《中国农业发展战略研究》专题快报

2019年第10期（总第26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　　　　　　　　　2019年5月20日

【动态资讯】

1．Smart Farm Policies in Korea

【AgroNews】The Smart Farm government policy started with the rapid opening of the oversea market with trading economies such as the US and the EU has progressed rapidly. In the agricultural sector, since 2004, R & D for agricultural and ICT convergence has expanded and begun to pursue various advanced agricultural technology policies. During the period of 2004 and 2009, the government carried out the 'u-Farm' leading business and successfully operated 25 models. Through this project, Korea achieved visible results that confirmed the possibility of integrating agricultural technology and IT technology such as implementation of optimum growth conditions using sensor and traceability system using electronic tags. The government's smart farm policy direction is as follows: First, it will promote the facility modernization project and smart farm promotion, expanding the foundation for the introduction of ICT convergence facilities and easing the investment burden on farmers. Second, it aims to encourage farmers to voluntarily introduce smart farms by objectively analyzing and promoting productivity improvements and reductions in labor force resulting from the adoption of smart farms. Third, localize and standardize the core parts and technologies of smart farm such as related equipment and growth management, and make and distribute Korean smart farm model that suits our agricultural environment and conditions. Fourth, farmers and related personnel will have the ability to utilize ICT and specialize in small items to support 100% of the benefits of smart farms in the field.

链接:

http://news.agropages.com/News/NewsDetail---30481.htm

2．Shedding light on the key determinants of global land use projections

【EurekAlert!】Land use is at the core of various sustainable development goals. An international research group consisting of researchers from several institutions including PBL Netherlands, IIASA, and the Potsdam Institute for Climate Impact Research, endeavored to disentangle the key determinants of global land use projections in a study published in Nature Communications this week. The way that we use available land has important implications for the attainment of economic, environmental, and societal goals. To this end, land use studies have been carried out in countries across the globe, with many large-scale studies looking at future scenarios for our planet. Various models were used for these exercises, resulting in diverse and sometimes inconsistent projections. More recently, specifically in the context of climate change research, researchers have been working to produce more harmonized results by using a commonly approved set of scenarios - the so-called Shared Socioeconomic Pathways (SSPs). These efforts were a first step towards harmonization and consistency, but not all differences between model results could be reconciled. The study helped to assess what levers could be used to mitigate the future impact of specifically population growth, which was identified as a major driving force. Increasing agricultural productivity, for instance, decreased the amount of land needed to feed each individual. The results also show that enforcing more efficient land use protection for forests and other biodiverse natural habitats mitigates the most adverse impacts of expansion of agricultural land. Lastly, shifting diets towards less resource intensive products, particularly those with a lower share of livestock products, can also alleviate the human pressure on ecosystems and the demand for land.

链接:

https://www.eurekalert.org/pub_releases/2019-05/iifa-slo051619.php

3．Study reports breakthrough to measure plant improvements to help farmers boost production

【RIPE】CHAMPAIGN, Ill. — An international team is using advanced tools to develop crops that give farmers more options for sustainably producing more food on less land. To do this, thousands of plant prototypes must be carefully analyzed to figure out which genetic tweaks work best. Today, in a special issue of the journal Remote Sensing of Environment, scientists have shown a new technology can more quickly scan an entire field of plants to capture improvements in their natural capacity to harvest energy from the sun. "The

method we developed allows us to measure improvements we have engineered in a plant's photosynthesis machinery in about ten seconds, compared to the traditional method that takes up 30 minutes," Katherine Meacham-Hensold, a postdoctoral researcher at the University of Illinois, who led this work for a research project called Realizing Increased Photosynthetic Efficiency (RIPE). "That's a major advance because it allows our team to analyze an enormous amount of genetic material to efficiently pinpoint traits that could greatly improve crop performance."

