# Pixl Predicted Paper June 2015 Answers

Volatiles in the Martian Crust is a vital reference for future missions - including ESA’s EXO Mars and NASA’s Mars2020 rover - looking for evidence of life on Mars and the potential for habitability and human exploration of the Martian crust. Mars science is a rapidly evolving topic with new data returned from the planet on a daily basis. The book presents chapters written by well-established experts who currently focus on the topic, providing the reader with a fresh, up-to-date and accurate view. Organized into two main sections, the first half of the book focuses on the Martian meteorites and specific volatile elements. The second half of the book explores processes and locations on the crust, including what we have learned about volatile mobility in the Martian crust. Coverage includes data from orbiter and in situ rovers and landers, geochemical and geophysical modeling, and combined data from the SNC meteorites. Presents information about the nature, relationship, and reactivity of chemical elements and compounds on Mars Explores the potential habitability of Mars Provides a comprehensive view of volatiles in the Martian crust from studies of actual samples as well as from the variety of landed missions, including the MER and Curiosity rovers Delivers a vital reference for ongoing and future missions to Mars while synthesizing large data sets and research on volatiles in the Martian atmosphere Concludes with an informative summary chapter that looks to future Mars missions and what might be learned

Just the mention of mathematics is enough to strike fear into the hearts of many, yet without it, the human race couldn't be where it is today. By exploring the subject through its 50 key insights--from the simple (the number one) and the subtle (the invention of zero) to the sophisticated (proving Fermat's last theorem)--this book shows how mathematics has changed the way we look at the world around us.

The two-volume set LNCS 11751 and 11752 constitutes the refereed proceedings of the 20th International Conference on Image Analysis and Processing, ICIAP 2019, held in Trento, Italy, in September 2019. The 117 papers presented were carefully reviewed and selected from 207 submissions. The papers cover both classic and the most recent trends in image processing, computer vision, and pattern recognition, addressing both theoretical and applicative aspects. They are organized in the following topical sections: Video Analysis and Understanding; Pattern Recognition and Machine Learning; Deep Learning; Multiview Geometry and 3D Computer Vision; Image Analysis, Detection and Recognition; Multimedia; Biomedical and Assistive Technology; Digital Forensics; Image processing for Cultural Heritage.

This book presents new technologies which are available now for the rehabilitation of visual acuity in patients suffering from keratoconusand for arresting the progression of this frustrating disease. All these current treatment options in differing combinations aim to improve the quality of life of the patients and although successful, they are causing confusion for the ophthalmologists; what procedure to do and when? How to perform? Which combination of treatments to choose? Controversies in the Management of Keratoconusprovidesthe widely used treatment options for keratoconus including collagen corneal cross –linking (CXL) covering all the available techniques, intrastromal corneal ring segments (ICRS) , phakic intra-ocular lenses (IOLs), photorefractive keratectomy (PRK) combined or not with CXL penetrating keratoplasty (PK) and deep anterior lamellar keratoplasty ( DALK). Each treatment is addressed by more than one author with different points of view in order to present the various approaches, the logic behind them and the most relevant clinical data available.A chapter by the editor tries to put some light on how to navigate among these controversies. This book will be of interest to trainees as well as the specialized ophthalmologists.

Dynamic Mars: Recent and Current Landscape Evolution of the Red Planet presents the latest observations, interpretations, and explanations of geological change at the surface or near-surface of this terrestrial body. These changes raise questions about a decades-old paradigm, formed largely in the aftermath of very coarse Mariner-mission imagery in the 1960s, suggesting that much of the interesting geological activity on Mars occurred deep in its past, eons ago. The book includes discussions of (1) Mars’ ever-changing atmosphere and the impact of this on the planet’s surface and near-surface; (2) the possible involvement of water in relatively new, if not contemporary, gully-like flows and slope streaks (i.e. recurring slope lineae); and (3) the identification of a broad suite of agents and processes (i.e. glacial, periglacial, aeolian, meteorological, volcanic, and meteoric) that are actively revising surface and near-surface landscapes, landforms, and features on a local, regional, and hemispheric scale. Highly illustrated and punctuated by data from the most recent Mars missions, Dynamic Mars is a valuable resource for all levels of research in the geological history of Mars, as well as of the three other terrestrial planets. Utilizes observational and model-based data as well as geological context to frame the understanding of the dynamic surface and near-surface of Mars Presents a broad spectrum of highly regarded experts and themes to discuss and evaluate the geological history of late and current Mars Includes extensive and detailed imagery to clearly illustrate these themes, discussions, and evaluations

