

AGRI-SNEHITHA: A Farmer Friendly Web Application

Abhilash C N, Rachana S, Sahana Koppalkar, Sanjana KM, Varshitha B

Dept. of Information Science and Engineering, SJB Institute of Technology, Bengaluru

Abstract: Agriculture is major sector of Indian economy and at present it is among the top two farm producers in the world. The farming sector provides about 52 percent of the total number of employments available in India and contributes around 19 percent to the GDP. Smart agriculture is an evolution of precision agriculture that supports remotely through appropriate solutions for farm management in real time. The web application “AGRI-SNEHITHA” will help the farmers predict the crop that provides better yield based on soil type, weather and demand. It also helps farmers to rent the tools required, hire the labourers, and sell the yield harvested by bidding system where the customers can bid the amount and purchase. It also maintains the database with the charges and payments based on number of days of work. This helps in creating employment opportunities for the labourers and eliminates the middlemen.

Keywords: Agriculture, crop prediction, e-commerce, employment, farm management.

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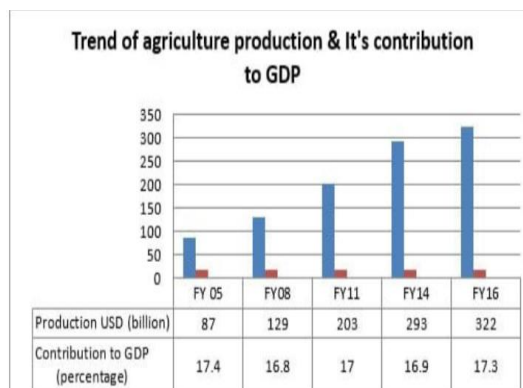
1 Introduction

What is agriculture? Agriculture is regarded as an art and science of culturing the soil, growing the crops and raising livestock. The term agriculture is derived from a Latin word- ager or Agri which defines the soil, and ‘culture’ denotes cultivation of the soil. It plays a vital role in the Indian economic development. Whereas, farming can be considered to be rather a complete system which comprises of inputs, processing, and outputs. The inputs provided can be seeds, fertilizers, machinery, which are further, undergone through operations such as ploughing, irrigation, sowing, weeding, and harvesting. By doing this, we obtain the final farm outputs such as crops, dairy and poultry products. Approximately about 70% of population for agriculture are dependent on livelihood. It is a significant sector of Indian economy as it subsidizes about 17% to the total Gross Domestic Product (GDP) and provides service to over 60% of the population. In last few decades impressive improvements were observed in Indian Agriculture. In India with the rising population, a large prerequisite of food will arise in near-term.

It acts as a key role in providing the low-cost domain to the country as we stand II in world-wide in farm output. Agriculture and many other allied branches such as fisheries and forestry reported for 13.7% of the GDP in the year 2014, in relative to 50% of the total workers. Agriculture is dependent on several forms in farming technology that includes pesticides, fertilizers, irrigation systems and hormones to aid farmers with higher yield of

crop, to enhance water and land management, and guard the crops from disease, insects, and harsh conditions of weather.

Figure 1 Agriculture’s contribution to GDP



Smart Agriculture is a growth of precision agriculture by inventing smart procedures to accomplish multi-functional about managing farm remotely in real-time [1]. Farmers perform a numerous task during the work in crop fields. Few tasks performed are repetitive in the field, like weeding, seeding, fertilizing, watering, may apparently be tough, and labour intensive. Even then those tasks need premonitory decision thoughts priorly to the actual tasks in order to make cycle of farming to be operative. Many of these issues are addressed by smart farming preventing crop wastage, actual usage of compost can help to improve the yield of crop.[2]

