

《农业水土资源监控研究》专题快报

2020年第15期（总第28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

2020年8月5日

【动态资讯】

1 . The FAO Land & Water response to COVID-19

【FAO】 Reinforcing an integrated systems approach to sustainable agricultural land, water and soil management. Access to a healthy environment and to fresh, nutritious and diverse food is critical for everyone. The livelihood conditions and the available means for action for the most vulnerable segments of society, especially the millions of smallholder producers and the landscapes where they act upon will depend on land, water and soil availability and quality. The production processes, technologies and policies available for these producers to maintain and strengthen the supply and consumption chains are constrained by the health of these resources.

链接:

<http://agri.ckcest.cn/file1/M00/01/0B/Csgk0V8pazGAQ7ARAAadxGnKLU2I413.pdf>

2 . 2020年农业行业的发展趋势及未来农业的前景分析

【华夏小康网】 近几年来，为了进一步推动农村农业的发展，国家在农业上推行了一系列的政策和措施，今年中央一号文件公布了全面部署实施乡村振兴战略，未来的农业将会呈现出不一样的面貌。趋势一：农业人口将进一步减少 一些小村庄会慢慢消失。趋势二：农民将慢慢转变为一种职业 不再是一种身份的象征。趋势三：农业补贴将会进一步增加。其他趋势，动物疫苗：未来，动物疫苗继续应用于农业的许多领域，以努力建立体系帮助农民获得更多疫苗的途径。例如：建立疫苗银行来对抗口蹄疫。农业吸引年轻族群合作：普遍认为，农业的最前沿问题是如何吸引新手们进入农业领域。农民希望与年轻人紧密合作，以实现双方的共同利益，并考虑自己的退休生活。奖励年轻人进入农业，从政府帮助他们减少债务，并在其中找到自己的定位。小农特色农业以增加

收入：小农强化特色农业以增加价值，应有助于提供额外资本来购买新设备。作物监测及其他技术：由于ICT技术成熟及5G时代来临，农民正日益面临挑战，并发现新技术可利用网络或带宽来帮助农业转型提升服务质量，例如：无人机监视农作物及田间土壤状况、区块链农产品认证及物流监控等。

链接：

<http://agri.ckcest.cn/file1/M00/01/0B/Csgk0V8paRCAKBC5AAp4NnL1u5M556.pdf>

3 . 中国是农业大国，却不是农业强国，未来农业发展之路在哪里

【绿之洲植保】近万年前，新石器时代的华夏民族开启了农业发展的起源，建立了庞大的农业国家。如今，我国依旧是全球范围中当之无愧的“农业大国”，但是却很难成为“农业强国”，我们的农民朋友每日辛勤劳作，但是仍处于社会收入的底层。

链接：

<http://agri.ckcest.cn/file1/M00/01/0C/Csgk0V8qyJeAJ5-7AAxWMqxfeLI935.pdf>

4 . 未来在农村，四个新方向几乎村村无法避免？农民要做好心理准备了

【农言乡事】未来，乡村振兴战略五年规划工作也会陆续在农村地区实施，可以看出在我国对三农的发展工作格外重视，农业农村优先发展已经成为新的方向，在五月份起，我国也部署了很多目标以及出台了許多新措施来助力乡村全面振兴，让农村的发展变得更好，让村民全面迈入小康。未来在农村地区，四个新方向几乎村村无法避免：1) 电商发展的方向。未来几年，传统电商也会被直播电商和自媒体电商替代，另外，随着物流、仓储、快递体系的完善，以后从事电商的人还会继续增加，农产品的销售渠道也会全面转向电商。2) 农业发展的方向。我们国家的农业发展方向已经转向了现代化、信息化和机械化，很多地方的土地现在也集中在新型经营主体的手中。未来的农村，随着种地的人不断减少，土地也会被大规模流转，农业也会和其他产业融合发展，未来的农村，新型职业农民会成为支撑力量，现代化，信息化、机械化也会成为我国农业发展的新方向，尤其是农村进入乡村振兴阶段后，这些现象更为突出。3) 养殖业转型的方向。未来的农村，随着市场需求量不断加大，生态养殖会成为一种新方向，很多人会追求原生态的肉类食品。4) 村庄发展的方向。因为人口流失等问题，有部分村庄现在已经走向了空心化，常住人口也大幅减少，如果按照这样的情况继续发展下去，未来在农村地区，空心房也会继续增加。针对这一问题，现在我国也采取了新措施，除了要求各地采取撤并搬迁的方式来解决空心化问题之外，我国还采取有力的措施让更多的人才留在农村助力乡村全面振兴。如果农村的人口继续流失下去，那么未来的几年，农村撤并搬迁，合村并居也会成为新方向。

