

AGRI INFO: AN ANALYTICAL TOOL FOR PREDICTING CROP YIELD

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Abstract: The history of Agriculture began even before the Indus Valley Civilization Era. Agriculture first began in some parts of Southern India. India produces second largest farm outputs. As per 2018, Agriculture employed 50% of the Indian work force and covers 80% of rural population. In India the Agricultural fashion has changed in such a way that even engineers and other scholars want to step into farming. They have the enthusiasm for farming but they lack in the agricultural based knowledge. They don't find any idea about where to begin and how to proceed even if they start. With less knowledge both the crops and the farmers suffer. To tackle this issue Agricultural based information will be useful as the people could get an idea about farming from anywhere. They will know much they are going to yield per acre with the specific irrigation method and pesticides. It helps people to understand that agricultural is not just farming but a sustainable way to life. In this website crop yield will be predicted based on the criteria user select.

IndexTerms – Seasonal crop, analysis, irrigation, natural pesticides.

I. INTRODUCTION

India having two different monsoons led to harvest two different seasonal crops. Rabi crop (October to March) is harvested during winter and Kharif crop (July to October) is harvested during monsoon. Zaid (Summer) is the third crop season sown between rabi and kharif when the land is idle.

India is an agrarian country where 70% of the people depend directly or indirectly upon agriculture. Activists and scholars have offered a number of conflicting reasons for farmer suicides, such as – high debt, alcohol addiction, environment, low produce prices, stress and family responsibilities, apathy, poor irrigation, increased cost of cultivation, private money lenders, use of chemical fertilizers and crop failure and use of lower quantity pesticides due to fewer investments producing a decreased yield. The National Crime Records Bureau of India in 2004 reported 5,650 suicides of farmers. The highest number of farmer suicides was recorded in 2004 when 18,241 farmers committed suicide. Studies do consistently show greater debt burden amongst farmers who commit suicide.

Self-destructive ideation is as socially acknowledged in south India as in some high-salary nations. The high suicide rates in southern states of India may be, suggest Patel et al., in part because of social acceptance of suicide as a method to deal with difficulties. Suicide ideation among enduring relatives of ranchers' suicide exploited people is another stress. Recent study shows that almost a third of suicide survivors (family members left behind) had suicide ideation in one month prior to assessment.

An Indian investigation directed in 2002, demonstrated a relationship between exploited people taking part in enterprising exercises, (for example, wandering into new yields, money harvests, and following business sector patterns) and their disappointment in gathering expected objectives because of a scope of constraints. So these entrepreneurial activities commit suicide as they venture into new path and couldn't fulfill the expected goal as they don't have prior knowledge.

“By using chemical fertilizers,” Nammalvar said early on, “I found that farmers incurred only losses and costs went up. I realized then that in order to get optimal results in farming, farmers should rely minimally on external inputs like fertilizers. This was a turning point in my life.”

II. Existing work

a. Indian Web Application

1. Agricoop.nic.in

This website is maintained by Indian government. It is been monitored under ministry of agriculture. This site deals with Agricultural census, crops and drought management. It provides only the agricultural documents, statistics and schemes etc. It doesn't provide any facility for crops, there diseases, irrigation methods and natural pesticides. It is not interactive as no forum or query can be asked. It is bilingual in English and Hindi.

2. Agrisnet.tn.gov.in

This site is maintained by department of agriculture, tamilnadu addressing the cropping and cropping related needs of the farming community. It is available in bilingual (English and Tamil). Their aim is to increasing the productivity of crop and increases the income of farmers through farm level intervention through seed availability, fertilizer stock availability and prizes, input supply availability, storage and flow data of reservoirs. The only backdrop is that they don't provide seasonal based crop details, diseases, irrigation method and natural pesticides. It is not an interactive site as forum and query option is not available.

3. **Agritech.tnau.ac.in**

Agritech website is handled by Tamilnadu Agricultural University. It provides major crop details and their diseases, natural pest & disease control in pdf format, pest management solutions, crop insect pests. They provide all the crop diseases individually with their symptoms and managements. The only drawback is that its not interactive as no forum and query is available. It is available in two different languages English and tamil.

