

《农业水土资源监控研究》专题快报

2019年第7期（总第7期）

中国工程科技知识中心农业分中心

中国农业科学院农业信息研究所

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【政策法规】

1. 修改后的《中华人民共和国土地管理法》

发布源：中国人大网

发布时间：2019-09-05

摘要：（1986年6月25日第六届全国人民代表大会常务委员会第十六次会议通过 根据1988年12月29日第七届全国人民代表大会常务委员会第五次会议《关于修改〈中华人民共和国土地管理法〉的决定》第一次修正 1998年8月29日第九届全国人民代表大会常务委员会第四次会议修订 根据2004年8月28日第十届全国人民代表大会常务委员会第十一次会议《关于修改〈中华人民共和国土地管理法〉的决定》第二次修正 根据2019年8月26日第十三届全国人民代表大会常务委员会第十二次会议《关于修改〈中华人民共和国土地管理法〉、〈中华人民共和国城市房地产管理法〉的决定》第三次修正）

链接:

<http://www.npc.gov.cn/npc/c30834/201909/d1e6c1a1eec345eba23796c6e8473347.shtm>

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【动态资讯】

1. 基于指标评价体系的我国粮食安全演变研究

【中国网·中国发展门户网】对于粮食安全的研究有赖于定量分析，构建科学、合理的指标体系有助于从宏观趋势上对粮食安全进行分析和评价。国内外对于粮食安全的评价开展较多。2018年，经济学人智库发布了《全球粮食安全指数报告2018》，通过动态基准模型对全球113个国家从粮食购买能力、粮食供给能力、粮食品质与安全、自然资源韧性4个维度进行综合排名。其中中国排名第46位，属于中上游水平。Coates从粮食充足性、营养充足性、文化可接受性和粮食稳定性的角度出发，建立粮食安全评价体系。

链接:

<http://agri.ckcest.cn/>

http://cn.chinagate.cn/news/2019-09/17/content_75122796_0.htm

2. 赵春江院士：未来农场将是无人农场，将会需要大量农业机器人！

【农机通网】“我国与发达国家水平差距明显，如农牧业工艺与机械设备结合的不够紧密，国内稳定性、故障率、易用性等指标不理想，生产成本较高，生产效率偏低，智能化程度不高，核心算法的差距显著。未来的农场将是无人农场，将会需要大量的农业机器人，国内很多单位在探讨无人农场，也建设了无人农场的示范。”近日，中国工程院院士赵春江在“中国畜牧兽医学会信息技术分会2019年学术研讨会”上作报告如上表示。

链接:

<http://www.nongjitong.com/news/2019/463318.html>

3. 遥感作“天眼” 农业更智慧

【大河网、新浪网】通过分析农作物遥感影像数据，可精准客观获取农作物种植面积、分布情况、农业灾害情况等，并可以预测作物产量，如同为农业生产装上了一双“科技眼”。9月11日，在郑州举办的中国卫星导航与位置服务第八届年会暨中国北斗应用大会上，记者现场见证了我省农业遥感监测技术的“神奇”之处。指导农业种植、保障粮食安全的“千里眼”。点开河南省农业遥感信息三维展示系统，省农科院农经信息所农业遥感研究室主任王来刚向记者一一展示：“这是我省秋季作物种植分布情况，这是示范区茶叶和大蒜种植分布情况……”屏幕上，各种作物的种植面积及结构一目了然，不仅可为政府决策提供参考，同时还可提前预测市场供给、指引相关商家在农产品收购上合理布置人力物力。

链接:

http://news.china.com.cn/live/2019-09/14/content_543383.htm

4. 全国农业节水农村供水技术与设备博览会即将召开

【中国农网】在新中国成立70周年之际，为全面展示我国节水供水技术装备丰硕成果，促进“水事业”发展再上新台阶，全国农业节水农村供水技术与设备博览会将于9月20日至23日在湖南长沙拉开帷幕。该博览会由中国农业节水和农村供水技术协会会同水利部、农业农村部及教育部下属相关部门共同举办，由华维节水科技集团股份有限公司、湖南农业大学等四家单位联合承办，是一次集中检阅我国水资源产业发展成果和共谋水资源发展未来的盛会。博览会以“科学用水、绿色生态、乡村振兴”为主题，汇集了国内

