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Estimation of Grassland Ecosystem Services Value of China Using Remote Sensing Data

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Grassland ecosystem is a very important terrestrial ecosystem in China.It provides not only a large number of economic products but also many ecological services for mankind.Estimation of the grassland ecosystem services values is urgently required for administration of the precious natural resource.This paper intends to propose a practical method to estimate grassland ecosystem services value using remote sensing data.First of all,the relationship between the value of organic matter production,O₂ released and CO₂ fixed,nutrient recycle,and environmental pollution cleaning and the net primary productivity(NPP)was established using various methods such as market value,substitution,shadow price,opportunity cost.Consequently,the relationship between the value of soil erosion control and the quantity of soil conservation,which can be calculated from vegetation coverage fraction,was also constructed.The value of water conservation function was calculated by vegetation coverage fraction.Then a net primary productivity(NPP)model of grassland based on photosynthesis efficiency model was proposed,in which all the parameters were retrieved from EOS/MODIS data.The method of determination of vegetation coverage fraction was also introduced.Finally,the value of grassland ecosystem services of China in 2003 was computed using the proposed method.Our results indicated that spatial variation of the ecosystem services value per unit area was consistent with the distribution of grassland types.The service value per unit area varied greatly with different grassland types.Shrub-meadow with sparse trees had the highest services value of 990259yuan/km²(RMB).The service value of upland meadow is also high up to 968586yuan/km²(RMB).Alpine desert steppe had the lowest services value of 56202yuan/km²(RMB).Alpine desert also had a low services value of 89952yuan/km²(RMB).Total service values of Chinese grassland ecosystem in 2003 was 1.70503×10¹²yuan(RMB).Different grassland types had different total services values depending on their areas.Alpine meadow had the largest amount of total value of 4.05998×10¹¹yuan,accounting for 23.81% of the total services values of the entire Chinese grassland ecosystem.The service value was also varied with different ecosystem functions.The released O₂ and the fixed CO₂ contributed the highest percentage to the total service values being 54.06%.The contribution of organic matter production,soil erosion control,nutrient recycle and water storage was 19.66%,14.28%,5.63% and 4.20%,respectively.

【Key Words】 : **grassland ecosystem services value remote sensing NPP MODIS**

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【References】

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10 Hits

- 1 CAO Yong-hong (College of Urban and Environmental Sciences,Northeast Normal University,Changchun 130024,China);[The basic thoughts about developing green ecological economy combined prataculture and livestock production on alkalized-salinized grassland in Northeast,China](#)[J];Journal of Northeast Normal University(Natural Science Edition);2008-04
- 2 ZHAO Jun,WEI Li,CHEN Shan(College of Geographic and Environmental Science,Northwest Normal University,Lanzhou 730070,P.R.China);[Dynamics of the ecosystem service values along the upper reaches of Shiyanghe River Basin](#)[J];Journal of Arid Land Resources and Environment;2010-01
- 3 JIANG Yong-hua^{①②},JIANG Hong^{①②}(^①International Institute for Earth System Science,Nanjing University,Nanjing 210093,China;^②International Research Center of Spatial-Ecology & Ecosystem

