

# Economic Analysis of Arecanut Cultivation in Central Western Ghats Region of Uttara Kannada District, Karnataka

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## ABSTRACT

Arecanut is the major crop of the Western Ghats of Karnataka, as it grows well in high rainfall hilly regions. Uttara Kannada is one of the major districts growing the arecanut under a multi-storeyed cropping system. This region has been earmarked as a traditional arecanut growing district since immemorial (Yadava, 2008). The study has been conducted to understand the profitability and constraints of arecanut cultivators in the region. A Random Sampling Design was employed for selecting farmers and about 90 farmers were interviewed from the central Western Ghats region in Karnataka state. The study was conducted with the help of a pre-tested schedule through the personal interview method. The budgeting technique and Garrett's ranking method were employed for the analysis of the study. The results of the study show that the total cost incurred for the establishment of a one-acre arecanut garden was ₹ 1,46,443. The annual maintenance cost including annuity of fixed cost was ₹ 36,312. Similarly, processing and marketing cost was ₹ 14,733 per acre. Overall total cost incurred per acre was more than ₹ 55,000. The gross and net returns obtained from the one-acre arecanut cultivation were ₹ 1,10,793 and ₹ 55,221 respectively. However, it can also be found that high labour wages, non-availability of timely and skilled labour, high cost of inputs and instability in market prices were the major constraints faced by the arecanut farmers.

**Keywords:** Arecanut, Budgeting technique, Garrett's ranking method, constraints

Arecanut (*Areca catechu* L.) is an important cash crop in the Western Ghats, Eastern Ghats, and East and North Eastern regions of India. It is mainly grown in Karnataka, Kerala and Assam under a multi-storeyed ecosystem (Yadava, 2008; Yadava *et al.* 2022). Among these, Karnataka alone accounts for around 80 per cent of the country's production. Kerala, Assam,

Meghalaya, West Bengal, and Tripura are the other important producing states which have expanded

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arecanut cultivation in the recent past (NHB, 2022). The areca plant is a tall-stemmed erect palm reaching varied heights depending on environmental conditions. Arecanut is an important component of the religious, social and cultural celebrations and economic life of people in India (Ahuja and Ahuja, 2011). Arecanut is also used in ayurvedic and veterinary medicines. The habit of chewing arecanut is typical of the Indian subcontinent and its neighbourhood. Although the production of arecanut is localized in a few states, the commercial product is widely distributed all over the country (Williams *et al.* 2002).

Arecanut is a major commercial crop in Karnataka state. It alone comprises about 1.35 million acres 5,40,000 ha (with a production of 1.1 million tonnes) which contributes around 70 per cent of the area under arecanut cultivation to the total arecanut cultivated area of the country in the year 2021–22. Moreover, the central western ghats region of Uttara Kannada district is popularly known for the traditional cultivation of arecanut under a multi-storeyed farming system in the almost predominant bio-climatic coastal zone, hilly zone and plain transitional zones of the district.

Even though arecanut plays a major role in the economy of the country, the policies of the Central and State governments are not supportive of encouraging and expanding the area under arecanut cultivation as arecanut is classified as a carcinogenic product (Li *et al.* 2019). Hence, arecanut producers are under the threat of banning arecanut. This problem is exaggerated by the high cost of investment, the incidence of pests and diseases, scarcity of skilled labours and unstable market prices in recent days. Against this backdrop, the present study examines the cost and returns obtained and the constraints faced by farmers for the cultivation of arecanut.

## MATERIALS AND METHODS

The study was based on primary data. A random sampling design was employed for the selection of farmers, and about 90 farmers were interviewed from the central western ghats region of Uttara Kannada district. In the region, three *talukas* such as Ankola, Yallapura and Siddapura, were selected, and 30 samples were collected from each taluka (Fig. 1). The study was conducted with the help of a pre-tested

schedule through a personal interview method. The budgeting technique and Garrett's ranking method were employed for the analysis of the study.

### Budgeting technique

This technique was used to estimate the cost incurred and returns obtained from each enterprise.

