

《农业水土资源监控研究》专题快报

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【动态资讯】

1. 解放劳力 高效节水 延链补链 聚集人才

【农民日报】近年来，新疆沙雅县坚持高效率组织、高起点规划、高质量建设、高水平运作，全力推进高标准农田建设。目前，全县已建成高标准农田124万亩。随着高标准农田建设的持续推进，沙雅县农村的生产经营关系得以重构，缺水问题得到缓解，产业集聚效应初步显现，知识型农民开始增多，乡村呈现出一派欣欣向荣的景象。

链接:

<http://agri.ckcest.cn/file1/M00/0F/EB/Csgk0GGrPlmAZeqYABLg6--mnQg359.pdf>

2. 【农科卫士保“三秋”】科学指导“中原粮仓”救灾复产

【中国农科院】“霜降到立冬，种麦莫放松”，这是一句古老的中国农谚。数百年来，中原大地的农民每年都会在霜降时节为冬小麦的播种而忙碌。而今年，年中的特大暴雨加上9、10月的连续降雨使河南新乡部分农田受到重创，为秋收秋种带来了罕见的困难。按照部院党组的统一部署，从7月开始，中国农业科学院农田灌溉研究所牵头的专家组通过田间课堂、线上指导等方式助力“中原粮仓”救灾复产。10月，到了“三秋”农作的紧要关头，灌溉所牵头，棉花所、作科所、油料所、信息所、资源区划所、农机化所等6所的15位专家不顾风雨背起行囊，一头扎进了受灾农田，连日在一线进行各类技术指导，助力受灾县市科学开展“耕种管收”，尽一切可能降低灾害损失，尽最大努力指导秋粮收获、夏粮播种。

链接:

<http://agri.ckcest.cn/file1/M00/03/19/Csgk0WGrPEeAL5INABFViPTV6is387.pdf>

【文献速递】

1. Monitoring honeybees (*Apis* spp.) (Hymenoptera: Apidae) in climate-smart agriculture: A review

文献源: Applied Entomology and Zoology,2021-12-25

摘要: Climate change is a major threat to agriculture production among small-scale farms worldwide. Climate-smart agriculture (CSA) is one of the technologies and strategies to sustain agriculture growth in a changing climate. Researchers are finding ways to collect big data, which are required to clarify local climate change and its impacts on agriculture to pinpoint the farming strategies for the practice of CSA. The honeybee (Hymenoptera: Apidae) hives around the world which are equipped with digital devices for continuously monitoring the status of colonies for precise beekeeping, accumulate huge amounts of data that can be used to address some questions about CSA. In this paper, we confer an overview of the big beehive data (BBD) and data science and identifies their potential applications to support CSA, as well as several challenges confronted by this approach. Here, we also outline that how can we predict the bee-plant interaction based on monitoring dynamics in honey production using novel and technological approaches. Numerous approaches including big data analytics, IoT, Wireless sensor network (WSN)-based monitoring systems, machine learning, and AI algorithms are being considered as a power source to assist in delivering novel insights and explication to the problems. We put in examples where all these approaches have been employed for monitoring and analyzing BBD. Moreover, we predict their role to aid in apiary management with the perspective of CSA.

链接:

<http://agri.ckcest.cn/file1/M00/0F/EB/Csgk0GGrSAiATkP6AA8Y1GCLqGk500.pdf>

2. Soil carbon and nitrogen stock of the Japanese agricultural land estimated by the national soil monitoring database (2015–2018)

文献源: Soil Science and Plant Nutrition,2021-12-02

摘要: Estimation of the soil organic carbon (SOC) stock based on the monitoring data is important to validate the carbon model estimates and provide the initial values of SOC stock to the model. The Japanese National Greenhouse Gas Inventory Report (NIR) has applied the RothC model since 2015 to report changes in SOC in agricultural land. This study estimated soil carbon and nitrogen stocks and C:N ratio of top 30 cm arable land in Japan using the 2015-2018 database of the national soil monitoring project. Estimates based on the stationary monitoring data from the top 30 cm of the soil layer are the first public release.

