# 西藏生态安全屏障保护与建设 成效监测与评估创新

#### 成果简介:

针对西藏高原脆弱环境下生态保护与建设难题,揭示高寒生态系统格局一过程一功能变化规律与驱动机制,提出生态保护一生态建设一支撑保障统筹的生态安全屏障构建新模式,系统解决环境与发展协调、区域生态安全可持续等重大问题,编制专项规划,获得国务院批准。研发了藏北高寒退化草地恢复技术、雅江河谷沙化治理与农田防护林建植技术、藏东南森林保育与采伐迹地营林技术、藏东小流域水土流失综合治理技术等,示范面积约2000公顷,综合效益显著。构建西藏多要素空地一体化生态监测技术体系,制定监测规范已颁布实施。建立适宜西藏高原生态工程特点的评估方法与指标体系,科学评估生态安全屏障一期工程建设成效,国务院新闻办公室对外发布。

#### Introduction:

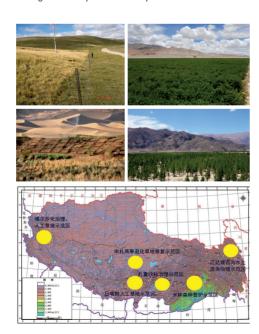
Since the environment and ecology in Tibetan Plateau is quite fragile, the ecological protection and construction become a big challenge to scientists around the world. To reveal the variation law and the driving mechanism of the pattern, process and function of the alpine ecosystem, our team developed an innovative model for the ecological security barrier integration on the ecological protection, construction and support. The model contributed to the environment and development coordination, regional sustainable ecological security. We made The Plan for Tibet's Ecological Security Barrier Protection and Construction which was approved by the State Council in 2009. And, we explored a series of technology to solve the environment problems in Tibet, such as the restoration method for the deteriorated grassland in northern Tibet, desertification control and farmland shelterbelt technology in Yarluntzanpo River Valley, forest conservation and plantation in deforested land technology in southeast Tibet, comprehensive controlling technology on soil erosion in small watershed in east Tibet. The demonstration engineering work is over 2000 ha and has shown a remarkable effect to the locals. Furthermore, we developed an ecological monitoring technology integrated with remote sensing, ground survey and multi factors. The ecological monitoring standard we made has been fully implemented in Tibet. We optimized an evaluation method and index system to assess the effectiveness of the ecological security barrier construction. The evaluation results have been released by the Information Office of the State Council.

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生态安全屏障的理论范式与基本思路

Ecological security barrier theory model and basic method



生态恢复技术应用与示范效益

Ecological restoration technology application and demonstration benefit

# Innovative Research on the Evaluation and Monitoring Achievements of Ecological Security Barrier Protection and Construction of Tibet

#### 推荐单位 / Recommended Units

中国科学院水利部成都山地灾害与环境研究所 Institute of Mountain Hazards and Environment, Chinese Academy of Sciences

### 完成单位 / Accomplished Units

中国科学院水利部成都山地灾害与环境研究所 Institute of Mountain Hazards and Environment, Chinese Academy of Sciences

### 合作单位/The Main Cooperation Unit

中国科学院地理科学与资源研究所

Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences

中国科学院青藏高原研究所

Institute of Tibetan Plateau Research, Chinese Academy of Sciences 西藏自治区环境科学研究所

Institute of Environment Sciences of Tibet Autonomous Region

#### 社会效益和经济效益:

2009 年国务院第 50 次常务会审议并通过《西藏生态安全屏障保护与建设规划(2008-2030年)》,国家投入专项资金 155 亿元,实施三大类 10 项工程,建设国家生态安全屏障。西藏高寒生态监测网络业务化运行,平均站网密度从 1.9 个站点 / 万平方公里提高到 5.2 个站点 / 万平方公里,生态监测规范已发布实施。2016 年 10 月,国务院新闻办公室举行了中国科学院《西藏生态安全屏障保护与建设工程(2008-2014 年)建设成效评估》发布会,向全球发布国家生态工程重要进展,用详实的数据科学、客观宣传了西藏生态环境保护与建设取得的成就。

#### **Economic and Social Benefits:**

In 2009, the 50th executive meeting of the State Council deliberated and approved The Plan for Ecological Security Barrier Protection and Construction in Tibet (2008-2030). With an investment of 15.5 billion yuan on 10 projects in three categories for national ecological security barrier construction, the Tibetan alpine ecological monitoring net started to work. The monitoring station number rises from 1.9 to 5.2 per km². In October 2016, the Information Office of the State Council held a press briefing on the evaluation results of the Achievements of Ecological Security Barrier Protection and Construction in Tibet. With the detailed data, the evaluation showed the scientific and objective achievements that China has gained on Tibet environment protection and construction to the world.