**(a) Gross return:** It was calculated by taking the actual output obtained by the farmers in the market or at prevailing rates in the study area. The same was used for imputing the value of produce retained for home consumption. It includes the value of both the main product and by-product.

$$\text{Gross return (GR)} = \text{Total product or Total quantity} \times \text{Price of the product}$$

**(b) Net return:** It is the amount of returns received from an investment after all costs have been paid.

$$\text{Net return (NR)} = \text{Gross Return (GR)} - \text{Total Cost (TC)}$$

**(c) Return per rupee of total cost:** It is the ratio of Gross returns obtained to the total cost incurred from an arecanut cultivation.

$$\text{Return per rupee to total cost} = \frac{\text{Gross Return (GR)}}{\text{Total Cost (TC)}}$$

### Garrett ranking technique

The Garrett ranking technique was used to identify benefits of the training and problems confronted by the agripreneur in the study area. Garrett ranking is applied to rank a set of items or factors as perceived by the sample respondents based on their priority. The order of merit assigned by the respondents was converted into scores using the formula given by Garrett and Woodworth (1977).

$$P_i = \frac{100(R_{ij} - 0.50)}{N_j}$$

Where,

$P_i$  = Per cent position

$R_{ij}$  = Rank given for the  $i^{\text{th}}$  factor by the  $j^{\text{th}}$  individual

$N_j$  = Number of factors ranked by the  $j^{\text{th}}$  individual

The per cent position is converted into scores by referring to the table given by Garrett and

Woodworth. Then for each factor, the scores of the individual respondents were added together and divided by the total number of respondents for whom scores were added. These mean scores for all the factors were arranged in descending order, and the most influencing factors were identified through the ranks assigned.

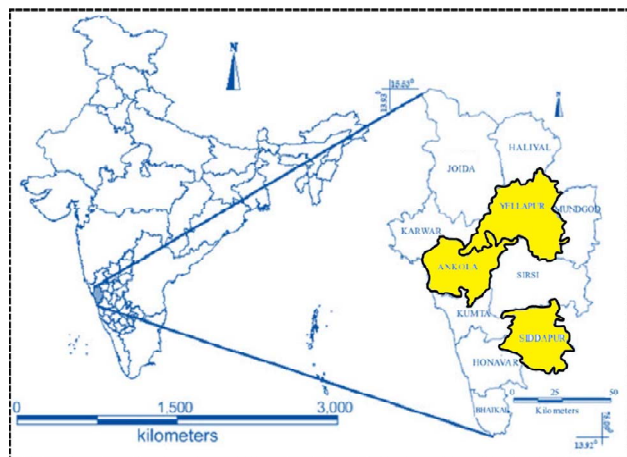


Fig. 1: Map of the study area (highlighted area)

## RESULTS AND DISCUSSION

Results of the study show that the average age of sample respondents was around 56 years and had up to the eighth standard of education. The majority of the farmers had small size nuclear families (around four members), as shown in Table 1.

Table 1: Sampling design and village wise social indicators of samples

Village	Sample size	Age (years)	Education (years)	Family size (Count)
Ankola	30	57.30	7	4
Harwada	15	55.70	6	4
Belambar	15	58.90	8	4
<b>Yallapur</b>	<b>30</b>	<b>54.05</b>	<b>9</b>	<b>4</b>
Arbail	15	54.60	9	4
Kodlagadde	15	53.50	8	3
<b>Siddapura</b>	<b>30</b>	<b>58.25</b>	<b>8</b>	<b>5</b>
Tyarshi	15	58.60	7	4
Shiralgi	15	57.90	6	5
<b>Overall</b>	<b>90</b>	<b>56.53</b>	<b>8</b>	<b>4</b>

