《中国农业发展战略研究》专题快报

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【动态资讯】

1. USDA releases annual Pesticide Data Program summary

【**AgroNews**】More than 99% of samples tested in the U.S. Department of Agriculture's Pesticide Data Program had residue levels well below levels established by the Environmental Protection Agency. The USDA published the 203-page 2017 annual summary on Dec. 17 and said 53% of samples had no detectable pesticide residue."This report shows that when pesticide residues are found on foods, they are nearly always at levels below the tolerances set by the U.S. Environmental Protection Agency," the report said. USDA and EPA work together to identify foods to be tested on a rotating basis, according to a news release. In 2017, sampling and/or testing program operations were carried out with the support of 10 states: California, Colorado, Florida, Maryland, Michigan, New York, North Carolina, Ohio, Texas, and Washington. For more than 25 years, the release said AMS works with cooperating state agencies to collect and analyze pesticide residue levels on fresh and processed fruits and vegetables, dairy, meat, poultry, grains, fish, rice, specialty products and water.

链接:

http://news.agropages.com/News/NewsDetail---28767.htm

2. 韩长赋在黑龙江调研时强调 切实推进东北地下水超采治理

【**中华人民共和国农业农村部**】本网讯 12月15-16日，农业农村部部长韩长赋在黑龙江调研时强调，要认真贯彻落实习近平总书记重要指示批示精神，采取有效措施推进东北地下水超采治理，适当调减地下水超采区井灌稻，优化种植结构，建设保护好东北大粮仓。东北地下水超采是社会普遍关注的问题。韩长赋主持召开座谈会，听取相关部门、

地方同志介绍有关情况，研究推动落实工作。得知黑龙江通过加强灌区工程建设、推广节水灌溉技术、开展水稻休耕试点等措施，地下水保护利用工作取得了阶段性成效，韩长赋给予充分肯定。他强调，有关地方和部门要从讲政治、讲大局的高度，加大工作推进力度，切实落实好地下水超采治理任务。井灌稻面积扩大，是导致东北部分地区地下水位下降的原因之一。要科学规划设计，细化工作措施，按照"宜旱则旱、宜水则水、以水定地、以水定额"的原则，采取"工程换水、灌溉节水、休耕停水"等措施，调整优化种植结构，减少地下水开采。地下水超采治理涉及的地方和部门较多，要加强领导，精心组织，强化统筹协调，明确责任分工，形成工作合力。要综合考虑最低收购价、轮作休耕、土地政策、水价改革等问题，明确完善相关政策，以改革为动力，统筹推动地下水超采治理、种植结构调整等工作，推动农业高质量发展。

链接:

http://www.moa.gov.cn/xw/zwdt/201812/t20181217_6165069.htm

3．Climate change leading to water shortage in Andes, Himalayas

【OHIO STATE UNIVERSITY】Climate change could have devastating effects on vulnerable residents in the Andes mountains and the Tibetan plateau, according to researchers at The Ohio State University who have been studying glaciers in those areas for decades. Their findings--that glaciers in both parts of the world are melting more rapidly than at any point in the last 10,000 years--mean the water supply in parts of Peru, Pakistan, China, India and Nepal will decline, soon. "Supply is down. But demand is up because of growing populations," said Lonnie Thompson, a climate scientist at Ohio State's Byrd Polar and Climate Research Center. "By 2100, the best case scenario is that half of the ice will disappear. Worst-case scenario: two-thirds of it will. And you've got all those people depending on the glacier for water."

链接:

https://news.osu.edu/climate-change-leading-to-water-shortage-in-andes-himalayas/

4．Governments, researchers underestimate impact of inefficient land-use on climate change

【EurekAlert!】Policymakers and researchers have underestimated the effect that changes in land management and people's diets would have on limiting greenhouse gas emissions and countering the effects of climate change, according to a study led by Princeton University. The researchers report in the journal Nature Dec. 13 that the inefficient use of

land for agriculture and even alternative-fuel production greatly increases greenhouse gas emissions. They provide a "carbon benefits index" for calculating whether efforts to combat climate change are helped or hurt by switching agricultural production from corn to soybeans to tropical fruits, or from cropland to grazing land or bioenergy, or back to forest.

