

Grus & Grade's UPAJGURU AgriTech Platform

Abstract

Indian agriculture has been transforming steadily over past two decades with the adoption of digital ecosystem and technological innovations in the sector. Various policy advocacy and structural transformations has contributed substantially to the changing mindset.

Agriculture, with its allied sectors, is unquestionably the largest livelihood provider in India ranking second in terms of agricultural farm output and allied sectors. Steady investments in technology development, irrigation infrastructure, emphasis on modern agricultural practices and provision of agricultural credit and subsidies are the major factors contributed to agriculture growth.

Market size of agriculture in India during FY 2020 was USD 276.37 billion (GVA added by Agriculture). It is 17.8% of the GDP. A total of 263 million families are dependent on agriculture as their main source of income which is equal to 22% of Indian population.

Now, there are a lot of efficiency gaps due to which farmers are not able to plan high value crops, could not get better yields, incur higher input costs and are unable to realize full value of their produce. Then there are harvest and post-harvest losses. As per FAO report, the post-harvest loss in Asia is approximately 8% of the GVA.

All these efficiency gaps and losses result in ~20% of value being lost in the overall value chain. This broad-based loss amounts to USD 55.27 billion amount which in real terms is 3.5% of Indian GDP.

Grus & Grade see this efficiency gap as a direct opportunity. Through our blockchain based traceability enabled platform we will plug these losses and pass-back the gains to the farmers by issuing crypto tokens. In the process, we would be helping these farmer families become self-reliant and more financially stable. The scope of impact of our solution is targeted at the bottom of the pyramid, thus will have a huge multiplicative impact on the GVA of agriculture in India.

Core Issues:

There are four major challenges in the Agri Value Chain, which results in efficiency gaps and lack of commercial value to the farming community, who are at the bottom of the pyramid:

1. Lack of access to quality input material during pre-harvest periods.
2. Small Holding farmland due to multiple fragmentation resulted in lack of capital investment for technological adoption.
3. Lack of access to information resulting in high exposure to extraneous risk for small holder farmers.
4. Lack of access to collateral free low-cost finance. Banks/FIs make higher provisioning due to lack of traceability of cash flow in the Agri-value chain.
5. The lack of traceability of in the Agri value chain results in lack of product differentiation, loss of trust at every intermediate level of food supply chain, also reduces transparency, trust, real time access and accuracy of data.
6. Lack of access and linkage to better markets, financial intermediation at low cost is a challenge for smallholder farmers, who are isolated in remote rural communities, with minimal communication infrastructure. They also face exploitation from middlemen who dictate prices for their produce.

Legacy model of agri value chain:

Agricultural activities can be categorized into five broad segments i.e., Input, Production, Quality Control/Storage, Processing, Distribution & Marketing. The activities involved in each of these broad segments of Agri value chain has been explained in Figure below:

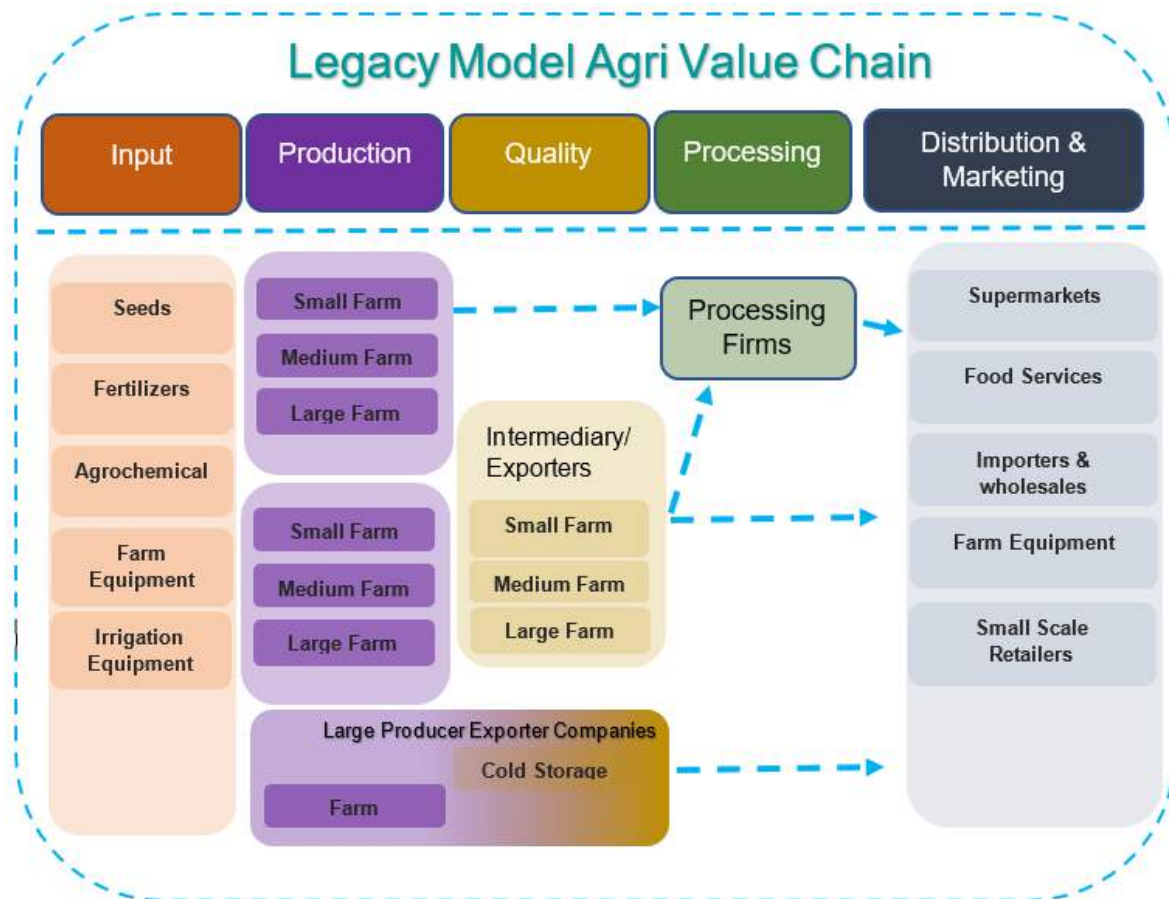
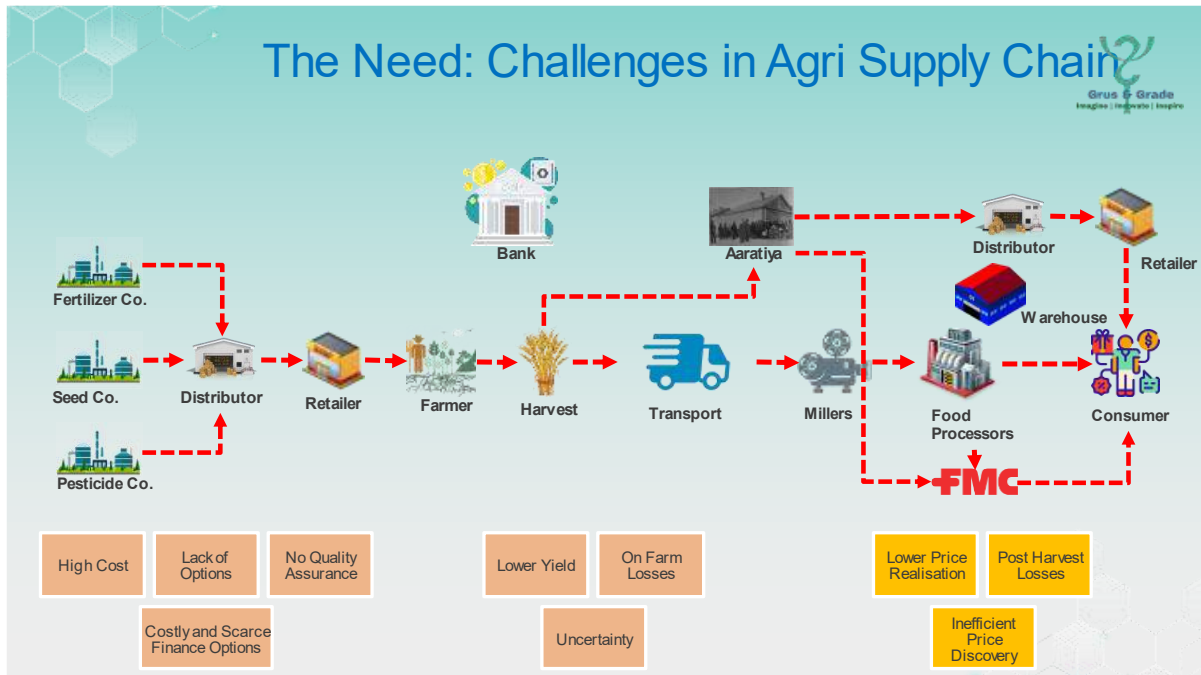


Figure 1: Legacy Model of Agri Value Chain

With the maturity of I-4.0, the opportunities for aggrotech start-ups increased manifold. The new business model applies multiple use of technologies such as image processing, natural language processing, Blockchain, AI, Data Science, hyperconnectivity, supercomputing, cloud computing and the internet of things.

