

JalKrishiPrabandh for Better Farming

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Abstract— As India is an Agricultural Country, majority of Indian farmers are marginal farmers who face challenges such as small landholdings, decreasing yield, decreasing profitability, uncertainty of water availability, vulnerability to world commodity prices and many more. Many farmers can be better-equipped to handle these challenges if they are provided the right information at the right time, personalized to meet their specific needs. This Agricultural Advisory System would leverage the power of feedback mechanism over mobile phones helps to bridge the information gaps existing between farmers and experts.

Key words: Agricultural Advisory System, Agro-based System, FarmERP, Krishi, Crop Disease

I. INTRODUCTION

Expert systems are computer applications, which use some non-algorithmic expertise for solving certain types of problems. For example, expert systems are used for providing information to the farmers according to their needs. Information about the crops, seeds, fertilizers, water requirements for soil is the important information needed by farmers for the efficient farming.^[1]

Natural and environmental conditions have changed dramatically in the last years as a consequence of climate change and climate variability modifying established practices for traditional crops change and climate variability modifying established practices for traditional crops. Since farmers have suffered several effects on its production process they have realized the importance of supporting future actions on reliable climate data, scientific development have also grown in last decades and planning offices are looking for better practices.^[2]

Agricultural activities comprise of following:

A. Production:

This is the process in which farmers use seeds and other required materials for proper growth of crops. Production depends upon nutritive value, market value, type of soil, weather conditions and climate.

B. Harvesting:

It is the process of gathering ripe crops from the field and storing it for further processing.

C. Sales:

After harvesting, crops are sold based on the demand of market.

II. EXISTING SYSTEM

FarmERP is PC-based software suite which provides complete control over agricultural operations. Its functionalities include complete resource-planning, multi-user environment, managing multiple farms, optimization of resources, input management and financial management of farm. It is centralized data management system for huge

amount data operating at various farm level, grading and pack houses level, etc.^[3]

A. Limitations of FarmERP

It requires secured internet connection for proper functioning. Farmers need to have their login necessarily on portal for any information access. They need to buy the different versions of software package for different usage.

III. NEED OF AUTOMATED SYSTEM

Farmers should be made aware of the various Agribusiness services.^[3] They should be provided information preferably in their regional language, in order to maximize the yields.

Mining techniques should be applied and the information should be provided to them according to their needs.^[4]

Two way communications should be available in order to determine whether the provided information is useful or not. (Feedback Mechanism)

Information that is provided to farmers should be updated like current best prices of crops, best available medicines for various diseases.^[4,5]

IV. LITERATURE SURVEY

Farmers lack knowledge about technical and scientific methods to prevent pest diseases and this proves to be the main reason for less production therefore less sales.^[9] The use of Big Data, within governmental processes, is valuable and allows increase in efficiency in terms of cost, productivity and innovation. But this data analysis requires multiple parts of government to work together and create innovative processes to deliver the desired outcome.^[15]

For decision making on several issues related to agriculture field; data mining plays a vital role.^[17]

V. PROPOSED SYSTEM

System that will collect data from farmers having different fragments of land and its characteristics. The purpose of JAL KRISHI PRABANDH is to keep records of different segments of land, production of different crops and sales of production along with the utilization of water.^[4,5] It will provide information about the required quality and quantity of the seeds and fertilizers. System will be able to reach to the farmers through different modes of communication in their preferred language.^[5]

Various modules of system:

A. Farmer Information:

In this, farmer will enter their personal information, land information, Mode of communication possible and their financial information so that our system will present the pesticides and fertilizers accordingly.

B. Identification of crops:

Depending on soil type, water source, climatic conditions of soil; our system will give the output for the type of crops that can be grown on the particular land.

C. Conversion in Preferred Language:

Depending on the language preferred language of farmer, the information will be converted and provided in their regional language and mode of communication chosen by farmer.

D. Disease Identification and Preventive measures:

Symptoms that were seen by farmers in their crops will be provided by farmer and system will be able to provide preventive measures like fertilizers that can be used to get rid of diseases and the shops that can provide fertilizers at best possible rate.

E. Report Generation:

Farmer will be able to generate the reports according to their needs. Reports can be sales per year, diseases occurred monthly or yearly, fertilizers that give best outputs or increased production.

