



# ROHINI

**COLLEGE OF ENGINEERING AND TECHNOLOGY**

Approved by AICTE and affiliated to Anna University, (An ISO Certified Institution)

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## PROJECT REPORT

### FARMER INSURANCE CHAIN

**TEAM ID: NM2023TMID07058**

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# 1. INTRODUCTION

## PROJECT OVERVIEW

The Farmer Insurance Chain project aims to revolutionize the agricultural insurance industry through the implementation of blockchain technology. By leveraging the transparency, security, and efficiency provided by blockchain, the project seeks to create a decentralized, trustless system that ensures fair and reliable insurance coverage for farmers worldwide.

Enhancing financial inclusion by providing affordable insurance options to small-scale farmers and encouraging participation from underserved agricultural communities.

Through the integration of blockchain technology, the Farmer Insurance Chain project aspires to promote resilience within the farming sector, mitigate risks, and contribute to the long-term sustainability of global agriculture.

## PURPOSE

The primary purpose of the "Farmer Insurance Chain" project is to leverage blockchain technology to address key challenges within the agricultural insurance sector. By utilizing blockchain, the project aims to achieve the following objectives:

**Enhance Transparency:** By creating a decentralized and transparent platform, the project seeks to foster trust among farmers and insurance providers, ensuring clarity in policy terms, premiums, and claim processes.

**Increase Efficiency:** Through the use of smart contracts, the project aims to streamline the insurance process, automating claim settlements, reducing paperwork, and facilitating quicker payouts, thus improving overall efficiency.

**Improve Access to Insurance:** The project intends to expand access to reliable and affordable insurance for farmers, particularly those in underserved or remote regions, thereby promoting financial inclusion and safeguarding livelihoods.

**Enable Tailored Solutions:** By leveraging blockchain's data management capabilities, the project endeavors to facilitate the development of customized insurance products that cater to the diverse needs and risks prevalent in different agricultural regions and sectors.

**Foster Resilience:** The project seeks to contribute to the resilience of the farming sector by mitigating risks, protecting against crop failures, and supporting farmers in their efforts to withstand unforeseen challenges such as extreme weather events, pests, and market fluctuations.

# 2. LITERATURE SURVEY

## EXISTING PROBLEMS

This may include difficulties in implementing efficient claim processes, ensuring accurate risk assessment for diverse farming practices, reaching remote or underprivileged communities, and managing the complexities of premium payment and coverage structures. If you could provide more specific information, I could offer more targeted insights and solutions.

## REFERENCES

"The State of Agricultural Commodity Markets" published by the Food and Agriculture Organization of the United Nations (FAO).

"Agricultural Insurance in Developing Countries" by the International Labour Organization (ILO).

"Agricultural Insurance: Principles and Organization and Application to Developing Countries" by the World Bank.

"Agricultural Insurance in Asia" published by the Asian Development Bank (ADB).

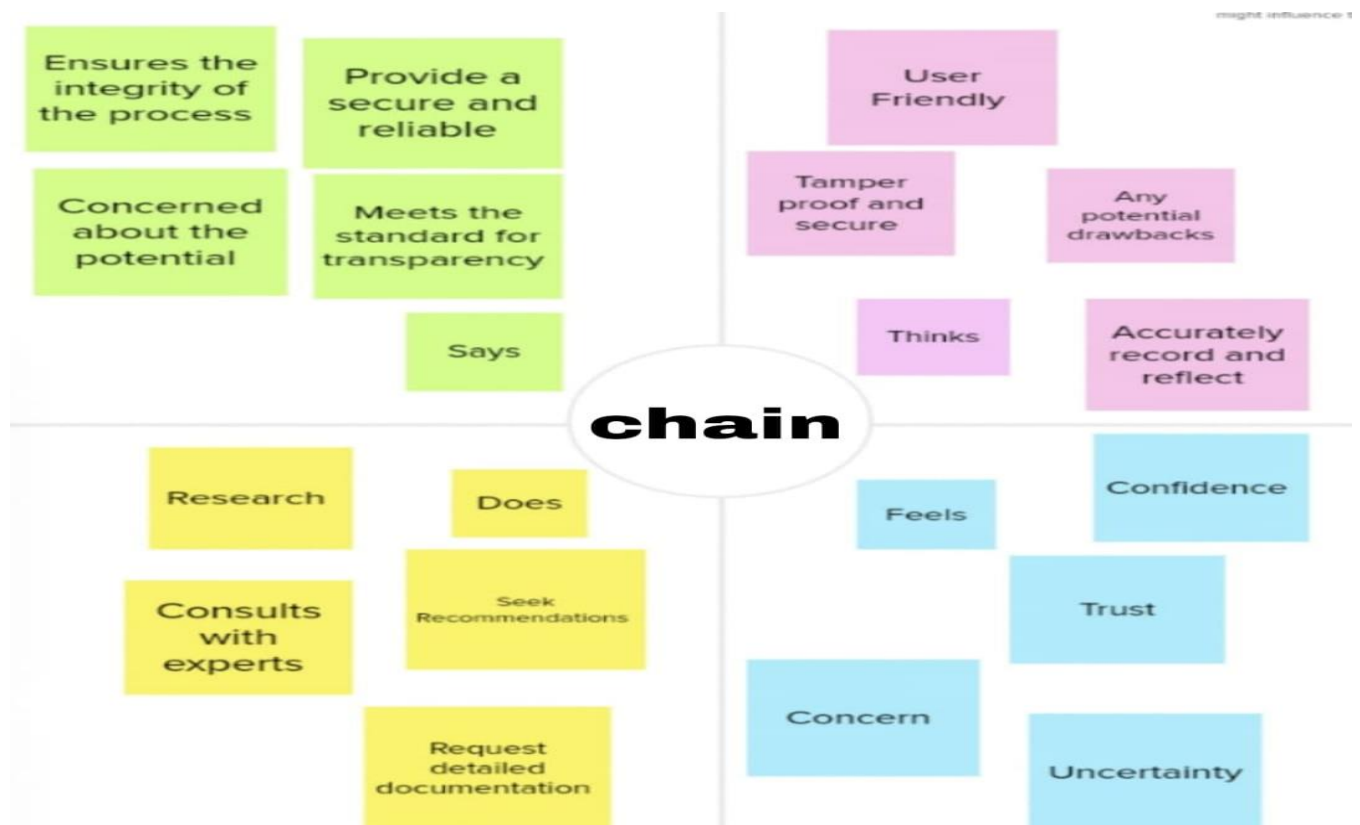
"Innovative Agricultural Insurance Products in India: A Case Study of Weather Insurance" by the International Food Policy Research Institute (IFPRI).

