当代科技重要著作·农业领域

云南竹类资源及其开发利用

BAMBOO RESOURCES AND DEVELOPMENT RESEARCH OF YUNNAN

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云南省科学技术委员会
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编著

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BAMBOO RESOURCES IN YUNNAN

AND THEIR EXPLOITATION AND UTILIZATION

WORKING STAFF

云南竹林区划分布图

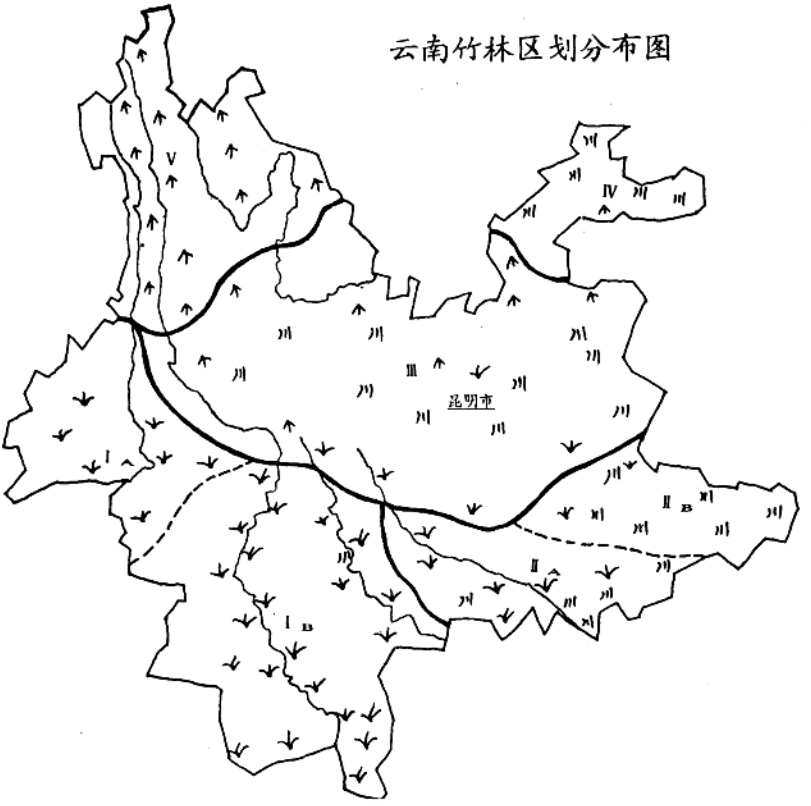

图　例

- 大型丛生竹
- 大（中）型散生竹
- 中（小）型混生竹
- 区　界
- 亚区界

云南竹林区划系统

Ⅰ. 西南部热性大型丛生竹林区

Ⅰ$_A$ 德宏、保山龙竹、空竹、真麻竹林亚区

Ⅰ$_B$ 西双版纳、临沧、思茅黄竹、甜竹、香糯竹林亚区

Ⅱ. 东南部热性大中型混生竹林区

Ⅱ$_A$ 红河沙罗单竹、中华大节竹林亚区

Ⅱ$_B$ 文山大节竹、方竹林亚区

Ⅲ. 滇东北暖性中型混生竹林区

Ⅳ. 滇东北暖性中小型散生竹林区

Ⅴ. 滇西北寒温性小型混生竹林区

开发利用、保护发展
竹类资源，造福人类。

黄炳生

一九九三年十一月

序 一

本书是在多学科综合研究基础上提出的综合报告，已经鉴定为具有国内领先水平，并达到国际先进水平，获省级科技成果奖。全书分16章，内容包括国内外竹类资源及其开发现状，云南竹类资源及其特色和优势，云南竹业发展的宏观对策及经济评价，以及竹林区划、基地建设、笋用、材用、造纸、观赏、工艺、生态、建材和竹文化等各方面。设计周密，内容详赡、全面，并能做到言简意赅、深入浅出、宏观和微观结合、长远规划和短期目标兼顾、理论水平和现实意义兼备的效果，是目前国内外地区性竹业发展的最全面的著作，将成为云南省发展竹业的指导性纲领性文献，其出版价值自不待言。据我所知，目前国内尚无类似著作出版，应予优先考虑，重点支持，及时出版。

