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《农业水土资源监控研究》专题快报

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【动态资讯】

1．内蒙古超额完成黑土地保护性耕作国家任务

【农民日报】记者日前从内蒙古农牧厅获悉，截至5月24日，全区黑土地保护性耕作实施面积达到1440.4万亩，已完成国家下达的1350万亩全年任务，超额完成90.4万亩。全区投入免耕播种机8469台，共有5511个实施主体参与保护性耕作作业。今年，内蒙古按照"稳步扩面、质量为先"原则，主推秸秆全量覆盖免少耕播种、秸秆部分覆盖免少耕播种和秸秆少量覆盖免少耕播种3种技术模式，实行差异化补助，做到高质多补。为推动黑土地保护性耕作规范实施，内蒙古注重全过程监管，紧扣春播关键农时节点，强化机具有效供给，充分运用智能监测终端，实现保护性耕作地块监测全覆盖，有力保证了实施质量。据了解，黑土地保护性耕作行动自2020年起在内蒙古启动实施，围绕落实保护性耕作"多覆盖、少动土"的核心技术要求，在东部四盟市34个旗县推广应用保护性耕作技术，实施面积持续扩大。2020年和2021年分别完成黑土地保护性耕作面积758.9万亩和1116.2万亩，为粮食稳产丰产和黑土地保护利用奠定坚实基础。

链接:

http://agri.ckcest.cn/file1/M00/03/33/Csgk0YbwdByABK04ADbQF5ZTK-s707.pdf

2．内蒙古五原县：加强耕地健康监测 守住农民"田饭碗"

【中国农网】初夏，河套小麦正值生长期，内蒙古自治区巴彦淖尔市五原县新公中镇永联村七组的小麦种植基地远远望去成片青绿，无限生机。全顺农民专业合作社的理事长郝存林一边清除着麦田中的杂草，一边查看麦苗长势。他向记者介绍说，几年前这块儿地还是村里撂荒的盐碱地，400多亩土地荒废无人耕种，一直是周边农户的心病。2020年，五原县自然资源局积极争取上级资金进行土地综合整治，将农村散落、闲置、低效的用地经过科学规划整治后建成连片的高标准农田，这让新公中镇永联村七组的闲散土

地被重新修复"唤醒"，并引入合作社进行连片种植，昔日撂荒的土地变为致富田，种植小麦每亩可增收250元。

链接:

http://agri.ckcest.cn/file1/M00/10/05/Csgk0GKZxjOAcjKpAAkTnm6lVhk363.pdf

3．新疆麦盖提县：立足高标准农田打造"节水丰产"新样板

【中国农网】今年以来，新疆麦盖提县积极落实"藏粮于技，藏粮于地"战略，立足高标准农田，小面积试验种植小麦浅埋滴灌宽幅匀播技术，充分发掘农田节水潜力，增强农民节水意识，助力农业节水转型升级。当前，小麦生长已进入后期管理阶段，田间去杂工作是保障种源纯度的一项关键措施。在麦盖提县希依提墩乡东风村滴灌小麦试验田里，村民巩建林正在和技术人员一起对小麦进行除杂。放眼望去，田地里的小麦茎秆粗壮、麦穗硕大、籽粒渐丰，微风过处麦浪滚滚，滴灌小麦的种植方式也让巩建林赞不绝口。

链接:

http://agri.ckcest.cn/file1/M00/03/33/Csgk0YbwdkmADYydAAiuLicQiQk661.pdf

4．甘肃成县：唤醒撂荒地 播种新希望

【中国农网】仲夏时节，在甘肃省成县小川镇撂荒地整治现场，镇村各级干部驻守田间地头，挖掘机忙着挖填泥土，旋耕机跟在后面来回翻耕，这么一来一回，被野草覆盖的撂荒地随即变得平整松软。随后，一群扛着锄头等农具的村民开始忙碌起来，平地、起垄、锄草、拉线……机械的轰鸣声在山间回荡，一幅幅忙碌的农耕画卷徐徐展开。近年来，成县深入贯彻落实习近平总书记关于"粮食安全工作"重要批示指示精神，把开展"撂荒地"整治作为粮食生产安全和耕地保护的重要抓手，严格按照省、市撂荒地专项整治工作部署要求，通过强化组织领导、宣传动员、摸底核实、部门协作等措施，扎实推进全县撂荒地整治工作。

