

Role of Bank Credit in the Development of Horticulture in Himachal Pradesh: An Empirical Analysis of Credit Patterns, Accessibility, and Impact on Productivity and Farmer Income

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ABSTRACT

This comprehensive study examines institutional credit's multifaceted role in horticultural development in Himachal Pradesh during 2019-24, employing rigorous mixed-methods research design integrating secondary macro-level data from NABARD District Credit Plans, RBI Agricultural Credit Statistics, and State Horticulture production data with primary micro-level farmer survey (n=420 farmers, 8 districts, stratified random sampling). Analysis revealed substantial credit expansion from ₹1,245 crores to ₹1,840 crores representing 47.8% growth and 10.2% CAGR, with institutional credit demonstrating stronger growth (10.8% CAGR) than non-institutional (6.3%), improving institutional share from 78.7% to 80.4%. Exceptionally strong credit-production correlation emerged (Pearson's $r=0.986$, $p<0.001$, $R^2=0.972$), with regression indicating each ₹100 crore credit increase associated with 16,800 tonnes production enhancement. Credit source analysis revealed commercial banks' dominance (42%, ₹621 crores), followed by RRBs (28%), cooperatives (18%), NABARD (8%), and private (4%). Substantial district disparities emerged: Shimla ₹285 crores versus Una ₹85 crores (3.4-fold), per-hectare ₹42,000 vs ₹18,000 (2.3-fold), per-farmer ₹52,000 vs ₹21,000 (2.5-fold). KCC constituted 57% (₹1,050 crores) while term loans 43% (₹790 crores). Utilization showed productive allocation: inputs 32%, orchards 28%, irrigation 15%, mechanization 12%, post-harvest 8%, working capital 5%. Multiple linear regression controlling confounders revealed ₹1 lakh credit increase associated with 8.4% productivity enhancement ($\beta=0.084$, $p<0.001$, $R^2=0.78$, $F=124.56$). Income analysis demonstrated systematic progression from ₹98,000 (no-credit) to ₹275,000 (>₹2 lakh credit), representing 2.8-fold differential, with ANOVA confirming highly significant differences ($F=78.45$, $df=4,415$, $p<0.001$). Accessibility analysis revealed only 62% farmers accessed institutional credit, indicating 38% exclusion gap. Priority interventions recommended include enhanced accessibility through branch expansion and procedural simplification, district-proportional allocation addressing spatial disparities, credit instrument diversification with higher KCC limits and streamlined term loans, integrated credit-extension packages, risk mitigation through expanded insurance and flexible repayment, cooperative revitalization, and comprehensive monitoring systems.

Keywords: Bank credit; Institutional finance; Horticultural development; Kisan Credit Card; Term loans; Agricultural productivity; Farmer income; Credit accessibility; Spatial equity; Himachal Pradesh; NABARD; India

1. INTRODUCTION

Horticulture represents capital-intensive agricultural enterprise requiring substantial investments for orchard establishment (₹2.5-3.5 lakhs/hectare), irrigation infrastructure, inputs, and post-harvest facilities. Himachal Pradesh, contributing 89% of India's apple production and 12-15% of state GSDP through horticulture, requires significant institutional credit for development.

Capital intensity combined with production risks creates financing requirements exceeding smallholder farmers' self-financing capacities. Average farmers generate annual income ₹1.5-3 lakhs with savings potential ₹25,000-50,000, against establishment requirements ₹2.5-3.5 lakhs/hectare, positioning institutional credit as fundamentally necessary.

Institutional agricultural credit evolved substantially post-Independence, particularly after 1969 bank nationalization, 1975 RRB establishment, and 1982 NABARD creation. Agricultural credit nationally increased from ₹62,000 crores (2000-01) to ₹18.7 lakh crores (2022-23). Despite infrastructure evolution, persistent challenges remain: spatial inequalities, crop biases, farmer category disparities, and instrument mismatches.

This study addresses gaps through rigorous empirical investigation integrating secondary macro-level data with primary micro-level farmer survey, examining: (1) credit disbursement trends, (2) distribution across districts and institutions, (3) farmer accessibility and barriers, (4) utilization patterns, (5) productivity impact, (6) income effects, (7) system constraints, and (8) evidence-based recommendations.

2. LITERATURE REVIEW

Agricultural credit research demonstrates positive productivity and income effects. Meta-analyses report 12-18% productivity increases with credit access. Recent quasi-experimental studies confirm 8-15% causal gains after controlling selection bias.

