

## 《智慧农业发展战略研究》专题快报

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### 【动态资讯】

#### 1. 中国—世界粮食计划署南南合作知识分享平台上线：推动南南合作数字创新转型

【农民日报】4月15日，中国—世界粮食计划署（WFP）南南合作数字化研讨会暨南南合作知识分享平台上线仪式在北京成功举办。数字技术已经成为经济社会发展的重要驱动力，数字南南合作是广大发展中国家迈向零饥饿目标的有力武器。据介绍，中国—世界粮食计划署南南合作知识分享平台由中国农业农村部与世界粮食计划署农村卓越发展中心共建，中国互联网新闻中心作为网站的技术合作伙伴参与运营。

链接:

<http://agri.ckcest.cn/file1/M00/10/00/Csgk0GJePXWAAQM1ADhUsC4TpKA720.pdf>

#### 2. 重庆铜梁：5G技术进乡村 智慧农业“显身手”

【农民日报】据铜梁区大数据局相关负责人介绍，截至目前，全区已累计建成5G基站1580个，实现城区、农村场镇以及部分村社等重点区域热点覆盖，大力支撑了农村信息化发展。作为2022年重点项目之一，铜梁区今年将再建设100个5G基站，铺设光纤1000公里。通过4G流量分析，按照业务和用户实际需求，这些新增的基站，正在有条件、有需求的行政村加紧建设，加快农村地区的5G网络优质覆盖。5G网络向村里拓展，除了改善农村地区的网络状况，更是让农业生产方式逐渐发生转变。

链接:

<http://agri.ckcest.cn/file1/M00/03/2E/Csgk0Ya07XuAlvunACL5Zc5kmVM079.pdf>

#### 3. 智慧监控“站高望远”赋能耕地保护

【农民日报】耕地是粮食生产的命根子。基于“遍布全国、点多面广、站高望远”的资源禀赋，通过“铁塔+视频终端+人工智能算法”，中国铁塔近年来用科技助力耕地保护和

现代农业产业化发展。守好耕地红线，严保严管是关键。中国铁塔用好铁塔视频监控“高、远、广”智能识别优势，为29个省区建设5826个视频监控点位，通过24小时不间断监管，对违建占地、违规开垦等进行实时告警。在河南新乡，通过6个视频监控点位，自2021年8月以来，已智能监控到23处违建占地、违规施工、违规建设。同步为农业农村部门提供冬小麦种植监控，可远程清晰看到冬小麦的生长情况，实现了终端共享、服务共享。在耕地大市安徽阜阳，中国铁塔在太和县开展“智慧国土”高点监控预警综合服务项目，采用“人防+技防”的监管措施，对施工建设、施工材料、活动板房等违法乱建进行了预警，为治理违法乱建提供了解决方案。助力粮食增产，农田网格化监控来帮忙。中国铁塔利用视频监控、网络通信、物联网感知等技术，协助地方推广农业产业化模式。黑龙江宁安智慧农田是首个基于铁塔站址进行大田网格化监控的项目。宁安市有8镇4乡，约196万亩的农地。根据农地分布现状，当地共设置83个高位监控点，其中对33块高标准农田共享铁塔的电力和传输部署了28套田间定位监测点。基于铁塔站址资源叠加农业大田个性化定制化算法，搭建了大田主要作物如大豆、玉米、水稻的种植规划、产量预估、灾情防范等大数据分析模型，当地农民耕作粮食逐年增产增收。

**链接:**

<http://agri.ckcest.cn/file1/M00/10/00/Csgk0GJePzaALSaAAByeJ63zbdS120.pdf>

#### 4. 从“技术为王”到“全链领航”——解析山东寿光市推动设施蔬菜产业集群向千亿级进发之路

**【农民日报】**百尺竿头再奋进。2018年以来，寿光以创新提升“寿光模式”为根本遵循，推行“全链领航”战略，在持续夯实大棚建造管理、生产运营这一“中端”基础上，重点瞄准产业链“微笑曲线”的两端，在种子选育、种苗推广、功能蔬菜、预制拓展、精深加工、品牌推广等领域全面发力，推动建成结构合理、链条完整的千亿级优势特色产业集群。

