



Crop Bazaar

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ABSTRACT—

The rapidly increasing population of India has led to widening of the gap between the demand and supply for food. To cater to this increasing demand farmers are compelled to grow more crops. There are various environmental and physical risks involved during the entire cultivation process. Farmers give their entire efforts for the cultivation of crops but at the end there is a major risk for the farmers which is not getting the optimal market value for their crops. We have several government policies in place which try to ensure that the crops are sold at reasonable prices, but this is not the case usually. There are several middle ware brokerage parties involved which doom the farmers by offering them a much lower price than the sell price which they should have received in the first place. Our application will provide the farmers with a platform to list their cultivated crops at a price decided by the farmer. This list of crops will then be available for the local crop markets and local traders who will be registered as bidders in our application. Once the bid period expires the crop will be sold to the highest bidder and then they can arrange transportation of the same.

Keywords—application, platform

I. INTRODUCTION

India is the second largest populated country in the world. The growing population of the country has contributed to the rise in demands of the basic needs, i.e., food, clothing, and shelter. The increasing demand for food can be satisfied by the country through a surplus production of crops. Farmers are the unsung heroes for satisfying the increasing demands. Still the farmers in our country are having a hard time meeting their day-to-day needs. There are certain factors involved during the entire process of farming ranging from adequate irrigation facilities, fertility of soil, availability of fertilizers, etc. After overcoming all these the major hurdle arises which is getting the optimal profits for their produce.

After crop cultivation and harvesting, Crop marketing plays an important role. Often there are middle agents which buy from farmers at a very cheap rate and sell them at markets at a reasonable profit. However, the one who is at loss is the farmer having a little amount at his hand for his production. Today's agricultural marketing undergoes a sequence of transfers from person to person till it reaches the customer. If the farmer is directly connected to the end markets, we can maximize his profits since there is no middleware.

PROBLEM STATEMENT

Agriculture is a great matter of Interest in our country. The importance of Agriculture emerges because it is one of the important processes to satisfy the increasing demands of the country. Many crops are cultivated in India using different irrigation methods based on the geographical conditions used. The crop production however depends upon how well the environmental conditions were during its cultivation.

Since a market is the primary medium for farmers to exchange their produce for money, lack of logistics connectivity to ensure that their harvest reaches markets in time results in lowering of the farmers' ability to monetise their produce. This becomes even more critical in case of perishable fruits and vegetables. This leaves the farmer with no option but to sell their produce at lower prices to the traders. This is how they are exploited and are left with little or no profits. Thus, the aim is to develop a modern way allowing the farmers to connect with end users and sell their produce at reasonable profits.

II. LITERATURE SURVEY

2.1 Existing System

According to Goldman Sachs, middlemen have become monopoly buyers of agricultural produce, allowing them to take advantage of any shortage in supply, or spurt in demand, but they will not pass on the benefits to farmers or consumers.

The Indian economy is grappling with inflation, with the Reserve Bank of India trying to curb the problem through continuous monetary tightening. In the quarter to June, inflation has remained at an elevated level, resulting in a 75 basis points (bps) hike in the repo and reverse repo rates. Food inflation continues to remain a key worry and a check on the food supply chain reveals structural problems that are unlikely to go away in the near term.

But, according to Goldman Sachs, rising food prices are benefitting middlemen rather than farmers and preventing a supply response. "One of the biggest constraints to the proper functioning of agricultural markets is the Agriculture Produce Marketing Committee (APMC) Act, which prevents farmers from selling their produce directly to retailers or the consumer. They can only sell in government-mandated markets (mandis) to licensed middlemen," Tushar Poddar, chief economist, India, Goldman Sachs, wrote in a report. "Being monopoly buyers allows the middlemen to take advantage of any shortages in supply, or spurts in demand, without passing on the benefits to farmers and generating the adequate supply response."

Food inflation is widespread and is the cause of strong demand and deep structural factors. A team from Goldman Sachs visited one of the biggest retailers of vegetables in Ahmedabad. Quoting the store manager, the investment banking and research firm said vegetable prices have doubled since the start of the year. In the store, tomato prices were up to Rs20 a kg from Rs8 a kg at the start of the year; onion prices were at Rs 11.50 a kg from Rs6 per kg, lady-finger prices have gone to Rs50 a kg from Rs25. There has been a bit of a volume response where substitutes are readily available, as sales have gone down to 2,500 kg daily, from 3,000 kg of fruits and vegetables at the start of the year, it said.