吴征镒

1994年10月10日

序 二

我国是世界产竹大国，无论种类、数量和分布面积都为其它国家所不及，早在秦汉以前古人即以"竹简"为书，造纸术的发明也是以竹为原料，凡此说明竹在我国文化传播上起着重大的作用。我国《康熙字典》收录有竹部文字多达960个，足见竹类对我国文化发展及人民生产和生活影响之大。

竹类以其年年抽笋、岁岁成竹，从笋到材广为利用而优于一般林木。随着科学技术的发展，各种竹质人造板已广泛应用于建筑、家具、车厢、包装等各个方面；竹笋、竹制工艺品及多种竹副产品也都成为出口创汇的重要商品。竹类除其巨大的经济效益外，又有很高的社会效益和生态效益。竹子经霜不凋、挺拔秀丽早已为画家所描绘、为诗人所歌咏、为人民所喜爱；茫茫竹海，万家竹楼更增添了边疆自然景色和民族风情。吸引着众多中外游客。茂密的竹林，盘结的竹鞭又使它具有很强的保水土和增肥力的能力，江河沿岸、堤坝水库、山坡沟箐及村寨四旁都适于广种竹子，这不仅可以大大增加群众的经济收入，美化生活环境，其生态效益更不能低估。

云南被学术界公认是世界竹亚科植物的起源地和现代分布中心之一，其种类约占全国总数之一半，也是世界上任何一个产竹国家所不及的，堪称"竹类的故乡"。竹种多自然不乏优良品种，再加天然竹林占有较大比重，从而使云南竹类资源在开发利用上占有明显的优势，但这一资源优势迄今尚未被人们充分认识。目前，国内各产竹省都把竹类资源开发做为重要产业来抓，竹材新产品不断创新。反顾云南省基本上还停留在原竹利用的早期阶段，所有人工竹林大都缺乏经营而处于半荒芜状态，大面积天然竹林更缺乏应有的管理而日益减少。生物资源经营得当可以再生发展，可为人们提供巨大财富，反之会导致解体！目前云南竹类资源也正好处在这个十字路口。

国家科委主任宋健同志在视察云南澜沧、耿马地震灾区时目睹云南竹类这一宝贵资源和它在恢复灾区经济中起到的作用，当即指出了开发云南省竹类资源的必要性和紧迫性。我们认为这一指示非常正确和及时。我国属贫林国，云南人均占有林业资源并不丰富，由于竹类植物特有的生物、生态及经济特性，如能进一步合理开发利用保护与发展，对云南林业发展和经济建设均具有现实的和深远的战略意义。

我们正是在这一背景下组织力量着手进行云南竹类资源开发利用与保护发展研究。此项研究虽着眼于云南但又不能不考察借鉴国外和省外经验；所涉及的内容十分广泛，从林业、轻工、建材、食品到供销、外贸几乎无所不及，是一部有关产业部门、科研、教学及林业工作者参考利用的著作。当然，本书内容在广度和深度上也有待今后继续深化和修改完善。

在工作进程中得到中国竹产业协会、云南省有关部门及四川省林业科学院、南京林业大学、浙江省林科所、中国林学会竹子分会等有关单位和有关专家的大力支持；特别是湖南省竹业进出口公司董事长吴旦人先生（云南省竹业协会高级顾问）十分关心云南竹业发展，曾不辞辛苦数次前来指导工作；云南省委副书记梁金泉同志亲自主持召开了竹产业开发现场办公会议，充分肯定了云南省竹类研究工作的显著成效和竹业发展的广阔前景；副省长黄炳生同志在百忙中为本书题词；著名植物学家吴征镒教授对本书给予高度评价；西南林学院林学系徐永椿教授、云南大学生物系孙必兴教授、云南师范大学地理系陈永森教授在百忙中亲自审阅书稿，我在此深表谢意。

云南省科学技术委员会　主任　张敦罗

BAMBOOS, CHINA AND YUNNAN
—— An English Synopsis to *BAMBOO RESOURCES IN YUNNAN AND THEIR EXPLOITATION AND UTILIZATION*

(Pu Yingshan*, Yang Yuming*, Hui Chaomao*)

BAMBOOS AND CHINA

All through the ages, Chinese people have always been fond of bamboos. In fact, China is the earliest country to have studied, cultivated, exploited and utilized bamboos in the world. This can trace back to the Neolithic Age, some 5,000 to 6,000 years ago. That is why the history of the Chinese civilization is called the history of bamboo civilization, and China is called a country with bamboo civilization.