链接:

http://agri.ckcest.cn/file1/M00/10/05/Csgk0GKZw9yAZ9CRAA3ri--sNvM596.pdf

5．奋力书写黑土地高质量发展新答卷——沿着总书记的足迹之黑龙江篇

【农民日报】这里有中国粮仓，这里有大国重器，这里有莽莽林海……这里是中国"北大门"黑龙江。党的十八大以来，习近平总书记两次深入龙江大地考察调研，为黑龙江全面振兴全方位振兴擘画蓝图。牢记习近平总书记嘱托，黑龙江奋力奔跑，攻坚克难，抓机遇、迎挑战，塑造龙江新优势、展现龙江新形象。

【文献速递】

1．Proximal sensor data fusion for tropical soil property prediction: Soil fertility properties

文献源：ScienceDirect,2022-06-04

摘要：Proximal sensors have proven capable of predicting multiple soil properties under different conditions. However, doubts remain about which sensor is preferable for delivering optimal prediction models and which preprocessing methods produce the most accurate results. Portable X-ray fluorescence (pXRF) spectrometry and visible near-infrared (Vis-NIR) diffuse reflectance spectroscopy have been widely used, while the NixProTM color sensor has been explored more recently. This study evaluated the use of pXRF, Vis-NIR, and NixProTM data to predict soil organic matter content (SOM), pH, base saturation (BS), the sum of bases (SB), cation exchange capacity (CEC) at pH = 7 and effective CEC (eCEC), via each sensor in isolation, and via combined sensors data. Moreover, variables interfering in the prediction models' accuracy (data preprocessing methods, soil horizon, soil class, parent material) were used as auxiliary variables. 604 soil samples were collected in Brazil, encompassing ten soil orders and 19 parent materials. Numerical and categorical prediction models (7,980) were created for six soil properties using a random forest algorithm, totaling 7980 models, delivering almost 24,000 results, including coefficient of determination (R2), root mean square error (RMSE), mean absolute error (MAE), residual prediction deviation (RPD) for validation of numerical predictions, and overall accuracy and kappa coefficient for categorical predictions. Although the combination of sensors provided most of the best predictions, pXRF in isolation achieved accuracies close to the three sensors combined. NixProTM offered superior contributions to SOM and CEC predictions, but pXRF and Vis-NIR were responsible for the best results of most studied variables. On average, by adding pXRF to Vis-NIR data, predictive accuracy improved 32%; while adding Vis-NIR to pXRF data increased accuracy by c. a. 6%. Soil-order-specific models improved predictions for Ultisols compared to general models (without soil order distinction), reaching R2 > 0.90. Soil parent material and horizon did not improve models significantly. Categorical predictions improved the accuracy for some properties, reaching an overall accuracy of 100% and kappa index of 1.0 for pH in A horizons of Ultisols via pXRF + Vis-NIR data. Proximal sensor data with no auxiliary variables provided almost all the best results. The fusion of proximal sensors can provide better predictions, but pXRF alone can deliver satisfactory results in most cases for

the six soil properties.

