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# Risk Experiences and Management Strategies in Primary Agricultural Credit Societies in Siddharth Nagar District, India

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## Abstract

*Primary Agricultural Credit Societies (PACS) play a crucial role in promoting rural financial inclusion in India; however, they face several risks that affect their sustainability and operational performance. This study examines the risk experiences and management strategies adopted by PACS in Siddharthanagar District, India. Primary data were collected from 60 PACS through a field survey conducted in 2025 using convenience sampling. Descriptive statistical tools, including mean, standard deviation, and ranking techniques, were employed for data analysis. The findings reveal that credit risk (M = 5.73, Rank = 1), operational risk (M = 5.32, Rank = 2), and liquidity risk (M = 4.58, Rank = 3) were the major risks experienced by PACS. External auditing (M = 5.90) and internal auditing (M = 5.70) were identified as the most effective risk identification practices. Portfolio diversification (M = 6.37) and trained staff (M = 6.27) were perceived as important risk mitigation strategies. Findings align with Nepalese and Indian studies on audits and diversification but diverge in undervaluing workshops and technology, possibly due to regional agricultural focus. This research fills gaps in district-specific insights and recommends strengthening governance practices, staff capacity, and climate-adaptive measures to enhance the resilience and sustainability of PACS.*

***Keywords:*** *Primary Agricultural Credit Societies (PACS); risk management; credit risk; portfolio diversifications*

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## Introduction

Primary Agricultural Credit Societies (PACS) play a significant role in strengthening rural financial inclusion and supporting smallholder farmers in India through the provision of agricultural credit, input supply, and related financial services. In rural states such as Uttar

Pradesh, where agriculture continues to employ a substantial proportion of the workforce, cooperatives serve as important institutional mechanisms for enhancing agricultural productivity and rural livelihoods. Siddharthanagar District, located in eastern Uttar Pradesh, is predominantly dependent on agriculture, particularly the cultivation of rice, wheat, and sugarcane. The district has a large network of cooperatives operating in the credit, dairy, and fisheries sectors, serving thousands of rural households. Despite their socio-economic importance, PACS face multiple risks that threaten their operational sustainability and long-term effectiveness (Ministry of Cooperation, n.d.; Tripathi, n.d.).

Risk management has become increasingly important for agricultural cooperatives because of growing economic, environmental, and institutional uncertainties. Agricultural cooperatives are highly vulnerable to credit defaults, liquidity constraints, operational inefficiencies, governance weaknesses, and market fluctuations. In addition, climate change has intensified the exposure of rural institutions to floods, droughts, irregular rainfall, and other environmental hazards, particularly in climate-sensitive regions such as Siddharthanagar District (Food and Agriculture Organization of the United Nations [FAO], n.d.). Previous studies have indicated that weak institutional governance, fragmented landholdings, and inadequate technological adaptation further increase the vulnerability of agricultural cooperatives in India (Gorakhpur Environmental Action Group, n.d.; Singh & Singh, 2021; Working Group on Risk Management in Agriculture, 2007).

Effective risk management practices are therefore essential to improve the resilience, profitability, and sustainability of PACS. Proper identification, assessment, and mitigation of risks can enhance financial stability, strengthen member confidence, and contribute to rural economic development. However, limited empirical studies have examined the specific risk experiences and management strategies of PACS at the district level, particularly in Siddharthanagar District. This study aims to fill this gap by analyzing the major risks experienced by PACS and evaluating the strategies adopted to manage those risks effectively.

**Review**

Effective risk management in agricultural cooperatives includes diversification, insurance, financial planning, and community-based strategies to reduce production and market risks (Food and Agriculture Organization of the United Nations, n.d.; Manfredo, 2003; Ningsih, 2025). Crop insurance programs such as Pradhan Mantri Fasal Bima Yojana (PMFBY) and cooperative participation in futures markets help manage yield and price volatility (Verma & Singh,

2025; Working Group on Risk Management in Agriculture, 2007). Moreover, responsible sourcing and risk-based due diligence following OECD-FAO guidelines, along with cooperative resource pooling and climate-smart farming practices, help reduce environmental, social, and climate-related risks (Agriculture Institute, 2024; Food and Agriculture Organization of the United Nations, n.d.; Tripathi, n.d.).