链接:

https://ripe.illinois.edu/press/press-releases/study-reports-breakthrough-measuring-plant-improvements-help-farmers-boost

4．Where there's waste there's fertilizer

【EurekAlert!】May 15, 2019 - We all know plants need nutrients, especially nitrogen and phosphorus. To give crops a boost, they are often put on fields as fertilizer. But we never talk about where the nutrients themselves come from. Phosphorus, for example, is taken from the Earth, and in just 100-250 years, we could be facing a terrible shortage. That is, unless scientists can find ways to recycle it. Scientists at Tel Hai College and MIGAL Institute in Israel are working on a way to make phosphorus fertilizer from an unlikely source -- dairy wastewater. Additionally, they are taking the element from the wastewater with another unlikely character. They are using the leftovers that comes from making clean drinking water, which contain the element aluminum. He says the next step in this research is to look at the use of water treatment leftovers that contain iron, because many soils also lack this element. The scientists must also show that no unwanted material such as hormones and antibiotics are in the fertilizer.

链接:

https://www.eurekalert.org/pub_releases/2019-05/asoa-wtw050619.php

5．Trade could be key to balancing conservation of freshwater sources and food security

【EurekAlert! 】An IIASA study published in the journal Nature Sustainability today, evaluated whether water for the environment could be prioritized under growing competition from other sectors. The results indicate that this could be achieved by shifting crop production from water scarce- to water abundant regions and tripling international food trade. Globally, the call to conserve or restore the ecological health and functioning of

rivers and their associated wetlands for both human use and biodiversity is gaining traction and in many countries, efforts in this regard are already being supported by national and regional policies and legislation. To successfully implement these conservation efforts, methods have been developed to define environmental flows, in other words, the quantity, timing, and quality of water flows required to sustain freshwater and estuarine ecosystems, as well as the human livelihoods and wellbeing that depend on them. Global freshwater resources are however increasingly under pressure, with about 70% of water abstracted from freshwater ecosystems being used for the irrigation of agricultural crops. Around 40% of our food is in fact produced on irrigated lands, while the demand for water from industry, energy, and municipalities is also set to increase in the future.

链接:

https://www.eurekalert.org/pub_releases/2019-05/iifa-tcb051319.php

6．天长村村都有"个性化"施肥方案

【中国农业新闻网】"在查询机上点'推荐施肥'这项，进去之后找咱们万寿镇选项，再找你们村，就能知道如何配备肥料了。"近日，在安徽省天长市万寿镇农技站服务厅里，镇农技站站长陆广进正为两名村民讲解如何使用最近安装的自助查询机。"家里的承包地种了几十年，咱还是第一回晓得如何精确施肥。"村民刘红星感慨地说。查询机里安装的是测土配方施肥专家系统。据了解，这个系统是天长市委托南京农大研制的，目前包含了推荐施肥、肥料参数设置、缺少肥力元素诊断等8个模块。该系统可使种植户查询到以村为最小单位的耕地土壤pH值、氮、磷、钾以及有机质含量，并根据种植作物类型和预定目标产量有针对性地推荐施肥配方。天长市土肥站站长杨静介绍说，该市从2008年至2017年连续10年实施测土配方施肥项目并采集数据，完成了覆盖15个镇（街道）151个行政村、22个社区的1898个村民组共5800多个点位的土壤采样、化验分析工作，为该系统积累数据。

链接:

http://www.farmer.com.cn/jjpd/nz/fl/201905/t20190513_1441466.htm

7．吉林启动建设地膜治理示范县

【中国农业新闻网】本报讯（记者阎红玉）近日，记者从吉林省农业农村厅了解到，2019年，吉林省启动建设地膜治理示范县，通过两年的时间，实现示范县推广使用标准地膜、回收加工体系进一步完善、当季地膜回收率达到80%以上，率先基本实现地膜资源化利用。到2020年，全省废旧农膜回收加工网络持续健康运行，资源化利用水平进一步提升，