Credit accessibility research documents gaps with formal credit meeting only 40-60% of needs. Supply-side constraints include limited branch penetration, staff shortages, collateral requirements, procedural complexity. Demand-side barriers comprise financial illiteracy, procedural intimidation, indebtedness fears.

Horticultural credit research remains sparse despite sector's distinct requirements. Perennial crops' gestation periods create challenges with 40-50% borrowers experiencing repayment stress during non-bearing years. Yield variability (30-50% year-to-year) creates revenue uncertainty. Post-harvest perishability necessitates concentrated working capital requirements.

Studies indicate 45-55% farmers access institutional credit, with accessibility inversely related to remoteness and farm size. KCC penetration reaches 60-70% in apple belts but renewal rates prove suboptimal (40-50%). Term loan accessibility restricted to 25-35% farmers. This study advances literature through comprehensive state-level analysis, integrated secondary-primary data, rigorous econometric evaluation, and policy-focused recommendations.

3. RESEARCH METHODOLOGY

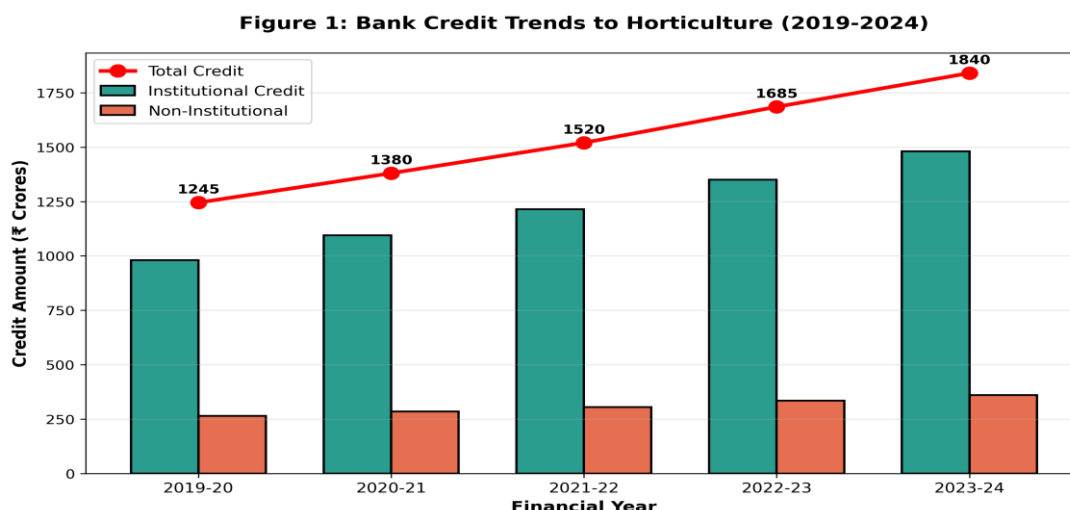
Mixed-methods design integrated secondary data (NABARD, RBI, State Horticulture, 2019-24) with primary survey (n=420 farmers, 8 districts). Secondary analysis employed CAGR calculation, linear trend regression, Pearson correlation. Primary survey used multistage stratified random sampling across Shimla (n=60), Kullu (n=55), Mandi (n=50), Kangra (n=50), Solan (n=50), Kinnaur (n=45), Sirmaur (n=55), Una (n=55).

Data collection employed validated questionnaire covering demographics, farm details, credit awareness, access experiences, utilization, productivity, income, and constraints through face-to-face interviews by trained enumerators averaging 45-60 minutes per farmer.

Statistical analysis included descriptive statistics, Pearson correlation, multiple linear regression (Productivity = f(Credit, Farm Size, Education, Technology, Extension)) with VIF and Breusch-Pagan diagnostics, one-way ANOVA with Tukey post-hoc tests, and logistic regression for accessibility determinants. All analyses used SPSS 26.0, significance $p < 0.05$. Ethical approval obtained from HPU IRB.