In the long-standing history of Chinese culture, bamboo was praised as "one of the three good friends withstanding severe coldness" together with pine and plum. Like plum, orchid and chrysanthemum, it was also personalized as one of the four upright gentlemen of honour. In the past, bamboo was planted as one of the indispensable elements in classical gardens of China. At present, it is still one of the ornamental plants in and around modern residences. In fact, Chinese people love bamboos because they have not only good ecological adaptability, multipurpose uses and high economic value, but also specific ornamental and aesthetical value. Therefore, the history of admiring and appreciating bamboos in China is almost as long as that of the Chinese nation, and countless poems eulogizing bamboos and traditional Chinese paintings of bamboos have long become an important part of Chinese culture.

Both ornamental and aesthetical value of bamboos can be summarized as follows:

Ⅰ. Evergreen All the Year Round and Natural with Various Postures

Most Chinese people from famous scholars to common paupers love bamboos because of their tall and graceful culms, natural branches and leaves, various beautiful shapes and postures, evergreen feature and specific charm full of interest.

As far as their ornamental and aesthetical value is concerned, bamboos possess four aspects of interest, i.e., their sounds, shadows, artistic conceptions and shapes, all of which have excellently been embodied in the odes to bamboos written up to now. When people walk leisurely in the shadows of green bamboos, a feeling of boundless comfort and pleasure will always well up in their hearts, forgetting all their fatigue and vexations. That was why Su Dongpo, a famous poet in Song Dynasty once said, "I would rather eat with no meat than live without bamboos", which can be said to be a true reflection of the inseparable relationship between Chinese people and bamboos. Planted here and there, in the parks or near small bridges, therefore, green bamboos can be used not only to beautify people's life, but also to mould their temperament and lofty values.

Ⅱ. Noble and Modest

"An exotic flower may be red, but it is red for only a short time. A slender bamboo is empty, but it is evergreen for all ages to fly". This can be said to be real portrayal of the styles of bamboos. It is true that peony is more gorgeous, pine and cypress are more magnificent and blos-

soms of peach and plum are prettier than bamboos. However, the noble, modest and elegant characteristics and qualities of bamboos are much more extolled and loved by the people. In horticulture, bamboos can not only be used to establish bamboo plantations, build bamboo paths and form bamboo hedgerows, but also be planted in the corners of the walls or near the buildings so that all the ugly parts of a garden can be concealed and covered by the bamboos selflessly without showing off themselves. They are noble because they are selfless. They are selfless because they don't show off themselves. They don't show off themselves because they are modest. They are modest because they are unadorned. They are unadorned but they beautify the environment. They beautify the environment but they are simple. They are simple but they supply shadows for visitors in the sun, hats for travellers in a rain, cradles for babies and walking sticks for the old, and they serve the people wholeheartedly. Therefore, bamboos are eulogized and loved by Chinese people and they are worth praising and loving for they have so many virtues.

There are many bamboos growing in China, and both China and the Chinese culture are characterized and influenced by the bamboos. Both the Chinese civilization and culture of bamboos are not only a splendid historical heritage to Chinese people, but also a legacy of history to the easterners and the people all over the world.

BAMBOOS AND YUNNAN

Distributed in the tropics and subtropics, bamboo plants are dominantly concentrated in the tropical monsoon regions in Southeast Asia——the world bamboo distribution center, in which Yunnan Province is located. Owing to its specific natural geographical environment with rolling mountains, numerous rivers, different elevations, varied topography, various climate types and evident regional differences, Yunnan is one of the regions that has the most bamboo species and most abundant natural bamboo resources in the world, for the natural bamboo forests here are extensively distributed and their types are very well-developed.

1. The Resources of Bamboo Species

According to statistics, over 1,000 bamboo species in 70~80 genera which have been recorded all over the world are dominantly distributed in the rainy tropics and subtropics in Asia, Africa, Americas and Australia. Among the recorded species and genera, there are about 400 species in 40 genera in China, most of which are distributed in the monsoon areas south to the Changjiang River. Therefore, China is a country with the richest bamboo plants in the world. Although Yunnan is an inland province, it is very rich in bamboo resources because it always has plentiful heat, abundant rainfall, varied topography and various habitats, so that it is beneficial to the growth, multiplication and differentiation of bamboo plants. The investigations made so far showed that there were 210 woody bamboo species in 28 genera naturally distributed in Yunnan, i.e., making up 40% of the total genera in the world and 70% of the total genera in china, and accounting for 20% of the total species of the world and over 50% of the total species of China. Evidently, Yunnan has much more bamboo species and genera than any other bamboo-producing provinces in China and any other countries in Southeast Asia do. With the further development of the investigations on bamboo plants, new species, genera, and even communities will be discovered gradually. It is thus obvious that neither any other countries nor regions in the world

are to be compared with Yunnan in the abundance of bamboo resources, for it is generally acknowledged as the original place and modern distribution center of bamboo plants all over the world.

