

Personalized Agro-Expert system with Quality Control

S.W.Wasankar¹, R.U.Vaidya²

¹CSE Department, SGBAU, India.

²IT Department, SGBAU, India.

ABSTRACT

In agricultural sector, farmers in rural areas faced major problems because of illiteracy. They cannot take the advantage of internet to access the information related to farming. The information represented in icons will help the farmers to take the important decisions. According to UNESCO report, 64% population in India cannot use the internet due to lack of technical knowledge. The economy of our country is totally dependent on agricultural success or failure. Farmer, the backbone of agriculture is in panic condition as he is not getting precision agriculture information leading to less crop yield. But now, in the era of Digital India, we can form the union of farmers through networking, and make the precision agriculture information reach the farmers through ICT. In this paper, we have discussed about how ICT can be used to reach precision agriculture information to the farmers to get high crop yield and to get high crop rates. Through our software, the latest agricultural technologies will be introduced to the farmers and scientific precision farming will be recommended to them. Major factor for getting high crop yield is soil test. Each farmer's soil has to be tested and based on that specific precision information relating to each farmer's soil like type of crops to be grown, amount of fertilizer to be used, type of irrigation and latest farm equipments is sent as specific notification to each farmer by NGO. This unique idea helps the farmers to get high crop yield and intern there will be economic growth of our Nation.

Keywords: *UNESCO: United nation educational scientific and cultural organization, NGO: Non Governmental organization, ICT: Information and communication Technology*

I. INTRODUCTION

In today's rapid changing world of internet we focused on the people especially from the rural areas. The main Aim behind this is that the people in rural areas are far away from internet technology. so, in order to get all the information about agriculture collectively, we have developed a Website and an Application which will help the farmer in many ways. Agriculture is the backbone of the Indian economy and the villages are the life lines of growth of India. Agriculture is a very important sector for the sustained growth of the Indian economy. Majority of the people from rural area and few of urban are still basically dependent on agriculture for employment. But still they are facing many problems like not getting the required materials i.e. seeds, fertilizers and pesticides in time, not getting precision information about cultivation and no proper guidance about the crop diseases and pesticides to use. As a result of different agricultural revolutions, no doubt India has achieved self-sufficiency in agriculture, but precision agricultural inputs are desirable in terms of improving the crop production and



minimizing the environmental impact. In India, there are several agro climatic zones geographically and the information needed for

the farming is widely different. In the era of Digital India we propose a method of developing a farmer's data network to enable the technology reach agriculture sector. In our system, we have made such an interface which can be accessed by semi-illiterate people. Also; there are options of

Marathi as well as other languages. So, That if any farmer is English illiterate he can get the information in Marathi. One more advantage of Website is that for registered user there is FAQ's facility and also he can type his Queries, which will resolved in specific duration. Also, if he has some other queries, he can directly contact to expert. System will automatically find out probable diseases and their preventive measures according to soil type and crop details of farmers as well as climate details. Probable diseases and preventive measures and guidelines will be appearing to respective home page. Farmers are unable to get the exact sources of information related to the farming as they do not have sufficient knowledge regarding technology and also the language barrier. There is no as such an existing system which uses the previous data from farmers under certain criteria and tries to analyze the previous history, so based on that it work. There are some applications are present which gives the crop rates in main cities, that works under government. So, we developed a system which uses a mobile like- Android Mobile or it can be used on the web page through system. The internet was opened to general users in 1994 and this new era of information and communication has played an important role in the field of expert systems. The web technology allowed the knowledge engineers and domain expert to build the system that can help the agriculture in many ways.

1.1 Objective

This project is aimed at developing a web application in which farmers send their products to quality control department and decide the price of product as per the quality. Also this develops a agro-expert system in which admin will guide the farmers about probable diseases and premeasured of crops.

1.2 Motivation:

Our main motivation for this project is to build something that can be useful for farmers so that we can prevent farmer's suicides count. Some other reasons to build this software:

- Built something for society using mathematics and computer science knowledge
- Agriculture sector plays a big role in India's economy overall.
- It's contribution to GDP of India was around 44% during 1973-74
- Most of the people in the villages India are dependent on agriculture

II. LITERATURE REVIEW

During the survey, we referred many papers. That was beneficial only for small scale or for few farmers .out of all papers survey we specially focused on how semi-illiterate people understand the information of agriculture.

We referred the paper "Krishi-Bharati: An Interface For Indian Farmers" Soumalya Ghosh, A. B. Garg, Sayan Sarcar, P.S.V.S Sridhar ,Ojasvi Maleyvar, and Raveesh Kapoor. University of Petroleum & Energy. This paper gave the idea about how the users interact with system through icons and results back with agriculture



information in Marathi as well in English text according to user. To access the agricultural information from internet, users have to form the proper query and got the result from the website admin or expert.

We referred another paper ‘Expert System Design and Architecture for Farming sector’ by Balmukund Maurya ,prof. Dr. Mohd Rizwan Beg,Sudeep Mukherjee, Dept of CSE integral university.It gives the idea about how to choose the appropriate crop by analyzing the soil quality.Based on the soil quality, we choose the appropriate crop.It also gave the big factor the weather forecast and general pattern weather for that region. We refer the paper ‘ The Devlopement of Multimodel Interface to Internet for common people’ D. Samanta, S. Ghosh, S. Dey, S. Sarcar, M. K. Sharma, P. K Saha, and S. Maiti, .It gave the idea about how the user can interact to the internet with three modes: text, speech and icon .We refer the paper ‘Multilingual Information framework for handling its textual data in digital media ’.this document describes the multilingual data across wide range of possible application in the translation process within several multimedia domains.

