



# Existence Value of Kodagu Devara Kadu, Sacred Groves in India<sup>1</sup>

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## Introduction

Sacred groves are manifested in different parts of the world. The park cemeteries of North America, the fetish groves of Nigeria, church forests of Ethiopia, Guthi forests of Nepal, Monastic forests of China, Thailand, The Oostakker sacred grove in Ghent, Belgium (Pic1), are a few examples. In India Devara kadu are commonly found in south India named as Devara bana, Pavitra vana or Devara kadu in Karnataka, Kavu in Kerala and Kovil kadu in Tamil Nadu. In North India, they are known as Deorais or Devrahali in Maharashtra, Sarnas in Bihar, Vanis, Orans, Kenkris or Shamlaldehs in Rajasthan and Lawkyntangs in Megalaya.

Kodagu is an unique district where every village has at least one sacred grove ('Devara kadu') and Devara kadu has sanctum housing a deity, forest surrounding the deity and a small water source to support the sanctum activities. Tradition of Devara Kadu existed much earlier, during 1000 BC in Kodagu at Kolathode-Bygode enroute Hathur-Kaikeri in Virajpet taluk (Pic 2).

## History of tree worship

Tree worship in India dates to vedic period. The "fig deity seal" existed in the ruins of Mohenjadaro, the center of the Indus valley civilization that flourished in 3000.B.C. In Jainism, each of the 24 Thirthankaras was associated with a tree. Vedic Texts of 2000 B.C. describe fig trees as housing the fertility spirits of "Ghandharva" and "Apsara". A fig tree (*Ficus religiosa*) alive today in Bodhgaya sheltered Buddha when he gained "Nirvana" (knowledge of the self) in the sixth century B.C. The Budhist emperor Ashoka also planted this species wherever he spread the new religion (Chandrakanth and Jeff Romm (1991)).

## Rights/privileges

The privileges and rights such as extraction of firewood for temple worship, materials for erection of pendals and timber for temple construction vests with temple committee. The villagers generally do not harvest anything from Devara Kadu. They offer social fencing to the Devara Kadu. The forest department has formulated a set of rules to preserve the Devara kadu under section 31 of the Indian forest Act, VII of 1878.

## Status of Devarakadu in Kodagu

Devara kadu exists in all villages of Kodagu district and each Devara Kadu is named after a specific deity. Kushalappa<sup>7</sup> reported that there are about 1214 Devara kadu in Kodagu district, of which 557 (46 per cent) are of less than one acre, 45 percent are around 5 to 10 acres and 4 per cent are more than 25 acres in size.

## Problem

Devara kadu area has drastically reduced by 62 per cent since 1905. In order to analyze the institutional and economic factors for degeneration of Devara kadu, the existence value of the Devara Kadu is estimated to appreciate the preservation value of the village community. This study focuses on the factors responsible for preservation and valuation of the institution of Devara kadu in Kodagu district with the objective of:

- 1) Analysis of historical, institutional, social and economical factors influencing preservation of Devara kadu.
- 2) Estimation of existence value of Devara kadu in Kodagu district



Pic 1: Sacred grove in Oostakker, Ghent, Belgium



Pic 2: Big Menhir symbolizing Iyyappa (Ishwara) in Kalathode-Bygode in Iyyappa Devara Kadu, Kodagu

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<sup>7</sup> Kushalappa, C. G., 1999, Devarakadus-Edging Towards Extinction. Coffee Land News, 3(48):1

## Sampling and field data

Kodagu district selected for this study on Devara kadu, has 1214 Devara kadu in 5000 acres. The district has two forest divisions : Madikeri forest division in the high rainfall zone of evergreen forests and the Virajpet division in the drier eastern fringe, with moist deciduous forests. From these two ranges four villages each were selected at random. From each village 10 respondents were chosen at random. Primary data relating to Devara kadu were obtained for 15 Devara kadu(s). Data were collected using pre-tested schedule, information regarding knowledge and opinion on Devara kadu, current contribution made towards Devara kadu to which the planter/ farmer respondent visits and also from respondents who do not visit the Devara kadu. Further their willingness to pay annually for preserving the Devara kadu in their village and for the Devara kadu in other villages (that they normally do not visit) were obtained. Information relating to socio economic aspects like social role, education, family composition, land holding and crop economics were elicited. Information on traditional values of ancestral home - "*lynmane*", the ancestral burial place "*Kaimada*" and contributions towards the same, were also obtained.

Existence value is commonly known as the value an individual has for the existence of a resource from which s/he does not derive any use now or in future. Accordingly to Krutilla (1967) existence value is the "willingness to pay for retaining an option to use an area or facility that would be difficult or impossible to replace and for which no close substitutes are available. The demand may exist even though there is no current intention to use the area or facility in question and the option may never be exercised.