Digital innovation provides a circular communication for each layer in the Agri value chain, thus reduce the role of the intermediators. The shift in communication from a liner model to a multivariate model became the key differentiator for the digital economy. Grus & Grade adopted a 360 degree approach to tackle the root problems in the agri value chain.



Grus & Grade Solution Architecture

Grus & Grade is a combination of Agri Tech and FinTech started by the Alumnus of IIM Indore, IIT Delhi and Delhi School of Economics in May 2020. In December 2021, the company has won nationwide contest conducted by APIARY, STPI Gurgaon under MEITY, GOI. Under this contest, G&G has been incubated at Centre of Excellence for Blockchain Technology under STPI NEXT Initiative (APIARY Gurgaon). Previously in March 2021, the company was incubated at AspireBIONEST, University of Hyderabad.

The company was awarded India 500 startup award for excellence in services and export in 2021 as well as Best emerging startup by CEO magazine in December 2021 for innovations in application of Blockchain and AI in Agri Tech and Fintech Sector.

Our core product named as 'UPAJGURU' is an end to end technological solution in the entire agri value chain. Built over Hyperledger Fabric, UPAJGURU's has inbuilt smart contracts agri commodity procurement, supply, finance and information flow. A Farmer Producer Organization and Micro Entrepreneurs are the distribution channel for scalability of the project.

UPAJGURU provides interface to the following actors in the Agri Value Chain:

1. Farmer at the centre of the ecosystem
2. FPOs and MEs as distribution channel
3. Input Suppliers - Seed, Fertilizer, Pesticide and Equipment suppliers.
4. Bank and NBFCs
5. Post-Harvest Supply Chain Actors - Millers, Food Processors, FMCG Companies, etc.

Built over Hyperledger fabric and enabled with advanced image processing tools, AI enabled analytical tools and IOT sensors, UPAJGURU Provides the following services:

1. End to End traceability of agri produce - from farm to fork
2. Access to quality Input supplies to Farmers at door steps at better price
3. AI and IOT enabled advanced farm management services to farmers
4. Geo Tagged Land records on a permissioned distributed ledger over blockchain
5. Access to finance to SHFs with complete traceability of end use of fund, smart contract enabled KYC, Loan application, Sanction, Documentation, Disbursement and Auto Repayment through inbuilt smart contract.
6. Access to market via FPO for selling their crops at a better rate.
7. Automated quality assessment (non-residual, damaged quality assessment) through image processing.

Grus & Grade is piloting its project in Sasaram District of Bihar for traceability of bio fortified seed varieties. We have collaborated with Yes Bank for distribution of agri loan and post harvest finance over blockchain distributed ledger. We are piloting the financial model in North Karnataka in March 2022. We have in-principle approval with ITC who will procure wheat from our Bihar location in April-May 2022.

Based on these research, Grus & Grade team designed a scalable and sustainable business model with an intricate mix of physical network and digital interface. G&G call this a physydigital model. The business model was designed in a way that the farmers become the owners of the distribution system of the agri value chain, while adopting the digital infrastructure of Grus & Grade tech platform named as 'UPAJGURU'. Farmers collaborate through an FPO for getting access to quality input materials, access to information, finance as well as market for their end produce. UPAJGURU provides a platform for the input suppliers such as seed, fertilizer, pesticide, and farm equipment suppliers so that they connect directly with the farmers through FPOs and Micro Entrepreneurs.

Similarly, farmers can sell their crop to FPOs and end consumers through the same application of UPAJGURU. They have access to finance and due to smart contracts inbuilt in the system, they can avail the credit any time without worrying for any further documentation or physical visits to banks. The banks can track their fund usage as well as assets created on real time basis, while immutable records of transactions, data and assets are stored on Hyperledger fabric.

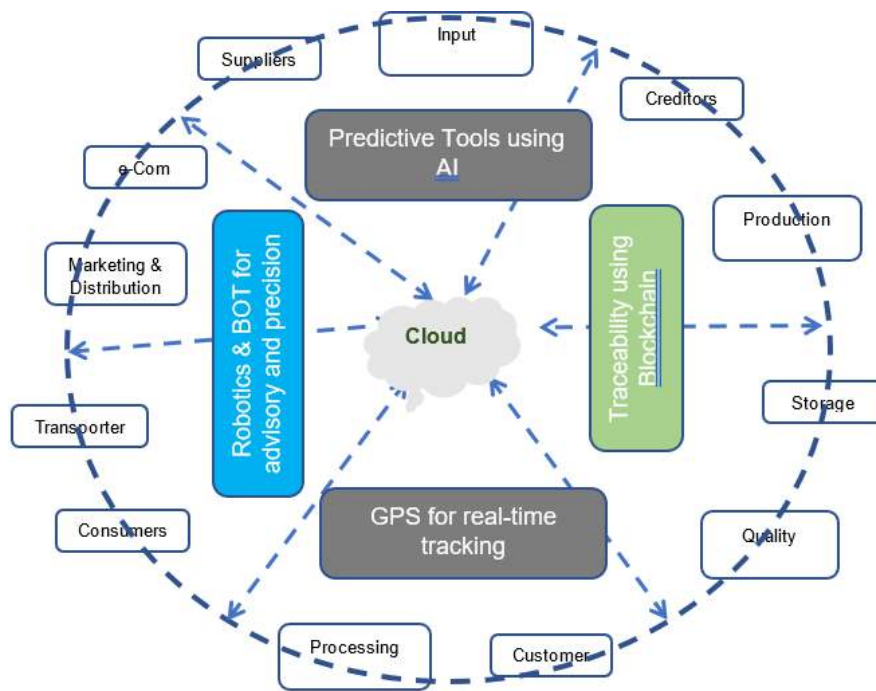


Figure 2: UPAJGURU's Technology enable change in communication strategy

A farmer has access to the following services over UPAJGURU:

1. Access to quality input materials before harvest or during harvest by executing smart contracts on the go.
2. Access to advanced farm advisory services & data driven insights for farm practices on real time basis. UPAJGURU uses IoTs on fields as well as applies AI/ML tools for predictive analytics for farm management.
3. Access to low-cost finance without collateral.
4. Access to market for selling their crop at a better rate.

How the project is different

1. There are no existing models or platform that uses end to end traceability in the entire ecosystem of Agri Value Chain.
2. The project introduces tokenization as a model for value redistribution. This incentivises all the stakeholders, thus increases the model's success and sustainability prospects.
3. Grus & Grade's intent for a long-term investment and scaling up of the project.
4. The project is customized for traceability of bio-fortified food. Thus, targeting SDG-2 goal of eradicating Global hidden hunger.
5. This results in higher degree of policy advocacy for commercialization of bio-fortified food.
6. The channel of distribution is FPOs/FPCs. This gives a natural platform for technology adoption and implementation.