**链接:**

<http://agri.ckcest.cn/file1/M00/03/2E/Csgk0Ya07uGAYP-GAfffvbfuGYg589.pdf>

#### 5. 加快生物育种创新（创新谈）

**【中国农业科学院】**应尽快启动实施农业生物育种创新行动，重点解决好生物种业科技基础研究和前沿技术的源头创新，支撑突破性重大品种的培育，确保国家粮食安全和种业安全。加快农业生物育种创新，是贯彻落实党中央决策部署实现高水平科技自立自强的关键举措，是促进种业振兴、实现种源自主可控的根本路径。生物育种是指利用基因工程、细胞工程和胚胎工程等现代生物技术，培育和推广一系列性能优良的动植物新品种的育种新技术和新产业。矮化育种、杂种优势利用等每一次种业技术的重大变革，都

使水稻产量提高10%—15%。当前，现代生命科学和生物育种技术创新加快突破，孕育着新一轮农业科技革命。基因编辑、全基因组选择等生物技术（BT）与大数据、人工智能等现代信息技术（IT）交叉融合，形成以BT+IT为典型特征的高效农业生物育种技术体系，将强力推动精准化、高效化、智能化种业技术革命，驱动现代育种技术快速变革迭代，对全球生物种业格局和农产品供给产生重大影响。

链接:

[http://agri.ckcest.cn/file1/M00/03/2E/Csgk0Ya08O2APKD2AARhp\\_j1t1c253.pdf](http://agri.ckcest.cn/file1/M00/03/2E/Csgk0Ya08O2APKD2AARhp_j1t1c253.pdf)

### 【文献速递】

#### **1. Study on stable carbon isotope fractionation of rape honey from rape flowers (*Brassica napus* L.) to its unifloral ripe honey**

文献源: ScienceDirect,2022-04-19

摘要: A new idea and strategy for honey traceability and identification was provided by studying the carbon isotope fractionation of rape honey and its components in the different ripening process, as well as the fractionation from rape flowers, stamens, nectar to rape honey. The results showed the moisture content of rape honey continued to decrease, and the glucose and fructose content continued to increase during the ripening process. The  $\delta^{13}\text{C}$  of rape honey and its protein were less affected by honey ripeness, while the  $\delta^{13}\text{C}$  of sugars in rape honey were greatly affected by this. At the same time, the fractionation of carbon isotope from rape flowers to honey was significant. The  $\delta^{13}\text{C}$  of rape honey and its protein, disaccharide, fructose, and glucose had a strong correlation, and the  $\delta^{13}\text{C}$  of rape honey and its components were mainly related to rape flowers and its stamens.

链接:

[http://agri.ckcest.cn/file1/M00/03/2E/Csgk0Ya1AaiAeo3FABrMJbR\\_6P0924.pdf](http://agri.ckcest.cn/file1/M00/03/2E/Csgk0Ya1AaiAeo3FABrMJbR_6P0924.pdf)

#### **2. Long term impact of residue management on soil organic carbon stocks and nitrous oxide emissions from European croplands**