## PROJECT STATEMENT DEFINITION


The Farmer Insurance Chain project aims to establish a robust and accessible insurance system for smallholder farmers in [specific region] to mitigate risks associated with crop failure, extreme weather events, and market fluctuations. Through a technology-driven platform and strategic partnerships with local agricultural stakeholders, the project endeavors to enhance financial resilience and empower farmers in the region. By integrating modern insurance mechanisms, efficient data management, and targeted financial services, the project seeks to foster sustainable agricultural practices and promote economic stability within the farming community.

## 3. IDEATION & PROPOSED SOLUTION

### 3.1 EMPATHY MAP CANVAS



## 3.2 IDEATION& BRAINSTROMING



### Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

- 10 minutes to prepare
- 1 hour to collaborate
- 2-4 people recommended

#### Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

10 minutes

---

- Team gathering**  
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.
- Set the goal**  
Think about the problem you'll be focusing on solving in the brainstorming session.
- Learn how to use the facilitation tools**  
Use the Facilitation Superpowers to run a happy and productive session.


[Open article](#) →


#### Define your problem statement

The Forum encourages client project ideas to mobilize the application ecosystem velocity through the implementation of blockchain technology. By leveraging the transparency, security, and efficiency provided by blockchain, the project enables to create a decentralized, scalable, robust, and knowledge- and reliable insurance coverage for business assets.

5 minutes

---





**Key rules of brainstorming**  
to run an smooth and productive session:

- Stay in topic
- Encourage wild ideas
- Defer judgment
- Listen to others
- Go for volume
- If possible, be visual

