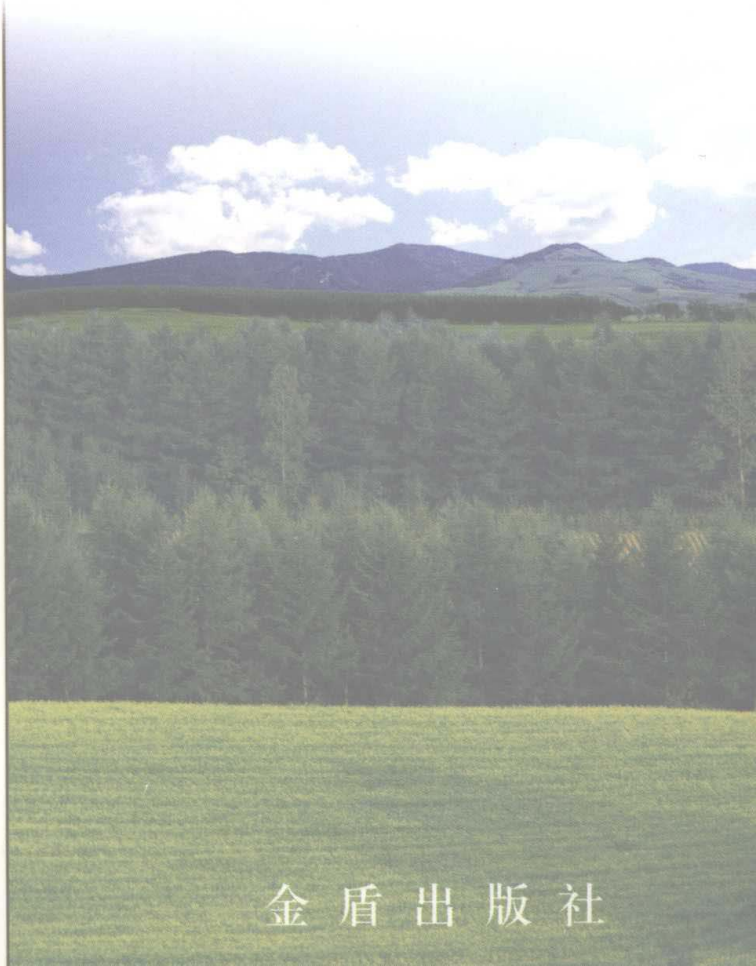
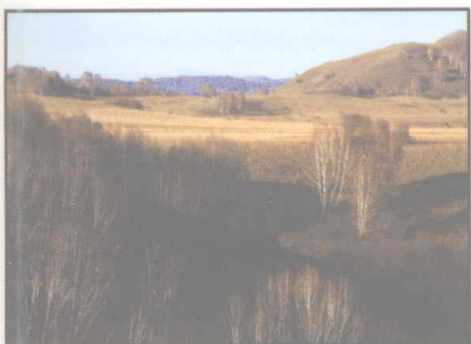


中国北方地区 生态建设与保护

ZHONGGUO BEIFANG DIQU SHENGTAI JIANSHE YU BAOHU

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内 容 提 要

本书由内蒙古林业勘察设计院经验丰富的林业专家崔玲等编著。全书分三部分共 15 章。作者以生态危机现状为题,阐明了荒漠化发生的原因和根据生态经济学原理合理利用自然资源的问题。按照生态系统理论并参照《中国植被》,将我国北方地区划分为 22 个生态条件类型区,分析了各区自然资源的特点,提出了各区农业经济发展的方向、土地利用结构布局的调整以及防护林体系的建设等重要构思。其中,特别是对山地造林树种及水源林、水土保持林和农田牧场防护林等方面的分析,新颖、独特。该书是作者多年科学研究和生产实践的总结,结构严谨,论述透彻,对我国北方地区生态建设与保护具有重要的指导意义,可供各级政府领导、从事生态环境治理和研究人员以及农、林、牧业科技人员阅读参考。

