2.5 Binary logistic regression model

To examine the combined influence of multiple explanatory variables on the likelihood of adoption, a binary logistic regression model was employed (Mahara & Karki, 2024; Hosmer et al., 2000). The dependent variable was binary in nature, representing the adoption status of improved wheat varieties among the 93 surveyed farmers. Respondents were categorized as either *adopters* (coded as 1) or *non-adopters* (coded as 0). The logistic regression model is specified as follows:

$$\log(p / (1 - p)) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n$$

Where:

- $\log(p / (1 - p))$ = log-odds of the event (i.e., adoption of improved wheat varieties)
- p = probability of adoption of improved wheat varieties (dependent variable)
- e = base of the natural logarithm
- β_0 = intercept (constant term)
- $\beta_1, \ldots, \beta_n$ = regression coefficients to be estimated
- $X_1, \ldots, X_n$ = independent (explanatory) variables

Table 1: Description of the variables used in the binary logistic model	
Variables	**Dummy/Continuous variables and explanation**
Dependent variable	
Adoption of improved wheat varieties	1 for adopter, 0 for non-adopter
Independent variables	
Education level	1 = literate; 0 = illiterate
Farming experience	years (continuous)
Landholding size	kattha (continuous)
Market distance	km (continuous)
Cooperative membership	1 = yes; 0 = no
Extension contact	1 = yes; 0 = no
Training received	1 = yes; 0 = no
Access to credit	1 = yes; 0 = no
Received subsidy	1 = yes; 0 = no
Access to extension services	1 = yes; 0 = no

2.6 Problems ranking for the adoption of improved wheat varieties

Farmers' perceptions of challenges associated with the adoption of improved wheat varieties were assessed using a five-point ordinal scale. The index of importance of problems was calculated by using the following formula (Shrestha, 2017).

$$Iimp = \Sigma (Si \times fi / N)$$

Where:

- Iimp = Index of Importance
- Σ = Summation
- Si = Scale value assigned to the i-th category
- Fi = Frequency of respondents selecting the i-th scale value
- N = Total number of respondents

3. Results and Discussion

3.1 Socio- economic and demographic characteristics

The study area is characterized by diverse socioeconomic and demographic conditions. The vast majority of households (90.3%) are male-headed, with the average age of the household head being 45.6 years. The population is predominantly Hindu (91.4%), with Christians comprising 8.6%. In terms of ethnicity, 88% of the population belongs to the Tharu community, followed by 12% Chhetri. Family structures are varied, with joint families representing 53.8% and nuclear families 46.2%. The average household size is eight persons. Educational attainment among household heads is relatively low; 24.7% are illiterate, 40.9% have completed basic education, 25.8% have reached secondary level, and only 8.6% have attained a bachelor's degree or higher.

Agriculture is the predominant source of livelihood, accounting for 63% of households, followed by foreign employment (25%), daily wage labor (10%), and government service (2%). The average annual household income is NPR 3.58 lakh. On average, households own 0.97 hectares of land, with wheat cultivated on approximately 0.91 hectares, producing an average yield of 3.32 tons per hectare. Market access remains a constraint, with an average distance of 4.5 km to the nearest market, ranging from 1 to 10 km. The prevailing price of wheat varies between NPR 3,800 and 4,200 per quintal. Overall, the findings suggest that the local economy is highly dependent on agriculture, with limited diversification of income sources and constrained financial resources.

Table 2: Socio-economic and demographic characteristics		
Variable	**Category**	**Percentage (%)**
Household head	Male headed	90.3
	Female headed	9.7
Religion	Hindu	91.4
	Christian	8.6
Ethnicity	Tharu	88
	Chhetri	12
Family type	Joint	53.8
	Nuclear	46.2
Education level of HHH	Illiterate	24.7
	Basic level	40.9
	Secondary level	25.8
	Bachelor' degree or higher	8.6
Primary income source	Agriculture	63
	Foreign employment	25
	Daily wage labour	10
	Government service	2
Average age of household head (years)		45.6
Average household size (persons)		8
Average annual household income (NPR in lakh)		3.58
Total average owned land (ha)		0.97
Average area under wheat cultivation (ha)		0.91

Table 2 (cont): Socio-economic and demographic characteristics		
Total average wheat yield (tons/ha)		3.32
Total average distance to market (km)		4.5

Source: Field survey, 2024

3.3 Different types of seed used by farmers

Figure 2 illustrates the distribution of different types of seeds used by farmers in the study area. The majority of farmers (60, 64.5%) reported using improved seeds, followed by Indian seeds (31, 33.3%) and local seeds (2, 2.2%).

