



*remote sensing*

# Remote Sensing for Precision Nitrogen Management

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# Remote Sensing For Nitrogen Management

**Terry C. Jones**



## **Remote Sensing For Nitrogen Management:**

Remote Sensing for Precision Nitrogen Management Yuxin Miao,Raj Khosla,David J. Mulla,2022-11-04 This book focuses on the fundamental and applied research of the non destructive estimation and diagnosis of crop leaf and plant nitrogen status and in season nitrogen management strategies based on leaf sensors proximal canopy sensors unmanned aerial vehicle remote sensing manned aerial remote sensing and satellite remote sensing technologies Statistical and machine learning methods are used to predict plant nitrogen related parameters with sensor data or sensor data together with soil landscape weather and or management information Different sensing technologies or different modelling approaches are compared and evaluated Strategies are developed to use crop sensing data for in season nitrogen recommendations to improve nitrogen use efficiency and protect the environment

*Integration of Remote Sensing and Crop Growth Modeling for Nitrogen Management Decision Support in Corn* Kelly Robert Thorp,2006 This dissertation describes efforts to move toward a completely integrated remote sensing and crop growth modeling tool for developing precision nitrogen management recommendations for corn Aerial hyperspectral remote sensing imagery collected throughout the 2004 growing season was used to estimate corn plant stand density and a machine vision system was used to map corn population on the ground Multiple linear regression analysis was used to assess the ability of all combinations of three reflectance bands to estimate corn plant population at resolutions of 2 m 6 m and 10 m Coefficients of multiple determination of up to 0.82 were achieved in this endeavor Although some limitations apply remote sensing can be used as a tool to provide corn plant population inputs for crop growth simulations A cross validation technique and bivariate confidence ellipses were used to evaluate CERES Maize simulations of spatial corn yield variability across an Iowa cornfield Results indicated that the model performed most poorly when using the wettest or driest growing seasons to validate the model because the model parameters fitted under the conditions of moderate growing seasons were less flexible for simulating yield in growing seasons with more extreme weather Results also indicated that topography affects the model performance spatially CERES Maize was also used to simulate yield and unused nitrogen remaining in the soil at harvest for a sequence of historical weather data Simulations were run for 13 spring applied nitrogen rates over a cornfield divided into 100 0.2 ha grid cells A methodology based on cumulative probability distributions was then developed to use model output for assessing the link between yield and nitrogen left behind for various nitrogen rates in each grid cell This methodology can be used to develop precision nitrogen management strategies that address both the economic and environmental concerns of nitrogen management practices Although the three projects in this dissertation furthered the development of remote sensing crop growth modeling and decision support technologies more work is required to obtain a completely integrated tool for development of precision nitrogen management strategies in Midwestern cornfields

**Site-specific Nitrogen Management and Remote Sensing Based Nitrogen Application Decisions in Wheat** Michael Darrell Flowers,2001

Remote Sensing of Crop Physiological Parameters for Improved Nitrogen Management in Semi-arid Wheat Production Systems David J. Bonfil, Daniel S. Long, Yafit Cohen, United States-Israel Binational Agricultural Research and Development Fund, 2009

**Sustainable Crop Production** Mirza Hasanuzzaman, Masayuki Fujita, Marcelo Carvalho Minhoto Teixeira Filho, Thiago Assis Rodrigues Nogueira, Fernando Shintate Galindo, 2020-06-17 This book includes twenty one comprehensive chapters addressing various soil and crop management issues including modern techniques in enhancing crop production in the era of climate change There are a few case studies and experimental evidence about these production systems in specific locations Particular focus is provided on the state of the art of biotechnology nanotechnology and precision agriculture as well as many other recent approaches in ensuring sustainable crop production This book is useful for undergraduate and graduate students teachers and researchers particularly in the fields of crop science soil science and agronomy

**Precision agriculture '07** J.V. Stafford, 2023-08-28 With ever increasing pressures on world agriculture in both economic and environmental terms application of the concept of precision agriculture is one way of enabling farmers and producers to cope Doing arable agriculture and horticulture more precisely means that the use of inputs is optimised crop yield and quality are maximised and leakage of agro chemicals and fertilisers to the environment is minimised This publication contains papers presented at the 6th European Conference on Precision Agriculture The papers reflect the wide range of disciplines encompassed by precision agriculture including soil physics crop physiology agronomy IT agricultural technology sensor technology remote sensing geostatistics and environmental science The wide range of research topics reported will be a valuable resource for researchers advisors teachers and professionals in agriculture long after the conference has finished Peer reviewed papers from the 3rd European Conference on Precision Livestock Farming are presented in a companion proceedings Precision livestock farming 07