"Our meetings suggested that most of the price rise is not benefitting farmers but middlemen. One of the largest players in the apple trade mapped out the supply chain for apples from farm to fork which suggests a 50% price appreciation from the farmer to the end-consumer. In several cases, it is even higher," the report said.

According to a study by CRISIL, during 2008-09 to 2010-11, food inflation was at 11.6% as compared to non-food inflation of 5.7%. Among 316 goods that have clocked a sharp increase in prices, 36 are raw food articles and 14 are fuel items. Prices of aviation turbine fuel (ATF), kerosene, bulk fruits and vegetables have all witnessed double-digit inflation. Inflation in eggs, meat and fish averaged at 23.6% in 2010-11, while inflation in milk stood at 19.7%. Milk prices have nearly trebled during the last two years.

As disposable incomes rise, consumer preferences have been shifting towards 'protein-based' food items such as eggs, meat, fish, and milk from traditional food items like food grains and cereals, thereby pushing up prices of the former category, the ratings agency said. (Read more, "Higher inflation cost households Rs5.8 trillion over the last three years".)

Goldman Sachs said, although demand has remained strong due to rising incomes which allows the middlemen to raise prices, there are some structural factors contributing to food inflation dynamics. The report said the unorganized nature of the distribution chain makes for multiple layers of inefficiency and rent seeking. At each stage, there is some loss of produce due to multiple hands the product goes through and inadequate infrastructure.

The lack of large and organized contract farming, and foreign direct investment (FDI) in retail, along with the prohibition of farmers selling to retailers directly, has prevented the establishment of seamless supply chains, competition, and economies of scale that are so critical for increasing productivity, the report said.

Talking about the erosion of agricultural land around the cities, due to rising real estate demand, Goldman Sachs said that with cities expanding rapidly outwards, the agricultural areas around the city-where the high value-added fruits, vegetables, milk, poultry are grown-have suffered, as farmers have been selling land to benefit from higher real estate prices. This has had a chain effect on land prices, resulting in less land for high value-added products. Therefore, the supply response to rising prices has been slow in coming.

Indeed, prices of fruits and vegetables are up 17%, milk 18%, and eggs, meat, and fish by 23% in the last 12 months. However, the investment in storage, cold chains, and transportation has been patchy, therefore wastage remains high, which is likely to keep the price level high, Goldman Sachs explained.

The investment bank said, in India, the employment guarantee scheme has led to increase in labour payment and had affected labour supply as well. It said, "The National Rural Employment Guarantee Act (NREGA) has led to increased wages and reduced agricultural and general labour supply."

To create a competitive market, especially in fruits and vegetables, India could take the import route. However, due to high tariff barriers on agricultural imports, this has not happened, and consumers must be dependent on domestic supply. "India imposes a tariff ranging from 30%-50% on imported fruits and vegetables, which prevents import competition," Goldman Sachs said.

Startups like Farm pal, Pune have opened new collection canters to help farmers deliver fresh produce easily by connecting farmers to their markets and cutting off the middlemen. India grew more foodgrain in 2017 than ever before and the government's agriculture budget rose 111 cent over four years to 2017-18. Yet, prices crashed, unpaid agricultural loans grew 20 per cent and 600 million Indians, who depend on farming, struggled to get by. Nearly 70 per cent of India's 90 million agricultural households spend more than they earn on average each month, pushing them towards debt. Farmers get a fraction of the money for their produce; about 80 per cent is pocketed by middlemen who control Agri-trade in India. Farm pal has established a connection with more than 1000 farmers, of which 400 farmers actively supply their crops to them. They provide a sale price that is at a 15-30 per cent premium over what the farmers receive in mandis, where they sell to middlemen according to the prevailing market price. It pays the farmers through online bank transfers, or in a few special cases, in cash on delivery. Besides, the farmers have a choice of selling their produce at their doorsteps and not facing exploitation at the hands of mandi traders. Eventually, the farmers will receive weekly pricing for their produce on their mobile phones, as well as price comparison between what Farmpal pays them and the prevailing market rate, in their bid to infuse more transparency in the Agri ecosystem.

