森林健康在中国

中美森林健康合作10周年总结报告

FOREST HEALTH IN CHINA
SUMMARY REPORT OF 10 YEARS OF CHINA-US
FOREST HEALTH COOPERATION

中国国家林业局造林绿化管理司
美国林务局国际合作司
美国孟菲斯动物园

Department of Afforestation, SFA, P. R. China
International Programs, Forest Service, USDA
Memphis Zoo, USA

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中国森林健康网
FOREST HEALTH

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International Program

森·林·健·康
FOREST HEALTH

MEMPHIS ZOO

前言

　　根据中美林业工作组第五次会议确定的2011～2013年合作计划安排，2013年4月24～26日，中国国家林业局和美国林务局在中国山东省泰安市共同举办了中美森林健康合作10周年纪念暨研讨会。中美森林健康合作项目实施以来，在中美双方的务实合作和共同努力下，项目建设取得了丰硕成果。各项目区充分考虑了森林资源状况、社会经济发展水平及对森林资源的主要功能需求，确定了不同的森林健康经营类型，科学编制了实施方案，采取综合措施推动森林健康经营，加强了科学研究，建立了典型监测样地，定期开展森林健康经营成效监测。10年来，项目区主要生态问题得到明显遏制，水土流失程度显著降低，森林健康状况有所提高，探索形成了森林健康评价指标体系和主要森林类型健康经营关键技术，森林经营管理水平有效提升。森林健康经营理念深入人心，得到了政界、学界和项目区民众的广泛关注与积极响应。项目区居民积极参与项目建设、发展经济林和林下经济、打造生态旅游产业，收入水平不断提高。

　　当前，全球林业正在发生深刻变化，加强森林可持续经营，积极应对气候变化已成为国际社会关注的热点问题，中美两国林业面临着许多共同挑战。中美两国同为林业大国，林业在两国经济社会发展中占有重要位置。加强中美林业合作不仅对双方提升本国林业建设水平具有重要作用，且对于推进全球森林可持续经营进程、促进绿色低碳发展、应对气候变化具有重要意义。根据中美森林健康合作10周年纪念暨研讨会纪要，中国国家林业局与美国林务局、孟菲斯动物园联合编制这本总结报告，旨在全面总结中美森林健康合作项目取得的成果和经验，为继续深入推进中美林业务实合作，不断拓展合作领域提供借鉴。

Preface

Based on the plan made during the 5th China-US Forest Health Work Group meeting, the State Forestry Administration of China (SFA) and the US Forest Service (USFS) teamed up to hold the ten year anniversary celebration and workshop in Tai'an city of Shandong Province in China on April 24-26th, 2013. Cooperation between the partners has helped China to make great strides in forest management since through the forest health demonstration project. Managers at all demonstration sites identified their site-specific forest resource conditions, social and economic development level, and their main objectives for forest functions. This knowledge was used to inform the establishment of different forest management regimes and guide scientifically-based implementation plans. During the implementation process, comprehensive measures were adopted at all sites to promote forest health management and strengthen scientific research. In order to monitor and evaluate the results of forest health management plans, sample plots were established at all demonstration sites. Over the past ten years, the primary ecological problems in the project areas have been curbed, soil erosion has been reduced, and the overall health of the forest has improved. In addition, a forest health indicator system has been developed and key technologies for forest health management for the main forest types have been established. As a result, forest management standards have been effectively enhanced. Forest health concepts were well publicized and received positive reactions from the government, academia, and the communities. Local communities at the demonstration sites actively participated in project development. By planting economically valuable trees and understory vegetation, and participating in ecotourism, community members have seen their incomes increase.

As the forestry situation changes throughout the world, there are great concerns in the international community regarding the role of forests in sustainable development. This requires more attention to strengthening sustainable forest management practices and ensuring that forestry is addressed in climate change mitigation efforts. Both China and the US are facing similar challenges, and there are many areas for cooperation in sustainable forest management, green and low carbon development, and the role of forestry in climate change mitigation. Forestry plays an important role in economic and social development both in China and the US. Strengthening forestry cooperation will not only have significance in forestry development for the two countries, but also benefit the global sustainable forest management, green and low carbon economic development and address climate change. This ten-year forest health cooperation summary report was written jointly by the State Forestry Administration of China (SFA), the US Forest Service (USFS), and Memphis Zoo. It aims to comprehensively sum up the challenges, achievements, and successful experiences of the forest health cooperation project, and provide suggestions for future forest management cooperation between China and the US.