链接:

https://www.eurekalert.org/pub_releases/2018-12/pu-gru121118.php

5．全国设施蔬菜绿色发展现场会在山东召开

【中华人民共和国农业农村部】本网讯　12月11日，农业农村部在山东召开全国设施蔬菜绿色发展现场会，总结交流各地推进设施蔬菜绿色发展和连作障碍治理的成效经验，安排部署下一阶段重点工作。会议强调，要把设施蔬菜绿色发展作为满足消费升级的重要内容、缓解资源环境压力的重要举措、增加农民收入的重要渠道，促进设施蔬菜生产由主要满足"量"的需求向更加注重"质"的需求转变，促进资源永续利用和农民持续增收。会议强调，要深刻领会绿色发展的内涵和要求，务实创新推进设施蔬菜绿色发展。抓好技术集成创新，实施有机肥替代化肥、绿色防控替代化学防控，集成组装节能、节水栽培技术模式。抓好经营机制创新，加快培育新型经营主体和新型社会化服务组织，提高生产的组织化程度和产业化水平。推进设施装备升级，制定发布设施标准，规范设施设计建造，加快新型机械装备、抗灾装备、智能装备推广应用。推进产品质量升级，抓好"一标三品"，推进标准化生产、品种改良、品质改进、品牌创建。同时，集中力量破解连作障碍制约瓶颈。

链接:

http://www.moa.gov.cn/xw/zwdt/201812/t20181212_6164792.htm

6．Brazil partners with Canada and US in agrochemical use on minor crops

【AgroNews】The Brazilian Health Surveillance Agency (Anvisa) has announced a technical-scientific cooperation agreement with Canada and the United States to evaluate existing products and stimulate the development of new agrochemicals for use on so-called "minor crops" - crops of less economic interest, such as fruits and vegetables. The main objective of the partnership is the exchange of experiences among the countries for the development of strategies to resolve problems faced in this sector. "The partnership is important because in Brazil, as well as Canada, the United States and other countries, companies in the industry are reluctant to invest in studies to generate data for the registration of agrochemicals for these crops. This is due to the fact that the registration

process for this type of product is extensive and expensive," explains Anvisa.

链接:

7．Azotic's natural nitrogen fixing technology is now commercially available in the USA

【AgroNews】Azotic Technologies, the UK-based global ag-tech company, is now making commercial progress with its natural nitrogen fixing technology. N-Fix®/ Envita^{TM} (Envita^{TM} is the brand in North America) is derived from a naturally occurring food grade bacteria (Gluconacetobacter diazotrophicus) that enables plants to fix nitrogen from the air and replace up to 50 per cent of their nitrogen needs as an alternative to fertiliser. It is environmentally-friendly, cost-reducing and also proven to increase crop yields. After positive field trial results on maize, soybean and rice, Envita is now commercially available to growers in 26 US States. In 2018, farm scale trials across 11 states validated the previous 6 years of research with encouraging results and feedback from growers. According to Nolan Berg, President at Azotic North America, "Envita increases yields on average 5-13% and in some cases up to 20% in trials where nitrogen fertiliser levels have not been reduced". Azotic has also carried out a series of successful rice trials in Vietnam, Thailand, and the Philippines. In three Vietnamese rice trials the response was a mean average 20% (825 kg/ha) yield increase across all the field trials (2017). Two rice trials were carried out in Thailand and two in the Philippines in 2018. Overall on the N-Fix treated plots yields were significantly higher than the untreated at every fertiliser N level tested with the N-Fix treated plots yielding 17% (645 kg/ha) more than the untreated. At 50% of the recommended N fertiliser application a substantial 29% (1t/ha) increase was seen. Further rice trials are being carried out in Vietnam, Thailand and the Philippines.

链接:

8．地膜污染治理研讨会在京召开

【中华人民共和国农业农村部】 本网讯 12月3日，农业农村部组织召开地膜污染治理研讨会，以推进地膜污染综合防治为主题，围绕农膜回收行动、全生物降解地膜试验示范、降解地膜适宜性评价等议题开展了交流与讨论。会议重点交流了2018年全生物降解地膜评价筛选及引领性技术示范情况，对降解地膜的农田适应性、补贴机制、堆肥条件下降解进程、环境安全影响等进行了研究讨论，代表们建议进一步完善降解地膜适宜

性评价技术规范，探讨全生物降解地膜大田推广应用的方法和路径。下一步，农业农村部将继续推进全生物降解地膜试验示范工作，完善降解地膜评价指标体系，强化配套政策落实，同时认真梳理地膜回收和综合利用方面的好做法、好经验、好模式，提出适宜不同区域的地膜污染治理解决方案。