2.1 Need of information support:

In this information age, the available information from various sources is growing at phenomenal rate, and this information is primary requirement and considered as the heart of Precision Agriculture. Numerous researches are being carried out, new results are discovered at the research institutions and they continue to accumulate in the form of Reports and Dissertation. Most of these findings, recommendations do not reach to the farmers at implementation level. That is because there is lack of proper channel between researcher and farmers. The lack of proper decision support system to disseminate timely, relevant farming advice, has been observed as a major road block for adopting precision agriculture (McBratney etal. 2005). But there is some good working framework for disseminating agriculture information using advances in information and communication technology are being tested and developed in many South Asian countries. So need of hour is virtual expert who can give personalized expert advice to a large community of farmers, specific to their need and aspiration considering various knowledge bases, since it is almost impossible for any human expert to consider every piece of available information before arriving at optimal decisions. To solve this problem some systems are making exists to farmers. But these systems have some inherent drawbacks and they do not provide proper knowledge.

According to the UN data, the world’s urban population is poised to surpass the rural total for the first time in history. One UN estimate says that August 16, 2008 will be the day when the shift will happen, with the urban population expected to overtake the estimated rural totals. By that time, more than half of all Africans will live in cities, making up a larger population than the whole of Europe [1]. The major growth of urban population is now taking place in low and middle-income nations such as India, China, and Brazil. China and India have occupied the first and second positions in the list of countries with the fastest growing 100 cities. The implications of such dramatic shifts for economic development, urbanization and energy consumption are immense [2].To meet the huge food grain requirement of 480 million tonnes (Mt) by the year 2050 [3], with the increasing challenge of biotic and abiotic stresses experienced by crops, introduction and adoption of modern technology in Indian agriculture is inevitable. It is true for other developing countries also. Agriculture, like other industries, has made entry into the knowledge-based era, leaving its previous resource-based nature. Future agriculture will be severely competitive, knowledge-intensive and market driven. WTO agreement and liberalization of agricultural trade have created not only new scopes but also new threats to the agriculture of developing countries. Removal of quantitative restrictions on import from 1 April, 2001 in India made quality and cost competitiveness the two most important factors to sustain in the globalized market. The high cost of



production and low productivity, even though India produces a large quantity of food grain, will throw Indian farmers out of the economic competition arena of free market [4]. Again poor grasp over cutting-edge technologies, due to the lack of timely start of research on advanced science, is one of the main problems of developing countries. Increasing the productivity on small-scale farms in developing countries is a critical part of a solution to the food insecurity problem. To face all these new challenges, increasing the productivity level of a pollution-free product is inevitable. This can be realized by applying advanced, environmental friendly technology, which can manage and allocate all resources efficiently for sustainable development of agriculture [5]. PA is such a new emerging, highly promising technology, that is spreading rapidly in the developed countries. PA is conceptualized by a system approach to re-organize the total system of agriculture towards a low-input, high-efficiency, and sustainable agriculture [6]E-agriculture is one of the action lines identified in the declaration and plan of action of the World summit of information society (WSIS). The "Tunis Agenda for the Information Society," published on 18 November 2005 and emphasizes the leading facilitating roles that UN agencies need to play in the implementation of the Geneva Plan of Action. The Food and Agriculture Organization of the United Nations (FAO) has been assigned the responsibility of organizing activities related to the action line under C.7 ICT Applications on E-Agriculture. Many ICT interventions have been developed and tested around the world, with varied degrees of success, to help agriculturists improve their livelihoods through increased agricultural productivity and incomes, and reduction in risks. Some useful resources for learning about e-agriculture in practice are the World Bank's e-sourcebook ICT in agriculture – connecting smallholder farmers to knowledge, networks and institutions (2011), [1] ICT uses for inclusive value chains (2013), [2] ICT uses for inclusive value chains (2013) [3] and Success stories on information and communication technologies for agriculture and rural development [4] have documented many cases of use of ICT in agriculture.

III. ANALYSIS OF PROBLEM

Some 75percent of poor people still live in rural areas and derive the major part of their income from the agricultural sector and related activities. Agriculture provides food ,income, and jobs ,and hence can be an engine of growth in agriculture-based developing countries and an effective tool to reduce poverty in transforming countries. Balancing agriculture and industry is an important—although difficult— dimension of development policy. Recently ‘agro-pessimist ‘views—based on the observation that agriculture in developing countries is often the least productive sector have been voiced in the literature.