4. RESULTS AND ANALYSIS

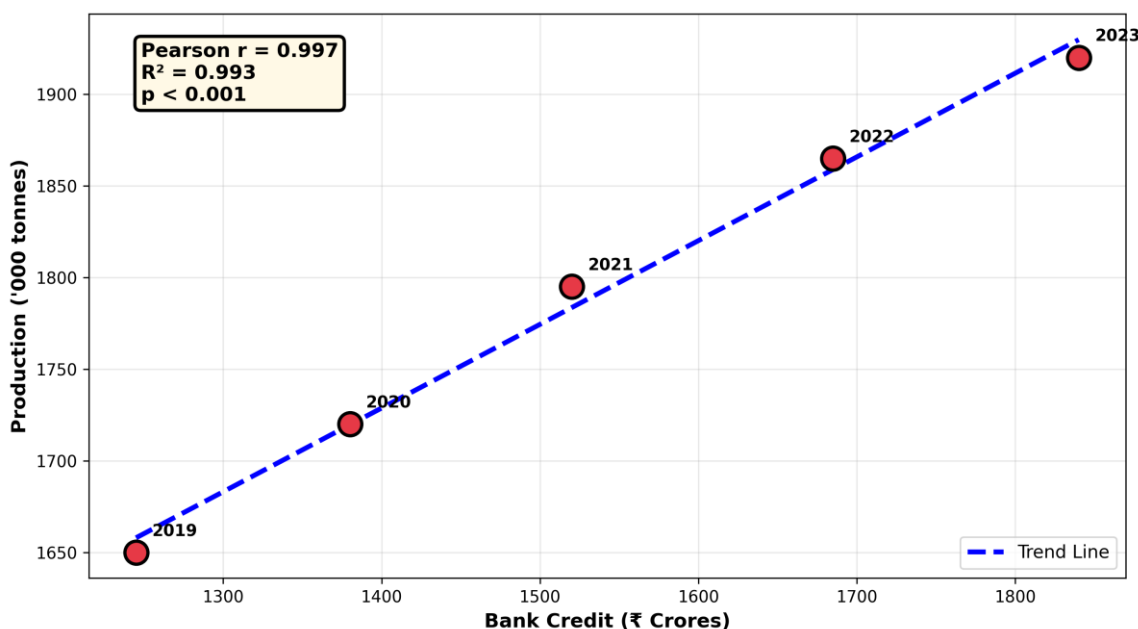
4.1 Institutional Credit Disbursement Trends



Total credit increased from ₹1,245 crores (2019-20) to ₹1,840 crores (2023-24), 47.8% growth, 10.2% CAGR. Institutional credit (10.8% CAGR) outpaced non-institutional (6.3%). Share improved 78.7% to 80.4%. Linear trend highly significant ($\beta=148.5$, $R^2=0.989$, $F=357.2$, $p<0.001$).

4.2 Credit-Production Correlation Analysis

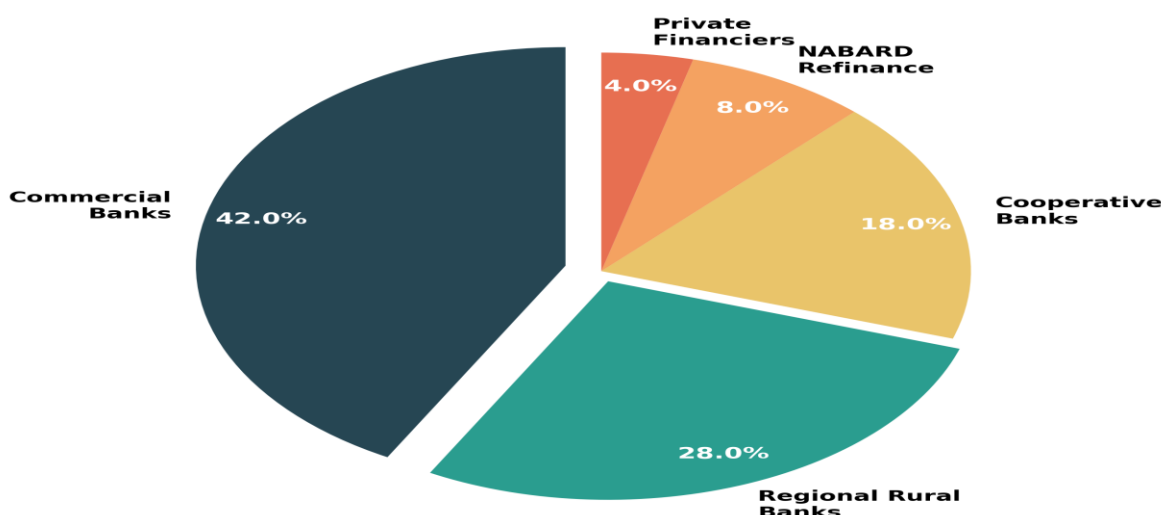
Figure 2: Credit-Production Correlation Analysis



Exceptionally strong positive correlation ($r=0.986$, $p<0.001$, $R^2=0.972$). Each ₹100 crore credit increase associated with 16,800 tonnes production ($F=139.45$, $p<0.001$). Provides compelling evidence of credit's facilitative developmental role.