During the 20 years phase, farming advancements in technology gave rise to unique changes in the superiority of our food, crop availability, with more profit for farmers. Agriculture in present is able to deliver food marketplaces with a better variety of harvests while reducing the quantity of land-area to produce those harvests. Modern technology advancements have allowed farmers to contend positively with large-scale saleable farming producers in the market. By greater breeding methods along with more resourceful farming, they are able to harvest high-quality yield, livestock durability, vegetables and fruits at a lower price. In India, cost of implementation is a great challenge. Hence, we must aim at emerging platforms that can be used by farmers easily. Agri-Snehitha not only aims large traditional farming but also increase farm management, and also organic farming. Agri-Snehitha also supports in terms of ecological issues by efficient water usage. In the traditional system, Agricultural implements (tools) like sickle, shovel, plough, hoe, cultivator play a very important role in farming. Most of the farmers use traditional tool for sowing seed that is made of wood and is drawn by a pair of bulls. In this system, farmers sell the crops to wholesalers and then to customers. In this case, there is a possibility of middle-men fraud and farmers won't get more profit.[1]

We aim to create a website that helps farmers to avoid such fraudulent activities throughout their farming process. It also focusses on suggesting the crops that provides better yield by considering the factors such as soil type, weather, humidity, pH and the market demand for the crop. The name 'Agri Snehitha' indicates Agriculture made friendly. 'Agri Snehitha' is a prototypical farm management website application. This web-app benefits the farmers to trade their farmed yield online and advises better practice in farm process. Thus, delivering a wider marketplace and not restricting to the resident market.

The website as its own has been remarkable as it brings all the elements together in one frame. There are several websites which help the farmers in farming process but they fail to address few issues like connecting the farmers directly to the customers which curb farmer's profit. In our website we try to resolve and update on implementations that can be done further by adding more functionalities in the website for effective farming process.

1.1 Motivation

- ❑ Agriculture is the most important part in the economy of India and presently it stands second in the world for the production of farm producers.
- ❑ The new and emerging technologies have made the transformation in the agriculture, that is very effective for enabling the growth of primary sector to enhance profitability and farm productivity.
- ❑ Precision in Agriculture can be obtained by providing inputs where and when it is required,

that has now emerged as the third wave in the revolution of modern agriculture (the first being the mechanization and green revolution using the necessary modification being the second), and at present, it is improving with a growth of farming knowledge because of obtainability of enormous amounts of data.

1.2 Objectives

- ❑ To create a website that helps farmers throughout their farming activities by suggesting the crops to provide better yield by considering the factors such as soil type, weather, humidity, pH and the market demand for the crop.
- ❑ To provide all the tools required for the farming activity on renting system, where farmers can hire the labours, maintain the charges and payment of the labours based on number of days the work.
- ❑ Concentrates on selling of the crops by the farmers to the customers, to facilitate the customers to either bid or buy directly by providing the suitable price.

2 Related works

changes in Climate can upsurge the vulnerability in production of agricultural yield, until farmers and scientists change their present tactics for making them climate resilient or climate smart. The incorporation of current developments in climate change science and big data analytics with agricultural system can significantly quicken innovation and agricultural research for climate smart agriculture (CSA). [3]

Alternative crops and Application of hybrid methods can be planned by providing the short-term weather forecast. [4] In our application, we offer the farmers with complete help and assistance right from sowing seeds to selling the fruitful crops in a profitable way.

Verma et al, [5] describe9 about various phases to be conducted for obtaining precise everyday crop particulars over the country:

1. Coding of complete agricultural crops
2. Establish necessary machinery for collection of data and field work.
3. combining collection of data with other subsidies and support worth.

We adapt such features in Agri-Snehitha along with various other functionalities such as blogs, prediction of demand and weather, online shopping and effective market. These features not only help the farmers in the farming processes, but also help in creating employment opportunities for skilled labours who will be hired by farmers. Agri-Snehitha also offers information regarding soil type and suitable crops for making the utmost profit and resulting in healthy

yield. Raza Ansari et al, [6] studied after the analysis of results for the classification of soils available in Karnataka, machine learning can be considered as an efficient approach. Random Forest (RF) was found to be the best and efficient approach amongst the applied model.