Despite progress in agricultural risk management, significant gaps remain in Siddharthanagar due to limited crop diversification, heavy reliance on food grains, and inadequate infrastructure, which increase farmers' risks (Abhay, 2021). Farmers also face challenges like high irrigation costs and fragmented landholdings, highlighting the need for localized risk assessments (Singh & Singh, 2021). Therefore, this study focuses on risk management practices in Siddharthanagar's agricultural cooperatives to identify strategies that improve efficiency, profitability, and sustainable rural development in India.

PACS, the grassroots units of the three-tier cooperative credit system, face various risks that can affect their operations and farmers' livelihoods (Panda, 2023). Research shows that effective risk management improves profitability, resilience, and credit access, whereas weak practices lead to higher non-performing assets and operational problems (Ningsih, 2025). In Uttar Pradesh, particularly in Siddharthanagar District, studies stress the need for region-specific strategies to manage climate and market risks.

Primary Agricultural Credit Societies (PACS) face multiple risks, including credit, liquidity, operational, and environmental risks. Credit risk, mainly from loan defaults and overdues, is the most significant, worsened by poor borrower evaluation and political interference. In Uttar Pradesh, overdues exceed 40% of loans, limiting lending capacity. Liquidity and interest rate risks arise from poor asset-liability management, as seen in District Central Cooperative Banks. Operational risks include weak governance, lack of technology, and inadequate infrastructure, with many PACS lacking professional management. Environmental risks like erratic rainfall further impact rain-fed regions such as Siddharthanagar. Regional disparities worsen challenges, with eastern Uttar Pradesh PACS experiencing low deposit mobilization and high non-performing assets (23.30%), resulting in net losses (Government of India, 2025; Kumar, 2019; Ravi, n.d.; Singh et al., 2020).

Risk management in PACS involves identifying, assessing, mitigating, and monitoring risks through strategies like loan portfolio diversification, crop insurance schemes such as PMFBY, and improved credit appraisal using models like CAMEL.

Effective practices, including price volatility hedging and community-based insurance, have been shown to improve farmer resilience and cooperative profitability. Cooperative banks also use liquidity buffers and interest rate hedging, though implementation varies. Technological tools like ICT for loan tracking are recommended but face adoption challenges in PACS (CRIBFB, 2024; Ningsih, 2025; Ravi, n.d.).

Empirical research on risk management in PACS is limited but expanding. Studies using the CAMELSC model highlight liquidity and credit risk challenges, underscoring the need for better risk indicators. In Karnataka, variations in financial management emphasize the importance of internal controls, while DCCB studies in Uttar Pradesh reveal poor performance due to high NPAs and liquidity problems. Case studies in eastern Uttar Pradesh, including Siddharthanagar, identify rice production risks linked to planting timing and varietal choices. Overall, cooperatives in low-income areas benefit from integrated risk strategies, though implementation gaps remain (CRIBFB, 2024; Journal, n.d.; Research Gate, 2026; Singh et al., 2020).

Farmer-level studies highlight coping strategies such as diversification and insurance that PACS can support, but specific research on Siddharthanagar's PACS is limited, with existing analyses focusing more on socio-economic vulnerabilities than cooperative-specific risks. While broader literature addresses general risks and practices, there is a lack of district-specific studies for Siddharthanagar, particularly regarding localized risk management, digital tool adoption, and environmental risk integration amid climate change. This study aims to fill these gaps by providing context-specific insights into risk management in Siddharthanagar's PACS (Senapati, 2020; ResearchGate, 2025).

