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CREDIT PENETRATION AND CROP EFFICIENCY UNDER THE KISAN CREDIT CARD SCHEME: DISTRICT-LEVEL EVIDENCE FROM GUJARAT

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ABSTRACT----------
This study is the first systematic analysis at district level of the Kisan Credit Card (KCC) scheme in Gujarat through credit penetration, loan disbursement, production outcomes, and crop-level efficiency. The goals of the study were: (i) the adoption of KCC across the district level; (ii) the effects of loan disbursement on agricultural output; (iii) yield and income growth after the implementation of KCC; and (iv) efficiency at the crop level. It employs a mixed-method methodology drawing on secondary datasets including NABARD, RBI, SLBC, Agricultural Census, and Directorate of Agriculture. Descriptive statistics, comparative analysis, correlation measures, and efficiency indicators (loan per acre, profit per acre, profit per ₹1,000 loan) are applied. Nationally, KCC accounts expanded from 4.26 lakh crore in March 2014 to 10.05 lakh crore in December 2024, covering 7.7 crore farmers. In Gujarat, cooperative banks and RRBs issued 2.13 million KCCs in 2018, declining to 1.45 million in 2020. The percentage was highest in irrigated districts like Kheda (73.9%) and Surat (72.8%) but the rate of penetration was lower in tribal districts such as Aravalli (63.1%). Crop-level efficiency analysis indicates that profits on potato and cumin alone exceed ₹2,000 per ₹1,000 loan, while staples like paddy and maize remain relatively inefficient. The results illustrate intra-state variances and crop-specific differences and this serves as timely material for ongoing policy discussions around credit targeting, institutional capacities, and sustainability in agricultural development.

KEYWORDS: *Kisan Credit Card (KCC); Agricultural Credit; District-Level Analysis; Loan Disbursement; Credit Penetration; Crop Efficiency; Gujarat; Yield and Income Growth; NABARD; RBI*----------

1. INTRODUCTION

For a long time, agricultural credit has been considered an important determinant of rural development and farm output from an Indian perspective. One of the most important policy interventions in agricultural finance is the Kisan Credit Card (KCC) scheme, introduced by the Reserve Bank of India (RBI) and implemented through NABARD (National Bank for Agriculture and Rural Development). The scheme aims to provide more affordable, flexible, and timely credit to farmers, facilitate financial inclusion, and reduce dependence on informal sources of credit, while also promoting investment in modern inputs, mechanization, and risk management. Gujarat, comprising varied Agro-climatic zones (irrigated plains, semi-arid regions), provides a good case to appraise the performance of the KCC scheme. The agricultural economy of the state varies in cropping patterns, credit utilization, and yield. Kheda, Surat, and Banaskantha are some of the districts that exhibit high penetration and efficiency, but several others face structural constraints associated with water scarcity, small landholdings, and limited mechanization. Despite the widespread adoption of KCC, systematic district-level analysis of its penetration, credit efficiency, and post-loan impact is scarce in the literature. Current research often emphasizes overall state trends, thus missing intra-state disparities and crop-level differences. To this end, this paper seeks to bridge this gap by utilizing recent district-level data from Gujarat to investigate:
The level of KCC adoption among farmers in the districts.

- The linkage between loan disbursement and agricultural production.
- Post-KCC yield and income growth outcomes.
- Credit efficiency across major crops.

By combining quantitative measures with correlation insights, the study aims to obtain an in-depth understanding of KCC as a driver of agricultural performance in the Gujarat context. The results are expected to enrich policy discussions on financial inclusion, targeted credit access, credit provision, and sustainable agricultural development, offering lessons for both state-level planning and national credit policy processes.

2. LITERATURE REVIEW

Institutional credit is one of the key pillars for agricultural development in India and has been established from very early stages in the Indian economy. The transformation from informal borrowing sources to formal credit channels is the subject of deep economic studies, with scholars focusing on its impact on combating predatory lending practices and investment in advanced agricultural inputs. The earlier work of Basu (2006) and Bell & Srinivasan (1989) emphasized that formal credit access not only reduces borrowing pressure but it also helps productivity growth as it means farmers would be able to use better seed, fertilizers and mechanization. In this wider context, the establishment of the Kisan Credit Card (KCC) scheme in 1998 was a landmark policy innovation aimed at allowing farmers flexible, timely and affordable credit under simplified processes and revolving limits (NABARD, 2000).

