

Development and Situation of Chinese Forest Resources

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Introduction

China is a developing country with large population. For the sack of sustainable development smoothly at the critical turning point to new times and opportunity, review the history of forest resources in China area is necessary and useful. Moreover, through listing and analysis amount of dates, we could get a general view on the Chinese forestry, where our position stays and what present condition is. China's economy is rapidly developing and industrialization is enlarging, which leads to increasing demand of timber and foodstuff. At the same time, the continuous development, exploitation, disturbance, and destruction of forest resources make forest lessen year by year. All the actions of short-term economic interest in price of ecology and environment lead to a unceasing decrease in primeval forest resources, a decline of productivity of natural secondary forest and artificial forest as well as forest function, a sharp decrease in species number and increasing in land desertification, soil erosion and themed-rock flow. As a result, all kinds of disasters frequently occur and the human living environment is deteriorating. How to solve these problems is the key point for our environment and entire country's economy development. This article would give some solutions and put forward the objective of the forest resources in China. The aim of forest area (26%) needs cooperation among all walks of life. Policy should be refined, strategy should be shifted and programs need to be better launched so as to realize the sustainable development of society, economics, resource, and environment.

1. General review on Chinese forest resource history

1-1 Forest resource in Ancient China

Nearly four to five thousand years ago, in the mainland of China there was about 60% area that covered by forest. The forms of forests were totally original forest, due to the non-existence of human destruction activities. In the northeast mountain area, the forest coverage could get to 90%, 80-90% coverage in the moisture regions of southeast of China

and in the half-moisture and half-drought of the middle of China forest coverage get to 40-50%, even in the drought area and high Tibet-Qing plateau, the coverage of forest could reach 10-20%.

1-2 In dynasty period and modern times

In this period, human activities began to affect the forest resource. With the development of agriculture, original forests were destroyed quickly for the sack of meeting demand for planting of large area, therefore opening up the wasteland and planting became the main way of destroying forest. According to some data, it shows that the forest coverage had declined under 50% in Han dynasty nearly two thousand years ago. Between Tang and Song dynasty, with the quickly increasing in population, more and more forest land were used as farm land, especially in the south and the middle of China where forests were destructed seriously and forest coverage was under 40%. At the end of Ming dynasty and at the beginning of Qing dynasty nearly four or three thousand years ago, in north China, the forests were destroy completely, and in some region of south China where the water traffic was convenient, forests were destructed seriously and forest coverage declined to 20%. Seventy years ago, because of the Japanese plundering and the unreasonable development the original forest disappeared in northeast of China and in southwest forest were reduced continual, where forest coverage decline 12.5%. From that time, original forests almost cleared in China only leave some low quality secondary forests until now.

1-3 After the foundation of People' s Republic of China

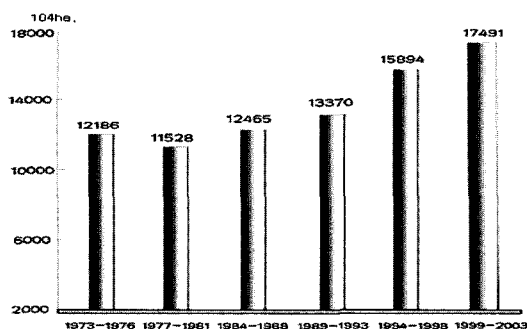
Table1 shows the change of forest resource in China from 1949. Accounting to the data in five times investigation to the forest resource, it indicates clearly that the area of forest resource decrease sharply from 1949-1981, but they increased gradually from 1981 to now. However, just as we have known, that for meeting the social demand, mature forests reduced gradually and young forests increased, so even though we can see some extent increase in total volume of forests on the table because of the planting project, it also showed that forest quality was declining, young forests accounted for much in China.