- Ecology, Hangzhou 311300, China); [Remote sensing estimation of forest ecosystem services-a case study of Yuhang district in Hangzhou](#)[J]; Science of Surveying and Mapping; 2009-06
- LIU Xing-yuan, SHANG Zhan-huan, LONG Rui-jun (International Centre for Tibetan Plateau Ecosystem Management, Lanzhou University; College of Pastoral Agricultural Science and Technology, Lanzhou University, Lanzhou, Gansu Province 730020, China); [Discussion on the Ecological Compensation Mechanism and Scheme of Rangeland](#)[J]; Acta Agrestia Sinica; 2010-01
- WANG Jian-qiang¹, HAO Run-mei¹, JARGAL² (1. College of Geographical Science, Inner Mongolia Normal University, Hohhot 010022, China; 2. College of Law and Political Science, Inner Mongolia Normal University, Hohhot 010022, China); [The Service Function Values of Grassland Eco-system of Hologeer County in Inner Mongolia](#)[J]; Journal of Inner Mongolia Normal University (Natural Science Edition); 2009-01
- LIU Junhui^{1,2}, GAO Jixi³ (1. Institute of Mountain Hazards and Environment, CAS & Ministry of Water Conservancy, Chengdu 610041, China; 2. China Graduate University of Chinese Academy of Sciences, Beijing 100049, China; 3. Institute of Ecology, CRAES, Beijing 100012, China); [Measurement and Dynamic Change of Ecosystem Services Value in the Farming-pastoral Ecotone of Northern China](#)[J]; Journal of Mountain Science; 2008-02
- MO Hong-wei^{1,2}, REN Zhi-yuan¹ (1. College of Tourism and Environment Science, Shaanxi Normal University, Xi'an 710062, China; 2. Hunan University of Science and Technology, Xiangtan 411201, Hunan, China); [Dynamic changes of vegetation's soil conservation value in Yuyang District of Northern Shaanxi in recent 30 years](#)[J]; Chinese Journal of Ecology; 2009-04
- ZHANG Ming-Yang^{1,3,4}, WANG Ke-Lin^{1,3}, CHEN Hong-Song^{1,3}, ZHANG Chun-Hun^{1,3}, LIU Hui-Yu², YUE Yue-Min^{1,3,4}, FAN Fei-De^{1,3,4} (1. Institute of Subtropical Agriculture, Chinese Academy of Sciences, Changsha, 410125, China; 2. College of Geography Science, Nanjing Normal University, Nanjing 210046, China; 3. Huanjiang Observation and Research Station for Karst Ecosystems, Chinese Academy of Sciences, Huanjiang, Guangxi 547100, China; 4. Graduate University of Chinese Academy of Sciences, Beijing 100049, China); [Quantified evaluation and analysis of ecosystem services in Karst areas based on remote sensing](#)[J]; Acta Ecologica Sinica; 2009-11
- YANG Min, FEI Yong-jun*, KE Lin, LIU Ya-li, LAN Xiu-hong (College of gardening and Horticulture, Yangtze University, Jingzhou 434025, China); [Research Progress on Evaluating Ecosystem Services of China Grassland](#)[J]; Prataculture & Animal Husbandry; 2010-03
- YU Fang¹, ZHU Wen-quan², CAO Dong¹, WANG Jin-nan¹ (1. Chinese Academy for Environmental Planning, Beijing 100012, China; 2. College of Resources Science and Technology, Beijing Normal University, Beijing 100875, China); [Economic cost of soil erosion from grassland degradation in Qinghai Province](#)[J]; China Environmental Science; 2009-01

【Citations】

Chinese Journal Full-text Database

10 Hits

- ZHAO Liang~1, GU Song~2, DU Ming-yuan~3, Tomomichi Kato~4, TANG Yan-hong~2, LI Ying-nian~1, ZHAO Xin-quan~1 (1. Institute of Biology of the Northwest Plateau, Chinese Academy of Sciences, Xining, Qinghai Province 810001, China; 2. National Institute for Environmental Studies, Tsukuba 3050053, Japan; 3. National Institute of Agro-environmental Science, Tsukuba 3050053, Japan; 4. Doctoral Program of Biological Sciences, University of Tsukuba 3058577, Japan); [The Seasonal Variations of Radiation Budget and of Community Biomass in the Haibei Alpine Meadows](#)[J]; Acta Agrestia Sinica; 2004-01
- ZHU Lian-qi, XU Shu-ming, CHEN Pei-yun (College of Environment and Planning, Henan University, Kaifeng 475001, China); [Study on the impact of land use/land cover change on soil erosion in mountainous areas](#)[J]; Geographical Research; 2003-04
- DUAN Fei zhou¹, CHEN Ling², A Limusi¹, XU Jie¹ (1. Department of Ecology and Environmental Science, NeiMongol University, Hohhot 010021, PRC; 2. Institute of Geograpy, Chinese Academy of China, Beijing 100101, PRC); [The Study on Reproductive Allocation of Nutrient Elements of the Steppe Plant Populations \(II\)](#)[J]; ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS NEIMONGOL; 2000-02
- OUYANG Zhi Yun WANG Xiao Ke MIAO Hong (Research Center for Eco Environmental Sciences, Chinese Academy of Sciences, Beijing 100080, China); [A primary study on Chinese terrestrial ecosystem services and their ecological-economic values](#)[J]; ACTA ECOLOGICA SINICA; 1999-05
- XIE Gao di, ZHANG Yi li, LU Chun xia, ZHENG Du, CHENG Sheng kui (Institute of Geographic Sciences and Natural Resources Research, CAS, Beijing 100101, China); [Study on valuation of rangeland ecosystem services of China](#)[J]; Journal of Natural Resources; 2001-01
- GAO Wang-sheng, DONG Xiao-bin (Regional Agricultural Development Research Center, College of Agronomy and Biotechnology, China Agriculture University, Beijing 100094, China); [Valuation of fragile agriculture ecosystem services in loess hilly-gully region: a case study of Ansai county](#)[J]; Journal of Natural Resources; 2003-02
- WANG Zong-ming, ZHANG Bai, ZHANG Shu-qing (Northeast Institute of Geography and Agricultural Ecology, CAS, Changchun 130012, China); [Study on the effects of land use change on ecosystem service values of Jilin Province](#)[J]; Journal of Natural Resources; 2004-01
- ZHAO Tong-qian^{1,2}, OUYANG Zhi-yun¹, ZHENG Hua¹, WANG Xiao-ke¹, MIAO Hong¹ (1. Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing 100085, China; 2. Henan University of Technology, Zhengzhou 451000, China); [Ecosystem services and their valuation in China](#)[J]; Journal of Natural Resources; 2007-02