We modified categorization of the soil temperature regime and soil-type classification for estimation, expecting to mitigate the underestimation and overestimation of SOC stock in the areas of soil temperature 15-17°C and more than 17°C, respectively, and to optimize the soil classification to 16 fewer types to allow an appropriate estimation even in the current situation of decreasing number of survey sites. Statistical analysis to see the effects of land use and soil temperature on SOC stock, TN stock, and C:N ratio showed that soil types other than Andosols had an inverse temperature-dependent trend for all variables, while Andosols had an unclear trend in soil temperature, supporting existing studies. Also, when Lowland soils (Fluvisols or Anthrosols in the World Reference Base) were surrounded by Andosols, redeposition of volcanic ash could affect the temperature trend in SOC stock for Lowland soils. The distribution map of the SOC stock and C:N ratio across Japan visually showed a high value in the Andosols distribution areas and a temperature-dependent trend at the distribution areas of the other soil types. The total SOC stock estimated in this study was 176 ± 12.8 TgC in paddy field, 100 ± 8.6 TgC in upland field, 25 ± 1.7 TgC in orchard, 78 ± 8.9 TgC in grassland, and 379 ± 17.9 TgC in total, the standard deviations of which were much smaller than those of the mean values for each land use calculated by the simple average method.

链接:

<http://agri.ckcest.cn/file1/M00/03/19/Csgk0WGrRvuAVIGzACrY9bCQlr8695.pdf>

3. 水足迹视角下京津冀县域粮食作物水土资源匹配格局

文献源: 中国农业资源与区划,2021-12-02

摘要: 农业水土资源是粮食生产的决定因素, 探明京津冀粮食生产中水土资源匹配格局特征对区域经济发展有深远的影响。[方法]从水足迹的视角出发, 分析了1980—2018年京津冀县域5种主要粮食作物(小麦、玉米、稻谷、大豆、薯类)的产量、播种面积、水足迹、耕地面积的时空变化, 运用水土匹配系数法及ArcGIS深入研究了1983、1998、2003、2016年水土资源匹配格局, 并进一步剖析区域农业水土匹配对农业生产的影响。[结果] (1) 当前京津冀水土匹配系数区间为[0.02, 1.25], 超出区间范围[0.281, 0.431]; 粮食生产格局与水土匹配系数空间格局均为“冀中南高、北部低”。(2) 研究时段内, 京津冀粮食总产量提高1.14倍, 播种总面积降低19.28%, 粮食单产量显著提高; 灌溉提高粮食单产量, 水土匹配系数与粮食单产量呈正相关。(3) 1980—2019年京津冀五种作物蓝水足迹均值(136.64亿 m^3)是绿水足迹均值(99.60亿 m^3)的1.37倍, 各作物水足迹变化不同, 间接反映地区农业种植结构的改变。(4) 京津冀水足迹总量提高2.45

倍,耕地总量下降20.59%,水土匹配系数变大,农业水土匹配程度差,间接指示研究区域地下水开发程度高。[结论]京津冀县域水土资源匹配存在较大提升空间,应从当地水土资源存在的问题出发,适当调整作物种植结构,关注区域地下水超采等限制农业发展的因素,促进京津冀地区农业水土资源可持续发展。

链接:

<http://agri.ckcest.cn/file1/M00/03/19/Csgk0WGrPbWALxZMACUiHlgC3wg329.pdf>

4. 基于稀疏样点的南方丘陵地区耕地土壤有效磷制图

文献源: 中国生态农业学报(中英文),2021-12-01

摘要: 绘制耕地表层土壤有效磷空间分布图对精准农业管理和土壤环境评估具有重要意义。目前土壤磷数字制图研究大多面向充足土壤样点的平坦地区, 基于稀疏样点的南方丘陵地区耕地土壤有效磷制图效果尚不清楚。本文以典型南方丘陵地区福建省建瓯市为研究对象, 基于96个稀疏土壤实测样点, 利用空间分辨率为10 m的Sentinel-2遥感影像获取的遥感变量, 联合气象和地形变量建立随机森林(Random Forest, RF)模型预测建瓯市耕地表层土壤(0~20 cm)有效磷含量, 并对比5种不同环境变量组合下的RF模型精度。结果表明, 加入遥感变量后, 地形、气象和pH组合的RF模型预测有效磷含量的精度显著提升[决定系数(R²)从0.36提升至0.59, 均方根误差(RMSE)降低20.34%], 联合全部变量(遥感、地形、气象和土壤pH)的RF模型预测精度最佳[R²为0.59, 平均绝对误差(MAE)为19.04 mg·kg⁻¹, RMSE为25.26 mg·kg⁻¹]。遥感变量、气象变量、地形变量和土壤pH分别可以解释土壤有效磷含量的22.87%、30.64%、30.38%和16.11%, 其中年均温、pH、地形湿度指数和高程是影响南方丘陵地区耕地土壤有效磷空间分布的主导因素。因此, 利用遥感、气象、地形和土壤pH组合的RF模型是在样点数量有限的情况下预测南方丘陵地区县市域耕地土壤有效磷含量的有效方法。