In this study the respondent knowledge and opinion about preservation of Devara kadu was elicited. Before asking them their actual willingness to pay for preservation of Devara kadu, their actual contribution for the festivals in the Devara kadu, of their village and contribution for festivals in another village was obtained. Their actual contribution treated as basis for the respondent's true willingness to pay for conservation and preservation of the Devara kadu.

A respondent contributing towards preservation of the Devara kadu in his/her village will have non-consumptive value as s/he is deriving an indirect benefit. However since existence value is based on the valuation due to non-accessibility to the resource, we elicit the respondent's willingness to pay for preservation of the Devara kadu in another village which s/he does not visit and thus does not derive any direct benefit from the same. Even when the interaction with the Devara kadu is indirect and offsite, this willingness to pay closely represents the existence value.

The Dichotomous choice (DC) Contingent Valuation questions were used. The questions pertaining to willingness to pay for preservation of Devara kadu in the respondent's village as well as in another village were of DC format. The respondent was confronted with an offered amount; then, in the next two follow up questions, was asked to specify his or her bid. Thus, it is argued that the specified bid amount is the respondents' true willingness to pay. This was mainly because the respondent's annual willingness to pay for preservation of Devara kadu was elicited thus trying to obtain his true willingness to pay. Logit model was used to estimate the willingness to pay for preservation of Devara kadu in their own village (WTP1) and that for preservation of Devara Kadu in another village (WTP2).

The model for estimation of the logit model :  $Z = \log (P_i / (1 - P_i)) = \alpha + \beta_i X_i = L_i$ . The dependent variable used is  $X =$  willingness to pay (1/0) towards

preservation of Devara kadu, with the independent variables such as  $X_1 =$  Income,  $X_2 =$  Education,  $X_3 =$  Monetary contributions towards family festivals,  $X_4 =$  Bid amount and  $D_1 =$  Clan depending on the respondent belonging to Kodava clan (1) or non Kodava clan (0).  $P_i =$  Probability that the respondent has willingness to pay for preservation or for enhancing the Devara kadu in his/her village or in another village;  $(1 - P_i) =$  Probability that the respondent is not willing to pay for preservation or for enhancing the Devara kadu in his/her village or in another village; The odds ratio  $P_i / (1 - P_i)$  is probability that a respondent is willing to pay to the probability that the respondent is not willing to pay to preservation of the Devara Kadu.

## Tobit model

The dependent variable in this model is the 'actual amount' that each respondent would pay for preservation. The range of this variable is restricted due to the bid amount (as no bids below 0 are allowed) in the Tobit estimation. The respondents' willingness to pay towards the preservation of devara kadu in another village, which they do not visit now or in future (WTP2) is considered as the existence value. The willingness to pay towards preservation of Devara kadu of their existing village which they visit is considered as use value (WTP1).

## Festivity and social fencing

The Devara kadu festivals are conducted once a year jointly by village communities with a sense of belongingness. The rituals - "Tere" "Thadambu dance" "Ethuporata", "Agni keri", "Bolakat", "Kattu" are common in Devara kadu festivals. Kodavas, Amma Kodavas, Koyyava, Kumbara, Kudiya, Panika, Banna, Heggade, Kaapaala, Kembatti, Irri, Meda, Vakkaliga Gowda, Jamma Gowda, Kuruba, Yerava, lingayaths and Bramhins all participate. All communities in the village participate in the Devara kadu festivity. The institution of Devara Kadu festivity strengthens the 'social fencing' of Devarakadu and thus reduces the transaction cost of protection to the Forest Department.

## Economic factors influencing preservation of Devara kadu

Kodagu is the largest coffee-growing district of India contributing around Rs. 1200 crores towards export of coffee from Karnataka. The increase in domestic and export demand for coffee, cardamom, pepper and recently ginger has resulted in increase in cultivation of uncultivated lands in Kodagu. This is the motivating factor for increase in cultivated area in Kodagu attracting the private forestlands. This in turn influenced encroachment of Devara kadu lands. Area per devara kadu varies widely from 0.11 acre to 1315 acres. The Neerulli Bana with 1315 acres is the largest Devara kadu in Kodagu district, while the modal size of Devara kadu varied between five and ten acres.

According to Kushalappa (1999), about 25 per cent of deva thakkas (temple committee heads) indicated that their Devara kadu has been encroached. The total area of such Devara kadu worked to 557 acres, of which 116 acres were reported as encroached by the temple committees. Thus encroached area formed 21 per cent of the total Devara kadu area (Table 1).