**Methodology**

The present study adopted a descriptive and quantitative research design to examine the research objectives systematically. Primary data were collected from 60 respondents of Siddharthanagar District through a self-administered structured questionnaire. A convenience sampling technique was used to select the sample respondents from the total population based on their accessibility and willingness to participate in the study. The questionnaire consisted of close-ended questions measured using a seven -point Likert scale ranging from "Strongly Disagree" to "Strongly Agree." To ensure the reliability of the instrument, Cronbach's Alpha was used to test the internal consistency of the questionnaire items, while validity was maintained through expert consultation, literature review, and careful construction of the questionnaire in line with the research objectives. The collected data were coded,

tabulated, and analyzed using IBM SPSS Statistics software. Various statistical tools, such as frequencies, percentages, mean, standard deviation, and ranking techniques, were employed for data analysis and interpretation

**Results and Discussion**

**Demographic Profile**

Table 1 summarizes the demographic profile of 60 respondents of PACS.

Table 1

Demographic Background Features of Respondents

| Features | | Frequencies | Percent |
|---|---|---|---|
| Position of Respondents | Manager/Managing director | 31 | 51.7 |
| | Accountant/Finance head | 28 | 46.6 |
| | Others (President, secretary, etc.) | 1 | 1.7 |
| Sex | Male | 40 | 66.67 |
| | Female | 20 | 33.33 |
| Age of cooperatives | Upto 10 year | 1 | 1.7 |
| | 11 to 20 year | 45 | 75.0 |
| | 21 to 30 year | 14 | 23.3 |
| Educational Qualification | Bachelor | 23 | 38.3 |
| | Masters and above | 37 | 61.7 |

Sources: Field Survey, 2025

As per the table, Primary Agricultural Credit Societies (PACS) in Siddarthanagar District operated for 10-20 years (75%); respondents were predominantly managers/managing director (51.7%) followed by accountants/finance heads (46.6%). Two-thirds were male (66.7%), and over half held master's degrees or higher (61.7%).

Level of Experience Towards Different Risks

Table 2 shows the order of ranks of different types of risk experiences by the respondents, where higher scores indicate greater perceived experience. The top risks identified were credit risk (M = 5.73, SD = 1.06, Rank 1), operational risk (M = 5.32, SD = 0.87, Rank 2), and liquidity risk (M = 4.58, SD = 1.73, Rank 3). Mid-ranked risks included

information technology (Rank 4), strategies/market (Rank 5), legitimacy/good governance (Rank 6), and internal control (Rank 7). The lower-ranked risks were capital (Rank 8), reputational (Rank 9), and investment risk (Rank 10). These results suggest cooperatives have stronger experiences with financial and operational risks compared to strategic or external risks.

Table 2

| *Level of Risk Experience, Siddarthanagar District's Co-operatives* | | | | |
|---|---|---|---|---|
| Types of Risk | N | Mean | Std. Deviation | Rank |
| Investment risk | 60 | 2.60 | 0.92 | 10 |
| Reputational risk | 60 | 2.80 | 1.19 | 9 |
| Capital risk | 60 | 2.92 | 0.93 | 8 |
| Internal control risk | 60 | 4.12 | 1.17 | 7 |
| Legitimacy and good governance risk | 60 | 4.17 | 1.51 | 6 |
| Strategies and market risk | 60 | 4.22 | 1.06 | 5 |
| Information technology risk | 60 | 4.35 | 1.38 | 4 |
| Liquidity risk | 60 | 4.58 | 1.73 | 3 |
| Operational risk | 60 | 5.32 | 0.87 | 2 |
| Credit risk | 60 | 5.73 | 1.06 | 1 |

Sources: Field Survey, 2025

The high credit risk experience aligns with common findings in Indian primary agricultural credit societies (PACS), where non-performing assets (NPAs) and poor loan recoveries are prevalent due to borrower defaults and crop failures (Government of India, 2025; Patil et al., 2024; Nikam, 2024). Operational risk, ranked second, reflects governance weaknesses, inefficient management, and internal control deficiencies typical in rural cooperatives (Saha & Ghosh, 2018; Nikam, 2024). The prominence of liquidity risk highlights financial management challenges such as asset-liability mismatches and funding constraints faced by PACS (Misra, 2008; Sharma, 2024).