Grus & Grade UPAJGURU Tech Platform

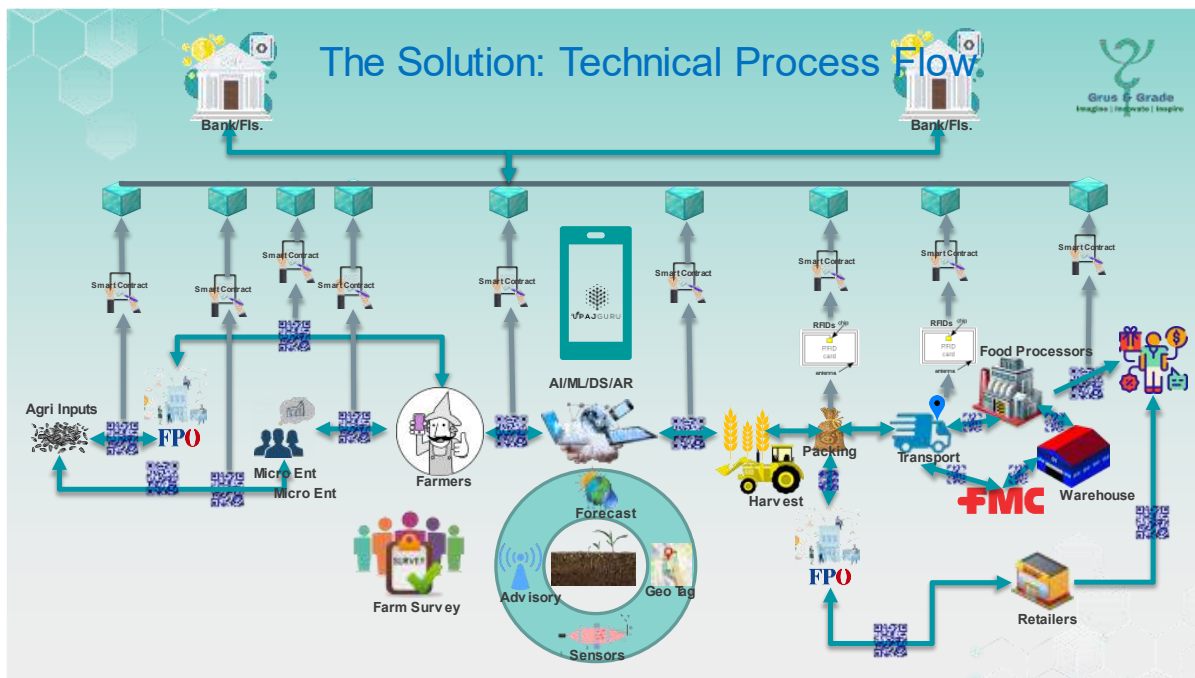


Figure 1: G&G Solution with Blockchain, traceability in supply chain

UPAJGURU is an end-to-end digital platform for all the actors in the agri value chain. The blockchain based technological platform has been developed over IBM's Hyperledger Fabric. Blockchain-based meta-data ensures the integrity of the data items contributed to assessing the traceability, trust and transparency of all asset's flows, commodity flow, information flow as well as financial and cash flow.

Blockchain technology is being touted as the Internet of Trust that combats most of the issues of centralized data storage systems, including ranking manipulation and fudging of data. Blockchain implementation in the Agri value chain ensures the traceability of a farmers crop, as it can trace the originality of crops in the entire Agri supply chain . The Blockchain property of immutability and transparency ensures that the data are not being manipulated or deleted by any entity.

The UPAJGURU platform is built on the Hyperledger fabric, a permissioned blockchain system. In brief, the proposed system's working can be explained as a blockchain-based novel system in which the crop information as well as cash transactions done by farmers is stored and shared through the efficient and secure Hyperledger fabric network establishing parity. This system offers a user-friendly web interface for providing traceability of transactions, data and crop.

Further, the Hyperledger composer REST API is used to connect the web applications to the blockchain network. In this proposed system, the endorser performs the validation and authentication of the rating as defined in the smart contract's logic.

The other advantage and unique feature of the proposed system is replacement of physical collateral with social collateral through inbuilt smart contracts. A farmer's financial data, KYC data, land records, crops under cultivation, cattle and other physical assets are all stored over the distributed ledger in a permissioned network.

These data are retrieved by the bank and FIs and an automated credit underwriting tool is populated. Once a farmer's credit assessment is complete, a smart contract is executed for loan documentation and disbursement. Farmer's end use of fund is also recorded on the permissioned

ledger over hyper ledger fabric. A smart contract for proper use of fund is executed between the farmer and the lending institution.

The farmer sells his crop to the FPOs/MEs who are also on the UPAJGURU network. Once the farmer sells his produce, a smart contract is auto executed for repayment of bank dues of the farmer. Thus, the system offers complete control over the cash flow to the lending institution. This reduces the credit risk for the lenders, thus reduces the cost of borrowing for the small holder farmers.

This section elaborates on the essential background details such as blockchain, Hyperledger Fabric and its role in Agri Value Chain:

Blockchain

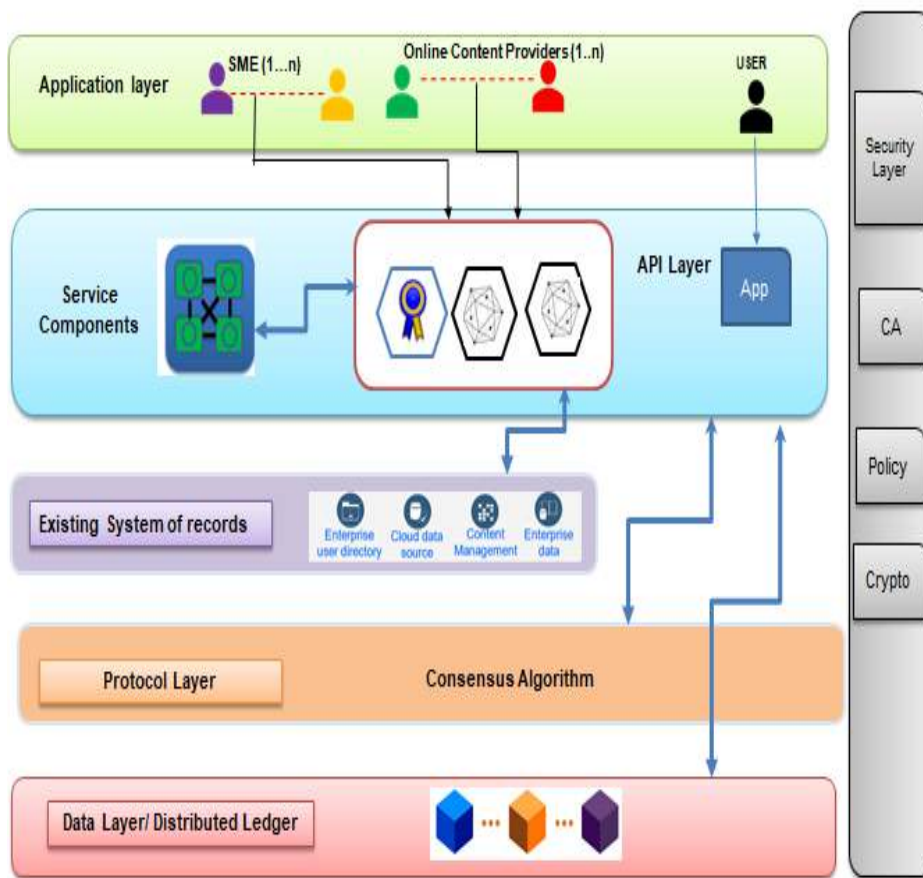
Blockchain is regarded as the next-generation technology, also labelled as the Internet of Trust. It has presented the possibility of perceiving the Internet as a value rather than a medium of communication. While the first application of Bitcoin and the world of cryptocurrency continue to rule the world, the other applications of Blockchain technology will rule the next decade or so (Nakamoto 2008) [1]. The technology is growing at a rate of 80% CAGR and is expected to hold 10% of the world's GDP by 2025[51]. At its core, Blockchain is a distributed ledger that is not owned by a single party and is cryptographically secured using various crypto algorithms [1]. The Blocks store the transactions and information, and they are chained to gather using cryptographic hashes. The technologies used in Blockchain contain some of the existing technologies like distributed ledger, asymmetric data encryption using PKI framework, consensus algorithms as Practical Byzantine Fault Tolerance, and message transfer protocols such as Whisper, etc. [13-23].

While public Blockchains continue to rule the Blockchain market, the private or business Blockchains are emerging and seeing the practical usages now. Live applications can be seen in distributed supply chains, the healthcare industry, Government operations, and many other fields. The education sector is also coming up with many use cases, especially after the emergence of online players coming into the scene [24-34]. Blockchain-based consortiums of educational institutes help for better collaboration and build up the grounds for more research-oriented higher education with collaboration from multiple institutes. Similarly, online content providers find synergies in collaborating via the Blockchain network and work effectively on common problems like effective content and federated ratings of the content.

