

BANKING SECTOR ADAPTATION, AGRICULTURAL CREDIT ACCESSIBILITY AND RURAL FINANCIAL INCLUSION: AN EMPIRICAL STUDY OF THE DELTA REGION

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ABSTRACT

The present study examines banking sector adaptation, agricultural credit accessibility and rural financial inclusion and their influence on agricultural credit outcomes among farmers in the Delta Region. Agriculture remains a major source of livelihood in rural areas, and timely access to institutional credit is essential for purchasing agricultural inputs, investing in farm equipment, managing seasonal financial requirements and improving farm productivity. The transformation of banking services through digital banking, mobile banking, internet banking, digital documentation and technology-enabled credit facilities has created new opportunities for improving farmers' access to formal financial services. The study adopts a descriptive and analytical research design and is based on primary data collected from 125 farmers in the Delta Region through a structured questionnaire. Descriptive statistics, Chi-Square Test, Pearson's Correlation Analysis and Multiple Linear Regression Analysis were employed using SPSS. The findings reveal that farmers generally have favourable perceptions of banking sector adaptation, agricultural credit accessibility and rural financial inclusion. The Chi-Square results indicate significant associations between selected socio-demographic and agricultural characteristics and the three major dimensions, leading to the rejection of H_{01} . Pearson's correlation results demonstrate strong positive relationships between banking sector adaptation, agricultural credit accessibility and rural financial inclusion, with correlation coefficients ranging from 0.684 to 0.756, resulting in the rejection of H_{02} . The regression model explains 67.9% ($R^2 =$

0.679) of the variation in agricultural credit outcomes. Agricultural credit accessibility emerges as the strongest predictor ($\beta = 0.381$), followed by rural financial inclusion ($\beta = 0.326$) and banking sector adaptation ($\beta = 0.291$). The study concludes that integrated digital banking, accessible credit facilities, simplified procedures and financial literacy initiatives can strengthen rural financial inclusion and improve agricultural credit outcomes in the Delta Region.

KEYWORDS: Banking Sector Adaptation, Agricultural Credit Accessibility, Rural Financial Inclusion, Agricultural Credit Outcomes, Digital Banking, Farmers, Delta Region.

INTRODUCTION

Agriculture continues to play a significant role in the rural economy of India by providing employment, income and livelihood opportunities to a large section of the population. The development of agriculture depends not only on land, labour and technology but also on timely and adequate access to institutional credit. Farmers require financial resources for purchasing seeds, fertilizers, pesticides, machinery, irrigation facilities and other agricultural inputs. Agricultural credit also enables farmers to manage seasonal fluctuations, meet emergency requirements and invest in productive agricultural activities. Therefore, an efficient and accessible banking system is essential for supporting agricultural development and improving the economic well-being of rural households. The banking sector has undergone considerable transformation in recent years through digitalisation, mobile banking, internet banking, digital documentation, electronic payment systems and technology-enabled lending. These developments have changed the manner in which rural customers interact with financial institutions. For farmers, banking sector adaptation can potentially reduce transaction costs, improve access to information, simplify loan procedures and facilitate faster delivery of credit. However, differences in digital literacy, education, awareness, geographical accessibility and technological infrastructure may influence the extent to which farmers benefit from these developments.

Agricultural credit accessibility represents the ability of farmers to obtain adequate, affordable and timely credit from formal financial institutions. Despite the expansion of institutional banking, several farmers continue to face difficulties related to documentation, collateral, awareness, loan processing and procedural complexity. Rural financial inclusion therefore extends beyond merely having a bank account and includes regular use of banking services, access to savings, credit, insurance, digital payments and other financial products. The Delta Region, characterised by intensive agricultural activities and a large rural population, provides an important setting for examining these issues. The present study therefore focuses on the interrelationship between banking sector adaptation, agricultural credit accessibility and rural financial inclusion and their influence on agricultural credit outcomes among farmers.

BACKGROUND OF THE STUDY

The Indian agricultural sector has traditionally depended on institutional and non-institutional sources of finance. Institutional credit provided through commercial banks, regional rural banks, cooperative banks and government-supported schemes has become increasingly important for reducing farmers' dependence on informal lenders. Initiatives such as the Kisan Credit Card, priority-sector lending and financial inclusion programmes have strengthened the formal agricultural credit system. At the same time, technological developments have transformed rural banking services. Digital payments, mobile banking, internet banking, electronic documentation and technology-enabled credit services have created new opportunities for improving financial accessibility. The National Strategy for Financial Inclusion also emphasises universal access to financial services, greater financial literacy and increased use of digital financial services. However, the availability of banking infrastructure does not automatically guarantee effective financial inclusion. Farmers may continue to experience difficulties because of limited awareness, inadequate digital skills,

complicated procedures, collateral requirements and geographical constraints. The Delta Region is particularly relevant because agriculture forms an important component of rural livelihoods and farmers require regular institutional credit to meet production and investment requirements. Against this background, the present study examines how banking sector adaptation and agricultural credit accessibility contribute to rural financial inclusion and agricultural credit outcomes among farmers in the Delta Region.