外高效节水、智慧灌溉的软硬件，包含高效节水灌溉产品、设备、系统与技術，智慧灌溉、供水、水利、农业物联网、河长制智能管理系统、水环境监测等硬件、软件与技術，PVC、PE等各种给排水管材管件。水泵、阀门、流量计、挤塑机、注塑机等机械装备和检测设备等相关企事业单位也将同聚一堂，交流实践经验，促进对接合作，共谋未来。博览会期间还将举办“全国农业节水和农村供水技术发展高峰论坛”、“中国农业节水和农村供水信息化发展论坛”等系列专项报告和研讨会，届时，相关政府主管部门负责人、院士专家及业界人士将共话我国“水事业”的未来及发展。

链接:

<http://www.farmer.com.cn/2019/09/14/842817.html>

5. 我国首颗民用高光谱业务卫星成功发射 开启自然资源调查监测新篇章

【央广网】9月12日11时26分，我国在太原卫星发射中心使用长征四号运载火箭，成功将5米光学业务卫星送入预定轨道，该星可有效获取宽幅高光谱及多光谱数据，进一步完善自然资源卫星观测体系，并将与后续系列卫星组网，形成全球领先的业务化对地光谱探测能力。该卫星运行于太阳同步轨道，设计寿命5年，通过所搭载的两台相机，可有效获取115公里幅宽的9谱段多光谱数据以及60公里幅宽的166谱段高光谱数据，其中全色谱段分辨率可达2.5米、多光谱为10米、高光谱优于30米，高光谱载荷可见近红外和短波红外光谱分辨率分别达到10纳米和20纳米。该星作为我国自主建造并成功运行的首颗民用高光谱业务卫星，是国家民用空间基础设施中新型对地观测卫星发展的又一重要成果。

链接:

http://china.cnr.cn/gdgg/20190912/t20190912_524775166.shtml

6. 江苏省委书记眼中的未来物联网发展

【环球网】9月7日，2019世界物联网无锡峰会在无锡召开，江苏省委书记娄勤俭发表主旨演讲，分享世界物联网的发展。娄勤俭书记表示，现在无锡集聚物联网企业超过2千家，去年营业收入达到了2600多亿。很多知名的企业和行业巨头都在无锡纷纷布局，一大批雏鹰、瞪羚、独角兽企业快速成长，这也引领了物联网未来的发展方向，无锡展开新型试点，率先出台产业支持政策，主导和参与制订超过50%的物联网国家标准、国际标准和行业标准。很多成功做法已经形成了制度性成果，这里搭建了前沿技术交流的平台，世界物联网博览会已经成为物联网领域最响亮的名片，新的智慧创新碰撞交流，新的技术产品集中展示，无人驾驶汽车新的应用已经触手可及。回望无锡物联网这十年，从实验到市场，从单点突破到全面开花，从改变生活到改变社会，星星之火已成燎原之

势。

链接:

<https://china.huanqiu.com/article/9CaKrnKmHQU>

7 . 俄远东和北极发展部编译版：2019年东方经济论坛上将展示“农业土地数据库”

【驻哈巴罗夫斯克总领馆经商室】俄远东和北极发展部网站8月8日消息，在第五届东方经济论坛上将有一项新服务的介绍。在俄罗斯远东和北极发展部的展台上，将展示一份电子地图，投资者将能够在上面选择一个可以启动农业项目的地块。远东和北极发展部长亚历山大·科兹洛夫表示，管理农业用地的统一数字服务将使我们能够识别未开垦或被滥用的土地，确保根据土地提交申请，按统一要求创建统一的数据库。我们应该更系统地分配资源，而不是“想挖哪就挖哪”。

链接:

<http://www.mofcom.gov.cn/article/i/yjil/e/201909/20190902896938.shtml>

8 . Leading the field in grassland agricultural success

【Nature】Lanzhou University researchers have led the development of sustainable grassland agricultural systems, contributing to the assessment and restoration of degraded grasslands. The grassland agro-ecosystem theory established by Ren Jizhou and his colleagues at the College of Pastoral Agricultural Science and Technology (CPAST) at Lanzhou University (LZU) has transformed China's long-held 'grain-oriented' farmland agriculture into a 'grain- grass-balanced' approach, and improved national food security.

