



Digital Agriculture and Institutional Credit: Evaluating AI-Driven Credit Risk Management in Kisan Credit Card Scheme

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ABSTRACT

Agriculture infrastructure is the most sensitive and undoubtedly one of the most important determinants for development of the economy, Being backbone of the economy, for the reason many reforms have been taken place from time to time to provide good base to boost production capacity of the sector as it contribute approximately 16% to 18% of India's overall Gross Value Added (GAV) farming continue to be the primary source of livelihood and provide employment for country's population for the only reason it is consider as primary source of daily bread butter among the community people who are especially in search of a cost-effective source of credit. The agriculture sector's contribution to India's GDP is estimated to be around 17-18. Agriculture is subject to numerous risks and unpredictable weather patterns, which make it more difficult to obtain sufficient credit to make investments for the preparation of land and the purchase of various farming inputs, and the employment of advanced technology in cultivation. Commercial Bank and other Cooperative banks are one of the major sources of credit suppliers to the small cultivators, but due to the uncertainty risk associated with agriculture, resulting in crop failure, leads to heavy losses for banks that depends on the sophistication of agriculture but cannot yield fruitful results ultimately it reduce the credit limit and apply tools which are in capable of assessing the intricacies of agriculture concern strict rule adherence before availing credit to the sectors but ultimate in affect to production capacity due to non-availability of funding in adequate quantity which directly affect the sustainability and food scarcity.

KEYWORDS: Kisan credit card, Agriculture Credit Risk Assessment, Commercial banks.

1. INTRODUCTION

India is a home of 378 million people, out of which 54.6% of the total workforce is engaged in agriculture and allied activities, where, according to the 2021 census, it accounts for 18.8% of GAV contributed from the agriculture sector; therefore, the agriculture sector is considered the backbone of the economy. Inclusion of funds to the agriculture sector is very crucial as cultivation requires huge amount as initial investment for preparation of land crop sowing and maintenance of crop the revenue from crop realized after it harvested and sold which can be several month after the initial month The Government takes various initiative for improvement of the sector Agriculture is full of risk and uncertainty which make it more difficult to acquire agriculture credit in sufficient

quantity. The dependence on credit is a reality for a vast number of farmers worldwide. It is not a sign of mismanagement but rather a reflection of the economic realities of a profession characterized by high risk. Intuitional credit schemes like Kisan Credit Card (KCC) are designed to address this fundamental need by providing timely, affordable, and accessible credit for the agriculture sector, which is associated with the risk of non-returning of credit due to natural climatic weather forecasting and other associated risks like crop failure, which frequently fall short in effectively assessing the intricacies of agricultural concerns.

Artificial Intelligence as robust in financial services has revolutionary and an open new door and opportunity in recent years for improving credit risk assessments. AI have provided more sophisticated information for maintaining credit risk assessments in banking sector, especially in agriculture sector which is quite strenuous to acquire adequate timely and cost effective funding to make investment in purchase of inputs required for agriculture, employing advanced tools and technology that raise production, that enables banks to assess the risk of returning loan amount by using data or objective measures not just the ability of the borrower to repay or even their capability to repay the loan amount Rural indebtedness which become the major cause of farmers suicide in rural area in several states, mostly affecting small and marginal farmers.

2. CONTRIBUTION OF THE PAPER

When banks use AI to evaluate agriculture credit risk, they stop looking just at static financial documents. Instead, AI combines satellite imagery, real-time weather models, historical crop yields, and soil metrics via India's Digital Public Infrastructure (like AgriStak) to build a "digital twin" of a farm.

3. LITERATURE REVIEW / RELATED WORK / BACKGROUND STUDY

The study focuses on changing scenarios in agriculture credit risk assessment after introducing AI in agriculture credit risk assessment in an age where an adequate, timely supply of credit is very challenging, Machine Learning Technologies for Digital Credit (BS Narasimha, PS Saiprasanna) and other paper by written by (J. Suthar). AI completely transforms many financial services industries, especially when it comes to agriculture. The practical and ethical contributions that lie in how AI is used by Indian Financial institutions with reference to the Kisan Credit Card credit tool to analyse agricultural credit risk.

