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Economics of Arecanut in Shimogga district of Karnataka

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Abstract
The study was conducted in the year 2016 – 2017 to study the "Economics of Arecanut in Shimogga district of Karnataka" with a sample of 120 respondents. It revealed that, the cost of cultivation during gestation period per hectare was found to be Rs.335213.80 for small size farms group, Rs.302767.20 for medium size farms groups and Rs.283631for large size farms group. Total cost incurred during bearing period by the small size farms were high (Rs.63182.44/ha) as compared to medium and large size farms (Rs.61790.20/ha and Rs.60135.40/ha). Average cost of cultivation in different size farms group up to 23 years was Rs.63990.51/ha for small size farm groups, Rs.61426.42 /ha for medium size farm groups, Rs.59282.66/ha for large size farm groups. The Gross Returns obtained per hectare by large size farms were high (Rs. 327173.91/ha) as compare to medium and small size farms (Rs.287608.70/ha and Rs.232826.09 /ha) respectively. Net returns per hectare were highest in large size farms (Rs.267891.30) compare to the medium and small size farms (Rs.226182.30/ha and 168835.58/ha). Cost A_1 was highest in large size farms (Rs. 36765.16/ha) followed by medium size farms (Rs. 32186.42/ha) and lowest in small size farms (Rs. 22179.51/ha) respectively. Cost A_2 in small, medium and large size of farms groups was Rs. 22179.51/ha, Rs.32186.42/ha and Rs.36765.16/ha respectively. Cost B was highest in large size farms (Rs. 42782.66/ha) as compared to medium size farms (Rs. 38226.42/ha) and lowest in small size of farms (Rs. 28390.51/ha) respectively. Cost C was highest in small size farms (Rs. 63990.51/ha) and lowest in large size farms (Rs. 59282.66/ha). Farm business income in small, medium and large size of farms group was Rs. 210646.58/ha, Rs. 255422.28/ha and Rs. 290408.74/ha respectively. Farm investment income was highest in large size farms (Rs. 273908.74/ha) as compared to medium size farms (Rs. 232222.28/ha) and lowest in small size farms (Rs. 175046.58/ha) respectively. Family labour income was Rs. 204435.58/ha for small size farms group, Rs.249382.28/ha for medium size farms group and Rs.284391.24/ha for large size of farms group.

Keywords: economics, cost, returns, arecanut

Introduction
The Arecanut palm (*Areca catechu L.*,) is an important commercial crop of India. It plays a prominent role in the Religious, Social and Cultural functions and the Economic life of people in India. Arecanut has uses in *Ayurvedic* and veterinary medicines. According to traditional Ayurvedic medicine, chewing Arecanut and betel leaf is a good remedy against bad breath. It is grown in India, Malaysia, Sri Lanka, and Indonesia, Philippines, Tropical Pacific, East Africa and some of the Pacific Islands. Production of Arecanut in the world was about 10.33 lakh tons from an area of 8.29 lakh hectares in 2013-14. India ranks first in terms of both area (47 percent) and production (47 percent) of Arecanut. Karnataka is the largest producer of Arecanut in India covering the area about 2,18,010 hectare and Production 4,57,560 tonnes in 2014-2015. Shimogga ranks first in area 43530 ha and production 60995 million tonnes followed by Chikkamangalore area 21 per cent and production 20 per cent. Dakshina Kannada area 15 per cent and production 12 per cent and UttaraKannada area 8 per cent and production 14 per cent in 2013-14.Therefore, an attempt was made to study the resource use efficiency in Arecanut and to compute the cost and returns in Arecanut cultivation in Shimogga district.