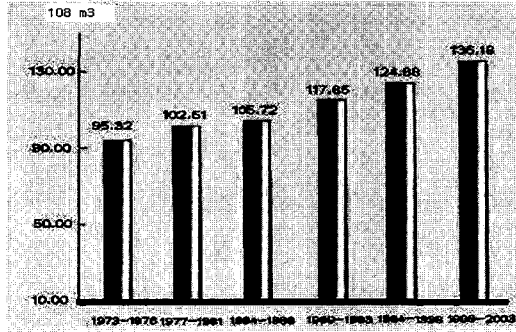
<Table. 1> Change of forest resources in China from 1949 to 1998.

Period of investigation years	Areas of forest (10000km ²)	Forest coverage (%)	Total volume (100million m ³)
1949	76.0	7.9	
1973~1976 first investigation	122.0	12.7	95.3
1977~1981 second investigation	115.2	12.0	102.6
1984~1988 third investigation	124.6	12.98	105.7
1989~1993 fourth investigation	133.6	13.92	117.85
1994~1998 fifth investigation	158.9	16.55	124.90

Source: <http://www.cfsdc.org>, Chinese Forestry Statistic Data Centre.

The following Fig.1 also shows that there is a turbulence change of forest coverage from 1949 to the second time investigation. All these change was resulted from the introduction of mechanical forestry machine to China, which leded to the destruction of a large area forests. Furthermore, from 1966-1976, as a result of the out of order of the forest management, forest resources were destroyed in even larger number. In 1981, the forest coverage reduced to the lowest point owned to the default of the economy and political policy. Recent more than 20 years, until 2003, attribute to the economy reform and open-up, and the total forest resource increased every year. Especially when the six key forestry programs were carried on in China, which covers more than 97 percent of China's counties, with total afforested area expected to reach 76 million hectares. But the form was not so optimistic duo to the destruction of ecology balance, frequency of flood sand-dust storm and drought. The challenge would exist for a long time.





<Fig. 1> Change in areas of forest (1973-2003) Fig.2. Change in Total volume of forest (1973-2003)
 Source: <http://www.cfsdc.org>, Chinese Forestry Statistic Date Centre.

2. Present condition and the existing questions of Chinese forest resources

2-1 Distribution of forest resources in China

Now there are total four main parts where the forest resources are distributed in called: Northeast forest region, southwest, northwest and collective forest region in south. Look at Table 2 that shows the distribution condition of Chinese forest resources.

<Table 2> Distribution condition of Chinese forest resources (~2003).

Main forest region	Forest region area/land (%)	Forest volume/total volume (%)
Collective forest region	36.1	19.0
Northeast forest region	24.8	30.7
North forest region	20.0	11.4
Southwest forest region	19.1	38.9

Source: <http://www.cfsdc.org>, Chinese Forestry Statistic Date Centre

Northeast forest region

The northeast forest region is the biggest forest region of China. Both its area of forest and timber output account for 1/3 of the total forest area and timber output of China. Wood production nearly 23 million m³ pre year in the 360000K square meters. This region takes a pivotal position in national economy. The development of agriculture, animal husbandry, fishery, and industry cannot be separated from the development of forestry. The broad leaved/Korean pine forest and dark coniferous forest are the high-productivity forest types in this region, and the former is the famous precious timber in the world. The Japanese

plundering and the unreasonable development in recent 50 years lead to the disappearing of the original broad leaved/Korean pine forest and dark coniferous forest in most parts of the region. Now they have been generally replaced by the secondary forest and artificial forest and can only be found in the natural reserve and at the steep slope of some high mountains. A series of ecological problems have been caused by forest destroy, such as shortage of resources, soil erosion, and land degradation. Consequently, the frequent inundation (Flood) directly endangers the regional agriculture and economic development as well as people's life. Therefore, the renovations and restoration of forest ecosystem, scientific management and sustainable development of forestry are the primary tasks. After 1949, the natal year of China, the artificial pure Larch forest was planted in a large scale in the northeast region. Larch is the famous fast-growing timber tree in the northeast regions, and makes a great effect on restoring and reconstructing forest of northeast forest region and on enhancing the economics. However, unduly emphasizing on timber production, ignoring soil acidulation, and the decreasing of soil fertility caused conifer forest diseases, insect pests, and sharp decrement in production. The second-generation's production of Changbai larch forest decreases to 15% per year averagely. The decreasing of soil fertility and productivity, and low stability are the major problems affecting the sustainable development of northeast forestry. Therefore, the other chief measures on the construction and development of northeast forest are to control the decreasing of the soil fertility and productivity and to build the optimized forest ecosystems for Changbai larch forest.