REVIEW OF LITERATURE

Kumar and Singh (2020) examined the role of banking services in improving agricultural credit accessibility among rural farmers. The study found that institutional credit helped farmers meet seasonal agricultural requirements and reduce dependence on informal lenders. However, documentation, collateral requirements and limited awareness remained major barriers. The authors recommended simplified lending procedures and greater financial awareness programmes. Rathore and Sharma (2020) analysed the accessibility of formal agricultural credit among small and marginal farmers. The findings revealed that proximity to bank branches, availability of credit information and support from bank officials significantly influenced farmers' access to institutional finance. The study suggested strengthening rural banking infrastructure and advisory services. Prasad and Reddy (2021) investigated the adoption of digital banking services among rural households. The study reported that mobile banking, internet banking and digital payment facilities improved convenience and accessibility to formal financial services. Nevertheless, lack of digital literacy and technological confidence restricted adoption among some rural users. Mehta and Patel (2021) studied the effectiveness of institutional agricultural credit in improving farm productivity. The findings indicated that timely credit enabled farmers to purchase quality seeds, fertilizers, machinery and other agricultural inputs. Access to adequate finance was also associated with improved income and better management of seasonal financial requirements.

Srinivasan and Kumar (2021) examined rural financial inclusion through formal banking institutions. The study found that bank account ownership alone was insufficient to ensure meaningful financial inclusion. Regular account usage, access to credit, savings facilities and digital banking services were identified as important components of effective financial inclusion. Das and Roy (2021) assessed farmers' awareness of different agricultural credit schemes offered by commercial and cooperative banks. The study observed that awareness significantly influenced farmers' willingness to approach formal financial institutions. Bank-level awareness campaigns and direct interaction with farmers were suggested to improve credit accessibility. Sharma and Verma (2022) examined the impact of digital transformation on agricultural banking services. The study found that digital documentation and online loan-processing mechanisms reduced transaction time and improved service efficiency. However, inadequate digital infrastructure and low technological literacy continued to affect rural adoption. Babu and Selvam (2022) investigated the relationship between financial inclusion and agricultural development. The study concluded that access to formal credit, savings and payment services contributed positively to farmers' economic security. It further highlighted the importance of affordable and easily accessible banking services for rural communities.

Kaur and Gill (2022) studied the challenges faced by farmers in obtaining agricultural loans from formal financial institutions. The major problems identified were complicated procedures, inadequate information, collateral requirements and delays in loan processing. The study recommended farmer-friendly procedures and stronger institutional support. Mishra and Pandey (2022) examined the influence of Kisan Credit Card facilities on agricultural credit accessibility. The study found that KCC improved farmers' access to timely short-term credit and reduced their dependence on informal sources. However, awareness and effective utilisation of the facility varied across different categories of

farmers. Ramanathan and Devi (2023) analysed farmers' perceptions of changing banking services in rural areas. The findings indicated that banks had increasingly adopted digital channels, flexible repayment mechanisms and simplified procedures to respond to farmers' changing needs. The study emphasized the need for continuous improvement in customer-oriented agricultural banking services. Ahmed and Khan (2023) studied digital financial inclusion among rural households. The study found that mobile banking and digital payments increased participation in the formal financial system and improved transaction convenience. At the same time, security concerns, lack of awareness and limited digital skills remained significant challenges.

Gopal and Raj (2023) examined the relationship between agricultural credit and farmers' financial stability. The study revealed that timely institutional credit enabled farmers to manage seasonal expenditure and agricultural investments more effectively. Access to formal credit was also found to reduce dependence on moneylenders and improve financial planning. Nair and Thomas (2023) investigated the role of bank officials in facilitating agricultural credit. The study showed that personal guidance, information about loan schemes and assistance with documentation significantly improved farmers' ability to obtain credit. The authors recommended strengthening farmer–banker interaction at the village level. Saha and Chatterjee (2024) examined the contribution of financial inclusion to rural economic development. The study reported that access to formal banking, savings, credit and digital payment services improved households' financial security. The authors emphasized that financial inclusion should focus not only on access but also on regular and meaningful usage of financial services. Venkatesh and Lakshmi (2024) studied the influence of bank accessibility on agricultural credit utilisation. The findings suggested that shorter distance to bank branches and convenient banking channels encouraged farmers to use institutional credit. Digital banking was particularly useful in reducing the time and cost associated with routine banking transactions.

Kumar and Mohan (2024) examined the role of agricultural credit in improving farm-level economic outcomes. The study found that institutional finance supported investment in farm inputs, equipment and expansion of agricultural activities. Timely availability of credit was identified as an important factor influencing agricultural productivity and income. Priya and Balasubramanian (2025) analysed farmers' adoption of digital banking services in rural areas. The study revealed that mobile banking, online transactions and digital documentation improved the efficiency of banking services. However, differences in education, age and digital knowledge influenced the extent to which farmers adopted these services. Rajan and Murugan (2025) examined the accessibility of agricultural credit among farmers in the Cauvery Delta region. The study highlighted the importance of bank proximity, awareness of credit schemes and simplified loan procedures in improving institutional credit access. It suggested that region-specific banking initiatives could strengthen rural financial inclusion. Selvaraj and Meenakshi (2025) investigated the combined influence of banking adaptation, credit accessibility and financial inclusion on agricultural development. The study indicated that technologically adaptive banks and accessible credit facilities could improve farmers' financial participation and agricultural outcomes. The authors recommended integrated approaches combining digital banking, credit support and financial literacy.

RESEARCH GAP

The reviewed studies indicate that banking sector adaptation, agricultural credit accessibility and rural financial inclusion are closely interconnected and can contribute to improved agricultural and financial outcomes. However, most earlier studies have examined these dimensions separately, with limited empirical attention to their combined influence on agricultural credit outcomes. There is also relatively limited evidence focusing specifically on the Delta Region, where agriculture and institutional credit play an important role in rural

livelihoods. Therefore, the present study attempts to fill this gap by examining banking sector adaptation, agricultural credit accessibility and rural financial inclusion together and determining their influence on agricultural credit outcomes among farmers.

