

ACCESS, UTILIZATION PATTERN AND IMPACT OF AGRICULTURAL CREDIT ON FARM INCOME: EVIDENCE FROM VEGETABLE FARMERS IN THAKRE RURAL MUNICIPALITY, NEPAL

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ABSTRACT

This study assesses farmers' access to credit, their utilization patterns, and the impact on farm income. Data were collected in 2024 by interviewing 150 randomly selected farmers from Thakre rural municipality of Dhading and analyzed using descriptive statistics, an independent samples t-test, and a weighted priority index. About 67% of sampled households accessed credits, of which only 47% used the funds exclusively for agricultural activities. Of the 67% who borrowed, 44% accessed formal credit sources, implying that the remaining 56% relied entirely on informal channels. The independent t-test shows that credit receivers have a significantly higher annual farm income (NRs. 536,231/HH) than that of non-receivers (NRs. 372,071/HH) at a highly significant level ($p = 0.0001$). Easier access to formal credit will substitute costly informal credit to enhance farm productivity and income. Therefore, implementing effective regulatory frameworks and strict monitoring is crucial to remove structural and procedural barriers, thereby enhancing proper credit access and utilization.

1. INTRODUCTION

In Nepal, agriculture influences the socio-economic dynamics of rural communities significantly. This sector contributes about 24.03% to the national Gross Domestic Product (GDP) (MoF, 2026). Despite its importance, Nepal's agricultural sector continues to lag in productivity, production, export volume, diversity, and product quality (Bhawan, 2018). In today's world, agricultural credit is critical for farmers to access new agricultural technologies. While timely access to production inputs such as seeds, fertilizer, and implements enhances production and productivity (Hussain, 2019), most smallholders face binding capital constraints that limit their initial purchasing power for high-quality production resources, causing a persistent drag on localized farming efficiency (Lamichhane, 2021). Agricultural credit is crucial for agricultural modernization and rural economic development (Khan *et al.*, 2011).

Recognizing the need to invest in agriculture, Nepal Rastra Bank (NRB) introduced Priority Sector Lending Program (PSLP) in 2017 that mandates formal institutions like banks and finance companies to allocate 10% of their loan to the agricultural sector at a subsidized interest rate of 5% (Upadhyay *et al.*, 2020). The NRB's Unified Directive 2020 mandated that commercial banks allocate at least 11%, 13%, and 15% of total credit in the agriculture sector in 2020/21, 2021/22, and 2022/23, respectively (Pandey, 2022). Other BFIs have also been directed to invest in agriculture as a priority sector (NRB, 2020). Since 1991/92, NRB has mandated that banks and other financial organizations to lend the "deprived sector" to uplift the socio-economic conditions of society's most vulnerable populations (NRB, 2008). As of mid-March 2022/23, banks and financial institutions have disbursed NRs. 411.27 billion in agricultural loans. As of this, the largest percentage of loans disbursed 38.7% have been utilized for

agricultural and associated services, followed by 37.2% for livestock and related services, 21.9% for crop farming-related services, and 2.1% for other related sectors (MoF, 2023). To ease financial constraints and promote commercialization, Nepal Rastra Bank implemented Interest Subsidy on Subsidized Loan Integrated Procedure in 2018. This framework provides a 5% interest subsidy on commercial agriculture and livestock loans up to NRs. 50 million, significantly lowering borrowing costs for farmers (NRB, 2018). By emphasizing project-based collateral and group guarantees, the policy expands formal credit access for smallholders lacking conventional land assets, aiming to optimize loan utilization toward productive farm investments like infrastructure and mechanization.

Different types of formal and informal sources are available to provide credit facilities to farmers. NRB regulates banks and financial institutions (BFIs), MFIs, and cooperatives as the formal sector. The informal sector includes farmers' groups, women's groups, personal and professional money lenders, relatives, and others (Rimal, 2015). Regardless of institutions established, several bottlenecks prevent farmers' access to credit, resulting in the sluggish growth of agriculture. High transaction costs, administrative hurdles, collateral requirements, high interest rates, restricted credit procedures and standards, a poor repayment ratio, and poor loan utilization skills all reduce credit access. Data from NSCA (2021/22) also stated that the agricultural loan recipients have dropped from 22% to 12% from 2011 to 2021 (NSO, 2021). Despite extending the accessibility and growth of official channels across the country, the use of friends and family to get loans has more than quadrupled, from 5% to 13% during the same period (IFC, 2023).