4. RESEARCH METHODOLOGY

Primary Data: information which collected directly by surveys of farmers in Gondia, interviewed with regional bank managers, or field observations

Secondary Data: Government Report from Ministry of Agriculture, RBI report on institutional credit, historical weather patterns, and satellite data from ISRO or open -source portals.

JUSTIFICATION OF PROBLEMS

The present paper tries to review that Commercial Banks are playing a leading role in the supply of agricultural credit, but their coverage was limited, due to the slow and costly infrastructure of manual verification of documentation, which is time-consuming and affects the production capacity of farmers who often urgently need funds for sowing or irrigation purposes. AI-Driven many advantages of financial and Non-Financial services in agriculture that help farmer's capacity to enhance their production and maintain sustainability but if we try to view another side the potential of AI model in the risk assessment of agriculture credit and its influence on commercial bank lending policies is not well supported by actual data, many farmers have ownership papers

revenue records or ID proofs only in physical form where on other side many land records are still in local language and hand written form, making verification more difficult.

OBJECTIVES

Examining how AI-driven credit risk assessment is changing agricultural lending procedures in Indian Commercial banks

1. Examining AI perspective in driven credit risk assessment and reforms in agricultural lending pattern in adopted by Institutional credit system.
2. To evaluate the problems which identified during implementation of AI risk Driven.
3. To examine how AI mould to represent agriculture credit risk.

SOURCES OF CREDIT

Agriculture credits are grouped into two categories: (1) Institutional sources, (2) Non-Institutional sources. Institutional sources include Cooperatives Societies, Commercial Banks, and other government agencies disbursing agricultural credit through a multi-agency network. Commercial banks provide loans in short-term and long-term, as per the purpose of the loan, to meet their urgent and timely needs for purchasing inputs, necessary equipment, and payments for infrastructure.

Commercial Banks are pioneering in creating new models of providing agriculture credit, and they also try to address the diverse and evolving needs of cultivators, and leverage government schemes and technology, which adds to the flexibility in lending approach. Finance is a very important ingredient in agriculture. The Reserve Bank of India gives special preference to the sector for inclusion of funds jointly with other Cooperative and Commercial Banks through the KCC scheme, which ensures that farming enterprises receive a sizable percentage of loans for boosting and enhancing agricultural outputs.

POTENTIAL OF AGRICULTURE CREDIT IN THE DEVELOPMENT OF RURAL AREAS

Agriculture credit, acting as a catalyst for rural growth and poverty reduction, provides farmers and other rural residents with the financial resources they need to improve their livelihood and adopt modern technology in cultivation and effectively in the broader economy

1) Enhancing Agriculture Productivity and Income:

Supply of enough loan amount which help farmers to purchase required inputs of better quality seeds, fertilizer, pesticides, and animal feed. This leads to the overall development of crop yields and farm productivity.

2) Employ Advance Technology.

Availability of agriculture loan in timely and sufficient quantity which enhance the confidence of farmers to employ their resources for betterment of economic resources and advance infrastructure on the farm, such as tractors, threshers, and bearing hiring charges for availing storage house facilities.

3) Financial inclusion for Allied activities:

KCC also provides loans for other businesses like dairy, poultry, and fisheries, which helps to meet their expenses in the off-seasons

Embracing AI can create opportunities for the low-income group of marginal farmers.

1) AI enables the design of products to meet more customers' needs and, side by side, incentivizes financial services providers (FSPs) who engage themselves in serving underserved customers at the last mile, which is also

helpful in eradicating major barriers of financial inclusion to the most urgent sector and also reduce the burden of high interest cost.

2) AI has substantially reduced cost throughout the financial services value chain, altering the cost of customer acquisition and retention and of processing financial transactions India's digital infrastructure, which includes Unified Payments Interface UPI India Instant Payment System, and Aadhaar, India's biometrics System, and an AI-driven conversational interface, provides suitable financial products for individuals living in remote areas and those with low literacy.