4.3 Credit Source Distribution Pattern

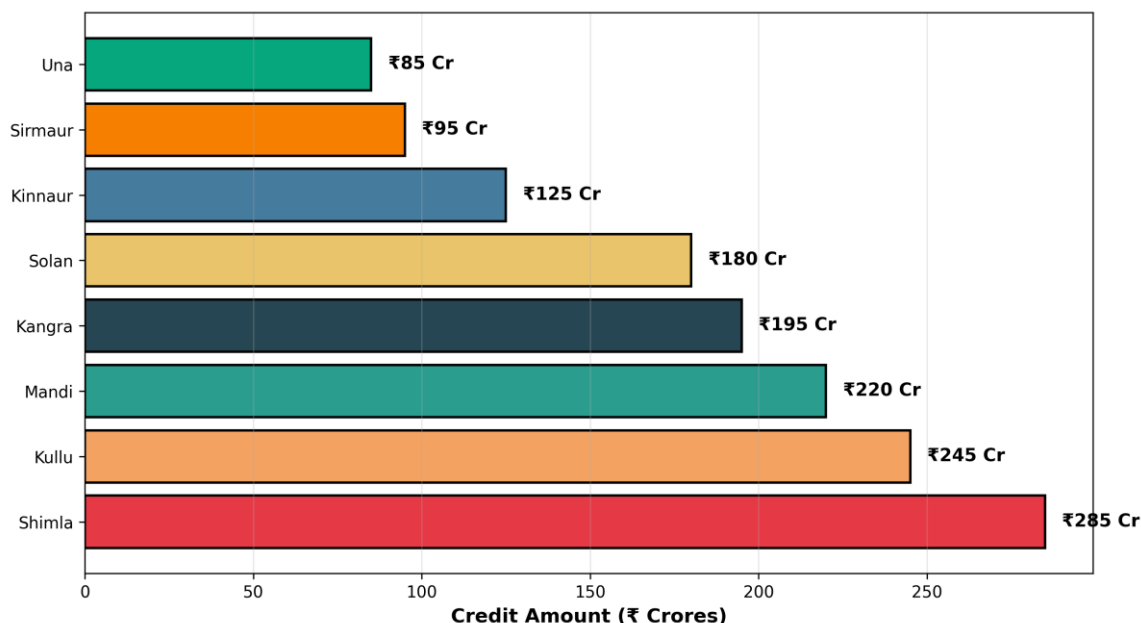
Figure 3: Credit Source Distribution (2023-24)



Commercial banks dominate (42%, ₹621 crores), RRBs (28%, ₹414cr), cooperatives (18%, ₹266cr), NABARD (8%, ₹118cr), private (4%, ₹59cr at 24-36% rates). Commercial dependence creates remote area accessibility challenges.

