THE ROLE OF UNIVERSITY FORESTS IN EDUCATION, SCIENTIFIC RESEARCH AND SOCIAL SERVICES AT BEIJING FORESTRY UNIVERSITY, P.R. CHINA

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Abstract
University forests are very important in academic forestry education. They are not only used for the in-forest teaching but also serve for scientific research and public education for people to gain knowledge of forests. Besides these functions, the university forests can also provide social services, such as camping and recreation. People can go into the university forests to enjoy the nature and relax.
Taking Beijing Forestry University as an example, this paper will describe the system of university forests in China, their categories, and their roles in forestry education, research and social services. Furthermore, this paper will also explain the development and management system of university forests, and key challenges to the university forests in the future.

Keywords: Tree farm, contracted forest fieldwork bases, university forest

Introduction: Beijing Forestry University

Forests are most important for the forest science education programmes at universities or colleges. They can provide field and research experience for students and professors. Therefore, Chinese universities have paid great attention to the university forests and have developed a university forest system. This paper discusses the general situation of the university forest system in China by taking Beijing Forestry University (BFU) as an example.

BFU is a key national university under the direct administration of the Ministry of Education (MOE) and technically affiliated to the State Forestry Administration (SFA). It is also listed among China's prestigious universities that are entitled to enjoy financial support from the country's educational initiatives like the Innovation Platform for Prioritized Academic Disciplines and the Higher Education Reinvigoration Project 211.

The history of BFU dates back to 1902. Originally known as the Forestry Section of the Agriculture Department of the Imperial University of Peking (Jingshi Daxuetang, the predecessor of Peking University), an independent Beijing Forestry College (BFC) was set up in 1952, which was one of the earliest higher education institutes in the country specializing in forest studies. Thanks to the unrelenting efforts of all the faculty members and students over the past more than sixty years, BFU has developed itself from a specialized college in forestry to its current status

as a comprehensive university with leading positions among its counterparts in disciplines such as forestry, soil and water conservation, desertification control and prevention, landscape architecture, biology, and forest engineering. BFU also offers extensive coverage of additional disciplines in agriculture, science and technology, economics and management, liberal arts, fine arts, law, and philosophy. Around 100,000 forestry professionals and overseas students have emerged from BFU as the builders of the country, including 13 celebrated academicians and a great number of distinguished scientists, researchers and managers.

Currently, BFU is organized into fourteen schools of studies, a Graduate School, a School of Continuing Education and a School of International Studies, offering 57 undergraduate programmes, 116 Master's programmes, 39 PhD programmes and five post-doctoral research stations. With three distinguished academicians in the leading, a highly competent teaching staff provides high-quality education to 32,000 students, consisting of 13,000 undergraduates, 4,100 graduates, 13,000 continuing education students and 1,700 part-time graduate students. Partnerships have also been established between BFU and over 170 higher education institutes, research institutes or NGOs throughout 30 countries and regions to carry out cooperative endeavours in education, scientific research and technologies.

In-forest education has played a very important role in the forestry programmes at BUF. Like the other Chinese forestry universities, BFU has formed its Teaching and Researching Support System which includes a forest tree farm controlled by BFU in Beijing, two contracted comprehensive forest fieldwork bases controlled by forest companies with funding from BFU and more than ten contracted forest fieldwork bases controlled by forest companies without administrative involvement by BFU (Figure 1). A few examples of these bases are: the experimental, demonstrative and promotional base for new forestry technologies in northern China, the comprehensive fieldwork base in the forest regions in southern China (located in Sanming city, Fujian province), the innovation and conversion base for technologies applicable to woody materials, the demonstrative site for quality seeds applicable to afforestation projects on the plains in northern China, and the base for economic forests (Chinese species) breeding and planting. The Teaching and Research Support System has provided strong support for academic forestry education and research projects.

The general description of the university forest system

The forest tree farm of BFU

The tree farm is controlled and managed by BFU. It is located northwest of Beijing, 28 km from BFU campus. The total land area of the farm is 832 ha of which 795 ha is covered by forests (see Figure 2 and 3) and the remaining land is used for management housing, student dormitory, teaching and research facilities, recreation facilities, and guest house. Mixed plantation forest constitute the main forest type of

the farm. The main tree species are Chinese arborvitae (*Thuja orientalis*), Chinese pine (*Pinus tabuliformis*), cork oak (*Quercus variabilis*), larch (*Larix sp.*), and

Figure 1: Location of the more than ten fieldwork bases of BFU in China.

Pinus amandii. Planting was intensive during the 1950s and 1980s. At present, very few plantations are made annually. The estimated total stem volume of the forest is 49 m3.ha-1, and an annual increment of 1 m3.ha-1. The crown coverage is estimated at 96.5%. There are 955 plant species and 536 insect species. Due to prohibition by the local government, there is no commercial logging in the farm. The main silvicultural and forest management operations carried out are forest tending, fire protection, and pest control. All of the cost for the farm is paid by BFU, and consequently, any revenue from the farm should be turned over to BFU. Recreation activities are the primary source of revenue from the farm. Currently, it is about US$ 360,000 each year.


Figure 2 and 3: Forest tree farm of BFU.

The overarching objective of the farm is to support teaching and research in forestry. There are about 30 courses at BFU which use the tree farm for teaching and practice each year. The courses are on plant sciences, entomology, soil science,

surveying, forest management, silviculture, forest fire protection, environment planning etc.

Figure 4 (left): Experts in fieldwork for plant germplasm survey. Figure 5 (right): A meteorological field station.

The forest is also a research place for professors (Figure 4). Currently there are more than ten research projects on the farm that focus on precipitation changes by forest (see Figure 5), technology for soil and water conservation by forests in North China (see Figure 6), a study on species selection by shrub forest, etc.