Southwest forest region

Chinese fir is a special conifer fast-growing species in Southwest forest region of China. Chinese fir, whose timber production accounts for 1/4 of commercial timber of China, is distributed in 16 provinces. However, many plant diseases and pest insects also occur in Chinese fir forest. The decreasing of soil fertility is the key problem limiting local economic development. Therefore, the primary task is to resolve soil fertility and productivity decreasing of the Chinese fir forest, and to construct an optimized model for forestry sustainable development.

Forestry in hilly region in south China

The agriculture and forest development was mainly in the south hilly region at all times. The table 2 clearly shows that in this area the forest volume is quite large; also occupy 1/3

of the entire country's forest volume. But recent years, population in this region increases rapidly, and the contradiction between agriculture and forest is outstanding. Most of the peasants reclaim forest lands, and this leads to the destruction of forest vegetation, soil erosion and the decrease of soil fertility. With the economic development, improvement of people's living conditions and the increasing demand of resource by society, some short-term economic behaviors lead to the hilly ecosystems in a deteriorating circle. Soil erosion and declining soil fertility limit local agricultural and economic development greatly. Therefore, how to renovate and utilize hills reasonably and soil resource is an important scientific question. With the development of restoration ecology, the protection and reconstruction of deteriorating ecosystems is a main topic in modern ecology. Regenerating the fundamental function of ecosystem in the degenerating hilly region and sustainable utilizing renewable biological resource are the inevitable requirement of local social and economic sustainable development.

North forest region

Only 11.4% volume of forest storage make this region the smallest forest region in China, but with the processing of Shelter belt Construction Program in North, the coverage of forest in this region will increase gradually and ecological environment can be notably improved.

2-2 Present condition of Chinese forest resource

According to the fifth investigation value of forest resource, the result indicates that the area of forest land was 263 million hm^2 and forest area was 15.9 million hm^2 , then the coverage we can get was 16.55%, and the total volume of live stand was 1127 million m^3 . Conifer forest area was 69.36 million hm^2 and its volume was 633 million m^3 . Broad-leaved forest area was 64.5 million hm^2 and its volume was 494 million m^3 , as this result, the volume ratio of conifer forest to broad-leaved forest was 56 to 44. Base on the data of Food and Agriculture Organization of the United Nation, forest area of China was ranked the fifth, follow Russian 67.0%, Brazil 58.0%, Canada 39.0% and America 31.3%, and the forest volume ranked the seventh follower Russian, Brazil, Canada, America Zaire and Indonesia. Compared with the world average of 0.94 hectare, the per capita forest area of China is very low. In China, it is only 0.11 hectare, accounting for 11.7% of the world average. China's forest storage per capita is also very low compared to the world average figure. The world average per capita forest storage is 68.25 cubic meters; while in China it's only 8.6 cubic meters,

accounting for 12.6% of the world average. There is no doubt that China is a country which lacks of forest cover, additionally, the young and middle age forest resources accounted for much, because of the destruction and over consuming in last thirty years, even if our country launches unprecedented Forestry Programs, it still needs time to be maturing. Therefore the conservation and sustainable development of forest resources is very important to the country.

2-3 The existing questions of Chinese forest resources

(1) A big gap between supply and demand of timber

Although China achieved a growth in both forest area and forest storage by the early 1990's, there is still a big gap between the supply and demand for timber. The reason is that the increasing part of forest area and storage is mainly due to the growth of young forests unsuitable for logging. The existing area and storage of matured and over-matured forests is not large enough to maintain a sustainable yield of timber. They cannot even afford to meet the rather low level of timber consumption in China. The annual deficit of standing forest storage from 1984 to 1988 was 40 million cubic meters, and the deficit in national wood consumption in 1993 was 34 million cubic meters. Basically, two methods were applied to fill the gap. One was to log more of the existing matured and over-matured forests; the other was to import timber. Neither of the methods is good. The first one intensifies the timber deficit; the second not only causes a large financial burden, but also increases pressure on world forest resources.