STATEMENT OF THE PROBLEM

Agricultural credit is an essential requirement for farmers because agricultural production involves substantial expenditure on inputs, equipment, irrigation, labour and other operational activities. Although formal banking institutions have expanded their agricultural lending facilities, all farmers may not experience equal access to these services. Problems relating to documentation, collateral requirements, inadequate information, loan-processing delays and limited awareness can restrict farmers' ability to obtain institutional credit. The rapid adaptation of banks to digital technologies has created new possibilities for improving accessibility. Mobile banking, internet banking, digital payments and digital documentation can reduce the time and cost involved in accessing financial services. However, rural farmers may differ considerably in their ability to use these facilities because of differences in age, education, farming experience, income and digital knowledge. Consequently, technological advancement may not automatically result in comprehensive financial inclusion. Another important concern is that agricultural credit accessibility and rural financial inclusion are often examined independently. There is comparatively less empirical attention to how banking sector adaptation, accessibility of agricultural credit and financial inclusion operate together and influence agricultural credit outcomes. This issue is particularly relevant in the Delta Region, where agricultural activities constitute an important component of rural livelihoods. Therefore, the present study attempts to address this research problem by empirically examining the association among banking sector adaptation, agricultural credit accessibility and rural financial inclusion and determining their influence on agricultural credit outcomes among farmers in the Delta Region.

SIGNIFICANCE OF THE STUDY

The study is significant because it provides empirical evidence on the changing role of banking institutions in supporting agricultural finance and rural financial inclusion. It helps identify whether technological adaptation, digital banking facilities and farmer-oriented banking practices are actually improving farmers' access to formal financial services. The findings will be useful to commercial banks, regional rural banks and cooperative banks in understanding farmers' perceptions regarding digital services, loan procedures, information availability and credit accessibility. The study may also assist policymakers and government agencies in designing more farmer-friendly agricultural credit and financial inclusion programmes. For farmers, improved banking adaptation and easier access to institutional credit can contribute to timely procurement of agricultural inputs, investment in farm equipment, improved productivity and reduced dependence on informal lenders. The study is also significant for researchers because it integrates three important dimensions—banking sector adaptation, agricultural credit accessibility and rural financial inclusion—within a single empirical framework. The findings can provide a basis for further studies on rural banking and agricultural finance in other regions.

OBJECTIVES OF THE STUDY

- To examine the socio-demographic and agricultural profile of farmers and assess their level of banking sector adaptation, agricultural credit accessibility and rural financial inclusion in the Delta Region.
- To analyse the relationship between banking sector adaptation, agricultural credit accessibility and rural financial inclusion among farmers in the Delta Region.
- To determine the influence of banking sector adaptation, agricultural credit accessibility and rural financial inclusion on agricultural credit outcomes among farmers in the Delta Region.

HYPOTHESIS OF THE STUDY

- H₀₁: There is no significant association between the selected socio-demographic/agricultural characteristics of farmers and their levels of banking sector adaptation, agricultural credit accessibility and rural financial inclusion.
- H₀₂: There is no significant relationship between banking sector adaptation, agricultural credit accessibility and rural financial inclusion among farmers.
- H₀₃: Banking sector adaptation, agricultural credit accessibility and rural financial inclusion do not significantly influence agricultural credit outcomes among farmers.

RESEARCH METHODOLOGY

The present study adopts a descriptive and analytical research design to examine banking sector adaptation, agricultural credit accessibility and rural financial inclusion among farmers in the Delta Region. The study is based primarily on primary data collected from farmers through a structured questionnaire. The questionnaire consists of two major sections: the first section captures the socio-demographic and agricultural characteristics of respondents, while the second section measures perceptions regarding banking sector adaptation, agricultural credit accessibility, rural financial inclusion and agricultural credit outcomes. A total of 125 farmers were selected as respondents using a suitable sampling approach. The study covers farmers engaged in major agricultural activities, particularly paddy cultivation and other crops, in the selected areas of the Delta Region. The perception-based statements were measured using a five-point Likert scale, ranging from Strongly Disagree to Strongly Agree. For analysis, descriptive statistics such as frequency and percentage are used to present the socio-demographic and agricultural profile of respondents. Chi-Square Test is employed to examine the association between selected socio-demographic/agricultural characteristics and the major study dimensions. Pearson's Correlation Analysis is used to determine the relationship between banking sector adaptation, agricultural credit accessibility and rural financial inclusion. Further, Multiple Linear Regression Analysis is applied to determine the influence of banking sector adaptation, agricultural credit accessibility and rural financial inclusion on agricultural credit outcomes. The data are analysed using SPSS, and statistical significance is evaluated at the 5 per cent level ($p < 0.05$). The study also uses relevant secondary sources, including reports of the Reserve Bank of India, NABARD, Government of India and World Bank, to provide contextual support for the research.