2.2 SOIL SURVEY

Soils of Konkan coast

The Konkan coast topography is divided into two different categories depending on the location and climatic conditions as follows:

1. South Konkan coastal zone

Table 2.2.1.1: South Konkan coastal zone.

| Sr. No. | Name of the Zone | Geographical location | Geographical spread of the zone/ Districts and tehsils included | Climatic conditions | Average annual rainfall | Soil type | Crop and cropping pattern |
|---------|---|--|---|--|-------------------------|---|--|
| I | Very high rainfall zone with laterite soils | 15.30 to 18.50 N Latitude 72.45 to 74.50 E Longitude | It Consists mainly of Ratnagiri and Sandhurdurg Districts. Total area of the zone is 13.20 lakh ha. Area under cultivation 3.5 lakh ha. | Daily temp above 20 C. Throughout the year. Rainfall due to S-W monsoon from June to Sept. | 3105 mm in 101 days | Laterite PH 5.5-6.5 acidic, poor in phosphorus rich in nitrogen and Potassium | Rice is the major crops i.e. 39% of cultivated area. Ragi 2nd imp crop 0.45 lakh Ha. Vari is a minor hill mullet grown on the slopes, pulses like horse gram grown on residual moisture. Oilseeds-Niger/ Sesamum, area under Summer Groundnut, Jowar and Tur is likely to increase with irrigation. Horticultural crops-Mango, Coconut, Cashewnut, Jackfruit, Banana and Pineapple Spices like clove Nutmeg and Blackpepper. |

2. North Konkan coastal zone

Table 2.2.1.2: North Konkan coastal zone.

| Sr. No. | Name of the Zone | Geographic location | Geographical spread of the zone/Districts and tehsils included | Climatic conditions | Average annual rainfall | Soil type | Crop and cropping pattern |
|---------|------------------------------|-------------------------------|---|---|----------------------------------|--|---|
| II | Very high rainfall zone with | 17.52 to 20.20 latitude 70.70 | Comprises Thane & Raigad districts. Total area 16.59 lakh ha Net sown area 4.69 lakh ha | Average daily temp 22 to 30 C. Min temp 17 to 27 C. | 2607 mm in 87 days. Maximum rain | Coarse & shallow. PH 5.5 to 6.5, acidic. Rich in nitrogen, poor in | Rice is major crop 40,600 lakh ha Vari 19,600 |

3. Lower Maharashtra region:

This region is further divided into two agro climatic zones based on rainfall, soil type and the vegetation.

2.Marathwada

Table 2.2.2.1: Marathwada

| Sr. No. | Name of the Zone | Geographical location | Geographical spread of the zone/ Districts and tehsils included | Climatic conditions | Average annual rainfall | Soil type | Crop and cropping pattern |
|---------|---|-----------------------|---|--|---|---|--|
| III | Central Maharashtra Plateau Zone /Assured Rainfall Zone | - | Comprises parts of Aurangabad, Jalna, Beed & Osmanabad districts. Major parts of Parbhani & Nanded & complete Lamn Buldhara & parts of Akola, Amravati, Yavatmal, Jalgaon, Dhule & Solapur. Area accounts to 75 lakh ha. Gross cropped area is 67.8 lakh ha. Forest accounts to 9.90 % of geographical area. | Maximum temp 41 C Minimum temp 21 C | 700 to 900 mm 75 % rains received in all districts of the zone. | Soil color ranges from black to red. Type- 1) vertisols 2) entisols & 3) inceptisols PH 7-7.5 | Jowar is a predominant crop occupying 33% of gross cropped area cotton-22.55% oilseeds 5.17%, pulses 7.65 %. Kharif jowar /bajra followed by gram, safflower. Area under the paddy is increasing. Pulses- tur, mung, urad, gram & lentils. Oilseedsgroundnut, sesamum safflower & ragi. Sugarcane & summer crops are taken on availability of irrigation. |

Transition Zone - 1

Spreads over 19 tehsils of five districts viz, Nasik, Pune, Satara, Sangli & Kolhapur.