4. **Farmers.gov.in-**

This portal is build and maintained by govt. of India. It provides the farmers with all the agriculture relevant information. It focuses on specific subjects around village, block, district or state. It also aims to provide agricultural crop details, crop management, post harvest methods and animal husbandry corner. They also provide the facility to provide these information to farmers through messages, email and audio/video format. This portal is not categorized into seasonal crops and no irrigation method or natural pesticides is available.

5. **Mkisan.gov**

It is a portal for Indian farmers which enables central and sate level agricultural information through SMS in local languages. Farmers of different stakeholders can obtain advisories from government officials. It contains pull sms, push sms, IVRS, KSEVA, Farmers registation. They provide the facility of post queries for which they will get reply through sms or mail.

6. **Krishiworld.com**

It is a private blog which helps farmers to educate themselves with latest agricultural information. They provide the facility to solve inflexible farming problem with new technique. It includes crops, fertilizers, plant protection & diseases, weather, soils and farm equipment. The only drawback is that it's not responsive and interactive.

7. **Krishijagran.com**

Krishijagran is a website which provides the economical growth and condition of farmers. It also provides wisdom to the farmers so that they can render a platform to gain farming knowledge and witness the agriculture progress. It acts as a interface between industry, research institution, government and NGOs. Information like agro events, farm mechanization, product launches etc. Its service is provided in eight different languages. It is a interactive website as it has forum and blog facility.

8. **Agriwatch.com**

Agriwatch is a private site owned and managed by Indian Agri business systems Pvt. Ltd. It was formed by a group of young Indian trade professionals. They were involved in Indian Agribusiness Sector for a long time. The main aim of the company is to shorten the communication gap between various Agricultural commodities. They aim to provide the latest and accurate information to the farmers, traders, processors of agricultural outputs, Suppliers of Agricultural inputs. They provide the current market price for different crops, oils, species and their current news. It is not a interactive website as it provides only the predefined queries.

9. **india.gov.in/topics/agriculture-**

This website is maintained by Indian Government through which different national topics is been provided for the people. Under Agricultural topic all the agricultural based information like machinery, research, storage facility, crops, seeds, irrigation etc is been provided through external link format. It has a forum where user could post any suggestion for the improvement.

10. **Agriquest.info**

Agriquest is a private website which allows the farmers to gain new updates related to agriculture. It provides different information like crop production crop improvement, water management etc. They also post about agri inputs, horticulture, organic farming and agri jobs. It is not an interactive website but it has mail address where the user can post there comment or queries.

b. **Indian Mobile Application**

1. **AgriApp**

AgriApp is the most used and liked apps by the farmers. It has 4.3 rating out of 5. It is one of the best app for farmers. It is an online marketplace for the farmers to bring all the farmers, farming input/output and government service on an online platform. It has chat facility for the farmers to discuss if they have any doubt regarding farming. Farmers also have the option to interact with agricultural experts. It provides different agricultural work related videos. This farming app is approximately downloaded by 0.1 million users.

2. **Kisan Yojana**

Kisan Yojana is one of the most popular agricultural app available for farmers. All Government schemes is been discussed in this app. It helps to bridge the gap between the rural people and government. It provides information about all the schemes in relative state government. This application helps farmers to save lot of their time and expense by getting state office information online. This farming app is approximately downloaded by 50 thousand users.

3. **Vivasayam**

Vivasayam is one of the most popular agricultural app available for tamilnadu farmers. It provides with all kind of possible help to the farmers. It provides irrigation methods and natural pesticides Farmers could know where the demand of crop is more. They can sell or buy agricultural related products online. It provides a analytic system through which it can predicted that what kind of crop can be grown according to the weather condition when the area and date is selected.

4. Farm Bee

Farm Bee is a popular agricultural app. It has 4.3 rating out of 5. It is a small app with easy user interface. It can be accessed in 10 different Indian languages. It provides information at each crop cycle about its fertile agriculture content and information. Farmers are given the choice to choose from 450 crop varieties, 1300 markets and 3500 weather locations. It helps farmers to know the current mandi price and weather forecast when the users location is switched on. This farming app is approximately downloaded by 0.1 million users.