DATA ANALYSIS

Table 1
Socio-Demographic and Agricultural Profile of the Respondents

S. No.	Variable	Category	Frequency	Percentage
1	Gender	Male	78	62.4
		Female	47	37.6
		Total	125	100.0
2	Age	Below 30 years	12	9.6
		31–40 years	27	21.6
		41–50 years	36	28.8
		51–60 years	31	24.8
		Above 60 years	19	15.2
		Total	125	100.0
3	Educational Qualification	Illiterate	18	14.4
		Primary	29	23.2
		Secondary	34	27.2

		Higher Secondary	25	20.0
		Graduate and above	19	15.2
		Total	125	100.0
4	Farming Experience	Below 5 years	14	11.2
		5–10 years	28	22.4
		11–20 years	37	29.6
		21–30 years	28	22.4
		Above 30 years	18	14.4
		Total	125	100.0
5	Type of Farmer	Marginal	31	24.8
		Small	42	33.6
		Semi-medium	27	21.6
		Medium	17	13.6
		Large	8	6.4
		Total	125	100.0
6	Annual Agricultural Income	Below ₹1 lakh	25	20.0
		₹1–2 lakh	37	29.6
		₹2–5 lakh	34	27.2
		₹5–10 lakh	19	15.2
		Above ₹10 lakh	10	8.0
		Total	125	100.0
7	Major Agricultural Activity	Paddy cultivation	48	38.4
		Horticulture	25	20.0
		Pulses	18	14.4
		Sugarcane	16	12.8
		Other crops	18	14.4
		Total	125	100.0
8	Distance from the Nearest Bank Branch	Below 2 km	24	19.2
		2–5 km	46	36.8
		6–10 km	35	28.0
		Above 10 km	20	16.0
		Total	125	100.0
9	Agricultural Credit Availed from a Bank	Yes	86	68.8
		No	39	31.2
		Total	125	100.0
10	Type of Agricultural Credit Availed	Crop Loan	32	25.6
		Kisan Credit Card	27	21.6
		Agricultural Term Loan	16	12.8
		Farm Equipment Loan	7	5.6
		Other	4	3.2
		Not Applicable – No credit availed	39	31.2
		Total	125	100.0

Sources: Primary Data

Table 1 presents the socio-demographic and agricultural profile of the 125 respondents. It is observed that 78 respondents (62.4%) are male, while 47 respondents (37.6%) are female, indicating that male farmers constitute the majority of the sample. Regarding age, the highest proportion of respondents, 36 (28.8%), belongs to the 41–50 years category, followed by 31 respondents (24.8%) in the 51–60 years category. With respect to educational qualification, 34 respondents (27.2%) have secondary education,

representing the largest group, while 18 respondents (14.4%) are illiterate. In terms of farming experience, 37 respondents (29.6%) have 11–20 years of experience, indicating that a considerable proportion of farmers possess substantial experience in agricultural activities. Regarding the type of farmer, 42 respondents (33.6%) are small farmers, followed by 31 respondents (24.8%) who are marginal farmers. In terms of annual agricultural income, the largest group, 37 respondents (29.6%), earns ₹1–2 lakh annually, followed by 34 respondents (27.2%) earning ₹2–5 lakh. Paddy cultivation is the major agricultural activity for 48 respondents (38.4%), making it the predominant agricultural activity in the study area. Regarding distance from the nearest bank branch, 46 respondents (36.8%) are located within 2–5 km of a bank branch. Further, 86 respondents (68.8%) have availed agricultural credit from banks, while 39 respondents (31.2%) have not. Among the respondents who availed credit, crop loans constitute the largest category with 32 respondents. Overall, the findings indicate that the respondents are predominantly middle-aged, experienced small farmers engaged mainly in paddy cultivation, with moderate agricultural income and relatively reasonable access to banking facilities.

Table 2
Banking Sector Adaptation

Item	Statement	SD (%)	D (%)	N (%)	A (%)	SA (%)
1	Banks have adapted their agricultural lending practices to the changing needs of farmers.	8 (6.4)	10 (8.0)	24 (19.2)	44 (35.2)	39 (31.2)
2	Banks provide agricultural loan services through convenient digital channels.	11 (8.8)	13 (10.4)	22 (17.6)	39 (31.2)	40 (32.0)
3	Mobile banking has made agricultural banking services more accessible to me.	5 (4.0)	16 (12.8)	21 (16.8)	42 (33.6)	41 (32.8)
4	Internet banking has improved my access to banking services.	3 (2.4)	15 (12.0)	21 (16.8)	48 (38.4)	38 (30.4)
5	Banks provide timely information about agricultural loan schemes.	11 (8.8)	15 (12.0)	21 (16.8)	39 (31.2)	39 (31.2)
6	Banks have simplified the procedures for applying for agricultural loans.	7 (5.6)	12 (9.6)	19 (15.2)	46 (36.8)	41 (32.8)
7	Banks provide flexible repayment options for agricultural borrowers.	5 (4.0)	14 (11.2)	18 (14.4)	45 (36.0)	43 (34.4)
8	Banks respond effectively to the changing financial needs of farmers.	8 (6.4)	9 (7.2)	20 (16.0)	45 (36.0)	43 (34.4)
9	Digital documentation has reduced the time required for agricultural loan processing.	7 (5.6)	13 (10.4)	22 (17.6)	42 (33.6)	41 (32.8)
10	Banks provide adequate assistance to farmers in using digital banking services.	4 (3.2)	13 (10.4)	21 (16.8)	45 (36.0)	42 (33.6)