Situated in the joint area of the 3 zones in physical geography in Asia (namely the tropical monsoon zone in South Asia, the subtropical monsoon zone in East Asia, and the Qinghai-Tibet Plateau zone), Yunnan possesses various complicated environments of physical geography in which the connection of the 3 zones and their transition from one to another are realized, and provides bamboo plants with beneficial conditions for their aggregation, dissemination and dissociation because of the separation effects of the high mountains and the network of river systems in this area. Therefore, in floral composition, this area forms its evidently unique regional characteristics on one hand, and shows its extensive connection with other regions around it on the other hand. In Southern Yunnan, the bamboo florae are chiefly made up of large clustered Indo-Malayan elements like *Dendrocalamus*, *Cephalostachyum*, *Melocalamus*, *Gigantochloa*, *Thyrsostachys*, *Pseudostachyum* etc., all of which are typical tropical Southeast-Asian elements and a major part of the bamboo florae in Yunnan. In Eastern Yunnan, the South-China elements from the Zhujiang River basin like *Indosasa*, *Schizostachyum*, *Sinobambusa*, and *Bambusa* are intermingled with the local ones. Interlinked with the elements of the Changjiang River basin, the Central-Yunnan Plateau and Northern Yunnan are the mixed and transitional areas for the southern type of clustered bamboo species and the northern type of scattered ones, eg. *Phyllostachys*, *Chimonobambusa*, *Neosinocalamus* etc. The subalpine area in Northwestern Yunnan is the distribution center of alpine bamboo species (there are many species of them) like *Fargesia*, *Yushania* etc., most of which are endemic species. The natural and extensively-cultivated genera and species in Yunnan are included in Table 1.

Ⅱ. The Resources of Bamboo Forests

1. *The Types of Bamboo forests*

Yunnan is not only abundant in the resources of bamboo species, but also rich in the resources of various bamboo forests including natural bamboo forests, mixed forests of bamboos and trees and plantations of bamboos because most of bamboo species in Yunnan can be used to form or establish the above-mentioned forests. There are altogether more than 30 major types of bamboo forests distributed in all parts of the province especially in Southern Yunnan. They are tropical bamboo forests, temperate bamboo forests, cold temperate bamboo forests, clustered bamboo forests, scattered bamboo forests, mixed bamboo forests, scansorial bamboo forests and other types of bamboo forests with various ecotypes as are shown in Table 2.

Table1. The Statistical Table of Genera and Species in Bamboo Subfamily in Yunnan

Genera	Types of Distribution	Number of Species			The Ratio of Yunnan to China(%)	Distribution		
		The World	China	Yunnan		The World	China	Yunnan
1. *Teinostachyum*	7—2	6	2	1	50.0	India Sri Lanka Burma China	Yunnan	Xichou Guangnan Jinping Mengla
2. *Schizostachyum*	6	70	7	6	85.7	South Asia New Guinea Madagasgar	Guangdong Guangxi Taiwan Yunnan	Wenshan Honghe Simao Xishuangbanna Lincang Dehong Luoping
3. *Leptocanna*	15	1	1	1	100	Yunnan in China	The endemic of Yunnan	Hekou Jingping Pingbian Mengzi Luchun Xinping
4. *Pseudostachyum*	7—2	1	1	1	100	Sikkim Bangladesh Southeast Asia	Guangdong Guangxi Yunnan	Xishuangbanna Dehong Luoping
5. *Melocalamus*	7—3	5	5	4	80	Burma Thailand China	Yunnan	Dehong Lincang Xishuangbanna Honghe
6. *Dinochloa*	7	20	3	1	33.3	Java Malaysia	Guangxi Yunnan	Tropics in Southern Yunnan
7. *Cephalostachyum*	6	21	5	5	100	South-Central Peninsula India Sikkim Madagasgar	Yunnan	Dehong Baoshan Xishuangbanna

Table 1.