链接:

<https://www.nature.com/articles/d42473-019-00254-w>

【文献速递】

1 . Impact assessment of land use functions on the sustainable regional development of representative Asian countries – A comparative study in Bangladesh, China and Japan

文献源：Science of the Total Environment,2019

摘要：Sustainable land use is a fundamental research field for land use planning. However, regional policymakers often lack access to the theoretical impacts that a land use policy might have on local development, especially in remote agricultural areas. Furthermore, knowledge exchange is important, especially in the context of globalization. This research employed the Framework of Participatory Impact Assessment and household surveys to

combine multilevel stakeholders and comprehensively assessed the impacts of different land management scenarios on land use functions (LUFs) and local sustainable development. We completed this comparative study in typical remote agricultural areas in Godagari upazila of Bangladesh, Guyuan of China and Noto of Japan, which all have gradient differences in terms of their economic and social aspects, natural conditions and main land use issues. The selected scenarios were business as usual, increase in agricultural input and reform of rural development mode. The main conclusions are as follows: (1) the farmers at the three study sites all showed a decreasing dependence on their land and a relevant level of stress on environmental LUFs, but the rooted reasons were different and even opposing; (2) scenarios with a high aggregate impact on LUFs might not enable a sustainable development model, and the assessment of land management measures should consider the balance among environmental, economic and social dimensions; and (3) land use and management practices should be conducted with consideration of local conditions, and protecting agricultural development and enacting appropriate agricultural reforms could revitalize local agricultural development. The results revealed the demand for location-specific land management practices and underlined the knowledge of agricultural management on an international scale.

链接:

<http://agri.ckcest.cn/file1/M00/0E/C8/Csgk0F2Ejk2AflmDAB8hAKvDfH0681.pdf>

2 . Bioenergy and ecosystem services trade-offs and synergies in marginal agricultural lands: A remote-sensing-based assessment method

文献源 : Journal of Cleaner Production,2019

摘要 : Growing non-food crops in marginal lands has been proposed as a solution to avoid land competition with food production. Mapping marginal agricultural lands is therefore fundamental for the sustainable development of rural landscapes. This study proposes a method based on remote sensing data to identify marginal agricultural lands for the production of wood biomass, and analyse potential trade-offs and synergies between the new wood crops, food production, and Ecosystem Services (ES) provided by vegetation. The province of Rovigo (northern Italy) was chosen as a representative case study. Three classes of marginal agricultural lands were mapped through the use of the Soil Adjusted Vegetation Index (SAVI): i) abandoned or unused agricultural lands, ii) potentially poorly or non-managed croplands, and iii) potentially low productivity croplands. Results showed that

marginal agricultural lands cover 1.7% of the agricultural areas of the province, and approximately 13,642 MWh yr⁻¹ of Second-Generation (2G) bioenergy can be produced in marginal agricultural areas while enhancing ES provided by vegetation, and avoiding any trade-off with food production. Since this energy potential covers just 8.4% of the total potential authorized in the province, the enhancement of ES could provide a suitable argument to support the conversion of marginal agricultural lands and increase the multifunctionality of the agricultural landscape.

链接:

<http://agri.ckcest.cn/file1/M00/0E/C8/Csgk0F2EJSWA1hh-AFQn8bq4GRo444.pdf>

3 . The vulnerabilities of agricultural land and food production to future water scarcity

文献源 : Global Environmental Change,2019

摘要 : Rapidly increasing populations coupled with increased food demand requires either an expansion of agricultural land or sufficient production gains from current resources. However, in a changing world, reduced water availability might undermine improvements in crop and grass productivity and may disproportionately affect different parts of the world. Using multi-model studies, the potential trends, risks and uncertainties to land use and land availability that may arise from reductions in water availability are examined here. In addition, the impacts of different policy interventions on pressures from emerging risks are examined. Results indicate that globally, approximately 11% and 10% of current crop- and grass-lands could be vulnerable to reduction in water availability and may lose some productive capacity, with Africa and the Middle East, China, Europe and Asia particularly at risk. While uncertainties remain, reduction in agricultural land area associated with dietary changes (reduction of food waste and decreased meat consumption) offers the greatest buffer against land loss and food insecurity.