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一 项目背景

（一）森林健康提出的背景

随着人类面临的全球气候变暖、生物多样性减少、生态环境恶化、森林火灾和有害生物入侵等严重威胁，美国等国家对森林生态系统的健康状况及其所提供的生态服务功能与效益越来越关注。20世纪80年代末至90年代初，为尽快制止生态恶化，美国在强调森林生态系统经营的基础上，应用保护人类健康的理念来保护森林生态系统的健康，提出了森林健康理念。森林健康经营引起了世界各国的高度重视。美国、加拿大等国率先对森林健康经营进行了探索和实践，德国、澳大利亚、欧盟等国家和地区也相继开展了森林健康监测工作。

1987年、1992年美国先后两次就森林健康问题举行国会听证会，并分别于1988年、1993年制订了全国范围的森林健康计划。1992年美国国会通过《森林生态系统健康与恢复法》，2003年时任美国总统布什在国会发表了有关森林健康的讲话，认为"森林健康是保证美国国土生态安全的必由之路"，从法律和政策层面对全国的森林健康经营提供了保障。森林健康得到了美国社会的广泛认同，成为美国林业发展新的里程碑。

Project Background

Background of the Forest Health Concept

As the forest ecological system faces increasing threats from global climate change, decreases in biodiversity, deterioration of the environment, forest fires, and invasive species introductions, many countries, including the United States, have begun to focus on the health of forest ecosystems. In an attempt to slow forest destruction in the late 20th century, the United States introduced the concept of forest health and suggested that protection of forest health should be based on the overall management of forest ecosystems. The United States and Canada were pioneers in the exploration and practice of forest health management. They were joined by Germany, Australia and the European Union as they began to monitor forest health.

In 1987 and 1992, the US held two hearings at Congress with regard to forest health, and in 1988 and 1993 worked out a national forest health plan. In 1992, the US Congress passed the *Forest Ecological System Health and Restoration Act*. In 2003, US president Gorge W. Bush delivered a speech at Congress, stating "forest health is the right and only way to safeguard America's ecological security". Forest health management received legal and policy support, and was widely accepted by American Society. The concept of forest health became a milestone in US forestry development and management.

◀
四川金堂示范点实施森林健康合作项目10年后的森林景观
Regional landscape of Jintang, Sichuan 10 years after the implementation of the forest health project

（二）森林健康的内涵

森林健康的实质是使森林具有较好的自我调节并保持其系统稳定性的能力，从而充分持续发挥森林的经济、生态和社会效益。美国和加拿大将"健康"的概念引入到森林生态系统管理中，认为健康森林是指能够保护生物多样性、保持良好的栖息环境、维护森林美学和自然资源可持续性的森林。森林健康理念倡导通过合理配置森林结构，实现森林病虫害自控、降低森林火险等级、增强环境保护功能和提高资源产值目标，使森林生态系统保持更高的生物多样性和稳定性，增强抵抗各种气象灾害的能力，能够满足人类所期望的多目标、多价值、多功能、多服务需求。

（三）中美森林健康合作项目的由来

20世纪90年代以来，随着对森林健康的广泛认同和研究不断深入，美国逐步形成了森林健康监测标准，已经发展成为涵盖健康经营规划、森林火险管理、森林病虫害防治、森林健康监测评价、人工促进自然修复、公众参与和环保意识教育等诸多方面的综合管理理论与实践体系。为借

Notion of Forest Health

The essence of Forest Health is to make forest self-sustained and stable, so as to play its economic, ecological and social effects. The United States and Canada introduced "forest health" into its forest ecosystem management, and believed a healthy forest is able to protect biodiversity, provide good habitat, present forest aesthesis and achieve natural resource sustainability. With rational build-up of forest structure, healthy forest can be pest and disease self-controlled, with lowered fire risks, stronger environmental function, and added resource value. The forest ecosystem can have higher biodiversity and stability, stronger capacity to mitigate meteorological disasters, so as to meet the expected demands of the humankind with multiple purposes, values, functions and services.