The primary application of Blockchain technology in the business world consists of use cases where multiple business entities need to collaborate on specific, well-defined parameters and come to a standard agreement to devise the business outcomes [35-45]. Generally, in such situations, the intermediary is required to run the operations. Concerning the given context, multiple online education vendors can appoint an intermediary or an organization that can review the content, provide the rating for the content, and suggest improvements to make it more competitive and relevant for the market and industry. The key problem with having a middle man in such a situation is that they might incline towards giving favours and getting favourable ratings in return due to the various organizations' vested interests. This might deteriorate the situation instead of improving it from the current system of user ratings. The key question is that we can find a technology-inclined solution to get an honest rating that cannot be tampered with and can be stored in a secure database. The answer is Blockchain. In the present context, private / permissioned Blockchain is more suitable as the online education institutes' content is an intellectual property and cannot be shared on a public

platform. To mitigate the risk of bias in the ranking system, the federated ranking system is suggested. It will decentralize the ranking process and avoid unbiased ranking.

Product Architecture:



The proposed agritech solution is developed based on the Hyperledger fabric, a permissioned blockchain system. Each user can perform transactions with a blockchain network through API. User needs to register with the Membership Service Provider (MSP)/ Fabric Certificate Authority. This feature allows only the registered user to participate in the system. The MSP validates the user and provides information about the user credentials and certificate for enrolment. The layer wise description of the Fig.1 is as follows -

- 1) **Application Layer** - This layer hosts the mobile / web application that provides an interface for farmers/users to initiate transactions on the Blockchain layer.
- 2) **Service Components** - These are some of the essential components of the Hyperledger Fabric Blockchain ecosystem. It includes Certification authority to issue valid credentials to users, ordering services for distributing blocks and transactions and various API services to connect the layers below.
- 3) **Existing System of records** - This layer consists of an existing database of the online content providers that will be used by the Blockchain layer for providing the federated ratings.
- 4) **Protocol Layer** - This layer consists of various consensus algorithms used in Hyperledger fabric to ensure the consistency of data across various nodes and agreement of transactions by endorsing peers. This also includes system chaincodes used by endorsing peers, ordering services etc.

- 5) **Data Layer** - This layer consists of a distributed database used in the Blockchain system to keep the immutable trail of transactions so that any transaction can be verified and audited at any point of time. Generally, this is a couch DB based world state ledger with the capabilities of a modern relational database.

Role of Blockchain Based Smart Contracts:

Farmer Onboarding

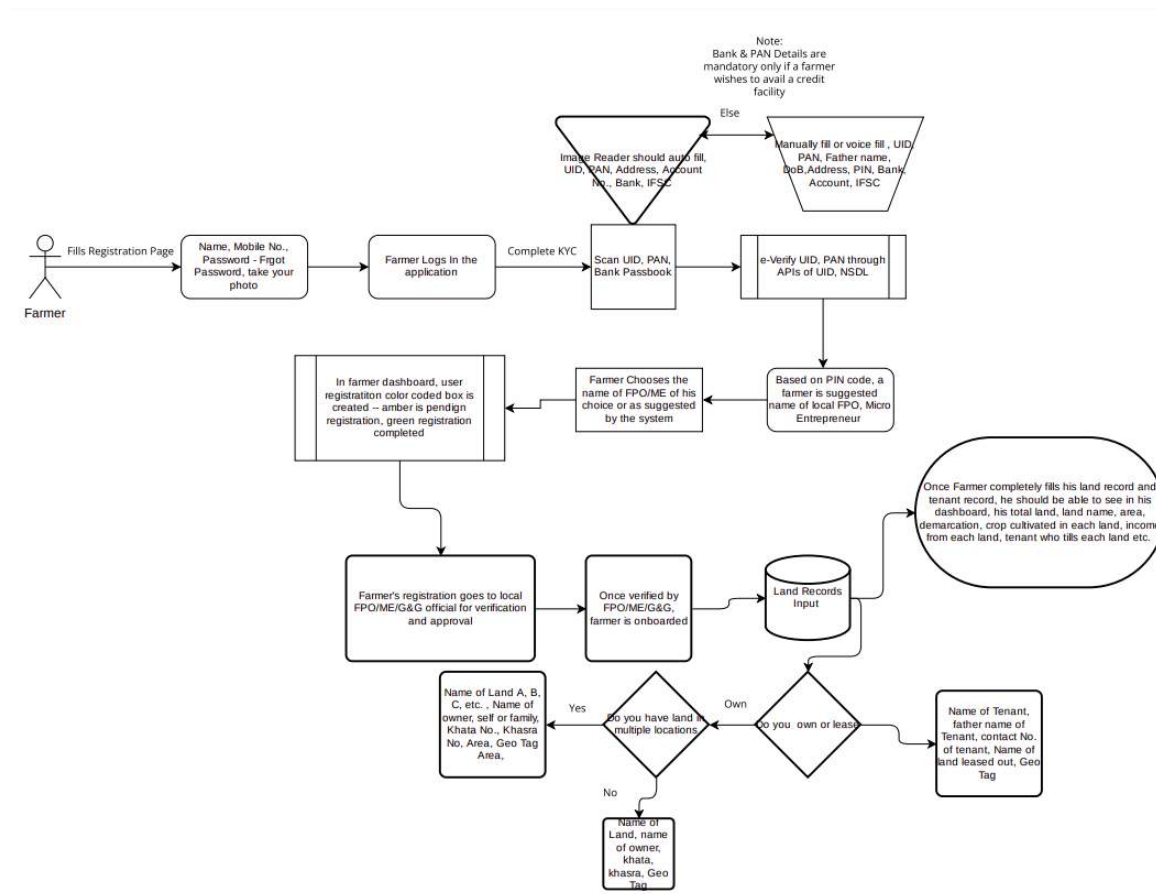


Figure 2: Source and Intellectual Copyright: Grus & Grade

Smart Contract Functionality:

- Validating Farmer's Personal Info and storing them in the ledger.
- Validating and storing Farmer's field data along with Farmer's financial data.

Value Proposition:

- Immutable and permanent records for farmers
- Timestamped trail of all on-boarding information and documents
- Electronic KYC that can be re-used by banks, market places and other players in agri domain.

FPO & ME Onboarding

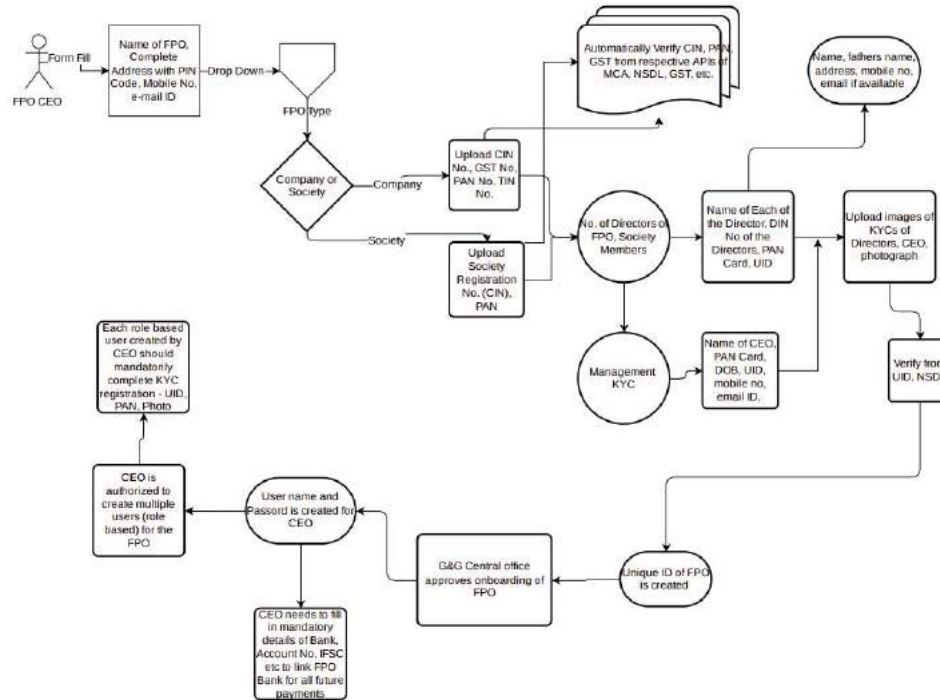


Figure 3:Source and Intellectual Copyright : Grus & Grade

Smart Contract Functionality :

- Validating a FPO/ME based on CIN Registration, GST Number, TIN Number, and then validation of each Entity's Director's, Board Members, and CO using their UID, PAN.
- Registration of new users for a FPO/ME, created by the CEO of FPO/ME.

