HEALTHY HARVEST FOR SUSTAINABLE DEVELOPMENT

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Abstract -

Agriculture is undoubtedly an important part of our livelihood. India, which is the second-largest producer of agricultural products in the world. But there are many problems that farmers have to face. Many of the farmers are going through a tough phase as people are not giving priority to farming due to which production is decreasing. During farming, farmers have to face plenty of problems. Due to the lack of contacts and knowledge, farmers don't get the idea of how to sell the product or how to do farming using modern methods as they are not having enough knowledge of technology. The Covid-19 pandemic has also hindered the farming sector. The GDP contribution of the sector had fallen from 5.6% to 2.9% as per the current financial year 2020-21. Due to lockdown, many services were closed which further resulted in restrictions on buying and selling of crops, seeds, fertilizers, and related products. The government has launched several schemes aiming to help farmers in every possible way to reduce their problems. But farmers are ignorant of these schemes which are made to benefit them. Every year they face huge losses due to shortage of water, crop failure, and many more. They don't get enough water supply for proper irrigation which further damages their crops.
***Key Words*:** Farmer Service portal, API, Government services, Private Services, Decentralized Database, Blockchain and Web Application

1. INTRODUCTION

India is a country known for its agriculture. Farmers are an integral part of the society who are directly or indirectly responsible for our survival in all sectors. It builds up trust among others[1]. As per the importance, the amenities / services provided to the farmers are either unreachable to them or not provided. To resolve this, we have created a portal to bring down every service provided on one single platform with the maximum transparency provided[2]. We provide direct integration of government services through our portal which is user friendly. When it comes to irrigation, fertilizers and soil health facilities, it becomes tiresome to go through every website and find the appropriate policy / client. A portal with all facilities in one place is an easy option. Since the farmers are directly contacting customers on the portal, the prices of the products offered by the farmer to the customer will also be affordable to customer, which will help both the farmer and the customer where the customer can save some money and the farmer will gain extra profit that he deserved [3-4].

2. EXISTING SYSTEM

In today's world, there is a need for such a platform that would be helpful for the farmers where they can get their crops insured easily, get all information regarding the government schemes, purchase seeds, and sell their crops in one place. In 2008, the government brought an agricultural debt waiver and debt-relief scheme in effect to benefit over 36 million farmers[5]. The scheme also covered direct agricultural loan to stressed farmers. However, most of the welfare programs and subsidies announced by both the central and state governments are yet to reach poor farmers, while big and wealthy landlords are hugely benefited[6-8].

We often see in the news that farmers throw away their crops because either their crops get damaged by weather, pests, and disease or they didn't get the appropriate demand[9]. Due to the absence of mandi houses and proper marketplaces, farmers are not able to sell their crops at a reasonable price. In this situation, they have to look for a middleman and local traders for business[10-11]. These middlemen don't provide them a reasonable price for their crops, and hence farmers are bound to either sell crops at a lower price or just throw them at the roads.

Our current system does not provide a way of e-learning for farmer that will provide the knowledge of new techniques in farming. It also lacks transparency which further gives rise to fraudulent acts.

3. OBJECTIVES and SCOPE

The main aim of this web application is to provide a combined portal for farmer related services and government schemes in a network where every farmer is identified by its unique identity key which creates viability among farmers to take advantage of available services in a proper way so there's no human interference and provide a trustworthy process[12]. Smart contract used in the Block chain network keeps the transaction successful as both the terms are obeyed and agreed while doing a transaction.

The objective of this project:

- Web portal for farmers related services and schemes.
- Easily accessibility and user-friendly environment to communicate.
- Doubt solving chat box
- Focus on creating a transparent system using smart contract and blockchain.

The scope of this Portal is to create a user-friendly portal. Every user wants the request or verification process to be fast and simple. So, we introduced the smart contract in the network which is agreeable by both the farmer (user) and the service provider. Smart contracts act as an API. It makes the process easier to understand by the terms nd conditions[13].

Due to the written text format of various government portal, farmers finds it difficult to register on the portal, so we have created this portal to deliver the information through pictures.

During Covid-19 outbreak, getting on ground verifications and consumption of services provided by the government becomes a hassle as the process takes time to be completed from both sides. We made it simple by introducing peer -to peer interaction through the portal as it does not require any human intervention which makes the process quite fast[14].

It became inconvenient for the farmers to buy and sell crops and fertilizers during the pandemic. Through our portal, a farmer can sell his crop from anywhere around the globe. The transaction is transparent. The hyper ledger of both the crop sold and transaction amount is listed in the block. That block is validated by designated nodes in the network block.

4. LITERATURE SURVEY

There is limited access to the market information, literacy level among the farmers is low, multiple channels of distribution that eats away the pockets of both farmers and consumers. Crop losses due to pests and diseases are a major threat to incomes of rural families and to food security worldwide. There is a need of the decision support system for the farmer for the high yields to be produced benefitting the farmer. This can be achieved when there is proper knowledge about the environmental conditions, Market Conditions and knowledge about the timely planning of Agricultural Activities. Transparent system is needed for implementation. Project Aims at the solution of all the above-mentioned issues by using our web portal where we have listed all services related to farmers.