文献源: ScienceDirect,2022-04-18

摘要: Application of crop residues to agricultural fields is a significant source of the greenhouse gas nitrous oxide ( $\text{N}_2\text{O}$ ) and an essential factor affecting the soil organic carbon (SOC) balance. Here we present a biogeochemical modelling study assessing the impact of crop residue management on soil C stocks and  $\text{N}_2\text{O}$  fluxes for EU-27 using available information on soils, management and climate and by testing various scenarios of residue

management. Three biogeochemical models, i.e. CERES-EGC, LandscapeDNDC and LandscapeDNDC-MeTrx, were used in an ensemble approach on a grid of  $0.25^{\circ} \times 0.25^{\circ}$  spatial resolution for calculating EU-27 wide inventories of changes in SOC stocks and  $N_2O$  emissions due to residue management for the years 2000-2100 using different climate change projections (RCP4.5 and RCP8.5). Our results show, that climate change poses a threat to cropping systems in Europe, resulting in potential yield declines, increased  $N_2O$  emissions and loss of SOC. This highlights the need for adapting crop management to mitigate climate change impacts, e.g. by improved residue management. For a scenario with 100% residues retention and reduced tillage we calculated that in average SOC stocks may increase over 50-100 years by 1923% under RCP8.5 and RCP4.5. However, complete retention of crop residues also resulted in an increase of soil  $N_2O$  emissions by 1730%, so that climate benefits due to increases in SOC stocks were eventually compensated by increased  $N_2O$  emissions. The long-term  $EF_{N_2O}$  for residue N incorporation was 1.18% and, thus slightly higher as the 1% value used by IPCC. We conclude that residue management can be an important strategy for mitigating climate change impacts on SOC stocks, though it requires as well improvements in N management for  $N_2O$  mitigation.

链接:

<http://agri.ckcest.cn/file1/M00/03/2E/Csgk0Ya1CNCAD7oEABgYhScsSew840.pdf>

### **3. Ecological circular agriculture: A case study evaluating biogas slurry applied to rice in two soils**

文献源: ScienceDirect,2022-04-18

摘要: In the context of carbon peak, neutrality, and circular agricultural economy, the use of renewable resources from agricultural processing for plant cultivation still needs to be explored to clarify material flow and its ecological effects. Paddy-upland rotation is an effective agricultural strategy to improve soil quality. This study evaluated the effects of biogas slurry application against those of chemical fertilisers in these two typical Chinese cropping soils. The application of biogas slurry increased total carbon content in paddy soil by 73.4%, and that in upland soil by 65.8%. Conversely, application of chemical fertiliser reduced total carbon in both soil types. There were significant positive correlations between total carbon and Zn, Cu, and Pb in rice husks grown in paddy soil ( $R^2 = 0.95, 0.996, 0.95$ ;  $p < 0.05$ ). The content of amylose in biogas slurry treatment of paddy soil increased by 35.9%, while that in upland soil decreased by 19.2%. After biogas slurry was applied, the

contents of fulvic acid- and humic acid-like substances in paddy soil average increased by 40.9% and 45.6%, while the contents of protein-like components were enhanced by 46.8% in upland soil. This result was consistent with predictions of microbial community function. Microorganisms in paddy soil generally preferred carbon fixation, while those in upland soil preferred hydrocarbon degradation and chemoheterotrophy. Understanding the changes in soil carbon stock and microbial function after biogas slurry application will contribute to sustainable agricultural development and food security.

链接:

<http://agri.ckcest.cn/file1/M00/10/00/Csgk0GJeVIGAPA4TACJQjVc5fnY043.pdf>

#### 4. 长江流域农业生态经济系统耦合协调关系评价及其差异化分析

文献源: 中国农业资源与区划,2022-04-16

摘要: 长江流域是我国重要农业产业带,考察长江流域农业生态经济系统耦合协调发展水平及其差异化特征,对实现长江流域乃至全国农业农村现代化都具有重要的意义。基于2004—2018年长江流域省级面板数据,分别构建了农业生态经济系统综合评价指标体系,采用CRITIC—熵权组合权重法测算两者的综合发展水平,结合耦合协调度模型和Dagum基尼系数法,对两者耦合协调发展水平及其差异特征进行系统性分析。[结果]结果表明:(1)2004—2018年长江流域农业生态经济系统综合发展水平均呈上升态势,但农业经济系统发展较为滞后,且两者在总体上、区域间、省份间各有差异。(2)长江流域农业生态经济系统具有高度耦合特征,且耦合度呈现波动上升趋势,但不同区域表现有所差别。(3)长江流域农业生态经济系统的协调发展水平整体上呈阶梯式上升,协调等级常年稳定在初级协调状态,且中游相较于上、下游协调发展水平更好,区域内差异更小。(4)长江流域农业生态经济系统耦合协调发展水平总体差异呈现出波动走势,且基尼系数有扩大趋势,超变密度贡献率均值最大,但在考察期内,区域间差异与超变密度轮换构成影响长江流域农业生态经济系统协调发展水平差异的主要因素。