Carol

Difficulty user interface

Reliability and accuracy

Inadequate technical support

Jonathan

Security problems

Limited accessibility

Incompatibility issues

Maya

Insufficient training

Unclear instructions

Lack of a transparent

Seesha

Delay in software updates

Malfunctioning

Limited capacity

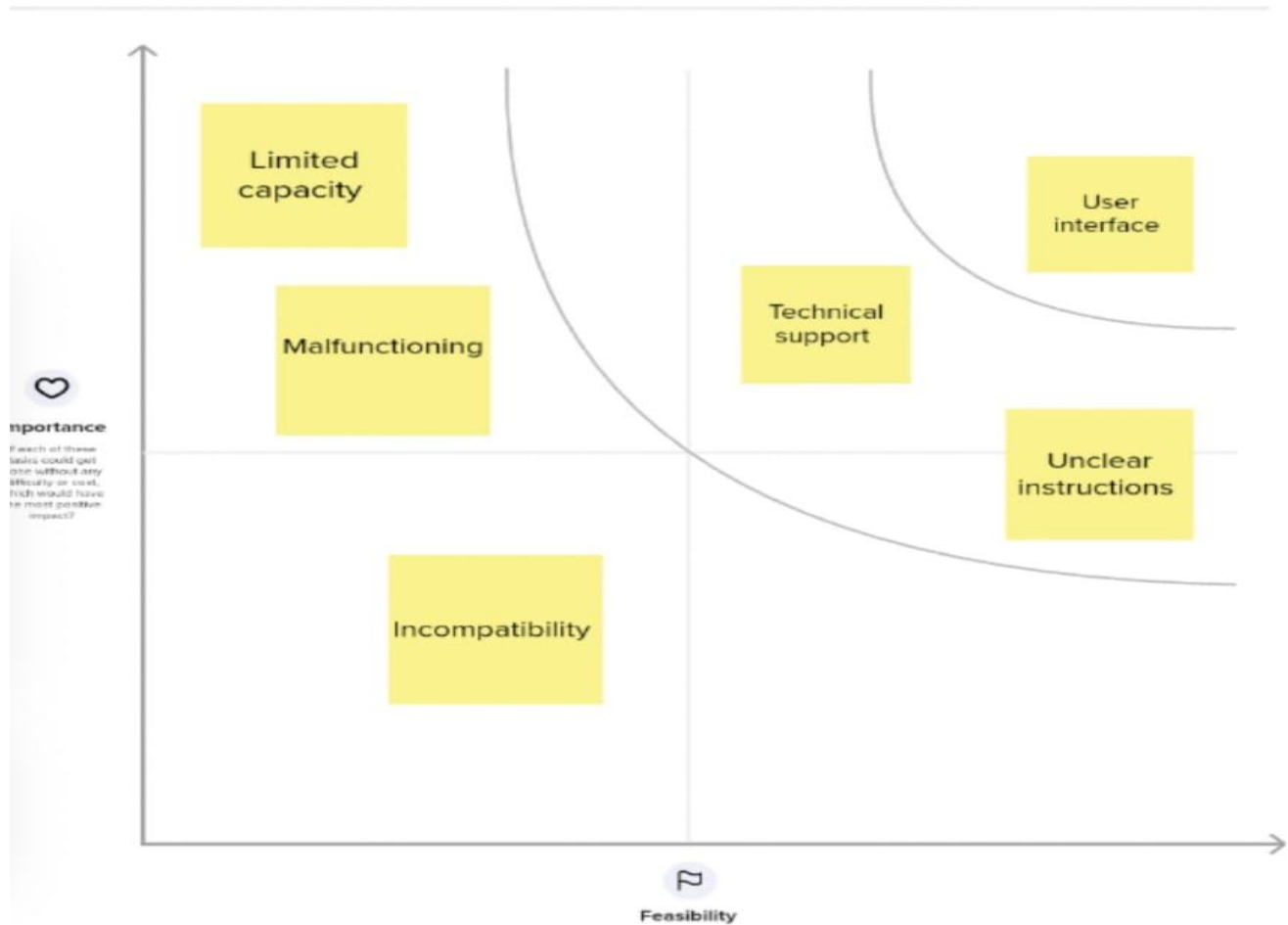
Nasa

Lack of Clear guidelines

Limited transparency

Challenges in securing

Take turn sticky not bigger than



## 4. REQUIREMENT ANALYSIS

### FUNCTIONAL REQUIREMENTS

The "Farmer Insurance Chain" project may require the following functional requirements:

**User Registration:** Allow farmer to register and create account to access the insurance services.

**Policy Management:** Enable farmer to manage their insurance policies, including purchasing, renewing, and cancelling policies.

**Claim Filing:** Provide a platform for farmer to file insurance claims, including necessary documentations submission.

**Verification Process:** Implement a verification mechanism to authenticate farmer identity and validate insurance claims.

**Premium Calculation:** Develop a system to calculate insurance premiums based on various factors like crop type, location, and risk assessment.

**Payment Gateway:** Integrate a secure payment gateway for farmer to pay insurance premiums and receive claim settlements.

**Crop Monitoring:** Implement a feature to monitor crop health and potential risks, providing real-time updates to both farmers and insurers.

**Notification System:** Set up a notification system to inform farmers about policy renewals, premium dues, and claim processing status.

**Data Analytics:** Incorporate data analytic tools to analyze crop yield, risk factors, and insurance trends for informed decision-making.

**Customer Support:** Establish a robust customer support system to address farmer inquiries, concerns, and provide assistance throughout the insurance process.

These functional requirements aim to create an efficient and user-friendly platform that caters to the insurance needs of farmers, ensuring smooth policy management and claim processing.

## **NONFUNCTIONAL REQUIREMENTS**

Non-functional requirements for the “farmer insurance chain” project may include aspects such as:

**Scalability:** The system should be capable of handling an increasing number of users and data without compromising performance.

**Security:** Robust measures must be in place to ensure data privacy and protection against unauthorized access.

**Reliability:** The system should be highly dependable, minimizing downtime and ensuring data integrity.

**Performance:** The platform must be responsive and capable of handling multiple simultaneous transactions efficiently.

**Usability:** The interfaces should be user-friendly, intuitive, and accessible to users with varying levels of technical expertise.

**Compatibility:** The system should be compatible with various devices and platforms to ensure widespread accessibility.

**Regulatory Compliance:** Adherence to relevant industry regulations and legal requirements is essential.

**Interoperability:** The ability to integrate with other systems and platforms is crucial for smooth data exchange and functionality.