Evolution of China-US Forest Health Cooperation

Since the 90s in 20th century, with the wide recognition and deepened research on forest health, a forest health monitoring standard has been formed in the US, and then developed into a comprehensive management and practice system covering healthy forest management and planning, forest fire management, pest and disease prevention and control, forest health monitoring and evaluation, human-

四川金堂示范点实施森林健康合作项目前的低质低效林
Low quality forest stands in Jintang, Sichuan at the beginning of the forest health project

四川金堂示范点森林健康合作项目标志牌
Forest health project sign in Jintang, Sichuan

鉴美国森林健康经营成功经验，提高中国森林经营水平，增强森林抵御火灾、病虫害等自然灾害能力，提高森林多种功能，2001年，作为中美林业合作的内容之一，中美森林健康合作被纳入《中国国家林业局和美国农业部关于林业合作谅解备忘录》。2002年，中国国家林业局（SFA）与美国林务局（USFS）合作开展了中美森林健康试验示范项目。10年来，在双方共同努力下，中美森林健康合作项目取得了明显成效。

二 项目概况

（一）项目目标

通过开展中美森林健康合作项目，引进美国森林健康经营理念，在中国不同区域开展森林健康经营试验示范，提高项目区森林资源的生态、经济和社会服务功能，为中国各地区开展森林健康经营提供经验。

（二）项目内容

（1）在中国选择不同区域、不同类型的森林，针对其主导功能不同明确项目建设目标，确定试验示范内容，提出森林健康经营措施。

（2）以持续提高森林功能、促进森林健康为导向，开展森林健康经营试验示范，具体包括造林、森林经营、林业有害生物防治、森林火险管理、野生动物栖息地和生物多样性保护、科普宣传培训等。

（3）按照森林健康理念，结合中国国情和林情，与国内外相关研究机构、科研院所合作开展科学研究，研究示范森林健康经营技术模式，监测建设成效，研究提出森林健康指标体系，为项目区开展森林健康经营提供技术指导。

fostered natural regeneration, public participation and environmental awareness education. In order to learn the successful experience of the US forest health management, increase China's forest management standard, strengthen forest resistance in natural disasters like fire, pest and disease, enhance forest's multi-functions, in 2001 as part of China-US forest cooperation, China-US forest health cooperation was written into the MOU between China's State Forest Administration and USDA Forest Service. In 2002, SFA and USFS jointly carried out China-US forest Health demonstration projects. In the following ten years, thanks to the joint efforts, obvious achievements had been yielded in China-US forest health cooperation.

Project Introduction

Goals

The goals of the China-US Forest Health Cooperative Projects include:
• Introducing the US Forest Health Management concept to China.
• Establishing Forest Health demonstration sites.
• Increasing the ecological, economic, and social functions of the forest resources in project areas.

Objectives

❶ To determine site-specific forest health management goals, activities, and measures for different types of multi-use forest throughout China.

❷ To promote and enhance forest health and function through forest health demonstrations. Proposed management activities include afforestation, forest management, pest and disease control, fire management, education, training, and wildlife habitat and biodiversity conservation.

❸ To study technical models of forest health management specific to China's forest conditions, monitor effects, build up a forest health indicator system, and provide technical guidance to demonstration sites in collaboration with engaged research institutions and scientific entities.