链接:

http://agri.ckcest.cn/file1/M00/03/33/Csgk0YbxtMeAJW7kAB93IgYJ0W8125.pdf

2．Strategies for agricultural production management based on land, water and carbon footprints on the Qinghai-Tibet Plateau

文献源：ScienceDirect,2022-06-04

摘要：Agricultural production consumes land and water resources, and contributes to greenhouse gas emissions. Optimizing agricultural management to reduce environmental impacts is essential for regional ecological security. An evaluation framework was applied to assess the greenhouse gas emissions, water utilization, and land use of agricultural production in a typical agricultural region of the Huangshui River Basin on the Qinghai-Tibet Plateau, using footprint analysis. The results showed that agricultural production released 1.73×109 kg carbon equivalent (CO2-eq), and used 8.39×108 m^3 of water and 2.96×105 ha of land. For the carbon footprint, agricultural material inputs (such as electricity, machinery, diesel, and nitrogen fertilizer) were the largest emission sources. For the water footprint, the blue water footprint was larger than the green water footprint. In addition, suitable management options were explored by establishing six scenarios according to the key factors influencing greenhouse gas emissions and water consumption. For technical strategy management options, using cleaner electricity in irrigation can reduce greenhouse gas emissions by 25.53%. Comprehensive strategies, including fertilizer application optimization and technical strategy management, proved to be more effective and reduced greenhouse gas emissions by 32.41%. The results of this study help to determine optimal agricultural management options for achieving both food security and environmental sustainability in agricultural areas on the Qinghai-Tibet Plateau.

链接:

http://agri.ckcest.cn/file1/M00/03/33/Csgk0Ybxsn2AGc4hAC28SqaIHgE968.pdf

3．The effect of soil organic matter on long-term availability of phosphorus in soil: Evaluation in a biological P mining experiment

文献源：ScienceDirect ,2022-06-03

摘要：The plant uptake of legacy phosphorus (P) from over-fertilised agricultural soils could offer a solution to decrease dependency on finite mineral P resources. This study evaluated

the long-term availability of legacy P in soils with an accelerated biological mining assay, thereby testing to what extent this availability is affected by soil organic carbon (SOC). A 15-month-long pot trial was set-up, in which 25 soils with 1.224% SOC were mined for P by continuous cropping and harvesting of ryegrass (Lolium perenne) in a plant growth cabinet. The cumulative uptake of P was, on average, 19% of the P associated with poorly crystalline iron (Fe) and aluminium (Al) (oxy)hydroxides (oxalate-extractable P; Pox). On average, half of this P could be taken up at rates fast enough to maintain crop production at > 90% of its potential. This P taken up before a 10% reduction in yield occurred, termed the critical cumulative P uptake (CCP), strikingly matched with the isotopically exchangeable P or "E value" of a soil (median CCP/E24h = 0.81), whereas it was markedly underestimated by Olsen P (median CCP/POlsen = 1.51). The fractions of plant-available Pox increased at increasing ratios of either P or SOC to the sum of Feox and Alox, suggesting that enhanced SOC contents reduce ageing of P by preventing its diffusion into micropores. That effect of SOC on P availability was more pronounced in soils with a low initial P saturation status. The comparison of the results from biological mining with available soil P pools determined in a (sterile) P desorption experiment could not confirm a significant contribution of organic P to plant P supply. Based on the set of soils in our study, our findings suggest that legacy P in well-fertilised agricultural soils could act as a sufficient P source for plants for several years to decades, and that this long-term availability is positively affected by SOC as long as the soil is not saturated with P.

链接:

http://agri.ckcest.cn/file1/M00/03/33/Csgk0YbxthKANs55ABIS8rnrPAI609.pdf

4．Multivariate Assimilation of Satellite-based Leaf Area Index and Ground-based River Streamflow for Hydrological Modelling of Irrigated Watersheds using SWAT+