Astrobiology is the study of the origin, evolution, distribution, and future of life in the universe. It is an inherently interdisciplinary field that encompasses astronomy, biology, geology, heliophysics, and planetary science, including complementary laboratory activities and field studies conducted in a wide range of terrestrial environments. Combining inherent scientific interest and public appeal, the search for life in the solar system and beyond provides a scientific rationale for many current and future activities carried out by the National Aeronautics and Science Administration (NASA) and other national and international agencies and organizations. Requested by NASA, this study offers a science strategy for astrobiology that outlines key scientific questions, identifies the most promising research in the field, and indicates the extent to which the mission priorities in existing decadal surveys address the search for life's origin, evolution, distribution, and future in the universe. This report makes recommendations for advancing the research, obtaining the measurements, and realizing NASA's goal to search for signs of life in the universe.

This simple, colorful picture dictionary is perfect for young readers. Here are more than 350 useful words in English, organized by topic, including school, sports, park, beach, house, street, farm, and wild animals. Each word is clearly illustrated for easy learning, and there is a full alphabetical list of words at the end of the book. A handy format, colorful illustrations, and simple, clear layout make this book ideal for early readers.

Exam board: WJEC Level: GCSE Subject: Geography First teaching: September 2016 First exams: Summer 2018 Target success in WJEC Eduqas GCSE (9-1) Geography B with this proven formula for effective, structured revision; key content coverage is combined with exam-style tasks and practical tips to create a revision guide that students can rely on to review, strengthen and test their knowledge. With My Revision Notes every student can: - Plan and manage a successful revision programme using the topic-by-topic planner - Enjoy an active approach to revision with clear topic coverage and related 'Now Test Yourself' tasks and practical revision activities - Improve exam technique through useful advice and formal exam-style questions - Monitor their knowledge and progress using the answers provided for each 'Now Test Yourself' activity and exam-style question - Develop geographical understanding and enhance exam responses with event/place examples

Technology is at the heart of learning for all of us and every teacher needs to be using social media, mobile technologies and transformational digital learning opportunities as an integral part of their range of strategies for helping students make the maximum progress. In this book in the 'Perfect' series, Mark Anderson, the ICT Evangelist, takes the technology-relatedelements of all the recent subject reports from Ofsted and using them offers clear and practical strategies that are proven to be successful in classrooms and offers up ideas for how they can be turned into a daily reality for all teachers.

"TOEFL Reading Practice Book: Reading Preparation for the TOEFL iBT and Paper Delivered Tests" by Exam SAM contains three complete TOEFL reading practice tests. Each practice reading test in this

book has three passages, just like the actual TOEFL Exam, so there are nine reading passages in the publication for you to study. All of the reading passages in the book are on factual, informative, or academic topics, which is also like the format of the actual TOEFL test. The practice exams have questions of all of the types that you will see on the real TOEFL reading test, so the book has questions on: Finding the main idea Reading for details Making inferences Language coherence Rhetorical functions Word meaning Locating referents Defining key terms Paraphrasing Author's attitude or opinion Summarizing The tips at the beginning of the book explain the format of the TOEFL reading test and tell you what to expect on your exam day. There is a complete answer key with in-depth explanations for each answer, so that you can understand why each answer is the correct one. The explanations give you additional tips to help you improve your test-taking technique. Get a step ahead in your exam preparation with Exam SAM Study Aids & Media.

Develop your students' subject knowledge and skills using this second edition Eduqas GCSE (9-1) Geography B Student book. Featuring updated case studies, practice questions and clear presentation of key terms, this thoroughly revised edition provides students with the up-to-date knowledge they need to succeed at GCSE. - Enhances students' subject knowledge, critical thinking and problem-solving skills using clear explanations of geographical issues, brought to life through an exciting, enquiry-based approach - Teaches students how to interpret, analyse and evaluate geographical information through a range of progressive, skills-building activities that use real-place data, maps and photographs - Boosts candidates' confidence approaching examination by providing opportunities for practice for each assessed theme - Highlights possible fieldwork projects and contains guidance on carrying out investigations that meet the changed assessment requirements