(2) Serious ecological consequences of over logging

The loss of forest has caused serious ecological problems.

Soil erosion: The Yellow River is famous for her muddy water. The soil and sand in the water coming from the upper and middle reach of the river. In those areas, forest coverage has been gone for thousands of years. In another major river basin, the Changjiang River (Yangtze River), the soil erosion area increased from 360 thousand square kilometers in the 1950's to 560 thousand square kilometers by the 1980s. The loss of forest coverage in the upper and middle reaches of the river is one of the main causes of the destructive floods in the middle and lower reaches.

Desertification -The loss of forests has caused the expansion of the desert in northern and

northwestern China. Every year, 170,000 hectares of land turns into desert. Farmland and grassland are damaged by sandstorm disasters. In the northwestern, north and northeastern areas, 13.33 million hectares of farmland and 100 million hectares of grassland suffers from sandstorm disasters each year.

Natural disasters - The loss of forests has caused an increasing of natural disasters. In the upstream area of the Changjiang River, the frequency of droughts and floods has increased dramatically. For example, there used to be a serious drought once every three years in the 1950's. But the frequency of drought increased to once every two years in the 1960s and eight in ten years in the 1970s. There were three flood disasters in this region in 1950s. The frequency increased to five in the 1970s, 15 and has been keeping increasing in the 1980s and 1990s. In the middle and lower reaches of Changjiang River, the flood of the river has become a very serious threat to the life and property of the people living along side the river. In 1998, a serious flood disaster happened in the middle and lower reaches, taking off the over one thousand people's lives.

Loss of Biological Diversity: The loss of forests directly results in the loss of biodiversity. The Report of Research on China's Biodiversity (1998) prepared by the National Environmental Protection Agency gives a detailed description of the situation of biodiversity and the threats facing it. According to the Program Outline of the National Ecological Environment Construction (1998) adopted by the State Council of China, 15% to 20% of China's fauna and flora were under threat currently, while the world average percentage was 10% to 15%

3. Objective and measures for sustainable development of forest resources

3-1 Objective of forest resources in China

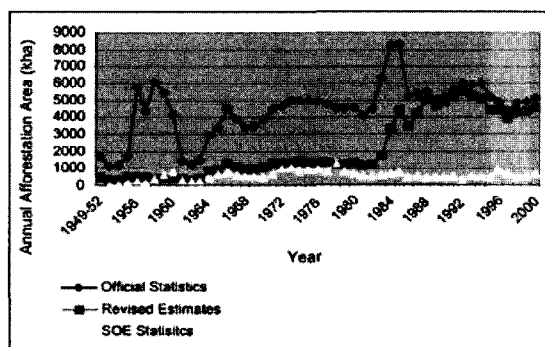
The status quo of China's forestry indicates that forestry development does not meet the requirement for maintaining ecological security and industry using. According to the Blueprint for Ecosystem Development in China, the forest cover is expected to exceed 26 percent in the coming 50 years, which requires a net increase of 90.66 million hectares in forest area. The area of newly established mature plantations will reach 212 million hectares in order to make up for the consumption of more than 10 billion cubic meters of forest resources, and it would take 140 years to achieve this objective at the previous speed. Given this, the Chinese

Government has decided to carry out the six key forestry development programs to promote the implementation of a strategy for forestry development by leaps and bounds. (The six key forestry development programs is as follow: 1. the key shelter belt construction program in north, northeast and northwest China (three north) and in the lower-middle reaches of the Yangtze River 2. the Beijing-Tianjin sandstorm-control program 3. the wildlife conservation and nature reserve development program 4. the fast-growing and high-yielding timber base construction program in key areas.5.the natural forest protection program 6.the program to return farmland to forests.) The effort aims to shorten the period needed for rehabilitating and developing forest resources under the conventional mode, take 50 years to complete the ecosystem development objective that would take more than 100 years to achieve under conventional conditions, push China's forestry into a new stage of sustainable development at an early date, keep the country's forest cover at more than 26 percent, and fundamentally improve the country's ecology and rebuild a beautiful landscape.