链接:

<http://agri.ckcest.cn/file1/M00/01/0B/Csgk0V8paG-ANm9VAAzPsEXzpcM843.pdf>

5 . 耕地保护责任落实大督查严查6种情况，耕地红线千万不要碰

【**网易新闻**】我国人口多、耕地少，耕地是一种十分珍贵的资源。国家对耕地一直有着严格的保护制度，划定永久基本农田，提出18亿亩耕地保护红线，对破坏耕地的违法行为严厉惩处。

链接:

<http://agri.ckcest.cn/file1/M00/01/0B/Csgk0V8pbQWAJUB2ABARLF05Y7M241.pdf>

6 . Can agriculture revive Indian economy?

【**AgroNews**】The Indian economy is all set to contract this year due to the Covid-19 pandemic. There is only bright spot in this year's economic story; the agriculture sector. A good rabi (winter) crop harvest, adequate rainfall during the ongoing monsoon and encouraging data on sowing on kharif (monsoon) crops, all point towards a good performance by agriculture.

链接:

<http://agri.ckcest.cn/file1/M00/01/0B/Csgk0V8paouAJbpJABpaq4gqI0o819.pdf>

7 . The new AQUAMAPS platform is now online!

【**FAO**】In a world with 7 billion people to feed and growing concerns about land and water scarcity, today's professionals need easy access to up-to-date information, models, approaches and technologies to support evidence-based decision-making for water resources assessments and sustainable food production.

链接:

<http://agri.ckcest.cn/file1/M00/01/0B/Csgk0V8pa6uAlfKHAASp3V98os350.pdf>

8 . 农业信息化和机械化快速发展 我国正大步迈入智慧农业时代

【**农业网**】智能农机田间走，“耕牛”转身变“铁牛”。脚不沾泥、手不碰水就把田种了，打开手机就能设定耕作深度，查看数据就知道农作物生长状况……智慧农业将现代信息技术与农业生产、经营、管理和服务全产业链融合，为传统农业提质增效提供了现代化解决方案。《中国数字乡村发展报告（2019）》预测，今年我国智慧农业潜在市场规模将达2000亿元。从“人扛牛拉”到“农机自耕”，从“指望经验”到“依靠数据”，

从“看天吃饭”到“科技助力”，智慧农业为农业生产方式带来了不一样的改变。智慧农业的场景下，谁来种地，怎么种地？

链接:

<http://agri.ckcest.cn/file1/M00/01/0B/Csgk0V8paceAHTfgAApMJQPInlw857.pdf>

9 . 2020年农业遥感市场现状及发展前景分析市场前景可期

【前瞻产业研究院】遥感以其快速、简便、宏观、无损及客观等优点，广泛应用于农业生产各个环节。农田作物信息的快速获取与解析是开展精准农业实践的前提和基础，是突破制约中国现代农业应用发展瓶颈的关键，在农业田间信息获取上，遥感技术优势明显。

链接:

<http://agri.ckcest.cn/file1/M00/01/0B/Csgk0V8paW2AfGypABr0O9mFZ5I236.pdf>

10 . 农业农村部2020年十大引领性技术发布

【农民日报公众号】为深入实施创新驱动发展战略和“藏粮于地、藏粮于技”战略，农业农村部组织开展了引领性技术集成示范工作，以支撑引领农业高质量发展为目标，每年发布10项关于绿色增产、节本增效、生态环保、质量安全等方面的引领性技术，着力打造集成示范样板，发挥引领作用，加快成果转化，推动农业提质增效。2020年农业农村部10 大引领性技术发布了，快来看看这些技术有哪些？

链接:

<http://agri.ckcest.cn/file1/M00/01/0B/Csgk0V8pZ6SAR-TfAct3jhbKGIQ583.pdf>

11 . 谈利用水文模型在气候变化条件下提高农业用水效率

【媒体管家发布】水资源在人类的生存与发展过程中发挥着关键性的作用,近几年来,气候变化的影响逐渐累积,气候变化又通过影响降水分布,降水强度,极端天气增多以及冰川融化影响全球水循环,致使水循环发生改变,水资源分布发生迁移,分布不平均程度加剧,水资源的可获得性在某些地区开始减小。水资源利用问题愈发突出,农业用水问题在水资源利用中占有很大比重,2017年我国农业用水3766.4亿立方米,占全社会用水需求的62.3%。高效配置农业水资源,不仅关系到农业的正常生产和国家的粮食安全问题,而且对整体水资源的管理有着非常重要的意义和价值。