This book explores the practicality of using the existing subsurface geology on the Moon and Mars for protection against radiation, thermal extremes, micrometeorites and dust storms rather than building surface habitats at great expense at least for those first few missions. It encourages NASA to plan a precursor mission using this concept and employ a “Short Stay” Opposition Class mission to Mars as the first mission rather than the “Long Stay” concept requiring a mission that is too long, too dangerous and too costly for man’s first missions to Mars. Included in these pages is a short history on the uses of caves by early humans over great periods of time. It then describes the ongoing efforts to research caves, pits, tunnels, lava tubes, skylights and the associated technologies that pertain to potential lunar and Mars exploration and habitation. It describes evidence for existing caves and lava tubes on both the Moon and Mars. The work of noted scientists, technologists and roboticists are referenced and described. This ongoing work is moreextensive than one would think and is directly applicable to longer term habitation and exploration of the Moon and Mars. Emphasis is also given to the operational aspects of working and living in lunar and Martian caves and lava tubes.

Exam Board: AQA Level: A-level Subject: Sociology First teaching: September 2015 First exam: June 2017 Need more exam practice? Letts will get you through your A-Level exam.

In this book the Groupe des Dombes a widely respected yet unofficial dialogue of Reformed, Lutheran, and Catholic scholars from French-speaking Europe undertakes a comprehensive study of the complex issue of doctrinal authority in the church. This includes the role of Scripture, of confessional texts, of decision-making bodies, and of individual persons entrusted with authority in service to the unity of faith. / While a number of previous ecumenical dialogues have studied the question of authority with a particular focus on the ministry of the Bishop of Rome, the Groupe des Dombes lays out the complex constellation of questions that is at issue in the differing ethos of Protestant and Catholic traditions. Its challenge to the churches reflects the agenda of ecumenical dialogue for decades to come.

With a foreword by Tim Rice, this book will change the way you see the world. Why is it better to buy a lottery ticket on a Friday? Why are showers always too hot or too cold? And what's the connection between a rugby player taking a conversion and a tourist trying to get the best photograph of Nelson's Column? These and many other fascinating questions are answered in this entertaining and highly informative book, which is ideal for anyone wanting to remind themselves – or discover for the first time – that maths is relevant to almost everything we do. Dating, cooking, travelling by car, gambling and even life-saving techniques have links with intriguing mathematical problems, as you will find explained here. Whether you have a PhD in astrophysics or haven't touched a maths problem since your school days, this book will give you a fresh understanding of the world around you.

A student-friendly and engaging resource for the 2016 Edexcel GCSE Geography B specification, this brand new course is written to match the demands of the specification. As well as providing thorough and rigorous coverage of the spec, this book is designed to engage students in their learning and to motivate them to progress.

A groundbreaking introduction to vectors, matrices, and least squares for engineering applications, offering a wealth of practical examples.

THE #1 KINDLE BESTSELLER. 'A beautiful, unconventional, uplifting love story' Paige Toon on One Step Closer To You. Perfect for fans of The Bucket List to Mend a Broken Heart. What do you do if you're 34, single and recovering from being jilted two weeks before your wedding day? This is Gilly Brown's dilemma. While friends are marrying and having children Gilly finds herself alone in London and holding on to her fractured family with their tragic past. At least she has her dog Ruskin and her dog-walking friends. But it's time to meet new people, Gilly gets a Monday to Friday lodger: handsome reality television producer Jack Baker. Gilly falls for Jack's charm and is transported into an exciting social whirlwind of parties, dining out and glamour. Guy, the newest recruit to her dog-walking group, isn't quite so convinced about Jack's intentions. As Guy watches them grow closer, his suspicions of Jack and his feelings for Gilly deepen. Is Jack so perfect after all... and what exactly does he get up to at the weekends?