National-Level Studies

National studies of the effect of KCC have seen quite a bit of empirical work in this regard. Chavan (2012) observed that the scheme has significantly facilitated increased financial inclusion as it has enhanced access to institutional credit, although differences in regional access to institutional credit remained, with some variations especially in rain-fed and tribal settings. Reserve Bank of India (2017) reports that the level of adoption was highest in the states with strong and efficient cooperative banking, and less developed regions lagged behind. NABARD (2019) stressed the significance of KCC for advancing crop diversification and mechanization notably in cash crop areas that is to say connecting access to credit to agricultural structural transformation.

State-Level Evidence

Additional state-specific analyses shed light on the mixed effects of KCC. In Punjab and Haryana Singh & Sharma (2015) observed that mechanization and input intensification made use of KCC which provided farmers with a more comprehensive way of increasing productivity while minimizing the need for informal borrowing. Similarly, analysis of eastern states found that the credit was generally survival-oriented, supplying the needs of consumption, but not productive investments. This divergence highlights how credit outcomes are influenced by regional agro-economic contexts. Patel (2018) and Desai (2020) study KCC's penetration in Gujarat found that KCC penetration was uneven between the districts with higher prevalence in irrigated and low prevalence in tribal belts. These findings are consistent with the wider literature in rural finance emphasizing the role of institutional capacity, infrastructure and awareness of farmers on credit absorption (Binswanger & Khandker, 1995). The Gujarat case is specialized because of its varying agro-climatic region characterized by irrigation and agricultural lands, from irrigated plains to semi-arid and coastal regions and its variety of credit availability and constraint

Policy Developments

Union Budget 2025–26 (Press Information Bureau, 2025): Government increased the KCC loan limit from ₹3 lakh to ₹5 lakh, in a bid to provide more affordable credit and enhance agricultural credit. This is anticipated to strengthen financial inclusion and the working capital of crop production and other relevant businesses through enhanced support provided to farmers through reform of the Modified

Interest Subvention Scheme.

The constraints and effectiveness reviews Hasan et al. (2025): A systematic review reveals institutional and socio-economic barriers that persist include complicated application processes, limited rural banking infrastructure, high default risks, and minimal financial literacy as institutional factors. While KCC has improved access to affordable credit, its effectiveness is still uneven, particularly in tribal and water-scarce areas.

Comparative Case Studies

Kaushik & Sharma (2025): A comparative study of Punjab and Haryana farmers showed that while financial security was improved by KCC—with an upsurge in agricultural production levels—it left many implementation problems such as documentation difficulties and awareness gaps. To ensure inclusivity, their results support the requirement for location-specific interventions.

Sustainable Agriculture Credit

Arockia (2025):Case of Kisan Cards in India highlights KCC's role in sustainable agriculture finance, where timely and low-interest loans have helped adopters adopt modern inputs and reduced informal borrowing. However, institutional strengthening and awareness campaigns need to be undertaken to facilitate that the benefits are equally spread.

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Macro-Level Evidence
Economic Survey 2023–24 (Government of India, 2024): Agricultural credit increased 1.5 times in FY24, with over 7.4 crore active KCC accounts by the end of 2023. The survey points to KCC's role in providing timely, hassle-free credit, noting growth of bank credit to agriculture at a rapid year-on-year rate of 19–21 percent from early 2024.

Growth Trends in India and Gujarat
At the national level, the Kisan Credit Card scheme has expanded in a remarkable way over the past decade. The total operative loan amount under KCC increased from ₹4.26 lakh crore in March 2014 to ₹10.05 lakh crore in December 2024, benefiting nearly 7.7 crore farmers across India. That growth reflects the deepening of institutional credit and a heightened focus by the government on reducing dependence on informal borrowing. The Union Budget 2025–26 further enhanced the loan limit from ₹3 lakh to ₹5 lakh, strengthening the position of KCC as a key channel for financing farming. But inequalities persist: fewer than 10 per cent of current holders of KCC are small, marginal farmers (who own less than 0.01 hectares) vs over 60 per cent of those with larger holdings, underscoring a persistent inequality of access. In Gujarat, cooperative banks and regional rural banks have been central in the issuance of KCC. The cumulative KCC accounts by cooperatives peaked at 2.13 million in 2018, but settled at 1.45 million in 2020, evidencing both institutional influence and structural limits like water scarcity and small landholdings. District penetration rates are still high in irrigated and central districts like Kheda (73.9%), Surat (72.8%), Vadodara (72.4%), whereas tribal and water-scarce districts like Aravalli (63.1%) and Chhota Udaipur (65%) continue to lag. The crop-level efficiency figures also indicate that the yields of potato and cumin generate profits exceeding ₹2,000 per ₹1,000 loan, while those of agricultural staples, like paddy and maize, are not as efficient. These trends underline that KCC will need region-specific strategies, institutional strengthening, and diversification in the crops cultivated to maximize its influence in Gujarat.