In the present study, from the survey of 17 Devara kadu(s), five Devara kadu temple heads reported that there is encroachment and the total encroached area was to the tune of 70.5 acres forming 26 per cent of total Devara kadu area. Thus, from the both the sources of information, the extent of encroachment of Devara kadu area ranged from 21 to 26 per cent.

**Table 1: Details of encroachment of Devara kadu**

Details of data and source	Data from Devara kadu festival	Data from the present study
	n = 40 Devara kadu	n = 17 Devara kadu
Number of Devara kadu where Committees are formed	40 (100)	15 (88)
Number of Devara kadu which reported the fact that their area is encroached	18 (45)	4 (23)
Number of Devara kadu which actually reported extent of encroached area	10 (25)	4 (23)
Extent of Devara kadu Area encroached (acres)	116 (21)*	70 (26)**
Total area of Devara kadu (acres)	1879	267
Total area of Devara kadu which are encroached (acres)	557	80
Number of Devara kadu in which action is taken on encroachers	6 (33)	3 (75)
Number of Devara kadu surveyed by the Department of Survey settlements and Land Records	27 (68)	2 (11)
Protection activity (fencing, planting) undertaken	5 (12)	2 (11)

Note: Data from Devara kadu festival refers to the data filled by the heads of Devara kadu committees who participated in the Devara kadu festival, Oct 2000. Figures in parentheses are per centages of the total number of Devara kadu under each study.

\* 21 per cent (=116/557) is the reported percentage of Devara kadu area encroached out of the total area of Devara kadu which reported the area encroached. \*\* 26 per cent (=70/267) is the reported percentage of Devara kadu area encroached out of the total area of Devara kadu which are encroached.

### Land tenure

About 74 per cent of sample respondents had 'jamma'<sup>8</sup> land tenure, 14 per cent 'sagu'<sup>9</sup> tenure, followed by 12 per cent of the respondents who were landless. Jamma land tenure is one of the most important institutional management systems, which has led to preservation of the traditions and culture of Kodagu. It is a joint ownership of the land, among all the eligible members of a family with the senior most member of the family exercising the control. In this system of tenure, the land cannot be sold outside the family fold. In case it has to be sold, then all the joint owners (listed in column 6 of the land records) have to sign. This procedure has necessitated the family to work together reflecting the family system of Kodagu. However, in recent times, there has been some dilution of the Jamma land tenure, the details of which are not available. The annual gross income of the respondents varied from Rs 3,000 to Rs 8,00,000, with an average of Rs. 68,491 per respondent, with the modal income being Rs. 20,000. The size of coffee plantation ranged from one acre to 100 acres in the sample. The slump in the price of coffee from Rs. 1500 per 50 kg during 1999 to Rs. 950 per 50kg bag during 2000, to Rs. 650 per 50-kg bag during 2001 has also contributed to the wide range in gross income.

Accordingly, an estimated 42 per cent of the respondents contributed for annual Devara kadu festival ranging from Rs. 100 to Rs. 5000 per family, modal value being Rs. 500. About 45 per cent of the respondents, contributed towards renovation of Devara kadu sanctum ranging from Rs. 100 to Rs. 15,000, the modal value being Rs. 1000.

### Purposes of visit to Devara kadu

About 40 per cent of the respondents performed different rituals and participated in cultural activities in Devara kadu. About 96 per cent of the respondents visited Devara kadu to seek blessings from the deity. A majority of the respondents participated in Devara kadu festivity to meet

other members of their family. Out of the 17 Devara kadu(s) in this study, in nine Devara kadu(s), there was the practice of 'konda' where villagers perform the ritual of running on the burning splinters. For this purpose one or two trees is/are cut. In order to facilitate this, about 43 per cent of the respondents helped in the process of cutting the tree/s and in preparation of the ground for burning splinters in the festival. Among the sample respondents, 20 per cent of them, were those who settled in Kodagu since the last five years. All these respondents who settled in Kodagu recently indicated that they visited Devara kadu for scenic beauty.

### Willingness to pay for preservation of Devara kadu

About 63 per cent of the respondents were willing to pay for preservation of Devara kadu as they believed, this would also preserve the forests in Kodagu. About 57 per cent of respondents expressed their willingness to pay for preservation of Devara kadu for performing in the festival. About 42 per cent of the respondents were willing to pay for preservation of Devara kadu so as to sustain the traditions of Kodagu. About, 31 per cent were willing to pay, in order to preserve the Devara kadu for future generation.

### Factors influencing Willingness To Pay (WTP) for preservation of Devara kadu

The logistic regression model is used to estimate the factors influencing the respondent's willingness to pay for preservation of Devara kadu in their village (WTP1). Education, contribution to family festivals and bid amount are the major factors influencing the respondents' willingness to pay for preservation of Devara kadu in their village (Table 2).