Value Proposition:

- Immutable and permanent records for FPO/ME
- Timestamped trail of all on-boarding information and documents including verification artifacts.
- Mass on-boarding for farmers via FPO.

Input Supplies

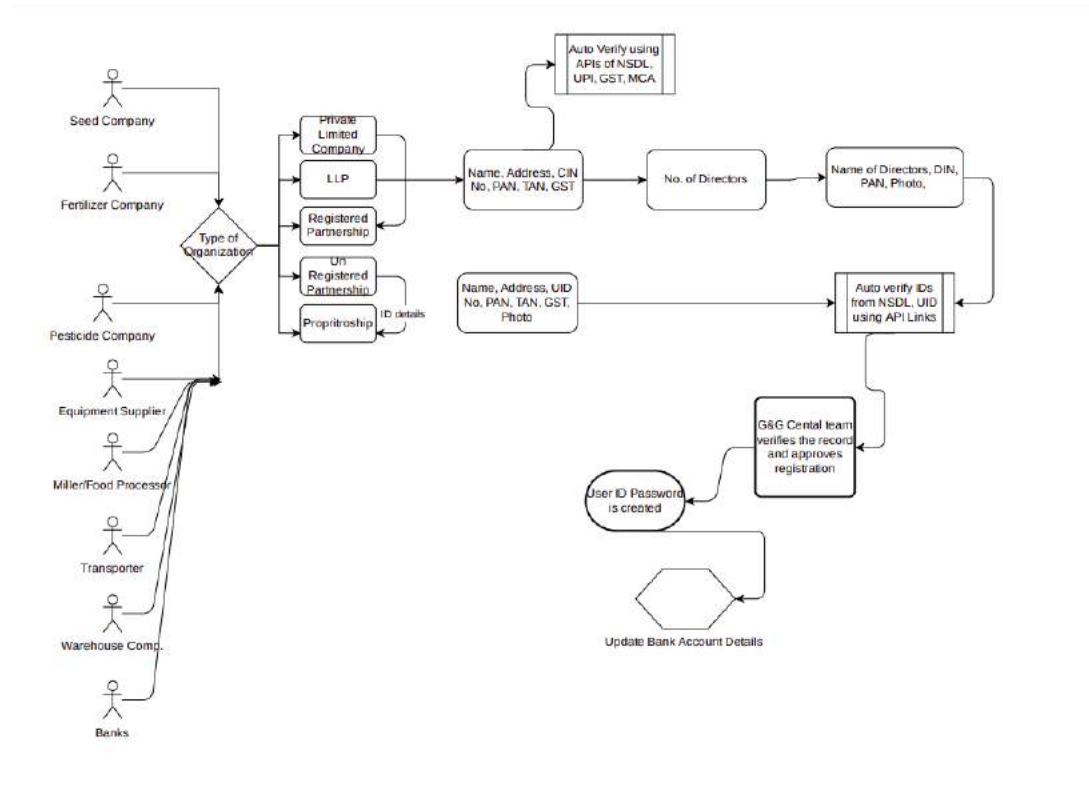


Figure 4:Source and Intellectual Copyright : Grus & Grade

Input Supplies - FPO Module

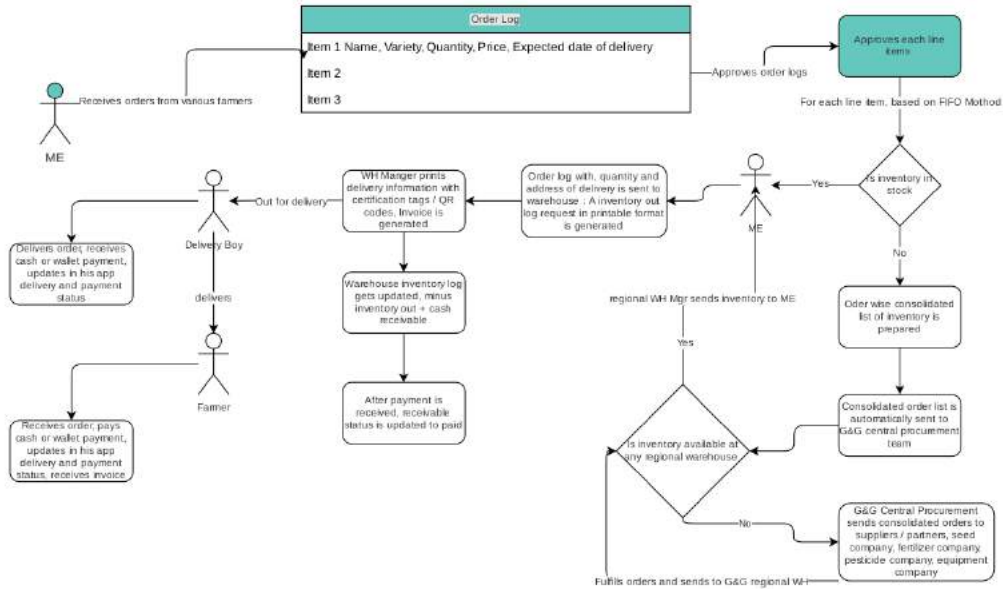


Figure 5:Source and Intellectual Copyright: Grus & Grade

Input Supplies - G&G Procurement Team

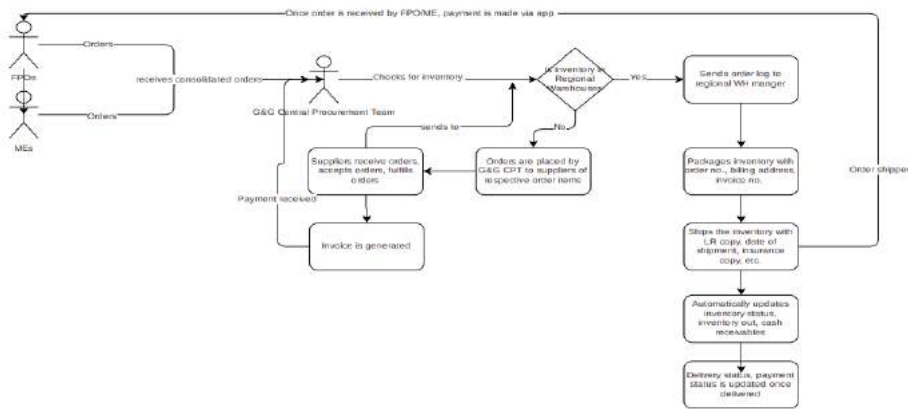


Figure 6:Source and Intellectual Copyright : Grus & Grade

Smart Contract Functionality :

- Registering organization based on the the type of organization it is and validating their info based on PAN, UID, GST, CIN
- Farmer can buy, sell, rent Pesticide, Fertilizers, etc and their transaction is saved in the ledger
- And Order is generated and shared with concerned partners.
- FPO/ME receives orders from various farmers, checks his inventory for stock and approves orders and updates the inventory while also updating the payment status.
- GnG Admin can also find a consolidated report and then verifies the inventory and approves the consolidated report.

Value Proposition:

- Immutable and permanent records
- Smart contract managed electronic order and supply chain related to agri market.
- Indisputable order clearance and artifacts.
- Trackability and transparency in the supply chain.