Sanjivani Bagade: Farmer Portal System using MERN Stack [1] – It is a farmers portal to provide service offered by the government and The main aim of this web application is to make a direct connection between customers and farmers which will be profitable for both customers and farmers. As most of the farmers lacks knowledge regarding new tools and technologies due to which there is loss of manpower and wastage of time. The objective of this project is to creating a bridge between farmers and customers and easily accessible site. This website focus on trading and information delivering.

SMART KRISHI- SMART KRISHI offers location-based services to the farmers. It includes weather forecasts, search for nearby farming related services, services for hiring laborers and farming tool and much more. The system aims to reduce farmer's work load, ease his daily work and thus ultimately increase the crop produce. Firebase is used for authentication and real-time database which provides the facility of backend services. For getting nearby location, the system uses standard zip-code database which provide latitude or longitude of zip-code and other information.

5. SYSTEM ARCHITECTURE

We describe the Algorithm, which is used to explain how the system is going to work, i.e., the process logic behind it, the flowchart, which represents the pictorial representation of the process logic and finally the Data Flow Diagram.

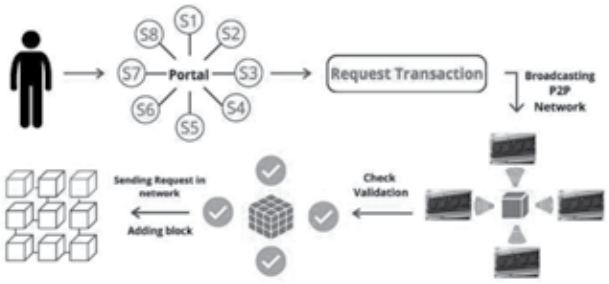


Fig-1: System Design

In the above representation a user login into the portal and select a service if there is any transaction done it gets flooded into the network and validation is checked that both parties agreed on the contract,

if transaction is done by a valid user, etc.. after the validations got verified the block of transactions gets circulated into the network.

5.1 Algorithm Used

There is no need of login for normal user who has the curiosity to know about the market information, new government service and different schemes. Farmers who want to perform buying and selling of their crops and take advantage of different schemes must have a verified login ID. During authorization, Farmer need to provide his bank account number, names of product to sell, his personal details, etc. Once availed with the username and a password for the website the users can perform different operations like checkout new government schemes available, get a list of different service providers nearby (i.e. water suppliers, soil examination center, Weather report, etc.). A farmer can directly buy fertilizers and high-quality seeds directly through our portal, during buying and selling of services and products, user can check the fund transfer details which is transparent and transaction is peer-to -peer in the network. We improve the economic status of both small and big level of farm owners and created a portal which is viable in communication and a user can get everything he want on his/her fingertips. This System will help farmers to sell agricultural products in convenient way and easy to use application for buy and sell.

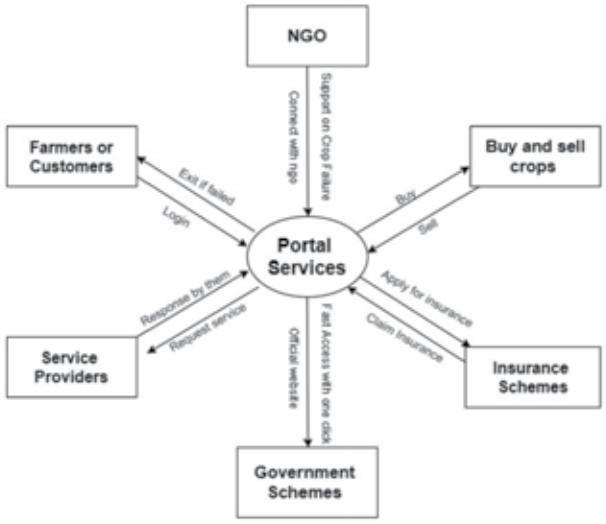


Fig-2: System Architecture

5.2 Flow Chart

The diagram has shown below gives some basic description regarding the flow of the system. All services are displayed. User can select any service he/she want. If user have requested a paid service than he will be redirected to the transaction page where ever transaction is recorded in the Hyper ledger and formation of block takes place which gets circulated in the network after the validation check. This flowchart representation will give an overview of the operations performed and where it goes after the operation has been performed. It shows the different conditions like ("if else") if one condition is not true then where the flow will return and from where will it start again or where will the flow terminate after some operation has been performed.



Fig-3: Flow Chart

6. METHODOLOGY

Following are the basic modules in the project:

Market Information: In buyers' section, a user can see the market information of nearby market sales. This will consist of selling rates of different product, product-wise details like quantity, grading, selling cost, etc. Farmer can also search for specific product and can sell their surplus in the most suitable rates.

Sell and buy crops: It includes Pricing, Billing and the Fund Transfer. Pricing will show the farmer at what price his commodity has been sold. Billing will create the bill after getting request from farmer for bill creation. Created bill will be displayed on the page. Bill will consist of unit price rate, total bill amount, commission of agent, vehicle fare, other expenditure, etc.

