LITERATURE SURVEY

TOPIC: Estimate The Crop Yield Using Data Analytics

Crop production in India is one of the most important sources of income and India is one of the top countries to produce crops. As per this project we will be analyzing some important visualization, creating a dashboard and by going through these we will get most of the insights of Crop production in India

MEMBER : VISNUKANTH M S

SENSING TECHNOLOGIES FOR PRECISION SPECIALTY CROP PRODUCTION

Author links open overlay panelW.S.Lee[a] V.Alchanatis[b1] C.Yang[c2] M.Hirafuji[d3] D.Moshou[e4] C.Li[f5]

With the advances in electronic and information technologies, various sensing systems have been developed for specialty crop production around the world. Accurate information concerning the spatial variability within fields is very important for precision farming of specialty crops. However, this variability is affected by a variety of factors, including crop yield, soil properties and nutrients, crop nutrients, crop canopy volume and biomass, water content, and pest conditions (disease, weeds, and insects). These factors can be measured using diverse types of sensors and instruments such as field-based electronic sensors, spectroradiometers, machine vision, airborne multispectral and hyperspectral remote sensing, satellite imagery, thermal imaging, RFID, and machine olfaction system, among others. Sensing techniques for crop biomass detection, weed detection, soil properties and nutrients are most advanced and can provide the data required for site specific management. On the other hand, sensing techniques for diseases detection and characterization, as well as crop water status, are based on more complex interaction between plant and sensor, making them more difficult to implement in the field scale and more complex to interpret. This paper presents a review of these sensing technologies and discusses how they are used for precision agriculture and crop management, especially for specialty crops. Some of the challenges and considerations on the use of these sensors and technologies for specialty crop production are also discussed.

Research highlights

▶ High resolution remote sensing imagery has the potential for yield estimation for specialty crops. ▶ Application of machine vision in agriculture is enhanced by the use of task-specific wavelengths in the visible and beyond the visible spectrum range, leading to more successfully accomplished tasks. ▶ There is a need for developing easy-to-use and low cost commercial VRA systems for specialty crops. ▶ Plant diseases can be detected with optical sensors.

MEMBER : YOGESH J

TEMPERATURE THRESHOLDS AND CROP PRODUCTION: A REVIEW

- Qunying Luo

Temperature thresholds for a range of crops from cereal crops to horticultural crops and to legum crops were identified through an extensive literature review. Identification of temperature thresholds provides a basis for quantifying the probability of exceeding temperature thresholds which is a very important aspect of climate change risk assessment. The effects of extreme temperatures on yield and yield components were then reviewed and summarised. Through these processes, critical phenophases were defined based on the sensitivity of crop yield and/or yield components to extreme high temperatures which were imposed on various phenophases. Information on the direction and degree of the impact of extreme temperature on yield/yield components can contribute to the improvement of crop models in which the effects of extreme temperature on crop production have not been adequately represented at this stage. Identification of critical phenophases at which crops yield and/or other economic characteristics are sensitive to extreme temperatures will help scoping appropriate adaptation options.

MEMBER : MOHAMED FAYAZ S

ALTERNATIVE CROP PRODUCTION SYSTEMS: A REVIEW OF THE ECONOMIC METHODS FOR COMPARING LITERATURE

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Wayne S. Roberts and

Scott M. Swinton

New crop production technologies developed in response to growing concern over environmental contamination from agriculture may be neither more profitable nor higher yielding than the systems they replace, but they often reduce environmental contamination or improve soil and water quality. Systems designed with environmental objectives cannot be evaluated fairly just by productivity, which is what often is done in economic studies of alternative systems. We review 58 recent studies comparing alternative crop production systems to identify the key criteria for system comparisons, the system characteristics important in designing the analysis, and the methods most suited for comparing alternative systems.

The four key criteria we looked for in system comparisons are expected profit, stability of profits, expected environmental impacts, and stability of environmental impacts. Most economic studies of crop production focus exclusively on profitability, and incorporate neither environmental criteria nor the dynamic characteristics inherent in alternative systems. We identify promising new approaches that take account of specific environmental characteristics and attempt to balance the objectives of profitability and environmental risk management. Balanced environmental-economic analysis is most likely to be achieved by integrating biophysical simulation models with economic optimization methods to model the trade-offs among profitability, environmental

impact, and system stability (both financial and environmental).

MEMBER: VIMAL KHANNA M

RESOURCES FOR CROP PRODUCTION: ACCESSING THE UNAVAILABLE

Author links open overlay panelJohn J.Ewel[1]Laura A.Schreeg[2]Thomas R.Sinclair[3]

Natural ecosystems and undomesticated plants have solved many resource-acquisition problems – problems challenging agriculture with economic and societal constraints on fertilizer, water and fossil energy.

Symbiotic N_2 fixation input can best be enhanced by focus on host plant. Biologically mediated extraction of phosphate from soils is widespread – geographically and phylogenetically – in nature.

Efficacy of water use can be increased by temporal regulation of transpiration, by deeper-rooted crops, and by hydraulic redistribution via roots from wetter to drier soil where it can become available to companion species.

An acute imbalance between human population and food production is projected, partially due to increasing resource scarcity; dietary shifts and the current course of technology alone will not soon solve the problem. Natural ecosystems, typically characterized by high species richness and perennial growth habit, have solved many of the resource–acquisition problems faced by crops, making nature a likely source of insights for potential application in commercial agriculture. Further research on undomesticated plants and natural ecosystems, and the adaptations that enable them to meet their needs for N, P, and water, could change the face of commercial food production, including on marginal lands.