Genera	Types of Distribution	Number of Species			The Ratio of Yunnan to China(%)	Distribution		
		The World	China	Yunnan		The World	China	Yunnan
8. *Thyrsostachys*	7—2	2	2	2	100	Subcontinent of South Asia South-Central Peninsula Malysia	Yunnan Fujian Guangdong Taiwan	Dehong Xishuangbanna
9. *Bambusa*	2—2	100	80	19	23.8	Tropics in Asia, Africa and Oceania	South and Southwest of China	Tropical and Subtropical areas in Southern Yunnan
10. *Dendrocalamus*	7—2	35	30	26	86.7	Indian Peninsula South-Central Peninsula	Guangdong Guangxi Yunnan Guizhou	Vastly distributed in the tropics and subtropics in Southern Yunnan
11. *Neosinocalamus*	15	5	5	3	60	The endemic of China	South and Southwest of China	Extensively cultivated in South and Southwest of China
12. *Gigantochloa*	6	30	6	6	100	Tropical Southeast Asia and Africa	Yunnan	Xishuangbanna Dehong Lincang
13. *Indosasa*	7—4	21	21	7	33.3	South China Northern Viet Nam	Guangdong Guangxi Yunnan Guizhou Southern Hunan	Wenshan Honghe Xishuangbanna Simao
14. *Sinobambusa*	14	17	16	2	12.5	China Viet Nam	Every province south to the Changjiang River	Wenshan Luoping

Table 1.

Genera	Types of Distribution	Number of Species			The Ratio of Yunnan to China(%)	Distribution		
		The World	China	Yunnan		The World	China	Yunnan
15. *Qiongzhuea*	15	3	3	2	66.7	The endemic of China	The contiguous area of yunnan, Guizhou and Sichuan	Northeastern Yunnan
16. *Chimonobambusa*	7	19	19	9	47.4	China, Japan Viet Nam India Burma	Southwest China Central China East China South China	Vastly Distributed
17. *Phyllostachys*	14	70	50	12	24.0	Vastly distributed from subtropics to temperate zone	Extensively distributed all over China except Northwest and Northeast China	Vastly distributed
18. *Chimonocalamus*	7—2	12	10	9	90	China India Burma	Southern Yunnan Tibet	Wenshan, Dehong, Lincang, Honghe
19. *Thamnocalamus*	14—1	5	1	1	100	China India Nepal	From the Himalayas in Tibet to Western Yunnan	From the west slope of the Gaoligongshan Mountains to Tengchong
20. *Bashania*	15	1	1	1	100	China	The Qinling Mountains	Introduced in Kunming
21. *Ampelocalamus*	15	8	8	3	37.5	The endemic of China	Southwest China	Northeastern Yunnan
22. *Racemobambos*	5	2	2	2	100	From North India to the Himalayas in China	Tibet Yunnan	The Gaoligongshan Mountains in Western Yunnan

Table 1.

Genera	Types of Distribution	Number of Species			The Ratio of Yunnan to China(%)	Distribution		
		The World	China	Yunnan		The World	China	Yunnan
23. *Fargesia*	14—1	76	75	49	65.3	China Sikkim Nepal	Medium alpine and subalpine areas in East and West China	Northwestern Yunnan Western Yunnan
24. *Yushania*	6—1	47	43	30	69.7	China India Congo	Medium alpine areas in subtropics in Southwest China	Vastly distributed
25. *Pleioblastus*	14—2	25	10	3	30	Japan China	East China South China Southwest China	Xishuangbanna, Wenshan, Honghe and Lincang
26. *Ferrocalamus*	15	2	2	2	100	China	The endemic of Yunnan	Jinping, Luchun, and Yuanyang
27. *Indocalamus*	7	30	15	2	13.3	Southeast Asia South Asia	The regions south to the Changjiang River	Southern Yunnan
28. *Gaoligongshania*	15	1	1	1	100	The endemic of China	The endemic of Yunnan	The west slope of the Gaoligongshan Mountains