（三）预期成果

（1）提高人们对森林健康理念的认识，为中国森林健康经营提供示范模式。

（2）建立适合不同试验示范区的典型森林健康经营模式。

（3）建立适合不同区域、不同类型的森林健康经营监测评价指标体系。

（4）充分展示健康森林在满足人类多种需求方面所具有的独特功能。

（5）促进中美两国人民在生态环境领域的友好合作。

（6）促进提高中国森林经营管理水平。

Expected Outcomes

1 Increase awareness of forest health and provide demonstration models for China's forest health management.

2 Establish typical forest health management models for different demonstration sites.

3 Create specific forest health monitoring indicator systems for different types of forests and regions.

4 Promote the unique functions of a healthy forest in meeting multiple human demands.

5 Foster friendly cooperation between China and the US in the ecological and environmental arenas.

6 Enhance China's forest management standard.

江西信丰示范点现场培训
Field trainings in Xinfeng, Jiangxi

现场培训村民种植中药材植物
Field training villagers to plant traditional Chinese medicinal botany

三 项目开展情况

（一）项目区域和承担单位

从2002年开始，中美森林健康合作付诸实践，先后在江西省信丰县、云南省丽江市、贵州省麻江县、陕西省佛坪县、北京市八达岭林场、河北省新乐市、山东省泰山林场、四川省金堂县和大兴安岭塔河林业局建立了9个森林健康经营试验示范区。

Project Development

Project Area and Undertaking Organizations

Since 2002, the China-US forest health project has been implemented in 9 demonstration sites including Xinfeng of Jiangxi, Lijiang of Yunnan, Majiang of Guizhou, Badaling Forest Farm in Beijing, Xinle of Hebei, Taishan Forest Farm in Shandong, Jintang of Sichuan, and Tahe Forest Bureau of Daxing'anling.

9个森林健康项目示范点分布示意图
Distribution of the 9 demonstration sites of forest health project

（二）项目组织实施

（1）成立协调合作的项目组织机构。中国国家林业局成立了由造林司主要负责人和各项目承担单位负责人组成的中美森林健康合作项目领导小组，各单位成立了由技术人员组成的项目执行小组；制定了项目管理办法，提出了项目建设考核指标，对各项目区年度建设任务完成情况进行检查考评；建立了各项目单位考察交流、现场工作会、座谈研讨会等项目协调机制，加强项目的组织协调和指导。美国林务局和孟菲斯动物园明确了专人负责协调指导中美森林健康合作项目。

Project Execution

❶ Management teams were formed to plan and implement projects at each demonstration site. A supervising team, led by the Department of Afforestation of SFA, was established with representative members from all participating organizations. The teams determined project management rules and evaluation methods, including an annual evaluation for each project. On-site meetings, seminars, and workshops were conducted throughout the implementation process to enable coordination and the exchange of information. USFS and the Memphis Zoo each assigned coordinators for the project.

（2）中美双方为项目提供了资金支持。中国国家林业局结合相关地区林业建设工程为森林健康项目提供了资金支持。各项目示范区所在地政府高度重视和支持示范项目建设，为项目实施提供了必要的配套资金。美方为举办项目研讨会、派专家赴项目示范区进行技术指导、接待项目区中方人员赴美考察学习等提供资金支持。

（3）中美双方联合开展人才培养和技术培训。中国国家林业局组建了由多所科研教学单位专家组成的项目专家团队，各项目建设单位也明确了科技支撑单位，开展技术培训，提高项目区专业技术人员水平；各项目区加强了与社区公众的沟通和能力建设，提高公众参与森林健康项目建设的积极性。美方邀请中方项目区管理和技术人员赴美国学习考察，并派出专家到中国项目区进行现场指导，开展项目建设成效监测、技术模式总结、森林健康评价指标体系研究等方面的人才培养和技术。

江西信丰示范点现场研究培训
Research and training at a pilot site in Xinfeng, Jiangxi

（三）项目内容和完成情况

（1）研究提出并划分了项目区森林健康经营类型。针对中国幅员辽阔、森林类型多样的特点，在开展森林健康项目示范时，充分考虑了不

泰山中美森林健康合作研讨会
Seminar on China-US forest health cooperation project at Mt. Taishan

2 Both China and the US provided funding for the project. SFA helped finance demonstration projects by combining related forestry construction projects. The US funded training seminars in addition to sending experts to demonstration sites and receiving Chinese delegations for study tours. All demonstration sites also received local government support and necessary matching funds.

