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10. EXPERT SYSTEM FOR AGRICULTURE

The home page of the expert system has three important components viz., Information System, Decision Support System, Diagnosing System (Crop Doctor)



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10.1 Components of the Expert system

- **Information System:** Information system is web based static information wherein all the technological and complementary information from A to Z about the crop are pooled and loaded in this component. It is a ready reckoner and user-friendly navigation with image based presentation, up scaling and updating the content at any time.
- **Crop Doctor:** Crop doctor is a vital component in the Expert system which acts as artificial intelligence. It is picture and image based „if and then rule“ based programme which has written using Dot net programme. It deals with diagnosing the pest, disease and nutritional disorders affecting the selected crops.



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10.1 Cont..

Decision Support System: " Decision support system is a computer-based information system including knowledge based system that support decision making activities. A decision is a choice between alternatives based on estimates of the values of those alternatives " Accordingly, the DSS has been contemplated and designed to get best possible options and decision by farmer themselves for the day today agriculture operation



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10.2 Soil Information System

Soil Information System (SIS) solution is an industry leading soil map solution that uses advanced sensors and intelligent targeting and geo-processing algorithms to produce high resolution, accurate soil and topographic information. By providing a greater understanding of the physical and chemical characterization of the soil, including how inputs move through the soil, SIS enables farmers' trusted advisors to implement more effective solutions to resolve the unique challenges of each area of their fields. This soil map can be used to make critical farm management decisions with irrigation, drainage, fertility, and more.



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10.3 Key Features

- Assess detailed soil properties for each field such as soil texture, compaction, root zone depth, moisture retention and availability, and soil fertility.
- View soil analysis for the top 48 inches (122 cm) of the field's surface in 3D.
- Download soil maps into your farm management software application, including Trimble Ag Software or other third-party software systems.
- Create variable rate application maps from the soil map to help maximize plant growth.



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10.4 Application

- Pre –Purchase Land Evaluation

SIS makes it possible to obtain a complete picture of the land you are considering before purchase or development. With a SIS analysis you will be able to predict a field's potential for growing capacity and identify challenges that will come up in the course of layout and planting. SIS helps growers avoid the pitfalls associated with sub-optimal soil properties that can permanently limit crop quality and yield.



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10.4 Cont..

- **Field Preparation and Field Design**

The single greatest opportunity a grower has to influence the long-term output of any field, vineyard, or orchard comes with the design and planting of a new field. Utilizing the SIS ensures that growers are able to design and prepare fields that are optimized for the long-term. SIS makes it possible to know precisely where to add deep-root amendments, select and plant crop varieties based on known moisture holding characteristics, and minimize in-field variability.



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10.4 Cont..

- **Improve Crop Quality**

SIS gives growers the tools they need to optimize growing conditions and improve overall crop quality. Plant materials within a field may be uniform, but the soils in which those crops grow are not. With SIS, growers can assess the variability within a field and treat different zones according to their unique needs, thereby raising quality to the highest grade achievable throughout the field.



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10.4 Cont..

- Optimize the Use of Water, Fertilizer and Amendments

Growers can immediately improve their bottom line by employing more efficient watering, fertilizer, and amendment application strategies. The difficulty comes with knowing where and to what degree you can reduce inputs without compromising crop quality. SIS makes it possible to target applications – making sure expensive inputs are used efficiently. Growers using SIS data no longer need to manage to the lowest common denominator, instead they can take advantage of naturally occurring availability while concentrating on helping low-productivity areas achieve higher yield and quality.