The nation is striving to find ways and means to keep its burgeoning population adequately fed. On the one hand it is facing the problem of declining productivity and on the other, challenges posed by liberalization. In such a scenario, leveraging the available natural resources and existing infrastructure is the only way to make the ends meet. Management of the already built infrastructure in harmony with natural systems is the clarion call of the day. Knowledge of the extent of existing infrastructure and natural resources is one of the most basic pre-requisites to utilize them effectively and in a sustainable manner. The discipline of agricultural engineering endeavors to develop technologies for enhancing productivity and reducing the cost of cultivation. Traditionally animate power was used for field operations and processing activities. As a result of introduction of mechanical power, agricultural engineering activities have expanded considerably. To sustain the project population of 1.363 billion by 2025 the productivity has to be increased by 100 per cent from the present level by



intensification of agriculture. It is estimated that the energy input to agriculture would have to be increased from the present level of 1.3 to 2.4kW/ha. The biggest problem that farmers in India face is Lack of access to information. Majority of farmers are relying on traditional methods of Farming and get very less support from government agriculture department. The most popular source of information for them is Input dealers. And it is found by research that most of the time they tend to impose their products on farmers. Due to lack of proper knowledge farmers are forced to buy their products which are expensive and most of the times useless to the farmers. This way farmers end up spending more money for practically nothing. This leads them into a vicious cycle of debtless.

3.1 Reasons for suicide:

A study conducted in 2014 found that there are three specific characteristics associated with high risk farmer:” those that grow cash crops ;such as coffee and cotton; those with marginal; farms of less than one hector and those with debts of 300 rs or more. The study also found the Indian states in which these three characteristics are most common had the highest suicide rates and accounted for almost 75% of the variability in state level suicides. Various reasons have been offered to explain why farmers commit suicide in India including floods, droughts, debt, use of genetically modified seeds, public health, use of lower quantity pesticides, due to less investments producing a decreased yield and government economic policies. There is no consensus on what the main causes might be but studies show suicide with teams are motivated by more than one cause on average three or more causes for committing suicide. Percentage of suicide due to failure of crops was 16.81 in 2002 .So we decided to work on this field to reduce the suicide rate and help them using expert suggestion to yield the crops.

In our system we have used the algorithms. First algorithm is about crop diseases and remedies. The second algorithm is about the crop suggestion according to weather report.

3.2 Crop according Diseases and Remedies suggestion

1. Farmer Registration
2. For each registered farmer repeat step no
3. initialize crops[]=farmer registered crops
4. for i=0 to crops.length
5. fetch and display crop[i] related diseases
6. fetch and display crop[i] related remedies
7. Increment i
- 8 repeat steps 4,5,6 untill i==crops.length
9. Stop

3.3 Explanation:

1. Initially the farmers do the registration along with their personal information n then they have to enter their crop category and crop name which they want grow then admin gives the idea about the possible diseases and their remedies according to their climate.

3.4 Crop Suggestion according to Weather

1. Register Farm details
2. initialize farms[]=farmer's registered farms
3. for i=0 to farms.length



4. initialize pincode=farms[i].pincode
 5. get weather condition according to pin code using Google API
 6. fetch crop that matches with weather condition
 7. suggest which crop can be taken
 8. Increment i
 9. repeat steps 4-8 while i==farms[].length
 10. Stop
- 2.Initially farmer register their farm details, from the pincode google API service fetch the weather contion and suggest which crop can be taken

IV. SYSTEM ANALYSIS

Analysis consists of two sub phases: planning and requirement definition. Major activities during planning include understanding customer's problems, performing feasibility study, developing and recommending solution strategy, determining the acceptance criteria and planning the developing process. The product of planning is system definition and project plans .The system definition is typically expressed in English or some other natural language and they incorporate charts, figures, graphs and equations of various kinds .The exact notation used in the system definition are highly dependent upon problem area.

The project plan contain the life cycle model to be used,organizational structure for the project ,preliminary development schedule ,preliminary cost and resources estimate .

V. EXISTING SYSTEM

Agriculture plays very important role in India. As Indian Economy depends on agriculture mostly. The Farmers have to search on different websites to collect information regarding the marketing part, the soil part, again about the weather updates and information in their own regional language

VI.PROPOSED SYSTEM

The drawback of the existing system has been overcome in our proposed web based application. In our system we solve every queries of the farmer to face every situations and problems comes to them while farming. The proposed information system is an environment friendly system solution that optimizes product quality and quantity while minimizing cost. Effective use of this information system gives greater crop yield and quality.

6.1 Assumptions and Dependencies:

1. The users must be aware of computer hardware and their different attributes.
2. The user must have basic knowledge of computer and operating system.
3. The user must have basic knowledge of android operating environment.
4. Application development requires a good knowledge of operating systems.
5. For application, the users should be aware of C# language and basic database operations
6. The computer in which this application is to be installed should be compatible with .Net Framework.

