贵州省"自然资本核算与生态系统服务估价"试点项目

Natural Capital Accounting and Valuation of Ecosystem Services Pilot Project in Guizhou Province

Performance Report

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Guizhou Provincial Bureau of Statistics
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联合国"自然资本核算与生态系统服务估价"项目试点地区

- 贵州试点项目于2018年7月贵阳国际生态文明论坛期间正式启动。

- The Guizhou Pilot Project was officially launched during the Guiyang International Ecological Civilization Forum in July 2018.

项目背景 Background

Establish expert team and develop work scheme

- 组建工作专班 Set up working group
- 制定出台《贵州省自然资本核算与生态系统服务估价项目工作方案》 Make *Program of National Capital Accounting and Valuation of Ecosystem Services Project in Guizhou*

Strengthen linkage and establish mechanism

- 与省直部门联动 establish the linkage mechanism with the provincial departments under direct control
- 编制自然资源实物量表 prepare a physical inventory of natural resources
- 形成《贵州省自然资本核算与生态系统服务估价研究方案》Make Research Approach for Natural Capital Accounting and Valuation of Ecosystem Service in Guizhou Province

Keep external exchange

- 2018年5月联合国项目贵州试点工作座谈会 May 2018 United Nations Project Guizhou Pilot Work Forum
- 2019年3月联合国贵州项目试点工作座谈会 March 2019 United Nations Project Guizhou Pilot Work Forum

Pilot exploration

- 贵阳市乌当区试点 Carry out Guizhou Pilot Project in Wudang District of Guiyang City, demonstrate the feasibility and rationality of the guidelines, accumulate the experience in collecting and processing basic data

■ 以《2012年环境经济核算体系—中心框架》、《实验性生态系统核算》框架为依据，在前期提出《研究方案》的基础上，编写完成《贵州省自然资本核算与生态系统服务估价编制方法》。

Make *Method of National Capital Accounting and Valuation of Ecosystem Services Project in Guizhou.*

01　生态系统范围账户 Ecosystem extent account

02　生态系统状况账户 Ecosystem condition account

03　生态系统服务账户 Ecosystem service account

五大生态系统

林木 Forest

草地 Grassland

农田 Farmland

水域 Water (Wetland)

城市 City

物理状况
Physical condition

土地覆盖类型比例 proportion of land cover type

土壤可侵蚀性 soil erodibility

环境状况
Environmental condition

空气环境质量 air quality

水环境质量 water quality

生物性状况
Biological condition

净初级生产力 plant coverage

生物多样性 biomass

人类干扰Human interference

人口密度 population density

建设用地占比 proportion of construction land

生态系统服务功能

产品供给功能
provisioning services

调节服务功能
regulating services

文化服务功能
cultural services

农业产品 Agricultural products
林业产品 Forestry products
畜牧业产品 Stockbreeding products
渔业产品 Fishery products
水资源产品 Fresh water
能源产品 energy

土壤保持 Soil conservation
碳固定 Carbon fixation
水源涵养 Water conservation
大气净化 Air quality maintenance
水质净化 Water purification
气候调节 Climate regulation

自然景观 Natural landscape

legend
- forest
- shrub
- grassland
- wetland
- farmland
- city
- desert

- 通过卫星遥感分析显示，2018年贵州省总面积17.6万km²，其中森林（含灌木）生态系统面积10.0万km²，占全省面积的57%；草地生态系统面积1.6万km²，占全省面积比例为9%；农田生态系统面积4.7万km²，占全省面积比例为27%；湿地生态系统面积0.5万km²，占全省面积比例为3%；城乡生态系统面积0.8万km²，占全省面积比例为4%，其中森林生态系统面积最大。

- The distribution map of ecosystem type, the distribution map of each ecosystem subtype and the inventory change table obtained through the superposition of satellite remote sensing images can describe the distribution and scope of each ecosystem type distinguished in the scope account. According to the distribution of basic ecosystems in Guizhou Province, there are five principal categories of ecosystem type: farmland ecosystem, forest (including shrub) ecosystem, grassland ecosystem, wetlands ecosystem, and urban ecosystem.

- 采用土地覆盖类型比例、土壤 可侵蚀性、空气环境质量、水环境质量、植被覆盖度、生物量、人口密度、建设用地占比等8项测评指标，对全省生态系统2018年生态系统状况进行评分。截至2018年末，全省生态系统评分为89.3，生态系统状况为二级健康。
- During the accounting period, and the value is marked according to the physical truth of each index, once for each accounting period. Then, the average value of various measures is calculated. Last, the corresponding ecosystem condition is determined according to the measurement score.