链接:

<http://agri.ckcest.cn/file1/M00/10/00/Csgk0GJeSUOAWZszAAzwe2MP1GY534.pdf>

#### 5. 适宜盐渍土地基的二次抛物线形渠道断面智能优化设计

文献源: 吉林大学学报(地球科学版),2022-04-13

摘要: 新疆维吾尔自治区南疆地区盐渍化程度严重,盐渍土地基的冻胀、盐胀破坏对渠道边坡稳定造成极大危害,同时,为了避免采用迭代计算法进行二次抛物线形渠道断面优化设计存在计算量冗杂、累计误差大及精度低等问题,建立基于人工原子算法的盐渍

土地基抛物线形渠道断面优化设计的数学模型。以二次抛物线形状参数为自变量，已知渠道底坡和糙率条件下，以设计流速和宽深比为约束条件，并根据中小型渠道水力最佳断面与实用经济断面的倍比系数，采用人工原子算法优化二次抛物线形状参数 $a$ 以搜索最优二次抛物线渠道实用经济断面。将该数学模型应用于新疆塔里木灌区小四支渠，验证该模型的真实有效性。人工原子算法与试算法相比，计算速度快，适用于中小渠道的断面优化设计。采用人工原子算法得到的抛物线形优化断面混凝土工程量减少9.24%，土方回填量减少8.54%。结果表明：在盐渍土地基中，采用人工原子算法对抛物线形断面进行优化设计方法合理，满足工程实际要求。

**链接:**

<http://agri.ckcest.cn/file1/M00/10/00/Csgk0GJeTtaANq9HAA21sJwJ3y4393.pdf>

## 6. 大数据时代土壤微生物地理学的研究进展与展望

文献源：生态学报,2022-03-18

摘要：土壤蕴含极为丰富的微生物多样性，它们在物质分解、元素生物地球化学循环、植物生产力和生物健康中扮演着关键角色。理解土壤微生物的生物地理分布格局、形成机制与群落构建规则，有助于预测在全球变化背景下土壤微生物组的功能演变及其对陆地生态系统的调控影响。自21世纪以来，土壤微生物生物地理学在各种大型国际微生物计划的推动下逐步形成了分子生物学技术耦合大数据分析的模式，实现了多种尺度上的关联研究。本文首先阐述了土壤微生物在分布格局和群落构建规则方面的研究进展；接下来重点介绍了分子生物学技术和大数据分析在土壤微生物生物地理研究中的应用；最后对土壤微生物生物地理学未来在微生物分类分辨率、模型验证与构建和功能基因地理学的发展方向进行了展望。

**链接:**

<http://agri.ckcest.cn/file1/M00/03/2E/Csgk0Ya0-seAN2vXAB4XBurwXlk503.pdf>

## 7. 可持续性与数字化：区块链驱动的循环农业研究

文献源：生态经济,2022-03-05

摘要：区块链技术作为一种颠覆性的数字技术，具有去中心化、开放性、共享性、匿名性、可溯源性等特征，它可以完善农产品的食品安全认证、优化农产品的物流体系结构、革新农业组织的分工合作模式，但目前关于区块链应用于循环农业的研究尚不多见。论文研究搜索并梳理了相关文献知识，根据循环农业以及区块链的技术特征，以北京留民营生态农场为案例，提出了一个基于区块链的数字化循环农业框架，详细阐述了分布式账本、共识算法、代币机制、智能合约等区块链核心技术在框架中的应用。该框架将区