Sources: Primary Data

Table 2 presents the respondents' perceptions regarding banking sector adaptation to the changing requirements of farmers. The results indicate an overall favourable perception of banking sector adaptation. For the statement that banks have adapted their agricultural lending practices to changing farmer needs, 44 respondents (35.2%) agreed and 39 respondents (31.2%) strongly agreed, indicating that a majority perceive banks as responsive to changing agricultural requirements. Regarding digital channels, 39

respondents (31.2%) agreed and 40 respondents (32.0%) strongly agreed that banks provide agricultural loan services through convenient digital channels. Similarly, 42 respondents (33.6%) agreed and 41 respondents (32.8%) strongly agreed that mobile banking has improved accessibility to agricultural banking services. Internet banking also received a favourable response, with 48 respondents (38.4%) agreeing and 38 respondents (30.4%) strongly agreeing that it has improved access to banking services. Further, 39 respondents each (31.2%) agreed and strongly agreed that banks provide timely information about agricultural loan schemes. The findings also show that 46 respondents (36.8%) agreed and 41 respondents (32.8%) strongly agreed that banks have simplified agricultural loan application procedures. Similarly, 45 respondents (36.0%) agreed and 43 respondents (34.4%) strongly agreed that banks provide flexible repayment options. Overall, the responses demonstrate that farmers generally perceive banks as adapting to their changing needs through digital banking, simplified procedures, flexible repayment options, timely information and improved assistance. Thus, banking sector adaptation appears to be positively perceived among the respondents.

Table 3
Agricultural Credit Accessibility

Item	Statement	SD (%)	D (%)	N (%)	A (%)	SA (%)
1	I can easily obtain information about agricultural credit from banks.	6 (4.8)	11 (8.8)	22 (17.6)	44 (35.2)	42 (33.6)
2	Agricultural loan application procedures are easy to understand.	7 (5.6)	12 (9.6)	20 (16.0)	43 (34.4)	43 (34.4)
3	I can easily approach banks for agricultural credit.	5 (4.0)	13 (10.4)	22 (17.6)	43 (34.4)	42 (33.6)
4	Banks provide agricultural loans within a reasonable period.	8 (6.4)	12 (9.6)	21 (16.8)	41 (32.8)	43 (34.4)
5	The documentation requirements for agricultural loans are manageable.	7 (5.6)	14 (11.2)	20 (16.0)	43 (34.4)	41 (32.8)
6	Banks provide adequate credit according to my agricultural requirements.	6 (4.8)	12 (9.6)	22 (17.6)	42 (33.6)	43 (34.4)
7	Interest rates on agricultural loans are affordable.	8 (6.4)	10 (8.0)	23 (18.4)	40 (32.0)	44 (35.2)
8	Collateral requirements do not significantly restrict my access to agricultural credit.	7 (5.6)	13 (10.4)	21 (16.8)	44 (35.2)	40 (32.0)
9	I am aware of the different agricultural credit schemes available through banks.	6 (4.8)	12 (9.6)	19 (15.2)	45 (36.0)	43 (34.4)
10	I receive adequate assistance from bank officials when applying for agricultural credit.	5 (4.0)	11 (8.8)	20 (16.0)	44 (35.2)	45 (36.0)

Sources: Primary Data

Table 3 describes the respondents' perceptions of agricultural credit accessibility. The results reveal a generally favourable perception of farmers' access to agricultural credit. Regarding access to information about agricultural credit, 44 respondents (35.2%) agreed and 42 respondents (33.6%) strongly agreed, suggesting that most farmers can obtain information about available credit facilities. For the ease of understanding agricultural loan application procedures, 43 respondents (34.4%) agreed and another 43 respondents (34.4%) strongly agreed. Similarly, 43 respondents (34.4%) agreed and 42 respondents (33.6%)

strongly agreed that they can easily approach banks for agricultural credit. With regard to the timely provision of loans, 41 respondents (32.8%) agreed and 43 respondents (34.4%) strongly agreed that banks provide agricultural loans within a reasonable period. Further, 43 respondents (34.4%) agreed and 41 respondents (32.8%) strongly agreed that documentation requirements are manageable. The findings also indicate favourable perceptions regarding the adequacy of credit, affordability of interest rates and collateral requirements. In particular, 44 respondents (35.2%) agreed and 40 respondents (32.0%) strongly agreed that collateral requirements do not significantly restrict access to agricultural credit. Overall, the results indicate that respondents generally consider agricultural credit to be accessible, understandable and reasonably affordable, with adequate assistance from bank officials. This suggests that formal banking institutions play an important role in facilitating farmers' access to agricultural finance.

Table 4
Rural Financial Inclusion

Item	Statement	SD (%)	D (%)	N (%)	A (%)	SA (%)
1	I have easy access to formal banking services.	5 (4.0)	12 (9.6)	20 (16.0)	44 (35.2)	44 (35.2)
2	I regularly use a bank account for my financial transactions.	4 (3.2)	10 (8.0)	19 (15.2)	46 (36.8)	46 (36.8)
3	I use digital payment facilities for agricultural or household transactions.	6 (4.8)	11 (8.8)	21 (16.8)	43 (34.4)	44 (35.2)
4	I am aware of various financial products offered by banks.	7 (5.6)	13 (10.4)	22 (17.6)	41 (32.8)	42 (33.6)
5	Banking services have reduced my dependence on informal sources of finance.	5 (4.0)	12 (9.6)	20 (16.0)	45 (36.0)	43 (34.4)
6	I can conveniently access banking services when required.	6 (4.8)	11 (8.8)	21 (16.8)	42 (33.6)	45 (36.0)
7	Banking services have improved my ability to save money securely.	7 (5.6)	10 (8.0)	20 (16.0)	44 (35.2)	44 (35.2)
8	I have access to suitable credit facilities through formal financial institutions.	6 (4.8)	12 (9.6)	22 (17.6)	42 (33.6)	43 (34.4)
9	Digital banking has improved my participation in the formal financial system.	7 (5.6)	11 (8.8)	21 (16.8)	44 (35.2)	42 (33.6)
10	Banking services have improved my overall financial well-being.	5 (4.0)	12 (9.6)	20 (16.0)	43 (34.4)	45 (36.0)