The lower rankings for strategies/market and investment risks contrast with agricultural settings, where market volatility, including price fluctuations and crop failures, often increases exposure and exacerbates credit defaults (Patil et al., 2024; Nikam, 2024). This difference may stem from the study's inclusion of both urban and rural cooperatives, unlike studies focusing solely on farming-based PACS. Mid to low rankings for governance and internal control risks also diverge from prior research that emphasizes structural weaknesses and regulatory gaps as

key threats (Saha & Ghosh, 2018). Additionally, the low ranking of reputational risk underestimates potential harm from poor loan recoveries and member distrust reported in some regional cooperatives (Singh & Singh, 2023).

Techniques Used by SAACOS to Identify Risk

Table 3 shows the ranks of nine risk identification techniques by mean scores, favoring formal methods: external auditing (M=5.90, SD=0.84, Rank=1), internal audit/inspection (M=5.70, SD=0.72, Rank=2), and monitoring external factors (M=5.48, SD=1.02, Rank=3). Mid-tier includes financial statement analysis (Rank=4) and scenario analysis (Rank=5), while lower ranks go to workshops/incident investigation (Ranks 6-7), benchmarking (Rank=8), and brainstorming (Rank=9), highlighting preference for auditing and monitoring over innovative approaches. Findings align with Nepalese cooperative studies emphasizing external/internal audits and financial analysis as primary risk identifiers in savings/credit societies (Bhandari & Babu, 2025), and financial ratios (e.g., CAR, NPL) for credit/liquidity risks (Paudel, 2021). Monitoring external factors mirrors market/policy risks in Chinese plantation-based farming cooperatives (Liang, 2024). Risk identification also boosts performance in Kenyan SACCOs (Mosioma, 2025).

Lower emphasis on brainstorming/benchmarking differs from U.S. electric co-ops' ERM principles, which advocate holistic methods like workshops and scenario analysis (Cooperative.com, 2023). Reduced focus on technical/natural risks contrasts with prominent market/natural risks in agricultural cooperatives (Liang, 2024), likely due to urban/financial versus rural/agricultural settings.

| Methods Followed | N | Mean | SD | Rank |
|---|---|---|---|---|
| Brainstorming | 60 | 4.52 | 1.42 | 9 |
| Industry benchmarking | 60 | 4.67 | 1.27 | 8 |
| Incident investigation and research | 60 | 5.07 | 0.66 | 7 |
| Risk assessment workshop | 60 | 5.07 | 1.26 | 6 |
| Scenario analysis | 60 | 5.28 | 1.33 | 5 |
| Financial statement analysis | 60 | 5.33 | 1.16 | 4 |
| Monitoring external factors like political, market trends, and economic | 60 | 5.48 | 1.02 | 3 |

| | | | | |
|---|---|---|---|---|
| conditions | | | | |
| Conducting an internal audit and inspection | 60 | 5.70 | 0.72 | 2 |
| External auditing | 60 | 5.90 | 0.84 | 1 |

**Table 3**

*Techniques Used to Identify Risk, Siddarthanagar District's Co-operatives*

Sources: Field Survey, 2025

Perception Towards Risk Mitigation Tools

As shown in Table 4, the perceptions towards risk mitigation techniques were portfolio diversification (M=6.37, SD=0.86, Rank=1), well-trained BOD/staff (M=6.27, SD=0.78, Rank=2), and rigid rules/regulations (M=6.23, SD=0.77, Rank=3). Mid: borrower analysis (Rank=4), defined roles (Rank=5), capital adequacy (Rank=6), risk committee (Rank=7). Lower: workshops/training (Rank=8), separate government body (Rank=9), high interest rates for high-risk loans (Rank=10). This highlights strategic/internal measures (diversification, training, governance) over external/regulatory or pricing adjustments.