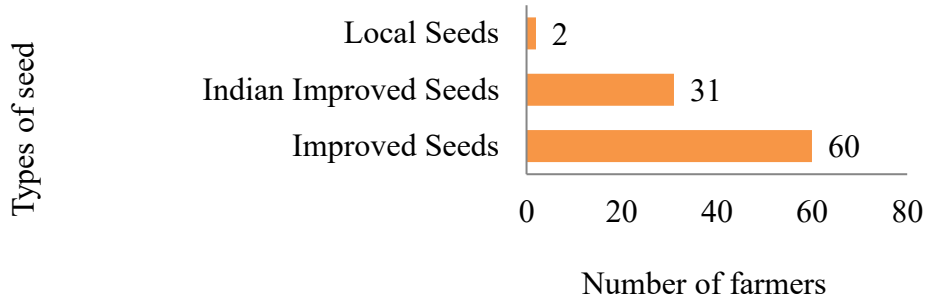

Figure 2: Different types of seed used by farmers in study area

3.4 Varietal distribution in the study area

The improved varieties found to be cultivated by the adopter in the study area are Vijay, Gautam, Banganga, Aditya, NL- 297, Zinc Gahun-1, 2 and 80 Borlaug 2020. Within the improved varieties coverage, Vijay was found to have the highest area coverage of 21.5% followed by Gautam (13.9%), Banganga (10.7%), Aditya (6.5%), NL-297 (5.4%), Zinc Gahun-1,2 (4.3%) and Borlaug 2020 (2.2%) as shown in figure 3.

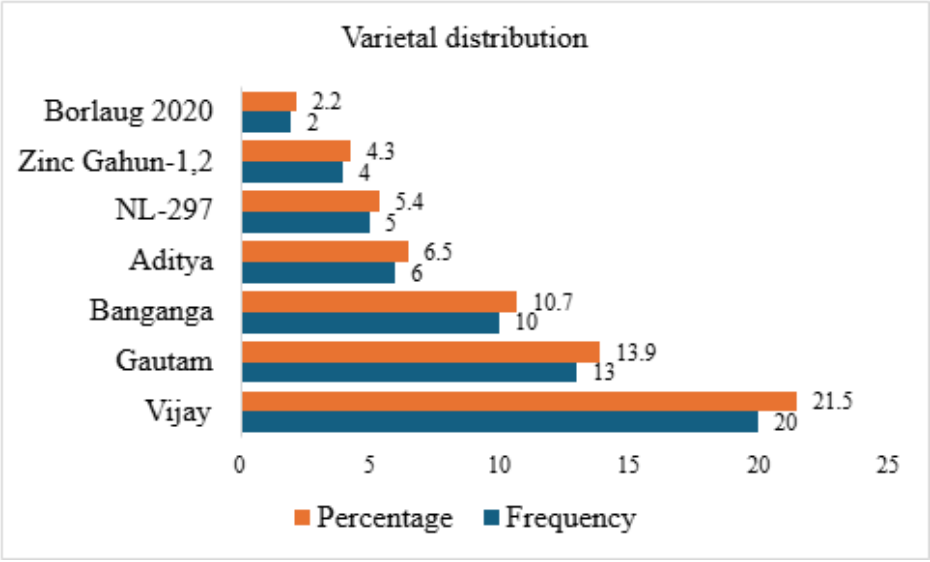

Figure 3: Varietal distribution in the study area

3.5 Factors affecting the adoption of improved wheat varieties

A binary logistic model was used to identify the factors affecting the adoption of improved wheat varieties. The results of the binary logistic analysis, shown in Table 3, indicate that the factors; members of any cooperatives, credit access, and receipt of extension services had positively significant results at the 5% level of significance. Similarly, education status, subsidies, and receipt of training were positively significant at the 10% level of significance among the ten explanatory variables.

The log likelihood value of 65.711 reflects how well the binary logistic regression model, with the included predictors, fits the observed data on adoption of improved wheat varieties. This pseudo R-squared value indicates that approximately 44.8% of the variability in the adoption of improved wheat varieties can be explained by the model. These results generally show that the model has a moderate to strong fit, which includes a significant percentage of the variability in the outcome variable as compared to a model with variables.