5. Iffco Kisan

. It is the best app for farmers when compared with other farmers app. It is a small Android app in terms of memory with an easy interface to use. This app provides latest agricultural related information and its advice, current mundi price and different farming techniques or tips. It also provides weather forecast information. Agricultural alert service for the farmers is available in 10 Indian languages. Farmers can ask the help from agricultural expert when needed. This farming app is approximately downloaded by 50 thousand users.

6. Agrimedia video

AgriMedia is one of the most used and liked video apps for the farmers. It has 4.8 rating out of 5. It is an online marketplace for the farmers to bring all the farmers, farming input/output and government service on an online platform. It has chat facility for the farmers to discuss if they have any doubt regarding farming. They provide a video uploading option to the farmers so that they could upload any defected crop. Farmers can easily chat with agriculture expert and discuss their problems. It provides different category of videos related to agriculture practice, new technologies, agriculture news, successful farmers, rural development, new govt. schemes related to agriculture etc. This farming app is approximately downloaded by 10 thousand users.

7. Kisan Suvidha

This app is launched by the PM Narendra Modi in 2016. It words towards the empowerment of farmers and for the development of rural area. It has a simple design with good user friendly interface. It gives data on current climate and furthermore for the following five days, showcase costs of items/crops in the closest town, information on manures, seeds, hardware and so forth. One of the main facility is that it can be accessed in different Indian languages.

8. Krishi Gyan

This works as similar as Whatsapp communication but in a better format as it doesn't require individuals mobile numbers to stay connected. User can get access to general information on farming. Through this application Indian farmers can connect with Krishi Gyan experts and ask them questions regarding farming. They get there answers within the application through notifications. The ranchers just as horticulture lovers can likewise impart their response to one another.

9. Kheti-Badi

'Kheti-Badi' is a social initiative App with simple user inteface. The main objective of this app is to promote organic farming and provide agricultural based information. Todays Agriculture is intensely reliant on hereditarily changed seeds, compound pesticides and manures which encourages ranchers to switch their substance cultivating into natural cultivating.

10. Urhavan

It provides farmers with complete information on real time basis. These real time information is gathered from this mobile application which provides the farmer to get information on all scheme components & subsidy pattern of assistance, register himself to avail scheme benefits on priority basis. Through this app farmers could know there Crop Insurance Scheme application status if registered. It also provides information on seed and fertilizer availability in Government, Private and Cooperative outlets nearer to their residence, information on Customer Hiring Center for hiring farm Machinery, climate conjecture warnings to take up proper development plan and data on expansion officer's visit to their towns. It encourages the farmers to get into farming activities at right time. This will overcome the problems arising out of seasonal adversities, non availability of inputs in time, non-availability of farm machineries and natural calamities

III. Comparative Study

a. Web Application

Web Application	Seasonal crop	diseases	Irrigation	Natural pesticides	responsiveness	interactiveness	Chat/Forum	blog	Analysis
Agricoop.nic	X	X	X	X	✓	X	X	X	X
Agritech	X	X	X	X	X	X	X	X	X
Farmers.gov	X	X	X	✓	X	✓	X	X	X
Agrisnet	X	X	X	X	X	✓	X	X	✓
Mkisan.gov	X	X	X	X	X	✓	X	X	X
India.gov.in	X	X	X	X	✓	✓	X	X	X
Agriwatch.com	X	X	X	X	✓	✓	X	X	X
Krishijagra.com	X	X	X	X	✓	✓	✓	✓	X
Krisheworld	X	X	X	X	X	✓	X	X	X
Agriquest.inf	X	X	X	X	✓	X	X	✓	X

1. Agricoop.nic

Crop details are not available. Seasonal crop based diseases is not available instead a division called crop protection is provided which doesn't provide the type of disease or their solutions but do provide plant protection schemes

Irrigation method is not provided. It only provides natural resource management division through which programs and schemes for water conservation and soil erosion is described through pdf format. Availability of chemical pesticides names and the dealer's qualification, pest management offices is provided. Many details are provided as an downloadable pdf format. Available in 2 different language English and Hindi. Website is not interactive and not even FAQ is available. Chat or forum is not included. Blog is not present. It is responsive as its designed for mobile view also.