Rimal (2015) investigated the impact of agricultural credit from commercial banks on GDP growth, finding that agricultural lending exerts a favorable and significant effect on agricultural GDP. Similarly, a study report

NRB (2014) from the Dhangadhi Banking Development and Research Unit revealed that all the farmers who used the loan facility attained a better level of technical efficiency (82% on average), whereas farmers who did not use the credit facility had a lower level (63% on average) in the study area. Access to sufficient credit greatly enhances household welfare, food security, and poverty reduction. Recent empirical work on smallholders in Nepal indicates that expanding access to formal financial windows plays an immediate role in transforming traditional production setups, enabling low-income growers to purchase high-yielding crop inputs and expand their localized cultivation scale (Mishra, 2021).

In view of the aforementioned problems, the following research questions served as the foundation for this study: a) what are the current credit access patterns and credit utilization practices; b) what is the relationship between credit access and farm income; and c) what are the constraints faced by farmers in accessing formal credit? Therefore, this study aims to investigate credit access and use pattern, as well as their effect on farm income. Study findings will generate valuable information serving financial institutions to offer more focused interventions to increase loan availability and effective use to enhance production and income.

2. MATERIALS AND METHODS

2.1 Study area

The Dhading district was purposively selected for this study as it is a premier hub for commercial vegetable production in Nepal, supplying approximately 30% of the Kathmandu Valley's total vegetable demand (MoALD, 2021). Within the district, Thakre Rural Municipality was selected as the primary research site, as it represents a key vegetable-producing pocket. This municipality spans a total area of 96.41 square km across 11 wards and is located at a distance of 32.5 km from Kathmandu with a total population of 32,374 (NPHC, 2021).