technology, Jiaozuo 434000, China); [Forest ecosystem services and their valuation in China](#)[J]; Journal of Natural Resources; 2004-04

9 ZHAO Hai-zhen1, LI Wen-hua1, MA Ai-jin2, HE Yong-tao1(1. Institute of Geographic Sciences and Natural Resources Research, CAS, Beijing 100101, China; 2. Institute of Animal Sciences, CAAS, Beijing 100094, China.); [Valuation of barley agro-ecosystem services in Lhasa-river valley region — A case study of Dazi County](#)[J]; Journal of Natural Resources; 2004-05

10 XU Zhong-qi1,2, LI Wen-hua1, MIN Qing-wen1, XU Qing3(1. Institute of Geographic Sciences and Natural Resources Research, CAS, Beijing 101001, China; 2. Graduate School of Chinese Academy of Sciences, Beijing 100039, China; 3. Agriculture University of Hebei, Baoding 071000, China); [Research on Changes in Value of Ecosystem Services in Xilin River Basin](#)[J]; Journal of Natural Resources; 2005-01

【Co-references】

Chinese Journal Full-text Database

10 Hits

- 1 YANG An-xue et al(The Institute of Forestry, Guizhou University, Guiyang, Guizhou 550025); [Summary of Study on the Ecohydrological Functions of Karst Forest Ecosystems in Guizhou](#)[J]; Journal of Anhui Agricultural Sciences; 2007-36
- 2 SHEN Hai-jian et al(Surveying and Mapping Research Bureau of Hunan Province, Changsha, Hunan 410007); [Effects of Land Use Change on Ecosystem Services Value Based on RS and GIS Technology](#)[J]; Journal of Anhui Agricultural Sciences; 2008-11
- 3 ZHANG Zhi qiang 1,2 , XU Zhong min 1 , WANG Jian 1 , CHENG Guo dong 1 (1.State Key Laboratory of Frozen Soil Engineering, CAREERI,CAS, Lanzhou Gansu730000, China; 2.Scientific Information Center for Resources and Environment, CAS; [Value of the Ecosystem Services in the Heihe River Basin](#)[J]; Journal of Glaciology and Geocryology; 2001-04
- 4 LI Ying-nian, ZHAO Xin-quan, \ ZHAO Liang, \ WANG Qi-ji, \ SHEN Zhen-xi (Northwest Plateau Institute of Biology, Chinese Academy of Sciences, Xining Qinghai 810001, China); [Analysis of Vegetation Succession and Climate Change in Haibei Alpine Marsh in the Qilian Mountains](#)[J]; Journal of Glaciology and Geocryology; 2003-03
- 5 WANG Gen-xu~{1, 2}, SHEN Yong-ping~1, QIAN Ju~2, WANG Jun-de~2 730000, China; 2. National Laboratory of Western China's Environmental Systems, Lanzhou University, Lanzhou Gansu 730000, China); [Study on the Influence of Vegetation Change on Soil Moisture Cycle in Alpine Meadow](#)[J]; Journal of Glaciology and Geocryology; 2003-06
- 6 GUO Xiao-yin~1, HE Yong~2, SHEN Yong-ping~2,3, FENG Ding~2(1.Chinese Academy of Meteorological Sciences, Beijing 100081, China; 2.Key Laboratory for Climate Studies, National Climate Center, China Meteorological Administration, Beijing 100081, China; 3.Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences, Lanzhou Gansu 730000, China); [Analysis of the Terrestrial NPP Based on the MODIS in the Source Regions of Yangtze and Yellow Rivers from 2000 to 2004](#)[J]; Journal of Glaciology and Geocryology; 2006-04