Scores for Ecosystem Condition Account

Area	Physical condition		Environmental condition		Biological condition		Human interference		Total score	Grade	Condition
	proportion of land cover type	soil erodibility	Air quality	Water quality	Plant coverage	Biomass	Population density	Proportion of construction land			
Province-wide	97.2	80	97.2	70	91	94	95	90	89.3	Grade II	Healthy

● 以2018年贵州省农林牧渔业增加值作为生态系统供给服务的价值量。汇总统计结果显示，2018年，全省生态系统供给服务价值为452亿元。供给服务价值通过扣减对应行业收入构成中人为参与部分，既避免了价值量化时的重复计算问题，又澄清了生态系统单独的贡献。其中水产品价值（包括水资源提供价值）最高，体现了贵州发达的水资源提供的丰富供给服务价值。

● Taking the value added of agriculture, forestry, animal husbandry and fishery in Guizhou Province in 2018 as the ecosystem provisioning service value. Provisioning services by deducting the artificial participation part of the corresponding industry income composition, the problem of double calculation in value quantification is avoided, and the individual contribution of ecosystem is clarified. The provisioning services includes agricultural products, forest products, animal husbandry products and aquatic products, among which the value of aquatic products (including the value of water resources) is the highest, which reflects the rich supply service value provided by Guizhou's developed water resources.

Total Value of Ecosystem Provisioning Services of Guizhou Province in 2018

| Service	Index	Value (RMB '00 million)	Percentage (%)
Provisioning service	Agricultural products	31	6.8
	Forest products	4	0.8
	Products of animal husbandry	11	2.4
	Aquatic products	406	90.0
	Total	452	100.0

- 在获取贵州省2018年各土壤保持因子数据的基础上，进行各因子图层处理，将土壤保持各个影响因子图层进行空间建模运算，得到贵州省2018年土壤保持空间分布图。

- The water and soil conservation model for the revised universal soil loss equation (RUSLE) is used for evaluation. Based on various soil conservation factors of Guizhou Province in 2018, the graphs of various factors are processed, and the spatial distribution map for soil conservation in Guizhou Province in 2018 was obtained through spatial modelling of the graph for factors affecting soil conservation.
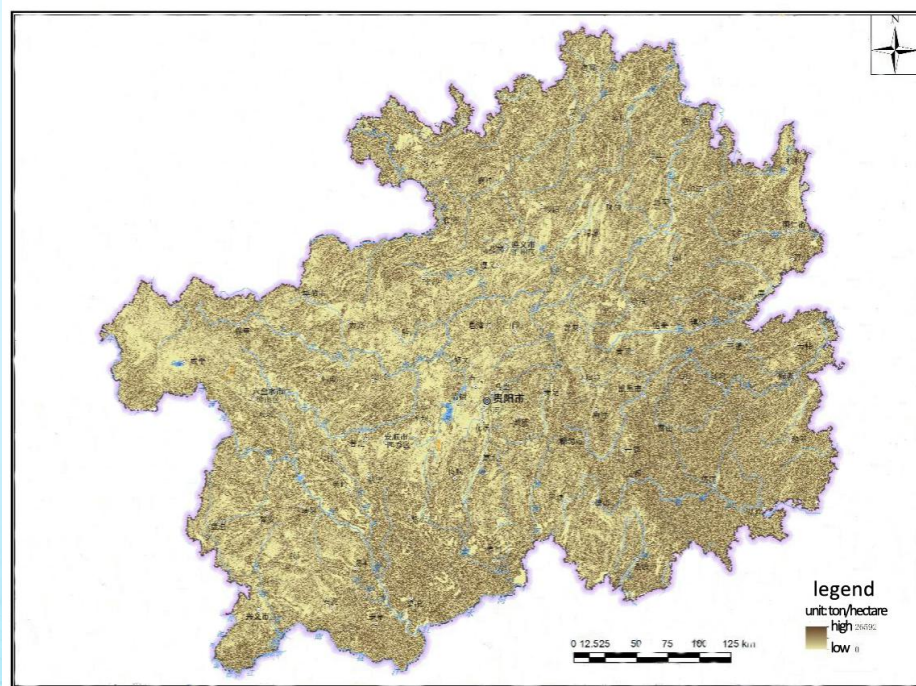
- 根据水源涵养量计算公式，在获取各个因子图层的基础上，通过ARCGIS空间建模运算，得到贵州省2018年水源涵养量空间分布图。