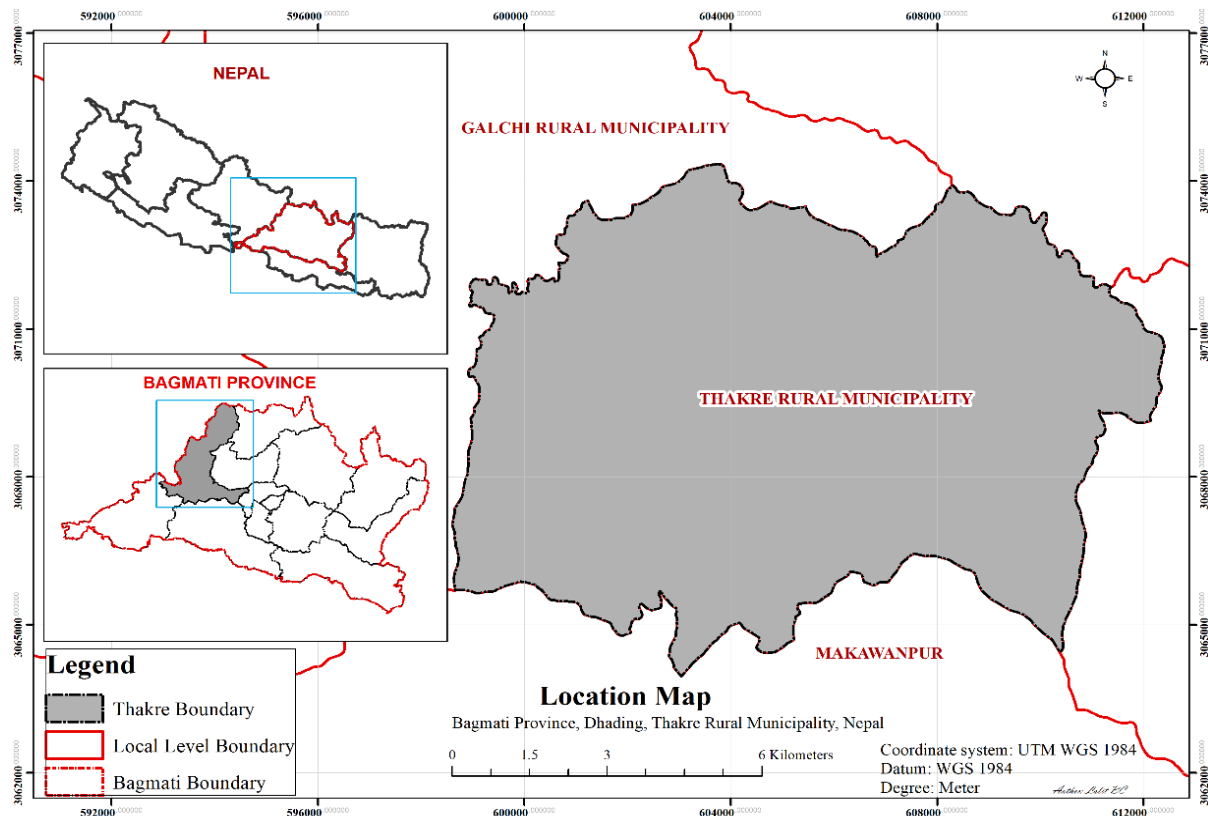


Figure 1. Map showing the study area

2.2 Sampling process

A multi-stage (four-stage) sampling technique was employed to select 150 farmers. Thakre Rural Municipality was purposively chosen, followed by a random selection of five wards (3, 5, 8, 9, and 11) of the municipality. From these, five communities were identified, and 30 vegetable farmers were randomly sampled from each. Additionally, three credit department officials from selected commercial banks and other financial institutions were selected purposively. The sample size ($n=150$) of farmers was determined using Taro Yamane's formula (Yamane, 1967) at the critical value 0.08.

2.3 Data analysis

Data were analyzed using descriptive and inferential statistical tools. Descriptive statistics summarized demographic and socioeconomic characteristics, while inferential statistics, particularly the t-test, were used to determine the effect of credit access to farm income by comparing mean annual farm income between credit users and non-users. To analyze the constraints in accessing the formal credit, weighted indexes

were calculated based on the major challenges faced by the credit non-users in accessing such credit. Farmers' perceptions of different difficulties were ranked by using the five-point level of extent comprising very high, high, moderate, partial, and low in an ordinal scale value of 5, 4, 3, 2, and 1, respectively. The priority index for each was computed using the following formula.

$$I_{\text{imp}} = \sum(S_i \times f_i) / N$$

Where,

I_{imp} = Scaling index

S_i = Weight assigned to each response

f_i = Frequency of the responses to a particular problem

N = Total number of respondents

3. RESULTS AND DISCUSSION

3.1 Household characteristics

The characteristics include socio-economic profile of the household head, such as age, gender, education, occupation, and household characteristics, such as household size, total operational landholdings, annual family income, and so on. Such factors were analyzed

to understand the demographic drivers of agricultural credit access and its use pattern in the study area. The descriptive statistics for socio-demographic variables (continuous) are summarized in Table 1. The average age of the 150 household heads was found to be 44.46, with a range of 28 to 75 years and a standard deviation of 10.44. The result indicates that middle-aged members of households served as household heads. Average family size was 4.7 (± 1.73), ranging between 1 and 11. Household heads' average experience in

farming was found to be 32 (± 1.73) years. The total operational landholding, on average, was 0.48 hectare (ha) (i.e., 9.53 ropani, where 1 ha = 20 ropani) spreading between a minimum of 0.5 ropani and a maximum of 92 ropani. The average annual farm income was NRs. 443206.67 that ranged from NRs. 50000 to 2000000. Accessibility to financial services also varied, with the distance to the nearest Bank or Financial Institutions (BFIs) averaging 6.29 km, ranging from a convenient 2 km to a more remote 14 km.

Table 1. Summary statistics of household characteristics

Variable	Mean	Standard deviation	Minimum	Maximum
Age of the household head (years)	44.46	10.44	28	75
Household size (number)	4.79	1.73	1	11
Farming experience (years)	32	13.83	3	60
Operational land holdings (ropani)	9.53	9.64	.5	92
Annual farm income (NRs.)	443206.67	261883.51	50000	2000000
Distance from BFIs (km)	6.29	2.40	2	14

As shown in Table 2, the majority of household heads were male (72.67%), while female heads accounted for 27.33%. This gender distribution suggests that resource ownership and household decision-making remain largely male-dominated within the local vegetable production sector. Education is a critical driver for adopting modern agricultural technologies as it exposes farmers to new ideas and concepts. In the study, the education level of the farmers was categorized into 6 groups: Never attended school, Non-formal, Primary, Secondary, Bachelor's, and Master's degree. The study found that 36% of household heads had only a primary-level education, followed closely by 32% with secondary-level schooling. Higher education was rare, with only 2% and 1.33% holding Bachelor's and Master's degree, respectively. This prevalence of lower formal education levels may influence the speed at which new agricultural technologies are integrated.