Table 2.2.3.1:TRANSITION ZONE -1

| Sr. No. | Name of the Zone | Geographical location | Geographical spread of the zone/ Districts and tehsils included | Climatic conditions | Average annual rainfall | Soil type | Crop and cropping pattern |
|---------|--------------------------------------|--|---|--|--|--|---|
| IV | Sub Mountain Zone/ Transition Zone 1 | Located on eastern slopes of Sahyadri ranges | Spreads over 19 tehsils of five districts viz, Nasik, Pune, Satara, Sangli & Kolhapur. The area of the zone measures 10,289 Sq Km | Average maximum temperature is between 28-35 C and minimum 14-19 C | 700-2500 mm. Rains received mostly from SW monsoon | Soils are reddish brown to black tending to lateritic. PH 6-7. Well supplied in nitrogen but low phosphorus & potash | Mainly dominated by kharif cereals, groundnut & sugarcane. Rabi crops are taken where there are deep soils & moisture holding capacity. Vegetables-potato, onion, chilies, tomato & brinjal. Fruits-mango, banana, guava cashew & grapes. |

Transition Zone - 2

This zone includes tehsil of Dhule, Ahmednagar, Sangli & central tehsils of Nasik, Pune, Satara & Kolhapur districts.

The tables given below illustrate more information about each zone.

Table 2.2.3.2:TRANSITION ZONE-2

| Sr. No. | Name of the Zone | Geographical location | Geographical spread of the zone/ Districts and tehsils included | Climatic conditions | Average annual rainfall | Soil type | Crop and cropping pattern |
|---------|--|--|--|--|---|---|---|
| V | Western Maharashtra Plain Zone /Transition-2 | It is a wider strip running parallel to the eastern side of the Sub Mountain Zone. | This zone includes tehsils of Dhule, Ahmednagar, Sangli & central tehsils of Nasik, Pune, Satara & Kolhapur districts. Geographical area 17.91 lakh ha. Net area sown is 8.86 Lakh ha. | Water availability ranges from 120-150 days. Maximum temperature 40 C & minimum 5 C. | Well distributed rainfall 700 to 1200 mm. | Topography is plain. Soils grayish black. Moderately alkaline 7.4-8.4, lowest layer is 'Murum' strata. Fair in NPK content. Well drained & good for irrigation. | The zone is predominantly a kharif tract suitable for a single rainfed crop. Principal crops are grown -kharif & rabi jowar, bajra, groundnut, wheat, sugarcane, urad, tur gram & ragi. |

2.3 Requirement analysis

2.3.1 Problem Definition

As per the analysis of existing systems mentioned in the above section, most of the work is focused mainly making the supply chain management more efficient. No direct have been made to cut the middleman, so the farmer will direct able to sell produce to the market sellers which will in order can increase their profit margin. This can be achieved by using the system, in which the farmer will be able to contact directly with the seller. This will have long term effect on the food market and can reduce inflation in the long run.

A. SCOPE

Crop Bazaar will help the farmers to list their cultivated crops on the website. The crops will be visible to all the bidders (local traders and markets) on which they will place their bids. Hence the scope of the system will be to provide the farmers a platform to connect with the right end parties, providing a better way for marketing crops and revolutionize the traditional marketing schemes.

The farmers and bidders will have to register themselves to the system and the system will then approve their details. Once their user ids are approved, they will be able to access their functionalities based on their roles in the system.

B. KEY MILESTONES

To reduce the involvement of the middleman for selling the crops from farmer to market sellers. To develop a crop management system that will help farmers to list their crop on the website and sell it directly in the market. Provide a UI to farmers in the form of a web application. Keep records of all crops. Real time monitoring of selling, bidding handling of the crops. To set up a server for maintenance of database and provide access to remote users. To develop a Crop Selling System which will help farmers selling the harvested crops. To increase the income of the farmers by proper utilization of the system.

III. METHODOLOGY

1. Farmer and Bidder Registration

A farmer and bidder will register to the system using their email id and will a password for future login in the system. These credentials obtained from the farmer and bidder through the website will be collected as apis and will be mapped with the help of hibernate in the respective database tables and columns. So, when the farmer or bidder will logging into the page they have to enter their registered credentials which will be authenticated that it exists or not, and credentials are valid or not.

The image shows a web form for farmer registration. The form has a yellow header with the title 'Farmer Registration'. Below the header, there are several input fields: 'Full Name' (with a placeholder 'The full name'), 'Surname' (with a placeholder 'The surname'), 'No. In' (with a placeholder 'The pin no'), 'Email' (with a placeholder 'Email address'), 'Contact Number' (with a placeholder 'The 11 digit number'), 'Gender' (with a dropdown menu), and 'Address' (with a placeholder 'The address'). There are also two checkboxes: 'I am a farmer' and 'I am a bidder'. A 'Submit' button is located at the bottom right of the form.