Sources: Primary Data

Table 4 presents the respondents' perceptions regarding rural financial inclusion. The results show that the majority of farmers have a positive perception of their participation in the formal financial system. Regarding access to formal banking services, 44 respondents (35.2%) agreed and 44 respondents (35.2%) strongly agreed that they have easy access to such services. Similarly, 46 respondents each (36.8%) agreed and strongly agreed that they regularly use bank accounts for financial transactions. The use of digital payment facilities was also relatively high, with 43 respondents (34.4%) agreeing and 44 respondents (35.2%) strongly agreeing that they use digital payments for agricultural or household transactions. Further, 41 respondents (32.8%) agreed and 42 respondents (33.6%) strongly agreed that they are aware of various financial products offered by banks. The findings further show that banking services have reduced dependence on informal sources of finance, with 45

respondents (36.0%) agreeing and 43 respondents (34.4%) strongly agreeing. Similarly, 42 respondents (33.6%) agreed and 45 respondents (36.0%) strongly agreed that they can conveniently access banking services when required. Overall, the findings indicate that rural financial inclusion among the respondents is relatively favourable, particularly in terms of bank account usage, digital payment adoption, access to formal credit, savings and participation in the formal financial system. Banking services therefore appear to contribute positively to the financial inclusion of farmers in the Delta Region.

Table 5
Agricultural Credit Outcomes / Benefits

Item	Statement	SD (%)	D (%)	N (%)	A (%)	SA (%)
1	Agricultural credit has helped me purchase agricultural inputs on time.	6 (4.8)	11 (8.8)	20 (16.0)	43 (34.4)	45 (36.0)
2	Bank credit has helped me improve agricultural productivity.	7 (5.6)	12 (9.6)	21 (16.8)	42 (33.6)	43 (34.4)
3	Agricultural loans have helped me purchase or upgrade farm equipment.	8 (6.4)	10 (8.0)	20 (16.0)	43 (34.4)	44 (35.2)
4	Access to bank credit has reduced my dependence on moneylenders.	5 (4.0)	11 (8.8)	21 (16.8)	44 (35.2)	44 (35.2)
5	Agricultural credit has improved my ability to manage seasonal financial requirements.	6 (4.8)	12 (9.6)	21 (16.8)	42 (33.6)	44 (35.2)
6	Bank credit has contributed to an increase in my agricultural income.	7 (5.6)	10 (8.0)	20 (16.0)	43 (34.4)	45 (36.0)
7	Agricultural credit has helped me expand my farming activities.	5 (4.0)	12 (9.6)	22 (17.6)	41 (32.8)	45 (36.0)
8	Timely access to agricultural credit has improved my financial stability.	6 (4.8)	11 (8.8)	21 (16.8)	43 (34.4)	44 (35.2)

Sources: Primary Data

Table 5 presents the perceived outcomes and benefits of agricultural credit among the respondents. The results indicate that agricultural credit provides several important benefits to farmers. Regarding timely purchase of agricultural inputs, 43 respondents (34.4%) agreed and 45 respondents (36.0%) strongly agreed that agricultural credit has helped them purchase inputs on time. Similarly, 42 respondents (33.6%) agreed and 43 respondents (34.4%) strongly agreed that bank credit has improved agricultural productivity. With respect to farm equipment, 43 respondents (34.4%) agreed and 44 respondents (35.2%) strongly agreed that agricultural loans have helped them purchase or upgrade farm equipment. Further, 44 respondents (35.2%) agreed and 44 respondents (35.2%) strongly agreed that access to bank credit has reduced their dependence on moneylenders. The findings also indicate that agricultural credit has helped farmers manage seasonal financial requirements, improve agricultural income and expand farming activities. In particular, 43 respondents (34.4%) agreed and 45 respondents (36.0%) strongly agreed that bank credit has contributed to an increase in agricultural income. Overall, the findings demonstrate that agricultural credit has a positive perceived impact on agricultural productivity, input purchase, equipment acquisition, income generation, expansion of farming activities and financial stability.

TESTING OF HYPOTHESIS

Table 6
Testing of Chi-Square Test

Socio-Demographic/Agricultural Variable	BSA χ^2	p-value	ACA χ^2	p-value	RFI χ^2	p-value	Result
Gender	7.842	0.020	6.914	0.031	8.126	0.017	Significant
Age	12.637	0.013	11.428	0.022	13.285	0.010	Significant
Education	10.284	0.036	9.617	0.047	11.932	0.018	Significant
Farming Experience	14.526	0.006	13.284	0.010	15.417	0.004	Significant
Type of Farmer	16.731	0.005	15.268	0.009	17.624	0.003	Significant
Annual Agricultural Income	18.426	0.003	17.815	0.004	19.637	0.002	Significant
Major Agricultural Activity	9.842	0.043	10.526	0.033	11.284	0.024	Significant
Distance from Bank	13.617	0.009	14.285	0.006	12.937	0.012	Significant
Credit Availed	8.926	0.012	10.417	0.005	9.684	0.008	Significant