Agriculture (vegetable farming) was the main economic activity with 132 (88%) household heads practicing it as their primary occupation, while the remaining 18 (12%) engage in other occupations like salaried jobs,

businessmen, and retired workers as their main occupation. Among the sampled households, at least one member from 36.67% of the households have been residing in foreign countries. Therefore, the remittances serve as a vital financial cushion, significantly enhancing the timely repayment of agricultural loans.

While 37.33% of the farmers are adopting the commercial farming system, the majority of farmers (62.67%) are still practicing the subsistence farming system. Around 93.33% of the household heads and their family are food self-sufficient and do not have to obtain credit to fulfill their food sufficiency needs year-round, while 6.67% of them obtain credit from both the formal and informal sources to meet basic food needs. A significant gap exists in technical support: only 18.67% of farmers have regular contact with agriculture extension workers. Overall, 57.33% households (at least one member) maintain memberships in farmer groups. The low level of extension services likely contributes to the limited adoption of advanced technologies and intensive farming systems.

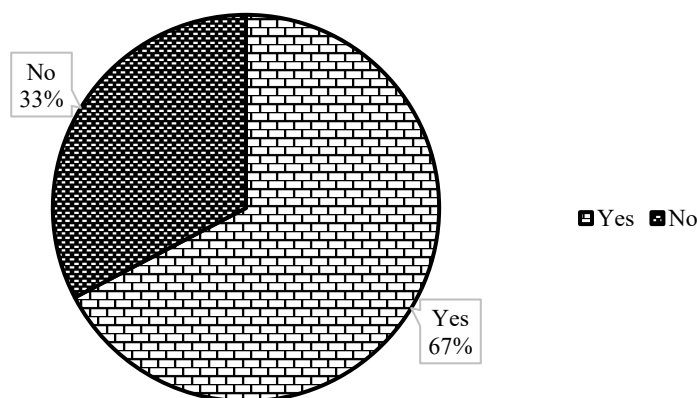
Table 2. Count of categorical variables describing the socio-economic characteristics of the households

Variables	Descriptions	Frequency	Percentage
Gender of household head	Female	41	27.33
	Male	109	72.67
Education level	Never attended school	37	24.67
	Non-formal	6	4
	Primary	54	36
	Secondary	48	32
	Bachelor's	3	2
	Master's	2	1.33
Occupation	Agriculture	132	88
	Other than agriculture	18	12
Remittance	No	95	63.33
	Yes	55	36.67
Nature of production	Subsistence	94	62.67
	Commercial	56	37.33
Food sufficiency	No	10	6.67
	Yes	140	93.33
Contact to extension agents	No	122	81.33
	Yes	28	18.67
Group membership	No	64	42.67
	Yes	86	57.33

3.2 Access to credit

The study found that a majority (67%) of farmers in the study area accessed credit for their farming operations. This access allows farmers to leverage capital for essential inputs, adopt modern technologies, and improve overall productivity. Furthermore, credit

provides the financial flexibility required to manage cash flows, enabling farm expansion or mechanization that might otherwise be unaffordable. In contrast, 33% of households lacked access to any form of credit, limiting their ability to modernize or scale their agricultural activities

**Figure 2.** Household credit access

In the study area, farmers had access to various credit sources, categorized broadly into formal and informal sources. The study revealed that of the 67% who borrowed, 44% accessed formal credit sources, meaning more

than half (56%) of the farmers were unable to secure loans from institutional lenders. This indicates a heavy reliance on informal networks or a total lack of structured financial

support for a significant portion of the farming community.