International Law has transformed and much transfused with other unknown fields in various sciences per se. AI Ethics is one of the emerging fields, where, policy intervention, in line with the idea of multilateralism has emerged merely recently. This emergence is not something pre-decided, but is usually gauged by some countries and some special non-state actors like the UN, for example, and non-state actors, which includes startups, NGOs and civil society actors most of the times. Works such as the Beijing Consensus on AI and Education, 2019, the 2017 Asilomar Conference on Beneficial AI, DARPA's conception of Explainable AI & many more have endorsed a sense of research aptitude and rationalization of the field of AI Ethics in Law, Policy and International Affairs. Our team of research contributors and analysts at the Indian Society of Artificial Intelligence and Law, have therefore at our very best, prepared a Handbook, in two parts, which caters to some important and influential fields of international law, and its synergy with AI Ethics. This handbook, with utmost humility is not some research encyclopedia. It serves to ignite curiosity and make people rethink or think differently about the way we see AI in our lives. It is a researched handbook, which has been edited by Professor Suman Kalani, Chief Research Expert of ISAIL (also the Assistant Professor at the SVKM's Pravin Gandhi College of Law, Mumbai, India), Kshitij Naik, Chief Strategy Advisor of ISAIL, Akash Manwani, Chief Innovation Officer of ISAIL and me. We have tried to give crisp and detailed case studies on various dynamic fields of AI and international governance, which consist in AI & International Affairs, AI & Society, AI & Ecology, AI & Governance & other miscellaneous chapters, such as on Emerging Technologies and Applied Sciences. When you read the book, please do not treat it as some mere answer to all of your questions. Instead, relish the ideas and realities which have been expressed in this work. The chapters reflect some generic notions of international law,

which have been widely accepted worldwide, and at the same time, might be an attempt to compel the readers to maybe come up with a reasonable policy intervention per se. We hope the readers would have a suitable time reading this book per se.

This book provides glimpses into contemporary research in information systems & technology, learning, artificial intelligence (AI), machine learning, and security and how it applies to the real world, but the ideas presented also span the domains of telehealth, computer vision, the role and use of mobile devices, brain–computer interfaces, virtual reality, language and image processing and big data analytics and applications. Great research arises from asking pertinent research questions. This book reveals some of the authors' "beautiful questions" and how they develop the subsequent "what if" and "how" questions, offering readers food for thought and whetting their appetite for further research by the same authors.

This book provides comprehensive coverage of corneal collagen cross-linking (CXL), a major management modality for keratoconus and ectatic corneal disorders. All aspects are covered, including refractive and non-refractive surgery indications, models of application, safety, efficacy, performance, outcome measures, evidence of CXL, complications, contraindications, use in children, and controversies. The discussion reflects the considerable progress that has been made in understanding of the modality since its development in the late 1990s. Detailed attention is paid to new concepts, changing surgical techniques and indications, the latest evidence-based science and research, and the future of CXL. Guidance is also provided on the use of CXL in combination with other modalities, such as LASIK, PRK, intracorneal ring implantation and others. The text is accompanied by numerous high-quality color illustrations. Corneal Collagen Cross Linking will provide the reader with a sound grasp of the technique and its use and will hopefully also serve as a stimulus to further research and advances.

Going beyond current books on privacy and security, Unauthorized Access: The Crisis in Online Privacy and Security proposes specific solutions to public policy issues pertaining to online privacy and security. Requiring no technical or legal expertise, the book explains complicated concepts in clear, straightforward language. The authors—two renowned experts on computer security and law—explore the well-established connection between social norms, privacy, security, and technological structure. This approach is the key to understanding information security and informational privacy, providing a practical framework to address ethical and legal issues. The authors also discuss how rapid technological developments have created novel situations that lack relevant norms and present ways to develop these norms for protecting informational privacy and ensuring sufficient information security. Bridging the gap among computer scientists, economists, lawyers, and public policy makers, this book provides technically and legally sound public policy guidance about online privacy and security. It emphasizes the need to make trade-offs among the complex concerns that arise in the context of online privacy and security.

Part history, part science and part philosophy and spirituality, "Water Is..." combines personal journey with scientific discovery that explores water's many identities and ultimately our own. Written by internationally published author, teacher and limnologist Nina Munteanu.

A unique book providing a tour through the fascinating connections between mathematics and games.

Comprehensive overview of the spectroscopic, mineralogical, and geochemical techniques used in planetary remote sensing.