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序

《中国北方地区生态建设与保护》一书,是作者参与了新中国建立以来半个多世纪的生产实践、不断取得科学研究的成就和在总结了生产建设过程中的经验和教训的基础上而完成的。

该书以能充分表达天然植被原始面貌的“中国植被区划”(吴征镒、侯学煜、张新时等著《中国植被》,科学出版社,1980)分区为基础,针对土地资源利用不合理造成土地荒漠化的现实情况,依据生态经济学原理,综合分析各区自然资源特点,按照落实因地制宜,因害设防,合理调整城乡建设,尤其是农业结构布局的思路,提出了治理途径和措施。主要有:以兼具沉沙效益为特点的山丘水源涵养林;小网格、乔灌混交的疏透结构窄林带农田牧场防护林网。对生态环境尤为脆弱的内蒙古高原草原和鄂尔多斯高原草原,作者曾特别为其制定了以灌草为主,实行人工种植与飞机播种造林相结合的草原沙地治理方式,包括退耕还林还草和防护林建设等草原综合保护治理方案。经多年实践,都已取得相应的实效。

由上可见,全书突出的特点基于来自多年的实践,问世之后不仅能满足生产建设上的急需,而且也将成为各级领导决策的科学依据。有幸先读书稿,受益良多,愿为之序。

中国工程院院士

吴君寿

前 言

本书是我们多年来对自然资源利用与保护的梗概总结,同时还阐述了笔者对环境治理的意见。这是我们在近 50 年的野外调查、考察、生产实践和科学研究的基础上,参考有关调查研究资料,应用现代生态学理论完成的。我们试图通过以山地丘陵水源涵养林、水土保持林为主体的森林植被建设和草原保护来改善环境,充分利用天然降水,涵养水源,保持水土等途径来缓解多年来洪涝、干旱和风沙、盐碱等的危害,达到促进生态效益、经济效益、社会效益和谐发展的目的。

一、实践与调查研究基础

我们从 20 世纪 50 年代起从事野外调查、考察研究、林业规划设计及教学科学研究工作,并长期深入基层指导山地造林和治沙造林的实践活动。同时从事农田防护林及山地造林研究和治沙造林研究工作。其间经历了 50 ~ 60 年代大规模草原造林的失败教训,并在长期实践中,在山地造林、治沙造林以及平原农田防护林营造中取得了成功经验。以上这些概括起来,结论就是必须按照植被自然分布规律建设植被、保护生态环境。草原区域显域环境是宜草地,不是宜林地,也不是宜农地;除荒漠区域之外的北方山地,用乡土树种建设和恢复森林植被是完全必要的和可行的;平原农田和草甸草原牧场建设防护林网是改善生态条件,实现高产、稳产的有效途径;草原区沙漠化土地通过林草生物措施治理可以有效改造;盐碱地实行森林措施与水利措施结合能够有效改良;草原自然资源承载量有限,应该适度合理利用。

二、理论基础

1. 生态学基础

当代生态学研究植物与环境的关系,至 20 世纪 30 年代初形成了系统理论。至今,这个理论不但广泛应用于实践,而且有了进一步深入的发展;特别是与经济发展交织在一起所形成的生态经济学理论方面,为合理利用自然资源,组织安排部署农、林、牧、渔业经济生产活动提供了理论基础。

2. 植物学基础

天然植被是生态环境性质和好坏的最好标志。然而,在植被方面,旧中国只有少数科学家做过一些局部性调查研究,不成系统。新中国建立后,逐步开展了大规模的自然资源调查研究工作。特别是 20 世纪 80 年代初《中国植被》和《内蒙古植被》等书的出版问世,阐明了植被分布规律,为生态建设提供了基础依据。

3. 相关学科研究成果的基础

与生态建设、保护的相关学科研究成果很多:最直接的有国内外森林生态系统的定位研究、森林水文学的研究、现代生态学生物量调查方法的研究、地貌与水资源的调查研究资料及地理学资料,60~70 年代盐碱地改良研究资料,都为生态建设的深入分析提供了有力依据。特别是对水源林建设用蒸腾系数小的长绿针叶树为主要树种的分析,农田防护林窄林带的分析,当代沙尘暴起源于内蒙古高原的分析及盐碱地改良的分析等方面都提供了重要依据。

三、书中讨论的主要问题

本书首先以生态危机现状为题,阐明了荒漠化发生的原因,接下来讨论的是如何根据生态经济学原理合理利用自然资源的问题。其中,首先是根据“中国植被区划”进行了北方地区生态建设区划,并在区划基础上,按生态系统理论讨论了生态条件类型划分问题;分析了各区自然资源特点,提出了农业经济发展方向和土地