链接:

<http://agri.ckcest.cn/file1/M00/0E/C8/Csgk0F2En4OAcjCABwc02JDQio733.pdf>

4 . Intensity and Stationarity Analysis of Land Use Change Based on CART Algorithm

文献源 : Nature,2019

摘要 : Land use directly reflects degree of human development and utilization of land. Intensity analysis of land use is a quantitative method to analyze land use changes. In this paper, land use changes in Tianjin were studied using Thematic Mapper (TM) remote

sensing images in 1995, 2000, 2005, 2010 and Operational Land Imager (OLI) remote sensing image in 2015. Land use information was extracted using decision tree classification method based on CART (Classification and Regression Trees) algorithm. This paper introduced land use intensity analysis to analyze its change intensity and stationarity, respectively at interval, category and transition levels. Based on the theory, new models were developed in the transition level to analyze land use change pattern. The analysis quantifies the contribution of a certain land categories to land use change during a specific time interval. The change of land use during 1995-2015 indicated that Tianjin experienced rapid urban development with the area of urban land increased by about 7.5%. This study provided a reference for the sustainable development of land use in Tianjin.

链接:

<http://agri.ckcest.cn/file1/M00/0E/C8/Csgk0F2EpKCAFAqJAEctqqAuHi4263.pdf>

5 . Application of remote sensing to water environmental processes under a changing climate

文献源 : Journal of Hydrology,2019

摘要 : Remote sensing, as a crucial method to obtain information on water environmental processes, has become a major source of data, particularly of water environment and water resources, which are sensitive to global climate change. The bibliometric analysis provided here shows the research characteristics and developments of remote sensing-based observations of water environmental processes under a changing climate from 2000 to 2018. Visualized knowledge mapping is introduced to investigate the development status, scientific collaboration, involved disciplines, research hotspots and emerging trends of this field. The breadth and depth of remote sensing application in water environmental process studies have improved significantly as the number of related publications rose at an average annual growth rate of 15.97% in the 21st century. The United States and China were the leading contributors with the largest number of publications and all of the top 15 most active institutions. In addition, this field is a highly interdisciplinary field that covers a wide range of interests, from water resources to environmental science, geology, engineering, ecology, and agriculture. The application of remote sensing technology has significantly promoted the estimation of evapotranspiration and soil moisture, thereby offering a more complete perspective to the understanding of the water cycle. Additionally, climate change and its complex interactions with water environmental processes, including the occurrence

of drought events, are of great significance and require special attention.

链接:

<http://agri.ckcest.cn/file1/M00/0E/C8/Csgk0F2EkzOARQXVALpQCQ0XQYU515.pdf>

6 . Evaluation of Land Cover Change and Agricultural Protection Sites: A GIS and Remote Sensing Approach for Ho Chi Minh City, Vietnam

文献源 : Heliyon,2019

摘要 : Ho Chi Minh City (HCMC), economic center and most populous city of Vietnam faces a strong structural change since its market liberalization in the late 1980s. Big challenges occur in the form of uncontrolled urban sprawl due to rapid population growth with encroachment of agricultural land, which leads to environmental and climatic issues like urban heat island effects, air pollution and flooding events. Remote Sensing and Geographic Information Systems (GIS) provide new computer-based technologies for urban planners which can greatly ease the monitoring of agricultural loss as well as improve decision making for future land management. In the first part of this study, land cover change dynamics are thoroughly assessed using moderate and high spatial resolution satellite imagery (Landsat and SPOT) over the period 2010-2017 in 22 districts of HCMC. In the second part, the land cover classification results of 2017 provide the initial map for a GIS-based Multi-Criteria-Decision-Analysis (MCDA) of potential agricultural protection sites. Therefore, criteria of climate adaptation and ecological service are established and embedded in the GIS-compatible Compromise Programming Model (CP). With the use of Analytic Hierarchy Process (AHP) by Thomas L. Saaty and additional expert knowledge, appropriate weighting factors have been affiliated. The results show that agricultural land decreased by more than two thirds in the period considered. However, particularly the western rural districts Bình Chánh and Hóc Môn still offer a great amount of valuable agricultural land suitable for protection. The proposed method can serve as a scientific framework for planning departments of fast growing cities to zone agricultural land for protection on an early planning stage in order to ensure sustainable land use development in the future.