The literature gives thematic insights:
Recent policy development and previous scholarship review reveal a number of common themes regarding the performance of the Kisan Credit Card (KCC) scheme.

First, there is robust evidence that institutional credit is related to productivity growth, in the form of modern inputs, mechanisation and crop diversification. However, the extent of these benefits is variable: cash crops and irrigated areas tend to be more efficient, and subsistence crops in rainfed or tribal areas are less responsive to credit.

In the second place, regional variations still determine results. Even though the national adoption rate has been high, with over 7.7 crore active accounts by 2023 and loan volumes rising from ₹4.26 lakh crore in 2014 to ₹10.05 lakh crore in 2024, there is still uneven distribution of the benefits. Irrigated regions like Kheda, Surat and Vadodara in Gujarat achieve more than 72 percent penetration, whereas tribal and water-scarce districts like Aravalli and Chhota Udaipur are behind. This validates the role of institutional outreach and agro-climatic setting in credit absorption and effectiveness.

Third, the effectiveness of KCC is strongly related to institutional capacity. Districts with a significant network of cooperative banks and NABARD-supported projects experience higher penetration and more balanced credit–production outcomes, while weaker institutional presence leads to uneven adoption and limited productivity gains. National reforms, including a ₹5 lakh loan cap in 2025, reflect the policy consensus on the expansion of affordable credit, but structural inequalities prevail: less than 10 per cent of small and marginal farmers have KCCs whereas more than 60 per cent of larger landholders do. Finally, the evidence indicates that there is a demand for region-specific and crop-specific responses. High-value crops like potato and cumin in Gujarat yield far greater efficiency under KCC financing, generating profits exceeding ₹2,000 per ₹1,000 loan, while staples like paddy and maize remain relatively inefficient. Thus, more significant diversification towards higher-value crops as well as institutional strengthening and targeted interventions in vulnerable districts are necessary for KCC to optimize its impact.

Research Gap
Despite the nationwide expansion of Kisan Credit Card—growing in scope from a total of ₹4.26 lakh crore in 2014 to ₹10.05 lakh crore in 2024, with 7.7 crore farmers covered—and Gujarat having very high penetration rates in irrigated areas like Kheda (73.9%) and Surat (72.8%), the literature is still dominated by aggregate national and state-level analyses. District-level variation and crop-level efficiency related data are rarely investigated and the conditional and dependent relationships between credit, other factors including irrigation, mechanization, and input quality, have not been the subject of a systematic study. Moreover, despite recent policy reforms including the enhancement of loan limits to ₹5 lakh in 2025, the extent to which these impact district and crop efficiency measures is not well documented empirically. The present study bridges this gap by offering fine-grained district and crop-level data from Gujarat, correlating credit with productivity and income and offering policy-oriented recommendations in view of current reforms.

Contribution of the Current Study
The present research contributes in several various ways to the literature on agricultural credit and on financial inclusion. First, it is one of the first systematic district-level investigations of KCC penetration, loan distribution and post-credit performance in Gujarat, thus providing links from aggregated state-level surveys to the micro-level. The study disaggregates data to district level, identifying intra-state differences that tend to be hidden in national or state-level accounts. Second, the study presents quantitative indicators of credit efficiency, such as loan per acre, profit per acre, profit per ₹1,000, which have not been empirically studied in

