**FIAT**

**Farmer’s Intelligent Assistant for Tragedy**

**A POC submitted for**

**IBM Call for Code**

**By**

**Team CodeMind**

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**Objective**

We are targeting 3 main objectives through this Call for Code solution entry -

**Humanitarian Protection in times of disaster –**

The elderly, disabled, and impoverished are statistically more likely to experience the adverse effects of natural disaster, including loss of property and loss of life. Studies show individuals with disabilities or health issues consistently have much higher rates of mortality - up to twice as much as the general population

**Disaster Preparedness & Building Back Better Aftermath -**

Agriculture is well known for being a volatile industry; with both unpredictable economic and geographical climates posing multiple threats to today’s farmers, many of whom, as a result, struggle to make ends meet.

Research has shown that rapid yet well-informed and well-orchestrated rebuilding measures can help to massively reduce the negative impact of disasters on the life, well-being, and health of individuals.

The lack of accessible, trustworthy and affordable insurance platform has meant that farmers in poorer areas of the world have been well and truly at the mercy of mother earth.

The objective is to develop and establish an environment addressing above mentioned and other significant issues for overall better Disaster Management

**Solution**

**As-Is**

Pradhan Mantri Fasal Bima Yojana (PMFBY) has been launched with an objective to simplify the insurance process for the farmers. Contribution for farmers have been pegged at 2% of sum assured for Kharif crops and 1.5% for Rabi. For all commercial crops it is kept at 5%. There is no limit to the sum assured. The balance amount of the premium (as per the actuarial rates) is to be paid equally by the State Govt and the Central Govt. The scheme is mandatory for farmers who take a loan for sowing and is optional for other farmers.

Insurance is offered at the village panchayat level – thereby assuming homogeneous behaviour within the entire village. The enrolment is mostly administered through the banks. The Insurance has two components

1.      Yield protection which mitigates the farmer’s loss in case of yield lower than defined thresholds) and

2.      Weather based Insurance which compensates farmers for losses linked to weather linked events including disasters

Farmers for a village are typically covered for both the insurance(s). Closer to harvest, the State Govt. departments conduct crop cutting experiment (CCE) for the representative areas and share the data with insurers. Claims are settled basis the gap between the target yield and the CCE data. For weather linked catastrophe, claims are settled basis the confirmation from the Meteorology department. Banks have first right to the claims disbursed for farmers having taken loan from the. They subsequently pass on the funds to the farmer post adjustment of scheduled loan paybacks.

**Where is the “Good Scheme” going wrong**

Several agency reports and empirical news items confirm the new scheme not being able to create the significant differential impact it was intended to make. A quick summary of gaps are as follows

1.      Poor claims settlement experience: Timely and adequate claims settlement seems to be a challenge. This is being attributed to multiple reasons namely

a.      Delay in premium payment by State Govt and

b.      Routing of the process through the banks – who make errors w.r.t. insurance guidelines leading to wrong/double deductions

c.       Delays by State Govt wrt Notifications

d.      Missing of crops in the Notified major crops list of State Govt

e.      Errors in “Notification of threshold yields”by state Govt

f.       No policy document available with farmers

g.      Significant loopholes in Assessment of Crop Loss

                                                  i.     Delays in/ non-submission of CCE (crop cutting experiment) reports

                                                ii.     Inadequate sampling size (non-representative for a complete village)

                                               iii.     Manpower crunch across all levels including insurers; Non existence/formation of Panchayati Raj Institutions and District level Technical/Monitoring Committee

                                               iv.     Absence of technology/ inadequate digitization to offset the manpower requirement

2.      Marginal improvement in Insurance penetration :

a.      The new scheme being only mandatory for loanee farmers; enrolment routing through banks has meant no one entity is really pushing the product to non-loanee farmers, sharecroppers and tenants.

b.      Documentation challenges dissuading sharecroppers and tenants

c.       There is no direct insurance to farmer contact at any stage –  a basic “marketing gap”

d.      Poor awareness wrt the scheme with a large section of farmers

e.      Absence of Panchayati Raj Institutions and District level Technical/Monitoring Committee