利用结构布局调整及防护林体系建设等问题。

对山地森林植被建设,根据现有资料分析说明了水源涵养林和水土保持林的重大生态效益和建设条件。其中主要是分析阐明常绿针叶树种蒸腾量小而蓄水功能高,应作为山地森林群落建设的主要树种,和山地地文条件好等建设水源林的有利条件。并鉴于现有山地天然林多为桦、杨、蒙古栎、辽东栎等阔叶树种和人工林多为落叶松林等蒸腾量大,蓄水功能低的实情,提出了包括现存天然桦林、人工落叶松林在内的中等山地种植云杉,包括栎林在内的低山丘陵种植油松,灌丛中栽植侧柏等,恢复改造次生植被种群结构,提高森林蓄水功能的措施。

对农田牧场防护林,主要阐明了其生态经济效益和如何建成结构合理的窄林带及林、路、渠、田结合改良盐碱地问题。

本书并阐明了草原区沙漠化土地治理和草原保护问题。我国几块草原沙漠化土地,包括科尔沁沙地、浑善达克沙地、呼伦贝尔沙地、毛乌素沙地及嫩江沙地、乌珠穆沁沙地,都处于水资源丰富的盆区,只要保护好,不但较容易建成灌草植被,有些地段还可以生长乔木林。对于广大草原因受自然条件制约,大部分土地不能生长乔木,主要靠合理利用保护。

欣悉 2003 年 6 月份中共中央、国务院发布了《关于加快林业发展的决定》,赋予林业基础地位、首要地位,建立以森林植被为主体,林草结合的国土生态安全体系。这将为生态环境建设与保护带来转机。

本书第十三章草原区沙漠化土地防风固沙林营造和中国北方地区生态建设与保护区划图,分别特邀内蒙古农业大学多年从事治沙研究及教学的张奎璧教授执笔和内蒙古林业勘察设计院宋伟工程师清绘。本书在编写过程中承蒙许多朋友提供资料。初稿完成后,先后蒙中国工程院院士关君蔚严师、北京林业大学徐化成教授、内蒙古农业大学冯林教授、刘振乙教授审阅,提出宝贵意见,最

后更蒙关老特为之序,在此一并衷心致谢。

因资料所限,论证不够充分,疏漏和不足之处,望广大读者批评指正。

崔 玲

2003年9月

Preface

In this book, we have summarized up utilization and conservation of natural resources, and ideas of the environmental governing. And the book is completed on the base of our survey, review, produce and practice, research, and reference of investigation and study, and application of modern ecology in the past semi-century. We tried to improve the environment by means of constructing headwater forest, soil and water forest of mountains and hill and of protecting grassland; and tried to reduce the devastating floods and droughts by fully utilizing natural precipitation, keeping water and soil, conserve water, the dust storm, and the salinized to promote harmonious expend of ecology benefit, economy benefit and society benefit.

1. Base of practice and investigation and study

We have undertaken field investigation designing and research work, inside research since the fifty years. On the base of study and practice, we took part in compiling. And in directing the work of the stated-operated forestry center and of the harness sandy waste over a long period of time. At the same time, we under taken the research of farmland shelter-belt, mountainous forestation and harness sandy forestation. At the period, we have been taught a pained failure moral of grassland forestation during the 50 ~ 60s in the 20th century and have made some successful experience, as mountainous forestation, harness sandy forestation and plain farmland shelterbelt forestation overall, We must construct vegetation and protect environment according to natural distribution law; The dominant surroundings of grassland zone is not fit to forest and to farm, but fit to plant grass only;

It is completely necessary and feasible to construct and restore forest by the indigenous tree species; on the northern mountains of China, except the mountains of the desert zone; The effective way to improve ecological condition and to achieve high and stable yield is to build protection forest network on plain cropland and grassy marshland; The desertification land of grassland zone can be reconstructed effectively by the way of forestation and planting grass; The salinized land can be efficaciously improved by combining forestry measure and water conservancy ; The natural resources of the grassland is limited, and we should utilize it in reason.

2. Base of theory

I . Base of ecology

The research of the relation between vegetation and environment in the present ecology had shaped to the system theory during the thirty years of 20th century. Up to now the theory not only is applied to practice tensively, but also has been made in-depth progress, especially the respect of eco-economics interweave with economy development. The theory offered theoretic foundation for utilizing natural resources in reason, arranging and deploying economy production of farming, forest, animal husbandry and fishery.