Similar results were found in the studies of Kasinath *et al.* (2020), Ramappa (2013), Pushpa *et al.* (2020)

and Pushpa *et al.* (2021). The main occupation of sample farmers was farming (more than 98% of family income was contributed by farming), and annual family income per family was found to be ₹ 7,26,125, ₹ 6,72,637 and ₹ 6,99,741, respectively (Table 2). The annual farm income per farm of sample farmers was found to be highest in Ankola taluk (₹ 7,14,500) followed by Siddapura taluk (₹ 6,73,901) and Yallapur taluk (₹ 6,64,941) and it might be due to highest landholding in Ankola taluk (4.50 acres), Siddapura taluk (3.75 acres) and Yallapur taluk (3.25 acres). Whereas the annual farm income per acre of sample farmers was found to be highest in Yallapur taluk (₹ 1,93,333), followed by Siddapura taluk (₹ 1,88,998) and Ankola taluk (₹ 1,50,962). The result indicate that the sample farmers from Yallapur taluk were efficiently derive income from the farm, followed by Siddapura and Ankola taluk.

Table 2: Economic status of the respondents

Village	Farm Income (₹/Farm)	Farm Income (₹/Acre)	Non-Farm Income (₹/Family)	Family income (₹/Family)
<b>Ankola</b>	<b>7,14,500</b>	<b>1,50,962</b>	<b>11,625</b>	<b>7,26,125</b>
Harwada	7,40,000	1,50,714	0	7,40,000
Belambar	6,89,000	1,51,210	23,250	7,12,250
<b>Yallapur</b>	<b>6,44,941</b>	<b>1,93,333</b>	<b>27,696</b>	<b>6,72,637</b>
Arbail	6,24,000	1,96,800	0	6,24,000
Kodlagadde	5,94,200	1,89,866	93,073	6,87,273
<b>Siddapura</b>	<b>6,73,901</b>	<b>1,88,998</b>	<b>25,840</b>	<b>6,99,741</b>
Tyarshi	6,93,600	1,91,442	12,282	7,05,882
Shiralgi	6,54,201	1,86,554	39,399	6,93,600
<b>Overall</b>	<b>6,84,447</b>	<b>1,77,764</b>	<b>9,387</b>	<b>6,93,834</b>

The result of cropping patterns and irrigation water sources indicate that most sample farmers practice multi-storeyed mixed farming (more than 74 %) rather than monocropping, irrespective of talukas (Table 3). Furthermore, most farmers utilize streams or open well as a source of irrigation (more than 77%), and a small portion irrigates through bore well water. Concerning mixed farming, many sample farmers were growing black pepper and banana crop along with arecanut as a multi-storeyed cropping system.

The result indicates that the overall total cost of establishment of a one-acre arecanut garden was ₹ 1,46,443, and it was found to be highest in the Yallapur taluk (₹ 1,62,201) followed by Siddapura

**Table 3:** Land holding, cropping system and source of water

Village	Landholding (Acres)	Type of farming (No.)			Source of water (No.)		
		Mono	Multi-storied	Total	Bore well	Stream/Open well	Total
<b>Ankola</b>	<b>4.50</b>	<b>7.00</b>	<b>23.00</b>	<b>30.00</b>	<b>5.00</b>	<b>25.00</b>	<b>30.00</b>
Harwada	5.00	3.00	12.00	15.00	1.00	14.00	15.00
Belambar	4.00	4.00	11.00	15.00	4.00	11.00	15.00
<b>Yallapur</b>	<b>3.25</b>	<b>10.00</b>	<b>20.00</b>	<b>30.00</b>	<b>8.00</b>	<b>22.00</b>	<b>30.00</b>
Arbail	3.50	4.00	11.00	15.00	5.00	10.00	15.00
Kodlagadde	3.00	6.00	9.00	15.00	3.00	12.00	15.00
<b>Siddapura</b>	<b>3.75</b>	<b>6.00</b>	<b>24.00</b>	<b>30.00</b>	<b>7.00</b>	<b>23.00</b>	<b>30.00</b>
Tyarshi	3.40	2.00	13.00	15.00	3.00	12.00	15.00
Shiralgi	4.10	4.00	11.00	15.00	4.00	11.00	15.00
<b>Overall</b>	<b>3.83</b>	<b>23.00</b>	<b>67.00</b>	<b>90.00</b>	<b>20.00</b>	<b>70.00</b>	<b>90.00</b>