Post-Harvest

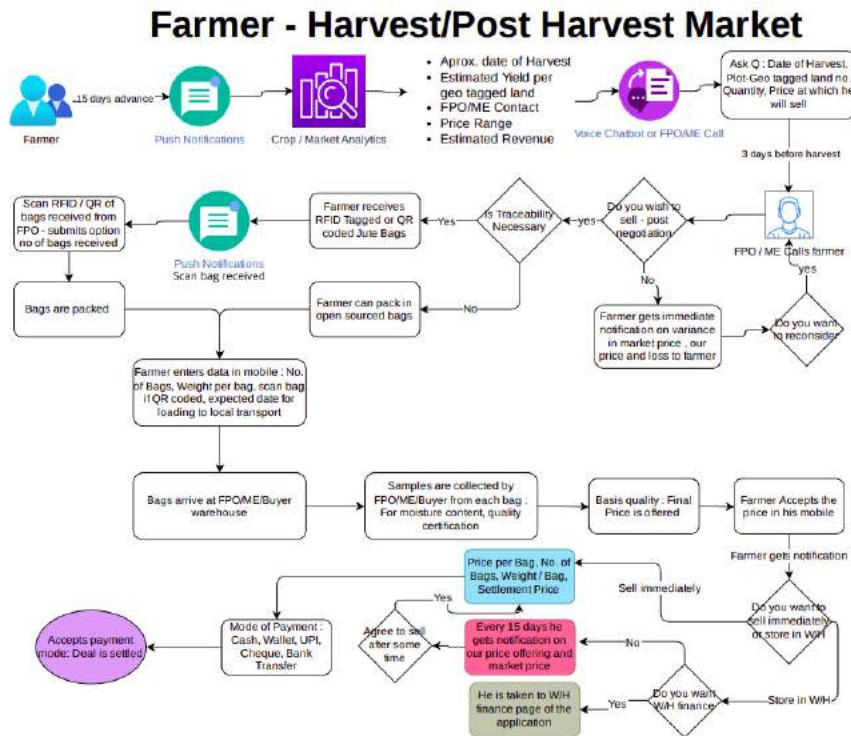


Figure 7:Source and Intellectual Copyright : Grus & Grade

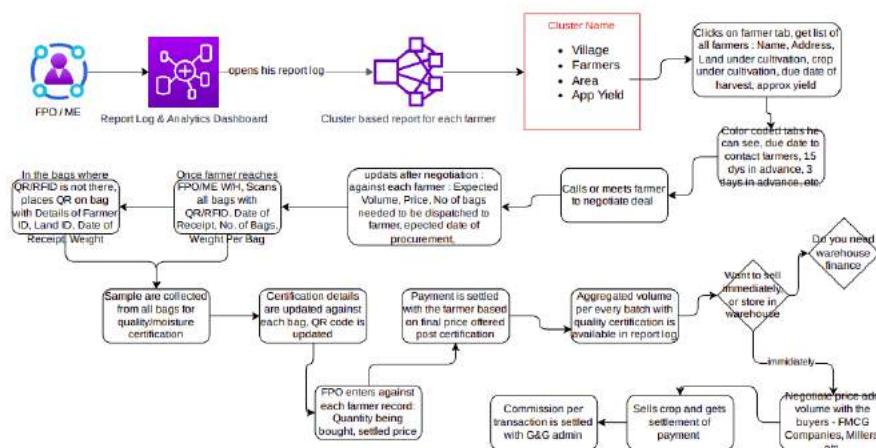


Figure 8:Source and Intellectual Copyright : Grus & Grade

Smart Contract Functionality :

- A Farmer can create a crop sell order which is verified by the FPO/ME in the smart contract, and they can agree on a specific price and complete a sell order which is recorded in the ledger

Value Proposition:

- Access to market, better price realization and minimization of post-harvest loss
- Traceability of nutritionally enhanced crops
- Automated settlement and audit trail of all transactions