We use various components for accurate working and results in order to analyse and process the real time information most efficiently. S.C. Mittal et al, [7] justify the importance and describes about the IT needs and types of components required to meet the above goals. Few broad factors to be considered coming to IT components are - Input and output devices, Storage devices, Networking components and transmission broadcasting. User friendly systems usually specifically have content in local languages and can thereby generate interest in farmers and other involved workers. Thus, it is possible to create exclusive networks or harness the strength of the internet to build and enable these services to every part of the country.

Artificial Intelligence has been imbibed in selection of crops and thereby help the farmers. Along with the collected database by the user who has gathered it based on specifications, the machines will communicate and coordinate among themselves to decide on most suitable crop to harvest and yield the highest profit along with fertilizers to promote maximum growth. Adding to which, deep learning has a huge reach and led to superior advancements [8].

Lastly, Parnal P Pawade et al, [9] conclude about how the problems faced by farmers from sowing the seeds until harvesting will be resolved by the machine learning. Many algorithms based on the supervised and unsupervised techniques of machine learning playing a major role in various sectors of agriculture. The various algorithms of machine learning can perform tasks such as identifying fruit disease, damages caused by insects, counting of fruits, to determine soil, texture, colour, slope, plant recognition, crop management, fruit grading, nutrition deficiency, plant phenotyping, etc.

3 The Proposed System

We have designed a system that enables the wholesalers and marketers to grow their business. It features various e-commerce features for buying farming related tools such as fertilizers, pesticides, tools such as plough, axle etc. It also helps the farmers to track the total production made through graphical representations, weather forecast etc. It also helps the farmers to look into labour's profiles and hire them based on the skills required. Therefore, this not only helps farmers but also creates employment opportunities for skilled labourers. 'Agri Snehitha' provides a concept of virtual agricultural trade to its users.

Generic Software Components

The input given to the object system are support services, Raw materials and technology devices. The object system is responsible for farm management, production units and resources.

Figure 2 Generic Software Components

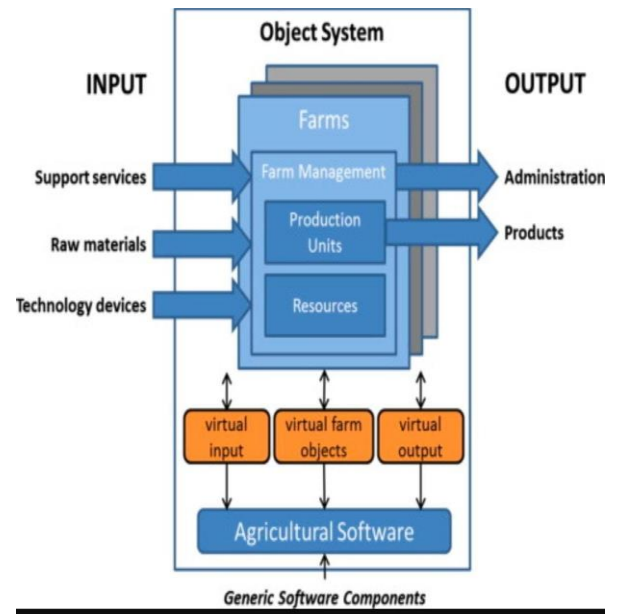
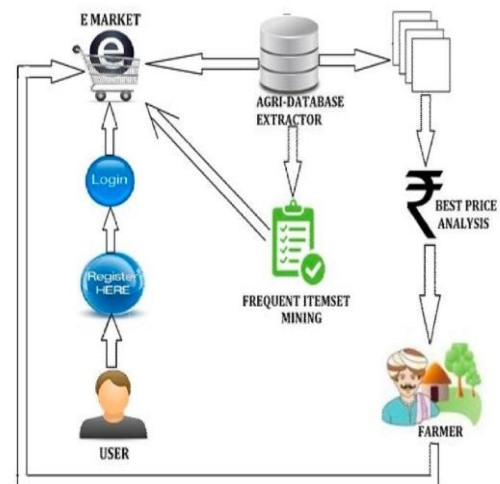


Figure 2 depicts the work flow of Agri-Snehitha. The four main entities are user, Agri database extractor, e market and the farmer. The user and farmer have to first register into the portal whose data will be stored in the database. Using the registered credentials they will be able to access the e-market. The farmer will first upload the yield to the e-market and will be given the best price analysis. The user will look into the price and can purchase from the farmer through the e-market.