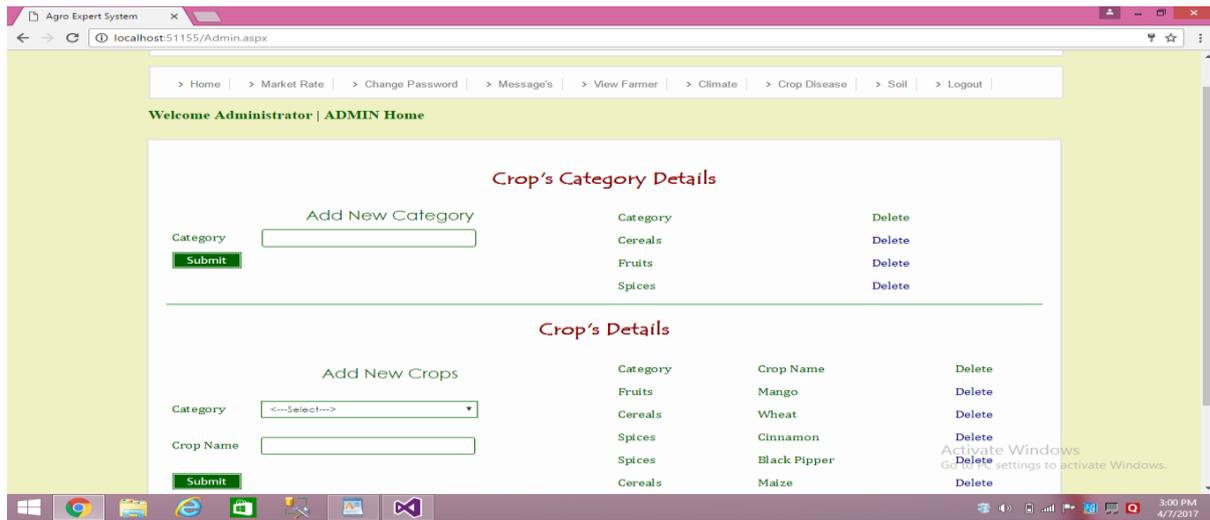


Fig 1. Admin's Homepage

This page shows the different modules of admin;s works.They shows the daily market rates of the crops ,shows the climate details,soils details ,crop disease ,special notice or message and the details of registered farmers.Admin can add the different categories of the crop and their details and also updates daily maecket rates for the farmer to sell their goods. If the admin want to change his password the can change it by using module change password.

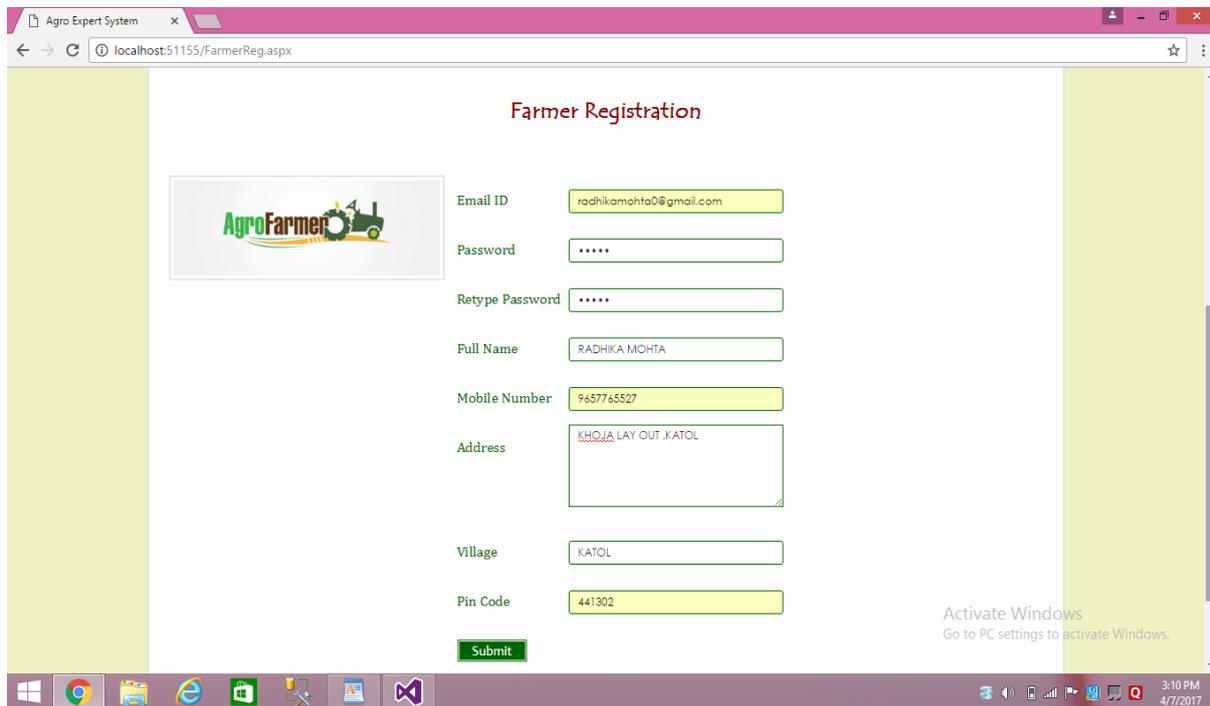


Fig.2.Farmer's Registration

This page shows the registration for new farmers .The farmer's will have to fill the following personal information to register.