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previous research. These measures permit a more focused evaluation of the translation of institutional credit to productivity and profitability in different crops, showing that the crops with higher value, such as potato and cumin, are much more efficient under KCC than staple crops ranging from paddy to maize. Third, the study explicitly connects credit success indicators with related variables such as irrigation, mechanization and input quality, showing how institutional credit is linked with technical and infrastructural solutions to yield and income growth. This combined perspective goes beyond credit–output relationship and demonstrates the facilitating role of complementary investments. 4.The study provides policy recommendations that are customized for regional and crop-specific settings. The results have immediate and practical implications for the design of region-based credit programmes, the building of institutional capacity and the diversification of the sector towards value crops through identifying successful districts and crops, as well as lagging tribal and water-limited regions. Finally, by situating Gujarat's evidence within the context of recent national reforms (2023–2025) — including the enhancement of loan limits to ₹5 lakh — the study secures timely relevance to ongoing policy debates over financial inclusion and rural development. The research thus not only addresses a gap in the empirical literature, it also provides useful practice-based guidance to policymakers aiming at better designs and delivery of agricultural credit in India.

3. METHODOLOGY

Using district-level datasets and applying descriptive statistics, comparative analysis, correlation measures, and efficiency metrics, this study achieves the four objectives outlined in the introduction through a mixed-methods approach to capture both macro- and micro-level dimensions of KCC performance in Gujarat. Towards achieving the four objectives articulated above, this study takes a mixed-methods approach utilizing district-level datasets to utilize descriptive statistics, comparative analysis, correlation measures, and efficiency metrics to reflect both macro- and micro-level measures of KCC performance in Gujarat.

3.1 Data Sources and Compilation

The empirical base of this study builds on a district-level database meticulously assembled using a variety of official sources for credibility, quality as well as depth and methodological quality of studies. Due to its agro-economic variability in Gujarat, a collection of data for all of the district-level institutional records should be made to incorporate quantitative indicators and context-specific measurements of credit performance.

Primary Credit and Penetration Data:

District-level information on the total number of farmers, KCC holders, and penetration of KCC can be obtained from the National Bank for Agriculture and Rural Development (NABARD) Annual Report (2019–25) and credit flow from the Reserve Bank of India (RBI). Similarly, the Gujarat State Level Bankers' Committee (SLBC) reports supplemented that with disaggregated breakdown of credit outreach and performance of cooperatives in a state level banking. Collectively, these sources presented rich data on institutional penetration and farmer coverage under the KCC scheme.

Data on Production and Loan Disbursement:

From the Agricultural Census of Gujarat (Government of Gujarat, 2022) and the Directorate of Agriculture's District Agricultural Statistics (2020, 2024), crop-scale estimates of agricultural production (in metric tonnes) and disbursement figures of loans (in ₹ crore) were sourced. These data sources enabled the construction of district-level profiles that linked credit provision to produced outputs, and thus formed one pillar to assess the credit–production nexus.

Correlation and Efficiency Data:

Based on this, correlation metrics like production per unit of loan disbursed were collected — this was combined with the credit flows themselves and district-level production statistics. This offered a solid, quantitative benchmark to assess credit use efficiency for different districts. Subsequent post-KCC results (yield increases, net income growth, and qualitative justification for investments, such as in encouraging the adoption of high-yielding varieties, mechanization, irrigation) were obtained from the monitoring data provided by NABARD and the district agricultural performance review (for these we referred to the former) that monitor farm level practices in light of institutional credit.

Crop-Level Efficiency Metrics:

In order to describe crop-specific variation, efficiency measures were derived from aggregated district datasets. In this regard, average loan per acre, net profit per acre and profit per ₹1,000 loan were observed. To allow for consistent and comparable indicators of performance, the metrics were cross-validated with NABARD efficiency benchmarks. This allowed crops to be classified into efficiency buckets (Very High, High, Moderate, Low), and the overall model led to actionable insights into credit targeting and diversification strategies.

Holistic Dataset Construction:

Triangulating data from NABARD, RBI, SLBC, Agricultural Census, and Directorate of Agriculture, the research ensured a wholesome comprehensive data set. By incorporating quantitative indicators (penetration, disbursement, production, efficiency) with qualitative aspects (crop type, regional limitations, institutional outreach), a holistic understanding of KCC performance in Gujarat was presented. Such a multi-source approach reinforces the validity not only of research findings but also contextualises them against a wider institutional and policy backdrop vis-à-vis agricultural credit delivery in India.