3 Personnel and technical training was provided for managers, staff, and participating community members. SFA organized expert teams from various research and teaching institutions, and scientific organizations to support demonstration projects. Each site also collaborated with its own scientific group. Demonstration sites strengthened communications with the local community to encourage public acceptance and participation. The US invited managers and technical staff from demonstration sites to participate in study tours, sent experts to China for guidance, and worked together on capacity building. US counterparts offered technical advise on results assessments, technical models, and a new forest health indicator system.

Project Activities and Completion Status

1 Different forest health management types

同示范区经济社会发展水平和森林资源现状，创新性地提出了根据森林类型和培育目标探索建立森林健康经营模式的项目建设思路。通过确立不同示范区的经营类型，制定森林健康主要目标和工作内容，形成了如贵州麻江天然次生林及封育林森林健康类型、江西信丰低效林改造及经济林建设森林健康类型、云南丽江天然林及次生林旅游区森林健康类型、陕西佛坪珍贵野生动物栖息地森林健康类型和北京八达岭国有林场经营及景观游憩林、水源涵养林建设等类型（表1）。森林健康经营类型的划分，充分体现了健康森林所具有的生态、社会、经济综合效益。

were classified across demonstration sites. A single forest health management model would not have been suitable because of the range of forest types, resource conditions, and human demands on forest products throughout China. Therefore, forest health models were established based on forest types and management purposes. Forest health goals and content were created for each site based on the most effective management type. See Table 1 for the management type chosen for each site. This classification of forest health management types fully represents the comprehensive ecological, social, and economic benefits of the healthy forest.

表1 项目示范区及其经营类型
Table1 Demonstration project sites and corresponding management type

编号 No.	示范项目承担单位 Undertaking Organization	森林健康经营类型 Forest Health Management Type	面积（公顷） Total Hectares
1	北京市八达岭林场、西山试验林场 Beijing Badaling Forest Farm, West Hill Experimental Forest Farm	风景游憩林 Landscape and leisure	796.1
2	江西省信丰县 Xinfeng, Jiangxi	低效林改造及经济林 Low efficient forest reform and economic forest	1522.6
3	云南省丽江市 Lijiang, Yunnan	天然林及次生林 Natural and secondary forest	17881.5
4	贵州省麻江县 Majiang, Guizhou	天然次生林及封育林 Natural secondary forest, and enclosed hillside forest for regeneration	2465.9
5	陕西省佛坪县 Foping, Shaanxi	珍贵野生动物栖息地 Habitat for endangered wildlife	7312
6	河北省新乐市 Xinle, Hebei	平原防护林 Plain green belt	3491.5
7	山东省泰山林场 Taishan Forest Farm, Shandong	古树保护群 Ancient tree protection	12000
8	四川省金堂县 Jintang, Sichuan	川中丘陵区森林 Hilly forest in Central Sichuan	1546.2
9	大兴安岭塔河林业局 Tahe Forest Bureau, Daxing'anling	水源涵养林 Forest for water conservation	6406

（2）科学编制森林健康示范区项目实施方案。为科学开展示范项目建设，各示范项目单位均依托有关林业院校和科研单位编制了项目建设实施方案或规划。项目建设实施方案充分考虑不同示范区的森林资源状况、社会经济发展水平以及对森林的主要功能需求，根据森林类型和培育目标的不同探索建立不同的森林健康经营模式，明确了建设目标、建设内容及成效监测指标等，将森林健康理念融入森林生态系统管理中，贯穿于森林经营活动计划全过程，并采取参与式方法编制方案，充分征求利益相关人意见，确保项目建设的科学性、持续性。

❷ Project implementation plans were created for demonstration sites with the help of forestry academies and research institutions. Based on the forest resource status, socioeconomic development level, and the main demand on forest services, different forest health management models were set up with clear goals, activities, and evaluation and monitoring indexes. Participatory methods were adopted to include stakeholders in the planning and implementation processes, ensuring acceptance and sustainability of the project.