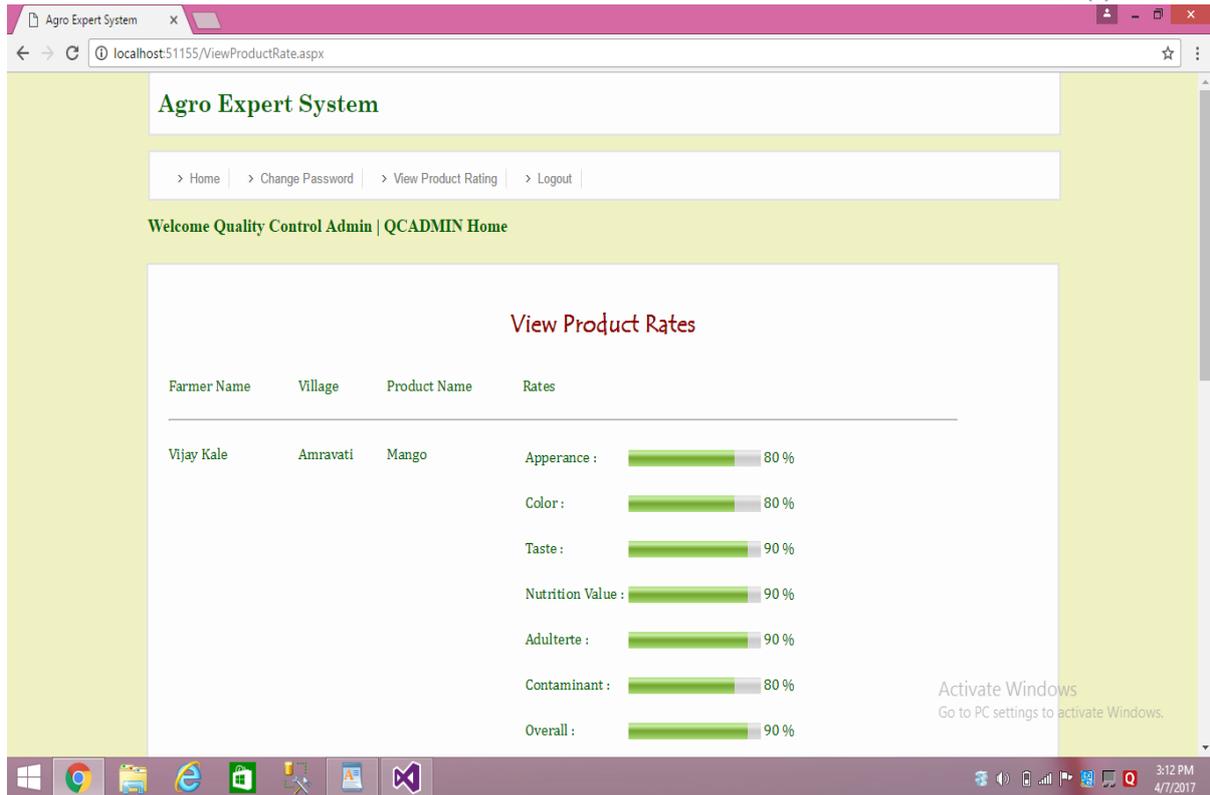


Fig.3.Expert Homepage

This page shows the working of expert for quality controls. The expert will rate the product sample send by the farmer according to the different qualities.

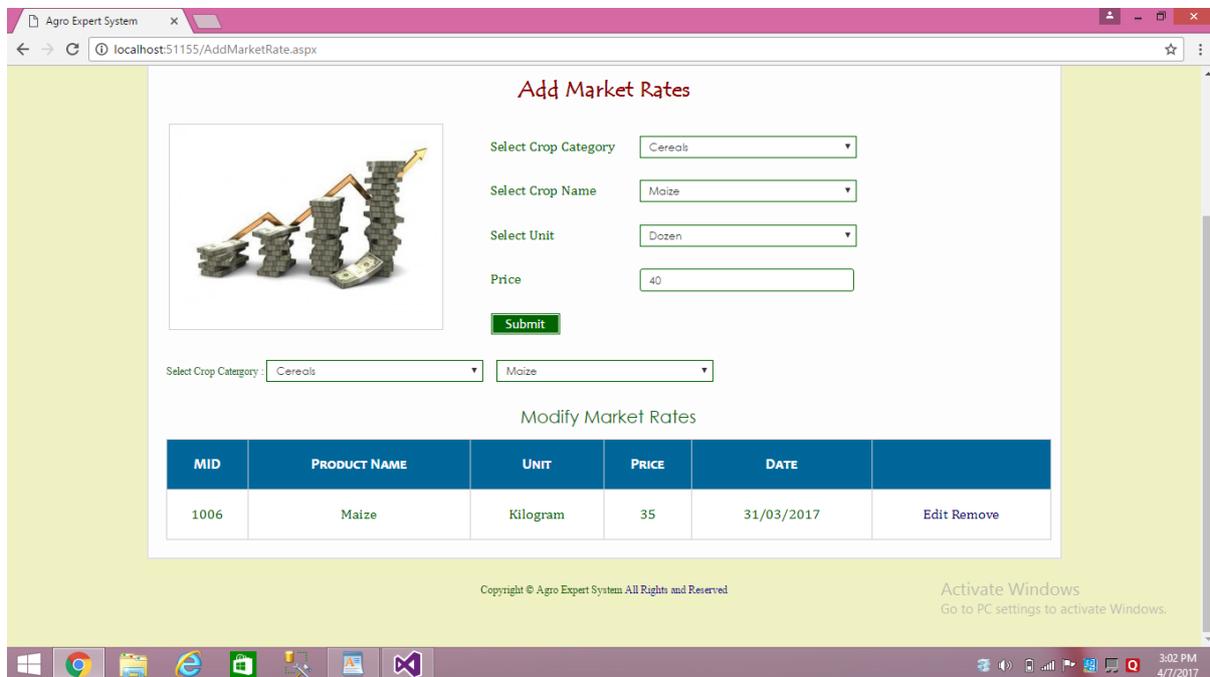


Fig.4.Market Rating

Administrator will have to add the daily market rates so that it can be viewed at the farmers page. Farmers will get the information regarding the daily rates of the product.