Table 2. The Major Types of Bamboo Forests in Yunnan and Their Distribution

Subtypes of Forest Plants	Forest Types	Types of Culms	Distribution
Cold Temperate Bamboo Forests	*Fargesia* spp. forest	Small-sized & mixed	Alpine and subalpine areas in Western and Northwestern Yunnan
	Yushania spp. forest	Small-sized & mixed	Vastly distributed in the sub-tropical medium-alpine areas
Temperate Bamboo Forests	*Fargesia yunnanensis* forest	Medium-sized & mixed	The mountainous areas in Western and Central Yunnan
	Chimonobambusa spp. forest	Medium-sized & scattered	Vastly distributed
	Qiongzhuea tumidinoda forest	Medium-sized & scattered	Yongshan, Danguang, Yiliang, Zhenxiong
	Sinocalamus affinis forest	Large-sized & clustered	Vastly cultivated in the plains in central Yunnan
	Bambusa intermedia forest	Large-sized & clustered	The plains and river valleys inCentral Yunnan and Southern Yunnan
	Phyllostachys pubescens forest	Large-sized & clustered	Yiliang, Yanjin
	Ph. nigera var. *henonis* forest	Medium-sized & scattered	Central Yunnan Southern Yunnan
Tropical Bamboo Forests	*Teinostachyum* spp. forest	Small-sized & viny	Xichou, Guangnan, Jinping, Mengla
	Chimonocalamus spp. forest	Medium-sized & clustered	From Southeastern Yunnan to Southwestern Yunnan
	Dendrocalamus membranaceus forest	Large-sized & clustered	The Lancang River Basin, Honghe, Dehong
	D. giganteus forest	Large-sized & clustered	Vastly cultivated in Southern Yunnan
	D. yunnanensis forest	Large-sized & clustered	Vastly cultivated in Southern Yunnan
	D. sikkimensis forest	Large-sized & clustered	Hekou, Jinping
	D. barbatus forest	Large-sized & clustered	The lower hot lands from Southern Yunnan to Southwestern Yunnan
	Bambusa sinospinosa forest	Large-sized & clustered	The xerothermic areas from Southeastern Yunnan to Southern Yunnan
	Schizostachyum funghomii forest	Large-sized & clustered	The muggy areas from Southeastern Yunnan to Southwestern Yunnan
	Sch. pingbianensis forest	Medium-sized & clustered	Pingbian, Malipo, Maguan
	Cephalostachyum pergracile forest	Large-sized & clustered	Xishuangbanna, Dehong, Lincang, Simao
	Indosasa sinica forest	Large-sized & scattered	From Southeastern Yunnan to Southwestern Yunnan
	Indosasa purpurea forest	Medium-sized & scattered	Wenshan, Honghe
	Ferocalamus strictus forest	Medium-sized & scattered	Jinping, Luchun, Yuanyang
	Melocalamus compactiflorus forest	Medium-sized & viny	Honghe, Xishuangbanna, Lincang, Dehong
	Pseudostachyum polymorphum forest	Medium-sized & scattered	Xishuangbanna, Dehong
	Bambusa lapidea forest	Large-sized & clustered	Southern Yunnan
	Thyrsostachys siamensis forest	Large-sized & clustered	Xishuangbanna, Dehong
	Gigantochloa spp. forest	Large-sized & clustered	Xishuangbanna, Dehong, Menglian, Lancang
	Dinochloa spp. forest	Medium-sized & viny	Xishuangbanna, Dehong, Lincang

2. *The Area and Stocking of Bamboo Forests*

Altogether, there are approximately 20,000,000 hectares of bamboo forests all over the world while there are about 7,000,000 hectares in China, which are about 35% of the total area of the bamboo forests of the world. In Yunnan, there are 331,000 hectares of bamboo forests, amounting to 4.7% of the total area of China. There is, however, a difference between Yunnan and the other five major bamboo-producing provinces, for most of the bamboo forests in these provinces are chiefly cultivated ones with the plantations of *Phyllostachys pubescens* over 80% of their total area except Guangdogn Province while most of the bamboo forests (90%) in Yunnan are natural ones, ranking the first in China. There are only 32,000 hectares (less than 10% of the total) of bamboo plantations in Yunnan. Most of them are scattered around villages, beside farming fields, and along various roads in all parts of the province. In recent years, large areas of bamboo plantations are being established in Southern Yunnan for the purpose of constructing shoot-producing and wood-producing bamboo bases. Therefore, the area of bamboo plantations will be enlarged in the future, and the production will be increased in large scale gradually. Listed in Table 3 are the area and stocking of bamboo forests in Yunnan.