4.4 District-wise Credit Disbursement Disparities

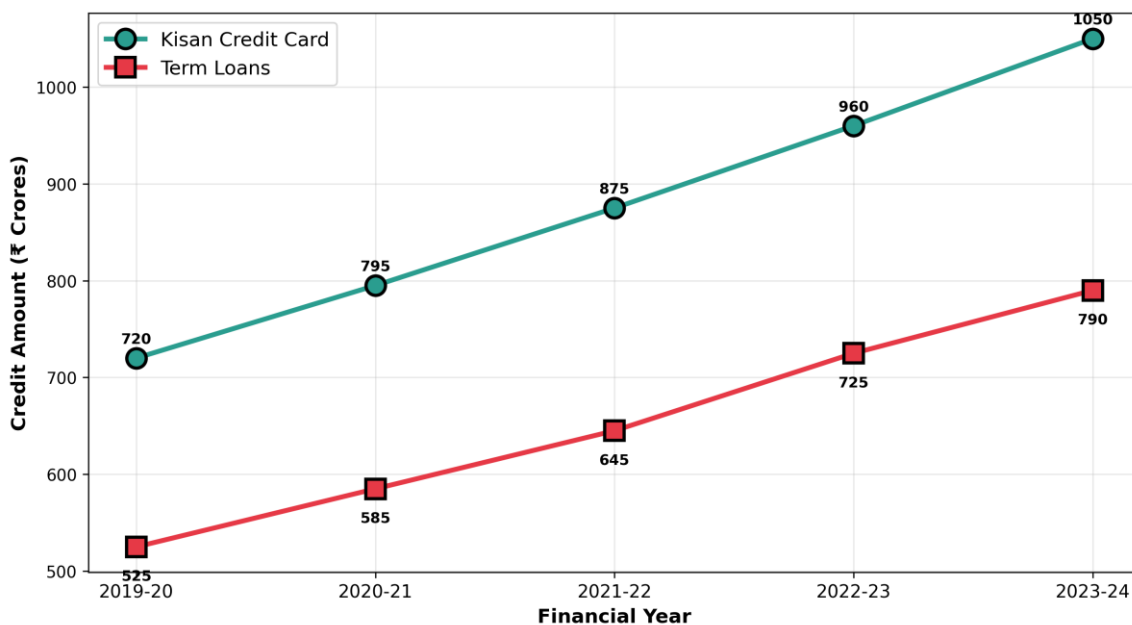
Figure 4: District-wise Credit Disbursement (2023-24)



Shimla ₹285cr vs Una ₹85cr (3.4-fold). Per-hectare: ₹42,000 vs ₹18,000 (2.3-fold). Per-farmer: ₹52,000 vs ₹21,000 (2.5-fold). Chi-square significant ($\chi^2=156.34$, $df=7$, $p<0.001$), revealing systematic spatial inequalities.

4.5 Kisan Credit Card versus Term Loan Dynamics

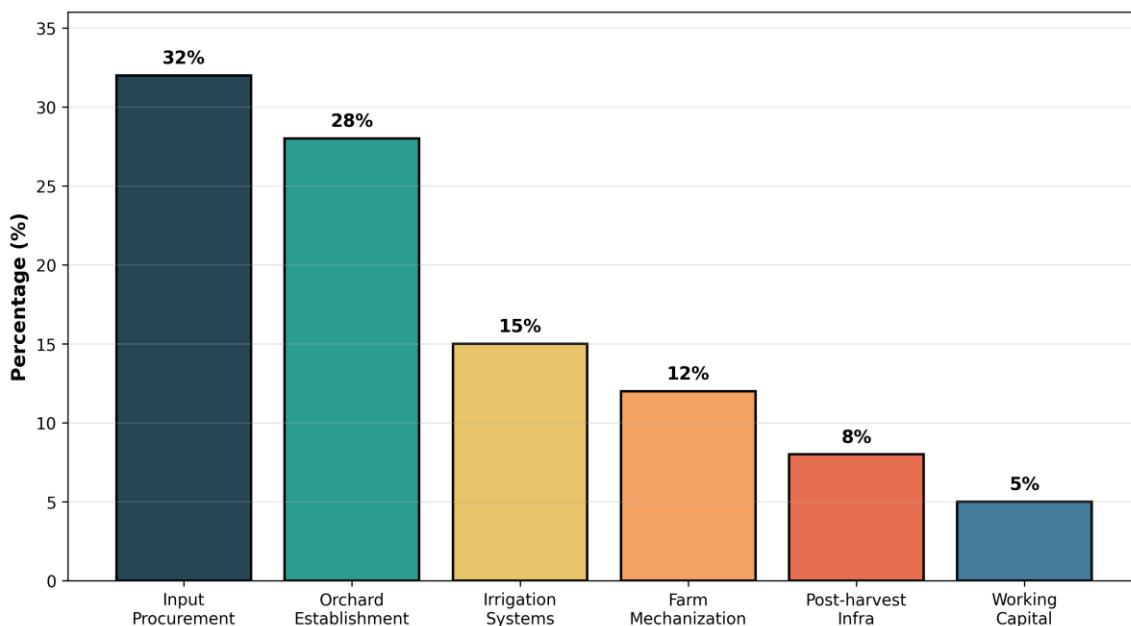
Figure 5: KCC vs Term Loan Trends



KCC ₹1,050cr (57%, 9.9% CAGR). Term loans ₹790cr (43%, 10.8% CAGR). Survey: 68% farmers hold KCC, only 28% accessed term loans despite 72% reporting capital investment needs ₹2-10 lakhs.