WTP2 is the willingness to pay towards preservation of Devara kadu in another village for which the respondents do not have access. The results indicate that education and contribution to family festivals are the two key factors influencing the respondent's willingness to pay.

**Table 2: Factors influencing willingness to pay (WTP) for preserving Devara kadu (logit model results)**

Variable	WTP1	WTP2
Constant	-1.496* (0.811)	-2.309** (0.950)
Income	0.34E-02 (0.0057)	-0.0041 (0.0057)
Education	0.155** (0.073)	.171** (0.076)
Contribution	0.398E-03* (0.232E-03)	0.384E-03* (0.076)
Bid amount	-.497E - 03* (0.265E-03)	0.387E-04 (0.258E-03)
Clan (1)	0.877 (0.782)	0.824 (0.828)
Odds ratio: 1 0	1.9 0.79	1.82 0.8
LR test	13.04***	17.24***
P: 1 0	0.65 0.44	0.64 0.43
N	74	74

\*\*\* 1% level of significance, \*\* 5% level of significance, \* 10% level of significance  
WTP1 = Willingness to pay towards preserving Devara kadu in their own village (annual contribution)  
WTP2 = Willingness to pay towards preserving Devara kadu in other villages  
Figures in the parenthesis represent standard error

<sup>8</sup> Jamma refers to land offered by the then Kodagu kings in recognition of the services rendered. Thus, the ownership of Jamma is not strictly private as it is a public land donated to those who offered their services. Jamma land can be a wet land assessed at one half of normal (sagu) rate of assessment

<sup>9</sup> Sagu refers to the ordinary ryatwari tenure of land held on full assessment at the ordinary rates.

## Odds ratios for willingness to pay

Odds ratio for WTP1 indicated that the chances for paying towards preservation increased by 1.9 chances when the respondent belongs to the kodava community. There are 1.9 chances in favour of willingness to pay towards preservation to one chance of not willing to pay. If the respondent does not belong to the ethnic kodava community, his/her willingness to pay decreases to 0.79 to one chance of not paying. Odds ratio for WTP2 indicated that the chances for paying towards preservation increased by 1.82 chances when the respondent belongs to the ethnic kodava community and was 0.8 when s/he did not belong to the community.

## Existence Value of Devara Kadu

The results obtained in Table 3 bring out the estimated willingness to pay for preservation of Devara kadu in their village as well as their neighbouring village. As expected the mean willingness to pay towards their own village was much higher at Rs.702 per family (US \$ 14). The estimated mean willingness to pay towards preservation of Devara kadu in another village was estimated as Rs 87 per family (US \$1.74), which is a flow concept in which the contribution is made annually. In the study, as the willingness to pay towards other Devara kadu is interpreted as existence value, the estimated existence value for preserving the Devara kadu worked to Rs 87 per family (US \$1.74).

**Table 3: Estimation of willingness to pay for preservation of Devara kadu in Kodagu district - 2001 (Tobit model)**

Variable	WTP1	WTP2	Mean of X
Constant	204.135 (1256.27)	-383.11 (331.31)	
Income	6.693* (3.91)	.754 (331.31)	66.13
Education	117.081** (59.40)	28.55* (16.06)	10.97
Age	-35.198 (18.26)	-3.127 (4.63)	53.37
Contribution	.273 (.10)	.118E-01 (.245E-01)	1064
Bid amount	-.501E-01*** (.195)	.913E-01* (.480E-01)	2096
Clan (1)	467.058 (658.05)	69.55 (175.66)	
Log likelihood function	-416.8638	-344.1938	
Estimated mean willingness to pay (1/0)	702(Rs) 235(Rs)	87(Rs) 15(Rs)	
N	74	74	

\*\*\* 1% level of significance; \*\* 5% level of significance; \* 10% level of significance  
WTP1 = Willingness to pay towards preserving Devara kadu of their own village (annual contribution).

WTP2 = Willingness to pay towards preserving Devara kadu of other villages.

Figures in the parenthesis represent standard error

## Policy Implications

The existence value of Kodagu sacred groves per family (Rs. 87) formed 10 % of the total economic value, while the use value formed the balance 90 %. The use value is dominating over the existence value (non use value). Perhaps this is largely responsible for encroachments and the current status of sacred groves. There has been reduction in the area of Devara kadu due to encroachment and conversion of forest area into plantations. The in-migration of diverse cultures who have no commitment to preserve the sacred grove as they do not form part of their native culture, Home Stays are leading to the dilution of the Devara kadu institution and the existence value. A mechanism has to be developed to involve all communities in the locality for preserving Devara kadu. The Devara kadu land converted to plantations should be reverted to forest land since the land under forest is on the decline especially at the village level. Emphasis has to be laid on preserving Devara kadu as forests reflecting the local bio diversity for future generation.

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