链接:

http://www.moa.gov.cn/xw/zwdt/201812/t20181204_6164365.htm

9．中央农办、农业农村部召开落实牵头职责加快推进农村人居环境整治工作座谈会

【中华人民共和国农业农村部】本网讯　12月3日，中央农办、农业农村部在京召开落实牵头职责、加快推进农村人居环境整治工作座谈会。农业农村部党组副书记、副部长余欣荣主持会议并讲话。他强调，农村人居环境整治是实施乡村振兴战略的第一场硬仗，农业农村部门要深入贯彻落实习近平总书记重要指示精神，切实提高政治站位，发扬担当精神，落实牵头职责，以更加扎实有力的行动，把农村人居环境整治这件大事、要事、实事、难事办好。按照中办国办《农村人居环境整治三年行动方案》的要求，抓紧入位，及时跟进，做好农村人居环境整治工作衔接，确保不断档、不耽误。要自觉加强学习钻研，掌握以前接触较少的垃圾、污水治理、改厕等农村人居环境整治的技术和管理知识，成为行家里手。重点要启动实施村庄清洁行动，加快农村"厕所革命"，统筹推进农村人居环境整治其他重点工作，组织开展督促检查，推动落实重点任务，加强村庄规划和人才队伍建设，强化技术创新和宣传引导。

链接:

http://www.moa.gov.cn/xw/zwdt/201812/t20181203_6164279.htm

10．宜昌因地制宜开展高山蔬菜土壤酸化治理

【中国农业新闻网】今年以来，湖北省宜昌市耕肥站结合化肥减量增效技术的推广，在全市开展高山蔬菜土壤酸化治理暨蔬菜化肥减量增效示范，取得了显著成效。近年来，宜昌市耕肥站因地制宜，指导菜农施用"有机肥+石灰+配方肥"治理酸性土壤，增强了土壤活性，降低了土壤中氮的残留，使土壤酸性降低。截至目前，全市高山蔬菜土壤酸化治理暨化肥减量增效示范面积达3.5万亩，其中核心示范区面积8600亩。为验证治理效果，宜昌市耕肥站在示范区设立了对比田，示范作物分别为辣椒、大白菜、萝卜等。实产验收的结果表明，示范田蔬菜亩均增产17%。采取施用'有机肥+石灰+配方肥'的技术模式进行土壤酸化治理，可一举三得。一是大幅降低菜农的投入，每亩投入减少115元，下降25.5%，8600亩核心示范区菜农共减少投入99万元。二是蔬菜产量大幅增加，亩均增产17%，核心示范区菜农收入增加1321万元，经济效益显著。三是保护了生态环境，

土壤酸化治理暨化肥减量增效行动每亩少施化肥（纯量）33.7公斤，示范区共少施化肥286.45吨，大大减少了农业面源污染。

链接:

http://www.farmer.com.cn/jjpd/nz/fl/201811/t20181130_1419715.htm

【文献速递】

1．Assessing the efficiency of changes in land use for mitigating climate change

作者：Timothy D. Searchinger; Stefan Wirsenius; Tim Beringer; Patrice Dumas

文献源：Nature,2018

摘要：Land-use changes are critical for climate policy because native vegetation and soils store abundant carbon and their losses from agricultural expansion, together with emissions from agricultural production, contribute about 20 to 25 per cent of greenhouse gas emissions. Most climate strategies require maintaining or increasing land-based carbon while meeting food demands, which are expected to grow by more than 50 per cent by 2050. A finite global land area implies that fulfilling these strategies requires increasing global land-use efficiency of both storing carbon and producing food. Yet measuring the efficiency of land-use changes from the perspective of greenhouse gas emissions is challenging, particularly when land outputs change, for example, from one food to another or from food to carbon storage in forests. Intuitively, if a hectare of land produces maize well and forest poorly, maize should be the more efficient use of land, and vice versa. However, quantifying this difference and the yields at which the balance changes requires a common metric that factors in different outputs, emissions from different agricultural inputs (such as fertilizer) and the different productive potentials of land due to physical factors such as rainfall or soils. Here we propose a carbon benefits index that measures how changes in the output types, output quantities and production processes of a hectare of land contribute to the global capacity to store carbon and to reduce total greenhouse gas emissions. This index does not evaluate biodiversity or other ecosystem values, which must be analysed separately. We apply the index to a range of land-use and consumption choices relevant to climate policy, such as reforesting pastures, biofuel production and diet changes. We find that these choices can have much greater implications for the climate than previously understood because standard methods for evaluating the effects of land use411 on greenhouse gas emissions systematically underestimate the opportunity of land to store carbon if it is not used for agriculture.