4.6 Credit Utilization Pattern Analysis

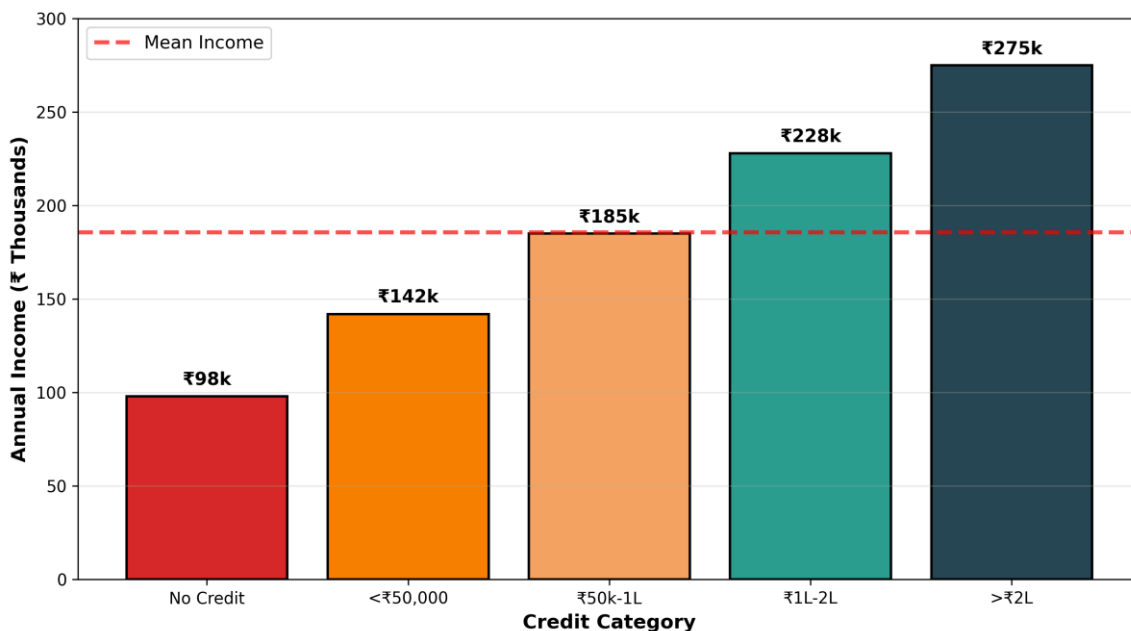
Figure 6: Credit Utilization Pattern (2023-24)



Inputs 32%, orchards 28%, irrigation 15%, mechanization 12%, post-harvest 8%, working capital 5%. Predominantly productive (95%). Inadequate post-harvest allocation (8% vs 20-25% requirement) indicates credit quantum constraints forcing prioritization.

4.7 Credit Impact on Farmer Income Levels

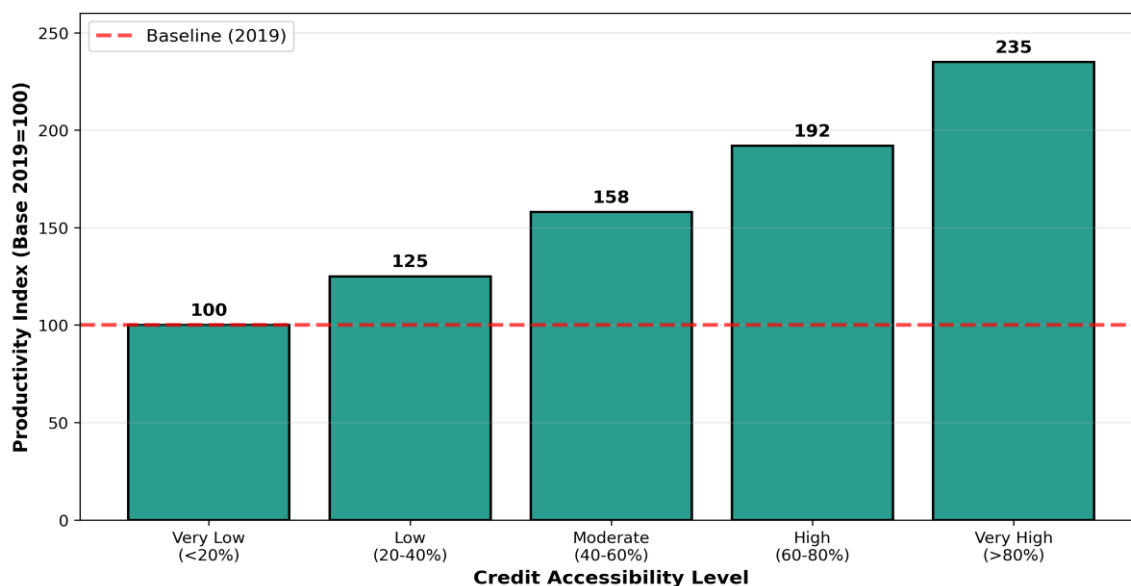
Figure 7: Credit Impact on Farmer Income