3.      Significant profits for insurers raising the credibility of the scheme

a.      Significantly higher actuarial rates

b.      Allegations of manipulation of CCE data

c.       Allegations of manipulation of threshold values of yield

d.      No options of profit sharing though Govt protects insurers against losses beyond a point

**The Key Gaps in The Current Process**

A deeper analysis indicates below key gaps

1.      Absence of a efficient ecosystem across the entire insurance process

2.      Lack of transparency and speed in claims administration

An effective ecosystem tied to specific cluster(s) or states, working closely with the farmers, can achieve the following:

1.      Drive higher enrolment through improved awareness for all categories of farmers

2.      Ensure a fully compliant contracting process; coordinating with banks, insurers & Govt bodies

3.      Ensure timely submissions of the CCE (crop cutting experiment) reports

4.      Ensure timely notifications and validation of the threshold yields

5.      Drive timely closure of all grievances

**To Be**

Solution is to build necessary ecosystem/network using technology which covers combined use of multiple technology platforms available today.

The team approached this problem by looking how a solution could benefit farmers who need access to information about the current situation, resources available to them by creating a personalized assistant and by providing a platform to enable them recover fast (faster and transparent insurance claim settlements here)

The same platform can help individuals with limited mobility, disability by providing them with real-time information about a disaster so they can make an informed choice about evacuation and find loved ones at a shelter.

**Assumptions**

This solution assumes that the end user, in this case a vulnerable person/farmer who lives in the path of a natural disaster, can use a mobile phone or has a proxy with access to a mobile network and electricity.

**Virtual Assistant**

**Virtual Assistant** for Farmers to help/guide them with Crop Insurance Schemes, Benefits and other assistance with respect to weather anomalies.

Provides real time or in advance weather notifications and Alerts to vulnerable persons and farmers

Enable informed choice about evacuation for vulnerable persons and give them real-time evacuation information or prepare contingency plan

Enable personalized experience for farmers for decision making and planning

**Blockchain Platform**

* It creates a secure, resilient, traceable, trusted and transparent business network for Disaster Management

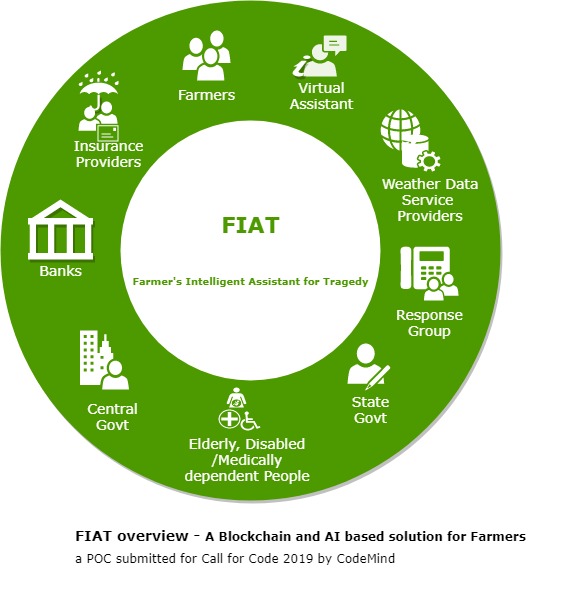
*They don’t have to understand insurance, they just need to know they are protected and taken care of when disaster strikes. Blockchain can create that trust in the process and virtual assistant (Bot) can assist with respect to any required insurance related or weather related information/alerts for overall enablement and confidence building.*

Once the confidence in the system comes back, number of farmers enrolling for the scheme will automatically go up.