链接:

<http://agri.ckcest.cn/file1/M00/01/0B/Csgk0V8pbH-ALKXjAAiSL11wdiY283.pdf>

【文献速递】

1 . An integrated approach for the estimation of agricultural drought costs

文献源: Land Use Policy,2021-01-20

摘要: This study proposes a novel method to assess the overall economic effects of agricultural droughts using a coupled agronomic-economic approach that accounts for the direct and indirect impacts of this hazard in the economy. The proposed methodology is applied to Italy, where years showing different drought severity levels were analysed. Agricultural drought stress was measured using the fraction of Absorbed Photosynthetically Active Radiation (fAPAR). Using a comprehensive, field-level dataset on agricultural yields, fAPAR-based statistical models were applied to major Italian crops and direct crop productivity impacts were estimated. Local-level, crop-dependent productivity shocks were fed into a regionalised Computable General Equilibrium model specifically calibrated for the Italian economy. Direct and indirect aggregate impacts after allowing for inter-regional trade and input reallocation were obtained. Total estimated damages ranged from 0.55 to 1.75 billion euro, depending on the overall drought severity experienced, while regional losses showed large spatial variability. Although most of the losses were concentrated on agriculture, other related sectors, such as food industry manufacturing and wholesale services, were also substantially affected. Moreover, our simulations suggested the presence of a land-use substitution effect from less to more drought-resistant crops following a drought. This study sheds light on the characterisation of the total damages caused by droughts while provides a tool with applicability in the implementation of drought risk management plans and the evaluation of drought management policies.

链接:

<http://agri.ckcest.cn/file1/M00/01/0B/Csgk0V8pb32AFha8ACJiedEYw1k109.pdf>

2 . Driving forces of agricultural expansion and land degradation indicated by Vegetation

Continuous Fields (VCF) data in drylands from 2000 to 2015

文献源: Global Ecology and Conservation,2020-09-10

摘要: Drylands account for 41% of the world's terrestrial surface, affect more than two billion people, and play a crucial role in global circulation and even global climate change. Therefore, the investigation of agricultural expansion and land degradation regions is a critical part of understanding the human-land coupling systems in dryland ecosystems. The specific distributions of agricultural expansion or land degradation in arid areas were obtained by using three indicators of global Vegetation Continuous Fields (VCF) data, in

which expanding agriculture is usually characterized by tree canopy (TC) loss and short vegetation (SV) gain, while land degradation is characterized by a decrease in short vegetation and an increase in bare ground (BG). Assessing the partial correlation of natural or socioeconomic factors and indicators of agricultural expansion or land degradation while the structural equation model was established, we found that (1) the vegetation situation in the global arid region is relatively stable, and the normalized difference vegetation index (NDVI) value in the Asian arid region is increasing annually; (2) precipitation in the global arid region has a highly positive correlation with TC and a highly negative correlation with BG, while temperature is strongly correlated with SV except in arid areas; (3) both agricultural expansion and land degradation regions are dominated by natural factors, especially temperature; and (4) the control of socioeconomic factors is not closely related to the original land use/cover types in dryland regions.

链接:

<http://agri.ckcest.cn/file1/M00/01/0B/Csgk0V8pcnOARxIdADJ7G6IDHnQ744.pdf>

3 . Grid-scale agricultural land and water management: A remote-sensing-based multiobjective approach

文献源: Journal of Cleaner Production,2020-08-20

摘要: This paper developed a remote-sensing-based multiobjective (RSM) approach to formulate sustainable agricultural land and water resources management strategies at a grid scale. To meet the spatial resolution and accuracy need of agricultural management, downscaled precipitation data sets were obtained with the help of global precipitation measurement (GPM) data and other spatial information. Spatial crop water requirement information were obtained via the combination use of the Penman-Monteith method, remote sensing information (MOD16/PET) and virtual water theory. Through integrating these spatial data and considering the impact of different spatial environments on crop growth, a grid-based integer multiobjective programming (GIMP) model was developed to determine best suitable crop planting types at all grids. GIMP can simultaneously consider several conflicting objectives: crop growth suitability, crop spatial water requirements, and ecosystem service value. Further, GIMP results were inputted into a grid-based nonlinear fractional multiobjective programming (GNFMP) model with three objectives: maximize economic benefits, maximize water productivity, and minimize blue water utilization, to optimize irrigation-water allocation. To verify the validity of the proposed approach, a

real-world application in the middle reaches of Heihe River Basin, northwest China was conducted. Results show that the proposed method can improve the ecosystem service value by 0.36×10^8 CNY, the economic benefit by 21.85%, the irrigation-water productivity by 25.92%, and reduce blue water utilization rate by 24.32% comparing with status quo.