- 7 WANG Jian~(1), QI Yuan~(1), CHEN Zheng-hua~(2), MA Ming-guo~(1), LI Jing~(1), HUANG Chun-lin~(1) (1.Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences, Lanzhou Gansu 730000, China; 2.Lanzhou University, Lanzhou Gansu 730000, China); [Modeling Dynamic Assessment on Ecosystem Services Based on Remote Sensing Technology — A Case Study on Gansu Grassland Ecosystem](#)[J]; Journal of Glaciology and Geocryology; 2006-05
- 8 ZHOU Wei Chuan CAI Jin Fa (Fuzhou Animal and Plant Quarantine Bureau, Fuzhou 350013, China) CHEN De Niu (Institute of Zoology, The Chinese Academy of Sciences, Beijing 100080, China) WU Yu Fen (Fujian Academy of Agricultural Sciences, Fuzhou 350003, Chin; [STUDY ON VIABILITY OF THE GIANT AFRICAN SNAIL IN CHINA](#)[J]; ACTA ZOOLOGICA SINICA; 1998-02
- 9 Li Qinglan1, Ren Jun1, Xu Jiangkun2, Tao Ling1(1.Institute of Environmental Ecology Environmental science and municipal engineering of Lanzhou Jiaotong University, Lanzhou 730070, China; 2.Jiangsu Xinyuan Environmental protection Co., Ltd, Nanjing 210004, China); [Economic Value of Urban Vegetation Ecosystem Services: A Case Study in Lanzhou](#)[J]; Environmental Science and Management; 2008-01
- 10 Anwar MOHAMMAT2), 3) YANG Yuanhe2) GUO Zhaodi2) FANG Jingyun2) (2)Department of Ecology, College of Environmental Sciences, and Key Laboratory for Earth Surface Processes of the Ministry of Education, Peking University, Beijing, 100871; 3)Xinjiang Institute of Ecology and Geography, Chinese Academy of Sciences, Urumqi, 830011); [Grassland Aboveground Biomass in Xinjiang](#)[J]; Acta Scientiarum Naturalium Universitatis Pekinensis; 2006-04

【Secondary References】

Chinese Journal Full-text Database

4 Hits

- 1 ZHENG Shu-hua1, WANG Kun1, ZHAO Meng-li2, HAN Guo-dong2, FENG Yu-feng1(1. Animal Science and Technology College, Chinese Agricultural University, Beijing 100094, China; 2. Ecology and Environment College, Inner Mongolia University, Huhhot 010019, China); [Primary evaluation of the indirect value on rangeland ecosystem services in Northern agro-pastoral ecotone — a case study in Taipusi banner and Guyuan](#) [J]; Pratacultural Science; 2009-09

- 2 ZHANG Bao-tian,WANG De-li(Institute of Grassland Sciences,Key Laboratory of Vegetation Ecology,Northeast Normal University,Changchun 130024,China);**A technique of rapidly restoring alkali-steppe with directly cultivating *Leymus chinensis* on the Songnen Plains**[J];Journal of Northeast Normal University(Natural Science Edition);2009-03
- 3 YANG Min, FEI Yong-jun*,KE Lin,LIU Ya-li,LAN Xiu-hong (College of gardening and Horticulture,Yangtze University,Jingzhou 434025,China);**Research Progress on Evaluating Ecosystem Services of China Grassland**[J];Prataculture & Animal Husbandry;2010-03
- 4 DU Hongliang1,.,CHEN Baiming2,YANG Ke2,31 Institute of Scientific and Technical Information of China,Beijing 100038,China2 Institute of Geographic Sciences and Natural Resources Research,Chinese Academy of Sciences,Beijing 100101,China3 Graduate School of Chinese Academy of Sciences,Beijing 100039,China;**Spatial-temporal distribution of the corrected ecological function values in Hebei Province**[J];Acta Ecologica Sinica;2010-09