It aligns with Indian cooperative banks' emphasis on portfolio diversification to reduce risk and enhance stability, as seen in Punjab central cooperatives, where loan diversification positively correlates with returns and mitigates volatility (Singh, 2014). Mirrors high prioritization of well-trained boards/staff and borrower credibility analysis in Nepalese savings/credit cooperatives for effective mitigation (Bhandari & Babu, 2025). Consistent with rigid rules and clear roles fostering good governance and competitiveness in Kerala agricultural cooperatives (Tripathy, 2021). Capital adequacy echoes liquidity risk strategies in Indian rural cooperatives (Sattar, 2026).

Lower ranking of workshops/training contrasts with ILO recommendations for regular risk management training to build cooperative resilience (International Labour Organization, n.d.). Minimal emphasis on government bodies diverges from calls for stronger regulatory oversight in Indian urban cooperatives to address governance gaps (Reserve Bank of India, 2024). Undervaluation of interest rate adjustments for high-risk loans conflicts with credit risk pricing strategies in Lagos cooperatives, where such measures enhance efficiency (Adetiloye et al., 2020), possibly due to contextual differences in financial vs. agricultural focus.

Table 4

Perceptions Towards the Techniques of Risk Mitigation, Siddarthanagar Districts of India Co-operatives

| Techniques | N | Mean | SD | Rank |
|---|---|---|---|---|
| High interest rates for high-risk loans and vice versa | 60 | 4.68 | 1.23 | 10 |
| A separate, powerful, and fully responsible government body is to be formed | 60 | 4.95 | 0.98 | 9 |
| Risk management workshops and training programs are to be conducted regularly | 60 | 5.40 | 0.72 | 8 |
| A risk management committee is to be formed | 60 | 5.47 | 0.87 | 7 |
| Adequacy of capital with a sufficient cash reserve | 60 | 5.65 | 0.95 | 6 |
| Clearly defined roles and responsibilities of different functionaries regarding risk management | 60 | 6.15 | 0.88 | 5 |
| Analysis of past and present economic position, trustworthiness (credibility), and honesty of the borrower | 60 | 6.22 | 0.42 | 4 |
| Rigid rules and regulations to be followed | 60 | 6.23 | 0.77 | 3 |
| Well-trained BOD members and working staff | 60 | 6.27 | 0.78 | 2 |
| Diversification of portfolio | 60 | 6.37 | 0.86 | 1 |

Sources: Field Survey, 2025

Ways of Effective Risk Management

Table 5 shows the ranks of the 13 perceived ways for effective risk management by mean scores (higher = greater perceived effectiveness). Top methods include risk assessment (M=6.77, SD=0.43, Rank=1), risk mitigation (M=6.65, SD=0.48, Rank=2), risk transfer (M=6.60, SD=0.59, Rank=3), risk identification (M=6.55, SD=0.59, Rank=4), and knowledge of risk management (M=6.48, SD=0.51, Rank=5). Mid-ranked are education/training (Rank=6), good governance (Rank=7), loan guarantees (Rank=8), risk avoidance (Rank=9), and external auditing (Rank=10). Lower ranks go to budget control (Rank=11), information technology (Rank=12), and transparency (Rank=13). The findings prioritize core risk processes and human factors over operational and transparency tools.

The high emphasis on risk assessment, identification, and mitigation aligns with systematic practices in Indian cooperative banks, where boards and committees focus on measuring, monitoring, and controlling risks like credit and liquidity through tools such as risk rating systems and portfolio reviews (Naz, 2020). Similarly, risk transfer ranks highly, consistent with insurance and diversification strategies in agricultural cooperatives that enhance resilience against market and environmental risks (Ningsih et al., 2024) and the potential of index insurance for rural households in India (Cole et al., 2012). Education, training, and knowledge of risk

management echo capacity-building efforts in cooperatives, including training for climate-smart practices and financial literacy to boost profitability (Ningsih et al., 2024). Good governance and external auditing match oversight mechanisms in rural cooperative banks, using frameworks like CAMELSC for risk evaluation (Nikam, 2024).

