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农业与资源环境信息工程专题

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前沿资讯

1．Climate threat to food supply chains creates 'domino effect'（气候对食品供应链的威胁会引起连锁反应）

简介：发表在《Natural Food》期刊上的悉尼大学新研究成果，模拟了气候变化和极端天气事件对澳大利亚食品系统和供应链的广泛影响，确定了潜在的连锁反应，包括工作和收入损失以及营养供应和饮食质量。该论文由理学院和商学院综合可持续性分析小组的 Arunima Malik 博士领导，分析了气候变化对澳大利亚不同部门和地区的影响。研究人员发现，气候变化和极端天气事件对整个社区都有影响，其中农村地区受到的不利影响最大。该研究还发现，飓风、洪水、丛林大火和热浪等气候事件可能会通过限制粮食供应和就业来影响周边地区。由于现代供应链的复杂互联性，这些事件的影响甚至可以波及到在遥远的地区到。作者开发了一个综合建模框架，用于追踪食品供应的减少如何影响非食品部门，例如运输和服务业。

来源：ScienceDaily

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全文链接:http://agri.ckcest.cn/file1/M00/03/3C/CsgkOYdch86AOB5QAACCUkHmghs198.pdf

2．Exploring blockchain technology to transform agrifood systems - Transparency and traceability are key to climate action and inclusive markets（探索区块链技术改造农业食品系统——透明度和可追溯性是气候行动和市场包容性的关键）

简介：To feed more people without exacerbating the climate crisis, we urgently need our agrifood systems to become more efficient, inclusive, resilient and sustainable. One way of achieving such an ambitious objective is to leverage the potential of modern, innovative technology. And with all the technologies that have emerged, blockchain is truly one that holds great promise. Born in 2009 as an application for the virtual currency Bitcoin, blockchain is essentially a shared and decentralized database. However, unlike traditional databases, it uses a digital ledger that is simultaneously duplicated and distributed across a network of nodes on computers or servers. As new data comes in, it is entered into a fresh block. Once the block is filled with data, it is chained onto the previous block and the data within it is locked. There are two key advantages to this distributed ledger technology: Records are immutable, since they are virtually impossible to change or hack; and the decentralized nature of the network means no single person or group controls the data, so fraud is less likely. Such benefits go well beyond the world of virtual currencies. When it comes to producing food for human consumption, feed for livestock or timber for homes, traceability and transparency ensure that we know that such products come from a safe source or that materials are from a sustainable provider, enhancing food safety and making recalls easier. Blockchain can also facilitate trade and provide greater legal certainty to land tenure systems.

来源：SeedQuest

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学术文献

1 .Measuring and evaluating SDG indicators with Big Earth Data（利用地球大数据测量和评估 SDG 指标）

简介：The United Nations 2030 Agenda for Sustainable Development provides an important framework for economic, social, and environmental action. A comprehensive indicator system to aid in the systematic implementation and monitoring of progress toward the Sustainable Development Goals (SDGs) is unfortunately limited in many countries due to lack of data. The availability of a growing amount of multi-source data and rapid advancements in big data methods and infrastructure provide unique opportunities to mitigate these data shortages and develop innovative methodologies for comparatively monitoring SDGs. Big Earth Data, a special class of big data with spatial attributes, holds tremendous potential to facilitate science, technology, and innovation toward implementing SDGs around the world. Several programs and initiatives in China have invested in Big Earth Data infrastructure and capabilities, and have successfully carried out case studies to demonstrate their utility in sustainability science. This paper presents implementations of Big Earth Data in evaluating SDG indicators, including the development of new algorithms, indicator expansion (for SDG 11.4.1) and indicator extension (for SDG 11.3.1), introduction of a biodiversity risk index as a more effective analysis method for SDG 15.5.1, and several new high-quality data products, such as global net ecosystem productivity, high-resolution global mountain green cover index, and endangered species richness. These innovations are used to present a comprehensive analysis of SDGs 2, 6, 11, 13, 14, and 15 from 2010 to 2020 in China utilizing Big Earth Data, concluding that all six SDGs are on schedule to be achieved by 2030.

来源：Science Bulletin

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2 . Problem identification model of agricultural precision management based on smart supply chains: An exploratory study from China（基于智能供应链的农业精准管理问题识别模型——来自中国的探索性研究）

简介：Nowadays, agricultural precision management (APM) has become an important way to transform the agricultural industry and realize the sustainable development of the agricultural supply chain. However, there is no relevant research based on the agricultural supply chain to explore the problems in the process of APM currently. There is also no literature to construct a problem identification model to provide guidance for corporate practice and provide suggestions for the government to issue encouraging policies. In order to fill the gaps, this paper adopts grounded theory method, interviews 24 business managers who carry out APM through a combination of personal in-depth interviews and focus group interviews, uses continuous comparative analysis ideas, and continuously refines and revises theories, and innovatively proposes an identification model of APM based on supply chain. It found that the four main categories of supply chain coordination, production resource support, scientific and technological equipment and structural system construction are the problems that hinder APM. Based on the

problem identification model, this paper puts forward suggestions for the better development of APM from two aspects: corporate practice and government policy.

来源： Journal of Cleaner Production

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全文链接:http://agri.ckcest.cn/file1/M00/03/3C/CsgkOYdcjPSAAT-3AAvcqffGmnc769.pdf

3．From parcel to continental scale – A first European crop type map based on Sentinel-1 and LUCAS Copernicus in-situ observations(从地块到大陆尺度——基于 Sentinel-1 和 LUCAS Copernicus 原位观测的首张欧洲作物类型图)

简介： Detailed parcel-level crop type mapping for the whole European Union (EU) is necessary for the evaluation of agricultural policies. The Copernicus program, and Sentinel-1 (S1) in particular, offers the opportunity to monitor agricultural land at a continental scale and in a timely manner. However, so far the potential of S1 has not been explored at such a scale. Capitalizing on the unique LUCAS 2018 Copernicus in-situ survey, we present the first continental crop type map at 10-m spatial resolution for the EU based on S1A and S1B Synthetic Aperture Radar observations for the year 2018. Random Forest classification algorithms are tuned to detect 19 different crop types. We assess the accuracy of this EU crop map with three approaches. First, the accuracy is assessed with independent LUCAS core in-situ observations over the continent. Second, an accuracy assessment is done specifically for main crop types from farmers declarations from 6 EU member countries or regions totaling >3 M parcels and 8.21 Mha. Finally, the crop areas derived by classification are compared to the subnational (NUTS 2) area statistics reported by Eurostat. The overall accuracy for the map is reported as 80.3% when grouping main crop classes and 76% when considering all 19 crop type classes separately. Highest accuracies are obtained for rape and turnip rape with user and produced accuracies higher than 96%. The correlation between the remotely sensed estimated and Eurostat reported crop area ranges from 0.93 (potatoes) to 0.99 (rape and turnip rape). Finally, we discuss how the framework presented here can underpin the operational delivery of in-season high-resolution based crop mapping.

来源： Remote Sensing of Environment

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