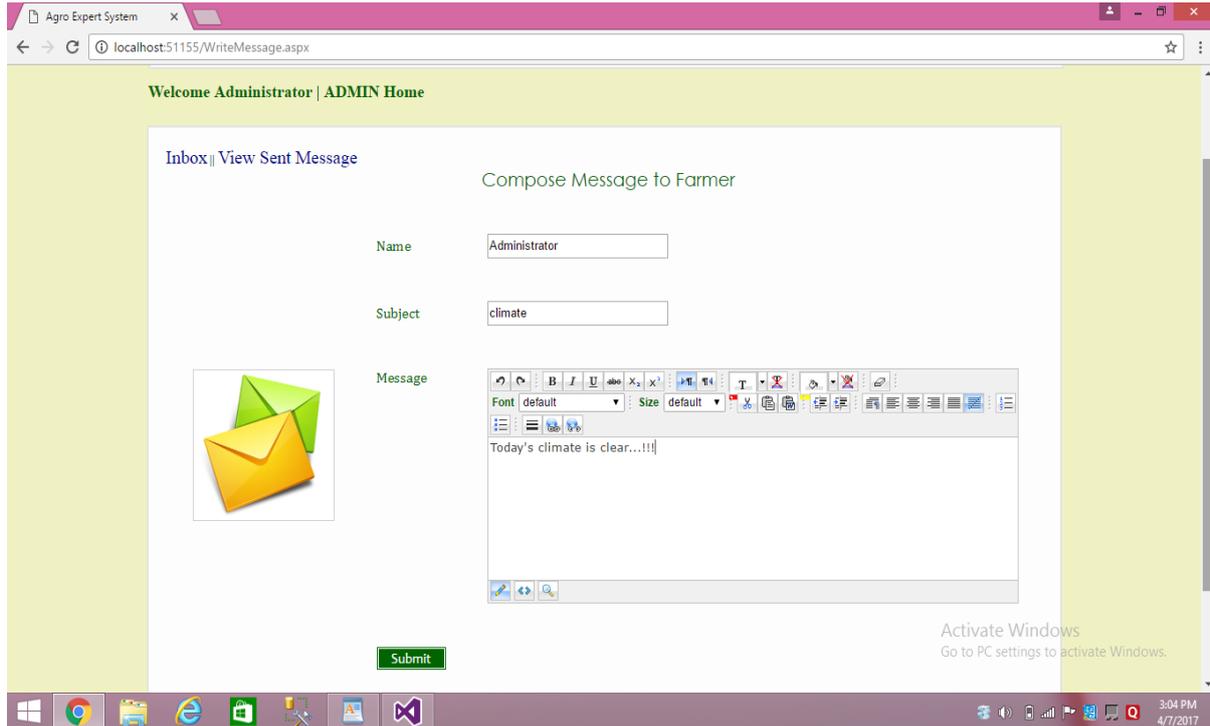


Fig.5.Message

Admin can sent messages to the farmers regarding the latest updates in rates,climatic changes,diseases of crops.This will also help to communicate with the farmers