Education level was found to be significant at 10% level of significance and positively related to the adoption of improved wheat varieties. The result shows that increasing the number of schooling years of the household head improves the odds of adopting improved wheat varieties by approximately 3.6 times. The finding is the same as the result that showed education positively affects the adoption of improved wheat varieties (Kudama, 2021). Increasing the family head's number of schooling years by one year improves the chance of adopting improved wheat varieties. Educated farmers get information on new technology from extension agents and are more likely to adopt improved technology as compared to their less educated counterparts. This suggests that education may enhance awareness and comprehension of the benefits associated with improved wheat varieties (Poudel et al., 2021; Abda, 2022).

Being a member of any cooperatives or organization is significant at the 5% level of significance and positively related to the adoption of improved wheat varieties. Farmers who have membership of any cooperatives or organization are approximately 4.37 times more likely to adopt improved wheat varieties as compared to farmers having no membership. This finding is consistent with Poudel et al. (2021), who reported that cooperative members had higher adoption rates than non-members. Similarly, Subedi et al. (2019a) found that farmers who were members of any organization were 15% more likely to adopt improved seeds compared to non-members.

Receiving training was found to be significant at 10% level of significance and positively related to the adoption of improved wheat varieties. The result shows that training increases the odds of adoption of improved wheat varieties by approximately 4.11 times. The finding is the same as the result that found farmers who receive training and have access to certified seed sources tend to allocate a larger portion of their land to adopt improved varieties of potato (Gairhe et al., 2017). The finding is similar with (Wang and Song, 2023). The study showed that both training

and demonstration methods were highly effective, with statistically significant results at the 1% level. This indicates that these approaches greatly increase the chances of farmers adopting improved wheat varieties.

Access to credit was found to be significant at 5% level of significance and positively related to the adoption of improved wheat varieties. The result shows that having access to credit increases the odds of adoption of improved wheat varieties by approximately 5.1 times. This suggests that financial support is crucial for farmers to invest in new varieties. The study's findings align with those who found that households with access to credit may have enough money to acquire improved wheat variety seeds as well as the essential inputs as recommended (Kudama, 2021). As a result, it promotes the adoption of improved wheat varieties.

Similarly, receiving subsidies was found to be significant at 10% level of significance and positively related to the adoption of improved wheat varieties. The result shows that receiving subsidies increases the odds of adoption of improved wheat varieties by approximately 4.11 times. Subsidies likely reduce the financial barriers to adoption, thus increasing the probability of adoption for those who received them. This finding is supported by Subedi et al. (2019b), who stated that subsidies help reduce production costs and provide technical support from government officials, which encourages farmers to adopt new technologies.

Extension services were found to be significant at 5% level of significance and positively related to the adoption of improved wheat varieties. The result shows that farmers who had access to extension services were approximately 8.39 times more likely to adopt improved wheat varieties. This highlights the importance of extension services in providing information and support for adopting improved varieties. These findings are consistent with Nazu et al. (2021), who reported that extension services significantly influenced the adoption rates of farmers. Services such as expert advice, field demonstrations, and farm visits help enhance farmers' knowledge and awareness, thereby encouraging adoption. Similarly, Wang and Song (2023) also found that farmers who received more public extension services were more likely to adopt improved wheat varieties.

Landholding size was found to be marginally significant at the 10% level ($p = 0.094$) and negatively related to the adoption of improved wheat varieties. The result shows that with each additional unit of land (e.g., hectare or bigha), the odds of adopting improved wheat varieties decrease slightly by a factor of 0.987. This suggests that farmers with larger landholdings may be slightly less likely to adopt improved varieties. One possible explanation is that the high cost of improved seeds may discourage large-scale farmers from adopting them on their entire land. Similar findings were reported by Acquah (2011). However, this contrasts with the results of Dibaba and Goshu (2019), who found a positive association between farm size and adoption.

Table 3: Factors affecting the adoption of improved wheat varieties (Logistic regression results)

Variables	B	Sig.	Odds ratio
Education level	1.283	0.066*	3.608
Farming experience	0.009	0.819	1.009
Landholding size	-0.013	0.094*	0.987
Market distance	-0.125	0.411	0.882
Cooperative membership	1.475	0.040**	4.371
Extension contact	0.644	0.514	1.904
Training received	1.414	0.080*	4.114
Access to credit	1.629	0.047**	5.100
Received subsidy	1.413	0.055*	4.110
Access to extension services	2.127	0.040**	8.387
Constant	-6.331	0.000	0.002
No. of observations	93		
Log-Likelihood	65.711[a]		
Nagelkerke R^2	0.448		