❸ Forest health demonstration projects were implemented at pilot 9 sites. A total of 3,900 hectares (1 hectare equals about 2.5 acres) of artificial forest were created, 5,744 hectares of low efficient forest were transformed, 109 pest and disease monitoring plots were set up, and 8,000 personnel were trained. Depending on the management strategies of each site, other activities included the development of forest recreation areas, mid- and young-aged forest fostering, close to natural forest health management, fire prevention and control, ecological benefit monitoring, giant panda and other wildlife corridor building, and bamboo regeneration and fostering.

村民参与式调研
Participatory rural investigation

（3）扎实推进森林健康示范区项目建设。9个试验示范区按照实施方案，基本完成了预期建设任务，项目期间共完成人工造林3900公顷，低效林改造5744公顷，设立病虫害监测样地109个，组织培训项目区林业工作人员8000人次。各项目示范区从本地实际出发，分别开展了森林生态游憩体系建设、低效林健康改造、中幼龄林抚育、近自然化森林健康经营、森林病虫害防治、护林防火、生态效益监测、大熊猫等野生动物廊道建设、竹林更新复壮等一系列森林健康经营活动。

北京西山林场示范点"森林健康——我们在行动"启动仪式
Opening ceremony of forest health—we are in action at pilot site of Xishan Forest Farm, Beijing

（4）广泛宣传森林健康经营理念。为进一步推广和宣传森林健康理念，国家林业局组织设计了森林健康标志，制作了森林健康宣传品，开发运行了中国森林健康网站，编印了《中美合作森林健康评价因子研讨会论文集》，并组织各示范区制作了图文并茂的森林健康宣传手册，详细介绍了示范区实施森林健康理念、思路和实践经验，使森林健康经营的理念得到了民众广泛的认可。另外，注意与当地中小学校合作，把森林健康理念引入课堂，增强公众森林健康意识，一些示范区还对小学师生开展了森林健康科普教育，小学教室里张贴了森林健康科普教育材料，起到了很好的宣传作用。森林健康示范项目特别重视示范区群众对森林的需求，采取参与式的工作方法，充分听取项目区村干部、普通群众的意见、建议，提高项目区群众参与森林健康示范项目的积极性。

（5）采取综合措施推动森林健康经营。各示范区结合地方实际，与农业、环保等部门紧密合作，采取多样化的综合措施推动森林健康经营。如：云南省丽江市玉龙县太安项目示范区是高寒贫困山区，每年每户薪柴消耗量约在4～5吨。为减少木材消耗，项目区开展了太阳能和沼气池建设。农户薪柴消耗减少到2～3吨，保护了森林资源，效果非常明显。山东省泰山林场地处泰山风景区，示范区内古树名木众多，是泰山历史文化的一部分，也是健康经营的重要对象。泰山林场围绕古树名木保护，开展抚育间伐、生态养护，改善古树生长空间和环境，积极培育后备古树资源。大兴安岭塔河林业局通过抚育材利用及林副产品生产加工，增加项目区的经济收入，降低森林火灾和病虫害发生危险。

❹ In order to further promote and spread the forest health concept, SFA designed a forest health logo, printed publications for education, opened the forest health website, and published the *China-US Forest Health Indicator Assessment Workshop Paper Collections*. Forest health brochures were distributed to the public to introduce the concept, method, and practice of forest health management. Additionally, students in local primary and middle schools learned about forest health through lessons and posters. Local demand on the forest was taken into consideration using comments and suggestions from village officials and community members. This participatory strategy helped to increase active community participation in demonstration projects.

❺ Comprehensive measures were adopted to promote forest health management. For example, in the cold alpine mountain area of Tai'an site of Yunnan Yulong county, the annual consumption of firewood was about 4 to 5 tons per household. In order to reduce firewood consumption, solar panels and biogas stoves were installed, which resulted in a reduced firewood consumption of 2 to 3 tons per household each year. Similarly, the old growth forest in the Taishan Forest Farm located in the Mountain Tai Scenic Zone was thinned and tended to provide an improved living space and environment. The Tahe Forest Bureau used the thinning products to produce processed forest by-products that were sold for economic gain. The removal of the thinning products helped to lower the danger of fire, pest, and disease outbreaks. These successful forest health management strategies were developed through close collaboration between sites, and local agricultural and environmental departments.