Fig 3.1.1- Farmer Registration

3. Crop Sell and Bid Management System

After logging into the website both farmer and bidder will different functionalities. Farmer will be able to post a sell request of the crop it want to sell at the market price. Then this sell request will be visible to the bidder, then the bidder will bid on the posted request of the crop and wait for the bidding period to get over.

4. Sell request and Bid Request Tracking

After the posting the crop sell request on the website it will receive a request successful message and bidder will also receive a bid request successful message. The farmer can track its open and closed sell request, he/she will be able to see the current max bid. And once the bid period is over, farmer will be notified of the current situation. The bidder will be able see its current bid, if the current bid gets outplacred, the bidder will be notified for the same and will ask to place a new bid if interested.

5. Proposed System



Fig 3.5.1- Home Page of Crop Bazaar



Fig 3.5.2- Login Page of Crop Bazaar

*At First the users i.e., farmers and bidders will register them self in the system.

*After registration the admin will authenticate user that it exists in the data base or not.

*Then the Admin approves the users, after approval the farmer will list the crop at MSP on the website and the bidders will bid on listed crops that are visible on the website.

*The farmer will be notified for the max bid on his listed crops.

*The bidder will be notified for a rebid if his bid is out placed.

*The System will lock the highest bid on the listed crops after given time window, that will be activated only after the first bid placed on the crops.

*The crops will be sold to the highest bidder.

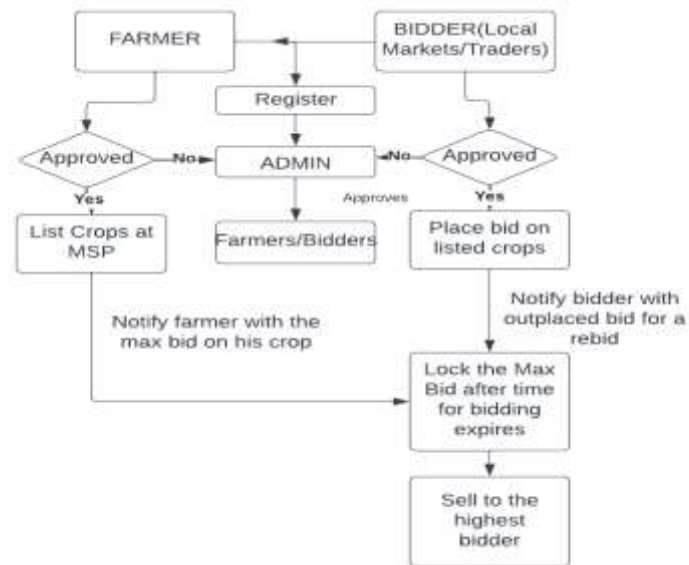


Fig 3.5.3- Flowchart Design of Crop Bazaar

The project is built on Spring Boot server. Spring and hibernate framework are used, as mostly used in industry-based java projects. The backend of the project is written in java. HTML and CSS is used for the front end. IDE used is Eclipse.

Flow of the data.

The user enters the details on the website which is collect through REST APIs. These REST APIs are to GET and PUSH data into the data base.

These API request are generated using a web controller which allow the view the data through its ModelAndView()property.

The data collected as java objects then mapped into the database to its respective table and columns. The mapping of the data is done with the help of hibernate, with the help of hibernate a lot of manual configurations is avoided and hard coding for data entry with SQL language is also avoided. Spring application framework and inversion control is used for java application. Core feature of the application are used.

It helps the web application to reduce the hard coding and redundancy in the code. It helps the application to write the code without thinking of configuration. These configuration in injected in the spring application using maven in the form jar files and dependencies.

IV. Conclusion

An Astute irrigation system with crop management and marketing is an application of modern, smart irrigation system using technologies like IoT and decision making. The Astute irrigation system with crop management and marketing project capable of combining three modules viz. Irrigation, Crop Management and Marketing into one application. Its purpose is to allow farmers to automate the irrigation process and thereby monitor it through a mobile application. The mobile application will also allow the farmer to select crops from the suggested list and then market the crops on an online platform. This online platform will allow farmers to post their harvest which will be then bid upon by various organizations.

V. Future Scope

Inclusion of pH sensor to accurately determine soil parameters. Machine learning algorithms for better prediction of crops to be grown. Sharing of Raspberry Pi between multiple farms hence facilitating cost cutting.

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