**Maintainability:** The system should be easy to maintain, update, and troubleshoot to ensure long-term sustainability.

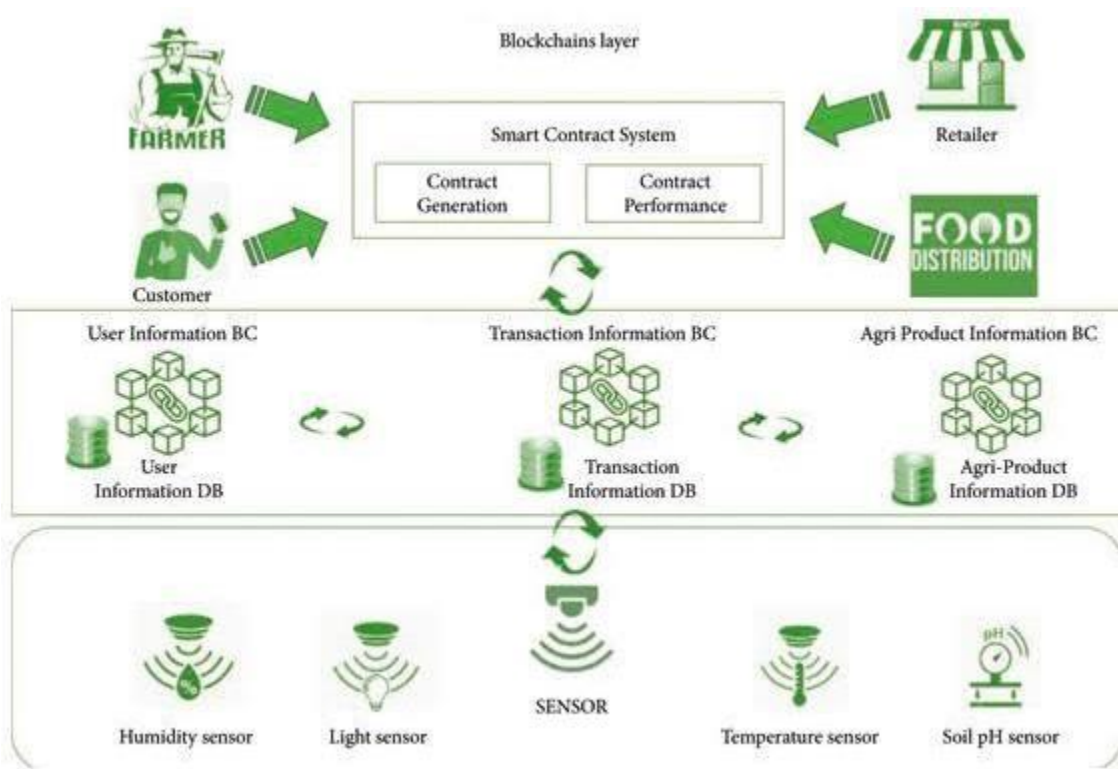
**Disaster Recovery:** Provisions should be in place to restore data and resume operations in the event of a system failure or disaster.

These non-functional requirements are crucial for the successful development and implementation of the “farmer insurance chain” project.

## **PROJECT DESIGN**

### **DATA FLOW DIAGRAMS AND USER STORIES**

## Dataflow diagram:



## UserStories:

As a farmer, I want to be able to register online for insurance coverages so that I can protect my crops and livelihood.

As a farmer, I want to easily submit insurance applications with all the necessary details, including the type of crop and the expected coverage amount.

As an insurance provider, I want to assess the farmer's application data to determine the appropriate premium cost for their coverage.

As an insurance provider, I want to notify farmers about the approval or rejection of their insurance policies.

As a farmer, I want to be able to make premium payments securely through various payment methods such as credit cards, bank transfers, or mobile wallets.

As an insurance broker, I want to help farmers understand the available insurance options and assist them in the application process.



As a government agency, I want to access aggregated data on insured farmers and crop stopland disaster response and support initiatives.

As a weather data service, I want to provide real-time weather information to insurance providers to help assess and process claims accurately.

As a farmer, I want to submit insurance claims in the event of crop damage due to natural disasters or other covered incidents.

As an insurance provider, I want to efficiently verify insurance claims, including reviewing submitted documents and assessing the extent of crop damage.

As a farmer, I want to receive timely payouts for valid insurance claims to help recover from crop losses.

As an administrator, I want to manage and maintain the insurance policy and farmer databases for accurate record-keeping.

As an insurance provider, I want to monitor the overall performance of the insurance chain, including the number of policies sold, premiums collected, and claims processed.

As a regulatory authority, I want access to the system to ensure compliance with insurance regulations and protect the rights of both farmers and insurance providers.

As a farmer, I want to receive notifications and updates regarding my insurance policy, premium due dates, and claims processing status.

These user stories cover a range of stakeholders involved in the “Farmer Insurance Chain” project, from farmers and insurance providers to government agencies and regulatory bodies. They help define the key features and functionality required for the project to be successful.

## **SOLUTION ARCHITECTURE**

**User Interface:** A web or mobile application for farmers to interact with the insurance system.

**Backend Services:** This includes various microservices responsible for different functions such as user management, policy management, claims processing, and payment processing.