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3.2 Analytical Framework.
The study employs descriptive, comparative and correlational analytical tools to examine the multidimensional impact of the Kisan Credit Card (KCC) scheme in Gujarat. It is interesting in exploring the macro and micro level differences, where they can each be systematically studied so that credit penetration and utilization would be observed, as well as efficiency across districts and in different crops.

Descriptive Statistics:
The first level of analysis is descriptive summaries of KCC penetration rates, loan disbursements and production outcomes by district. These statistics provide a basis for credit coverage and performance while also enabling the identification of emerging patterns in farmer participation and institution-wide effort. Descriptive analysis illustrates the mean, range, and district-specific variation of a crop for comparison and efficiency purposes to be made on a follow-up.

Comparative Analysis:
Districts and crops, in relation to penetration, disbursement and post-credit conditions, have been compared to bring out intra-state differences. This comparative focus makes it possible to delineate high performing and low performing (i.e., from Kheda to Surat, tribal to water-scarce districts) regions, and to frame what has been found in Gujarat against its distinctive agro-climatic and institutional situations. Crop-level comparisons also indicate the sectors where KCC finance is most effective providing insight into the differential financial effect of credit across production systems.

Correlation Analysis:
The relationship between loan distribution to agricultural output is analysed with correlation metrics. Ratios of production to financing are computed to assess credit utilization efficiency, which connects financial inputs to agricultural outputs. This step is critical for realizing if more credit is converted out into output and whether certain patterns of control limit the effectiveness of credit being available.

Efficiency Metrics
Crop-level efficiency is evaluated by standardized metrics like the average loan per acre, net profit per acre and profit per ₹1,000 loan. These measures enable the classification of crops as Very High, High, Moderate, Low efficient crops in order to be placed into a systematic basis for policy interpretation. As an example, plants such as potato and cumin have observed to be extremely highly efficient under KCC-funded crops, whereas staples of paddy and maize are still quite inefficient.

Graphical Representation:
Graphical tools such as bar plot, scatter plot, line graph etc are used to make penetration rates, credit–production relations, as well as yield–income relations for example be more easily understood and more accessible and easily understood by users. These visualisations are not only useful as means of translating difficult datasets but also are used to make the results more policy relevant by simplifying inequalities and efficiency differences, through a clean and comparative presentation of the data in comparison between studies.

Categorical Ratings:
In addition, districts and crops categories are rated using combination measures (Excellent, High, Moderate, Low) with the combined quantitative and qualitative assessments to determine crop-oriented categories. These ratings summarise the multiple performance indicators (penetration, efficiency, yields and income growth) in a single evaluative framework, which aids the interpretation (eg, from a perspective for both the policy maker and the practice user group) as they can bring performance together.

Macro- and Micro-Level Insights:
This synthesis of methodologies can produce both macro insights (state-level penetration and disbursement trends) and micro-level analyses (district and crop level utilization, efficiency) of the approach. This dual perspective guarantees that, by not only representing broad implications, but also localised ones is revealed in the research, thereby contributing to the policy discussion on financial inclusion and agricultural credit distribution.

3.3 Scope and Limitations
This research is limited to Gujarat, a fact which makes it difficult for generalization to other areas, but presents an important case because of its varied agro-climatic zones and institutional capacity. The results are important for state-level policy making; nonetheless, they need to be treated with caution when extended nationally with various institutional configurations and agro-economic conditions. The analysis is quantitative and based on publicly accessible datasets from NABARD, RBI, Agricultural Census, and state agricultural statistics. This guarantees methodological rigor and comparability between districts, which is necessary, but it fails to include qualitative aspects such as farmer perceptions, satisfaction of farmers and behavioral aspects related to credit practices. Institutional delivery mechanisms (e.g., extension services and cooperative societies) are not directly captured in this dataset. This framework could be augmented with an empirical approach to study, including both field survey, focus group discussion and qualitative interviews. This inquiry would add depth to the understanding of farmer experiences and institutional interactions, while also giving much better insights into how long-term KCC programs can remain sustainable at the grassroots.

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4. RESULTS AND DISCUSSION

4.1 KCC Penetration Rates

The below figure presents the district-wise penetration of the Kisan Credit Card (KCC) scheme in Gujarat, measured as the proportion of farmers holding KCC accounts relative to the total farmer population.