**Cloud Platform** for providing high availability, more security and scalability for this ecosystem

**FIAT Application**

FIAT Application will utilize features of these platforms in combination to provide the technical solution we are looking for. It creates a secure, resilient, traceable and transparent business network for Disaster Management using Hyperledger Fabric (a blockchain framework implementation and one of the Hyperledger projects hosted by The Linux Foundation)

**System Overview –**

* Farmers
* Insurance Providers
* Banks
* Central Government
* State Government
* Response Group
* Weather Data Providers
* Virtual Assistant (for personalized experience, text to speech and speech to text service provider)
* Individuals with Limited Mobility or Disability or Dependent People

**How Blockchain based FIAT can help Crop Insurance in India?**

Block chain’s ability to handle multiple parties in a single, transparent transaction chain at a marginal cost makes it an ideal technology platform to administer crop Insurance. The current PMFBY scheme is administered along clusters and as mentioned earlier, a cluster is a collection of districts of a large state or all the districts of a small state. Each cluster can be managed using one Blockchain with the lending banks, insurance company, the enrolled farmers, the weather offices and the coordinating agency on the same Blockchain. Such a chain would work as follows

1.      State Govt can upload all notifications and guidelines wrt crops and threshold yields

2.      Insurance company can upload the rates for all crops vide the master contract with the State Govt for that cluster

3.      All insurance applications from farmers can be uploaded on the system. For farmers who have taken loans, the respective banks can be made a “party” in proposals

4.      Banks can validate all the transactions pertaining to them and approve of the insurance applications

5.      All approved contracts with the farmers can be notified on the Blockchain by the insurance company

6.      All nonapproved contracts can be notified; coordinating agency can amend and resubmit

7.      State Government and Central Government can make automatic payments to the insurance company – triggered by the contract approvals

8.      All the farmer level policy documents can be accessed by the coordinating agency; can be downloaded and shared with the individual farmers

9.      All CCE results can be uploaded by the State Govt bodies or by the coordinating agency on receipt from the State Govt.

10.   Weather Data providers can have a direct feed into the Blockchain updating area-wise data of events/incidents

11.   Claim Settlement can be handled as follows

a.      For yield protection insurance, all farmers who have a lower than threshold yield, can register for a claim; Claim payments can be approved or rejected automatically,  basis the CCE results. All payments to directly credited to the farmer’s bank accounts

b.      For weather linked insurance, all payments to be automatically triggered through the Smart Contract feature of Blockchain as soon as the incidence is triggered into the Blockchain (not requiring the claims to be registered)

It can be seen that the above process vastly simplifies the registration, approval and claims process, encouraging farmer uptake and a fair and easy distribution of funds and should therefore be seriously considered.

Blockchain’s low running costs, high trust factor and simple administration makes for a strong case for use in the crop insurance

**Out of Scope**

Automation related to deciding crop yield data and collecting & entering CCE data.

**Key Features –**

**Virtual Assistant (Bot)**

**Blockchain based Platform** which enables Affordable, Accessible Crop Insurance and facilitates Transparent, Timely & fair Pay-outs in case of disaster event. The architecture of this *distributed ledger technology* provides a transparent, cost effective and secure means for tracking the ownership and the transfer of assets.

**Mobile/ Web Application and Service API Interfaces** - The FIAT Application provides one platform to connect the Farmers, Insurance service providers ( their existing enterprise systems ), Data Providers and Governments using APIs