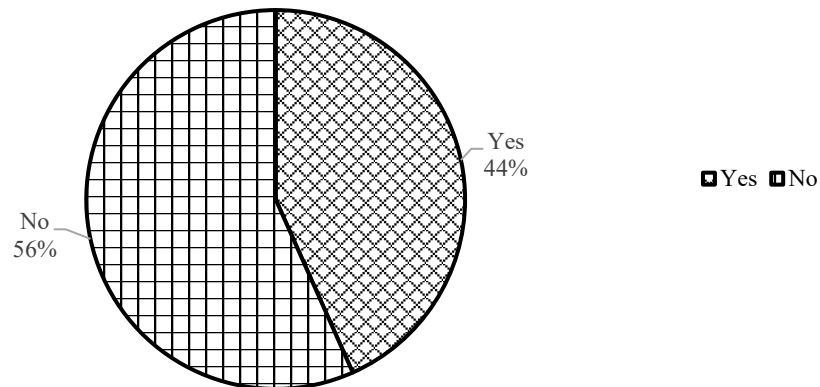


Figure 3. Sampled households (%) with access to formal credit

Result as shown in Table 3 indicates that the majority of farmers in the study area do not have access to formal credit, though those who obtain from formal channels benefit from a more structured and reliable borrowing environment with more favorable terms, such as subsidized interest rates. Approximately 10% of respondents had access to both formal and informal channels to meet their capital needs. Study reveals a significant disparity on borrowing costs between institutions: Microfinance Institutions (MFIs) recorded the

highest annual interest rates, averaging 17% due to the risks and costs of serving fewer number of underserved populations with limited collateral. However, Commercial Banks and Financial Institutions (BFIs) served the largest population and offered a lower average rate of 11.7%. As expected, the rate of interest and the population served by the cooperatives were found intermediate between banks and the micro-finance companies.

Table 3. Sources of credit accessed by the households in the study area

Sources of credit	Frequency	Average interest rate charged (%)
Formal		
Bank	40 (26.67)	11.7
Cooperative	24 (16.00)	13.62
Micro-finance	2 (1.33)	17
Sub-total	66 (44.00)	
Informal		
Friends and relatives	33 (22.00)	
Input suppliers	8 (5.33)	
Village lenders	8 (5.33)	
Sub-total	49 (32.67)	
Both formal and informal	15 (10)	

Figures in parentheses indicate the percent of households

3.3 Pattern of credit use

The study reveals that nearly half of the credit users (47%) used the credit exclusively for agricultural purposes, while 41% applied the funds to a mix of agricultural and non-agricultural needs. Only 12% directed their credit solely toward non-agricultural uses. Notably, 100% of credit users reported a positive impact on their agricultural

productivity and household food security, citing an enhanced ability to meet essential production requirements. This aligns with findings by Siyoum *et al.* (2012) who noted that credit programs empower rural farmers to invest in vital agricultural supplies and focus on farm management by reducing the immediate need for off-farm income-generating activities.

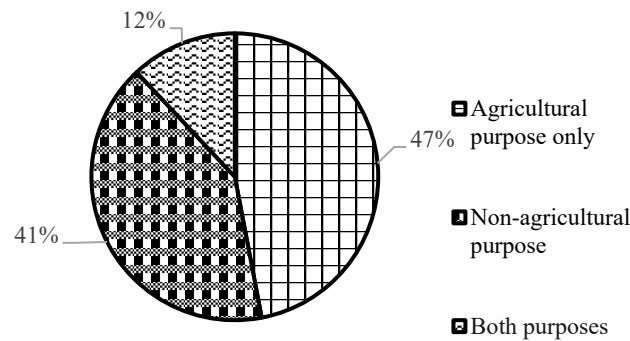


Figure 4. Utilization of accessed credit by the household

"Within the agricultural sector, credit allocation was distributed across both variable inputs and capital investments, as illustrated in Figure 5. The largest share was utilized for purchasing fertilizers and pesticides (23.53%), followed closely by payments for farm labor (21.57%). Beyond these immediate production expenses, a substantial portion of the credit was directed toward structural modernization and capital assets: construction of plastic tunnels for vegetable cultivation accounted for 17.65%, while the purchase of

agricultural land comprised 15.69%. Mechanization and livestock expansion also represented notable shares, with 11.76% spent on custom hiring or purchasing agricultural machinery, and 9.80% allocated to buying livestock or poultry. This distribution demonstrates that while farmers prioritize chemical inputs and labor to sustain immediate seasonal yields, they also make significant mid-to-long-term investments in agricultural infrastructure and land expansion.