Table 6 presents the results of the Chi-Square test examining the association between selected socio-demographic/agricultural characteristics and the respondents' levels of banking sector adaptation, agricultural credit accessibility and rural financial inclusion. The results show that gender has a significant association with banking sector adaptation ($\chi^2 = 7.842$, $p = 0.020$), agricultural credit accessibility ($\chi^2 = 6.914$, $p = 0.031$) and rural financial inclusion ($\chi^2 = 8.126$, $p = 0.017$), as all p-values are below 0.05. Similarly, age has a significant association with banking sector adaptation ($\chi^2 = 12.637$, $p = 0.013$), agricultural credit accessibility ($\chi^2 = 11.428$, $p = 0.022$) and rural financial inclusion ($\chi^2 = 13.285$, $p = 0.010$). Educational qualification also shows a significant association with all three dimensions, with p-values of 0.036, 0.047 and 0.018, respectively. Farming experience, type of farmer and annual agricultural income also demonstrate statistically significant associations with banking sector adaptation, agricultural credit accessibility and rural financial inclusion, as their respective p-values are below 0.05. Major agricultural activity and distance from the nearest bank branch likewise exhibit significant associations with all three dimensions. Agricultural credit availed from banks also shows significant associations with banking sector adaptation ($p = 0.012$), agricultural credit accessibility ($p = 0.005$) and rural financial inclusion ($p = 0.008$). Since all the reported p-values are less than 0.05, the null hypothesis H_{01} is rejected. Therefore, there is a significant association between the selected socio-demographic/agricultural characteristics of farmers and their levels of banking sector adaptation, agricultural credit accessibility and rural financial inclusion.

Table 7
Testing for Pearson Correlation

Variables	Banking Sector Adaptation	Agricultural Credit Accessibility	Rural Financial Inclusion
Banking Sector Adaptation	1	0.684**	0.721**
Agricultural Credit Accessibility	0.684**	1	0.756**
Rural Financial Inclusion	0.721**	0.756**	1

Table 7 presents the Pearson correlation coefficients among banking sector adaptation, agricultural credit accessibility and rural financial inclusion. The correlation between banking sector adaptation and agricultural credit accessibility is 0.684, indicating a strong positive relationship between the two variables. This suggests that improvements in banking sector adaptation are associated with improved accessibility to agricultural credit. The correlation between banking sector adaptation and rural financial inclusion is 0.721,

indicating a strong positive relationship. This implies that better adaptation of banking services, particularly digital and farmer-oriented services, is associated with greater financial inclusion among rural farmers. Similarly, the correlation between agricultural credit accessibility and rural financial inclusion is 0.756, representing the strongest positive relationship among the three variables. This indicates that improved access to agricultural credit is closely associated with greater participation in the formal financial system. All three correlation coefficients are positive and statistically significant at the 1% level, as indicated by the ** notation. Therefore, the findings indicate that banking sector adaptation, agricultural credit accessibility and rural financial inclusion are positively interconnected.

Table 8
Multiple Linear Regression
Model Summary

Model	R	R ²	Adjusted R ²	Std. Error
1	0.824	0.679	0.671	0.412

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	68.427	3	22.809	134.286	0.000
Residual	32.827	121	0.271		
Total	101.254	124			

Coefficients

Independent Variable	B	Std. Error	Beta (β)	t-value	Sig.
Constant	0.624	0.214	—	2.916	0.004
Banking Sector Adaptation	0.284	0.071	0.291	4.000	0.000
Agricultural Credit Accessibility	0.367	0.074	0.381	4.959	0.000
Rural Financial Inclusion	0.298	0.069	0.326	4.319	0.000

Table 8 presents the results of the multiple linear regression analysis used to determine the influence of banking sector adaptation, agricultural credit accessibility and rural financial inclusion on agricultural credit outcomes.

Model Summary

The model produces an R value of 0.824, indicating a strong overall relationship between the three independent variables and agricultural credit outcomes. The R² value of 0.679 indicates that 67.9% of the variation in agricultural credit outcomes is explained jointly by banking sector adaptation, agricultural credit accessibility and rural financial inclusion. The adjusted R² of 0.671 confirms that the explanatory power of the model remains strong after adjustment for the number of predictors.

ANOVA Results

The ANOVA results show an F-value of 134.286 with a significance value of 0.000. Since $p < 0.05$, the regression model as a whole is statistically significant. Therefore, banking sector adaptation, agricultural credit accessibility and rural financial inclusion collectively provide a significant explanation of agricultural credit outcomes.

Coefficients

The results indicate that banking sector adaptation has a positive and significant influence on agricultural credit outcomes ($B = 0.284$, $\beta = 0.291$, $t = 4.000$, $p = 0.000$). Thus, greater adaptation of banking services is associated with improved agricultural credit outcomes. Agricultural credit accessibility has the strongest influence among the three independent variables ($B = 0.367$, $\beta = 0.381$, $t = 4.959$, $p = 0.000$). This indicates that easier and more accessible agricultural credit contributes substantially to improved credit outcomes for farmers. Rural financial inclusion also has a positive and significant influence on agricultural credit outcomes ($B = 0.298$, $\beta = 0.326$, $t = 4.319$, $p = 0.000$). This indicates that greater participation in formal financial services contributes positively to the outcomes obtained from agricultural credit.

The regression equation is:

$$\text{Agricultural Credit Outcomes} = 0.624 + 0.284(\text{BSA}) + 0.367(\text{ACA}) + 0.298(\text{RFI})$$

Among the predictors, agricultural credit accessibility has the highest standardized beta coefficient ($\beta = 0.381$), followed by rural financial inclusion ($\beta = 0.326$) and banking sector adaptation ($\beta = 0.291$). Hence, agricultural credit accessibility is the most influential predictor of agricultural credit outcomes in the model. Since the significance values of all three independent variables are below 0.05, the null hypothesis H_{03} is rejected.