The low ranking of information technology contrasts with its role in Indian cooperative banks for monitoring risks like interest rate and forex exposures through tools such as Value at Risk models (Naz, 2020). Transparency's bottom rank differs from governance studies emphasizing internal controls and audits to reduce operational risks (Nikam, 2024), possibly due to contextual focus on agricultural versus banking cooperatives. Budgetary control's low priority diverges from financial planning in agricultural cooperatives for mitigating economic shocks (Ningsih et al., 2024). External auditing's mid-low rank conflicts with its high use in credit risk assessment in rural banks (Nikam, 2024), highlighting potential urban-rural or sector-specific differences.

**Table 5**

Perception Towards Ways for Co-operative's Risk Management, Siddarthanagar District, India

| **Tools/Ways** | **N** | **Mean** | **Std. Deviation** | **Rank** |
|---|---|---|---|---|
| Transparency | 60 | 5.67 | 0.68 | 13 |
| Information Technology | 60 | 5.88 | 0.85 | 12 |
| Budget and Budgetary Control | 60 | 6.05 | 0.89 | 11 |
| Engagement of the External Auditor | 60 | 6.18 | 0.81 | 10 |
| Risk Avoidance | 60 | 6.22 | 0.56 | 9 |
| Loan Guarantee as Security | 60 | 6.27 | 0.55 | 8 |
| Good Governance | 60 | 6.27 | 0.71 | 7 |
| Education and Training | 60 | 6.30 | 0.65 | 6 |
| Knowledge of Risk Management | 60 | 6.48 | 0.51 | 5 |
| Risk Identification | 60 | 6.55 | 0.59 | 4 |
| Risk Transfer | 60 | 6.60 | 0.59 | 3 |
| Risk Mitigation | 60 | 6.65 | 0.48 | 2 |
| Risk Assessment | 60 | 6.77 | 0.43 | 1 |

Sources: Field Survey, 2025

In the fertile yet delicate landscapes of Siddharthanagar, Primary Agricultural Credit Societies stand as beacons of hope for smallholder farmers, yet they navigate a storm of risks that demand unwavering resilience.

This study illuminates the dominant shadows of credit, operational, and liquidity risks, while spotlighting proven strategies like external auditing, portfolio diversification, and rigorous risk assessment as pathways to stability. By prioritizing formal audits and internal governance over innovative but underutilized tools like workshops and technology, these cooperatives reveal a pragmatic approach tailored to their rural realities—consistent with broader Indian and global patterns, yet distinct in downplaying external regulatory bodies and digital aids.

**Conclusion and Implications**

**Conclusion**

The study concludes that Primary Agricultural Credit Societies (PACS) in Siddharthanagar District mainly experience credit, operational, and liquidity risks, which significantly affect their sustainability and financial performance. The findings show that cooperatives rely more on traditional risk management practices such as external auditing, internal control, portfolio diversification, and risk assessment to manage risks effectively. However, limited emphasis on technology, transparency, and training indicates the need for modernization and capacity enhancement in cooperative risk management practices.

Implications

The study has important practical and policy implications for cooperative institutions and policymakers. Strengthening governance systems, improving staff training, promoting financial discipline, and adopting technology-based risk management tools can enhance the resilience and sustainability of PACS. The findings may also assist cooperative managers, government agencies, and financial regulators in designing effective risk management policies and support mechanisms for rural cooperatives.

The implications are profound and actionable. For policymakers, strengthening regulatory frameworks through dedicated risk committees and incentives for crop insurance under schemes like PMFBY could curb high NPAs and liquidity crunches, fostering sustainable rural development. Practitioners in PACS should invest in staff training and borrower evaluations to enhance credibility and reduce defaults, ultimately improving profitability and member trust. On a broader scale, integrating climate-smart practices, such as diversified cropping and tech-driven monitoring, could shield against environmental perils, aligning with national goals for food security and poverty alleviation. Future research should explore longitudinal impacts of these strategies in similar districts, incorporating qualitative insights from farmers to bridge remaining gaps. Ultimately, empowering Siddharthanagar's cooperatives not only safeguards harvests but cultivates enduring prosperity, turning risks into opportunities for a thriving agrarian future.

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