

An insight into the socio-economic view of coffee based agroforestry systems of Kodagu: a small scale forestry

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ABSTRACT

Kodagu, a beautiful land along the Western Ghats is the second smallest and one of the densely wooded districts in the country. The commercial timber harvesting from the natural forests and introduction of coffee cultivation was initiated by Britishers during nineteenth century. The traditional methods for the establishment and maintenance of coffee plantations involve placement of young coffee plants under canopy provided by one or more tree species and diverse coffee plantations can be considered as managed forests. In the last decade due to increase in the coffee price, the area under coffee cultivation was also increased at the cost of natural forested ecosystems. Some people believe that these coffee based agroforestry systems are looming threat to our forested ecosystems. On the other hand, it is also believed that, they harbor trees, so help in conservation of biodiversity, especially the coffee based agroforestry systems of Kodagu and its unique land tenure systems made them to have high potential areas of conserving our biodiversity. In the present study we are looking for the relations between the sociological issues, that is land tenure systems and the economic issues in terms of stumpage value from the coffee based agroforestry systems. The economy intern influences the social well being of the community.

Key words: Coffee, Biodiversity, Agroforestry, land tenure systems.

INTRODUCTION

Kodagu, the second smallest district in Karnataka after Bangalore Urban is one of the densely forested districts not only in the state but also in the country. Eighty percent of the 4106 square kilometers of Kodagu is forested. The district, extends between 11° 56' – 12° 52' N and 75° 22' - 76° 11'E. Kodagu district is a micro hotspot of biodiversity within the larger Western Ghats, one of the 25 hotspots and eight hottest hotspots of biodiversity in the world today (Myers 2000). The district has a steep west to east climatic gradient. The rainfall decreases from west to east. The decrease in rainfall is accompanied by a longer dry season. The second climatic gradient is the lengthening of dry season from south to north and is related to seasonal advance and withdrawal of the monsoon-giving rise to variations in the floristic composition of forests with latitude. The third factor is temperature gradient that determines the changes in vegetation in function of altitude and exposure (Pascal 1988).

The British started commercial timber harvesting from natural forests and introduced coffee cultivation in the mid nineteenth century. This is believed to have brought more severe landscape transformation than in the past (Elourd, 2000) Cultivation of coffee also continued unabated in post independence India and soon became the major commercial enterprise. As a result, there was little dependence on arable crops and the extent of non tree covered land did not change significantly between 1850 and 1980 (Moppert, 2000). The landscape transformations between 1980 and 2000 have been dramatic because of the intensification and privatization of

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coffee cultivation. It can be argued, however, that this is a peculiar example, where the quality of the forest has deteriorated, but the total tree cover is little altered.

MATERIALS AND METHODS

Sampling procedure:

The sampling technique adopted was randomized stratified sampling. The study area was grouped into different strata like vegetation types and size classes of plantations. To decide the ideal sampling size and shape, preliminary sampling was done using different shape and size of sampling units. Based on species area curve method it was decided that a rectangular quadrat of 25 X 50 meter dimension is the most appropriate size. Two plots of 25 X 50 meters were laid in each estate. Since, with an area of 2500 square meters 90 per cent of the tree species could be captured in the sampling units.

Volume:

By using the girth and total tree height volume was calculated by using the formula; $\text{Volume} = \pi r^2 \cdot h$

Where, 'r' is radius at breast height and

'h' is the total height of the tree.

Stumpage value:

Stumpage value was estimated by considering the market price of timber in previous three years at Karnataka Forest Department timber depot. The average price for three years was computed and was multiplied with volume of trees. Stumpage value of exploitable timber was estimated only for the trees with diameter above 20 cm at breast height.

Stumpage value = Average price of the timber X volume of
the tree

RESULTS AND DISCUSSIONS

Volume of the tree species under different land tenure systems

The total volume of all the tree species as well as the native tree species was higher in unredeemed plantations compared to redeemed plantations, but there was no significant difference between them. While the total volume was comparatively higher in redeemed plantations. The higher proportion of native tree volume in unredeemed plantations is due to the restricted tree rights in this tenure as indicated by Uthappa (1998) and Elouard et al. (2000).

Among the different size class of the coffee plantations the total and the naïve tree volume was comparatively higher in large plantations, while the volume of exotic tree species was higher in small plantations compared to large plantations. This could be due to the higher economic need of the small planters, that is they can get additional returns through the short rotation exotic tree species in addition to the coffee.

Stumpage value of the tree species under different land tenure systems

The results of the present study indicates the stumpage value of total (7.08), native (5.88) and exotic (1.26) tree species was higher in unredeemed land tenures compared to redeemed land tenures. The stumpage value of exploitable timber of total tree species was significantly higher in unredeemed tenure (4.51 lakhs/ha), and for the native and exotic tree species was also higher but was not significantly different. The land tenure systems under which the coffee plantations are established plays a important role in determining the composition of the tree species, which intern determine the stumpage value of coffee plantations (Chaumette, 1997). According to Muthappa (2000), plantations under unredeemed land tenure where there are restrictions on tree harvesting and had higher tree volume (44 cu. m.) and consequently had higher average stumpage value of eight lakh per acre respectively as compared to redeemed land tenure systems.

Under different sized plantations

The stumpage value of total and native tree species was higher in larger plantations than the smaller plantations and similar results are reported for the stumpage value of exploitable timber. Similar kind of results was reported by Muthappa (2000). The small planters were in need of additional short term

economic returns and hence the stumpage value of exotic tree species was higher in smaller plantations. Hence small planters preferred shorter rotation species compared to long rotation native tree species. Similar observations also made by Shonil Bagwat (2002).

Volume (cu. m/ha) of the timber under different land tenure systems

| Nature | Redeemed | Un redeemed | t value | P value |
|--------|------------|-------------|---------|---------|
| | Mean± SD | Mean± SD | | |
| Total | 69.64±5.86 | 85.40±20.08 | 1.51 | 0.11 |
| Native | 55.94±6.55 | 74.69±16.58 | 2.10 | 0.06 |
| Exotic | 13.69±8.37 | 10.72±4.20 | 0.63 | 0.28 |

Volume (cu. m/ha) of the timber under different size class of the plantation

| Nature | Large | Small | t value | P value |
|--------|--------------|--------------|---------|---------|
| | Mean± SD | Mean± SD | | |
| Total | 16.74 ± 6.47 | 16.14 ± 1.19 | 0.17 | 0.43 |
| Native | 14.63 ± 5.69 | 12.66 ± 1.60 | 0.65 | 0.27 |
| Exotic | 2.68 ± 1.13 | 2.79 ± 1.73 | 0.11 | 0.45 |

Stumpage value (Rs/ha) under different land tenure systems

| Nature | Redeemed | Un redeemed | t value | P value |
|--------|-----------|-------------|---------|---------|
| | Mean± SD | Mean± SD | | |
| Total | 5.77±0.51 | 7.08±1.68 | 1.49 | 0.12 |
| Native | 4.63±0.54 | 5.88±1.87 | 1.27 | 0.15 |
| Exotic | 1.13±0.69 | 1.20±0.39 | 0.16 | 0.44 |

Stumpage value (Rs/ha) under different size class of the plantations

| Nature | Large | Small | t value | P value |
|--------|-----------|-----------|---------|---------|
| | Mean± SD | Mean± SD | | |
| Total | 6.3±2.66 | 5.69±1.06 | 0.47 | 0.33 |
| Native | 5.41±2.33 | 4.76±1.09 | 0.56 | 0.29 |
| Exotic | 0.89±0.48 | 0.93±0.87 | 0.08 | 0.46 |

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