An Ecological Study on Teak Bearing Forests under MSS in the Bago Mountains, Myanmar

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Research Background

Teak bearing forests are those forests in which teak can naturally grow well. Teak is one of the most important commercial hardwood species indigenous to four south and south-east Asian countries (India, Myanmar, Thailand and Laos) and for Myanmar; it is the most valuable species bringing glory and wealth to its inhabitants. Teak is capable of thriving on a variety of geological formations but it requires reasonable soil depth and good subsoil drainage. In Myanmar, the northern boundary limit of teak is about 25° N latitude which extends up to the Kachin State and is some distance outside the northern tropic. Its southern boundary is about 15° N latitude in the Amherst district (Tewari, 1992). In the east, it is found in the Shan State and extends beyond the frontier into Thailand while the northwest boundary does not extend beyond the western watershed of the Irrawaddy and Chindwin rivers. Teak cannot be found in the dry zone of central Burma, the delta areas or areas of high and low elevation of tropical evergreen forests. The total area of teak forest in Myanmar is approximately 16,517,700 ha (Gyi & K. Tint, 1998). In Myanmar, the natural teak bearing forests are the country's primary source of forest products, providing teak and other commercial hardwood species. Forest resources play a major role in socio-economic development and forest product exports are an important source of foreign exchange. Teak from the Bago Mountains has an exceptional timber quality. According to Kermode (1964), the forest area of the Bago Mountains is the forested region which has both the highest level of teak growth and the highest density of stocking of teak in all of Myanmar. The forested area of the Bago Mountains is about 1,878,541 ha in total (Zin, 2000) making up about 11.3% of the total teak bearing forests of the country. Although the teak bearing forests of the Bago Mountains are important in terms of Myanmar's forest management, there is no detailed ecological study on tree regeneration and stand structure.

Research Purpose and Aim

(1) To observe the current situation of Myanmar Selection System

(1) To observe the effect of selective logging on tree regeneration

(2) To observe the canopy damage due to selective logging

Results and achievements by fieldwork

(1) Methodology

A field survey was carried out in compartment 62 and 80 of the Kabaung Reserved Forest. In compartment 62, logging operations were carried out in 2007. Logging operations were delayed and then carried out in January, 2008. In September 2008, logging operations were carried out again in compartment 62 to extract the remaining marked trees from 2007. In compartment 80, logging operations are scheduled to be carried out next year.

Two permanent sample plots (60 m x 80 m each) were set up in the logged areas of 2008 and 2007. In addition to this one more permanent sample plot (60 m x 100 m) was established in compartment no. 80 in which logging operations will be carried out next year. Each sample plot was divided into 20 m x 20 m sub-plots. In each sub-plot, measurement for all living trees with height≥ 1.3 m, a bamboo census and regeneration counting for teak and some commercial species was carried out. For trees with DBH≥ 10cm, the stem diameter at breast height (d.b.h), numbering and location were recorded. All teak and some commercial trees seedlings and saplings were counted in each sub-plot. The number of saplings and seedlings will be used as an indicator of regeneration. Logged stumps were tagged and their diameters were measured. The maximum height of the bamboo, number of culms, maximum and minimum sized clumps was measured. The location of trees, saplings, seedlings and logged stumps was recorded for each sub-plot. Four canopy photos were taken at 1m height in four inner centers of each plot in order to observe the canopy openness. In the area logged in 2008, a 300 m x 300m plot was set up and a teak stumps survey was carried out by measuring their diameters and recording their locations. The tracing of logging roads and marking the location of log landings within a 300m x 300 m plot was also conducted.

(2) Results and Achievements

In the study area, 224 trees and 425 bamboos were enumerated. 29 tree species were found and teak (*Tectona grandis*) was the most abundant among those species. The most abundant hardwood species were *Xylia xylocarpa*, *Mitragyna rotundifolia* and *Terminalia tomentosa*. The dominant bamboo species were Kyathaung (*Bambusa polymorpha*) and Thaik (*Bambusa tulda*). In many sub-plots, the number of bamboos was greater than that of tree species. The total number of teak trees (DBH ≧10 cm) after logging was 19 trees per hectare. Among the 19 remaining teak trees, 18 trees had a DBH of > 10 cm. In the area logged in 2008, the effect of selective logging on tree regeneration could not be investigated whereas in the area logged in 2007, the number of teak seedlings was two times higher than that of the 2008 logged area. In both logged areas, seedlings of *Xylia xylocarpa* were found abundantly. Seedlings of other species, such as *Mitragyna rotundifolia, Anogeissus acuminate, Dalbergia cultrata, Terminalia tomentosa etc.* were also found.

Photo 1. Tree regeneration in logged areas

Photo 2. Extraction of the timber roads

Photo 3. Disturbances due to the logging operation

Implications and impact on future research

In the study area, mother trees for teak regeneration were not found. The number of teak seedlings is fewer than that of *Xylia xylocarpa* seedlings and this should be taken into consideration for teak regeneration in logged areas. Due to the abundance of bamboo, the shade of bamboo may have an impact on teak regeneration. Some of the teak seeds under the trees were eaten by animals. Animal disturbance is a factor for teak seed germination. In some sub-plots of the 2007 logged areas, teak seedlings could not be grown due to the presence of weeds. In such areas, weeding is necessary for teak regeneration. Bamboo flowering and forest fires are also main factors for teak regeneration but these factors could not be analyzed in this study. By observing the remaining teak trees, abnormal distribution of the stand diameter classes of *Tectona grandis* was found with a lower number of small trees. By analysis of the teak stumps, most of the extracted teak trees were within the exploitable girth limits.

Next year, permanent sample plots in the study area will be visited again. Then, the measurement

of tree regeneration and an examination of the possible factors effecting tree regeneration will be carried out. Tree ring analysis will be conducted in order to find out the growth rate of teak trees. Canopy damage due to selective logging will be analyzed through a combination of satellite imagery and field data.

References

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