链接:

http://agri.ckcest.cn/file1/M00/06/59/Csgk0FwbIfeAchVoAG8vizjo2eA097.pdf

2．Resource nexus perspectives towards the United Nations Sustainable Development Goals

作者：Raimund Bleischwitz; Catalina Spataru; Stacy D. VanDeveer, et al.

文献源：Nature Sustainability,2018

摘要：Debate around increasing demand for natural resources is often framed in terms of a 'nexus', which is perhaps at risk of becoming a buzz word. A nexus between what? Over what scales? And what are the consequences of such a nexus? This article analyses why readers should care about the nexus concept in relation to the United Nations Sustainable Development Goals (SDGs). We discuss a five-nodes definition and propose perspectives that may lead to a reload of climate policy with buy-in from supply-chain managers and resource-rich developing countries. Our research perspectives address modelling approaches and scenarios at the interface of bio-physical inputs and the human dimensions of security and governance.

链接:

http://agri.ckcest.cn/file1/M00/06/59/Csgk0FwbI66AcrgCABByNsp6Lxc081.pdf

3．Put more carbon in soils to meet Paris climate pledges

作者：Cornelia Rumpel; Farshad Amiraslani; Lydie-Stella Koutika, et al.

文献源：Nature,2018

摘要：Soils are crucial to managing climate change. They contain two to three times more carbon than the atmosphere. Plants circulate carbon dioxide from the air to soils, and consume about one-third of the CO_2 that humans produce. Of that, about 10-15% ends up in the earth. Carbon is also essential for soil fertility and agriculture. Decomposing plants, bacteria, fungi and soil fauna, such as earthworms, release organic matter and nutrients for plant growth, including nitrogen and phosphorus. This gives structure to soil, making it resilient to erosion and able to hold water. Typically, organic matter accounts for a few per cent of the mass of soil near the surface.

链接:

http://agri.ckcest.cn/file1/M00/06/59/Csgk0FwbHq6AZT7kABCCt__3UJg476.pdf

4．In-season performance of European Union wheat forecasts during extreme impacts

作者：M. van der Velde; B. Baruth; A. Bussay, et al.

文献源：Scientific Reports,2018

摘要：Here we assess the quality and in-season development of European wheat (Triticum spp.) yield forecasts during low, medium, and high-yielding years. 440 forecasts were evaluated for 75 wheat forecast years from 1993-2013 for 25 European Union (EU) Member States. By July, years with median yields were accurately forecast with errors below ~2%. Yield forecasts in years with low yields were overestimated by ~10%, while yield forecasts in high-yielding years were underestimated by ~8%. Four-fifths of the lowest yields had a drought or hot driver, a third a wet driver, while a quarter had both. Forecast accuracy of high-yielding years improved gradually during the season, and drought-driven yield reductions were anticipated with lead times of ~2 months. Single, contrasting successive in-season, as well as spatially distant dry and wet extreme synoptic weather systems affected multiple-countries in 2003, '06, '07, '11 and 12', leading to wheat losses up to 8.1 Mt (>40% of total EU loss). In these years, June forecasts (~ 1-month lead-time) underestimated these impacts by 10.4 to 78.4%. To cope with increasingly unprecedented impacts, near-real-time information fusion needs to underpin operational crop yield forecasting to benefit from improved crop modelling, more detailed and frequent earth observations, and faster computation.

链接:

http://agri.ckcest.cn/file1/M00/06/59/Csgk0FwbIJWAZ5N5AClq9aMst0o336.pdf

5．Effects of land use/cover on surface water pollution based on remote sensing and 3D-EEM fluorescence data in the Jinghe Oasis

作者：XiaopingWang; FeiZhang

文献源：Scientific Reports,2018

摘要：The key problem in the reasonable management of water is identifying the effective radius of surface water pollution. Remote sensing and three-dimensional fluorescence technologies were used to evaluate the effects of land use/cover on surface water pollution. The PARAFAC model and self-organizing map (SOM) neural network model were selected for this study. The results showed that four fluorescence components, microbial humic-like (C1), terrestrial humic-like organic (C2, C4), and protein like organic (C3) substances, were successfully extracted by the PARAFAC factor analysis. Thirty water sampling points were selected to build 5 buffer zones. We found that the most significant relationships between land use and fluorescence components were within a 200m buffer, and the maximum contributions to pollution were mainly from urban and salinized land sources. The clustering

of land-use types and three-dimensional fluorescence peaks by the SOM neural network method demonstrated that the three-dimensional fluorescence peaks and land-use types could be grouped into 4 clusters. Principal factor analysis was selected to extract the two main fluorescence peaks from the four clustered fluorescence peaks; this study found that the relationships between salinized land, cropland and the fluorescence peaks of C1, W2, and W7 were significant by the stepwise multiple regression method.