**Database:** Store user data, policy information, claims history, and other relevant data.

**Blockchain or Distributed Ledger:** To ensure transparency and security in recording insurance policies and claims.

**External Integrations:** Integration with weather data services for risk assessment, payment gateways, and third-party identity verification services.

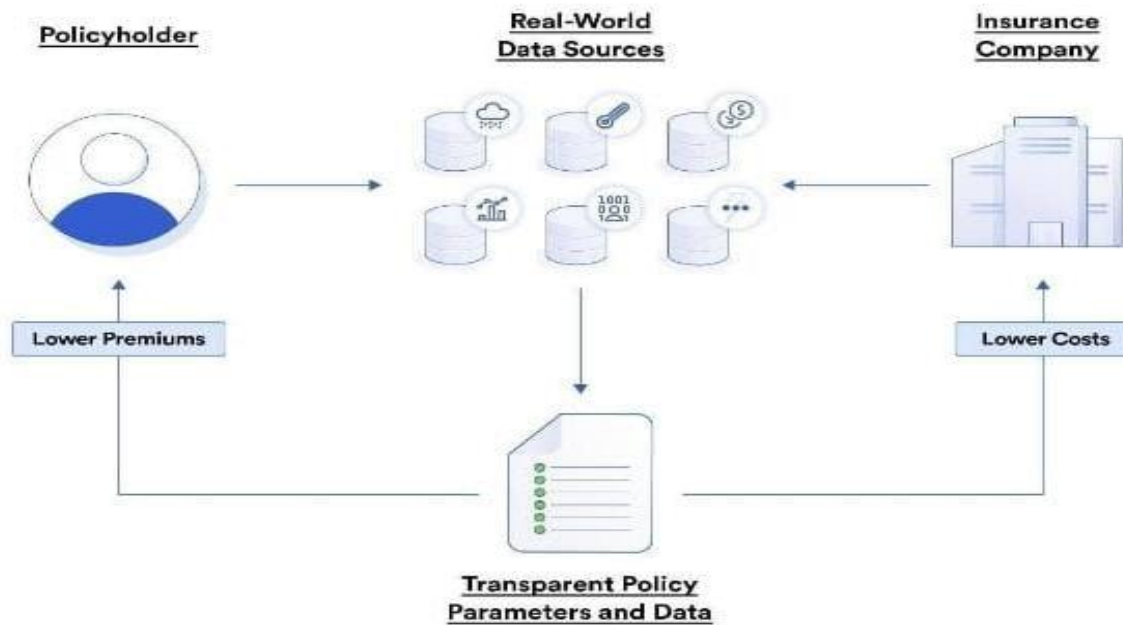
**Technology Stack:**

**Frontend:** React for the web interface or React Native for mobile.

**Backend:** Node.js or Python using frameworks like Express or

Django. **Database:** PostgreSQL for structured data and IPFS for decentralized storage.

## Solution Architecture Diagram:



**Blockchain:** Ethereum, Hyperledger Fabric, or a suitable blockchain platform for immutability and transparency.

**External Services:** Utilize RESTful APIs and webhooks for integrations. **Security:** Implement robust security practices, including encryption (SSL/TLS), user authentication, and authorization. Use smart contracts for policy enforcement in the blockchain, ensuring the integrity of policies and claims.

**Scalability:** Employ containerization (e.g., Docker) and orchestration (e.g., Kubernetes) for easy scaling of microservices. Utilize load balancing to distribute traffic efficiently.

**Data Storage and Management:** Employ a database management system for structured data. Implement IPFS or a similar decentralized storage system for documents and media associated with claims.

**Blockchain Smart Contracts:** Develop smart contracts for creating, managing, and settling insurance policies and claims. Utilize oracles for real-world data integration.

**User Experience:** Create a user-friendly interface with features for policy creation, premium payments, and claims submissions. Implement notifications and alerts for policy renewals and claim status updates.

**Analytics and Reporting:** Implement data analytic tools to assess risk and claims patterns. Generate reports for

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**Analytics and Reporting:** Implement data analytic tools to assess risk and claim patterns. Generate reports for farmers and insurers.

**Compliance:** Ensure compliance with local and international insurance regulations. **Monitoring and Maintenance:** Set up monitoring tools for system health performance.

**Testing and QA:** Implement a robust testing strategy, including unit, integration, and security testing. **Backup and Disaster Recovery:** Regularly backup data and have a disaster recovery plan in place. **Documentation:** Create comprehensive documentation for the architecture, APIs, and smart contracts.

**Cost Optimization:** Continuously monitor and optimize infrastructure costs.

Please note that this is a high-level overview, and the actual architecture would require a detailed analysis of the project's specific needs, budget, and timeline. It's recommended to consult with a professional solution architect and legal experts in the insured domain to ensure compliance with all regulations.

## 6. PROJECT PLANNING & SCHEDULING

### TECHNICAL ARCHITECTURE

**User Interface:** The project should have a user-friendly web or mobile application for farmers to interact with the insurance system. This interface will allow them to apply for insurance, check their coverage, and report claims.