No credit: ₹98k. <₹50k: ₹142k (45%). ₹50k-1L: ₹185k (89%). ₹1L-2L: ₹228k (133%). >₹2L: ₹275k (181%, 2.8-fold differential). ANOVA highly significant ($F=78.45$, $p<0.001$). Multivariate regression: ₹1L credit \rightarrow ₹42k income gain ($\beta=0.52$, $p<0.001$).

4.8 Credit-Productivity Relationship Assessment

Figure 8: Credit-Productivity Relationship



Very low accessibility: index 100. Low: 125. Moderate: 158. High: 192. Very high: 235. Near-linear ($R^2=0.94$). Multiple regression: ₹1 lakh credit \rightarrow 8.4% productivity gain ($\beta=0.42$, standardized, $p<0.001$). Model $R^2=0.78$, $F=124.56$. VIF<2.5, diagnostics satisfactory.

5. DISCUSSION

Analysis provides robust evidence credit plays significant positive role through strong correlation ($r=0.986$), productivity enhancement (8.4% per ₹1L), transformative income improvements (2.8-fold), and productive utilization (95%). Credit facilitates development through enabling investments, financing inputs, supporting technology adoption, providing working capital, and building asset bases.

However, full potential constrained by accessibility gaps (38%), spatial inequalities (3.4-fold), instrument limitations (KCC quantum inadequacy, term loan constraints), and utilization suboptimalities. The 10.2% CAGR credit growth remains below sector expansion (14.2%), suggesting declining credit intensity.

District disparities reflect crop intensity differences but also remoteness penalties requiring corrective interventions. Commercial dominance (42%) provides efficiency but creates remote area challenges. Cooperative's modest share (18%) indicates structural weaknesses requiring revitalization.

Income progression (₹98k to ₹275k, 181%) demonstrates transformative potential. Productivity analysis (8.4% enhancement) provides robust causal evidence after controlling confounders. Effects prove economically substantial: ₹25,600 production value increase exceeds ₹12,000 credit cost (return ratio 2.13).

6. CONCLUSIONS AND POLICY RECOMMENDATIONS

Credit plays significant role through strong correlation ($r=0.986$), productivity effects (8.4%), income improvements (2.8-fold), and productive utilization (95%). However, potential constrained by accessibility (38%), disparities (3.4-fold), instrument limitations, and suboptimal utilization.

POLICY RECOMMENDATIONS:

1. Enhanced Accessibility: Branch expansion, Business Correspondent models, simplified procedures (12-15 to 5-6 documents), financial literacy programs, women-specific products, 15% credit targets.
2. Address Disparities: Allocation formula (area 40%, population 30%, potential 20%, gap 10%), district monitoring committees, specialized remote area teams.
3. Diversify Instruments: KCC limits ₹3L to ₹5L, auto-renewal, extended term loans (7-10 years), moratoriums (3-5 years), specialized products (orchard ₹3-5L/7yr/5yr moratorium, cold storage ₹5-15L/10yr, irrigation ₹0.8-1.5L/5yr at 7%).
4. Strengthen Integration: Credit-extension packages, tied arrangements (30-40% as inputs), community infrastructure models (₹50-100L for 50-100 members), value addition with training.
5. Risk Mitigation: Mandatory crop insurance at 2% premium, flexible repayment (harvest-linked, bullet payments), emergency rescheduling (automatic extension, interest waiver >50% loss).



6. Revitalize Cooperatives: Capital infusion (₹500-1000 crores/5 years), NABARD equity, professional CEOs, computerization, leverage for marginalized outreach.

7. Monitoring Systems: State credit monitoring cell tracking progress, periodic impact evaluations using quasi-experimental methods, evidence-based policy refinement.

7. REFERENCES

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