链接:

http://agri.ckcest.cn/file1/M00/06/59/Csgk0FwbIBWAXeEMAELm1GswSQo826.pdf

6．A spatio-temporal land use and land cover reconstruction for India from 1960–2010

作者：Simon Moulds; Wouter Buytaert; Ana Mijic

文献源：Scientific Data,2018

摘要：In recent decades India has undergone substantial land use/land cover change as a result of population growth and economic development. Historical land use/land cover maps are necessary to quantify the impact of change at global and regional scales, improve predictions about the quantity and location of future change and support planning decisions. Here, a regional land use change model driven by district level inventory data is used to generate an annual time series of high-resolution gridded land use/land cover maps for the Indian subcontinent between 1960-2010. The allocation procedure is based on statistical analysis of the relationship between contemporary land use/land cover and various spatially explicit covariates. A comparison of the simulated map for 1985 against remotely-sensed land use/land cover maps for 1985 and 2005 reveals considerable discrepancy between the simulated and remote sensing maps, much of which arises due to differences in the amount of land use/land cover change between the inventory data and the remote sensing maps.

链接:

http://agri.ckcest.cn/file1/M00/06/59/Csgk0FwbHUKAX2T0ABV6eksLdps429.pdf

7．Intercomparison of phenological transition dates derived from the PhenoCam Dataset V1.0 and MODIS satellite remote sensing

作者：Andrew D. Richardson; Koen Hufens; Tom Milliman; Steve Frolking

文献源：Scientific Reports,2018

摘要：Phenology is a valuable diagnostic of ecosystem health, and has applications to environmental monitoring and management. Here, we conduct an intercomparison analysis

using phenological transition dates derived from near-surface PhenoCam imagery and MODIS satellite remote sensing. We used approximately 600 site-years of data, from 128 camera sites covering a wide range of vegetation types and climate zones. During both "greenness rising" and "greenness falling" transition phases, we found generally good agreement between PhenoCam and MODIS transition dates for agricultural, deciduous forest, and grassland sites, provided that the vegetation in the camera feld of view was representative of the broader landscape. The correlation between PhenoCam and MODIS transition dates was poor for evergreen forest sites. We discuss potential reasons (including sub-pixel spatial heterogeneity, flexibility of the transition date extraction method, vegetation index sensitivity in evergreen systems, and PhenoCam geolocation uncertainty) for varying agreement between time series of vegetation indices derived from PhenoCam and MODIS imagery. This analysis increases our confidence in the ability of satellite remote sensing to accurately characterize seasonal dynamics in a range of ecosystems, and provides a basis for interpreting those dynamics in the context of tangible phenological changes occurring on the ground.

链接:

http://agri.ckcest.cn/file1/M00/06/59/Csgk0FwbHgmAQk-QADAqme8am8k676.pdf

8．Change in Land Use and Evapotranspiration in the Manas River Basin, China with Long-term Water-saving Measures

作者：Guang Yang; Lianqing Xue; Xinlin He, et al.

文献源：Scientific Reports,2018

摘要：Widespread application of water-saving measures, especially advanced drip irrigation technologies, may significantly impact on the land use, and further potentially alter regional ecological environments in an arid area. In this study, the remote sensing and geographic information system technology were used to analyze the LANDSAT images (1976-2015) and the MOD16 evapotranspiration data (2000-2015) in the Manas River Basin (MRB), China where the water-saving technologies have experienced the past 40 years. Our results show that the area of the cultivated land was approximately doubled from 1976 to 2015 with a dynamic degree of cultivated land ranging from 1.7% to 4%. The reclamation rates were estimated at 9.5% in 1976 and 21.8% in 2015 and the comprehensive index of land use degree shows an increasing trend in the MRB. The evapotranspiration in the MRB suggests that the cultivated land is becoming more humid while the other regions are becoming

more arid. Long-term change in the land use is mainly promoted due to the multiple years' efforts on development of the water-saving technologies. This study greatly improves our understanding of the interactions between change in ecological environments and human activities and may provide policy makers guidance of sustainable development at an arid area.