【Secondary Citations】

Chinese Journal Full-text Database

10 Hits

- 1 ZHANG Zhi qiang 1,2 , XU Zhong min 1 , WANG Jian 1 , CHENG Guo dong 1 (1.State Key Laboratory of Frozen Soil Engineering, CAREERI,CAS, Lanzhou Gansu730000, China; 2.ScientificInformation Center for Resources and Environment, CAS;**Value of the Ecosystem Services in the Heihe River Basin**[J];Journal of Glaciology and Geocryology;2001-04
- 2 LI Ying-nian,ZHOU Hua-kun,SHEN Zhen-xi (Northwest Plateau Institute of Biology,the Chinese Academy of Sciences,Xining Qinghai 810001,China);**The Association Analysis of Herbage Yield and Meteorological Factors in Alpine Meadow**[J];Acta Agrestia Sinica;2001-03
- 3 LI Ying nian,ZHAO Xin quan,CAO Guang min,SHI Sheng bo (Northwest Plateau Institute of Biology, the Chinese Academy of Sciences, Xining Qinghai 810001, China);**The Study of Reflective Radiation and Surface Albedo of Alpine Meadow Vegetation**[J];Acta Agrestia Sinica;2002-01
- 4 LI Xiao jian 1, LIU Gang jun 1, QIAN Le xiang 2, Jim Peterson 2 (1.College of Environment and Planning, Henan University, Kaifeng, Henan 475001; 2.School of Geography and Environmental Science, Monash University, Clayton, Vic 3168 Australia);**Assessment of Land Use and Land Cover Change in a Middle Size Catchment: A Case Study of the Middle Yiluo Area**[J];Scientia Geographica Sinica;2001-04
- 5 PENG Wen ying 1,2 , ZHANG Ke li 1, JIANG Zhong shan 3, KONG Ya ping 1 (1.Department of Resources and Environment Sciences, Beijing Normal University; 2. Neijiang Normal College, Neijiang, Sichuan 641112; 3. Institute of Soil and Water Conserve;**Runoff and Sediment Changes Characteristics after Returning Cropland to Grass on the Loess Plateau**[J];Scientia Geographica Sinica;2002-04
- 6 GUO Xu dong, FU Bo jie, CHEN Li ding, MA Ke ming, LI Jun ran (Research Center for Eco Environmental Sciences, CAS, Beijing 100085, China);**Effects of Land Use on Soil Quality in a Hilly Area —— A Case Study in Zunhua County of Hebei Province**[J];Acta Geographica Sinica;2001-04
- 7 CHEN Siqing 1,2 , LIU Jiyuan 2 , ZHUANG Dafang 2 , XIAO Xiangming 2,3 (1. Institute of Remote Sensing Applications,CAS,Beijing100101, China; 2. In stitute of Geographic Sciences and Natural Resources Research,CAS,Beijing100101, China;3. Institute for the Study of Earth,Oceans and Space,University of New Hampshire,Durham,NH03824, USA);**Quantifying Land Use and Land Cover Change in Xilin River Basin Using Multi-temporal Landsat TM/ETM Sensor Data**[J];Acta Geographica Sinica;2003-01
- 8 Cai Qiangguo(Institute of Geography,Chinese Academy of Sciences,Beijing 100101)Shiu-hung Luk(University of Toronto Toronto, Canada)Wang Guiqing(Shanxi Institute of and Water Conservation, Lishi Shanxi 033000);**PROCESS-BASED SOIL EROSION AND SEDIMENT YIELD MODEL IN A SMALL BASIN IN THE HILLY LOESS REGION**[J];ACTA GEOGRAPHICA SINICA;1996-02
- 9 Fu Bojie Chen Liding Ma Keming (Research Center for Eco Environmental Sciences, Chinese Academy of Sciences, Beijing 100085);**THE EFFECT OF LAND USE CHANG ON THE REGIONAL ENVIRONMENT IN THE YANGJUANGOU CATCHMENT IN THE LOESS PLATEAU OF CHINA**[J];ACTA GEOGRAPHICA SINICA;1999-03
- 10 HE Chun-yang, SHI Pei-jun, CHEN Jin, ZHOU Yu-yu (Key Laboratory of Environmental Change and Natural Disaster, Ministry of Education of China, Beijing Normal University; Institute of Resources Science, Beijing Normal University, Beijing 100875, China);**A study on land use/cover change in Beijing area**[J];Geographical Research;2001-06