2016年10月26日,国务院新闻办公室发布《西藏生态安全屏障保护与建设工程建设成效评估》

On 26th Oct 2016, the Information Office of the State Council released the evaluation report on the Effectiveness of Tibet Ecological Security Barrier Protection and Construction Project from 2008 to 2014





国家科学技术进步奖二等奖

The second prize of National Science and Technology Advancement Award





西藏自治区科学技术奖一等奖 西藏自治区科学技术奖二等奖

The first prize of Science and Technology Advancement Award of Tibet Autonomous Region

The second prize of Science and Technology Advancement Award of Tibet Autonomous Region

## 团队成员 / Team Members:



王小丹 Wang Xiaodan

中国科学院水利部成都山地灾害与环境研究所主要贡献:项目总体设计。提出了生态安全屏障构建技术体系,开展了生态恢复关键技术研发与示范,组织完成了国家重大生态工程监测、评估与后续工程优化。

Institute of Mountain Hazards and Environment, Chinese Academy of Sciences

Dr. Wang formulated the overall planning of the project. Besides the systematic technology of the ecological security barrier, his innovative technology of the ecological restoration has been used on the demonstration construction. He also led to complete the national key ecological construction monitoring, survey and optimization of the follow-up projects.



张天华 Zhang Tianhua

西藏自治区环境科学研究所

主要贡献:有效整合了西藏生态监测资源,规范 了生态监测指标与方法,重点推进了生态监测网 络与生态安全屏障信息系统业务化运行。 Institute of Environment Sciences of Tibet Autonomous Region

Prof. Zhang integrated the ecological monitoring sources in Tibet and standardized the index and methods on the ecological monitoring. He also improved the ecological monitoring network and promoted the ecological security barrier information system.



程根伟 Cheng Genwei

中国科学院水利部成都山地灾害与环境研究所 主要贡献:项目总体设计。发展了冻土区分布式 水文模型,解决了冻融作用下水文过程模拟难 题,完成了主要生态系统水源涵养能力评估。 Institute of Mountain Hazards and Environment, Chinese Academy of Sciences

Dr. Cheng formulated the overall planning of the project. He developed the distributed hydrological model in the permafrost region. The difficulty on the hydrology process simulation under the freeze-thaw has been solved by the model. He completed the evaluation on the water conservation capability.



吴建波 Wu Jianbo

中国科学院水利部成都山地灾害与环境研究所 主要贡献:系统开展了主要生态工程区内外对 照研究,提出了生态工程规模与布局优化的技术途径。 Institute of Mountain Hazards and Environment, Chinese Academy of Science

Dr. Wu systematically studied the difference between the internal and external of main Tibetan Eco-security Barrier project area, and put forward the techniques for optimizing the scale and layout of ecological projects.



刘伟龙 Liu Weilong

中国科学院水利部成都山地灾害与环境研究所 主要贡献:查明了主要生态工程实施进展,评估 了自然保护区、重要生态功能区和生态敏感区生 态保护成效。 Institute of Mountain Hazards and Environment, Chinese Academy of Sciences

Dr. Liu illustrated the progress of the key ecological construction. He also evaluated the effectiveness of ecological protection on the nature reserves, the key ecological function regions and the ecological sensitive areas.



洪江涛 Hong Jiaotao

中国科学院水利部成都山地灾害与环境研究所 主要贡献: 阐明紫花针茅群落氮磷植物元素库在 降水梯度上解耦作用,揭示低磷环境下高寒植物 生殖优先的进化权衡适应策略。 Institute of Mountain Hazard and Environment, Chinese Academy of Sciences

Dr. Hong illustrated precipitation decoupled the N and P pools of the S. purpurea community along the moisture gradient, and drew out an evolutionary equilibrium strategy of priority for reproductive in alpine plants under low phosphorus conditions.



朱立平 Zhu Liping

中国科学院青藏高原研究所

主要贡献: 开展了气象、冰川、湖泊、林线、草 地生态系统等联网监测与变化原因分析,完成了 各生态安全屏障区生态功能动态评估。 Institute of Tibetan Plateau Research, Chinese Academy of Sciences

Dr. Zhu organized the network monitoring for the changes of climatic factors, glaciers, lakes, tree lines and grassland ecosystem, and performed their variation reasons analyses. He completed the dynamic evaluation of ecological functions in the ecological safety barrier regions.



黄 麟 Huang Lin

中国科学院地理科学与资源研究所

主要贡献:研发高原生态系统关键指标长时间序列信息的获取技术,揭示了近20年来高寒生态系统变化趋势与驱动力。

Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences

Dr. Huang developed the acquisition technology of the long-term information on the key index in the alpine ecosystem. She revealed the trend and driving force of the alpine ecosystem over the past 20 years.



张宪洲 Zhang Xianzhou

中国科学院地理科学与资源研究所

主要贡献:定量识别了气候变化和人类活动对高 寒生态系统的影响,完成了西藏天然林保护和退 牧还草工程实施成效监测与评估。 Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences

Dr. Zhang quantitatively explained the effect of the climate change and human activities on the alpine ecosystem. And, he evaluated the effectiveness of construction on the natural forest protection area and returning cropping land to forage land area.



鄢 燕 Yan Yan

中国科学院水利部成都山地灾害与环境研究所 主要贡献: 开展了天然草地保护工程的系统调查 与研究,揭示了围栏封育对种间竞争、生物量、 多样性和固碳的影响机制。 Institute of Mountain Hazard and Environment, Chinese Academy of Sciences

Dr.Yan investigated the effectiveness of natural grassland protection project and found the possible influence of fence enclosure on species competition, biomass, biodiversity, and carbon sequestration.

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