链接:

http://agri.ckcest.cn/file1/M00/06/59/Csgk0FwbIvyAfAWbAB-yxL6HamI553.pdf

9．Spatial-Temporal Variation of Drought in China from 1982 to 2010 Based on a modified Temperature Vegetation Drought Index (mTVDI)

作者：Shuhe Zhao; Dianmin Cong; Kexun He, et al.

文献源：Scientific Reports,2018

摘要：Droughts cause huge losses of society and environment, therefore it is important to study the spatial-temporal pattern of drought. The traditional remote sensing drought indices (AVI, VCI and TCI) only consider the single factor representing the soil moisture (surface temperature or NDVI). The comprehensive remote sensing drought indices (VSWI and TVDI) can estimate the soil moisture more accurately, but they are not suitable for large scale region especially with great elevation variation. In this study, a modified Temperature Vegetation Drought Index (mTVDI) was constructed based on the correction of elevation and dry edge. Compared with the traditional drought indices, mTVDI had a better relationship with soil moisture in all selected months (R=−0.376, −0.406, −0.459, and −0.265, p<0.05). mTVDI was used to analyze the spatial-temporal patterns of drought in China from 1982 to 2010. The results showed that droughts appeared more frequently in Northwest China and the southwest of Tibet while drought centers of North and Southwest China appeared in Huang-huai-hai Plain and Yunnan-Guizhou Plateau respectively. The frequency of drought was increasing as a whole while the frequency of severe drought increased significantly by 4.86% and slight drought increased slowly during 1982 to 2010. The results are useful for the understanding of drought and policy making of climate change.

链接:

http://agri.ckcest.cn/file1/M00/06/59/Csgk0FwbIoOAI8y4AEEACcdfP0w660.pdf

10. Evaluation of riparian condition of Songhua River by integration of remote sensing and field measurements

作者：Bolin Fu; Ying Li; Yeqiao Wang, et al.

文献源：Scientific Reports,2018

摘要：Riparian zone is crucial to the health of streams and their surrounding environment. Evaluation of riparian condition is essential to achieve and maintain good stream health, as well as to sustain ecological functions that riparian areas provide. This manuscript is aimed to evaluate riparian conditions of Songhua River, the fifth longest river in China, using physical structural integrality (PSI) values derived from remote sensing and validated by field measurements. The variation and clusters of PSI values were discriminated by the spatial statistics to quantify variation of riparian condition in each measurement section. Evaluation results derived from 13 measurement sections indicated that over 60% of the riparian zones have been disturbed by human activities. Analysis of land use patterns of riparian zone in the cold and hot spots found that land-use patterns had an important effect on riparian condition. The build-up and farmland areas had been the main human disturbances to the riparian condition, which were increased from 1976 to 2013. The low-low clusters (low PSI values with low neighbors) of PSI values can be implemented to identify the vulnerability of the riparian zone.

链接:

http://agri.ckcest.cn/file1/M00/06/59/Csgk0FwbH5uAc6VLAJEo79AozuE935.pdf

【行业报告】

1. The United Nations World Water Development Report, Nature-based Solutions for Water

发布源：UN-Water

发布时间：2018-03-19

摘要：The United Nations World Water Development Report, Nature-based Solutions for Water, launched 19 March 2018 during the 8th World Water Forum, and in conjunction to the World Water Day, demonstrates how nature-based solutions (NBS) offer a vital means of moving beyond business-as-usual to address many of the world's water challenges while simultaneously delivering additional benefits vital to all aspects of sustainable development. NBS use or mimic natural processes to enhance water availability (e.g., soil moisture retention, groundwater recharge), improve water quality (e.g., natural and constructed wetlands, riparian buffer strips), and reduce risks associated with water-related disasters

and climate change (e.g., floodplain restoration, green roofs). Currently, water management remains heavily dominated by traditional, human-built (i.e. 'grey') infrastructure and the enormous potential for NBS remains under-utilized. NBS include green infrastructure that can substitute, augment or work in parallel with grey infrastructure in a cost-effective manner. The goal is to find the most appropriate blend of green and grey investments to maximize benefits and system efficiency while minimizing costs and trade-offs.

链接:

http://agri.ckcest.cn/file1/M00/06/59/Csgk0FwbKFiABeipAfRnv6KLfoQ261.pdf