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# Forestry in Shaanxi Province, People's Republic of China – the part played by Yanan Zhengxian

## He Zhengxian

Shaanxi Province is a long, narrow region running from north to south in central China. A mountainous area, Qinglin Mountain (3372m), lies across the central part from west to east, dividing the province into two parts. Watersheds to the south of the mountain drain into the Yangtze; north of Qinglin they drain into the Yellow River. Since the mountains restrict the airflow moving north, the climate becomes drier and colder from south to north. This results in three distinct climatic and phytographic zones.

- 1) The semi-arid sand dune area along the central part of the Great Wall.
- 2) The loess plateau, which covers 100,000 km<sup>2</sup> in the centre of Shaanxi, and which constitutes the forest steppe region.
- 3) The country south of the mountain barrier which has mixed deciduous and evergreen broad-leaved forest.

From the north to the south, minimum winter temperatures

range from to -28°C to -12°C (mean -9°C to -20°C), and maximum summer temperatures from 32°C to 38°C (mean 18°C to 26°C).

Serious soil erosion exists in all parts of the province. The total area being eroded is 137,000 km<sup>2</sup>, equivalent to 70% of the total area. Annual loss of silt is 9 million tonnes, about 8 million of which comes from the loess plateau in central Shaanxi. A strategic plan has been drawn up for soil conservation. This contains different afforestation and management methods for the different geographic regions.

In the north of the province, windbreak and sandbreak shelter belts have been established using native or naturalised trees such as saxoul (*Haloxylon ammodendron*), Russian olive (*Elaeagnus angustifolia*), Tamarix (*Tamarix chinensis*), and locust (*Robinia pseudocacacia*.) More recently *Pinus silvestris* var *mongolica* has been extensively planted with better results.

In the north of the loess plateau, attempts were made to establish soil conservation forests of Chinese pine (*Pinus tabulaeformis*), *Platycladus orientalis*, *Ulmus pumila*, *Hippophae rhamnoides*, and *Robinia pseudoacacia*. As annual evaporation

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is greater than the rather meagre rainfall, establishment was not satisfactory, and a solution to this problem was listed as a national priority. Recently, a method of ground preparation and planting on reverse slope terraces has been developed for these arid regions. This has resulted in greatly improved plant survival rates, and the method has been widely used in large areas of Shaanxi Province.

In the flat loess plateau of central Shaanxi, farmland protection forests have been established, mainly with poplars (*P. tomentosa* and several hybrid clones) and Paulownia (*P. elongata*, *P. fortunei*, *P. fargesii* and *P. tomentosa*). This is a form of agroforestry, but unlike New Zealand, there are no animals or pasture under the trees, but arable farming instead. In addition, so-called "economic forest" is common with trees such as apples, peaches, pears, persimmon and pomegranate, together with grape vines.

In the south of Shaanxi Province there are mainly "economic forests" and timber forests containing *Pinus tabulaeformis*, *P. massoniana* and *P. armida*.

As the loess plateau covers the largest part of Shaanxi, and *Pinus tabulaeformis* is considered the main timber species there, with *Populus* and *Paulownia* also favoured because of their multiple use possibilities, tree improvement programmes have been dominated by these three species. However, at Yanan arboretum, research continues on the potential of many other trees for afforestation programmes.

Yanan arboretum is situated in Yangjiawan, Yanan city, in Shaanxi Province at latitude 36°36'N and longitude 109°31'E. It was established in the loess plateau of central China in 1980, chiefly to help restore the vegetation and ecological balance of the area. To accomplish this aim, the following objectives were set:

- to establish a suitable gene pool by collecting and growing the tree species native to the loess plateau, particularly those that were rare and endangered;
- to carry out basic research on the biology and ecology of these trees;
- to carry out applied research on propagation and establishment techniques.

The total area of the arboretum is 57.5 ha. It contains 697 tree and shrub species from 160 genera and 75 families. Some are of foreign origin. To date, over 100 species have been identified as having some potential for soil conservation, production forestry, or as amenity trees. In addition, some locally endangered species have been established to ensure their conservation. These include *Kolkwitzia amabilis*, *Fraxinus mandshurica*, *Pinus silvestris* var. *mongolica*, *Elaeagnus mollis*, *Pseudolarix kaempferi*, *Ginkgo biloba*, *Metasequoia glyptostroboides*, and *Davidia involucrata*.

Research projects at the arboretum have involved phenological observations on selected tree species, studies on their ecophysiology, nursery and establishment techniques for the main species, and soil conservation methods for small watersheds. The latter involve a combination of engineering and biological measures using trees, shrubs and grasses of various kinds.

Yanan arboretum is comparatively young, but has nevertheless accumulated much useful experimental and practical information in the ten years since its establishment. It has links with many domestic and international organisations. Students, both graduate and undergraduate, come from all parts of China to study there, and it is widely regarded as an important reservation of botanical resources.

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## A current radiata pine lumber export opportunity

(Continued from P.31)

### Summary

To summarise, sawn timber is a sub-sector of the forest products industry. It is an industry that is dominated by average performance. We compare our performance against others on average. We feel good if we are better than the average. And we work to recover if our averages are down.

To date, New Zealand has proved that it can grow radiata trees very effectively. These trees sold as raw logs in Asian export markets yield acceptable and above average returns. In contrast, sawn timber manufacturing has endured overcapacity and is under-capitalised. The sawmill returns have been inadequate.

Periodically, there are valued-added opportunities that arise which have the potential to create business excellence. These can require a different type of marketing and/or industry structure. If such opportunities are to be realised, the

New Zealand industry and Government need to carefully consider how to create a supportive environment. That is, large forest owners should plan to increase domestic log sales to smaller sawmillers. And Government should encourage venture capital and other funding to build an independent remanufacturing industry and related marketing activities.

In this lumber export alternative, the "window" or time framework for establishing an effective supply position with the US millwork industry is likely to take two to three years. At the end of that time, they either will not need a large supply of New Zealand radiata pine due to non-lumber substitutes or other supply sources could take over, including Southern pine from Brazil.

It should be noted that Brazil grows Southern pine equally well, compared to New Zealand radiata, and that there are established forest plantations reaching

maturity. Already, the Brazilian sawmill industry is exploiting export opportunities in the US. And in some regions of the US Southern pine is being used on an experimental basis, as millwork feedstock (fingerjoint blanks, etc.) with good results. Clearly, they too can expand and become a more successful interloper, if New Zealand is unprepared to meet the challenge.

There are no shortages of innovation opportunities for countries that can innovate. Contrast the basic Canadian forest product commodities to the value-added forest products of Finland. What New Zealand requires is a "jump start" to improve the performance of its solid wood industry, and hence, the ability to expand the down-stream processing of value-added fibre products (by-product chips). These strategic moves will improve the overall New Zealand averages for the entire sector.