Figure 3 Work-Flow of Agri-Snehitha



3.1 Methodology

- Setting up the web application.
- Windows 10 OS is preferred for the initial prototype. (Will improve in further prototypes)
- Coding and Designing
- Loading of data, hosting the website and testing.
- Running the application.

There are 4 varieties of users for the planned system.

- **Administrators:**
Administrators are the users who have full privilege of the web application and can add or administer the website's information and can also add categories for all the products.
- **Sellers:**
Farmers are considered as the sellers as they can register to the website and sell their productions online. After the registration process the farmers login to the system by providing login id and password. He can also buy the farm related products and also hire the workers for field work.
- **Customer:**
Customers will purchase farm products online. The customer sends purchase request to farmers for buying the farm product and check the quality of the products sold.
- **Worker:**
Workers receive numerous requests for work from several farmers and they can also approve or reject a request depending on their interest and availability.

4 Experimental Results

The work is implemented in PHP and AJAX. For designing the web pages cascading style sheets are used and templates of bootstrap is integrated for better user interface. There are various modules in the proposed system as listed below.

Login Module: login module is designed for the seller, customer, admin worker and to perform login activity to the system by entering user credentials like the id and password. After login, main account page will be opened by the system.

Customer Module: customer module is designed for the customer to perform various activities by registering to the web-application. The activities the customer can perform include purchasing products uploaded by administrator, send purchase request to purchase the farm produce uploaded by farmers. Through this module he can send or delete the purchase request After performing quality test and price quotation.

Seller Module: This module is designed for the farmers who are the sellers to sell their farm produce online. Farm produces will be displayed on the main page of the website. Farmer views the request and sell their produce to the customers who offers the better price.

Worker Module: This module is designed for the labourers to help them get employment opportunities. The labourers can register by entering their profile and experience details. This information helps the farmers to Hire labourers based on the skills of labourers and requirement of farmers.

Dashboard Module: This module caters to administrators and employees where in Admin has complete control of the settings of the web application and employees have the privilege to manage all kinds of records

Article Module: Here, the employees or admins can post all sorts of news and blogs which can be helpful for farmers. The farmers can then browse the article menu which has been implemented in the blogs. It also provides various welfare schemes that can benefit the farmer.

Category Module: This module features to create various kinds of categories such as fruits, vegetables, cereals, grains etc. These categories further contain different varieties. For example, the category fruit contain different varieties such as apple, mango, grapes, papaya, pineapple and many others. This facilitates customers to have different variety of products from which he can purchase

Location Module: This module facilitates admin to add the new country, state, district or city.

Products Module: There are two types of products sold in the web-application. One which is uploaded by admins to help farmers in farming activities such as shovel, axe, seeds, fertilizers. The second category include farm produce grown by farmers.

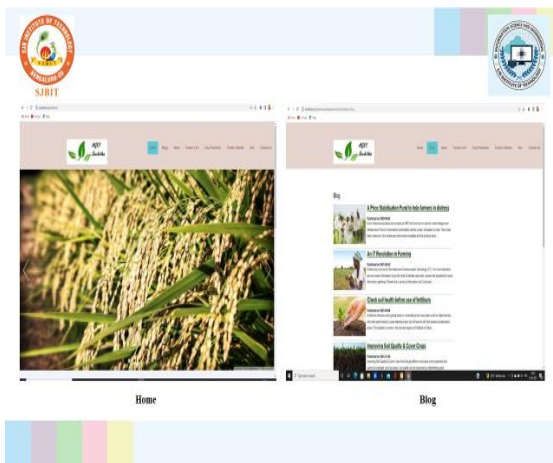
Billing Report: After the purchase of every product the system produces billing report. The billing report contains billing details, customer contact details, and purchased product information, bill generation date, billing amount. The total cost is automatically calculated by the system.