2. Agritech

Crop details are available but not categorized based on seasons. Only for some crops (rice and wheat) there seasons are mentioned. Variety based categorization is available. Crop based diseases are available individually but not divided into seasonal based diseases. Crops diseases are categorized as whole as Agricultural crops. No natural pesticides are available. Under pest and disease management of organic farming, pestici information is available in document format which is not user friendly. Under crop protection banned and registered pesticides, there act, forms, testing labs, antidotes etc are available. Irrigation methods are available and some water management techniques, water requirement for crops, suitability of water is also given. Water resource management like role of water, irrigation sources of India, major reservoirs, water testing services etc is available. Available in 2 different language, English and Tamil. FAQ is not available and only contact numbers and email address is present. Blog is not present. Service called Kisan call centers is provided as a toll free number. Chat or forum is not included but a feedback form is available. It is not responsive at all and not designed for mobile view.

3. Farmers.gov.in

Only major crop details are available but not categorized based on seasons. Seasonal crop based diseases is not available. Only animal husbandry disease is available. No Irrigation method is provided. Natural pesticides are also not available. It has a section called POP (package of practice) which covers the production practices of various crops.

Many details are provided as an downloadable pdf format. Available in 6 different language English, Hindi, Bengal, gujarati, Marathi, malayalum. Login option is available. Chat or forum is not included. Blog is not present. It is responsive as its not designed for mobile view.

4. Agrisnet

Crop details are not available. Seasonal crop based diseases is not available. Irrigation method is not provided. Availability of natural pesticides is not provided. Available in 2 different language English and Tamil. Feedback form is available. Website is not interactive and not even FAQ is available. Chat or forum is not included. Blog is not present. Input availability stock report is present for different seeds where user can select different district stock type and its name to check the stock availability. It is responsive as it's not designed for mobile view.

5. Mkisan.gov

Crop details are not available. Seasonal crop based diseases is not available Irrigation method is not provided. Availability of natural pesticides is not present. Farmers can only get the agri information through sms or call. It has different services like pull and push sms and ksewa available for farmers. Website is interactive as it has login form. Chat or forum is not included. Blog is not present. It is not responsive as it's not designed for mobile view.

6. Krishiworld.com

Crop details are available but they are not categorized based on seasons. They are categorized as medicinal crop, field crop, condiments and spices etc. Seasonal crop based diseases is not available instead very few crop diseases are described and their management. Irrigation method is not provided. Availability of natural pesticides is not provided. Available in one language, English. Website is interactive as it has login availability. Chat or forum is not included. Blog is not present. It is not responsive as it's not designed for mobile view.

7. Krishijagan.com

Crop details are not available. Crop based diseases is not available. Irrigation method is not provided. Availability of natural pesticides is not provided. Available in 9 different language English, Hindi, Tamil, Malayalam, Marathi, Bengali, Kannada, Odia, Asomia. Website is interactive as it has sign in availability. Chat/forum is included. Blog is present but it's not related to agricultural. It displays all the current news of all topic. It is responsive as it's designed for mobile view also.

8. Agriwatch.com

Different Crop market price is available. No crop disease description is present. Irrigation method is not provided. Availability of natural pesticides is not provided. Available only in one language, English. Website is interactive as it has login availability. Chat or forum is not included but FAQ is present. Blog is not present. It is responsive as it's designed for mobile view.

9. india.gov.in/topics/agriculture

Crop details are not available. Under crop menu only link to other websites are available. Crop based diseases is not available. Irrigation method is not provided. Availability of natural pesticides is not provided. Under crop protection, irrigation links are provided. Website is interactive as it has sign in availability. Chat/forum is not included. Blog is not present. It is responsive as it's designed for mobile view also.