- The amount of water conservation in the ecosystems was calculated according to the water balance equation. According to the calculation formula for water conservation and available factor graphs, the spatial distribution map for water conservation in Guizhou Province in 2018 was obtained through ARCGIS spatial modeling.
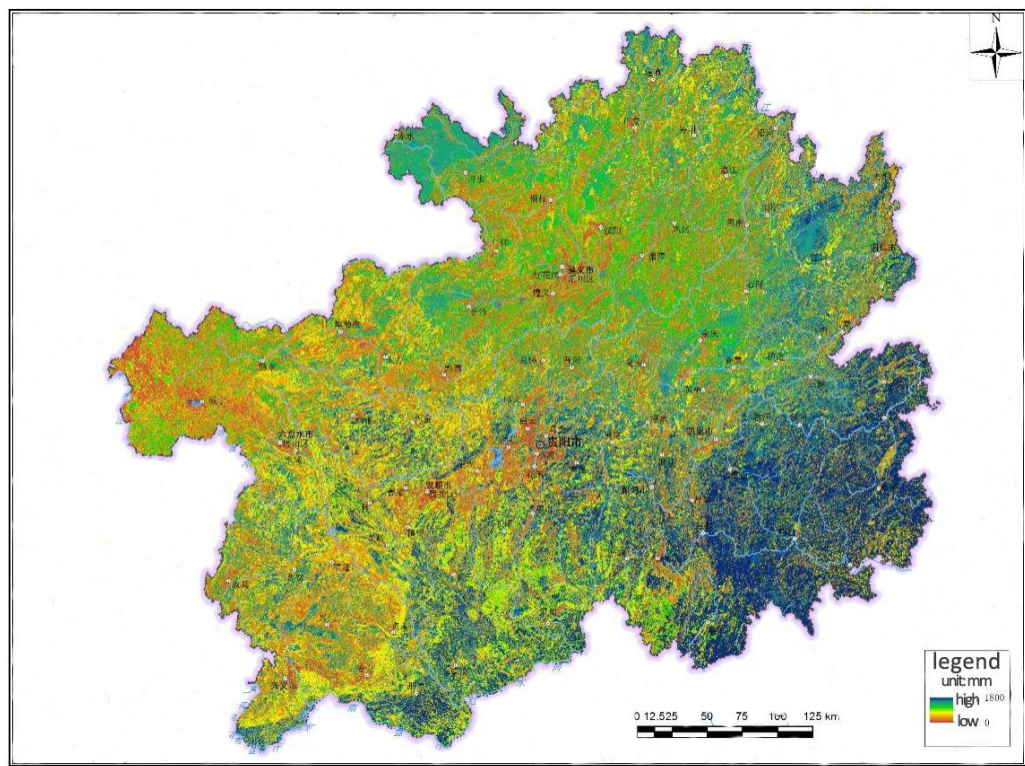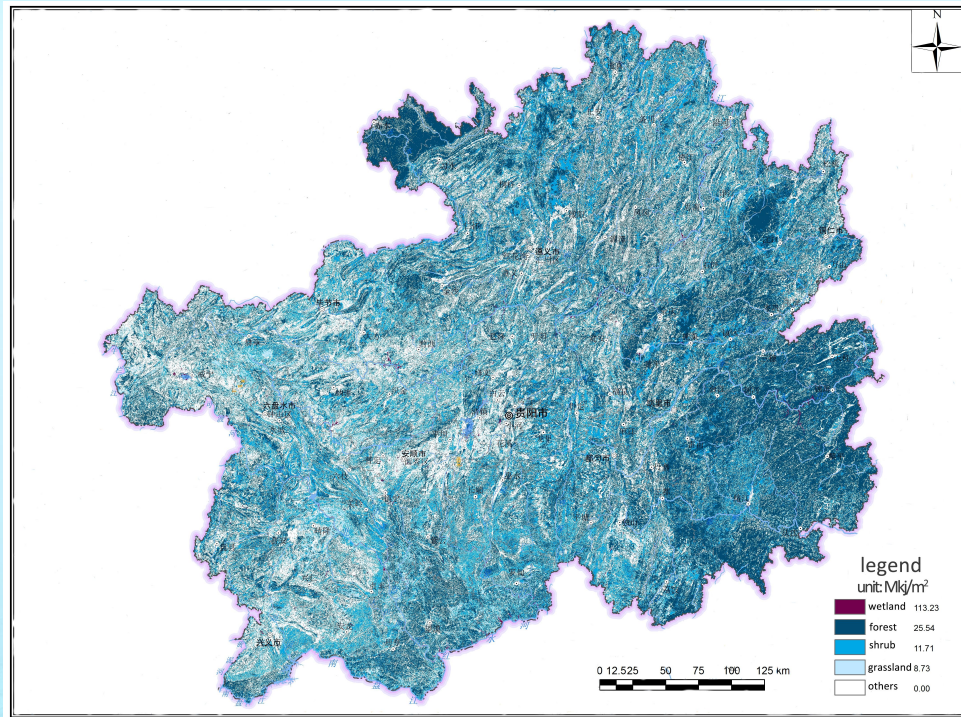
- 研究过程中选择碳固定作为生态系统碳固定功能的评价指标。通过NEP测量生态系统固碳量，得到贵州省2018年生态系统固碳分布图。