政策机制进一步完善，总体农膜回收利用率达到80%以上。据了解，吉林省将以花生、玉米和瓜菜等大宗覆膜作物为重点，选择覆膜面积大并具备废旧农膜回收加工能力的县，以推进标准地膜使用、补贴地膜回收利用环节开展废旧地膜综合利用为方向，建立专业化回收、机械化回收等多种方式的回收利用机制，形成技术可推广、运营可持续、政策可落地、机制可复制的示范样板。吉林省地膜回收工作以标准地膜应用、机械化捡拾、专业化回收、资源化利用为主攻方向，通过完善扶持政策、加强试点示范、强化科技支撑、创新回收机制、防控地膜残留污染提升废旧农膜资源化利用水平，促进农业绿色发展。全省农业农村主管部门要利用每年春耕备耕期间地膜回收的重要"窗口期"，积极组织农户、新型经营主体、回收企业、第三方服务组织等切实做好春耕备耕期间地膜回收工作。

链接:

http://www.farmer.com.cn/jjpd/nz/nzdt/201905/t20190506_1440975.htm

8．职业农民培育三年提质增效行动启动

【中华人民共和国农业农村部】本网讯 4月28-29日，全国新型职业农民培育管理培训班暨农民教育培训工作现场会在上海举行，启动职业农民培育三年提质增效行动。据了解，今年中央财政继续安排20亿元，聚焦乡村振兴人才需求，分层分类实施农业经理人、新型农业经营主体带头人、农村实用人才和现代创业创新青年等培育计划，全年培育职业农民100万人以上。会议指出，职业农民培育要紧紧围绕促进产业兴旺核心目标，坚持技能培育和职业教育两条腿走路，面向优化素质结构、提高合作水平、发挥带动作用三个方向发力，提升培育精准性、师资教学开放性、跟踪服务延续性、线上培育普及性，把职业农民培育成产业兴旺生力军、市场开拓先行者、创新创业带头人和带动小农户发展的先锋队。会议强调，三年提质增效行动旨在推动职业农民培育转型升级，提升质量效能，由注重数量全面转向数量质量并重转变，凝聚多部门合力，发挥多渠道资源作用，聚焦四项重点任务：一是深入实施培育工程，逐步实现所有农业县市区全覆盖。二是推动制度建设，留住、吸引、储备更多高素质劳动者投身农业。三是强化培育体系，统筹农广校、农业院校等资源，健全完善"专门机构+多方资源+市场主体"培育体系。四是搭建发展平台，为职业农民成长发展提供更好的支持服务。会议对新型职业农民智库建设、发展论坛、信息化发展、推介活动等工作做了全面部署。

链接:

http://www.moa.gov.cn/xw/zwdt/201904/t20190430_6288137.htm

9．农业科技人员知识更新远程培训正式启动

【中华人民共和国农业农村部】本网讯 4月25日，由农业农村部人事司、科技教育司主办的农业科技人员知识更新远程培训正式启动，首期培训班围绕当前农业农村发展形势、国内国际背景等方面进行讲解。培训课程通过全国农业远程教育平台农科讲堂面向全国1000余个卫星站点进行直播，同时通过互联网平台和手机APP进行同步直播。各地学员分别通过卫星网、互联网、移动端直播、点播系统参加培训。通过反馈及不完全统计，直播当天参训人数超过6.5万人次，其中卫星网1.5万人次，互联网2万余人次，移动端3万余人次。此次培训选题内容得到各地参训人员的广泛好评，学员普遍反映通过培训能及时了解掌握中央强农惠农富农政策及现代农业科技的新知识、新方法、新技能，切实提高广大科技人员开展科研和推广工作的能力水平，助力乡村振兴。