链接:

<http://agri.ckcest.cn/file1/M00/0F/EB/Csgk0GGrPqaAF7H9AGeuJVIO3ME945.pdf>

5. 基于SWAT模型的喀斯特流域产流特征对石漠化治理措施的响应

文献源: 水土保持学报,2021-11-30

摘要: 为探讨适合于西南喀斯特地区石漠化治理的有效生物措施,以典型喀斯特流域——打邦河为研究区,以SWAT模型模拟为基本研究手段,以打邦河流域黄果树水文站、高车水文站连续多年实测水文数据作为基础率定资料,设置6种石漠化治理措施情景,分别模拟各治理措施的产流特征,从产流特征探讨不同措施的生态效益。结果表明:(1)率定期(2008—2013年)黄果树水文站R²=0.86,NSE=0.77,高车水文站R²=0.76,NSE=0.63;验证期

(2014—2018年)黄果树水文站 $R^2=0.79$, $NSE=0.57$,高车水文站 $R^2=0.75$, $NSE=0.54$,均符合模型的评价标准,表明SWAT模型在打邦河流域具有较好的适用性;(2)坡度 15° 以上有林地、经济林和牧草地较坡耕地蓄水截流效果较好。坡度 $15^\circ \sim 25^\circ$,以及 25° 以上,蓄水截流效果均表现为经济林>牧草地>有林地;(3)经济林+牧草地措施一方面可以有效缓解打邦河流域工程性缺水的问题,另一方面基于潜在的经济效益,优化调整当地坡耕地种植结构,可实现区域农业可持续发展。结果可为西南喀斯特地区石漠化治理、生态恢复和乡村振兴提供理论参考,对促进喀斯特流域社会经济可持续发展具有一定的参考意义。

链接:

http://agri.ckcest.cn/file1/M00/03/19/Csgk0WGrQEyACf2KACdehd_KyBw617.pdf

6. 基于RUSLE模型的云南省土壤侵蚀和养分流失特征分析

文献源:水土保持学报,2021-11-30

摘要:准确评估区域土壤侵蚀和养分流失空间分布特征,是开展区域水土保持规划和生态治理的基础。基于GIS空间分析技术和RUSLE模型,对云南省土壤侵蚀和养分流失特征进行定量化分析。结果表明:云南省土壤侵蚀面积为 $1\ 835.91 \times 10^4 \text{ hm}^2$,占总面积的48.07%,平均侵蚀模数为 $15.65 \text{ t}/(\text{hm}^2 \cdot \text{a})$,土壤侵蚀以微度侵蚀、轻度侵蚀为主,但极强烈侵蚀、剧烈侵蚀是区域侵蚀产沙的主要来源。滇西南区土壤侵蚀强度较大,而滇西北区土壤侵蚀强度较小。区域土壤侵蚀主要发生在夏季,旱地是区域侵蚀产沙的主要策源地。流失土层厚度集中分布在 $0 \sim 2 \text{ mm/a}$,平均土层流失厚度为 1.19 mm/a 。土壤有机质(SOM)、全氮(TN)、速效钾(AK)、有效磷(AP)的平均流失模数分别为 $820.00, 55.19, 3.32, 0.32 \text{ kg}/(\text{hm}^2 \cdot \text{a})$,4种养分流失量空间分布均存在一定的聚集特征,总体表现为滇西区等西部区域大于东部区域。研究结果可为云南省水土保持规划和水土流失生态环境建设提供科学依据。

链接:

<http://agri.ckcest.cn/file1/M00/0F/EB/Csgk0GGrP4SAUIwzABNFoUaHUno402.pdf>

7. 资本禀赋、技术认知与农户耕地低碳利用意愿

文献源:浙江农业学报,2021-11-30

摘要:耕地低碳利用对于减少农业温室气体排放,促进农业持续健康发展具有积极意义。建立资本禀赋、技术认知的理论分析模型和研究假说,利用湖北省347户农户的调研数据,在测度农户资本禀赋、耕地低碳利用技术认知的基础上,采用Logit模型、中介效应模型、调节效应检验方法,就资本禀赋、技术认知与农户耕地低碳利用意愿的关系进行实证研

究。结果发现,资本禀赋不仅对农户耕地低碳利用意愿在1%水平上有显著的直接正向影响,还会通过技术认知这一中介变量在1%水平上产生显著的间接正向影响,环境素养在农户自我效能认知和耕地低碳利用意愿间发挥正向调节作用。据此,建议从经济资本、社会资本、文化资本3个角度提升农户的资本禀赋;通过多种渠道提升农户对耕地低碳利用的认知水平;提高农户环境素养。

链接:

<http://agri.ckcest.cn/file1/M00/03/19/Csgk0WGrP1uAMeXPABZaHO9uom4142.pdf>

8. Agricultural seasonality, market access, and food security in Sierra Leone

文献源: Food Security,2021-11-26

摘要: Seasonal variations in agriculture is a major contributor to undernutrition in many agrarian economies. While recent studies have highlighted the role of markets in improving nutrition, the relative importance of markets in smoothing food consumption across seasons remains largely unexamined. Using data from Sierra Leone, this paper analyses whether access to local food markets mitigates seasonal fluctuations in household dietary diversity and food security. Our results confirm that agricultural seasonality imposes significant fluctuations on household dietary diversity and food security. Households, especially those in rural areas, are found to experience significant deteriorations in dietary diversity and food security during the lean season. Most importantly, the results also show that households with better market access consume more diverse diets and are more food secure in both lean and non-lean seasons than remoter households. An important policy implication of these results is that market-based interventions aimed at strengthening market access through improved market infrastructure and roads can significantly contribute to year-long food consumption smoothing, improved dietary diversity and overall food and nutrition security.

链接:

<http://agri.ckcest.cn/file1/M00/03/19/Csgk0WGrQZyALCP2ABE18khsslg228.pdf>

9. Accurate Identification of Agricultural Inputs Based on Sensor Monitoring Platform and SSDA-HELM-SOFTMAX Model

文献源: Journal of Sensors,2021-11-24

摘要: The unreliability of traceability information on agricultural inputs has become one of the main factors hindering the development of traceability systems. At present, the major

detection techniques of agricultural inputs were residue chemical detection at the postproduction stage. In this paper, a new detection method based on sensors and artificial intelligence algorithm was proposed in the detection of the commonly agricultural inputs in *Agastache rugosa* cultivation. An agricultural input monitoring platform including software system and hardware circuit was designed and built. A model called stacked sparse denoising autoencoder-hierarchical extreme learning machine-softmax (SSDA-HELM-SOFTMAX) was put forward to achieve accurate and real-time prediction of agricultural input varieties. The experiments showed that the combination of sensors and discriminant model could accurately classify different agricultural inputs. The accuracy of SSDA-HELM-SOFTMAX reached 97.08%, which was 4.08%, 1.78%, and 1.58% higher than a traditional BP neural network, DBN-SOFTMAX, and SAE-SOFTMAX models, respectively. Therefore, the method proposed in this paper was proved to be effective, accurate, and feasible and will provide a new online detection way of agricultural inputs.

链接:

http://agri.ckcest.cn/file1/M00/03/19/Csgk0WGrSUGAU_V7ABCDL1M49_g806.pdf

10. Community-Level Impacts of Climate-Smart Agriculture Interventions on Food Security and Dietary Diversity in Climate-SMART VILLAGES in Myanmar