- The carbon fixation were selected as the evaluation indexes for the carbon fixation function of the ecosystems during research. According to the calculation method for carbon fixation, the distribution map of carbon fixation of the ecosystem in Guizhou Province in 2018.
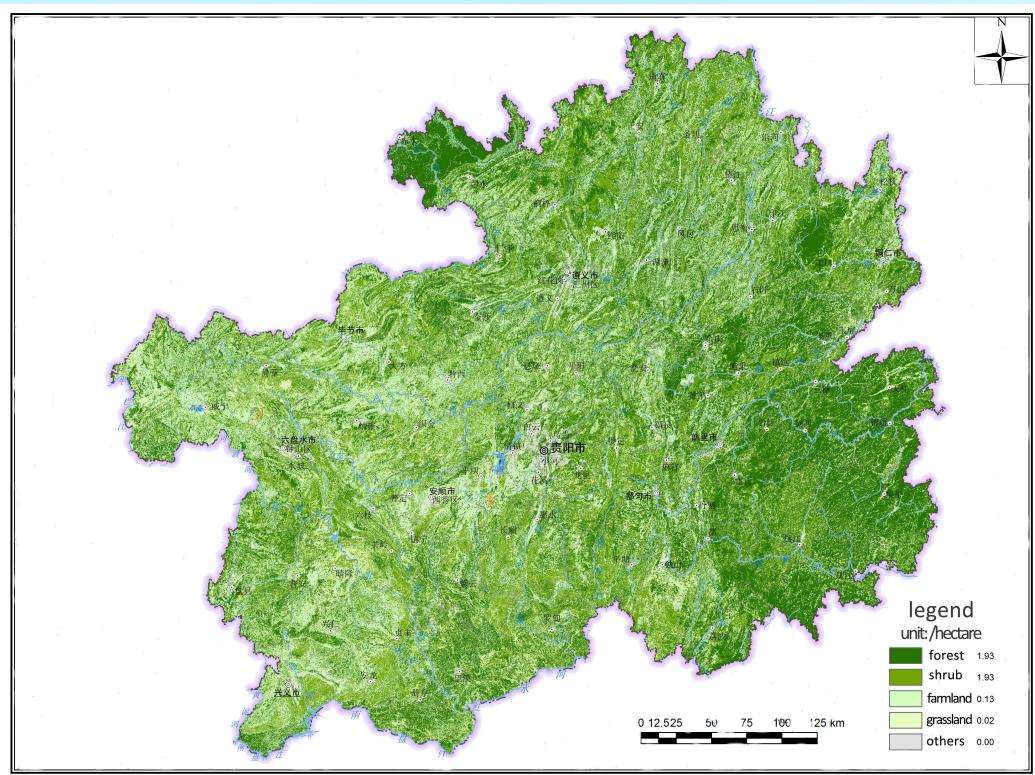
- 以生态系统降水和蒸发消耗的总能量作为气候调节的功能容量。根据贵州省2018年不同生态系统通过降水/蒸发吸收热量的空间分布数据，得出贵州省2018年气候调节功能容量的空间分布。

- The total energy consumed by ecosystem precipitation and evaporation is used as the function capacity for climate regulation. According to the heat absorption capacity of different ecosystems through precipitation/evaporation and the spatial distribution data of Guizhou Province in 2018, the spatial distribution of function capacity of climate regulation of Guizhou Province in 2018.

legend
unit: Mkj/m²
- wetland 113.23
- forest 25.54
- shrub 11.71
- grassland 8.73
- others 0.00

0 12.5 25　50　75　100　125 km

- 大气净化主要的空气污染物有二氧化硫、氮氧化物和工业粉尘。研究过程中，通过对二氧化硫、氮氧化物的吸收、抑尘能力等指标计算了生态系统的空气净化能力。Air purification main air pollutants include sulfur dioxide, nitrogen oxide and industrial dust. During the research, the air purification capacity of the ecosystems was calculated based on the absorption of sulfur dioxide, nitrogen oxide, inhibition of dust absorption and other indexes.