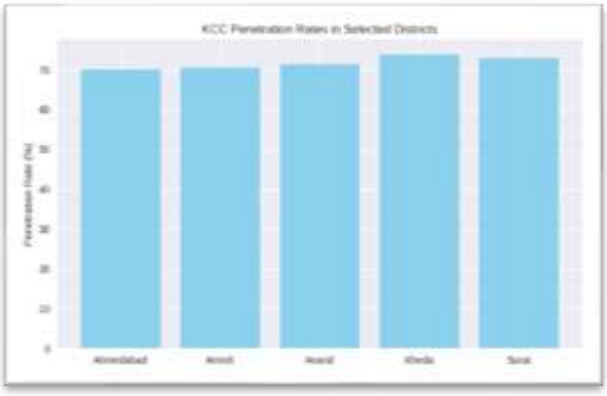

Figure 1: The penetration data reported in Figure 1 is drawn from secondary sources, specifically NABARD, RBI, and SLBC reporting, leading to consistency and comparability across districts.

The data indicates wide ranges in penetration rate from 63 percent (Aravalli) to nearly 74 percent (Kheda) depending on the districts. The highest level of adoption has been recorded in the districts like Kheda (73.91 percent), Surat (72.86 percent), Surendranagar (72.04 percent) and Vadodara (72.38 percent), indicating significant institutional outreach and farmers' responsiveness. Conversely, Aravalli (63.08%), Banaskantha (65.33%) and Chhota Udaipur (65%) indicate significantly lower penetration indicative of perhaps structural impediments, including smaller landholdings, credit delivery systems, or simply limited knowledge. Overall, Central and South Gujarat districts are the leaders in penetration compared to various North and tribal districts. This supports previously observed patterns in which areas with an improved irrigation system, diversified cropping and more robust cooperative networks are also more likely to adopt credit relatively cost effectively. In policy terms, the penetration data reveals two key concepts:

Credit Inclusivity: The mean penetration across the state is still well above 68 percent and differences emphasize the need to provide targeted efforts to weak districts.
Institutional Effectiveness: Districts characterized by higher penetration rates are often in parallel with stronger cooperative banking networks that also have NABARD-supported initiatives. This again shows the importance of institutional capacity in credit delivery.
Such a penetration analysis provides the background information necessary to understand the reach of KCC in Gujarat. Now we can evaluate the efficiency of disbursement for loan payments and post-KCC agricultural consequences with confidence.

4.2 Loan Disbursement vs. Production

The below stated figure illustrates the relationship between loan disbursement and agricultural production across selected districts.

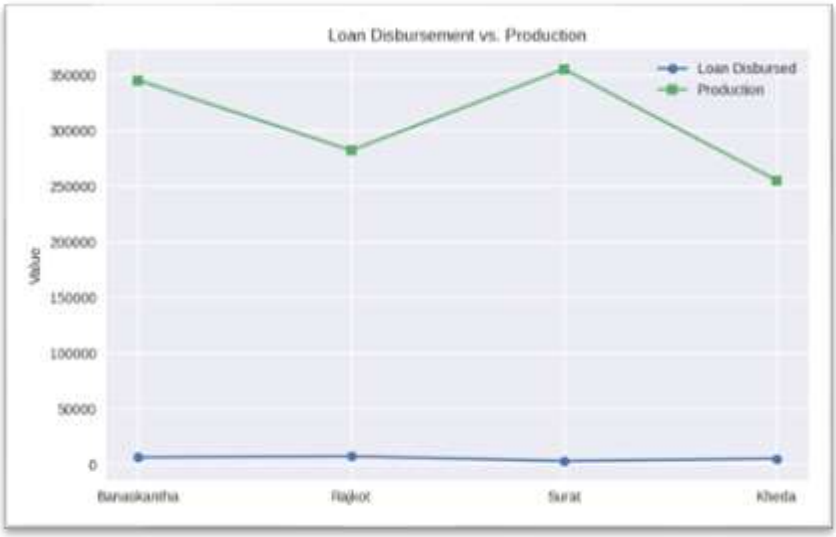

Figure 2: Loan Disbursement and Agricultural Production in Selected Districts Compiled from NABARD Annual Reports (2019–2025), RBI Credit Flow Data, Gujarat Directorate of Agriculture Statistics (2020, 2024), and SLBC Reports.