链接:

http://www.moa.gov.cn/xw/zwdt/201904/t20190426_6212948.htm

10．中国粮食安全政策实践与经验国际研讨会在京召开

【中华人民共和国农业农村部】本网讯 4月24—25日，由中国农业农村部与联合国世界粮食计划署联合主办的中国粮食安全政策实践与经验国际研讨会在京召开，农业农村部副部长屈冬玉在会上指出，全球粮食安全形势仍不乐观，中国农业农村部愿与相关国际组织一道，同广大发展中国家开展南南合作，分享中国维护粮食安全的政策、经验、成果，加强农业互联互通、经贸合作，共同致力于联合国2030可持续发展议程的实现，打造一个零饥饿的人类命运共同体。会议发布了《中国粮食安全政策演进与实践》，旨在总结中国改革开放以来实现粮食安全的经验做法，以期帮助发展中国家促进本国粮食安全。联合国世界粮食计划署、驻华协调员、粮农组织、国际农发基金等国际组织均表示中国在农业发展和减贫方面的经验值得其他发展中国家借鉴，对中国分享经验的做法表示赞赏。国家粮食与物资储备局以及10个发展中国家相关代表参加会议。

链接:

http://www.moa.gov.cn/xw/zwdt/201904/t20190425_6212840.htm

【文献速递】

1．Poly(methylene-co-cyanoguanidine) as an Eco-friendly Nitrogen Fertilizer with Prolonged Activity

作者：Piotr Rychter; Diana Rogacz; Kamila Lewicka, et al.

文献源：Journal of Polymers and the Environment ,2019

摘 要： Poly(methylene-co-cyanoguanidine), PMCG, is an oligomeric polycation that has

found its application in the waste-water treatment as well as in preparation of polyelectrolyte complex microcapsules for biomedical purposes. Considering the nitrogen-rich composition of repeating unit, PMCG may be a valuable polycation utilized as a novel slow-release fertilizer. The aim of this study was to evaluate the potential of PMCG as a nitrogen fertilizer during its 6-month incubation in the soil. Monocotyledonous oat (*Avena sativa*) and dicotyledonous radish (*Raphanus sativus* L.) were selected as representative model plants for plant growth test. The effect of PMCG on plant growth and development was dependent on both the PMCG concentration and time of incubation. An increase in the nitrogen amount in green parts of plants demonstrated the uptake of the plant-available form of nitrogen released from PMCG incubated in the soil. This resulted in an increased percentage of fresh matter and shoot height of the tested plants during their exposure to PMCG. Ecotoxicological impact of PMCG in the soil during incubation period against bacteria *Allivibrio fscheri* and crustacean *Heterocypris incongruens* was also assessed. PMCG was found as the potential polymer fertilizer that does not require special treatment and can be used as it is for the prolonged release of nitrogen in agriculture.

链接:

http://agri.ckcest.cn/file1/M00/06/6C/Csgk0FzU5WGAYqsWACjdHcqby9o734.pdf

2．中国省际农业绿色发展水平及区域差异评价

作者：金赛美

文献源：求索,2019

摘要：基于DPSIR模型,构建一个中国农业绿色发展评价指标体系。利用熵权法对农业绿色发展状况进行评价,并引入Theil系数对其进行空间解构。根据所构建的农业绿色发展评价体系,利用中国30余个省市区的面板数据,对各省市区(本文中"中国各省区"数据没有包括港澳台数据)农业绿色发展水平、区域差异性进行实证分析。研究表明:中国总体农业绿色发展能力不强,超过半数的省区农业绿色发展能力总体水平较低、发展不平衡、驱动力不足、响应不强烈。因此,中国各省区应结合自身资源条件,强化农业绿色发展理念,合理开发利用各种自然资源,改善农业生产环境,增加绿色农产品产量,促进农业绿色发展。