England's school system performs below its potential and can improve significantly. This white paper outlines action designed to: tackle the weaknesses in the system; strengthen the status of teachers and teaching; reinforce the standards set by the curriculum and qualifications; give schools back the freedom to determine their own development; make schools more accountable to parents, and help them to learn more quickly and systematically from good practice elsewhere; narrow the gap in attainment between rich and poor. The quality of teachers and teaching is the most important factor in determining how well children do. The Government will continue to raise the quality of new entrants to the profession, reform initial teacher training, develop a network of "teaching schools" to lead training and development, and reduce the bureaucratic burden on schools. Teachers will be given more powers to control bad behaviour. The National Curriculum will be reviewed, specifying a tighter model of knowledge of core subjects so that the Curriculum becomes a benchmark against which school can be judged. Schools will be given more freedom and autonomy, the Academies programme extended and parents will be able to set up "Free Schools" to meet parent demand. Accountability for pupil performance is critical, and much more information will be available to aid understanding of a school's performance. School improvement will be the responsibility of schools, not central government. Funding of schools needs to be fairer and more transparent, and there will be a Pupil Premium to target resources on the most deprived pupils.

Everyone Succeeds is the story of Torquay Academy, where head Steve Margetts has employed the Leadership Matters principles to turn round a failing school into one of the most improved in SW England in just three years.

This study, commissioned by the National Aeronautics and Space Administration (NASA), examines the role of robotic exploration missions in assessing the risks to the first human missions to Mars. Only those hazards arising from exposure to environmental, chemical, and biological agents on the planet are assessed. To ensure that it was including all previously identified hazards in its study, the Committee on Precursor Measurements Necessary to Support Human Operations on the Surface of Mars referred to the most recent report from NASA's Mars Exploration Program/ Payload Analysis Group (MEPAG) (Greeley, 2001). The committee concluded that the requirements identified in the present NRC report are indeed the only ones essential for NASA to pursue in order to mitigate potential hazards to the first human missions to Mars.

What is an imaginary number? Can two parallel lines ever meet? How can maths help us predict the future? Charting the development of maths around the world from Babylon to Bletchley Park, this book explores big questions like these and explains how the answers help us understand everything from patterns in nature to artificial intelligence. Written in clear English, The Maths Book is packed with short, pithy explanations that cut through the jargon, step-by-step diagrams that untangle knotty theories, memorable quotes, and witty illustrations that play with our ideas about numbers. This diverse and inclusive account of mathematics will have something for everybody, including the maths behind world economies and espionage. But it also traces the history of maths, from ancient ideas such as magic squares and the abacus to modern cryptography, fractals, and the final proof of Fermat's Last Theorem. Continuing the "Big Ideas" series' trademark combination of authoritative, clear text and bold graphics, The Maths Book uses an innovative visual approach to make the subject accessible to everyone, whether you're an avid student or just curious about maths.

Machine Learning for Planetary Science presents planetary scientists with a way to introduce machine learning into the research workflow as increasingly large nonlinear datasets are acquired from planetary exploration missions. The book explores research that leverages machine learning methods to enhance our scientific understanding of planetary data and serves as a guide for selecting the right methods and tools for solving a variety of everyday problems in planetary science using machine learning. Illustrating ways to employ machine learning in practice with case studies, the book is clearly organized into four parts to provide thorough context and easy navigation. The book covers a range of issues, from data analysis on the ground to data analysis onboard a spacecraft, and from prioritization of novel or

interesting observations to enhanced missions planning. This book is therefore a key resource for planetary scientists working in data analysis, missions planning, and scientific observation. Includes links to a code repository for sharing codes and examples, some of which include executable Jupyter notebook files that can serve as tutorials Presents methods applicable to everyday problems faced by planetary scientists and sufficient for analyzing large datasets Serves as a guide for selecting the right method and tools for applying machine learning to particular analysis problems Utilizes case studies to illustrate how machine learning methods can be employed in practice

In 2011, I began creating online tutorial videos on Youtube, with a vision to share my GCSE expertise in English language and literature. As I write, these videos have been viewed over 10 million times across 214 different nations. My GCSE English Youtube channel has over 60,000 subscribers. To accompany these videos, I have published over 20 revision guide eBooks-one of which you are currently looking at! My guide to the previous GCSEs in English language and literature sat at the top of the Amazon bestseller's list for over 45 weeks and achieved huge acclaim; this book aims to build on those strengths.In this ebook, you'll receive detailed guidance on every question in the AQA GCSE English Language exams. Please note that this ebook is not endorsed by or affiliated to any exam boards; I am simply an experienced teacher using my expertise to help students. However, if you read some of the 100+ reviews for this guide, you will see that it has already helped students, teachers and parents across the UK.As an extra bonus, this ebook contains links to five special video tutorials which are only available to those who purchase this guide. These links appear later in the text. I hope you enjoy the ebook. You should also purchase the accompanying eBook which covers the English Literature exams.