链接:

<http://agri.ckcest.cn/file1/M00/0E/C8/Csgk0F2EnoOADYh6AETwEoMr3DU727.pdf>

7 . Temporal detection and prediction of agricultural land consumption by urbanization

using remote sensing

文献源：The Egyptian Journal of Remote Sensing and Space Science,2019

摘要：The most fertile land in Egypt is under continuous loss by urbanization. In some countries, this could be considered normal, but in Egypt, it is a severe violation of the country's limited agricultural land. The main objectives of this research are to quantify the agricultural land consumption by urbanization and predict the future pattern of this process in some parts of Alexandria and El-Behiera governorates using the Landsat satellite images of 1987, 2001, 2015, and 2019. Image classification was performed using the Maximum likelihood supervised classification technique. Five land use/cover (LULC) types have been identified, which are agriculture, urban, gardens, the international road, and water. Classification results were further enhanced by employing post-classification and filtering processes which increased classification accuracy and minimized urban land use overestimation. Four LULC maps have been developed for 1987, 2001, 2015 and 2019. A post-classification comparison method was applied to detect the LULC changes among the independently classified images and quantify the loss of agricultural land by urbanization. Prediction of urban encroachment to agricultural land was performed by Land Change Modeler basing on both the past change trend of urbanization and the influencing distance-to-urban factor. The future LULC prediction maps for 2019, 2050, and 2100 have been generated. Prediction validity was applied using actual vs predicted LULC 2019 maps. The results indicated that the agricultural and urban categories are the prevailing LULC types in the investigated area. Over the last three decades significant loss in the agricultural land was observed together with remarkable growth in the urban area. The agricultural land was decreased by 11.03%, while the urban area was increased by 11.84%. The rate of agricultural land consumption by urbanization after 2001 was more remarkable than the rate before 2001. The results also indicated that the agricultural and urban land use categories have the highest possible probability of change. It is predicted that agricultural land will decrease by 11.5% and 24.5% in 2050 and 2100, respectively. Conversely, urban areas will increase by 12% and 25% in 2050 and 2100, respectively. This process will become the main feature of LULC change in the future, which means that the agricultural land could completely vanish within the next two hundred years at the current degree of agricultural land consumption by urbanization. The outcomes of this research could help policy makers to adopt appropriate strategies towards better management of LULC and increase the sustainability of the highly productive agricultural land through preventing violation on such valuable land.

链接:

<http://agri.ckcest.cn/file1/M00/0E/C8/Csgk0F2EIWCANJ2hADPU1vl3M4s457.pdf>

8 . Analysis and identification of abandoned agricultural land using remote sensing

methodology

文献源 : Land Use Policy,2019

摘要 : The management of abandoned agricultural land as well as their effective use are relevant for any country to a greater or lesser extent. An attempt to tackle the problems of ineffective utilization of abandoned agricultural land is made in Lithuania and elsewhere. While analyzing the issues related to abandoned agricultural land, a clear definition of an abandoned area is important to perceive as well as potential methods for the identification of such areas are needed to analyse. Also, in order to suggest an effective utilisation of abandoned agricultural land for sustainable land use in the country, the analysis and statistics of such land is important to undertake. The paper discusses the analysis of abandoned agricultural land in Lithuania, providing the dynamics of changes of abandoned agricultural land and the percentage distribution of such land across Lithuania. Also, the factors, which caused the abandoned agricultural land appearance in Lithuania identified and described. The Remote Sensing method identified and analysed as the most effective methodology for abandoned agricultural land identification. A collection of spatial data on abandoned agricultural land was formed on the base of spectral images of the terrene obtained from an artificial Earth satellite and a map of abandoned agricultural areas was created upon applying remote cartographic methods.