链接:

http://agri.ckcest.cn/file1/M00/06/6B/Csgk0FzU26mAZK_WAByDRH-6xEQ766.pdf

3．农业绿色发展的内涵与评价研究

作者：孙炜琳; 王瑞波; 姜茜

文献源：中国农业资源与区划 ,2019

摘要：[目的]推进农业绿色发展是农业发展观的一场深刻革命,关键在体制机制创新,建立一套适用于全国不同地区农业绿色发展评价的指标体系与评价办法,从而增强各地农业绿色发展责任意识,为推进农业绿色发展提供方向指导和决策参考。[方法]通过对国内外相关研究的梳理分析,对新时代我国农业绿色发展的内涵进行界定,进一步明确农业绿色发展的评价思路。[结果]在此基础上,构建包括4个一级指标、19个二级指标的农业绿色发展定量评价体系与由6个一级指标、15个二级指标构成的农业绿色发展定性评价指标体系,提出了归一化法和标准化系数法等评价方法。[结论]政府要加快建立完善农业绿色发展组织体系、领导干部农业生态资源离任审计以及农业绿色发展考核奖惩制度等制度体系,进一步强化农业生态资源数据采集与统计体系建设,加快更新农业资源环境统计条目,为农业绿色发展评价提供数据支撑。

链接:

http://agri.ckcest.cn/file1/M00/06/6B/Csgk0FzU2fiAfzFnAAhj3IesX1o306.pdf

4．高原特色农业绿色发展战略研究——以云南省为例

作者：邓秀月

文献源：农村经济与科技 ,2019

摘要：促进农业绿色发展是加快生态文明体制改革的必然选择。从以绿色发展为导向的视角思考我国高原地区农业的发展模式,深入研究高原农业如何实现绿色发展对于区域经济可持续发展具有重要意义。本文以云南省为研究样本,分析现阶段云南高原特色农业发展中存在的问题,对高原特色农业绿色发展战略进行研究并提出相关发展思路和建议。

链接:

http://agri.ckcest.cn/file1/M00/06/6B/Csgk0FzU2xSAfqiwAAGy2WL5Gys125.pdf

5．Green entrepreneurial farming: A dream or reality?

作者：Ali Sher; Saman Mazhar; Farhad Zulfiqar, et al.

文献源：Journal of Cleaner Production,2019

摘 要： Like other developing countries, Pakistan is under severe economic pressure and striving to boost entrepreneurial orientation for achieving growth through minimal depletion of natural resources. In order to facilitate widespread and successful adoption of

green entrepreneurial farming, it is crucial to address barriers inhibiting the uptake of green entrepreneurial activities in farming for the sustainability of natural resources as well as food provision. To this end, the present study aimed to investigate barriers in the adoption of green entrepreneurial farming in Pakistan. To fulfill the study objectives, after a comprehensive literature review and field visit, 34 barriers were identified. The results based on ranking analysis identified 20 out of 34 barriers as critical barriers to adoption of green entrepreneurial farming in the country. Furthermore, factor analysis was employed to group underlying 20 critical barriers into six major categories viz. 1) training and development-related barriers, 2) entrepreneurial orientation related barriers, 3) market orientation-related barriers, 4) customer orientation-related barriers, 5) innovation orientation-related barriers, and 6) green supporting supplies-related barriers. Results showed that most dominant barrier among six groupings was training and development-related barriers and the marginal role of government in the provision of such endeavours. This implies that government needs to play a more active role in the adoption and promotion of green entrepreneurial farming in Punjab, Pakistan.

链接:

http://agri.ckcest.cn/file1/M00/06/6C/Csgk0FzU5GeAXJzmAAmo8-NE4G0356.pdf

6. A state-of-the-art review on facilitating sustainable agriculture through green fertilizer technology adoption: Assessing farmers behavior

作者: Nadia Adnan; Shahrina Md Nordin; Mohamad Ariff Bahruddin, et al.