链接:

<http://agri.ckcest.cn/file1/M00/01/0C/Csgk0V8qyb-Af4vOAEMsac1AHRA955.pdf>

4 . COVID-19 risks to global food security

文献源: Science,2020-07-31

摘要: As the COVID-19 pandemic progresses, trade-offs have emerged between the need to contain the virus and to avoid disastrous economic and food security crises that hurt the world's poor and hungry most. Although no major food shortages have emerged as yet, agricultural and food markets are facing disruptions because of labor shortages created by restrictions on movements of people and shifts in food demand resulting from closures of restaurants and schools as well as from income losses. Export restrictions imposed by some countries have disrupted trade flows for staple foods such as wheat and rice. The pandemic is affecting all four pillars of food security (1): availability (is the supply of food adequate?), access (can people obtain the food they need?), utilization (do people have enough intake of nutrients?), and stability (can people access food at all times?). COVID-19 is most directly and severely impacting access to food, even though impacts are also felt through disruptions to availability; shifts in consumer demand toward cheaper, less nutritious foods; and food price instability. We outline the main threats COVID-19 poses to food security and suggest critical responses that policy-makers should consider to prevent this global health crisis from becoming a global food crisis.

链接:

<http://agri.ckcest.cn/file1/M00/01/0B/Csgk0V8pbrmAMhenAAtvqCuqWWQ151.pdf>

5 . A classification of European agricultural land using an energy-based intensity indicator and detailed crop description

文献源: Landscape and Urban Planning,2020-06-20

摘要: With agricultural areas covering almost half of European land, proper management of agro-ecosystems is key to achieve the European Union's environmental and climate objectives. This requires spatially explicit methods and indicators. We developed an

approach for the classification of agricultural land by combining two main dimensions i) land cover, using detailed geo-spatialized census data covering 63 individual crops; ii) management intensity, measured as the anthropogenic energy required in the primary crop production. As a result we identified 10 main crop systems further classified into 30 'crop-management systems' at a spatial resolution of 5 arcminutes. The resulting maps show the spatial patterns of agricultural management intensity across Europe, both in absolute terms (total energy input per hectare) and relative to the dominant crop system in the spatial unit of analysis. The use of multiple intensity dimensions provides new, more detailed insights on agricultural intensity by which areas that were previously classified as low-medium intensive - some permanent crops systems or irrigated arable land - appear now as highly intensive. An expert-based evaluation was carried out on the intensity maps and corroborated the obtained results. The generated maps can be used to support decision-making in designing more targeted, context-specific agricultural and territorial policies. In particular, findings can be relevant in the context of the Common Agricultural Policy post 2020 and the Biodiversity Strategy towards 2030, both of which will benefit from more detailed spatially explicit information to achieve their stated objectives.

链接:

<http://agri.ckcest.cn/file1/M00/01/0B/Csgk0V8pcvSAMZzhADYFfg3YCA4285.pdf>

6 . Keeping pace with climate change in global terrestrial protected areas

文献源: Science Advances ,2020-06-17

摘要: Protected areas (PAs) are essential to biodiversity conservation, but their static boundaries may undermine their potential for protecting species under climate change. We assessed how the climatic conditions within global terrestrial PAs may change over time. By 2070, protection is expected to decline in cold and warm climates and increase in cool and hot climates over a wide range of precipitation. Most countries are expected to fail to protect >90% of their available climate at current levels. The evenness of climatic representation under protection—not the amount of area protected—positively influenced the retention of climatic conditions under protection. On average, protection retention would increase by ~118% if countries doubled their climatic representativeness under protection or by ~102% if countries collectively reduced emissions in accordance with global targets. Therefore, alongside adoption of mitigation policies, adaptation policies that improve the complementarity of climatic conditions within PAs will help countries safeguard

biodiversity.