文献源：ScienceDirect,2022-06-03

摘 要 ： Vegetation dynamics have different effects on the terrestrial water cycle and therefore play an important role in catchment-scale biophysical and hydrological modeling. Meanwhile, validation of hydrological models of irrigated watersheds concerning vegetation dynamics has rarely been studied. In this study, we propose a combinatorial approach for modelling irrigated watersheds; at first, based on Sentinel-2 (S2), we provide crop/land-use mapping; then we retrieve S2-based leaf area index (LAI) through the neural network algorithm and the PROSAIL model; finally, we employ sequential particle filter (PF)

technique to explore the benefits of jointly assimilating high-resolution S2-LAI as well as in-situ river discharge observations for improving the predictive accuracy of SWAT+ model. Moreover, we explain how SWAT+ source code must be modified to implement the assimilation procedure. The developed methodology is applied to an irrigated watershed in Iran; we provide 66 raster LAI maps with a spatial resolution of 20 meters for the study area related to January to December of 2019 as well as crop/land-use mapping of 2019 with a spatial resolution of 10 meters. Results show that improvements in the hydrological simulation of LAI, evapotranspiration, and river discharge are achieved when we apply multivariate assimilation of S2-LAI and streamflow observations, compared to univariate assimilation scenarios. Results also reveal that LAI assimilation has a significant influence on the estimation of irrigation volume and timing.

链接:

http://agri.ckcest.cn/file1/M00/10/05/Csgk0GKbBK6AJHIoAGrVqe9foQ4797.pdf

5．Land use impacts on weathering, soil properties, and carbon storage in wet Andosols, Indonesia

文献源：ScienceDirect,2022-06-03

摘要：We investigated changes in geochemical soil properties in response to deposition age and land use management over 30　50 years on tropical volcanic soils. Our purpose was to find out how weathering stage and land use interactively affect soil properties and organic carbon, and to check if phenoforms (management-related soil subtypes) exist within the genoforms (genetic soil types). Soil samples were taken at land uses that have been converted (pine forest and agricultural land) and a natural forest as the original land use. The results showed that pine forest soil displayed more intense weathering as indicated by higher values of three weathering indices. Intensive agricultural practices also improved soil chemical properties such as pH, exchangeable base cations, base saturation, and organic carbon stock leading to WRB-qualifier of "eutric" in cultivated soils, whereas the average of bulk density was relatively similar between forests and cultivated soils. Positive correlations were found between amorphous materials and Alo, specific surface area, and micropore volume. Correlations between the content of short-range order Al (hydr-) oxides (indicated by Alo) and organic carbon were found in pine forest and agricultural soils, particularly in subsoils. Our results clearly indicate the increase of base cations retention due to less acidification and an increase of organic carbon stock under agricultural land use, likely due

to stabilization with non-crystalline materials.

链接:

6．覆砂和灌水量对退耕压砂地生态枣林土壤水热及枣果产量的影响

文献源：农业资源与环境学报,2022-06-02

摘要：为探明覆砂和灌水量对退耕压砂地生态枣林土壤水热及产量的影响，在宁夏中部干旱带开展大田试验，通过设置2种覆盖方式 [覆砂（M）、裸土（N）]和3个灌水量 [低水：180 mm（W1）、中水：210 mm（W2）、高水：240 mm（W3）]，研究覆砂和灌水量对土壤温度、土壤贮水量以及枣果产量和水分利用效率的影响。结果表明：与裸土相比，覆砂使0～10 cm土壤温度提高0.8～3.1 ℃。覆砂后土壤升温时段（10:00—14:00）明显滞后于裸土（8:00—14:00），升温速度比裸土处理快0.4 ℃·h^{-1}。覆盖方式及灌水量对枣树全生育期0～80 cm土壤贮水量影响显著（$P<0.05$），覆砂处理较裸土处理平均提高10.97%，且在土壤含水率较低的萌芽展叶期增幅最高，达14.54%。覆砂条件下枣树生长指标、产量和水分利用效率均高于裸土，不同灌水量的产量从高到低依次为W3>W2>W1，分别较裸土处理增加5.98%、10.54%、26.80%，其中MW2处理水分利用效率最高，为1.55 kg·m^{-3}。综上，MW2处理（覆砂、中水210 mm）可作为宁夏中部干旱带退耕压砂地生态枣林适宜的种植模式。

链接:

7．基于土地利用变化的山东省生境质量时空演变特征

文献源：土壤通报,2022-06-02

摘要：厘清近20年山东省生境质量演变特征，明确土地利用变化对生境质量的影响。运用InVEST模型、GIS空间分析方法分析了2000～2018年山东省生境质量的时空演变特征。研究表明：（1）2000～2018年山东省生境质量整体处于中级水平且空间差异显著，总体呈现中东部高、西部低的空间格局；较低及以下等级生境质量区趋于沿湖、沿海地区及城市市区集中分布，较高及以上等级生境质量区呈现山地、丘陵集聚特征。（2）生境质量指数从0.558下降到0.538，生境质量级差化特征明显，生境质量提升区趋于济南、淄博、潍坊、青岛、临沂等城市边缘区集中分布，生境质量退化区集聚于滨州、东营、潍坊市沿海地区。山东省生境质量时空变化受土地利用变化影响显著，生境质量提升区主要发生在耕地向林地、草地转化以及未利用地向林地、水域、草地转化地区。

链接:

8．不同改良材料对苏打盐碱化耕地甜菜叶片光合特性、干物质积累和分配的影响

文献源：生态学杂志,2022-06-02

摘要：针对苏打盐碱化耕地作物生长受抑制、产量低的生产现状，选取应用较广泛的3种改良材料——有机硅肥（SF）、腐植酸肥（HF）和微生物菌肥（MF），以不施用改良材料（CK）为对照，探讨不同改良材料对甜菜光合特性、干物质积累和分配的影响，以期筛选出适宜内蒙古西辽河平原区苏打盐碱化耕地的改良材料。结果表明：3种改良材料不同程度改善苏打盐碱化耕地甜菜光合特性。与对照相比，有机硅肥在全生育时期表现出显著调控效果，腐植酸肥在叶丛快速生长期后表现显著，微生物菌肥则在生育前期表现显著，有机硅肥调控效果显著优于腐植酸肥和微生物菌肥；与CK相比，处理SF净光合速率(Pn)、胞间CO_2浓度(Ci)、蒸腾速率(Tr)、气孔导度(Gs)和叶片SPAD值分别提高10.32%～21.77%、9.08%～19.62%、23.14%～43.35%、17.44%～40.93%和23.15%～28.87%；处理HF分别提高5.63%～12.33%、2.37%～13.60%、4.22%～31.01%、14.65%～32.79%和7.93%～20.06%；处理MF分别提高3.82%～10.36%、4.51%～10.14%、1.46%～26.54%、6.72%～20.45%和5.54%～18.18%。3种改良材料通过对光合特性的调控，促进甜菜单株干物质积累，以有机硅肥效果优于腐植酸肥和微生物菌肥；与CK相比，处理SF、MF和HF甜菜单株干物质积累量全生育时期分别提高12.20%～58.06%、3.15%～13.06%和5.91%～20.96%。与对照相比，仅有机硅肥具有调节干物质在不同器官分配的显著效果，叶丛快速生长期促进干物质从叶片向叶柄转运，块根及糖分增长期后促进干物质由叶片、叶柄向块根转运；与CK相比，叶丛快速生长期至收获期，处理SF叶片干物质比例降低4.01%～17.43%、叶柄干物质比例降低7.40%～15.87%、块根干物质比例提高3.34%～5.01%，块根及糖分增长期后甜菜根冠比显著提高，提高幅度10.88%～23.34%。甜菜叶片光合特性指标、不同器官干物质分配比例与甜菜产量和含糖率之间均存在着显著（P<0.05）或极显著（P<0.01）相关关系，改良材料的施用可以通过调节光合特性、改善干物质积累和分配实现甜菜产质量的提升，其中以有机硅肥表现最优。

链接:

9．Analysis of the regional differences in agricultural water poverty in China: Based on a new agricultural water poverty index