Schemes: It lists all government schemes related to particular product and area and can apply in the same way as for compensation.

Soil Quality: Farmer can book an appointment to get their soil examined through the SOIL EXAMINATION Portal.

Insurance Policies: Farmers can get information about the insurance and insurance claim regarding their crops on the INSURANCE CLAIM portal.

Fertilizers: Farmers can save their crops by purchasing best-suited fertilizers from the FERTILIZERS portal.

Water Supply: Farmers can get a list of water suppliers in their nearby area with address and contact details.

Chat Bot: Chat bot Powered by IBM is provided specially to make things smooth and easier.

Smart Contract: Smart contract is a contract signed between the buyer and seller. Both must agree to each other's terms and conditions to make the transaction validated between both.

7. Functionalities

Farmers Function:

- Redeem any service in simple steps.
- Register themselves for buying and selling of crops and fertilizers.
- Claim Insurance and schemes by providing basic KYC with the portal while registering with the network.
- List or delist their crops.
- Book a slot for soil examination
- Get water supply for the crops through nearby water supply agencies.
- Get to know about which crops should be planted according to the desired location.
- Connect with the NGOs for the support in case of any losses.

Consumer Function:

- Get all details of farmers who is selling their crops.
- Send request for peer-to-peer communication or negotiation.
- Place order on network using our portal.

Admin Function:

- Add or remove new customers or farmers with their Unique ID.
- Provide basic customer support /Query.
- Add or remove services listed on the portal.

8. Limitation of system

1. Lack of equality to access the internet in rural areas.
2. Technology Implementation Challenges.
3. Lack of reliability on new technology by the user.
4. Due to consensus mechanism mistakes cannot be corrected.

9. Advantage of System

1. There was a time when government schemes are not known to farmers, our user-friendly portal for farmer not only keeps updated to farmers but also give an insightful information and guides to step-by-step process through register process.
2. Accurate tracking of transaction while applying for a service or performing a transaction.
3. Due to Permanent Ledger every transaction by the user is traceable.
4. Exposure to farmers and market insight.

5. No database maintenance cost.

6. Cost reduction.

10. Result

Various results obtain from this research are summarized in the points below

- Farmers will be able to list or delist agricultural products.
- It will give exposure to farmers to buy /sell their products.
- Portal provides ease of understanding and navigating through the government websites.
- Consumers will be able to receive the product they purchase at a desirable market value.
- Due to non-intervention of middleman farmers will be benefitted.
- Fund transfer will be direct and peer-to-peer in the network. No waiting for fund transfers. Direct communication between provider and consumer.
- Network is transparent and user friendly.

Table 1 : Comparison Analysis

Research papers	User-Friendly Interface	Insurance services	Government facility	SMS notification facility	Trading Services	Weather Forecast	Public-private services	Marketing	Chat bot	Transparency
Healthy harvest for sustainable development				✕						
Farmer Portal System using MERN Stack		✕	✕			✕	✕		✕	✕
Domestic Farm Portal		✕		✕		✕	✕		✕	✕
E-FARMING		✕				✕	✕		✕	✕
E-Farming an Interface for Indian Farming		✕					✕		✕	✕

11. Future Work

1. Most of the farmers in India fall under the illiterate section due to lack of opportunities. To resolve this, we will provide centers which will help farmers and help to increasing employment opportunities consecutively.

2. Because of the Lack of practical knowledge, the farmers can't handle the machines properly. At first stage, they will never know how to handle the pesticides pump and other equipment's. So, in some cases it will turn into the injuries by machines and pesticides pump.

3. Various languages will be added to the chat bot to increase usability and make the portal more robust.

4. Global expansion, taking it on global level where two different individuals can communicate and transact in between. It will give farmers an exposure to trade their crops globally at a reasonable rate.

CONCLUSION

- Easy redemption of government schemes for farmers.
- Provide Global Platform for farmers.
- Provide flexible environment.

This project will be helpful for farmers to know more about market information; will act as unique interface of schemes and compensation.

Where data immutability is the main focus through blockchain integration. There are lot of scams going on how people take advantages of illiterate farmers. All this because of misleading by the middle man.

Currently, the farmer goes to nearest market handover his product to a particular agent, agent sells the product to another agent or a dealer at the cost of that market. There is no transparency.

Through our portal farmers can not only create a direct contact with the buyer and seller but also get a peer-to-peer communication platform. Farmer can directly buy & sell and Take advantage of services related to farmers by the govt by just clicking on some pictures on our portal. We have created a viable communication platform for farmers, even if they don't read they can navigate through government portal by just clicking pictures which makes this process more insightful for user. It is a complete individual process in our portal where a person can buy/sell his crop directly to the customers or any potential buyer at both reasonable rates whatever he wants and being transparent by both side on smart contract they both must participate and agree for successful transaction. The process being transparent so the transaction block in distributed over network which make it more transparent and reliable for all.

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