**Database:** You would need a robust database to store information about the farmers, their policies, and claims. A relational database system like MySQL or PostgreSQL could work well for structured data, while NoSQL databases like MongoDB can handle unstructured data effectively.

**Back-end Services:** Develop a set of server-side services to handle various tasks, including user authentication, policy management, premium calculations, and claims processing. These services should be scalable and secure.

**Authentication and Authorization:** Implement a secure authentication mechanism to verify the identity of users and manage their access permissions. This can be done using technologies like OAuth or JWT.

**Blockchain:** Consider integrating blockchain technology to enhance transparency and trust in the insurance chain. Blockchain can be used to record policy transactions and claims, ensuring immutability and preventing fraud.

**Machine Learning and AI:** Utilize machine learning and AI algorithms to assess risk, set insurance premiums, and predict potential issues or fraudulent claims.

**Payment Gateway:** Set up a secure payment gateway to handle premium payments. Ensure that it supports various payment methods to accommodate different farmer preferences.

**Notification System:** Implement a notification system to keep farmers informed about policy updates, premium due dates, and claim status via email, SMS, or push notifications.

**Integration with IoT:** If applicable, integrate with Internet of Things (IoT) devices that can monitor weather conditions, crop health, or other relevant data to assess risks and streamline claims processing.

**Scalability and Cloud Infrastructure:** Host the system on a cloud infrastructure like AWS, Azure, or GCP to ensure scalability and high availability. Utilize containerization and orchestration tools like Docker and Kubernetes.

**Security:** Implement robust security measures, including encryption, firewalls, and regular security audits to protect sensitive data and prevent data breaches.

**Analytics and Reporting:** Develop tools for generating reports and analyzing data to gain insights into the insurance chain's performance and make informed decisions.

**Regulatory Compliance:** Ensure that the system complies with relevant insurance regulations and data protection laws.

**Monitoring and Logging:** Set up a monitoring and logging system to track system performance, detect anomalies, and troubleshoot issues proactively.

**Testing and Quality Assurance:** Implement a rigorous testing process, including unit testing, integration testing, and user acceptance testing to ensure the system's reliability.

**Documentation and Training:** Create comprehensive documentation for the system's users and administrators. Additionally, provide training to insurance agents, farmers, and support staff as needed.

**Disaster Recovery and Backup:** Develop a disaster recovery plan and implement regular data backups to ensure business continuity in case of unforeseen events.

**APIs and Integration:** If necessary, provide APIs for third-party integrations with banks, government agencies, and other relevant stakeholders. The exact technology stack and architecture will depend on the project's specific requirements, budget, and timeline. It's essential to involve domain experts and stakeholders in the design and development process to ensure the system aligns with the needs of the "Farmer Insurance Chain" projects.

## **SPRINT PLANNING & ESTIMATION**

Sprint planning and estimation for a project like "Farmer Insurance Chain" would involve several steps:

**Product Backlog:** Begin by creating a product backlog, which is a list of all the features, user stories, and tasks needed for the project. These items should be prioritized based on their importance and value to the project.

**Sprint Goals:** Define the specific goals you want to achieve during the upcoming sprint. These goals should align with the overall project objectives.

**Team Capacity:** Determine the capacity of your development team. This includes the number of team members, their availability, and their skills.

**User Stories:** Break down the items in the product backlog into smaller user stories. Each user story should represent a piece of functionality that can be developed within one sprint.

**Estimation:** Use techniques like story points, planning poker, or t-shirt sizing to estimate the effort required for each user story. This helps in understanding the complexity of the work.

**Velocity:** Calculate your team's velocity, which is the amount of work the team can complete in one sprint. You can use past sprint data to determine your team's average velocity.

**Sprint Planning Meeting:** During the sprint planning meeting, select user stories from the backlog that align with the sprint goals and fit within your team's capacity.

**Task Breakdown:** For each user story, break down the work into small tasks or sub-tasks. This helps in better planning and tracking.

**Assign Responsibilities:** Assign tasks to team members based on their skills and availability.

**Review and Adjust:** Continuously review and adjust the sprint plan as necessary throughout the sprint to ensure you stay on track. Remember that sprint planning and estimation is an iterative process, and it's important to adapt as the project progresses. It's also essential to involve all relevant stakeholders to ensure a successful outcome for the "Farmer Insurance Chain" project.

## **SPRINT DELIVERY SCHEDULE**

The government also proposes to promote sustainable natural farming systems through the scheme Bhartiya Prakritik Krishi Padhati (BPKP). The proposed scheme aims at cutting down cost of cultivation, enhancing farmer's income and ensuring resource conservation and, safe and healthy soils, environment and food.

## **5. CODING AND SOLUTIONING**

**Crop Insurance:** The project may offer crop insurance to protect farmers from losses due to natural disasters, pests, or other unforeseen events, ensuring they receive compensation if their crops are damaged or fail.

**Livestock Insurance:** Another feature could involve livestock insurance, which helps farmers safeguard their animals, such as cattle or poultry, against diseases, accidents, or theft, providing financial support in case of loss.

