Chapter 8

SUMMARY AND CONCLUSIONS

Teak is a valuable multipurpose timber naturally found in the forests of Kerala. The first teak plantation in India was started in Nilambur in 1842. Since then there has been a continuous expansion of teak plantations in government forests. In this study, productivity and profitability in government teak plantations in Kerala were analysed. The results and conclusions are summarised here.

The study revealed that the mean total yield from teak plantations in Nilambur was 151.257 m³ ha⁻¹ and the mean annual increment (MAI) during a rotation of 53 years was 2.854 m³ ha⁻¹ year⁻¹ during the period 1967 to 1994. The mean total yield in Other Divisions in a rotation of 65 years was 148.643 m³ ha⁻¹ and the MAI was 2.287 m³ ha⁻¹ year⁻¹. The mean total yield and MAI for Kerala as a whole were 144.833 m³ ha⁻¹ and 2.497 m³ ha⁻¹ year⁻¹ respectively in a mean rotation of 58 years.

For plantations in site quality class I, the expected MAI at 53 years is 8.210 m³ ha⁻¹ year⁻¹ and for site quality IV plantation, it is 1.780 m³ ha⁻¹ year⁻¹ according to the All India Yield Tables for teak. The MAI obtained in Nilambur is equivalent to the yield expected in site quality class III/IV. The plantations with yield in the lowest decile has a site quality class far below the lowest class. Even the plantations with yield in the highest decile had only the
site quality class of II/III. Therefore, the best teak plantations in Nilambur which were famous for its teak showed a productivity level far below the expected yield in site quality class I.

The average site quality based on the mean yield in Other Divisions was only IV while the site quality based on yield from highest and lowest deciles was II/III and far below the lowest class respectively.

Based on the actual yield, the mean site quality observed in Kerala was equivalent to III/IV class. The site quality in the highest and lowest deciles were II and far below the lowest class respectively. It is seen that the site quality was better in Nilambur than that in Other Divisions. It is found that even with a higher rotation age, the mean yield in Other Divisions was lower than that in Nilambur. This indicates that on the average, Nilambur teak plantations have a higher productivity.

The financial cost benefit analysis of teak plantations in Nilambur Divisions showed that for the mean yield, the net present value (NPV) ranged from Rs.1,91,000 at 6% discount rate to Rs. 15,000 at 18% discount rate. The benefit cost ratio (BCR) ranged from 7.5 to 2 at 6 and 18% rate of discount. For the mean yield, internal rate of return (IRR) is 31.3%. This means that the average profitability of teak plantation was 31.3% when land rent has not been taken into account. Even for plantations having low yield, the IRR was 11.7 %. When a land rent of Rs. 1300 ha\(^{-1}\) year\(^{-1}\) is considered, the profitability
of plantations having low yield was 7.8%. And with a higher land rent of Rs. 2500, it was 6.0%. Using BCR as a criterion, discount rates higher than 12% brought down the BCR to less than 1 for low yield when no land rent was considered. When a land rent of Rs.1300 was considered, a discount rate above 6% brought down the BCR to less than unity for low yield. When mean yield is considered, the BCR becomes less than 1 only at a discount rate of 18% with a land rent of Rs.2500. At 12% discount rate, if a high yield is obtained, the maximum land rent possible is Rs.9750 ha\(^{-1}\) year\(^{-1}\). If the yield is low, no land rent can be paid at a discount rate of 12%. The term land rent is used to denote the potential surplus considering the current cost, yield and benefit. This also indicate the maximum money available for higher inputs if needed.

Profitability analysis of teak plantations in Other Divisions with mean yield without considering land rent showed a BCR above 1 even when a discount rate of 18% was considered. But when the yield in the lowest decile was taken, a discount rate at 9% brought the BCR below 1 which makes it unprofitable. The IRR of teak plantations for the mean yield was 22.8% ranging from 7.5% for the lowest decile to 44.4% for the highest decile. For plantations with mean yield, when the land rent at the rate of Rs.1300 was considered, the IRR was reduced to 13.9%. When the land rent was Rs.2500 ha\(^{-1}\), the IRR was further reduced to 9.6%. With a land rent of Rs.2500, the NPV became negative for the lowest decile at 6% rate of discount. The maximum land rent possible in teak plantations in Other Divisions with mean
yield is Rs.1750 at a discount rate of 12%. For plantations in the lowest decile, the surplus is negative or nil.

Profitability analysis of teak plantations in Kerala with mean yields without considering land rent showed a BCR of 1.6 even when a discount rate of 18% was considered. But when the yield in the lowest decile was taken, a discount rate at 9% brought the BCR below 1 which makes it unprofitable. The IRR of teak plantations for the mean yield was 26.0% ranging from 8.2% for the lowest decile to 45.2% for the highest decile. When the land rent at the rate of Rs.1300 was considered, the IRR for plantations with mean yield reduced to 17.3%. When the land rent was Rs.2500 ha⁻¹, the IRR further reduced to 12.5%. With a land rent of Rs.2500, the NPV became negative for the lowest decile at 6% rate of discount. The maximum land rent possible in teak plantations in Kerala with mean yield is Rs.2750 at a discount rate of 12%. For plantations in the lowest decile, the surplus is negative or nil at a discount rate above 9%. The profitability analysis using IRR, BCR and NPV for mean yield for Nilambur and Other Divisions showed that Nilambur teak plantations are more profitable than plantations in Other Divisions although the rotation ages are different.

Apart from the analysis on the productivity and profitability of teak plantations in the government forests, the claims made by the teak plantation companies in the private sector was evaluated. The analysis based on two major teak growing companies and two leading financial institutions showed
that the IRR in investment in financial schemes range from 15.3% to 15.7%. And in the teak growing schemes, they range from 25.9% to 28.7%. However, most of the returns are based on the projected value of teak wood of unspecified girth. The projected price is not guaranteed by the teak growing companies.

The evaluation of claims of the private teak growing companies, based on the actual performance in government forests and the expected yield according to the All India Yield Tables revealed that the projections made by the companies to attract investors are too optimistic.

The productivity achieved in government teak plantations was much below the potential productivity as indicated in the All India Yield Tables. Even then, the plantations are profitable to the government. With better management inputs, it is possible to increase the productivity in government teak plantations at least to the level indicated by the site quality of each plantation. For this, yield class assessment have to periodically be carried out instead of mere site quality determination once in a rotation, based on top height.