链接:

<http://agri.ckcest.cn/file1/M00/01/0B/Csgk0V8pclqAGHxrADJPuNKMTqw218.pdf>

7 . An Agricultural Water Use Package for MODFLOW and GSFLOW

文献源: Environmental Modelling & Software,2020-05-20

摘要: The Agricultural Water Use (AG) Package was developed for simulating demand-driven and supply-constrained agricultural water use in MODFLOW and GSFLOW models. The AG Package uses pre-existing hydrologic simulation provided by MODFLOW and GSFLOW. Three options are available for simulating water use for agriculture: (1) user-specified demands, (2) demands determined by a user-specified irrigation trigger value that is compared to the ratio of the simulated actual to potential evapotranspiration (ET), and (3) demands determined by minimizing the difference between potential and actual ET. The latter two approaches use energy and soil-water balance to determine crop-water demands. Irrigation withdrawals are diverted into canals and routed to fields using the MODFLOW SFR Package, or irrigation water is provided/supplemented by groundwater. Combined with MODFLOW or GSFLOW, the AG Package can simulate dynamic water use by agriculture in developed basins while providing flexibility to represent a range of irrigation practices.

链接:

<http://agri.ckcest.cn/file1/M00/01/0B/Csgk0V8pcSCAaLl0ADePjd-6XH0231.pdf>

8 . Challenges of agriculture and food systems issues in China and the United States

文献源: Geography and Sustainability,2020-05-16

摘要: China and the United States are the two most significant nations in the contemporary global food and agricultural network. In addition, they are two of the most important innovators with respect to the development of new crop varieties, agro-technologies, farm products, markets and consumer issues, such as consumer resistance to genetically modified foods, among others. In the face of an ever-complex web of interactions, technologies and products among producers and consumers in both nations, there are far more structural similarities than differences in the food and agriculture sectors of these two nations. This essay, adopting some of the themes of the Sino-American Symposium on Future Issues Affecting Quality of Life, presents a limited but representative comparative

assessment of three of the most important shared challenges impacting the agricultural sectors of China and the United States for the period from 2000 to the present including 1) environmental challenges related to agricultural water supply, 2) declines in farm labor and rural population, and 3) growing food-related concerns and challenges. For both nations, excessive and unsustainable groundwater consumption has lowered water tables and limited crop production. Rural populations and farm workforces in both nations are also declining, leading to labor challenges in both nations. Finally, concerns regarding food safety are also very similar with major challenges to the farm sector associated with consumer resistance to genetically modified food crops and sanitation issues linked to lengthening supply chains. All of these issues threaten the development of sustainable agricultural production systems.

链接:

<http://agri.ckcest.cn/file1/M00/01/0B/Csgk0V8pc3GAAAxEAB0-REhdXqI967.pdf>

【统计数据】

1 . 全国土地利用数据产品

发布源: 地理国情监测云平台

发布时间: 2020-08-04

摘要: 全国土地利用数据产品是以Landsat TM/ETM/OLI遥感影像为主要数据源, 经过影像融合、几何校正、图像增强与拼接等处理后, 通过人机交互目视解译的方法, 将全国土地利用类型划分为6个一级类, 25个二级类以及部分三级分类的土地利用数据产品。土地利用现状数据产品包含栅格数据集和矢量数据集, 其中耕地和城乡、工矿、居民用地平均分类精度达到85%以上, 其他土地利用类型平均分类精度75%以上, 可满足各行业用户的应用需求。

链接:

<http://agri.ckcest.cn/file1/M00/01/0C/Csgk0V8qyMaACBDRABn50b3jDBE639.pdf>

【专业会议】

1 . 2020智慧灌溉高峰论坛

发布源: 活动家

发布时间: 2020-08-04

摘要: 为加快推动3S、5G、物联网、大数据、云平台、人工智能、区块链等新一代智能技术和信息技术在节水灌溉工作中的应用, 加快灌区现代化改造和信息化建设, 完善田间节水设施, 大力推广应用智能高效节水新技术、新设备, 实现农田水利信息化和现

代化的发展目标，现决定举办“2020智慧灌溉高峰论坛暨培训班”。为便于各地各单位参会，论坛培训将在银川和成都分两期进行。

链接:

<http://agri.ckcest.cn/file1/M00/01/0B/Csgk0V8qx0yAN8XjACO7ZUUcH0k171.pdf>

主编：赵瑞雪
地址：北京市海淀区中关村南大街12号
电话：010-82106649

本期编辑：陈亚东
邮编：100081
邮件地址：agri@ckcest.cn