Table 3. The Area and Stocking of Bamboo forests in Yunnan

Types of Bamboo Forests	Area (hectares)	Stocking (tons)	Percentage (%)
Natural Forests and Plantations of Large-Sized and Medium-Sized Bamboos (Diameter $\geqslant$ 2 cm)	189,000	19,000,000	57.10
Natural Forests of Small-sized Bamboos (diameter $<$ 2 cm)	110,000	4,800,000	33.23
The Total of Natural Bamboo Forests	299,000	23,800,000	90.30
Bamboo Plantations	32,000	3,850,000	9.70
Total	331,000	27,650,000	100

Among the bamboo distribution areas, Southern Yunnan has the most abundant bamboo resources, especially in Xishuangbanna. Next are Northwestern Yunnan and Southeastern Yunnan where alpine small-sized bamboos are chiefly distributed. In central Yunnan, there are the least abundant bamboo resources.

In Yunnan, there are some 17,000,000~19,000,000 tons of total stocking of green culms in the natural forests of large-sized and medium-sized bamboos with an average culm weight of 90~100 tons per hectare and the annual culm output up to 4,240,000~4,700,000 tons. Since the annual output of the culm stocking of the bamboo plantations is about 720,000~840,000 tons, the total annual culm output of all the bamboo forests is 4,920,000~5,540,000 tons in Yunnan Province.

3. *Discussion on Various Natural Distribution Areas of Bamboos*

According to the floral elements, dominant communities, ecological features of forest types, differences of areal environment, distribution regularities, economic utilization, segregation in development, and natural and historical conditions of the bamboo forests in Yunnan, the bamboo distribution areas in this province are divided into the following five natural ones.

3—1. *Tropical Area of Clustered Large-Sized Bamboos in Southern Yunnan*

This area consisits of Xishuangbanna, Simao, Lincang, Dehong and some Parts of Baoshan, and it is closely connected with India and Burma. In this area, there are more than 100 bamboo species in about 20 genera, most of which are clustered and large-sized ones. In fact, this area is the one with the richest bamboos in Yunnan. To be more concrete, this area can be divided into two subareas: one is the subarea of *Dendrocalamus giganteus* and *Cephalostachyum capitatum* consisting of the prefectures of Dehong and Baoshan, and another one is the subarea of *Dendrocalamus giganteus*, *Dendrocalamus membranaceus*, and *Cephalostachyum pergracile* consisting of the prefectures of Xishuangbanna, Simao, and Lincang.

3—2. *Tropical Area of Mixed Large-Sized and Medium-Sized Bamboos in Southeastern Yunnan*

This area is made up of Honghe and Wenshan Prefectures which are closely connected with South China. Still, this area is divided into two subareas.

The total area of bamboo forests here is approximately 35,000 hectares dominated by *Schizostachyum funghomii* and *Indosasa sinica* which are concentratively distributed in Honghe, covering about 20,000 hectares.

3—3. *Temperate Area of Medium-Sized Bamboos in Central Yunnan*

This area is about 10,000 hectares only. The area of Bamboo forests is the smallest one with relatively simple bamboo species, most of which are scattered in plantations.

3—4. *Temperate Area of Scattered, Medium-Sized and Small-Sized Bamboos in Northeastern Yunnan*

Consisting mainly of Zhaotong Prefecture, this area is characterized as an area with the features of the Changjiang River basin.

The area of bamboo forests is 36,000 hectares, most of which are covered with natural forests of *Qiongzhuea tumidinoda* together with *Chimonobambusa yunnanensis* and *Fargesia* spp., and some of which are covered with plantations of *Neosinocalamus affinis*, *Phyllostachys heterocloda*, *Phyllostachys bambusoides f. tanakae* etc.

3—5. *Cold Temperate Area of Mixed Small-Sized Bamboos in Northwestern Yunnan*

This area consists of the Prefectures of Diqing, Lijiang, Dali etc., which are situated in the Hengduanshan Mountains full of steep cliffs, rapid rivers, and deep valleys with varied topography and climates. This area directly borders Burma and neighbors with Tibet. Since the area possesses very comprehensive bamboo florae, it has specific theoretical value in academic research. In this area, there are approximately 90,000 hectares of bamboo forests dominated by subalpine small-sized *Fargesia* spp. and *Yushania* spp. which are naturally distributed. In the lower altitudes of this area, however, there are also some small plantations of some large-sized and medium-sized bamboos like *Dendrocalamus giganteus*, *Phyllostachys nigra var. henonis* and so on.

Ⅲ. The Features and Advantages of the Bamboo Resources in Yunnan