AI Contributions to the Agriculture Sector

AI enables the joint provision of financial and non-financial services simultaneously, such as giving weather prediction related information to smallholder farmers so that they can prepare in advance and also offering investment advice. Digital Green's development of farmer chatbots to provide real-time personalized advice to small-scale farmers, along with financial services. Digital Agriculture Mission aims to leverage technology farming practices and empower a farmer-centric digital ecosystem, improving transactions in government schemes and promoting innovation in the sector. Key aspects of digitalization in agriculture: Digitalization Public Infrastructure (DPI) that also supports the Digital General Crop Estimation survey (DGCES)

POTENTIAL OF FINANCIAL SERVICES PROVIDERS

Several traditionally underserved at the last mile, assessing loans was out of reach for low-income farmers due to the lack of credit history and collateral. However, the growing digital trail started to shift how credit scoring and credit risk assessments are conducted. These histories make low-income customers marginal farmers more viable for loans, especially as AI algorithms can use alternative data sources like digital transactions, utility bill payments, inventory purchase or sale, or cash flow to assess creditworthiness with High-quality loss. This leads to an increase in the habits of farmers, resulting in more efficient and specialized loan offerings.

Aadhaar and PAN Link to Your Bank Account

E-KYC (know Your Customer). When you open a bank account, the bank uses your Aadhaar and PAN for electronic verification; This process is called e-KYC. It allows them to confirm your identity and address instantly without the need for a lot of physical paperwork.

Credit History and Financial Transactions: your PAN is linked to all your major financial transactions, including loan and investment bank needs, which require verification of your creditworthiness. They use your PAN to access this information.

RISK MANAGEMENT

To facilitate farmers in minimizing the risk of crop failure due to natural disasters and other climatic changes, by combining agricultural financing with insurance products for the General Crop Estimation Survey, the DAM digital agriculture mission is designed for the General Crop Estimation Survey.

The traditional loan monitoring process for these KCC Cards has been challenging due to manual verification of documents, which was quite slow, and the scattered nature of agricultural lands. Digitalization aims to streamline government schemes, crop loans, and the insurance system by providing accurate data on crop area and yields, reducing paperwork, and improving accessibility.

AI for land and crops verification, providing.

An AI platform has been developed for the large-scale analysis, real-time monitoring, and historical satellite imagery to verify land ownership and assess crops due to changes in weather patterns and crop prices. This allows proactive intervention and tailored collection strategies, such as offering payment extensions or restructuring loans based on fluctuations in circumstances.

Detection: AI can check on fraudulent applications and activities by analyzing patterns and manipulating data to ensure the integrity of the lending process.

5. CONCLUSION AND FUTURE SCOPE

The current studies highlight how AI has new infrastructure for the agriculture industry and is promoting the adoption of new technologies, including digital tools among farmers, like Government initiatives such as the National E-Governance Plan in agriculture, and developments of farmers' portals and mobile applications to promote smart agriculture. But there are many farmers who cannot afford smartphones, and many farmers living in remote areas suffer from connectivity problems. No doubt AI provides fast verification of data, which helps to supply loan requirements to urgent funds for sowing or irrigation purposes, and many farmers have ownership papers and revenue records or ID proof only in physical form. On the other side, many land records are still in the local language and handwritten form, making verification more difficult. Many issues related to marginal farmers and many issues with model accuracy, data availability, and ethical issues that are yet to be overcome.

6. RESEARCH INTEGRITY STATEMENT

The authors declare that the manuscript is original, complies with the journal's plagiarism and AI usage requirements, has not been published or submitted elsewhere, and that all applicable ethical guidelines have been followed in conducting, reporting, and publishing the research.

7. REFERENCES

- 1) www.scribd.com
- 2) KCC/PDF Artificial Intelligence Scribd
- 3) www.arxiv.org
- 4) AI-Driven Credit Risk Assessment in Agriculture: A Case Study of Indian Commercial Banks