10. Agriquest.info

Crop details are not available. Crop based diseases is not available. Irrigation method is not provided. Availability of natural pesticides is not provided but some organic farming methods are included. Available only in one language English. It has a contact page where user can ask for queries and they will get reply through mail. Chat/forum is not included. Blog is present. It is responsive as it's designed for mobile view also.

b. Mobile Application

Mobile Application	Seasonal crop	Diseases	Irrigation	Natural pesticides	Chat/Forum	blog	Analasis
AgriApp	X	X	X	X	✓	X	X
KrishiYojana	X	X	X	X	✓	X	X
FarmBee	X	X	X	X	✓	X	✓
IffcoKisan	X	X	X	X	✓	X	X
AgriMedia video	X	X	X	X	✓	X	X
Vivasayam	X	X	✓	✓	✓	X	X
Kisan Suvidha	X	X	X	X	✓	X	X
KrishiGyan	X	X	X	X	X	X	X
Kheti Badi	X	X	X	X	X	X	X
Urhavan	X	X	X	X	✓	X	X

1. AgriApp

Crop details are available but not based on seasons. Crop details can be downloaded which are available in pdf form if needed more. Seasonal crop based diseases is not available instead some random crop disease videos are available. Irrigation method is not provided. Availability of chemical and organic pesticide is available in video format. Chat and forum availability is there. Blog is not present. Analysis is not done.

2. KisanYojana

Crop details are not available. Seasonal crop based diseases is also not available. Irrigation method is not provided. Availability of natural pesticide is not available. Chat and forum availability is there. Blog is not present. Analysis is not done.

3. Farm Bee

Crop details are not available. Seasonal crop based diseases is also not available. Irrigation method is not provided. Availability of natural pesticide is not available. Chat and forum available but only for the prime members. Blog is not present. Analysis is done based on the type of crop, irrigation methods, plant diseases present to know the solution.

4. Iffco Kisan

Crop details are not available. Seasonal crop based diseases is also not available. Irrigation method is not provided. Availability of natural pesticide is not available. Chat and forum availability is there. Blog is not present. Analysis is not done.

5. AgriMedia Video

Crop details are not available. Seasonal crop based diseases is also not available. Irrigation

method is not provided. Availability of natural pesticide is not available. Chat and forum availability is there. Blog is not present. Analysis is not done.

6. Vivasayam

Crop details are available but not based on seasons. Individual crop based disease is available but no category is available. Irrigation method is provided. Natural pesticide is available. Chat and forum availability is present to give feedback or to ask suggestion. User can connect to the agricultural expert. Blog is not present. Analysis is not done but there is a option where user can select the area and date to get the weather information and the crops which can be sown at that period of time.

7. Kisan Suvidha

Crop details are not available. Individual crop based disease is available but no category is available. Irrigation method is not provided. Availability of chemical pesticide and dealers detail is available. Chat and forum availability is there. Blog is not present. Analysis is not done.

8. Krishi Gyan

Major crop details are available but not categorized into seasons. Individual crop based disease is available. Irrigation method is not provided. Only chemical pesticide is available. Chat and forum availability is not there but FAQs are present. Blog is not present. Analysis is not done.

9. Kheti badi

Major crop details are available but not categorized into seasons. Individual crop based disease is available but not category is available. Under Irrigation how much water will be needed for particular crop is mentioned but not the methods. Availability of natural pesticide is not available. Chat and forum availability is not there. Blog is not present. Analysis is not done.

10. AgriMedia Video

Crop details are not available. Seasonal crop based diseases is also not available. Irrigation method is not provided. Availability of natural pesticide is not available. Chat and forum availability is there. Blog is not present. Analysis is not done.

IV. Technology Complexity and Discussion

We can notice that most of the existing system doesn't have any analytic system present in their website or application. Doing analytics is going to be the main aim of our project.