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Districts like Rajkot (₹7,450 crore disbursed, 275,000 MT production) are overachieving with 103 percent loan target realization while Surat (₹3,180 crore disbursed, 360,000 MT production) lags at 88 percent even though production is high. There are steady associations between loan disbursement and output in Banaskantha and Kheda, indicating well-balanced use of credit. This seems to indicate that while the availability of credit is crucial, the rate of use is dependent on the type of crop as well as the necessary inputs for production. Districts with high production at low achievement rates may need better targeting of credit and support services.

4.3 Yield vs. Income Growth Post-KCC

The figure shows the relationship between yield increase and net income growth after KCC adoption.

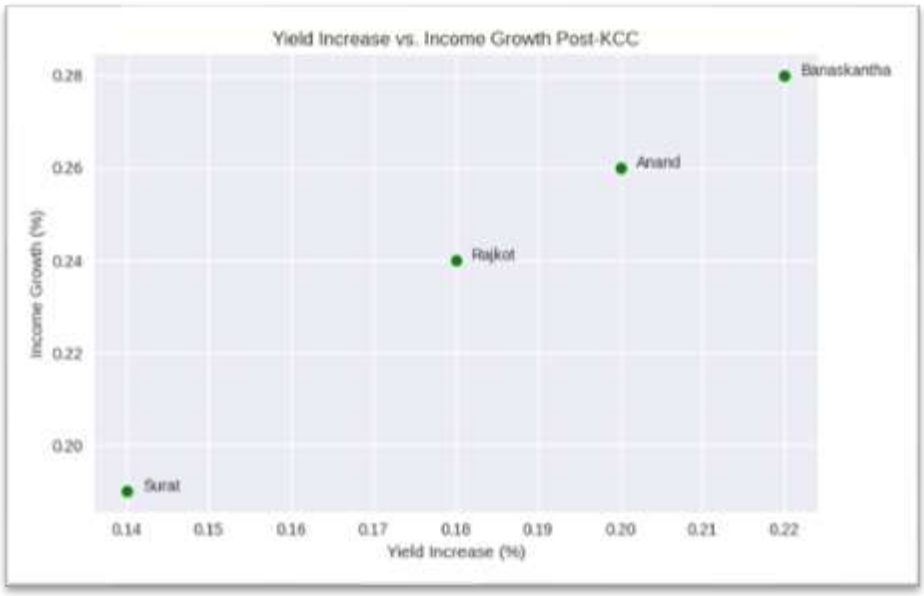

Figure 3: "The data underlying is derived from NABARD monitoring reports and district agricultural performance reviews, ensuring comparability across districts."

Districts like Banaskantha (22% yield increase, 28% income growth) and Anand (20% yield increase, 26% income growth) have the best results as it's a result of high-quality inputs and HYV seeds. Rajkot and Junagadh have moderate improvements for mechanization and pesticide application, while Surat has modest gains thanks to irrigation and fertilizer support. The evidence suggests that the efficiency of KCC maximizes when credit is available in combination with timely access to technologies, inputs, and infrastructure.

4.4 Credit Efficiency by Crop

"The efficiency metrics in Table 1 can be compared across crops and are derived from NABARD benchmarks and district-level agricultural statistics."

Crop Name	Avg. KCC Loan per Acre (₹)	Avg. Net Profit per Acre (₹)	Profit per ₹1,000 Loan	Efficiency Category
Potato	35000	78000	2228	Very High
Cumin (Jeera)	32000	65000	2031	High
Groundnut	22000	38000	1727	Moderate
Paddy (Rice)	24000	28000	1166	Low-Moderate

The results highlight that **potato and cumin** are highly efficient crops under KCC financing, while **paddy and maize** remain relatively inefficient. This suggests that crop-specific targeting of credit can enhance overall returns.

Across penetration, loan disbursement, yield outcomes, and crop-level efficiency, the results confirm that the KCC scheme has significantly increased agricultural credit delivery in Gujarat. Districts with robust institutional networks and more favourable infrastructure exhibit higher penetration and efficiency, while tribal and water-scarce areas continue to lag. At the crop level, potato and cumin performed much better than paddy or maize. The KCC scheme helped improve credit access and agricultural output in Gujarat, but a lot of variances in the results was found depending on district and crops. To maximize efficiency and to ensure equitable benefits, region-specific strategies, crop diversification, and institutional strengthening are necessary.