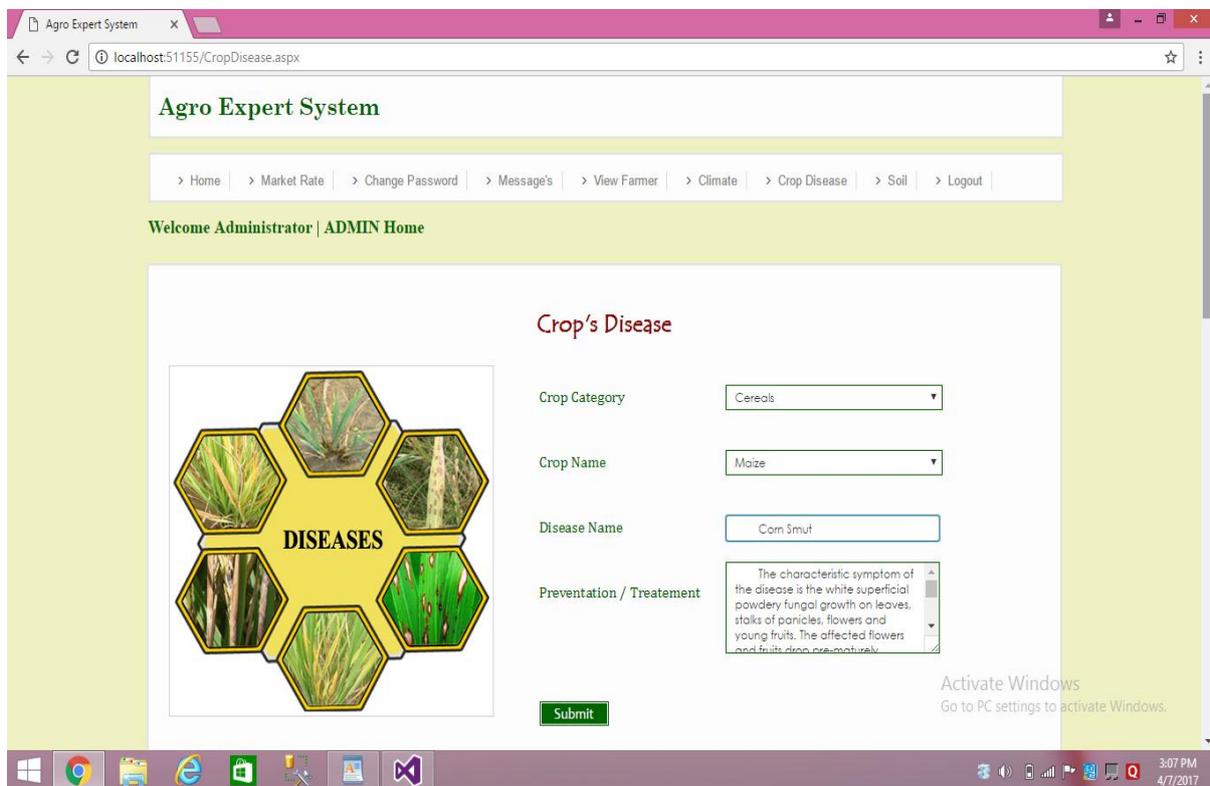


Fig.6.Crop Disease

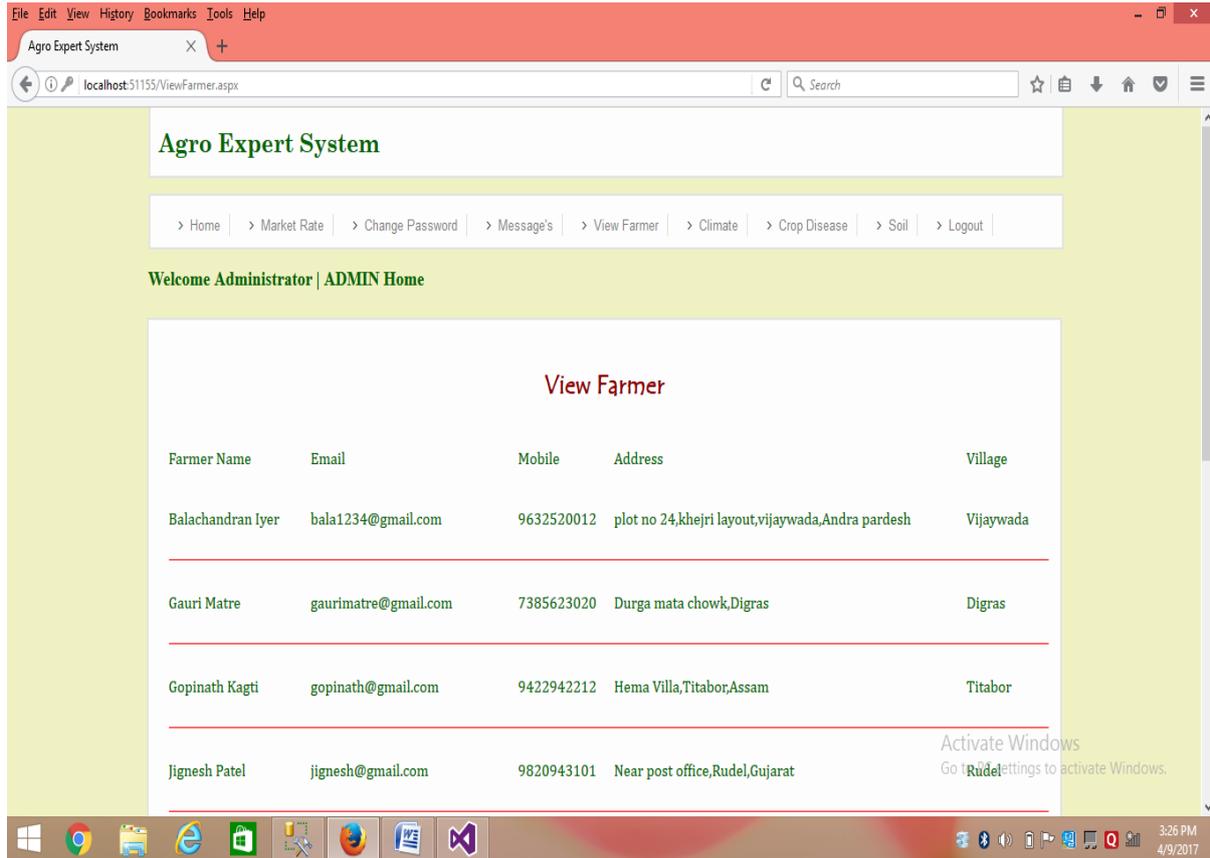


Fig.7.Diseases of Crops

Admin can add the diseases of crops and prevention measures and treatment that can help the farmers for their crops.