*** 1% level of significance; ** 5% level of significance; * 10% level of significance.

3.6 Problems for the adoption of improved wheat varieties

The most significant problem is the high cost of seeds, with an index value of 0.76, indicating that it is the top concern. This is followed by the unavailability of seeds on time, which has an index value of 0.65, making it the second most critical problem. The poor quality of improved variety seeds ranks third, with an index value of 0.60, reflecting a considerable impact on farmers' productivity. Fourth on the list is the lack of knowledge about improved varieties, with an index value of 0.54, suggesting a notable gap in farmers' understanding of the benefits and usage of these improved wheat varieties. Lastly, the unavailability of improved variety seeds in the local market, with an index value of 0.43, is also a concern but ranks fifth, indicating it is relatively less critical compared to the other issues. Similar findings were reported by Subedi et al. (2019a) and Poudel et al. (2021) These insights underscore the need for interventions to reduce seed costs, improve seed availability, enhance quality, provide better education on improved varieties, and ensure local market accessibility.

Table 4: Problems for the adoption of improved wheat varieties

Problems	Index Value	Ranking
High cost of seeds	0.76	I
Unavailability of seeds on time	0.65	II
Poor quality of improved variety seeds	0.60	III
Lack of knowledge about improved varieties	0.54	IV
Unavailability of improved variety seeds in the local market	0.43	V

4. Conclusion

This study highlights the urgent need for targeted interventions to overcome key barriers and promote the adoption of improved wheat varieties among farmers. The findings can inform several policy initiatives aimed at enhancing wheat production. To encourage the use of improved wheat varieties, government and non-governmental organizations should develop training programs on modern wheat varieties and their related technologies. Also provide credit facilities and subsidies, which help in the adoption of improved wheat varieties. Similarly, provisions should be created for providing high-quality improved wheat varieties through formal sector sources (agro-vets, cooperatives) to increase wheat productivity and, as a result, rural farmers' family income. Future research is needed into the impact of using improved wheat varieties on household food security and the farm household in the field of economics, as this was not addressed in the current study.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of paper.

REFERENCES

Abda, A., 2022. Adoption of Improved Wheat Varieties by Wheat Producers in the Bale Zone of Ethiopia. International Journal of Agricultural Extension and Rural, 9(2), Pp. 1-19.

Acquah, H. D., 2011. Farmers' perception and adaptation to climate change: A willingness to pay analysis. Journal of Sustainable Development in Africa, 13(5), Pp. 150–161.

Bhatt, P., Bist, P., and Ojha, L.N., 2020. Farmers' Preferences of Improved Wheat Varieties in Wheat Subsector Kailali, Nepal. International Journal of Applied Sciences and Biotechnology, 8(4), Pp. 432-436. https://doi.org/10.3126/ijasbt.v8i4.33671

Bhatta, A., Gupta, A., and Joshi, P.P., 2022. Adoption of improved wheat varieties at Kanchanpur, Nepal. Archives of Agriculture and Environmental Science, 7(4), Pp. 577-584. https://dx.doi.org/10.26832/24566632.2022.0704015

Bist, P., Bhatt, P., Bist, N.S., and Kafle, R., 2021. Factor Affecting Wheat Seed Production and Associated Constraints in Kailali District, Nepal. International journal of social sciences and management, 8(1), Pp. 299 305. https://doi.org/10.3126/ijssm.v8i1.34224

Devkota, U., Pandey, S.R., Neupane, M.P., Arun, G.C., 2020. Adoption level of improved wheat production technology in wheat-superzone, Kailali, Nepal. Fundamental and Applied Agriculture, 5(4), Pp. 500–512. https://doi.org/10.5455/faa.29145

Dibaba, R., and Goshu, D., 2019. Determinants of High Yielding Wheat Varieties Adoption by Small-Holder Farmers in Ethiopia. Journal of Natural Sciences Research, 9, Pp. 12. https://doi.org/10.7176/JNSR

Gairhe, S., Gauchan, D., and Timsina, K., 2017. Adoption of Improved Potato Varieties in Nepal. Journal of Nepal Agricultural Research Council, (3), Pp. 38-44. http://dx.doi.org/10.3126/jnarc.v3i1.17274

Ghimire, k., and Magar, R.T., 2017. Diversity in Nepalese Wheat Genetic Resources as Revealed by Agro-morphological Markers. International Journal of Scientific and Engineering Research, 7(8), Pp. 2229-5518.