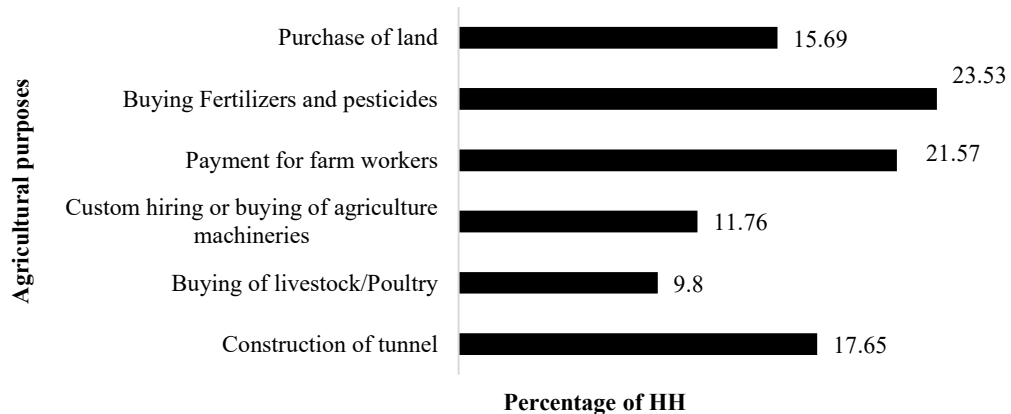


Figure 5. Allocation of credit for specific agricultural purposes

When credit was diverted to non-agricultural sectors, it was predominantly used for fixed household investments and family advancement rather than minor daily expenses, as shown in Figure 6. The leading non-agricultural utilization was house construction, accounting for 26.83% of the responses, followed closely by personal expenses at 24.39%. Notably, financing family members for study abroad constituted a major share at 19.51%, reflecting a

significant household strategy to secure future remittance inflows. Funding for education and school fees comprised 14.63%. Conversely, the smallest allocations were shared equally between basic household consumption requirements (7.32%) and the repayment of prior debts (7.32%). This hierarchy suggests that when credit is diverted away from farming, it is primarily directed toward long-term asset creation and human capital development.

This phenomenon of credit diversion is a rational household coping and economic diversification strategy. Vegetable farming in Thakre Rural Municipality is characterized by high seasonal production risks, weather dependencies, and market price volatility. Because agricultural yields are highly unpredictable, farming households frequently divert portions of their loans toward securing stable, non-farm income streams - such as international migration for remittance - to mitigate future production shocks. Furthermore, formal credit lines often carry

rigid, immediate repayment timelines that do not align well with seasonal crop harvesting cycles. When local credit options lack flexible restructuring terms for unexpected crop failures, making large investments in volatile open-field vegetable cultivation becomes financially unviable. Consequently, farmers strategically reallocate borrowed capital toward fixed household infrastructure or family education, which offer more reliable, long-term livelihood security than immediate farm reinvestment.

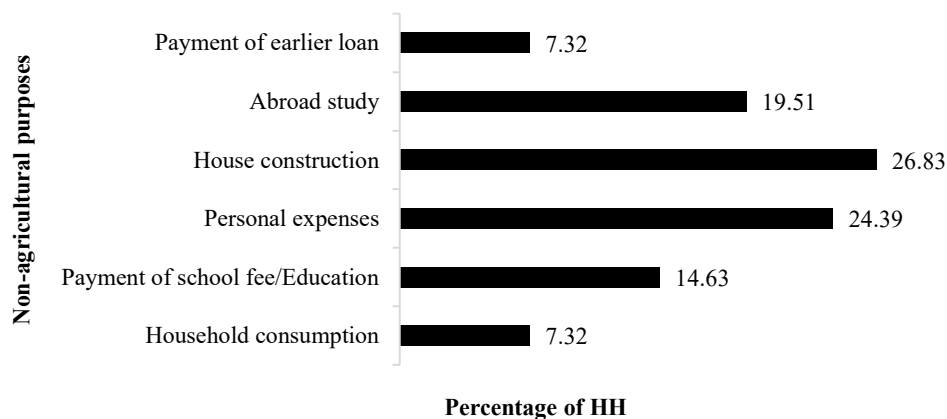


Figure 6. Allocation of credit for non-agricultural purposes

3.4 Effect of credit on annual farm income

The comparative analysis of mean annual farm income between credit recipients and non-recipients is presented in Table 4. The results demonstrate that households with credit access achieved a significantly higher mean annual farm income (NRs. 536,230.8/HH) compared to those without credit access (NRs. 372,070.6/HH). The calculated t-value of 3.9903 confirms that this income disparity is statistically significant at the 1% level ($p < 0.01$), underscoring the vital role of credit in enhancing household financial well-being. Various other socio-economic variables also affect farm income. However, credit access acts as a primary catalyst

because investment leverage via borrowed capital yields a greater operational impact than relying on limited household equity alone. The high efficiency of borrowed credit ensures its complete and productive utilization. This triggers a clear economic progression where increased investment leads to higher crop productivity, which directly expands overall farm revenue. The finding is in line with Chandio *et al.* (2017) who observed that credit-receiving households experience twice as much income compared to those reliant solely on their own limited capital. Higher income of the credit receiver was attributed to commercialization, efficiency, and higher productivity.