II . Base of botany

The vegetation is best sign for environmental nature and fine or bad. But in botany, only few scientists made some partial investigation and study in the past, which has not formed a system. After the People's Republic of China was set up, the scientists had open up the investigation and study of natural resources on a large scale progressively. In particular, *China's vegetation and Inner Mongolia vegetable* were published in the 1980s. In the two books, the distributing regulation of vegetation were expounded well, and the theoretical basis was offered for our constructing

ecology.

III .Base of investigation in correlated subject

There are many subjects related to eco-environment construction and protection. The locating study of home and abroad forest environment, the research of forest hydrology, the biomass study on modern ecology, and the datum of investigation, the study on geomorphology and water resources, the datum of geography, and the research datum on improving salinized land in the 1960s – 1970s, etc. All these data provide convincing evidences for analysis of constructing eco-environment, especially, for the analysis of constructing headwater forest by evergreen coniferous trees, whose transpiration coefficient is as small as main species, for the analysis of narrow belt in farmland shelter-belt, for the analysis of the present dust storm originating from the plateau of Inner Mongolia, and for the analysis of improving salinized land, etc.

3. Main question discussed in the book

First of all, we expounded the reason of occurrence desertification from ecological crisis. Secondly, we discussed how to utilize natural resources in reason according to the principle of eco-economics. In the first place, we make divisions of the districts of eco-environment in the north on the base of the division of China's vegetation. In addition, on the base of division, we discussed how to divide the type of eco-environment, and analyzed the specialty of natural resources in different zones, and brought forward the following questions: developing direction of agro-economy, arrangement and adjustment of land utilization structure, and construction of protection forest system, etc.

In the forest community construction of mountains; according to the datum in existence, expounded headwater conservation forest and the soil and water conservation forest have great ecological benefit, and that they

need definite condition. In which, we mainly analyzed evergreen coniferous tree has so small transpiration coefficient and so high function of store water, that it should be the main tree species of forest community constructing in mountains and the other beneficial condition for constructing head-water forest of mountains just like the good physiographical condition of mountains. Besides, many forest trees have great transpiration coefficient and low function of store water in the existent natural forests which consist of forest the *Betula* forest, the populus and the *Quercus* forest in natural forest and the *Larix* in the forest plantation, so we put forward the ways, in which to plant spruce (*Picea*) on medium-mountains, including natural birch (*Betula*) and the *Larix* forest plantation in the existent forest, and to plant Chinese pine (*Pinus tabulaeformis*) on the low mountains and hills, including oak (*Quercus*) forest extent, and to plant arborvitae (*Platycladus orientalis*) in the scrub forest, etc. and to improve the secondary forests by means of above steps; and to raise the function of store water of these forests.

When discussing shelter forest on farmland and pasture, we set forth its eco-economy benefit, how to construct reasonable structure in narrow belt; and improving salinized land by combining forest, road, canal and field.

In the same time, we expounded that the problem of desertification covering in grassland zone and the grassland protection, The several pieces of desertification land (Kergen sandy water, Hunshandak sandy water, Hulenbar sandy water, maowuso sand water, etc.) is all in basin area where water resources is plenty. If protected well, it is not only easy to plant bush and grass but to plant arbor. The wild grassland is limited by the natural condition. So that the arbor cannot be planted in most place of it. So we protect it by means of reasonable use.

A resolution on speeding up the development of forestry was enacted by the central committee of the communist part of China and the state council last months. In the decision, the forestry is put on the determined and prodominant position. And we decide to establish the ecology safety system as on main body and to combine forest with grass. It is very gland information. It will bring a favorable turn for environment construction and protection.

Professor Zhang Kuibi, who wrote *desertification land windbreak forest sand-fixation forest of grassland region*, and engineer Song Wei, who drew the map of ecology construction and protection division in north of China, were specially invited in the thirteenth chapter of this book. When compiling the book, many friends offered data for me, when the first draft was finished, academician Guan Junwei of project academia of China, professor Xu Huacheng, professor Fen Lin and professor Liu Zhenyi checked and approved it successively and offered me invaluable opinions, here I express my sincere thanks to all of them.

Because of limited data, some argumentations are insufficient. I hope readers can criticize and point out mistakes so that I can be corrected them when it's reprinted.

Cui Ling

09, 2003

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