**Table 4:** Cost of establishment of arecanut garden (₹/ Acre)

Sl. No.	Particulars	Ankola	Yallapur	Siddapura	Overall
1	Land preparation	78,810	1,23,333	1,18,613	1,06,919
2	Seedling cost	12,143	9,475	7,609	9,742
3	Labour charges	4,441	3,903	3,778	4,041
4	FYM	15,607	18,633	12,795	15,678
5	Fertilizers	0.00	0.00	12,000	4000
6	Plant Protection Chemicals	4,642	4,380	4,217	4,413
7	Irrigation	1,000	2,267	1,062	1,443
8	Miscellaneous	200	210	212	207
	<b>Total cost</b>	<b>1,16,843</b>	<b>1,62,201</b>	<b>1,60,286</b>	<b>1,46,443</b>

taluk (₹ 1,60,286) and Ankola taluk (₹ 1,16,843) (Table 4). Out of total establishment costs, the cost of land preparation was found to be highest with ₹ 1,06,919, followed by the cost of FYM (₹ 15,678), seedling cost (₹ 9,742), plant protection chemicals (₹ 4,413) and labour charges (₹ 4,041). These results are on par with a recent study conducted by Totagar's Sale Society, Sirsi, Uttara Kannada, Karnataka, during the year 2018.

The annual maintenance cost of a one-acre arecanut garden was found to be ₹ 27,875, while the fixed cost was ₹ 8,434 (Table 5). Among total maintenance costs, the cost of FYM was found to have a major share with ₹ 13,997, followed by labour charges (₹ 8,061) and plant protection chemicals (₹ 4,511). Among total fixed costs, the major share was occupied by the rental value of land (₹ 4,065), followed by depreciation charges (₹ 3800).

The result of processing and marketing costs of arecanut indicates that the cost of de-husking, transportation, packing, drying and boiling was found to be ₹ 10,811, ₹ 1,955, ₹ 907, ₹ 540 and ₹ 520, respectively (Table 6). All these costs constituted the overall annual total processing and marketing cost for a one-acre arecanut (₹ 14,733). This cost was found to be highest in the Yallapur taluk (₹ 16,763) followed by Siddapura taluk (₹ 14,497) and Ankola taluk (₹ 12,940).

The overall variable cost of one-acre arecanut cultivation was found to be ₹ 47,135, comprised of the cost of maintenance, processing and interest on working capital. The total fixed cost was found to be ₹ 8,437 and together constituted the total cost of ₹ 55,572. The overall gross and net returns obtained from the one-acre arecanut cultivation were ₹ 1,10,793 and ₹ 55,221, with a return per rupee of ₹ 1.99. These results align with the studies of Pooja

**Table 5:** Annual maintenance and fixed cost of Arecanut garden (₹/ Acre/ annum)

Sl. No.	Particulars	Ankola	Yallapur	Siddapura	Overall
1	Irrigation	488	1,007	710	735
2	Plant protection chemicals	4,929	3,440	5,163	4,511
3	Fertilizer	0	367	1,347	571
4	FYM	18,452	12,687	10,852	13,997
5	Labour charges	4,083	11,633	8,467	8,061
	<b>Total maintenance cost</b>	<b>27,952</b>	<b>29,134</b>	<b>26,539</b>	<b>27,875</b>
6	Rental value of land	4,049	4,045	4,100	4,065
7	Land revenue	20	20	20	20
8	Depreciation charges	3,669	3,780	3,950	3800
9	Interest on fixed capital @ 7 per cent	542	549	565	552
	<b>Total Fixed cost</b>	<b>8,280</b>	<b>8,394</b>	<b>8635</b>	<b>8,437</b>
	<b>Total cost per year</b>	<b>36,232</b>	<b>37,528</b>	<b>35,174</b>	<b>36,312</b>

**Table 6:** Processing and marketing cost of arecanut (₹/ Acre)

Sl. No.	Particulars	Ankola	Yallapur	Siddapura	Overall
1	De-husking	8,333	13,093	11,008	10,811
2	Drying	500	713	406	540
3	Boiling	417	480	664	520
4	Packing	238	1,187	1,297	907
5	Transportation	3452	1,290	1122	1,955
	<b>Total cost</b>	<b>12,940</b>	<b>16,763</b>	<b>14,497</b>	<b>14,733</b>