Farm Management

My Land Module

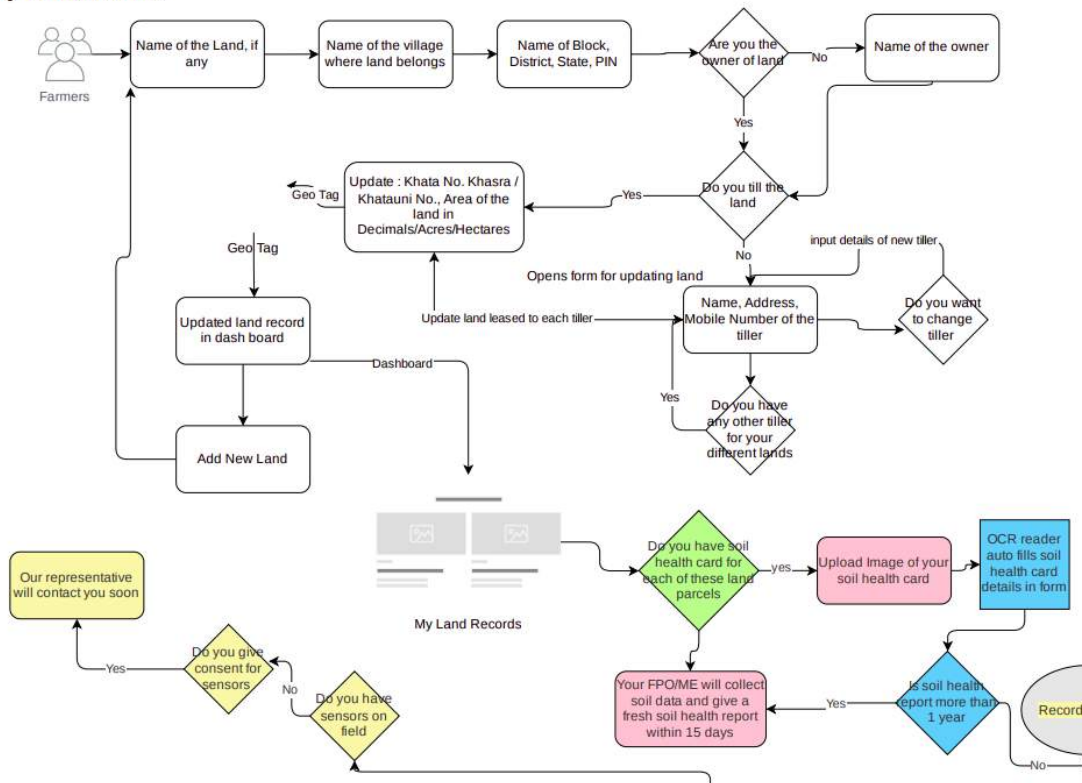


Figure 9:Source and Intellectual Copyright : Grus & Grade

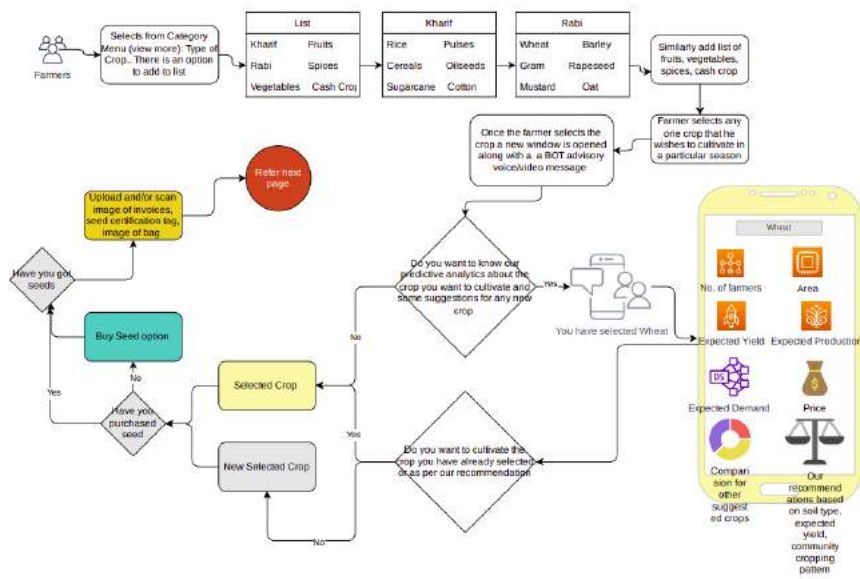


Figure 10:Source and Intellectual Copyright: Grus & Grade

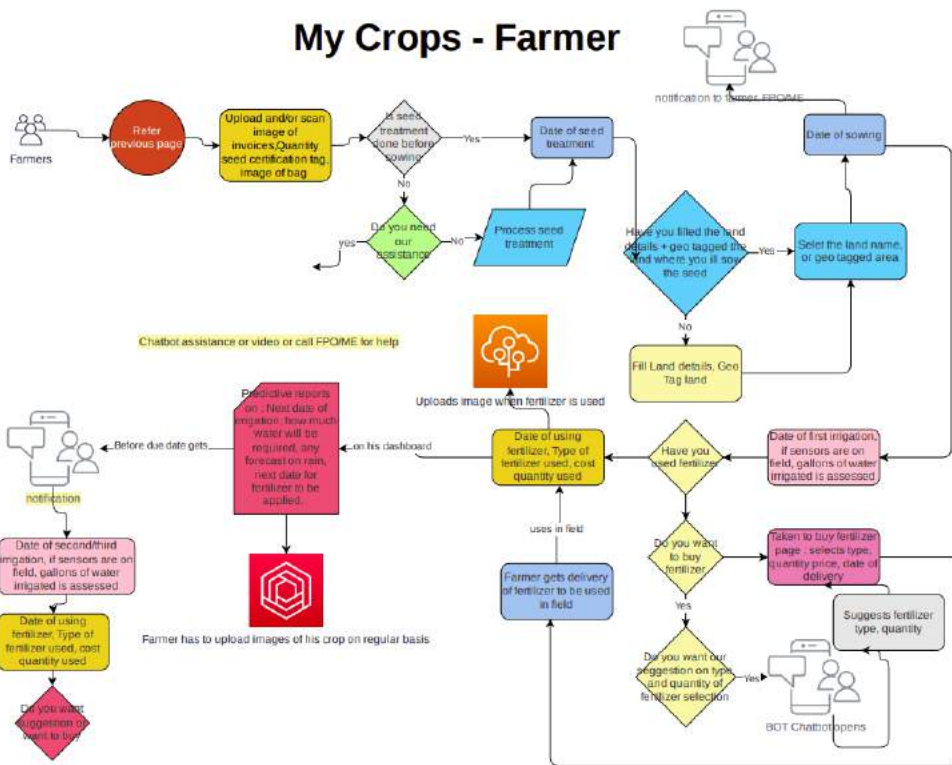


Figure 11:Source and Intellectual Copyright : Grus & Grade

My Crop - Farmer - Pest Module

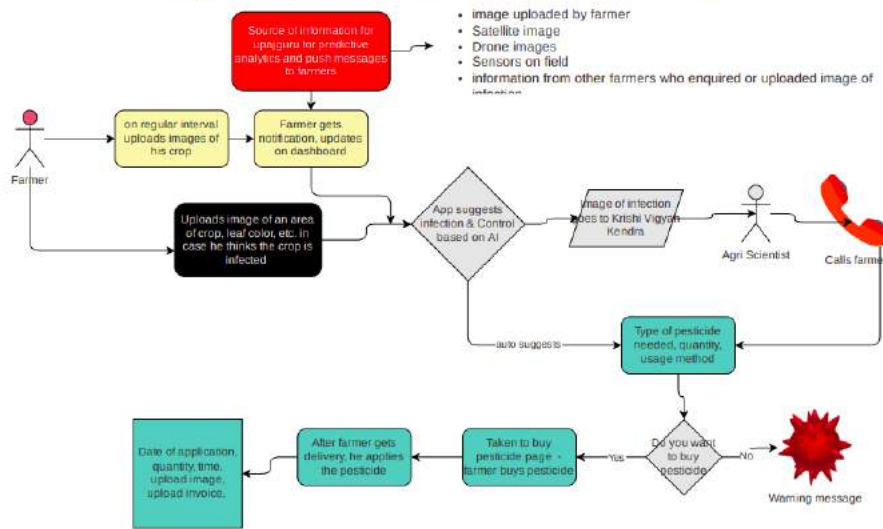


Figure 12: Source and Intellectual Copyright : Grus & Grade

Smart Contract Functionality :

- Farmer Land Details (Geo Tags, Address, Owner/Tiller details, Soil health card, etc) is stored in ledger
- Farmer Crop Details which include the type of seed he has, or wishes to buy, as well as saving certification details for the seeds, fertilizers which he has received.
- Farmer crop details are stored in the ledger which include seed type, seed certification details, fertilizer, and pesticide details.

Value Proposition:

- Immutable and secure farmer records
- Can be used for analytics on soil, weather, crop conditions for farmers and specific land areas.
- Can be used for analytics on seed and crop categories and output.

Finance Module

Finance Module for Farmers

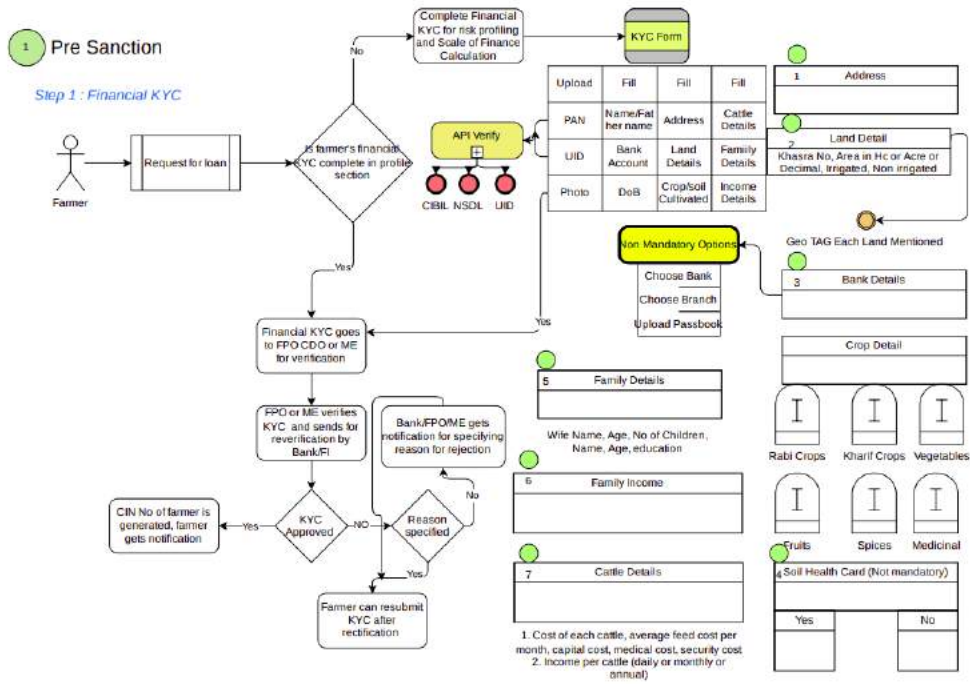


Figure 13:Source and Intellectual Copyright : Grus & Grade

Farmer - Loan Disbursement

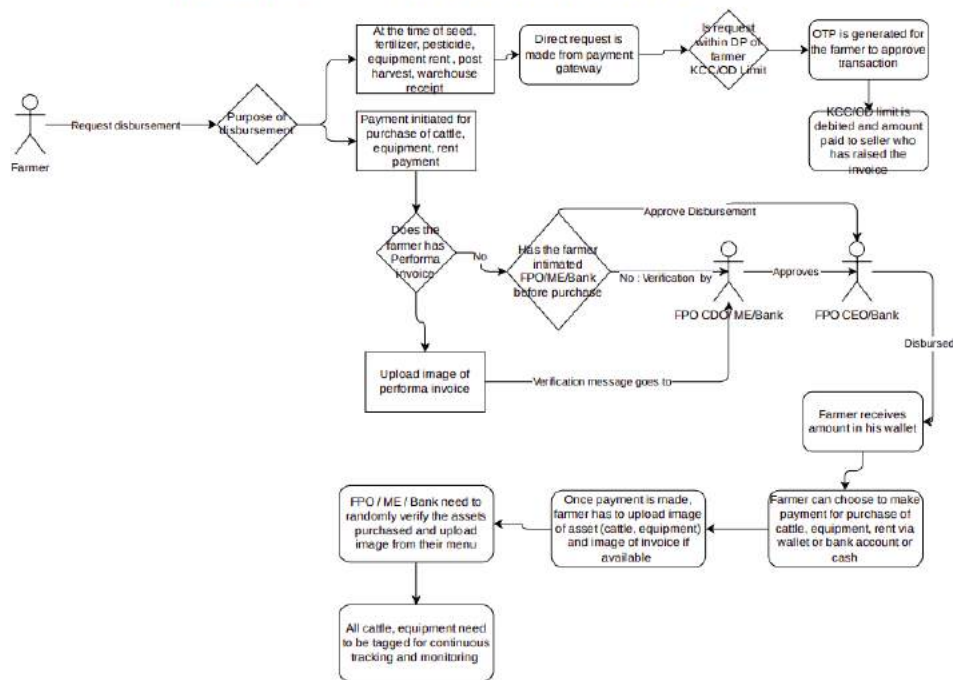


Figure 14:Source and Intellectual Copyright : Grus & Grade

Smart Contract Functionality:

- Verification of Farmer's Financial data, Risk profiling and Calculation of financial loan contract is initiated. All this data along with all the necessary requirements of the loan is saved on the ledger side.
- Following initial KYC of farmer's data, the loan application data is stored and on successful loan completion a smart contract is initiated for both parties to agree on shared terms and conditions.
- A third smart contract is initiated after signing up on terms, and all the necessary data is stored into the ledger
- Auto repayment is executed once farmer gets payment for the sale of his crop over UPAJGURU Platform.