- 水质净化功能容量主要基于监测数据进行计算，并根据生态系统中污染物组成和浓度变化选取合适的指标进行定量评价。常用指标包括氨氮、COD、全氮、全磷和部分重金属。Water purification function capacity is mainly calculated based on monitoring data, and appropriate indexes are selected for quantitative evaluation according to the pollutant composition and concentration changes in the ecosystems. Common indexes include ammonia nitrogen, COD, total nitrogen, total phosphorus and partial heavy metals.

Function Capacity and Value of Regulating Services of Guizhou Province in 2018

Service	Index	Function capacity per unit area	Total function capacity	Value (RMB '00 million)
Regulating service	Soil conservation	1493.26 (t/ha)	275.12 (billion tons)	1549
	Water conservation	475.88 (mm)	865.07 (billion tons)	7146
	Carbon fixation	-	2093.41 ('0,000 tons)	184
	Climate regulation	-	24143.21 (10^{12}KJ)	2962
	Air purification	-	1966246.96 (t)	24
	Water purification		204491.72 (t)	3
	Total			11868

➢ 文化服务采用区域内自然景观的年旅游总收入作为文化服务功能的功能量评价指标，主要选取A级景区收入。The tourism cultural service value of natural landscapes of Grade A and above in Guizhou Province in 2018 was calculated.

Service	Index	Amount of cultural services ('0,000 person-times)	Cultural service value (RMB '00 million)
Cultural services	Natural landscape tourism	47069.44	4747

provisioning services
45.2 billion
2.7%

cultural services
474.7 billion
27.8%

遵义市

铜仁市

毕节市

贵阳市

六盘水市

安顺市

黔东南州

黔南州

黔西南州

69.5%

regulating services
1186.8 billion

In 2018, the ecosystem services of Guizhou Province were valued at RMB 1706.7 billion.
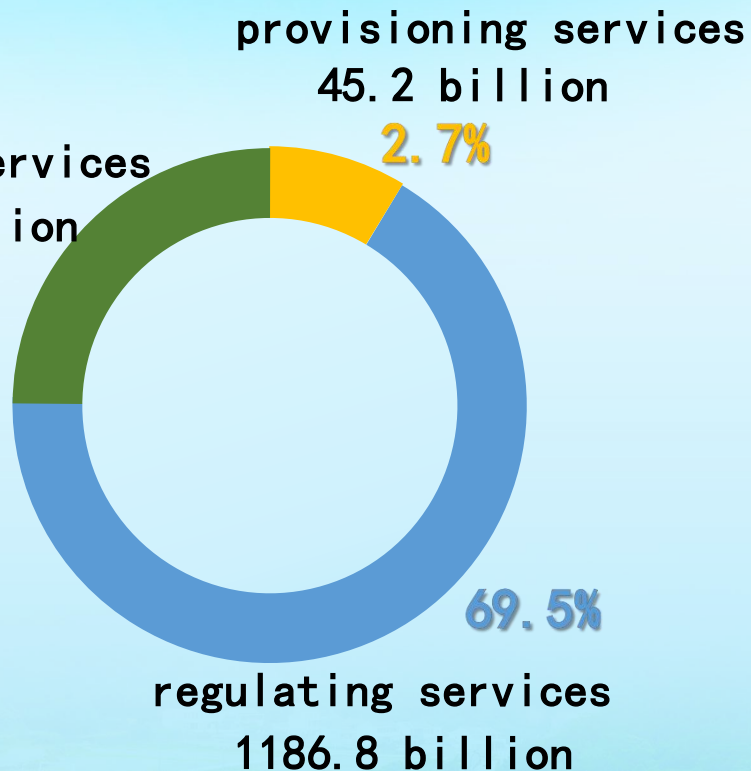
By comparing with the GDP of Guizhou Province in 2018,the total value of ecosystem services of Guizhou Province accounted for 111.3%

- **For statistical models,** The data are mostly collected by different functional departments of China by administrative division, and the data for different types of ecosystems are unavailable. Therefore, the value of some ecosystem services cannot be aggregated by different types of ecosystems, such as farmland ecosystem, forest (including shrubs) ecosystem, grassland ecosystem, wetland (including waters) ecosystem and urban ecosystem.

- **For valuation methods,** the accounting for the increase or decrease in natural capital and ecosystem service value cannot be achieved without the price reduction index of various services. At present, a relatively mature theoretical support and price survey system has not been established yet.

谢 谢!
Thanks!

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