**Adaptive Nutrient Management Systems for Plant Nutrition: Optimization, Profitability, and Ecosystem Assessment** Henry Yabbey Sintim, Khurram Shahzad, Xinhua Yin Yin, 2025-03-25 Proper nutrient management is essential for optimizing plant growth and productivity while minimizing environmental impact Traditional nutrient management practices often rely on fixed application rates as determined from soil test analyses and other non plant based factors without considering the dynamic nutrient requirements of plants Adaptive nutrient management systems aim to address this issue by integrating precision agriculture data driven approaches and advanced technologies to optimize nutrient application strategies These systems take into account factors such as in season soil and crop conditions as well as other environmental variables to tailor nutrient inputs for increased plant productivity reduced nutrient losses and maximum economic profitability *Proceedings for the ... International Symposium on Remote Sensing of Environment, the ... Symposium of the Canadian Remote Sensing Society, 2003*

Instant Insights: Advances in fertilisers and fertiliser technology Dr Paul Miller, Dr Dan S. Long, Prof Bryan G. Hopkins, Dr Asher Bar-Tal, Dr Uri Yermiyahu, Dr Alon Ben-Gal, 2024-01-23 Considers the role of future fertiliser development in achieving a more

sustainable agriculture Explores the range of techniques required to optimise fertiliser application in modern agriculture such as rate placement and timing Includes case studies which demonstrate the successful application of fertigation techniques in conventional and soilless cultivation systems

**GIS Applications in Agriculture** Francis J. Pierce, David Clay, 2007-02-13 As the first volume in a unique series concentrating on in depth discussions of GIS topics GIS Applications in Agriculture examines ways that this powerful technology can help farmers firms to produce a greater abundance of crops with more efficiency and at lower costs Each chapter describes the nature of the problem examines the purpose of the GIS application describes methods used to develop the application provides results and offers a conclusion as well as other supportive information When appropriate it presents the underlying statistical approach for the GIS software that is used This text also includes a CD ROM that features data sets and the full color maps produced by the use of GIS

**Innovation for Environmentally-friendly Food Production and Food Safety in China** Nicholas Clarke, Deliang Peng, Jihong Liu Clarke, 2023-08-28 The edited volume focuses on modern agro technologies for achieving climate smart agriculture in China and meeting the UN sustainable development goals especially SDGs 2 13 and 15 It describes the technologies being adopted in China for meeting food security challenges with the main focus being on soils China is a large and diverse country and what happens there has a global impact In the past decades China has achieved remarkable increases in food production feeding nearly 20% of the world population with less than 10% of the arable land This great achievement was mainly based on the intensive use of chemical inputs like fertilizers and pesticides which in turn caused environmental pollution and food safety issues China has fully realized this important issue and has adopted a Zero Growth policy to restrict the further increase in chemical fertilizers after 2020 Chinese scientists have developed regional optimum crop management practices and guidelines to increase crop yield and nutrient use efficiencies compared with current farming practices Chinese agricultural soil is also currently in critical condition with severe environmental pollution These agricultural practices need improvement to maintain sustainable food production with minimum environmental footprint At present the traditional mode of agricultural production in China is difficult to sustain This book offers case studies and sustainable solutions for transforming agricultural sciences in China The book is a useful reading material for stakeholders such as governments policymakers research institutions and farmers

Precision agriculture '15 John V. Stafford, 2023-08-07 Precision agriculture is now main stream in agriculture and is playing a key role as the industry comes to terms with the environment market forces quality requirements traceability vehicle guidance and crop management Research continues to be necessary and needs to be reported and disseminated to a wide audience These proceedings contain reviewed papers presented at the 10th European Conference on Precision Agriculture held at the Volcani Centre Israel The papers reflect the wide range of disciplines that impinge on precision agriculture technology crop science soil science agronomy information technology decision support remote sensing and others The broad range of research topics reported will be a valuable resource for

researchers advisors teachers and professionals in agriculture long after the conference has finished Proceedings of the Great Plains Soil Fertility Conference ,2006 *Geo-spatial and Temporal Image and Data Exploitation III* Nickolas Lea Faust,William E. Roper,2003 First conference has title Automated geo spatial image and data exploitation **Proceedings of the ... International Symposium on Remote Sensing of Environment** ,2007 Proceedings, 32nd International Symposium on Remote Sensing of Environment ,2007 *Journal of Soil and Water Conservation* ,2017 Vol 25 no 1 contains the society s Lincoln Chapter s Resource conservation glossary **Third European Conference on Precision Agriculture, June 18-20, 2001, Montpellier, France** Gilbert Grenier,Simon Blackmore,Ecole nationale supérieure agronomique (Montpellier, France),2001 Proceedings of Space ... ,2000 *Improving Nitrogen Management in Sugarcane Production of the Mid-South Using Remote Sensing Technology* Joshua Lofton,2012

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