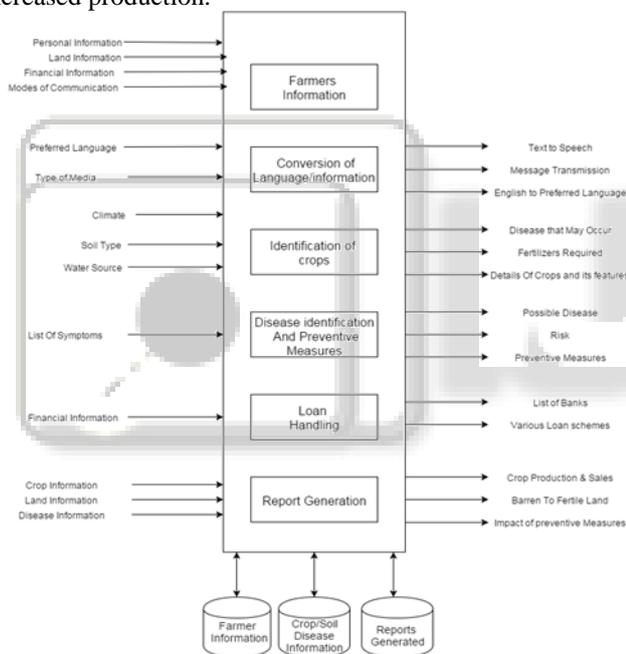


Fig. 1: Report Generation

VI. IMPLEMENTATION METHODOLOGY

A. Crop Estimation

The Directorate of Economics and Statistics (DES) calculates various factors like the production and yield in respect of prime crops of oilseeds, fibers, foodgrains and other important commercial crops and also the estimates of area. Approximately 80% of the total agricultural yield is covered by these horticultural crops. The product of the area estimates and the corresponding yield estimates provide the estimates of crop production. These estimates are then recorded, stored in a database and modified from time to time for future analysis. The estimates of area and yield rates are of utmost importance in the entire analysis of agricultural statistics. [8]

B. Area Estimation

The System presently available to gather area statistics divides the states in the country into three broad categories. The first category includes Union Territories (UTs) and states which are surveyed using maps and the area and land use statistics are prepared. These land records are maintained by the revenue agencies and these states are called "Land Record States". Those states where the area statistics are collected on the basis of samples collected by the EARAS (scheme of Establishment of an Agency for Reporting of Agricultural Statistics) are included under the second category. The third category covers the hilly areas of Assam, the rest of North-Eastern states (other than Nagaland, Tripura, Sikkim and Arunachal Pradesh), Daman and Diu, UTs Goa, Andaman and Nicobar Islands and Lakshadweep, where no reporting agency is established. Further analysis on these categories and the compartmentalized land would help us gather more information on the various crops that can be planted.

C. Advance Estimates of Crop and Production

The Indian Government provides general estimates regarding agricultural production in a four point format throughout the economic year for farmers. The estimates are given in following four points:

1) First Advance Estimates:

The first advance estimates regarding the area and production of kharif(monsoon) crops are generated in the month of September every year, when the monsoon crops are mature enough and south-west monsoon season is about to end.

2) Second Advance Estimates:

The second advance estimates are made in January each year. The advance estimates of kharif(monsoon) crops generated during the National Conference of Agriculture for Rabi Campaign may change after the introduction of more precise information from the provincial or state Governments.

3) Third Advance Estimates:

These estimates are generated along the end of March or the first week of April each year, when the National Agricultural Conference for Kharif Campaign and the state governments come up with their analysis of estimates for both kharif and rabi crops.

4) Fourth Advance Estimates:

The Fourth Estimates are the prepenultimate estimates provided by the Indian Government during the present agricultural year. These estimates are prepared in the month of June or July every year, when the National Workshop on Improvement of Agricultural Statistics is organized, as end of May marks the harvesting of most of the rabi crops, SASAs can provide better estimates for the production during both kharif and rabi seasons as well as the presumptuous assessment of summer crops made at the time of National Workshop.

5) Final Estimates:

The existing system provides a final estimate during the months of November or December which serves as a base for production analysis of the next agricultural year.

Our system uses these estimates as a predecessor for further analysis; it would take into account the estimates

of the present year as well as the predictions from the past to give an optimal estimation.

VII. DATA FLOW

A. DFD Level 0:

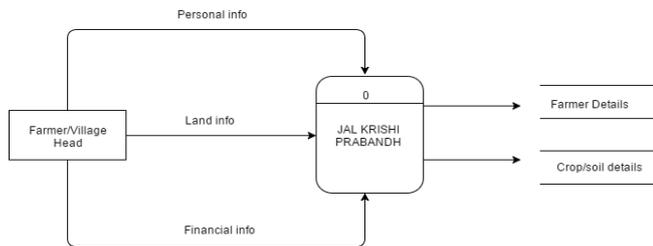


Fig. 2: DFD Level 0

B. DFD Level 1:

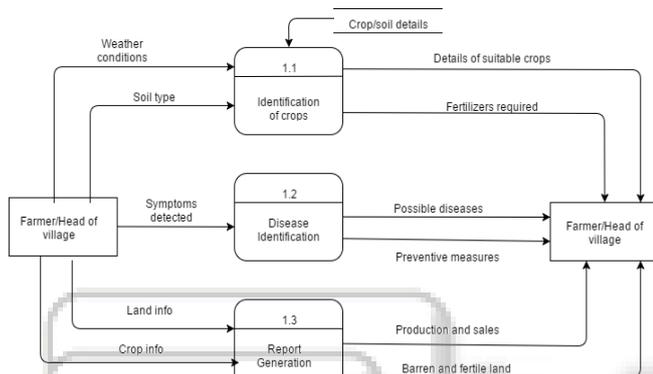


Fig. 3: DFD Level 1

VIII. CONCLUSIONS AND FUTURE WORK

The Project as of now is just an intermediary model of what can be done to improve the life of farmers and also the agriculture system which is the backbone of the Indian economy.

The resources and time available initially does not allow to build complete prototype that can do the ground work as well.

Further extension of the project can encourage the inclusion of hardware required for the ground work.

Hardware includes satellite monitoring of specific locations, sensors to gather and transmit real time data that can help in providing earlier solutions to yield better results.

Initially the security and integrity of the users of the system are the main points taken into consideration.

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