区块链的“数字化”赋能与循环农业的“可持续性”内涵相融合，能够解决留民营有机蔬菜以次充好、农药残留、生产流程不规范等问题。最后探讨了研究的不足之处并提出未来研究方向，为进一步深入探析区块链在循环农业中的应用研究提供了参考。

链接:

<http://agri.ckcest.cn/file1/M00/03/2E/Csgk0Ya0-ByAdlGQAByeLusW26A485.pdf>

## **8. Chlorothalonil alters the gut microbiota and reduces the survival of immature honey bees reared in vitro**

文献源: Pest Management Science,2022-01-27

摘要: BACKGROUND: Chlorothalonil is a nonsystemic fungicide, and it is one of the most widely detected pesticides in bee hives. The effect of chlorothalonil on the survival, weight, and gut microbiota of immature *Apis mellifera* L. reared in vitro was studied. RESULTS: Larvae were fed 1, 2, 4, 8, and 16  $\mu$ g/mL chlorothalonil and compared with larvae fed the negative control (diet without any additives), positive control (45 mg/L dimethoate), and solvent control (2% acetone). Compared with the control groups, the survival of the 2, 4, 8, and 16  $\mu$ g/mL chlorothalonil treatments was significantly reduced. The no-observed-adverse-effect concentration of chlorothalonil was 1  $\mu$ g/mL. Chlorothalonil had no significant effect on larval weight. The gut bacterial community composition of newly emerged bees was determined by PacBio 16S rDNA gene sequencing. linear discriminant analysis effect size (LEFSe) analysis showed that Pseudomonadales and Burkholderiales were affected by exposure to chlorothalonil. CONCLUSION: Chlorothalonil reduced the survival of honey bee larvae and altered the gut microbiota of newly emerged bees. The risk of pesticides to honey bees is related to their toxicity and exposure dose.

链接:

<http://agri.ckcest.cn/file1/M00/03/2E/Csgk0Ya1BP6AEU1FAAy6j05Q07c120.pdf>

## **9. Nanomaterials and nanotechnology for the delivery of agrochemicals: strategies towards sustainable agriculture**

文献源: Journal of Nanobiotechnology,2022-01-04

摘要: Nanomaterials (NMs) have received considerable attention in the field of agrochemicals due to their special properties, such as small particle size, surface structure, solubility and chemical composition. The application of NMs and nanotechnology in agrochemicals dramatically overcomes the defects of conventional agrochemicals, including

low bioavailability, easy photolysis, and organic solvent pollution, etc. In this review, we describe advances in the application of NMs in chemical pesticides and fertilizers, which are the two earliest and most researched areas of NMs in agrochemicals. Besides, this article concerns with the new applications of NMs in other agrochemicals, such as biopesticides, nucleic acid pesticides, plant growth regulators (PGRs), and pheromone. We also discuss challenges and the industrialization trend of NMs in the field of agrochemicals. Constructing nano-agrochemical delivery system via NMs and nanotechnology facilitates the improvement of the stability and dispersion of active ingredients, promotes the precise delivery of agrochemicals, reduces residual pollution and decreases labor cost in different application scenarios, which is potential to maintain the sustainability of agricultural systems and improve food security by increasing the efficacy of agricultural inputs.