Value Proposition:

- Automated loan generation / loan approvals and loan disbursements thru smart contract
- Auto consolidation and full traceability of loan usage.
- Possible loan rate reductions due to smart tracking of funds and legitimate demand tracking.
- Automation of repayment, thus complete realization of credit proceeds for banks, reduction in NPAs and hence lending rates.

Smart Contract Codes (Few codes of our Project)

```
Chaincode > SS > # postharvest.js > postharvest > updateSellCropFarmer
1  'use strict';
2  const {
3    Contract
4  } = require('fabric-contract-api');
5  const ClientIdentity = require('fabric-shim').ClientIdentity;
6
7  const Common = require('./common');
8  const common = new Common();
9
10 class postharvest extends Contract {
11
12 >   async sellCropFarmer(ctx, data) {-
13     }
14
15   async updateSellCropFarmer(ctx, data) {
16
17     data = JSON.parse(data);
18     var asset = await common.queryData(ctx, data.uidNo);
19     asset = JSON.parse(asset).data;
20
21     asset.fpoBid.quantity = (data.fpoBid.quantity == undefined) ? asset.fpoBid.quantity : data.fpoBid.quantity;
22     asset.fpoBid.unitPrice = (data.fpoBid.unitPrice == undefined) ? asset.fpoBid.unitPrice : data.fpoBid.unitPrice;
23     asset.fpoBid.bidAmount = (data.fpoBid.bidAmount == undefined) ? asset.fpoBid.bidAmount : data.fpoBid.bidAmount;
24
25     if (data.finalQuantity && data.finalUnitPrice && asset.finalBidAmount == '') {
26       asset.finalBidAmount = parseInt(data.finalQuantity) * parseInt(data.finalUnitPrice);
27       asset.finalQuantity = data.finalQuantity;
28       asset.finalUnitPrice = data.finalUnitPrice;
29     } else if (data.finalQuantity && data.finalUnitPrice && asset.finalBidAmount != '') {
30       var res = {
31         status: 'error',
32         statusCode: 200,
33         message: "Final Bid has already been issued.",
34         data: {}
35       }
36       return JSON.stringify(res);
37     }
38   }
39 }
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Chaincode > SS > JS loanjs > loan > loanApplicationG
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140   loanUsage: asset.loanUsage,
141   monitoring: asset.monitoring,
142   documentation: {
143     sanctionLetter: asset.documentation.sanctionLetter,
144     dpNoteAdded: asset.documentation.dpNoteAdded,
145     groupRegistered: asset.documentation.groupRegistered,
146     timeStamp: asset.documentation.timeStamp
147   },
148   fpo: asset.fpo,
149   data: {
150     activityType: (activitytype == '') ? asset.data.activityType : activitytype,
151     loanType: (loantype == '') ? asset.data.loanType : loantype,
152     loanPurpose: (loanpurpose == '') ? asset.data.loanPurpose : loanpurpose,
153     loanTenure: (loantenure == '') ? asset.data.loanTenure : loantenure,
154     equipmentCost: (equipmentcost == '') ? asset.data.equipmentCost : equipmentcost,
155     operationCost: (operationcost == '') ? asset.data.operationCost : operationcost,
156     landHolding: (landholding == '') ? asset.data.landHolding : landholding,
157     landArea: (landarea == '') ? asset.data.landArea : landarea,
158     incomeSource: (incomesource == '') ? asset.data.incomeSource : incomesource,
159     income: (income == '') ? asset.data.income : income,
160     cropType: (croptype == '') ? asset.data.cropType : croptype,
161     cropCycle: (croppcycle == '') ? asset.data.cropCycle : croppcycle
162   },
163   timeStamp: asset.timeStamp
164 }
165
166 const temp2 = await common.postData(ctx, loan.loanApplicationId, Buffer.from(JSON.stringify(loan)))
167
168 const result = {
169   status: 'success',
170   statusCode: 200,
171   message: "Loan " + loanapplicationid + " updated successfully.",
172   data: {
173     loanApplicationId: loanapplicationid
174   }
175 }
176 return JSON.stringify(result);
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Chalncode > SS > JS farmer.js > farmer > updateFarmer

```
113
114 async updateFarmer(ctx, data) {
115   data = JSON.parse(data);
116   var asset = await common.queryData(ctx, data.uidNo);
117   asset = JSON.parse(asset);
118   asset = asset.data;
119   var struct = {
120     uidNo: asset.uidNo,
121     name: (data.name == '') ? asset.name : data.name,
122     role: asset.role,
123     creditScore: asset.creditScore,
124     fatherName: (data.fatherName == '') ? asset.fatherName : data.fatherName,
125     phoneNumber: (data.phoneNumber == '') ? asset.phoneNumber : data.phoneNumber,
126     adhaarNumber: asset.adhaarNumber,
127     loginId: (data.loginId == '') ? asset.loginId : data.loginId,
128     paid: (data.paid == undefined || data.paid == '') ? asset.paid : data.paid,
129     bank: {
130       bankName: (data.bank.bankName == '') ? asset.bankName : data.bank.bankName,
131       accountNumber: (data.bank.accountNumber == '') ? asset.accountNumber : data.bank.accountNumber,
132       ifscCode: (data.bank.ifscCode == '') ? asset.ifscCode : data.bank.ifscCode
133     },
134     address: {
135       houseNumber: (data.address.houseNumber == '') ? asset.houseNumber : data.address.houseNumber,
136       village: (data.address.village == '') ? asset.village : data.address.village,
137       block: (data.address.block == '') ? asset.block : data.address.block,
138       district: (data.address.district == '') ? asset.district : data.address.district,
139       state: (data.address.state == '') ? asset.state : data.address.state,
140       pinCode: (data.address.pinCode == '') ? asset.pinCode : data.address.pinCode
141     },
142     password: asset.password,
143     emailId: (data.emailId == '') ? asset.emailId : data.emailId,
144     verificationStatus: asset.verificationStatus,
145     kycStatus: true,
146     executive: asset.executive,
147     language: (data.language == '') ? asset.language : data.language,
148     loan: asset.loan,
149     groupLoan: asset.groupLoan,
150     asset: asset.asset,
151     fpo: asset.fpo,
```

```
152     // asset.paid == undefined || data.paid == '' ? asset.paid : data.paid
256
257 async addCart(ctx, data) {
258   data = JSON.parse(data);
259
260   var asset = await common.queryData(ctx, data.uidNo);
261   asset = (JSON.parse(asset)).data
262   let time = new Date().getTime();
263
264   if (asset.cart == [] || asset.cart == undefined) {
265     asset.cart = [{
266       varietyId: data.varietyId,
267       image: data.image,
268       quantity: data.quantity,
269       price: data.price,
270       timeStamp: time,
271       variety: data.variety,
272       category: data.category
273     }]
274   }
275   var flag = true;
276   asset.cart.forEach((item, i) => {
277     if (item.varietyId == data.varietyId) {
278       if (parseInt(data.quantity) == 0) {
279         asset.cart.splice(i, 1);
280       } else {
281         asset.cart[i]["quantity"] = data.quantity;
282       }
283       flag = false;
284     }
285   });
286   if (flag) {
287     asset.cart.push({
288       varietyId: data.varietyId,
289       image: data.image,
290       quantity: data.quantity,
291       price: data.price,
292       timeStamp: time,
293       variety: data.variety,
294       category: data.category
```