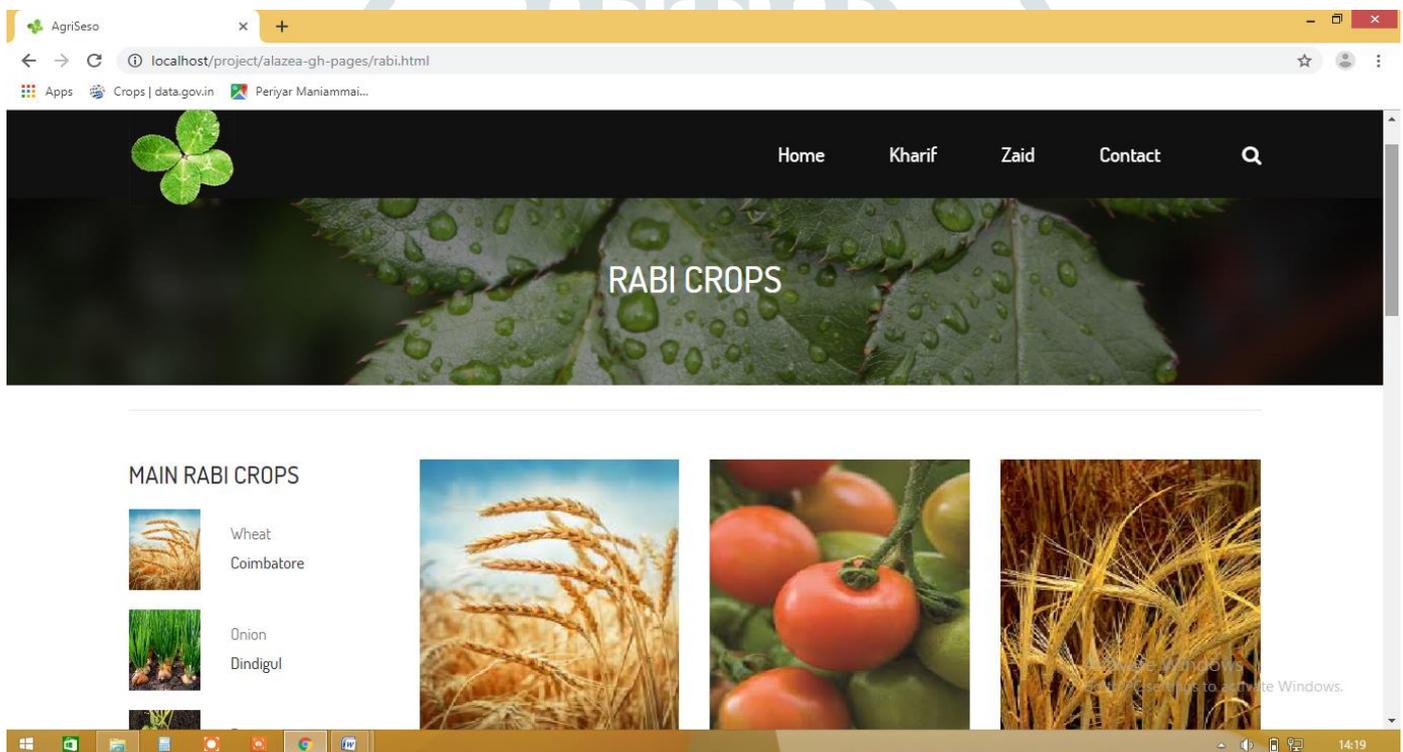
In the existing system there are two websites which does analytics. These two websites are "Farmers.gov.in" and "Agrinet". In "Farmers.gov.in" analytic study is done to see the no of crops grown in a state. Selecting some criteria like crop type, name and state it shows the list of crops grown in that particular state. In the second website "Arisnet" it calculates the no of stocks present through analytics.

Likewise in agricultural app called "Farm Bee" there is a analytic process in which the details like current crop, variety, farm area, soil type, season, irrigation method, organic carbon management, key problems are given as input. When these inputs for the field are submitted we get the solution for our problem.

V. Proposed System

Through analytics we are going to propose a system or method by which when a user select some criteria he will get an output of how much yield and profit he is going to gain at the end of his harvest.