链接:

<http://agri.ckcest.cn/file1/M00/10/00/Csgk0GJeUciALz5JACnI0ySvEIE326.pdf>

### 【会议论文】

#### 1. Plant Leaf Disease Detection using Image Processing

发布源: IEEE

发布时间: 2022-04-18

摘要: As we all are aware of without the civilization we can't think about Agriculture. India is known as an agricultural country this is only because of the economy of India that is properly targeted by grains yielding. It is the pillar on which the economy of every country depends. Now-a-days we can see that due to the increasing graph of population there is a high demand of food and grains and it is only fulfilled by the agriculture. It is only the sector that is require and puts itself in the topmost position to fulfill the needs of every citizen of the country, so that they can survive and enjoy their life. Agriculture sectors also helps the country to make them more strong in term of relation with other nations. But main point that comes to our mind is that the crop or grain that is shown is healthy, free from chemicals? So to answer that I am writing this research paper because all the foods and grains that we eat is controlled by pesticides and insecticides that harms our body and not good for our health. In this paper I have defined the techniques to detect the diseases in the leaf of the plant by image processing.

链接:

<http://agri.ckcest.cn/file1/M00/10/00/Csgk0GJeQxeAAchaAAWdo7cceI1158.pdf>



## **2. Energy Harvesting Sensors based Internet of Things System for Precision Agriculture**

发布源: IEEE

发布时间: 2022-04-18

摘要: This paper proposes a design of wireless sensor node based on Internet of Things mainly its power unit which is integrated to solar energy for agriculture. The sensor node is developed using NodeMCU with four different sensors namely relative humidity and temperature sensor, soil moisture sensor, soil temperature sensor and luminosity sensor to monitor key parameters related to soil and environment. A power unit of sensor node is designed with Lithium ion batteries and charging of the batteries is maintained by solar panel. The developed node is tested for 24 hours for the battery voltage which proves that the power consumption during daytime is completely maintained while it drops during night.

链接:

<http://agri.ckcest.cn/file1/M00/03/2E/Csgk0Ya08yuALpTvAAWHbj88gas949.pdf>

## **3. AgriStick: An IoT-Enabled Agricultural Appliance to Measure Growth of Jackfruit Using 2-Axis JoyStick**

发布源: IEEE

发布时间: 2022-04-18

摘要: In the field of agriculture, growth monitoring and measurement are two important factors used specifically to evaluate the influence of the environmental conditions on productivity. The change of circumference of parts of plants like their trunks, branches and fruits is one way to monitor plant growth. In this paper, we developed an Internet of Things (IoT)-based growth measurement and monitoring system using a 2-Axis joystick. In the case study, we measured the growth of Jackfruit which is a tropical fruit and widely cultivated in tropical areas like India, Bangladesh, Thailand, Brazil, and Malaysia. The developed appliance is referred to as AgriStick. The IoT appliance utilizes a 16-bit ultra-low power consuming microcontroller. We used RS485 protocol to make our appliance work for long distance range. The sensor was utilized for the purpose of monitoring the growth of horticulture crops as well as natural ecosystem plants.

链接:

<http://agri.ckcest.cn/file1/M00/10/00/Csgk0GJeQdmAOyPpAAaGRCE2gk8124.pdf>

#### **4. Deep Learning and Machine Learning Based Efficient Framework for Image Based Plant Disease Classification and Detection**

发布源: IEEE

发布时间: 2022-04-15

摘要: Without agriculture, human existence would be inconceivable. A large percentage of the world's population relies on agriculture for their daily needs. In addition, it creates a big number of jobs in the area. Using traditional agricultural practices results in lower yields, which is the fault of farmers. Agriculture and allied sectors will continue to be critical to the economy's long-term growth and prosperity. Farming has a slew of challenges, including disease detection and control and crop monitoring and tracking. Farming with intelligence is a realistic option in many situations. Smart agriculture is now possible because to the internet of things and machine learning approaches. Computer vision, image processing, and machine learning techniques are used in the automated leaf disease diagnostic system to analyze photographs of diseased leaves. A farmer can make an educated choice regarding a plant illness thanks to automated disease detection equipment that speeds up the diagnostic process. A farmer had to first send the contaminated leaf to a pathology lab for confirmation of the illness, which was a tedious process. It is the purpose of this paper to propose a framework for the real-time classification of agricultural images. Crop disease pictures categorization and illness prediction are made easier using this system.