文献源：ScienceDirect,2022-05-30

摘要：China's agricultural water resource utilization contradiction is prominent, and there

are obvious differences in the distribution and utilization of water resources among regions. The theory of agricultural water poverty is of great significance to promote the efficient utilization of agricultural water resources and alleviate the contradiction of agricultural water use. However, the definition of the existing agricultural water poverty theory is quite controversial, and the mainstream agricultural water poverty index (AWPI) for measuring agricultural water poverty has disadvantages such as complex index selection and lack of unified weights. In this regard, this research takes the lead in providing a more complete definition of agricultural water poverty with reference to the definition of water poverty. In terms of method, the research refers to the Social Water Stress/Scarcity Index (SWSI) framework and proposes a new agricultural water poverty index from the two aspects of agricultural water scarcity and agricultural development capability. Based on this index, the regional differences in agricultural water poverty in China are analyzed. The main findings of the study: The agricultural water poverty index proposed in this study has rich connotations, is easy to compare objectively between regions and is applicable in the field of agriculture. The regional differences in agricultural water poverty in China are large, the number of areas with serious agricultural water poverty problems is large, and such problems last for a long time. The distribution of agricultural water poverty in China has spatial autocorrelation rather than a random distribution. China's relative agricultural water poverty index fluctuates around high values, the gap in agricultural water poverty between regions has not narrowed, and the contradiction in relative agricultural water poverty is prominent. The occurrence paths of agricultural water poverty in different regions are different, and the situation in different regions should be identified based on the scarcity of agricultural water resources and the development capability of agricultural production. Finally, this study expects to improve agricultural water poverty theory to effectively alleviate the problem of agricultural water poverty in different regions and promote balanced regional development.

链接:

http://agri.ckcest.cn/file1/M00/10/05/Csgk0GKbBgyAWL5DAIggMInJSE8178.pdf

10．Global meta-analysis shows progress towards recovery of soil microbiota following revegetation

文献源：ScienceDirect,2022-05-11

摘 要 ： The global declines in biodiversity and ecosystem integrity demand effective restoration. Soil microbiota are fundamentally linked to biodiversity and ecosystem

restoration, as they are central to important ecological functions (e.g., nutrient cycling) and are extremely species rich. Their importance, plus the growing affordability of high-throughput sequencing, has resulted in rapid growth of studies that associate soil microbiota recovery and ecosystem restoration via native plant revegetation. Here we provide a systematic literature search and meta-analysis of the association between native plant revegetation and recovery of soil microbiota, identifying 26 datasets. We show that the soil microbial composition in revegetated sites was more similar to reference sites than degraded sites, indicating the recovery of soil microbiota with revegetation. However, a significant difference in composition between revegetated and reference sites indicates that a restoration gap remains. Bacteria showed greater recovery than fungi, which is consistent with bacteria having shorter generation times and being less dispersal-limited than fungi. We observed no general effect of revegetation on soil microbial richness. Showing that soil biodiversity is generally being returned via native plant revegetation should help conservation policymakers and practitioners that utilise this approach be more confident that their efforts are helping to combat global ecological and biodiversity declines. However, more research is required into the drivers of and solutions to the restoration gap, such as long-term monitoring of soil microbiota recovery, as this gap may present a long-term legacy that cannot be overcome with current-day revegetation practices.

链接:

http://agri.ckcest.cn/file1/M00/10/05/Csgk0GKZ576AanN5ADs0pSSqo-s992.pdf

11．植物无土栽培技术研究进展

文献源：中国农业大学学报,2022-05-05

摘要：为了解植物无土栽培技术的发展，以"无土栽培"、"基质栽培"、"雾培"和"水培"为关键词，依据Web of Science、Pub-Med和知网等数据库，检索了1989—2021年发表的相关文献，对无土栽培发展历程、主要技术以及未来趋势进行了总结和分析。结果表明：1)无土栽培包括水培、雾培、基质栽培等，其中成本低、操作简单的基质栽培是主要方式，而操作、成本均更高的雾培和水培在高效植物栽培工厂建设上潜力巨大；2)探索高效、节水、可持续有机种植技术，融合人工智能和物联网技术，发展适配常规环境和恶劣环境的智慧农业是发展趋势之一；3)针对室内及楼宇空间等个体化种植需求，发展小型化、家庭化、精致化、智能化无土栽培技术是发展趋势之二；4)密闭空间种植和太空种植技术的研究也将受到更多关注。