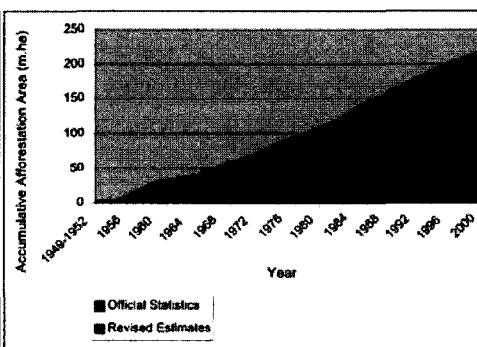
3-2 Measures of forestry sustainable development

The central government now carried on the scientific development ideas in every field of society. Forestry sustainable development demands greatly hard work of government and people as premise.

3-2-1 Increase the investment to the afforestation, especially put the center of gravity on the construction of six key forest programs.



〈Fig. 3〉 Accumulative afforestation area, 1949-2000 Source: SFA (2001b)



〈Fig. 4〉 Accumulative afforestation area, 1949-2000 Sources: China forestry statistics, various issues; China forestry yearbook

As shown in the "statistics bulletin of the six key forestry projects 2003" released by the State Forestry Administration, China's six key forestry projects have produced a total forestation area of 8.2628 million hectares in 2003, a year on year increase of 21.92 percent and accounting for 90.61 percent of total forestation area in China. Started in 1998, the six key projects have brought about a total of 20.0975 million hectares of forest, and total investment of 94.67 billion RMB (yuan) has been made. The project of natural forest resources protection saw smooth progress. The year saw completion of a forestation area of 688,300 hectares; 613,900 hectares of mountain area were newly sealed for forest; and another 2,598,000 hectares was put under care and maintenance. The project of converting farmland to forest and grassland went on smoothly. A total of 6,840,900 hectares of forest and 196,900 hectares of grass were planted. The Beijing-Tianjin Sand Source Control Project has produced notable social and ecological effects. In 2003, 275,300 hectares were afforested in the fourth phase of the "three north forest shelter belt program", of which 86.29 percent were shelter belt. By the end of the year an actual area of 1,164,300 hectares of mountains were sealed for forests. 177,300 hectares of mountains were newly sealed. A total of 854 million Yuan were invested.

3-2-2 Promoting Five Historical Transformations of the Forestry Sector

(1) Shifting emphasis of development from industry to public undertaking. (2) Shifting from free use to non-gratuitous use of forest ecological value (3) Shifting from devastating forests for arable land to returning farmland to forests. (4) Gradually shifting emphasis from felling natural forests to logging in plantations. (5) Shifting from administration by forest departments to management by society.

3-3-3 Systems containing policies and laws should be set up.

National policy-making department and the main scientific research department must know the importance of the relation between forestry sustainable development and basic national policy, and they also should recognize that forestry is important, indispensable. Under the guarantee of policies and laws, overall development strategy should be made scientifically.

4. Summary

China has a very large area, but the total and average amount of forest resources are

always relative scarcity, retrospect the forest history, when the activities of human beings existed on the earth, the forest resources began to reduce gradually, it indicates that the amount of the forest resources have grate connection with the activities of human beings, especially from the foundation of New China, long term out-of- order logging and unsustainable development make the forest resources and ecological environment be destructed seriously. However, although Chinese forest resources still face a large number of complicated problems, it has already begun to recover and been into the right orbit through listing and analysis a series dates. Additionally, six key forest resources program's launching and the strategy shifting will take China enter a bright future.

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