This report analyses how schools in England have interpreted and begun to respond to the government's 'self-improving school-led system' (SISS) policy agenda, an overarching narrative for schools policy since 2010 that encompasses an ensemble of reforms including academies, multi-academy trusts (MATs) and Teaching School Alliances (TSAs). Based on a large-scale, four-year, mixed-methods study, the report asks whether or not the models of co-ordination and school support emerging locally since 2010 represent a genuine basis for an equitable and inclusive 'school-led' system. It explores the factors that support and hinder such developments as well as the implications for schools and school leadership.The analysis draws on governance theory to evaluate the reforms, which are conceived as an attempt to mix and re-balance three overlapping approaches to co-ordinating the school system: hierarchy, markets and networks. This shows that while one popular interpretation of the SISS agenda is that it requires inter-school partnerships to 'self-organize' their own 'school-led' improvement, this is in fact a partial account that underplays the dominant influences of hierarchical and market mechanisms on the thinking and actions of schools and school leaders and the networks they are developing.The report includes important new empirical findings, for example on the impact of MATs of different sizes and on the relationship between Ofsted inspection outcomes and levels of socio-economic stratification between schools. It also combines the perspectives of multiple case study schools across four different localities to provide rich insights into leadership decision-making and agency in the context of local status hierarchies and rapid policy-driven change. As a result, while focusing on changes in England, it provides a unique set of insights into how different governance regimes interact across different local contexts to influence patterns of schooling and school-to-school collaboration - insights that will have relevance for research and practice on school system governance more widely.

Approach your WJEC/Eduqas GCSE 9-1 English Language exam with confidence using this write-in workbook full of annotated exam-style questions, sample answers and exam tips. Step-by-step guidance will help you to improve your exam technique so that your answers are clear, relevant and well-developed. Use the carefully chosen questions to get used to the kind of questions you can expect to see in your exam and the different ways that you should approach them. The easy to understand advice will help you to: - Understand what exam questions are asking you to do in each question - Evaluate, develop and explain your personal responses to extracts - Remember to spend the right amount of time on each question and avoid other common mistakes - Show examiners that you understand key terms and techniques

SERS was discovered in the 1970s and has since grown enormously in breadth, depth, and understanding. One of the major characteristics of SERS is its interdisciplinary nature: it lies at the boundary between physics, chemistry, colloid science, plasmonics, nanotechnology, and biology. By their very nature, it is impossible to find a textbook that will summarize the principles needed for SERS of these rather dissimilar and disconnected topics. Although a basic understanding of these topics is necessary for research projects in SERS with all its many aspects and applications, they are seldom touched upon as a coherent unit during most undergraduate studies in physics or chemistry. This book intends to fill this existing gap in the literature. It provides an overview of the underlying principles of SERS, from the fundamental understanding of the effect to its potential applications. It is aimed primarily at newcomers to the field, graduate students, researchers or scientists, attracted by the many applications of SERS and plasmonics or its basic science. The emphasis is on concepts and background material for SERS, such as Raman spectroscopy, the physics of plasmons, or colloid science, all of them introduced within the context of SERS, and from where the more specialized literature can be followed. Represents one of very few books fully dedicated to the topic of surface-enhanced Raman spectroscopy (SERS) Gives a comprehensive summary of the underlying physical concepts around SERS Provides a detailed analysis of plasmons and plasmonics

To feed a world population that will exceed 9 billion by 2050 requires an estimated 60% increase over current primary agricultural productivity. Closing the common and often large gap between actual and attainable crop yield is critical to achieve this goal. To close yield gaps in both small and large scale cropping systems worldwide we need (1) definitions and techniques to measure and model yield at different levels (actual, attainable, potential) and different scales in space (field, farm, region, global) and time (short and long term); (2) identification of the causes of gaps between yield levels; (3) management options to reduce the gaps where feasible and (4) policies to favour adoption of sustainable gap-closing solutions. The aim of this publication is to critically review the methods for yield gap analysis, hence addressing primarily the first of these four requirements, reporting a wide-ranging and well-referenced analysis of literature on current methods to assess productivity of crops and cropping systems.