2023年第19期总391期

# 农业与资源环境信息工程专题

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2023年5月8日

## 前沿资讯

### 1．Protecting the Earth Through Climate-Smart Agriculture and Technologies(通过气候智能农业和技术保护地球)

简介：Feeding a world population estimated to exceed 9 billion by 2050 will require significant increases in agricultural production, yet those increases must be sustainable solutions that protect the world's natural resources. As USDA's primary extramural funding agency, the National Institute of Food and Agriculture (NIFA) invests in research, education and Extension efforts to ensure a secure food supply while protecting and enhancing the world's natural resources. NIFA's Agriculture and Food Research Initiative (AFRI) is the nation's leading competitive grants program for agricultural sciences. AFRI-funded science is vital to meeting food, fiber and fuel demands as the global population expands while safeguarding the world's land and water resources. NIFA is working to transform American agriculture to increase production in sustainable ways and doing so in the context of diminishing land and water resources and a changing climate.

来源：USDA

发布日期:2023-04-26

全文链接:http://agri.ckcest.cn/file1/M00/10/2B/CsgkOGRUyrmAUgLDAAFV85rX1To398.pdf

## 学术文献

### 1．Evaluating the impacts of watershed rehabilitation and irrigation interventions on vegetation greenness and soil erosion using remote sensing and biophysical modelling in Feresmay watershed in Ethiopia(利用遥感和生物物理模型评估埃塞俄比亚Feresmay流域恢复和灌溉干预措施对植被绿化和土壤侵蚀的影响)

简介：Soil erosion and subsequent land degradation undermine efforts to ensure food security and environmental sustainability in Ethiopia. The government of Ethiopia has implemented extensive soil and water conservation (SWC) programs in severely degraded and food-insecure areas of the country, in some cases integrated with subsequent or parallel irrigation development. However, the effectiveness of these interventions has not been extensively evaluated. This study, therefore, evaluates the performance and impacts of SWC practices in terms of improving vegetation greenness and reducing soil erosion in Feresmay watershed in Ethiopia. Long-term Landsat-based Normalised Difference Vegetation Index (NDVI), Revised Universal Soil Loss Equation (RUSLE), and Soil and Water Assessment Tool (SWAT) were used for change-detection analysis before and after the implementation of various SWC interventions. The results revealed the positive impacts of SWC interventions in improving the vegetation greenness and soil erosion reduction although the outcome varied by intervention. Increased vegetation greenness was observed largely in areas where area closure with catchment treatment (ACCT) and impacts of irrigation (IRR) interventions are dominant, while relatively little impact was observed at the watershed level analysis. Although these interventions helped to reduce soil loss, the results highlighted the need for more SWC interventions to minimise further soil loss.

来源：All Earth
发布日期:2023-04-11
全文链接:http://agri.ckcest.cn/file1/M00/10/2B/CsgkOGRUzSyAdkppALX8XmXRIH8069.pdf

## 2．Crop type mapping with temporal sample migration（具有时间样本迁移的作物类型映射）

简介：Accurate and timely crop maps are crucial for monitoring agricultural production. Current supervised classification methods based on remote sensing rely heavily on ground-truth samples collected at a high cost, and the years without sampling highly limit classification accuracy. To address such a challenge, we proposed a time-migration method based on historical training samples collected in 2017, 2018 and 2020 to conduct supervised crop classification mapping in the target year (2021) with no ground samples. We chose Hailun City, Heilongjiang Province of northeastern China, as the study site; the major crops included corn, soybean, and rice. We reconstructed time series of Sentinel-2 data and selected spectro-temporal features to identify standard crop phenological curves. We calculated the similarity between reference and image spectra and designed label-matching rules to identify training samples through the dynamic time warping algorithm. We then used the historical samples to map the crop types of the target year. The results showed that the migration accuracy reached 95% for major crop. Using these samples as training data with a random forest to classify the target year, the overall accuracy reached 94.13%. The new sample time-migration method proposed in this study can efficiently migrate historical samples, greatly reducing the cost of ground-truth sampling.
来源：International Journal of Remote Sensing
发布日期:2023-03-31
全文链接:http://agri.ckcest.cn/file1/M00/03/59/CsgkOYirgpqATLgNAIG5XOyKwLs164.pdf

## 3．Estimating fractional vegetation cover and aboveground biomass for land degradation assessment in eastern Mongolia steppe: combining ground vegetation data and remote sensing（蒙古东部草原土地退化评估中植被覆盖率和地上生物量的估算：结合地面植被数据和遥感）

简介：Fractional vegetation cover (FVC) and aboveground biomass (AGB) are critically important for monitoring grassland degradation, and their accurate estimation can be used as key proxies for assessing land degradation. The main purpose of this study was to estimate the FVC and AGB in the eastern Mongolian steppe using remote sensing and machine learning. In this context, spectral bands and vegetation indices were extracted from the processed Sentinel-2 data and used as predictors. The field vegetation data were derived from the Mongolian pasture-monitoring database, which consisted of 256 plots with FVC and AGB measurements. Consequently, we derived FVC and AGB from Sentinel-2 imagery using 256 field vegetation measurements in the vast eastern Mongolian steppe as a reference for random forest (RF) models (R2FVC = 0.81, R²AGB = 0.76). Among the variables, the predictor variables derived from spectral vegetation and soil indices, especially NDVI, Simple Ratio (SR), and OSAVI, were highly important for predicting FVC and AGB. As expected, a comparison among the map values showed that the spatial distribution of FVC and AGB was

consistent with the landscapes and ecoregions in the study area. As the FVC and AGB maps only showed the current condition of vegetation cover, we also analysed NDVI trends to explain vegetation cover changes. We tested temporal trends in vegetation using Landsat NDVI time series data and the Mann-Kendall trend test. This revealed that in 7.3% of the area, the NDVI significantly increased, whereas a significant decrease was observed in 58% of the area.

**来源：** International Journal of Remote Sensing

**发布日期:**2023-01-23

**全文链接:**http://agri.ckcest.cn/file1/M00/10/2B/CsgkOGRUzxKAAW-vAFnLcwLyxR0688.pdf

## 科技报告

### 1．2023全球粮食政策报告：重新思考粮食危机应对措施

**简介：**2022年，世界面临多重危机。旷日持久的2019冠状病毒病疫情(COVID-19)、重大自然灾害、内乱和政治动荡以及气候变化日益严重的影响对食物系统的破坏仍在继续，而与此同时，俄乌战争和通货膨胀加剧了全球粮食和化肥危机。危机数量不断增加，多种危机的叠加影响日益加剧，饥饿人口和流离失所者数量不断攀升，促使人们呼吁重新思考粮食危机应对措施，从而为变革创造了一个真正的机会。

**来源：** IFPRI

**发布日期:**2023

**全文链接:**http://agri.ckcest.cn/file1/M00/10/2B/CsgkOGRUzeeAI7pyACVK5kGgOMw229.pdf