文献源: Trends in Food Science & Technology,2019

摘要: Green technology is the means of improving towards the rising environmental concern. The implication of green fertilizer technology (GFT) is the need for the modern development of environmentally friendly technology, also to increase the production level among all the agriculture crops. It is especially needed for paddy production, as it has always been considered as an important commodity because it is the main staple food for the nation. Paddy production in Malaysia using GFT allows for sustainable development and boosts the yield. Nevertheless, the adoption rate of GFT is unsatisfactory in most of the developing countries, including in Malaysia. The fact that the cost of production is considerably higher results in low-level perception regarding the adoption of GFT. Hence, the integration of communication and technology factors could become one of the main elements for the further development of the paddy sector in Malaysia. The overall objective of this research study will identify the factors that determine paddy farmer's adoption

decision on GFT in Malaysia. To do so, a literature review was compiled on the topic of agriculture innovation-based adoption decision theories such as Diffusion of innovation (DOI), Theory of reasoned action (TRA), Theory of Planned Behavior (TPB) and Technology acceptance model (TAM) and communication channels to study paddy farmers' adoption decision of GFT. The results of the review revealed that this framework highlights adoption as an intricate behavior, interweaving aspects such as communication channels, socio-psychological and innovation attribute considerations. The conceptual framework illuminates the decision towards adoption as a self-motivated process, assumes a composite interaction among groups of variables coming from two different theories. The combination of DOI, TRA, TPB, TAM and communication channels overcome some limitations that arise when the only theory is used to examine the adoption decision among paddy farmers in Malaysia. Correspondingly, there has been limited empirical research done on the decision of adoption toward GFT use among paddy farmers in Malaysia.

链接:

http://agri.ckcest.cn/file1/M00/06/6C/Csgk0FzU3MGAObVlABZgc6igL9Y719.pdf

7．加强农业污染治理 实现绿色发展目标

作者：徐瑞璇

文献源：吉林农业,2019

摘要：农业是国家之本,农业发展关系国计民生。在国家高度重视农业发展的今天,我们更应该积极探索农业发展与环境保护及治理间的平衡,寻求利国惠民之道。本文探讨农业生产过程中的主要污染类型和综合治理措施。

链接:

http://agri.ckcest.cn/file1/M00/06/6C/Csgk0FzU2_SAf3jtABUjtsxCcY0397.pdf

8．农业绿色发展技术导则(2018～2030年)

作者：中华人民共和国农业农村部

文献源：农技服务,2019

摘要：为贯彻落实中共中央办公厅、国务院办公厅《关于创新体制机制推进农业绿色发展的意见》,大力推进生态文明建设,有力支撑农业绿色发展和农业农村现代化,农业农村部组织编写并印发了《农业绿色发展技术导则(2018～2030年)》。

链接:

http://agri.ckcest.cn/file1/M00/06/6B/Csgk0FzU2rWAGUyzAA08l9mTSCo532.pdf

9．基于虚拟耕地流动视角的省际耕地生态补偿研究

作者：樊鹏飞；梁流涛；许明军，等.

文献源：中国人口·资源与环境,2019

摘要：作为生态补偿的一个重要组成部分,耕地生态补偿不仅能有效解决耕地生态系统"外部性"溢出问题,而且能够成为促进区域协调发展的重要杠杆,对于协调好我国吃饭、建设和生态之间的关系具有重要意义。虚拟耕地是生态系统循环中的重要物质流,在区域生态系统运行过程中发挥着重要作用。本文通过核算和分析我国省际间粮食流动格局,以"虚拟耕地"为载体,提出构建我国省际耕地生态补偿思路。结果表明:(1)2000—2015年间我国耕地生态补偿支付区和受偿区分布一直较为稳定。受偿区主要集中在我国东北、华北和西北地区,具体包括黑龙江、吉林、辽宁、内蒙古等省区,支付区主要集中在我国东南、西南和中部部分地区具体包括广东、浙江、福建、上海等省区;(2)我国省际间耕地生态补偿标准存在较大差异。2000年有五个省区的应获额度在20亿元以上,有六个省区的应付额度在10亿元以上。2005年有五个省区的应获额度在40亿元以上,有五个省区的应付额度在20亿元以上。2010年有五个省区的应获额度在80亿元以上,有五个省区的应付额度在35亿元以上。2015年有四个省区的应获额度在160亿元以上,有五个省区的应付额度在80亿元以上。研究提出:一方面要建立基于虚拟耕地流动的耕地生态补偿机制,具体包括构建补偿管理平台,明确补偿资金来源,建立多元化补偿方式,建立相应的调控与监督机制四个方面;另一方面要建立耕地生态补偿机制的保障体系,具体包括建立健全耕地生态补偿立法体系,建立耕地生态环境监测体系,建立多元化融资体系,加强有关耕地生态补偿方面的宣传教育五个方面。