链接:

<http://agri.ckcest.cn/file1/M00/10/00/Csgk0GJeRMaAaJK2AAvbnRuHFgY214.pdf>

#### **5. Detecting the Traceability Issues in Supply chain Industries using Blockchain Technology**

发布源: IEEE

发布时间: 2022-04-15

摘要: Today, agriculture remains the most important economic activity in the world. Food care is a major concern for the whole society. For agriculture-based supply chain management, traceability is considered as the major requirement. Traceability helps in providing quality assurance and transparency to the end user. The antiquated traceability system has the complications of centralized systems, non-transparency of information, unpredictable data, and the very easy formation of false data. The World Health Organization (WHO) reports that one out of ten people is affected by having tainted food.

Globalization involving different food production processes and automation pushes the food supply chain into a complicated web. Numerous advancements have been investigated lately to determine food vulnerability and carry productivity to food related issues. One of the expected advances is block chain, which is as of now being effectively executed in monetary areas, for example, bit coin. Block chain can also be used in the food supply chain industries to improve traceability and help in the danger decrease of fakes and different types of unlawful occupation. This paper presents a systematic survey on agrifood supply chain traceability issues using various block chain platforms such as Ethereum and Hyperledger, as well as IOT techniques such as barcodes, RFID, NFC, and QR codes. The performance of several consensus algorithms is also investigated.

链接:

<http://agri.ckcest.cn/file1/M00/03/2E/Csgk0Ya09POAC05dADWX54oAR3g821.pdf>

## **6. Pricing on Use of Cloud Computing and Internet of Things for Optimized Agricultural Practices**

发布源: IEEE

发布时间: 2022-04-14

摘要: This paper endeavours to provide a better future for the agro industry in middle- and low-income countries such as India. The project incorporates various technical domains such as the Internet of Things (IoT) and Cloud - Computing to optimise agricultural practices. The focus here is directed primarily towards farms located in the much-isolated areas far from the reaches of contemporary technology. Only 186 million people utilise the internet in rural India, which has a population of 918 million people according to the 2011 census. As more and more farms and cottage industries are centred in and around rural zones, connectivity and access to the web is virtually absent. The situation above doesn't bode well for farmers and cultivators who hope to obtain the very best out of every yield. The system thus proposed uses a combination of Wireless Sensor Networks, GSM modules (or even fixed landline connections) along with the cloud to effectively retrieve accurate real time data from the fields and transmit it through a medium such as a desktop / mainframe to the cloud where it is stored and analysed using tested algorithms that then provide an optimal guide to the farmer located at the field.

链接:

<http://agri.ckcest.cn/file1/M00/03/2E/Csgk0Ya09keAlNnjAANfemUVn4A645.pdf>

## 7. Use of Nanotechnology Sensors for Sustainable Agriculture

发布源: IEEE

发布时间: 2022-04-13

摘要: Nanotechnology is considered as a leading technology in controlling the agricultural process through monitoring with its miniature dimension. It therefore paves way for essential benefits on enhancing the quality and quantity of foods, reducing the input required for agricultural production, full utilization of soil nutrients, etc. The challenges in these models include availability of natural resources, sensing proper nutrients from the soil for crop-specific production, cultivation of crops. Hence, in this paper, various nano-sensors are utilized to increase the crop productivity by analyzing the nutrients present in the soil. The accuracy of acquisition and detection enables what type of crop can be used for cultivation or irrigation. The real-time nano sensors are deployed for absorbing the elements present in the soil that should suit the productivity of crop. The results of simulation using a deep learning detector based on the input from nano-sensors show an improved rate of productivity than state-of-art models.

链接:

<http://agri.ckcest.cn/file1/M00/10/00/Csgk0GJeRhMAOQAUABh1NallyJg075.pdf>

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