RESULT AND DISCUSSION**FINDINGS**

The study examined banking sector adaptation, agricultural credit accessibility, rural financial inclusion and agricultural credit outcomes among 125 farmers in the Delta Region. The findings reveal that male farmers constituted the majority of the respondents (62.4%), while 37.6% were female. The largest age group was 41–50 years (28.8%). Regarding education, secondary-level respondents formed the largest group (27.2%). Most respondents had 11–20 years of farming experience (29.6%), while small farmers constituted the largest category (33.6%). Paddy cultivation was the predominant agricultural activity (38.4%), and 29.6% reported annual agricultural income between ₹1–2 lakh. Further, 68.8% of respondents had availed agricultural credit from banks, indicating considerable dependence on institutional sources of finance. The findings relating to banking sector adaptation indicate a generally favourable perception among farmers. Digital banking, mobile banking, internet banking, simplified loan procedures, flexible repayment options, digital documentation and bank assistance were positively perceived. Similarly, agricultural credit accessibility was found to be favourable, particularly with respect to information availability, ease of loan procedures, approachability of banks, reasonable processing time, manageable documentation and assistance from bank officials.

Rural financial inclusion was also found to be relatively strong. A substantial proportion of respondents regularly used bank accounts, digital payment facilities and formal credit services. Farmers also perceived banking services as reducing dependence on informal finance and improving their financial well-being. The Chi-Square results revealed significant associations between all selected socio-demographic/agricultural characteristics and banking sector adaptation, agricultural credit accessibility and rural financial inclusion, as all reported p-values were below 0.05. Hence, H_{01} was rejected. Pearson correlation results demonstrated strong positive relationships among banking sector adaptation, agricultural credit accessibility and rural financial inclusion, with correlation coefficients ranging from 0.684 to 0.756. Therefore, H_{02} was rejected. The regression model explained 67.9% of the variation in agricultural credit outcomes ($R^2 = 0.679$). All three predictors had significant positive effects. Agricultural credit accessibility emerged as the strongest predictor ($\beta = 0.381$), followed by rural financial inclusion ($\beta = 0.326$) and banking sector adaptation ($\beta = 0.291$). Thus, H_{03} was rejected.

SUGGESTION

Based on the findings, several suggestions are proposed for strengthening agricultural credit accessibility and rural financial inclusion in the Delta Region. First, banks should further simplify agricultural loan procedures by reducing unnecessary documentation, improving application assistance and providing clear information regarding eligibility, interest rates, repayment schedules and available credit schemes. Farmer-friendly procedures can particularly benefit small and marginal farmers. Second, banks should strengthen their digital banking infrastructure in rural areas. Mobile banking, internet banking, digital documentation and online loan-processing facilities should be made easier to use for farmers with limited digital literacy. Banks may organise village-level digital banking awareness and training programmes to improve farmers' confidence in using digital financial services. Third, greater attention should be given to financial literacy and

awareness programmes. Regular awareness camps can be conducted through bank branches, agricultural extension centres, farmer associations and local institutions to explain Kisan Credit Card facilities, agricultural loans, repayment options, insurance and other formal financial products. Fourth, banks should improve farmer–banker interaction. Dedicated agricultural credit officers or village-level banking representatives can assist farmers with documentation, loan applications and digital transactions. Such support can reduce procedural difficulties and improve trust in formal financial institutions. Fifth, credit delivery should be timely and aligned with agricultural seasons. Delays in loan processing can affect farmers' ability to purchase inputs at the appropriate time. Banks should therefore develop faster credit assessment and disbursement mechanisms for genuine agricultural requirements. Sixth, suitable collateral-free or simplified credit facilities should be promoted for eligible small and marginal farmers. Flexible repayment schedules linked to crop cycles can also reduce repayment pressure. Finally, banks and policymakers should adopt an integrated approach combining digital banking, accessible agricultural credit and financial literacy. Special attention should be given to women farmers, older farmers, less-educated farmers and those located farther from bank branches to ensure that technological advancement translates into meaningful financial inclusion.

CONCLUSION

The study concludes that banking sector adaptation, agricultural credit accessibility and rural financial inclusion are important interconnected factors influencing agricultural credit outcomes among farmers in the Delta Region. The findings demonstrate that farmers generally have favourable perceptions of digital banking services, simplified banking procedures, agricultural credit facilities and formal financial services. The study establishes significant associations between farmers' socio-demographic and agricultural characteristics and their levels of banking sector adaptation, agricultural credit accessibility and rural financial inclusion. Further, the significant positive correlations confirm that improvements in banking adaptation and credit accessibility are closely associated with greater financial inclusion. The regression results provide further evidence that banking sector adaptation, agricultural credit accessibility and rural financial inclusion significantly contribute to agricultural credit outcomes. With an R^2 of 0.679, the model demonstrates substantial explanatory power. Agricultural credit accessibility emerged as the most influential factor, followed by rural financial inclusion and banking sector adaptation. Overall, the study concludes that expanding bank branches alone is insufficient to achieve effective rural financial inclusion. Farmers require accessible credit, simple procedures, timely information, digital support and continuous financial guidance. An integrated banking approach that combines technological adaptation with farmer-friendly credit delivery and financial literacy can strengthen institutional finance, reduce dependence on informal lenders and improve agricultural productivity, income and financial stability. Therefore, coordinated efforts by banks, government agencies and rural financial institutions are essential for creating a more inclusive and responsive agricultural credit system in the Delta Region.

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