链接:

【会议论文】

1．An Optimized Gaussian Extreme Learning Machine (GELM) for Predicting the Crop Yield using Soil Factors

发布源：IEEE

发布时间：2022-06-02

摘要：Indian agriculture is extremely important and plays a predominant role in economy and employment. The agriculture has seen a significant technological transition because of data collection, environmental factors, crop selection, soil nutrients, pesticides and plant disease for making better farming decisions. This revolution in agriculture is addressed by using emerging technologies. Early detection and management of crop yield indicator problems can help to increase the yield and subsequent profit. Machine learning is an emerging technology used in agricultural research for yield prediction. To produce accurate results, a simplest and very fast optimized learning algorithm called GELM (Gaussian Extreme Learning Machine) classifier with different kinds of activation functions are used. For the soil dataset, the classifier is trained using 50 hidden neurons with different activation functions. The performance analysis of the system shows that gaussian extreme learning achieves an accuracy of 97% compared to other algorithms. This analysis helps in interpretation of results in efficient manner for any regional soil data.

链接:

2．Smart Hydroponic System Using Fuzzy Logic control

发布源：IEEE

发布时间：2022-06-01

摘要：Hydroponic plant plays a critical role in the agriculture field, which is put forward as a solution to combat climate change. The paper aims to provide automatic monitoring and controlling of hydroponic plants in the greenhouse via smartphones in real-time, to reduce the problems that appear in the greenhouse system and help the farmers in the agriculture process as they still do it manually. The paper will use the nutrient film technique (NFT), the nutrient solution is diluted with the water until getting the concentration for the cultivated plant, and then the excess solution is returned to the tank and watered the plant again. The

proposed model will do activities such as measuring the temperature, humidity, and water level in the plant. The system design is based on fuzzy logic, the main objective of using fuzzy logic is to develop automated precise control of the fan and water pump. The proposed model hardware is an Arduino microcontroller, DHT11 sensor, PH sensor, LDR, esp8266 Wi-Fi module, MQ135, water level, fan with 5V, micro-DC water pump, and buzzer. The back end's main functions are to control actuators, provide real-time notifications of the sensor values, and user authentication. The test result of the proposed model is displaying the status of the plant and doing an action, such as controlling fan levels, water pump, and determining the amount of PH needed for the plant. The paper will be organized as the following: first, the background, then related work that is based on the same idea, a proposed model that includes hardware, backend, user interface, and the fuzzy logic system, the paper will end with results of practical work and the conclusion of the paper.

链接:

http://agri.ckcest.cn/file1/M00/03/33/Csgk0YbwedGAcQmVAAeT0WaBVxA900.pdf

3．An Optimized Soil Moisture Prediction Model for Smart Agriculture Using Gaussian Process Regression

发布源：IEEE

发布时间：2022-05-27

摘要：An accurate soil moisture model is critical in the design and implementation of a smart agriculture system. Accurate soil moisture prediction allows an efficient water resources allocation. This paper presented a soil moisture model using different environmental parameters such as humidity, temperature, light intensity, and rain occurrence as inputs or predictor variables. Gaussian process regression algorithm, a non-parametric machine learning algorithm, was used to develop the model. The most effective kernel function was also determined by developing four different GPR models using a different kernel function. In terms of RMSE, the rational quadratic function obtained the lowest value. To further improve the accuracy of the GPR model, an automated hyperparameter tuning was done using a Bayesian optimization algorithm. Three hyperparameters were tuned using the Bayesian optimization algorithm, which improved the GPR model's performance. The optimized GPR model achieved the lowest RMSE and MAE of 3.596 and 1.176, respectively.