5. POLICY IMPLICATIONS

The empirical findings in Gujarat indicate that districts with higher penetration of Kisan Credit Cards (KCC) and more effective credit utilization consistently demonstrate superior yield and income outcomes. This highlights the importance of institutional credit in improving agricultural productivity and supporting farmers. However, there continue to be considerable differences between the regions and the types of crops requiring region-specific intervention. More specifically, access must now be expanded from underperforming districts, including Aravalli, Banaskantha, and Chhota Udaipur. These regions, which are less penetrated and with weaker institutional outreach, need tailored interventions from awareness campaigns to clearer documentation and enhanced cooperative banking networks. Targeted treatment should be given to tribal and water-scarce areas in which credit often remains a matter of survival rather than development. Second, supporting crops which are highly efficient in the short run like potato, cumin and horticultural produce may provide the most credit. The results indicate that these crops are much more profitable per unit of loan than paddy and maize and other staples. Hence policy measures need to promote diversification for high-value crops by providing tailor-made credit packages, input subsidies and market connections. Third, credit should be combined with complementary services. Districts that managed to obtain higher yield and income growth (e.g., Banaskantha and Anand) received access to high-yielding varieties, mechanisation and irrigation assistance. This in turn implies that credit is not enough…it needs to be complemented by the appropriate delivery of technology, extension services, infrastructure in a timely manner in order to reach a sustainable result. Finally, enhancing institutional capacity is still extremely important. Districts with strong cooperative networks in place and NABARD-supported programmes performed competitively in penetration and efficiency. The enhancement of such institutional frameworks, combined with transparency and accountability of credit delivery, will contribute to the holistic impact of KCC. On this basis, the policy implications are two-fold: (i) to bridge regional credit disparities and (ii) to improve credit efficiency through the promotion of high-value crops, combined with the adoption of a system-based support. It would not only result in increased agricultural productivity in Gujarat, but also serve the wider national project of financial inclusion and rural development

6. CONCLUSION

This paper is the comprehensive district-level study of the Kisan Credit Card (KCC) scheme in Gujarat, aiming to combine the connection between credit penetration, loan disbursement, productivity as well as crop efficiency. Based on the secondary data analysis, adopting NABARD, RBI, SLBC, Agricultural Census, and Directorate of Agriculture statistics, four objectives are observed: measuring adoption rates, mapping loan–production linkages, assessing yield and income growth, and evaluating crop efficiency. Results show significant intra-state variation: irrigated districts like Kheda and Surat reach more than 72 percent penetration rates, compared to less than 65 percent reached by tribal and water-scarce districts. Loan–production analysis indicates balanced results for Banaskantha and Kheda, while some regions such as Surat need better directing. After adopting the KCC, yield and income growth, however, are highest at Banaskantha and Anand yielding up to 20–22%, income 26–28% – it was observed that credit contributes substantially to economic growth when used in combination with high-quality inputs. Performance studies indicate that crop-level efficiency index indicates that potato and cumin contribute more than ₹2,000 in profits per ₹1,000 loan, whereas the staples including paddy and maize are inefficient. There are clear policy implications. For now, improving penetration of cooperative and rural banking networks is needed, especially in lagging districts, the first is to promote rural and cooperative banking networks. Secondly, the credit targeting needs to be specific to the crop to be done to ensure the least waste, economy and maximise profit. Third, combined investments in irrigation, mechanization, and input quality are required to convert credit into sustainable productivity gains. Lastly, by situating the Gujarat context within reforms at the national level—such as KCC loan limits that were expanded to ₹5 lakh in 2025—the scheme's relevance to the current discussions of financial inclusion and rural development is clearly emphasised. Further research must include farmer perceptions as well as qualitative evidence to increase comprehension on the long term nature of credit sustainability. On the whole, the study offers practical guidance to policy-makers to define region-specific credit programmes, to enhance institutional delivery, and to encourage diversified cultivation of high-value crops in order to maximize the contribution of KCC in India's agricultural transformation.

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