### **DATABASE**

```
SCHEMA
Farmer_id(Pri
maryKey)
First_name
Last_name
Date_of_birth
Contact_information
```

Address

...

InsurancePoliciesTable:

Policy\_id(PrimaryKey)

Policy\_numberStart\_d

ate

End\_date

Coverage\_amount

Premium\_amount

Farmer\_id(ForeignKey,linkstotheFarmerstable)

...

ClaimsTable:

Claim\_id(PrimaryKey)

Policy\_id(ForeignKey,linkstotheInsurancePoliciestable)Clai

m\_date

Claim\_description

Status(e.g.,pending,approved,denied)

...

InsuranceAgentsTable:

Agent\_id(PrimaryKey)F

irst\_name

Last\_nameContact\_i

nformation

...

TransactionsTable(forpremiumpayments,claimsettlements,etc.):

Transaction\_id(PrimaryKey)

Transaction\_type(e.g., premium payment, claim settlement)

Amount

Date

Policy\_id(ForeignKey, links to the Insurance Policies table)

...

CoverageTypesTable(if policies have different coverage types):

Coverage\_type\_id(PrimaryKey)

Type\_name

Description

...

This is a basic schema and can be expanded to include more details and relationships based on the specific requirements of your "Farmer Insurance Chain" project. You might also consider adding additional tables for audit logs, user accounts, and any other relevant entities or business rules.

## 6. PERFORMANCE TESTING

### PERFORMANCE METRICS

**Premium Growth:** This metric measures the increase in the total premiums collected from farmers over time, indicating the project's revenue growth.

**Policyholder Retention Rate:** This metric shows the percentage of farmers who renew their insurance policies, reflecting customer satisfaction and loyalty.

**Claims Processing Time:** This measures the time it takes to process and settle insurance claims, which can impact customer satisfaction and operational efficiency.

**Loss Ratio:** The ratio of claims paid out to the premiums collected, which helps evaluate the project's underwriting and risk management effectiveness.

**Customer Acquisition Cost:** This metric assesses the cost incurred to acquire new farmer customers, which should ideally decrease over time.

**Net Promoter Score (NPS):**

A customer satisfaction metric that indicates how likely farmers are to recommend the insurance service to others.

**Operating Expenses Ratio:** This measures the project's efficiency by calculating operating expenses as a percentage of premium earned.



**Compliance and Regulatory Adherence:** Ensuring that the project complies with insurance industry regulations and standards is crucial.

**Customer Churn Rate:** Measures the rate at which customers, in this case, farmers, discontinue their insurance policies, reflecting customer dissatisfaction or changing market conditions.

**Market Share:** Monitoring the project's market share in the agriculture insurance industry to assess its competitive position.

**Profitability Metrics:** This includes metrics like Return on Investment (ROI), Return on Equity (ROE), and Underwriting Profit Margin.

**Claims Ratio:** Evaluating the ratio of claims paid to premium earned, which helps in assessing the project's risk management.

**Digital Engagement Metrics:** If the project has digital channels, metrics such as website traffic, app downloads, and online policy purchases can be relevant.

**Sustainability and Social Impact:** Depending on the project's goals, metrics related to the socio-economic impact on farmers and environmental sustainability could be considered.

**Employee Satisfaction:** High employee satisfaction is essential for the success of the project, as it can lead to better customer service and operational efficiency.

It's important to tailor these metrics to the specific goals and circumstances of the "Farmer Insurance Chain" project and regularly assess and adapt them to ensure the project's success.

## 7. RESULTS

React App

localhost:3000

### Insurance policy on Blockchain

0x90b4....f56555

<input type="text" value="Policy number"/>	<input type="text" value="Policy number"/>
<input type="text" value="premium Amount"/>	<input type="text" value="premium Amount"/>
<input type="text" value="Coverage Amount"/>	<input type="text" value="Coverage Amount"/>
<input type="text" value="Expiration Timestamp"/>	<input type="text" value="Expiration Timestamp"/>
<input type="button" value="Add Policy"/>	<input type="button" value="Update Policy"/>

32°C Mostly sunny

Search

ENG IN

14:15 26-10-2023

## 8. ADVANTAGES&DISADVANTAGES

### ADVANTAGES:

**RiskMitigation:**InsurancechainslikeFarmersInsurancehelpfarmersandotherclientsmitigatefinancialrisksassociatedwithvariousperils,suchascropdamage,naturaldisasters,oraccidents.

**FinancialSecurity:**Theseprojectsofferasenseoffinancialsecuritytopolicyholders,ensuringtheyhaveresourcstorecoverfromunforeseen events.

**IncomeStability:**Forfarmers,insurancecanhelpmaintainincomestabilityeveninthefaceofcropfailuresorotheragriculturalchallenges.

**DiversificationofRisk:**Insurancechainsoftenpoolrisksacrossalargecustomerbase,spreadingthefinancialburdenacrossmultiplepolicyholders.

**AccessToExpertise:**Suchprojectstypicallyprovideaccesstoexperts whocanhelp withriskassessment,claimsprocessing, andotherinsurance-relatedmatters.