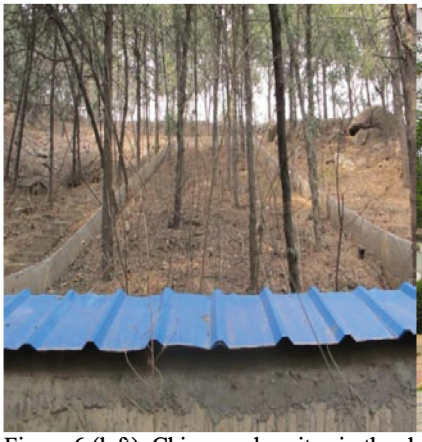

Figure 6 (left): Chinese arborvitae in the sloping land. Figure 7 (right): Recreation activities.

In addition to supporting teaching and research of students and teachers from BFU, the farm also provides several public services due to its proximity to the urban district. The main public services provided by the farm are as follows:

- The university forest accepts students from other universities in Beijing to learn and practice their plant and biology knowledge. For example, in 2015, 3600 students from seven universities in Beijing visited the forest to do their field work.

- The farm is also a practice base of science education for primary school and secondary school students at Beijing. More than 2000 students visit the farm to gain knowledge about trees and forest each year.
- Since its nomination as a National Forest Park in 2003, the forest serves as a forest park for the local people (Figure 7). More than 200,000 persons visit the forest each year.

Contracted forest base with funding from BFU

China is a large country. The climatic and natural conditions vary greatly within the country. As a result, the tree species in North China are different from tree species in the South. Forestry students need to go to different places to do their field practice. Therefore, BFU has developed two contracted forest bases. One is located in South China, Sanming forest experiment base, Fujian province, with 20 ha of nursery, 24 ha for tree species collection, and 2000 ha of forest (see Figure 8). The general office, laboratories, greenhouse and dormitories cover three ha. The distance from Beijing to Sanming forest experiment base is around 2000 km. BFU signed a contract with the local government in 2009. Based on the contract, BFU funded the establishment of the general office, laboratories, greenhouse and dormitories, and the purchase of equipment for teaching and research.

The other forest base, Pingquan forest experiment base, is located in Hebei province in Northeast China with 20 ha of nursery, two ha for tree species collection and 670 ha forest (see Figure 9). Based on the contract, BFU funded the establishment of the general office, laboratories, woodworking shop, the chemical processing shop of forest products and dormitories, and the purchase of equipment for teaching and research. The distance from Beijing to Pingquan forest experiment base is around 300 km. The contract with the local government for this forest base was also signed in 2009.

Figure 8: The comprehensive fieldwork base in southern China (Sanming city, Fujian).

The bases are managed by the local state forest farm. However, the farms take the requirements from BFU and make the forest suitable for university purpose. The

students and professors go to the two bases for field training and forest research projects each year without paying to the local government. The local government bears the management expenses.

Contracted forest base without funding by BFU
Besides the two bases, BFU has also developed more than ten contracted forest bases across China, which are not funded by BFU. The students and professors go to these forest bases for learning and research according to the courses and research project requirements (see Figure 10). BFU is not required to pay for the field study and research work. Nonetheless, the forest companies will receive technical support from BFU.

Figure 9 (left): The comprehensive fieldwork base in northern China (Pingquan County, Hebei). Figure 10 (right): Xiaolongmen Forest Farm in northern China.

The challenges to the university forest system

The university forest of BFU has played an important role in the university education and scientific research for the last several decades. Despite, during the last 40 years, it has faced numerous challenges due to changes in the governance and the economic system. Its main challenges are as follows.

Forest management of the contracted forest bases has become unstable. The contracted forest companies have paid more attention to economic returns. In most cases, the forest management decisions are made to maximize the economic returns from forests. Sometimes, these decisions are not very appropriate for university education or research. Because BFU cannot directly influence the management decisions at the bases under contract, the overall forest management has, in many instances, taken a direction that does not contribute to the study and research objectives of the forest. As the company leadership has changed several times, company vision and management directions have also changed over the course.

The relationship with the contracted university forest bases is not steady. Most contracts were signed during the last 20 years. The oldest one has now expired. While contract renewal might have been a solution, but over the years, some forest companies and tree farms have not honoured the contract. Therefore, BFU is looking to sign new contracts with other forest companies. This change in

management does not particularly benefit the growing education and research needs of the forests.

Recommendations for the future

To improve the university forest system, the university can take the following measures.

- Establishing a union of university forests by all relevant teaching institutes. Currently in China, there are six independent forestry universities, one forest policy college, as well as many forestry colleges or forestry-related majors established in study programmes at other universities, colleges and secondary vocational schools. The universities or colleges are located in different places around China. And all of them have their own university forest. The purpose of all these university forests is identical. Hence, they can form a union and share their forest.
- Strengthen the relationships with contracted forests companies. In the future, the university should strengthen the relationship with the forest companies with more input including funding, technical support and training, etc. In the long run, the university should manage the contracted forests themselves to make the forests meet the university education and research needs.
- Strengthen the Industry-Academia-Research Integration Bases. During the last ten years, BFU has invested considerable efforts to set up a new model which is called Industry-Academia-Research Integration Bases. To facilitate this, numerous fieldwork bases have been set-up throughout the country. A few examples of these bases are:
    - the experimental, demonstration and promotional base for new forestry technologies in northern China;
    - the comprehensive fieldwork bases in the forested regions of southern China (located in Sanming city, Fujian province);
    - the demonstration site for the development and industrialization of fine quality floral seeds;
    - the innovation and testing base for technologies applicable to woody materials;
    - the demonstration site for quality seeds applicable to afforestation projects in the plains of northern China;
    - the base for economic forests breeding and planting.

This new model will help BFU further enhance the forestry education, research and practice.