The proposed system has the following key features:

- The farmers sell their farm productions online and the customers can purchase various agricultural products. The customers then send the purchase request to check the quality of the product.
- After collection of all the farm produce from the farmers, it will be sold to the customers. The customers send the request to the farmer to buy the farm produce. The Payments will be received from the customers once the product is delivered to them.
- There are 4 kinds of users: Farmers Customer, Administrator and Workers. Authentication of login-id and password is required to login the system.
- The blog and article sector benefits farmers to expand their profitability and productivity by providing knowledge about various welfare schemes.
- Admin have authority view and print all categories of reports.

Figure 4 Product variety

Fruit	Redcurrant	<p>Currents are mostly high utility plants or deciduous shrubs, which grow to an average height of 1-1.5 meter. They mostly consist of redcurrants, blackcurrants or gooseberries, etc. Redcurrants are highly flavoured berries, which are used for making jams and jellies. They are slightly more sour than the blackcurrants. The Redcurrant or the Ribes rubrum belongs to the genus Ribes in the gooseberry family Grossulariaceae. This berry or currant is native to many parts of Western Europe including Belgium, France, Germany, Netherlands, Northern Italy and Spain. A flowering plant, the redcurrant bears yellow-green flowers, which mature to form translucent red berries, which are consumable. An average berry is around 8-12 mm in diameter. There are around 3-10 berries in each raceme.</p>
Cereals and Pulses	Barley	<p>Barley is a cereal grain used in large proportions as an animal feed, while the rest is used as a malt in whiskey or sugar as well as health food. Barley belongs to the family of poaceae, a plant commonly known as grass. It is available in a variety of forms like whole barley, hulled barley, pearled barley as well as barley flakes. It is a rich source of metals like zinc, copper, phosphorous, etc. as well as other nutrients like calcium and iron.</p>
Cereals and Pulses	Rice Bran	<p>Rice bran is the hard outer part of the grain that consists of aleurone, a form of protein found in the protein granules of maturing seeds, as well as pericarp, the outer and edible layer of the rice kernel. Apart from these two, it also contains germs and endosperm of the rice kernel. Rice bran is obtained as a by-product during the rice milling process and the outer layers or parts are removed at the time of whitening or polishing of the husked rice. It composes of many nutritious substances like protein, fat, fiber, various anti-oxidants, etc. that have a beneficial effect on human health. Because of its multi-nutritional properties, rice bran is being consumed by humans for thousands of year</p>

Figure 5 Home page and Blogs page**Figure 6** Prediction Result

Prediction Result

Year	Crop	Area	Production
2022	Areca nut	1254	2000
2022	Other Kharif pulses	2	1
2022	Rice	102	321
2022	Areca nut	1254	2061
2022	Other Kharif pulses	2	1
2022	Rice	83	300
2022	Rice	189.2	510.84
2022	Rice	52	90.17
2022	Rice	52.94	72.57
2022	Rice	2.09	12.06

5 Conclusion

The project focuses on modern technologies for farming by eliminating traditional methods. The web application created will help farmers to interact with the customers directly helping them to get a better profit. It also helps farmers to predict the crop that provides better yield based on soil type, weather and on-demand. It maintains a labour database and includes a bidding system where the customers can directly buy the crops from the farmer.

The web-application can be mainly used in agriculture and farming industry. We can overcome unemployment problems and provide employment as per requirement in the agriculture industry. This application also acts as an e-commerce platform for a farmer that helps them to rent tools and hire laborers required during the farming process.

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