链接:

http://agri.ckcest.cn/file1/M00/06/6C/Csgk0FzU5pmAMTzEAA178VYmG7c828.pdf

10．Evaluation of groundwater quality and assessment of pollution indices for heavy metals in North of Isfahan Province, Iran

作者：Ali Rezaei; Hossein Hassani; Nima Jabbari

文献源：Sustain. Water Resour. Manag. ,2019

摘要：Groundwater resources can be potentially a target for various sources of contaminations. One major step towards characterization of contamination sources and the associated parameters, is to conduct groundwater quality assessment through different methods. When dealing with heavy metals, calculation of pollution indices is among wellknown techniques of contamination characterization. The objectives of this study include primary assessment of physicochemical parameters of the groundwater and heavy

metal concentrations and finding distributions using multivariate statistical methods in the study area (i.e. north Isfahan province, Iran). Heavy metal pollution index (HPI) and metal index (MI) were the two indices evaluated for contamination assessment of heavy metals in 35 samples drawn within the study area. Generally, results indicated that the HPI of the groundwater in the study area was less than the critical value (<100). Based on HPI values, 51% of samples were classified as having low pollution levels, 46% medium pollution levels and 3% high pollution levels. The MI results revealed that two samples in the study area were significantly polluted with heavy metals. Water-type classification according to dominant cations and anions was also conducted and the result identified four types of water: NaCl, NaSO$_4$, NaHCO$_3$ and CaHCO$_3$. Multivariate statistical techniques [namely, correlation analysis and principal component analysis (PCA)] were applied for the evaluation of variations and interpretation of a large complex groundwater quality data set from the study area. The principal component analysis (PCA) extracted four components that control the groundwater chemistry. Findings of our study can be used in devising preventive measures to control pollution in the study area and similar regions where the groundwater resource would be relied upon for drinking purposes in the future.

链接:

http://agri.ckcest.cn/file1/M00/06/6C/Csgk0FzU5iyAYKHxAK0cDULUy9c725.pdf

【行业报告】

1．Environmental Engineering for the 21st Century: Addressing Grand Challenges (2019)

发布源：National Academies of Sciences, Engineering, and Medicine

发布时间：2019-05-01

摘要：Environmental engineers support the well-being of people and the planet in areas where the two intersect. Over the decades the field has improved countless lives through innovative systems for delivering water, treating waste, and preventing and remediating pollution in air, water, and soil. These achievements are a testament to the multidisciplinary, pragmatic, systems-oriented approach that characterizes environmental engineering. Environmental Engineering for the 21st Century: Addressing Grand Challenges outlines the crucial role for environmental engineers in this period of dramatic growth and change. The report identifies five pressing challenges of the 21st century that environmental engineers are uniquely poised to help advance: sustainably supply food, water, and energy; curb

climate change and adapt to its impacts; design a future without pollution and waste; create efficient, healthy, resilient cities; and foster informed decisions and actions.

链接:

http://agri.ckcest.cn/file1/M00/06/6C/Csgk0FzU6bCASPLRA0_lh8QmZkY672.pdf

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