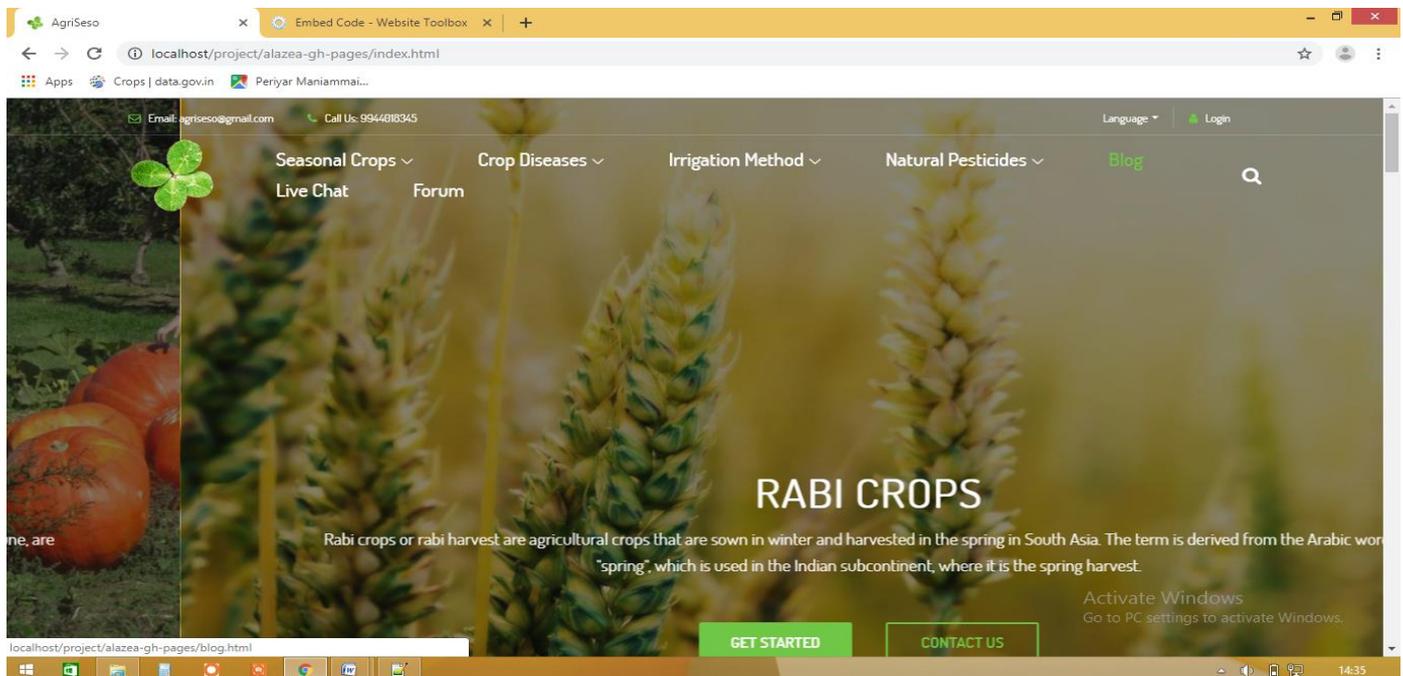
This projects second aim is to provide seasonal based crop categorization. There is not even a single website or application which provides the crop details in seasons. This project is going to propose crops and its diseases based on its seasons. Different effective irrigation methods and natural pesticides will also be provided.



Effective irrigation in the sense as less water will be used for irrigation when compare to usual irrigation methods. With less water needed for the irrigation more water can be saved for other purposes. Many new irrigation methods are being included to be used by the farmers.

Irrigation methods like drip irrigation, buried clay pot, dry farming, scheduling, perforated pipe, water wise method, micro catchments etc will be introduced. For natural pesticides eucalyptus oil, onion and garlic spray, neem oil, chrysanthemum tea, tobacco spray diatomaceous earth will be used.

This website is going to be designed using bootstrap so that it will be effective even for hand held devices. Forum and live chat will be included to make the website interactive with the users.



Blog facility will be provided in which when some new agricultural related topic will be discussed then after full discussion that topic will be posted in blog for future references.

VI. Conclusion

Through this project we can say that an effective and user interactive website will be build which will have crop related details based on different agricultural seasons like Rabi, Kharif and Zaid. Its main purpose will be to provide a analytical study and create a out based on the input provided. The analysis will be done according to the inputs like crops, irrigation methods, and the area it is been sown. According to these input an output will be processed which will show the farmers the amount of yield and profit he is going to gain.

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