Table 4. Mean comparison of annual farm income between the credit recipients and credit non-recipients

Variable	Credit receiver	Credit non-receiver	Mean difference	t-value	P-value
Mean annual farm income (NRs.)	536230.8	372070.6	164160.2	3.9903***	0.0001

This is supported by national macroeconomic evaluations in Nepal which confirm a long-run co-integrating relationship between commercial bank credit flows and agricultural GDP expansion, highlighting institutional credit as a strategic driver of input intensification (Acharya & Duwal, 2024). Sidhu *et al.* (2008) identified a positive link between the usage of factors of production and credit in Punjab. Furthermore, Upadhyay *et al.* (2020) found that binding credit constraints heavily restrict a household's capacity to optimize resource allocation, leading to lower agricultural productivity and suppressed farm household performance. Supporting these findings, NRB (2014) reported that institutional credit acts as a vital tool to relax cash constraints, thereby significantly enhancing the production efficiency and overall output of the farming sector. Rahman *et al.* (2014) emphasized that agricultural credit is a primary determinant of enhancing farm productivity, concluding that the timely provision of adequate credit enables the purchase of high-yielding variety (HYV) seeds, fertilizers, and pesticides.

3.5 Constraints in Accessing Formal Credit

The major constraints faced by farmers in accessing formal credit were evaluated using a Weighted Constraint Index, as presented in Table 5. The primary hurdle identified by farmers was the lack of personal connections with bank officials (Rank 1), highlighting a prominent social network barrier. Most credit-constrained farmers reported that an existing personal relationship inside the financial institution was practically a prerequisite to expedite loan applications and secure approval. Following this social barrier, lengthy paperwork was ranked as the second major constraint, indicating rigid bureaucratic hurdles. Distinct from the network barrier, long physical distance from BFIs was identified as a separate geographical constraint, ranking third, which increases transactional costs and travel time for remote farmers. Complex transaction procedures, lack of education, insufficient collateral, and rigid repayment schedules further restrict credit acquisition. These distinct structural, procedural, and geographical barriers must be systematically addressed to enhance formal credit access and utilization.

Table 5. Index value of constraints in accessing the formal credit

Constraints	Index value	Rank
Insufficient collaterals/ landholdings	0.37	6
Lack of education	0.42	5
Lengthy paper works	0.68	2
Lack of personal connection with bank officials	0.73	1
Long distance from BFIs	0.62	3
Complex transaction procedure	0.57	4
Need for extended loan repayment in case of financial setbacks	0.29	7

4. CONCLUSION

Agricultural credit is a definitive driver of economic resilience and income growth for vegetable growers in Thakre Rural Municipality, as an independent t-test confirmed that credit recipients earned a significantly higher mean annual farm income than non-recipients. However, a critical institutional access gap remains, forcing a large portion of the population to rely entirely on high-cost informal channels. Credit utilization patterns reveal that while seasonal inputs like fertilizers, pesticides, and labor dominate immediate farm budgets, farmers make substantial capital commitments toward plastic tunnel construction and land purchase. When diverted to non-agricultural sectors, capital is primarily channeled into long-term family assets like house construction and financing study abroad.

Furthermore, accessing institutional finance is severely hindered by distinct structural and physical constraints. The foremost barrier is a

prominent social network distance, specifically the lack of personal connections with bank officials to expedite loan processing, which operates independently of geographical barriers like long physical distances from banking institutions. To bridge these gaps, local authorities and financial institutions must expand institutional proximity by establishing government-owned bank branches in commercial vegetable pockets, streamline bureaucratic procedures to remove connection-based advantages, enforce strict agricultural lending quotas with subsidized interest rates, and implement robust monitoring mechanisms to ensure credit tracks directly into productive farm modernization.

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