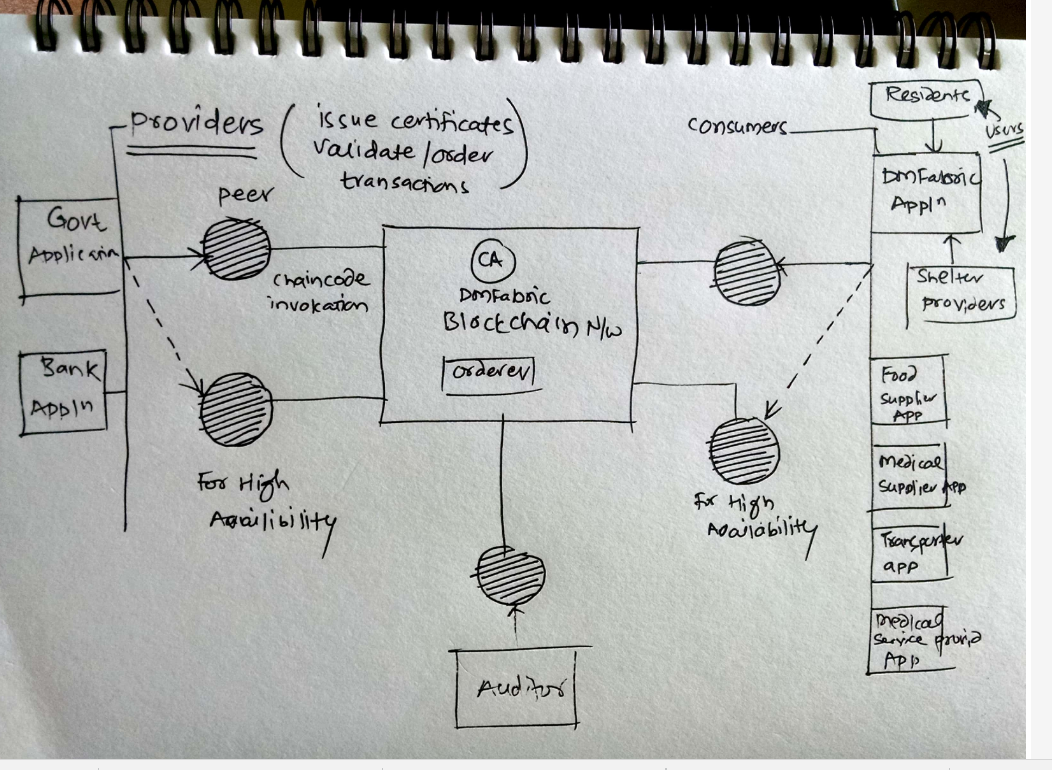
**Architecture**

Below is reference architecture for FIAT showing primary systems & components -

**References**

<https://www.linkedin.com/pulse/blockchain-potential-game-changer-indias-crop-insurance-das>

**DMFabric Network**



**Technology & IBM services**

**IBM Blockchain Platform**

Hyperledger Composer – provides abstraction layer for Hyperledger Fabric (which leverages **Javascript**)

Hyperledger Fabric - Hyperledger Fabric allows components, such as consensus and membership services, to be plug-and-play. Hyperledger Fabric leverages container technology to host smart contracts called “chaincode” that comprise the application logic of the system

**IBM Bluemix** – to host blockchain

**IBM Push Notifications -** to popup alerts on the mobile & web

**IBM Mobile Foundation** - to provide offline capabilities for residents to get information even if they are not connected to the internet

**IBM App ID –** toprovide the facility to login to the application using the social media identity (Google, Facebook)

**IBM API Management -** to provide secure access to the APIs exposed by the application.

**IBM Cloudant – A distributed database based on Apache CouchDB** for storing documents etc.

**JAVA SDK/ Node for APIs**

**IBM IoT Platform** – can be used for leverage services for Internet of Things but this is not in scope currently for this poc.

The system will keep evolving and may use other technologies in future.

**Use Case Scenarios –**

Use Case Scenarios are covered in **separate document**

**DM Fabric Environment Set Up**

**What Next ?**

High level solution roadmap for DMFabric application can be like -

* Make necessary improvements in the DMFabric application and complete necessary integrations with different services to **make it PRODUCTION READY**
* **Integrate this Blockchain solution with IBM IoT Platform** –to leverage services for Internet of Things
* **Get this application to actual user base and communities to test** for feedback and inputs

Crop Insurance And Disaster Assistance

Virtual Assistant

for Farmers to help them with Crop Insurance Schemes

& for Dependent Persons for disaster alerts/ assistance

Dialog Skill for Crop Insurance Support and Disaster Assistance based on weather updates

Skill Details

**Skill Name:**Crop Insurance And Disaster Assistance

**Skill ID:**8d01ec7d-c40f-4a65-af28-586b55adc69c

**Workspace ID:**8d01ec7d-c40f-4a65-af28-586b55adc69c

**Legacy v1 Workspace URL:**https://gateway-lon.watsonplatform.net/assistant/api/v1/workspaces/8d01ec7d-c40f-4a65-af28-586b55adc69c/message

Service Credentials

**Service Credentials Name:**Auto-generated service credentials

**Username:**apikey

**Password:**D72auFNRtKqEfzyiy77kR8fqRdHgDkk9-NwNsA4kSbQm

Crop Insurance And Disaster Assistance