

中国北方旱区沙漠化的人口暴露度研究

韩乐¹ 赵媛媛^{1, 2} 丁国栋^{1, 2}

(1.北京林业大学水土保持学院, 水土保持国家林业局重点实验室, 北京, 100083; 2.宁夏盐池毛乌素沙地生态系统国家定位观测研究站, 盐池 751500)

摘要:【目的】沙漠化严重威胁着旱区人民的生活福祉, 揭示沙漠化的人口暴露度对客观认识沙漠化风险、改善人地关系有着重要意义。【方法】本文以中国北方旱区为研究区, 基于 2000-2020 年净初级生产力和人口数据, 在全域和沙漠沙地两个尺度上量化了区域沙漠化时空格局, 并评估了沙漠化区域的人口暴露度。【结果】2020 年中国北方旱区沙漠化土地面积 54.79 万 km², 占中国旱区总面积的 13.88%, 主要分布在毛乌素沙地、库布奇沙漠、古尔班通古特沙漠和浑善达克沙地, 其沙漠化面积分别占其总面积的 55.16%、44.42%、42.15%和 36.37%; 经线性趋势分析后得出, 2000-2020 年, 研究区内沙漠化呈总体逆转、局部恶化趋势, 逆转区域面积 174.72 万 km², 占比 44.51%, 恶化区域面积 0.98 万 km², 占比 0.25%; 沙漠化发展区域主要分布于古尔班通古特沙漠和塔克拉玛干沙漠西北部, 以及东南城市聚集区域; 人口暴露度呈东南高西北低的空间分布形式, 截至 2020 年, 毛乌素沙地总人口暴露度最高 (26.22 万人), 其次为塔克拉玛干沙漠 (12.13 万人), 柴达木盆地沙漠和呼伦贝尔沙地最少, 均仅有 42 人; 人口暴露度于 2005 年、2011 年、2015 年处于人口暴露高值区, 但总体来看, 人口暴露度在 21 年间呈波浪式下降, 由 2000 年的 3261.87 万人 (暴露比例 20.58%) 降低至 2020 年的 970.17 万人 (暴露比例 5.50%), 且不同受灾率下人口暴露度均降低。【结论】结合数据分析及人类活动和气候条件综合结果, 应重点关注新疆中部人口聚集区和内蒙古中东部农牧交错带两个区域, 并建议重点区域重点治理, 使当地自然环境能在长时期、大范围不发生明显退化, 以增强自然系统和社会系统的恢复力, 提高区域抗风险能力。

关键词: 沙漠化; 人口暴露度; 旱区; 沙漠; 沙地

Population exposure to desertification in the drylands of northern China

Abstract: 【Objective】 The aim of this study was to investigate the effect of the different modes of mixing birch into larch plantation on soil faunal communities and functional group in mountain area of northern Hebei, China. 【Method】 We taking the drylands of northern China as the study area, based on the Net primary productivity (NPP) and population data from 2000 to 2020, quantifies the spatial and temporal patterns of regional desertification at two scales: the whole area and the desert sands, and assesses the population exposure of desertification areas. 【Result】 We found that the desertification area of drylands in 2020 is 54,800 km², accounting for 13.88% of the total area of China's drylands, mainly distributed in the Mu Us Sandy-Land, Kubuqi Desert, Gurbantunggut Desert and Hunshandake Sandy-Land, whose desertification area account for 55.16%, 44.42%, 42.15% and 36.37% of their total areas, respectively. Based on linear trend analysis and significance analysis, it is concluded that from 2000 to 2020, the study area shows an overall reversal and local deterioration trend, with a reversal area of 174.72 km², accounting for 44.51%, and a deterioration area of 0.98 km², accounting for 0.25%; the desertification development area is mainly distributed in the Gurbantunggut Desert and the northwestern Taklamakan Desert, as well as the southeastern urban gathering area. The population exposure is spatially distributed in the form of high in the southeast and low in the northwest, as of 2020, the highest population exposure is in Mu Us Sandy-Land (262,200 people), followed by Taklamakan Desert (121,300 people), and the lowest in

Qaidam Basin Desert and Hulunbuir Sandy-Land, both with only 42 people. In 2005, 2011 and 2015, the population exposure is in a period, but in general, the population exposure decreased in waves during the 21 years, from 32,168,700 people (exposure ratio: 20.58%) in 2000 to 9,701,700 people (exposure ratio: 5.50%) in 2020, and the different disaster area's population exposure had a decreased trend. **【Conclusion】** Combined with the data analysis and the comprehensive results of human activities and climate conditions, we should focus on two areas: the population agglomeration in the central part of Xinjiang and the agricultural-pastoral interlacing zone in the central-eastern part of Inner Mongolia. We suggest that the key regions should be key governance so that the local natural environment can be treated without significant degradation in a long period and on a large scale, to enhance the resilience of natural and social systems, and improve the regional risk resistance.