Hosmer, D. W., Lemeshow, S., and Cook, E. D., 2000. Applied logistic regression 2nd edition.

Joshi, B.K., Mudwari, A., and Bhatta, M.R., 2006. Wheat Genetic Resources in Nepal. Nepal Agric. Res. J, (7), Pp. 2.

Kandel, M., Bastola, A., Sapkota, P., Chaudhary, O., Dhakal, P., Chalise, P., and Shrestha, J., 2018. Analysis of Genetic Diversity among the Different Wheat (Triticum aestivum L.) Genotypes. Türk Tarım ve Doğa Bilimleri Dergisi, Pp. 180-185.

Kudama, G., 2021. Determinants of Improved Wheat Variety Adoption in Horo District, Oromia Region, Ethiopia. International Journal of Economics and Business Administration, 2(7), Pp. 48-55.

Mahara, G., and Karki, A., 2024. Effect of Various Improved Technology in Wheat Production Zone of Nepal. International Journal of Applied Agricultural Sciences, 3(10), Pp. 126-137. https://doi.org/10.11648/j.ijaas.20241003.15

Mariano, M.J., Villano, R., and Fleming, E., 2012. Factors influencing farmers' adoption of modern rice technologies and good management practices in the Philippines. Agric. Syst, 110, Pp. 41–53. https://doi.org/10.1016/j.agsy.2012.03.010

MoALD., 2022. Statistical Information on Nepalese Agriculture. Singhadurbar, Kathmandu, Ministry of Agriculture and Livestock Development.

Mudwari, A., 1999. Wild relatives of wheat and its status in Nepal. In : Wild relatives of cultivated plants in Nepal (R Shrestha and B Shrestha, eds). Proceedings of National conference, Kathmandu, GEM-Nepal, 2(4), Pp. 83-89.

NARC., 2019. Annual report on agricultural research and development 2018/2019. Nepal Agricultural Research Council. https://www.narc.gov.np/publication

Nazu, B.S., Khan, K.M., Saha, M.S., Hossain, E.M., and Rashid, H.M., 2021. Adoption of improved wheat management practices: An empirical investigation on conservation and traditional technology in Bangladesh. Journal of Agriculture and Food Research, (4). New York. Jhon Wiley and Sons Inc.

Poudel, D., Yadav, K.R., Gauli, B., Chhetri, A., and Poudel, S., 2021. Research Article Assessment of adoption of improved wheat production technology in Nawalparasi (West) district, Nepal. International Journal of Agricultural and Applied Sciences, 2(2), Pp. 69-74. https://doi.org/10.52804/ijaas2021.2211

Shrestha, A., 2017. Study of production economics and production problems of honey in Bardiya district, Nepal. Sarhad Journal of Agriculture, 34(2), pp.240–245.

Subedi, S., Ghimire, Y.N., Adhikari, S.P., Devkota, D., Shrestha, J., Poudel, H.K. and Sapkota, B.K., 2019a. Adoption of certain improved varieties of wheat (Triticum aestivum L.) in seven different provinces of Nepal. Archives of Agriculture and Environmental Science, 4(4), Pp. https://dx.doi.org/10.26832/24566632.2019.040406

Subedi, S., Ghimire, Y. N., Adhikari, S.P., Devkota, D., Poudel, H. K., and Sapkota, B. K., 2019b. Adoption of improved wheat varieties in eastern and western Terai of Nepal. Journal of Agriculture and Natural Resources, 2(1), Pp. 85-94. https://doi.org/10.3126/janr.v2i1.26047

Timsina, K. P., Ghimire, Y. N., Gauchan, D., Subedi, S., and Adhikari, S. P., 2018. Lessons for promotion of new agricultural technology: a case of Vijay wheat variety in Nepal. Agriculture and Food Security, (7), Pp. 63. https://doi.org/10.1186/s40066-018-0215-z

Wang, X., and Song, Y., 2023. Public Agricultural Extension, Pest and Disease Experience, and Adoption of Improved Wheat Varieties. Swedish University of Agricultural Sciences, Uppsala, Sweden, 72, Pp. 3-4. https://doi.org/10.30430/gjae.2023.0350

Yadav, K.R., Yadav, K.P., and Tiwari., 2022. Resource Use Efficiency of Wheat (Triticum Aestivum L.) Production in Kailali District, Nepal. Tropical Agroecosystems (TAEC), 3(2), Pp. 50-56.