文献源: Climate,2021-11-21

摘要: Diversification of production to strengthen resilience is a key tenet of climate-smart agriculture (CSA), which can help to address the complex vulnerabilities of agriculture-dependent rural communities. In this study, we investigated the relationship between the promotion of different CSA practices across four climate-smart villages (CSVs) in Myanmar. To determine the impact of the CSA practices on livelihoods and health, survey data were collected from agricultural households (n = 527) over three years. Within the time period studied, the results indicate that some the CSA practices and technologies adopted were significantly associated with changes in household dietary diversity scores (HDDS), but, in the short-term, these were not associated with improvements in the households' food insecurity scores (HFIAS). Based on the survey responses, we examined how pathways of CSA practice adoption tailored to different contexts of Myanmar's four agroecologies could contribute to the observed changes, including possible resulting trade-offs. We highlight that understanding the impacts of CSA adoption on household food security in CSVs will require longer-term monitoring, as most CSA options are medium- to long-cycle

interventions. Our further analysis of knowledge, attitudes and practices (KAPs) amongst the households indicated a poor understanding of the household knowledge, attitudes and practices in relation to nutrition, food choices, food preparation, sanitation and hygiene. Our KAP findings indicate that current nutrition education interventions in the Myanmar CSVs are inadequate and will need further improvement for health and nutrition outcomes from the portfolio of CSA interventions.

链接:

<http://agri.ckcest.cn/file1/M00/0F/EB/Csgk0GGrRVmADXJfABDGEAKCQIA537.pdf>

11. The role of the urban agriculture on food security during armed conflicts in the Gaza Strip

文献源: Acta Agriculturae Scandinavica Section B, Soil and Plant Science,2021-11-07

摘要: In Sweden, drainage and the construction of water infrastructure have influenced agriculture in the last few centuries both positively and negatively. Recently, a trend has set in where wetlands are constructed to retain water, retain and reduce nutrients and to enhance the biodiversity. This study aimed to use remote sensing techniques to study landscape water retention over time. In this pilot study, water retention structures in Gotland (57 ° 28'35.0"N18 ° 29' 13.9"E) and Kalmar Län (56 ° 39'41"N16 ° 21'46"E) for 2000/2001 and 2020 were identified and analyzed using Landsat data. In this study, it was found that the number of water retention structures (>0.8 ha) increased from 44 to 101 for Gotland Län and from 44 to 127 for Kalmar Län. Most water retention structures were <4 ha and were located in mid- and downstream areas. A comparison of the remote sensed results with the Swedish Meteorological and Hydrological Institute (SMHI) database showed a disagreement of the spatial coordinates of the wetlands in the database with the water retention structures. This pilot study has shown that remote sensed data can be used to identify water retention structures, although higher resolution imagery would be highly advisable in these kinds of studies.

链接:

<http://agri.ckcest.cn/file1/M00/0F/EB/Csgk0GGrS4GAOF4XAFb-uuS-ON4681.pdf>

12. 水足迹视阈下河北省农业用水驱动因素分析

文献源: 中国农业资源与区划,2021-10-27

摘要: 河北省地下水超采严重、水资源长期供需不平衡的背景下,探究河北省农业用水

真实消耗情况及其驱动因素，对水资源安全、可持续利用具有重要意义。【方法】基于作物需水量和作物实际用水量测度河北省农业生产蓝水足迹及绿水足迹，利用LMDI模型解析河北省农业用水变化的影响因素及驱动机理。【结果】结果显示，2002—2018年河北省农业水足迹数量呈波动下降趋势，技术效应、种植规模效应和节水效应对河北省农业水足迹变化呈增量效应，其中技术效应对水足迹数量变化的正向驱动贡献值最大，这说明农业技术应用、规模效应带动和节水成效保障加快了河北省农业节约用水进程；管理效应和种植结构效应对河北省农业水足迹数量变化呈减量效应，这说明水利化程度、农业种植结构给河北省农业节水带来一定程度的压力。【结论】河北省水资源优化配置和高效利用，应重点强化农业节水技术、节水管理和结构调整。推广高效节水灌溉技术，推进水肥一体化建设；加大节水政策的宣传和培训力度，提高设施维护保持能力；优化各地区种植结构，持续推进“一季休耕，一季雨养”的种植模式，提升水资源和种植结构的匹配度，从而减轻河北省水资源短缺压力。

链接:

<http://agri.ckcest.cn/file1/M00/0F/EB/Csgk0GGrQG6ACItAABERfUUoOS4018.pdf>

【会议论文】

1. Digital sustainability in smart agriculture

发布源: IEEE

发布时间: 2021-12-03

摘要: With reference to sustainable digitalisation in smart agriculture (SmA), available academic literature does not properly clarify whether digitalisation applied at farming is sustainable economically, environmentally, and ethically - in the long period - and whether it is not. The necessity to develop this research lays its basis on the fact that, until now, sustainability researchers, digital scientists and agricultural experts have apparently been studying it in separate tanks with different meanings of SmA sustainability. In this paper, the authors aim at addressing this necessity: the study analyses the relationship between digitalization and sustainability, applied to smart agriculture domain. For this purpose, a framework is proposed to evaluate the digital impact of ICT solution considering both components, i.e., hardware (agricultural machine and related ICT tools and devices) and software (data and information systems). Taking into consideration the hardware, an interesting role to lowering the digital impact is played by retrofitting solutions. Furthermore, a responsible and sober design of info logical-based information systems is fundamental to avoid unnecessary added impacts. The authors' ambition is to propose a general framework where some accountability could be assigned to specific software or

digital strategies, in a SmA life cycle view. From such a standpoint a more integrative and sustainable perspective of digitalisation effects can be foreseen in the agricultural sector.

链接:

<http://agri.ckcest.cn/file1/M00/03/19/Csgk0WGrUPmAaAiTABRIQp4LphI332.pdf>

2. An IoT-based Smart Agriculture System with Locust Prevention and Data Prediction

发布源: IEEE

发布时间: 2021-12-03

摘要: Locust and grasshopper infestation have a long history of affecting crops and human lives. From ancient Egypt to the Bronze age, everywhere, we have seen the manifestation of locust outbreaks and how humans have fought against it for their survival generations after generations. The latest locust eruption began in June 2019 and has continued through 2020. It has been the worst one in the last 70 years in Middle Africa, Middle East, South Asia, and South America. Countries are taking precautions to be safe from this outbreak because, after this corona pandemic, no nation is willing to face another economic pandemic. In advances of facing the consequences of the locust swarms, we need to find an effective and smart solution. In this paper, we have come up with the idea of monitoring important agricultural factors such as soil moisture, temperature, and humidity using sensors to provide real-time information to the farmers about imminent locust infestation to their mobile. Also, to ease their work, our proposed system will provide water and pesticides automatically to the fields by using Raspberry Pi and Node MCU. Our proposed system will generate ultraviolet light and loud noise to kill the insects in case of a locust outbreak. As locust's habitats are closely related to different agricultural factors, linear regression, logistic regression, and support vector regression, machine learning algorithms have been implemented to predict the temperature and humidity so that the farmers can anticipate these factors well ahead of time and plan accordingly. Overall a next-generation solution to fight the locusts has been implemented in this paper.

链接:

<http://agri.ckcest.cn/file1/M00/0F/EB/Csgk0GGrT4eAVoROAAjOStHg6cg062.pdf>

3. Utilization of IoT: Automated Seed Plantation based Smart Agriculture

发布源: IEEE

发布时间: 2021-11-30

摘要： Agriculture plays an indispensable role in developing one nation, and water is the primary resource for agriculture. So, using IoT, properly utilizing adequate water in the irrigation process is possible through our smart agri-bot (bot specifically used in smart-agriculture). The soil moisture sensor is used to get moisture data, and as per the microcontroller programming, it automatically ON/OFF the motor of a water pump. Agri-bot is controlled from anywhere as it is connected through the cloud. The bot runs for a specified time, then plants the seeds and covers the field area. The soil moisture status is identified and displayed on board. The Arduino UNO will gather and handle the information got from the sensors. When a limited moisture level of the soil is reached, the water will supply for proper seed plantation. This research is dedicated to farmers, and nursery experts as the utilization of automated smart seed planters replace the conventional techniques for the irrigation process and make a revolutionary change.