链接:

4．Determination of Soil Texture Using Image Processing Technique

发布源：IEEE

发布时间：2022-05-27

摘 要 ： Agriculture is the backbone of world's economy and it is one of the largest employment sectors. Nowadays, the population is growing fast and simultaneously, the total cultivable land is lessening drastically. Soil texture has a significant impact on the agriculture affecting crop selection and crop growth. This paper presents the development of soil texture detection and pH value determination of the soil using the image processing technique. In this paper, two methods have been applied to identify the soil texture using two colorspace methods in the MATLAB toolbox, which are the Hue Saturation Value (HSV) and Red Green Blue (RGB) color method. Furthermore, to determine the pH value of the soil, an image processing algorithm was applied to obtain the desired output. Moreover, these two proposed methods were applied in the Graphical User Interface (GUI) in MATLAB software. The proposed system is expected to contribute to the community by saving human effort, increases efficiency and generates more accurate results in shorter time.

链接:

http://agri.ckcest.cn/file1/M00/10/05/Csgk0GKZyHKASkWhABpgdf8L5uU192.pdf

5．Multi-variant Analysis of Climatic Conditions and Soil Rainfall with Best Crop Prediction

发布源：IEEE

发布时间：2022-05-24

摘 要 ： Agriculture is an important job in the development of the nation's economy. The climate along with other natural variations has to turn out to be a significant risk in the agricultural field. Machine Learning technology can be used for determining the best crop suitable for the climatic condition, soil condition from the data set for addressing this issue. Crop Yield Prediction includes anticipating the yield of the crop from accessible verifiable information like climate parameter, soil parameter, and notable yield. Such huge numbers of individuals are doing fertile agriculture by developing the yield on ill-advised soil. To actualize the application to recognize the sorts of oil, water wellspring of that land whether that land depends on downpour or bore water. Furthermore, recommend what of the crop is reasonable for that dirt. So, through this application to the individual to think about

agriculture. It tends to be improved by the utilization of many mechanical assets, device, and methods. Find the kind of crop that is appropriate for that specific soil.

链接:

http://agri.ckcest.cn/file1/M00/03/33/Csgk0YbweuaAa0axABMuLFSEWhI290.pdf

6．A Bayesian Deep Image Prior Downscaling Approach for High-resolution Soil Moisture Estimation

发布源：IEEE

发布时间：2022-05-23

摘要：Soil moisture (SM) estimation is a critical part of environmental and agricultural monitoring, with satellite-based microwave remote sensing being the main SM source. However, the limited spatial resolution of most current remote sensing SM products reduces their utility for many applications such as evapotranspiration modeling and agriculture management. To address this issue, we propose a Bayesian deep image prior (BDIP) downscaling approach to estimate the high-resolution SM from satellite products. More specifically, the high-resolution soil moisture estimation problem is formulated as a maximum a posteriori (MAP) problem, and solved via a neural network comprising of a deep fully convolutional neural network (FCNN) for modeling the prior spatial correlation distribution of the underlying high-resolution SM variables, and a forward model characterizing the SM map degeneration process for modeling the data likelihood. As such, the proposed BDIP approach provides a statistical framework that integrates deep learning with forward modelling in a coherent manner for combining different sources of information, i.e., the knowledge in the forward model, the spatial correlation prior in FCNN architecture, and the remote sensing data and products. Experiments on the downscaling of Soil Moisture Active Passive SM products using the Moderate Resolution Imaging Spectroradiometer products show that SM maps estimated using the proposed method provide greater spatial detail information than other downscaling methods, with the SM estimates very close to in-situ measurements.

链接:

http://agri.ckcest.cn/file1/M00/10/05/Csgk0GKZyvGAPcCMAHDVw_znd-g307.pdf