链接:

http://agri.ckcest.cn/file1/M00/0E/C8/Csgk0F2EIAaATr1_ABHtCXoa6EU191.pdf

9 . Research advances of SAR remote sensing for agriculture applications: A review

文献源 : Journal of Integrative Agriculture,2019

摘要 : Synthetic aperture radar (SAR) is an effective and important technique in monitoring crop and other agricultural targets because its quality does not depend on weather conditions. SAR is sensitive to the geometrical structures and dielectric properties of the targets and has a certain penetration ability to some agricultural targets. The capabilities of SAR for agriculture applications can be organized into three main categories: crop identification and crop planting area statistics, crop and cropland parameter extraction, and

crop yield estimation. According to the above concepts, this paper systematically analyses the recent progresses, existing problems and future directions in SAR agricultural remote sensing. In recent years, with the remarkable progresses in SAR remote sensing systems, the available SAR data sources have been greatly enriched. The accuracies of the crop classification and parameter extraction by SAR data have been improved progressively. But the development of modern agriculture has put forwarded higher requirements for SAR remote sensing. For instance, the spatial resolution and revisiting cycle of the SAR sensors, the accuracy of crop classification, the whole phenological period monitoring of crop growth status, the soil moisture inversion under the condition of high vegetation coverage, the integrations of SAR remote sensing retrieval information with hydrological models and/or crop growth models, and so on, still need to be improved. In the future, the joint use of optical and SAR remote sensing data, the application of multi-band multi-dimensional SAR, the precise and high efficient modeling of electromagnetic scattering and parameter extraction of crop and farmland composite scene, the development of light and small SAR systems like those onboard unmanned aerial vehicles and their applications will be active research areas in agriculture remote sensing. This paper concludes that SAR remote sensing has great potential and will play a more significant role in the various fields of agricultural remote sensing.

链接:

http://agri.ckcest.cn/file1/M00/0E/C8/Csgk0F2Ej_WAEb7nAAewUMQPy_I273.pdf

10 . 农业土地利用综合效益评价及耦合协调关系研究

文献源：国土资源科技管理,2019

摘要：基于县域尺度分析土地利用综合效益及耦合协调关系可为决策农业土地最优利用模式的提供科学依据。以高集约化农业区长沙县为案例,构建效益评价指标体系,采用熵权-TOPSIS法计算土地综合效益,利用耦合协调度模型分析经济-社会-生态效益耦合协调关系。研究结果表明长沙县土地利用综合效益值从1996年的0.199增长至2016年的0.792,经济效益增长最快;土地利用系统内部耦合协调度在0.249~0.510之间波动变化,经历了低度耦合协调-勉强耦合协调-中度耦合协调的演变历程,总体土地利用效益及耦合协调度总趋势上升,但仍有很大的提高空间。建议通过调整土地利用结构、增强自然灾害抵御能力、引导农户合理施肥等措施提升社会-经济-生态效益耦合关系,实现农业可持续发展。

链接:

<http://agri.ckcest.cn/file1/M00/0E/C8/Csgk0F2EoheAVnsyAAInU527aM441.pdf>

【相关成果】

1 . 土壤墒情监测系统

发布源：全国农业技术推广服务中心

发布时间：2019-08-07

摘要：系统从 2009 年开始建立，全国土壤墒情监测系统的建立及推广应用，为各级农业管理部门提供了理想的办公平台。目前系统已经有各级用户1000 多个，接收数据 300 多万条。

链接:

<http://www.soilmoisture.org.cn/>

2 . Monitoring the Planet's Pulse — Resource Watch

发布源：World Resources Institute

发布时间：2018-04-03

摘要：Monitoring the Planet's Pulse. Resource Watch provides trusted and timely data for a sustainable future. More data are available today than ever before. Yet too often policymakers, business leaders, and analysts cannot access the data they need to make informed decisions about the environment and human well-being. That's why WRI and over 30 partners built Resource Watch, a dynamic platform that leverages technology, data, and human networks to bring unprecedented transparency about the planet right now. Resource Watch features hundreds of data sets all in one place on the state of the planet's resources and citizens. Users can visualize challenges facing people and the planet, from climate change to poverty, water risk to state instability, air pollution to human migration, and more.

链接:

<https://resourcewatch.org/data/explore>

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