链接:

<http://agri.ckcest.cn/file1/M00/03/19/Csgk0WGrUgSAcNS3AATrg-QQxSk545.pdf>

4. A Novel Approach towards using Internet-of-Things in Smart Agriculture Monitoring System

发布源: IEEE

发布时间: 2021-11-30

摘要： With the introduction of the Internet-of-Things (IoT) in the field of agriculture, the concept of agribusiness has witnessed a surge in the production of high-quality crops, better yearly yield, and reduction in manual labor. This proposed technique is low-cost and easy to implement, which provides farmers with a smart field monitoring system with the aid of a mobile application and also provides a solution to tackle unsolicited climatic conditions without human intervention. Prediction of temperature, humidity, and rain for the next day is also a key feature of the system. In our proposed system, we have used a Node Micro Controller Unit, a Wi-Fi microchip for connectivity, various sensors for monitoring, various actuators for taking suitable actions, and an android application for displaying real-time data. The cloud used for storing real-time data is Firebase. The proposed technique will reduce human efforts to a great extent compared to the traditional way of farming. This concept can be implemented on large farmlands as well as polyhouses. This research proposes a prototype for a smart agriculture management system that would replace the time-consuming traditional farming approach with advanced technology that would not

only assist in monitoring but also automate the essential operations without affecting crop quality and production.

链接:

<http://agri.ckcest.cn/file1/M00/03/19/Csgk0WGrTRyAHxlzAAawMd1al60548.pdf>

5. The Agricultural Greenhouse Management Platform based on IoT and SSM Architecture

发布源: IEEE

发布时间: 2021-11-25

摘要: This paper introduces the agricultural greenhouse management platform, a WEB-based system constructed from the SSM architecture. The platform integrates big data technologies with IoT and can be used to promote the informationization and intelligentization of greenhouses and farms. Our system provides many functions such as real-time monitoring of crop environmental parameters, real-time prompt of greenhouse warning information, data analysis and download, crop information management, traceability information management, employee information management, etc. We employ HTML5, CSS, AJAX, Express, Nunjucks, Highcharts and other front-end development technologies to design the web pages, and adopt the SSM three-tier architecture to develop the back-end business processing modules. Our platform has been tested in some local farms and help them improve the management efficiency of greenhouses and farms.

链接:

<http://agri.ckcest.cn/file1/M00/0F/EB/Csgk0GGrUSeAHX3tAApumAicQ64472.pdf>

6. Fuzzy cognitive modeling of agricultural land productivity in the context of food security

发布源: IOP Conference Series: Earth and Environmental Science

发布时间: 2020-11-19

摘要: The article deals with the problems of fuzzy cognitive modeling and evaluation of the productivity of reclaimed soils, taking into account the combination of natural-climatic, soil and environmental factors. To construct a fuzzy model, the parameters to be modeled were the coefficient of bioclimatic productivity with a range of variation of 0.5-1.5, and the yield of grain crops, which varied within 10...45 dt/ha for different natural and climatic zones. The theoretical basis for the development of a model of land productivity is the theory of fuzzy inference based on the fuzzy-multiple approach. The main stages of fuzzy modeling using the Mamdani algorithm in interactive mode are presented. An algorithmic representation of

the dependence of the integral indicator of the productivity of agricultural land on the value of the yield of grain crops, and the coefficient of bioclimatic productivity is obtained. The constructed fuzzy model allows to obtain estimates of the generalized indicator of agricultural land productivity based on the yield values for the range of values of the bioclimatic coefficient. The constructed model can be used as a part of a system for predicting the level of food security.

链接:

<http://agri.ckcest.cn/file1/M00/0F/EB/Csgk0GGrQ0CAD0qXAAuN0NF4Xsk239.pdf>

【相关专利】

1. 基于SAR数据的水田撂荒地识别方法

发布源: 中国专利

发布时间: 2021-11-12

摘要: 本发明提供一种基于SAR数据的水田撂荒地识别方法,基于SAR数据的水田撂荒地识别方法包括: S101: 采集多时相SAR数据,并对多时相SAR数据进行预处理获取后向散射系数; S102: 根据后向散射系数获取多时相SAR数据中水田样本的后向散射特征; S103: 根据后向散射特征选取多时相SAR数据中的水田的训练样本,基于训练样本构建水田撂荒地识别模型,通过水田撂荒地识别模型对多时相SAR数据进行撂荒水田和非撂荒水田识别。本发明耗时短、效率高,消耗的人力物力成本低,且不容易出现错漏,从而能够及时、准确获取撂荒信息,便于及时根据撂荒信息对水田进行保护,提高了保护效果。

链接:

<http://agri.ckcest.cn/file1/M00/0F/EB/Csgk0GGrUoaADJXSAAmOQcvcsq4381.pdf>