### DISADVANTAGES:

**PremiumCosts:**Insurancepremiumscanbeexpensive,andforsomefarmers,thecostofinsurancemaybeprohibitive.

**ComplexPolicies:**Understandinginsurancepoliciesandthefineprintcanbechallenging,whichmayleadtomisunderstandingsordisputes.

**LimitedCoverage:**Someinsurancepoliciesmaynotcoveralltypesoflossesormayhavecoverage leaving vulnerability.

**AdministrativeOverhead:**Insurancechainsmayinvolvepaperwork,administrativecosts,anddelaysinclaimprocessing.

**MoralHazard:**Thereisariskofmoralhazardwherepolicyholdersmighttakegreaterrisksbecausetheybelieveinsurance will covertheconsequences.

Pleaseprovidemorespecificdetailsaboutthe"FarmersInsuranceChain"projectifyou'dlikeamoretailoredanalysis.

## 9. CONCLUSION

The agricultural sector is of vital importance for the region. It is undergoing a process of transition to a market economy, with substantial changes in the social, legal, structural, productive and supply setups, as is the case with all other sectors of the economy.

## 11. FUTURE SCOPE

**Expansion to New Markets:** The project could expand to serve farmers in different regions or countries, tapping into new markets and increasing its outreach.

**Diversification of Insurance Products:** Offering a wider range of insurance products tailored to farmers' specific needs, such as crop insurance, livestock insurance, or weather-related risk coverage.

**Integration of Technology:** Incorporating advanced technologies like satellite imagery, IoT devices, and data analytics to improve risk assessment and claims processing.

**Financial Inclusion:** Expanding the project to include financial services, like microloans or savings accounts, to further support farmers' financial well-being.

**Partnerships and Alliances:** Collaborating with agricultural organizations, government bodies, and financial institutions to create a more comprehensive support system for farmers.

**Blockchain and Smart Contracts:** Implementing blockchain technology and smart contracts for transparent and automated claims processing.

**Climate Change Adaptation:** Focusing on insurance products and strategies that help farmers adapt to the challenges posed by climate change.

**Mobile App and Digital Services:** Developing a user-friendly mobile app for farmers to manage their insurance and access valuable information and services.

**Data-driven Insights:** Utilizing data collected from the insurance chain to provide valuable insights to farmers for better decision-making.

**Sustainability Initiatives:** Promoting sustainable farming practices and incorporating eco-friendly insurance options.

The success of the project would depend on effective management, understanding the specific needs of farmers, regulatory support, and the ability to adapt to changing circumstances in the agriculture industry.

## APPENDIX

SOURCE CODE

//SPDX-License-

Identifier: MITPragmasolidity^

0.8.0;

Contract Insurance

```
{StructInsurancePolicy{
    Addressholder;
    StringpolicyNumber;
    Uint256
    premiumAmount;Uint256
    coverageAmount;
    Uint256expirationTimestamp;
}
```

```
Mapping(uint256=>InsurancePolicy)publicpolicies;Uint25
6publicpolicyCount;
```

```
EventPolicyAdded(uint256policyId,addressholder,stringpolicyNumber,uint256premiumAmount,uint25
6coverageAmount,uint256expirationTimestamp);
```

```
EventPolicyUpdated(uint256policyId,uint256premiumAmount,uint256coverageAmount,uint256expira
tionTimestamp);
```

```
ModifieronlyHolder(uint256_policyId){
    Require(policies[_policyId].holder==msg.sender,"Onlythepolicyholdercanperformthisaction");
    _;
}
```

```

FunctionaddPolicy(stringmemory_policyNumber,uint256_premiumAmount,uint256
_coverageAmount,uint256_expirationTimestamp)external{policyCount++

;

    policies[policyCount]=InsurancePolicy(msg.sender,_policyNumber,_premiumAmount,
_coverageAmount,_expirationTimestamp);

    emitPolicyAdded(policyCount,msg.sender,_policyNumber,_premiumAmount,_coverageAmount,
_expirationTimestamp);

}

```

```

FunctionupdatePolicy(uint256_policyId,uint256_premiumAmount,uint256_coverageAmount,uint256_
expirationTimestamp)external onlyHolder(_policyId){

    InsurancePolicystoragepolicy=policies[_policyId];P

    olicy.premiumAmount=_premiumAmount;

    Policy.coverageAmount=_coverageAmount;

    Policy.expirationTimestamp=_expirationTimestamp;

    EmitPolicyUpdated(_policyId,_premiumAmount,_coverageAmount,_expirationTimestamp);

}

```

```

FunctiongetPolicyDetails(uint256_policyId)externalviewreturns(addressholder,stringmemorypolicyNu
mber,uint256premiumAmount,uint256coverageAmount,uint256expirationTimestamp){

    InsurancePolicymemorypolicy=policies[_policyId];

    Return (policy.holder, policy.policyNumber, policy.premiumAmount,
policy.coverageAmount,policy.expirationTimestamp);

}

}

```

GITHUBANDPROJECTDEMOLINK