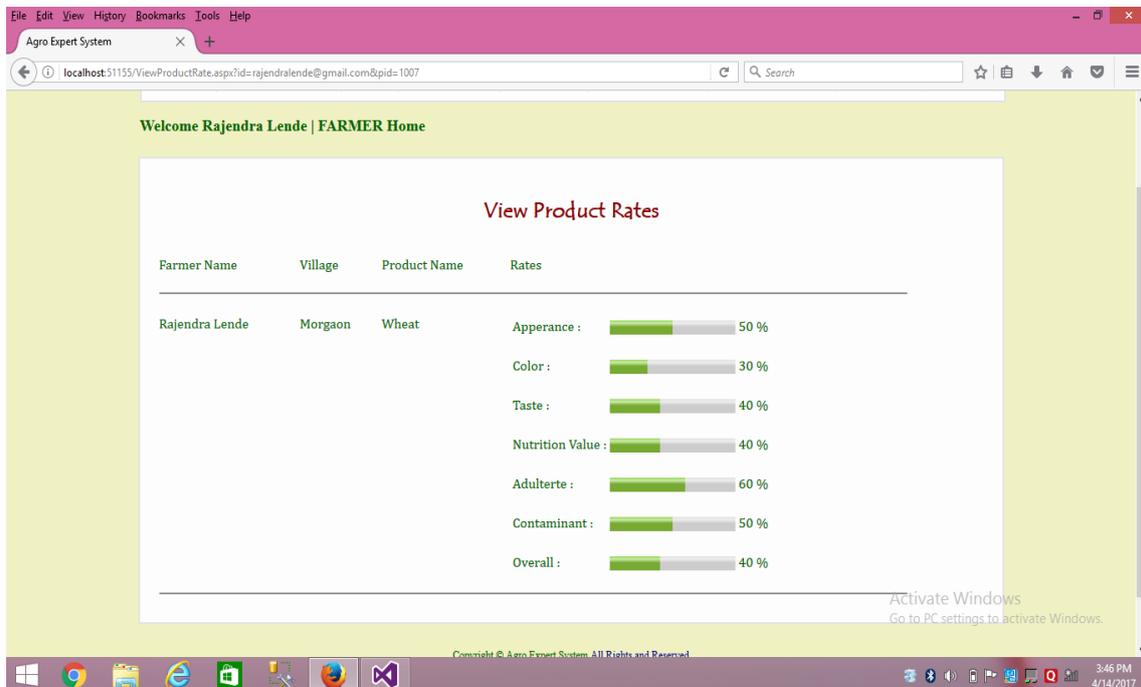


Fig.8.Before expert advice

When farmer send his wheat sample manually to expert ,quality of wheat was not so good its appearance ,taste ,nutrition value was average and overall rating of the wheat is 40%. And when he goes to market to sell his wheat he will not get satisfying price for wheat.

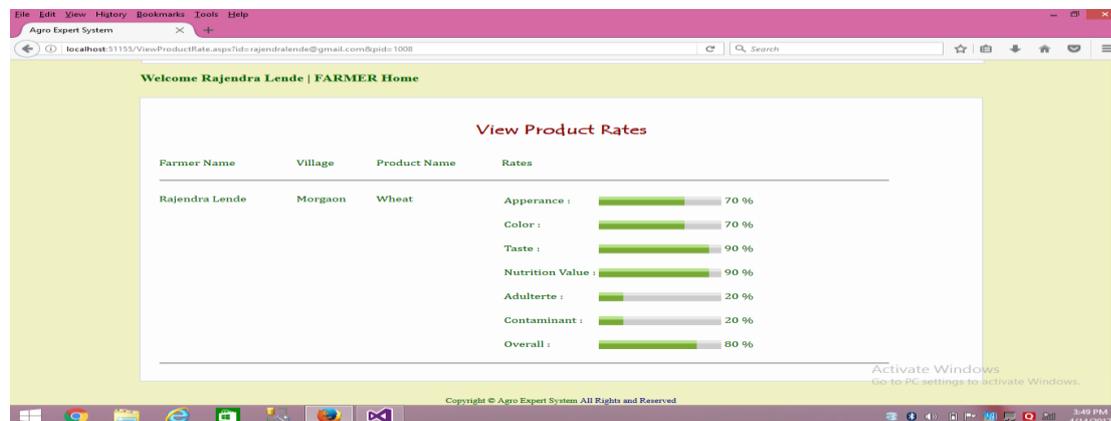


Fig.9.- After expert advice

After adopting the methods for growing the quality crop suggested by expert about climate changes and preventions farmer analysis the drastic change in product quality

VIII. ADVANTAGES

1. Low or no start up costs.
2. Great flexibility in relation to fast up and down scaling of resource needs.
3. Other common outsourcing advantages like security for uptime, availability, Contingency, Arrangements, reduced costs of investment in organizations infrastructure.
4. Weather updates can be arranged to change after some specific duration so latest updates can be fetched.
5. Native language support has been provided wherever required and possible
6. Daily updates for the market rates of the products and quality of the product is demonstrated .

IX. FUTURE SCOPE

In our project we will try to make our web based application even more friendly by providing audio input method with the help of which is totally illiterate farmer will also get interact with our project and get best solution for their queries by their own without any help of computer expert.

X. CONCLUSION

Our website gives the whole information regarding to crops, Weather status and also user can get the expert advice in Marathi and in English languages. Our application can be used as smart system which will be more sophisticatedly working for benefit of the user. A user can be made aware about current weather statistics and new information regarding to crops, seeds, fertilizer etc just on single click of a button. He can even consult with experts if needed. This application can be very much helpful even if one could not read the information on the device by native Name language support provided in it. This model will be a great enhancement to currently using



techniques. This project is an initial proposal to show that this kind of information system is very helpful for the farmers in India

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