**Table 7:** Cost and returns of arecanut cultivation (₹/ Acre)

Sl. No.	Particulars	Ankola	Yallapur	Siddapura	Overall
1	Maintenance cost	27,952	29,134	26,539	27,875
2	Processing cost	12,940	16,331	14,497	14,589
3	Interest on working capital @ 11 per cent	4,498	5,001	4,514	4,671
	<b>Total Variable cost</b>	<b>45,390</b>	<b>50,466</b>	<b>45,550</b>	<b>47,135</b>
4	Fixed cost	8,280	8,394	8635	8,437
5	<b>Total cost</b>	<b>53,670</b>	<b>58,860</b>	<b>54,185</b>	<b>55,572</b>
6	Gross returns	1,05,714	1,16,800	1,09,866	1,10,793
7	<b>Net returns</b>	<b>52,044</b>	<b>57,940</b>	<b>55,681</b>	<b>55,221</b>
8	<b>Return per rupee</b>	<b>1.97</b>	<b>1.98</b>	<b>2.03</b>	<b>1.99</b>

*et al.* (2018), who reported that the total cost of cultivation of the arecanut crop was ₹ 59,282 and net returns of ₹ 1,68,835 (Table 7).

It also can be seen that the total cost and net returns were found to be highest in Yallapur taluk (₹ 58,860 and ₹ 57,940, respectively), followed by Siddapura taluk (₹ 54,185 and ₹ 55,681, respectively) and Ankola taluk (₹ 53,670 and ₹ 52,044 respectively). However, the return per rupee of investment was found to be highest in Siddapura taluk (₹ 2.03), followed by Yallapur taluk (₹ 1.98) and Ankola taluk (₹ 1.97).

Badhe and Tambat (2005) reported inadequate inputs and high labour charges as the major constraints faced by the arecanut growers. The high labour wages be the prime constraint faced by the farmers in arecanut cultivation with the Garrett value of 74.9, followed by a dearth of labour during peak period (71.8), non-availability of skilled labourers (65.6), high input costs (52.1), instability in market prices (51.3) and more distance to market (41.5) found to be the major constraints. Furthermore, malpractices in the market (40.00), scarcity of quality inputs in time (37.2), unavailability of public transportation

(28.7), lack of knowledge on processing (20.8), lack of knowledge in grading and standardization (12.9) and an insufficient number of buyers (7.1) were the other constraints faced by farmers which had less impact (Table 8).

**Table 8:** Constraints in cultivation of arecanut

Sl. No.	Constraints	Garrett Score	Rank
1	High labour wages	74.9	1
2	Unavailability of labour during peak period	71.8	2
3	Non-availability of skilled labourers	65.6	3
4	High input costs	52.1	4
5	Instability in market prices	51.3	5
6	More distance to market	41.5	6
7	Malpractices in market	40.0	7
8	Unavailability of quality inputs in time	37.2	8
9	Unavailability of public transportation	28.7	9
10	Lack of knowledge on processing	20.8	10
11	Lack of knowledge in grading and standardizing	12.9	11
12	Insufficient number of buyers	7.1	12

## CONCLUSION

Arecanut is a major livelihood source for the central Western Ghats region of Uttara Kannada district of Karnataka state. The arecanut-based multi-storeyed farming system is evident in the district's almost predominant coastal, hilly and plain transitional zones. The overall variable cost for one-acre arecanut cultivation (₹ 47,135) comprises of cost of maintenance, processing and interest on working capital and the total fixed cost (₹ 8,434) constituted the total cost of ₹ 55,569. The overall gross and net returns obtained from the one-acre arecanut cultivation were ₹ 1,10,793 and ₹ 55,221, with a return per rupee of ₹ 1.99. High labour wages, unavailability of labour during peak periods, non-availability of skilled labourers, high input costs, instability in market prices and more distance to market are the major constraints faced by the sample farmers. The study suggests that further may reduce intense dependency on the skilled labour force.

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