Objectives
To analyze the Cost and Returns of Arecanut crop per hectare in different size of farms groups

Materials and methods
Arecanut cultivation is practiced throughout the district. However, the large scale cultivation of Arecanut is concentrated mainly in Sorba taluk extending on an area of 408 hectares and forming 24.5 per cent of the total area under Arecanut in the district. Hence, Sorba taluk was specifically selected for the study. The information on area under Arecanut crop and number of Arecanut growers from the selected villages was obtained from the respective village accountants (Talati). A proportionate sample of ten per cent of the population from each village was selected randomly. Thus, the total size of the sample selected for the study was 120. The highest average age of the sample farmers in Sorba taluk was found to be 50 years and more than 75% farmers depended mainly on agriculture as their primary occupation. Around 25% of farmers in the selected taluks completed their Graduation education were as the per cent of illiterate farmer in the selected taluks ranged from 5 to 10%. The sample average area under Arecanut cultivation was 1.25 ha in

different size of farms group. On an average plant population per ha was 1200. For analyzing the data collected during the study, tabular analysis and financial analysis were employed. The technique of tabular analysis was employed for estimating the cost of cultivation during gestation period, cost of cultivation during bearing period, yield and return structure of Arecanut.

Results and discussion

Table 1: Cost of Cultivation of Arecanut crop per hectare in different size of farm groups, during gestation period.

Sl. No	Particulars of Farm Operations	Size of Farm Groups		
		Small	Medium	Large
1	Hired Human Labour Charges	20060.00 (5.98)	27300.00 (1.01)	29630.00 (10.44)
2	Bullock Labour Charges	-	-	-
3	Machinery Labour Charges	3600.00 (1.07)	3600.00 (1.18)	3600.00 (1.26)
4	Cost of Seedlings	15550.00 (4.63)	15550.00 (5.13)	15325.00 (5.40)
5	Cost of Farm Yard Manure	8160.00 (2.43)	7590.00 (2.50)	6925.00 (2.44)
6	Cost of Irrigation charges	850.00 (0.25)	800.00 (0.26)	775.00 (0.27)
7	Cost of Plant Protection charges	12500.00 (3.72)	8000.00 (2.64)	7800.00 (2.75)
8	Cost of Borewell	75000.00 (22.37)	65000.00 (21.48)	58000.00 (20.44)
9	Cost of Microjet/sprinkler	60000.00 (17.89)	52000.00 (17.17)	47000.00 (16.57)
10	Cost of Fencing materials	10800.00 (3.22)	10000.00 (3.30)	9500.00 (3.34)
11	Cost of Miscellaneous charges	7640.00 (2.27)	7500.00 (2.47)	7500.00 (2.64)
12	Interest on Working Capital @ 8%	17132.80 (5.11)	15787.20 (5.21)	14884.40 (5.24)
13	Deprecation on Fixed Resources	9310.00 (2.77)	7600.00 (2.51)	7375.00 (2.60)
14	Land Revenue Paid to Government	300.00 (0.08)	300.00 (0.09)	300.00 (0.10)
15	Interest on Fixed Capital @ 10%	6211.00 (1.85)	6040.00 (1.99)	6017.50 (2.12)
16	Rental Value of Own Land	52500.00 (15.66)	52500.00 (17.34)	52500.00 (18.50)
17	Imputed value of Family Labour	35600.00 (10.62)	23200.00 (7.66)	16500.00 (5.81)
	Total Cost of Cultivation	335213.80 (100)	302767.20 (100)	283631.90 (100)

Note: Figure in parenthesis indicate per cent to the total

For establishing, Arecanut plantation investment has to be made on land, borewell, microjet/sprinkler, pump house, plant material, digging of pits and sprayer and these costs together constituted the material costs of establishment. These costs have to be invested during the year of establishment of the plantation in the study. During next five years farmers has to maintain the plantation by applying fertilizers, manures, Plant protection chemicals, irrigation etc. The total costs of cultivation during gestation period (Table1) were found to be Rs.335213.80/ha for small, Rs.302767.20/ha for medium and Rs.283631.90/ha for large size farms group. Out of which the cost of bore well and sprinkler/micro jet and hired labour were the items of cost with major share in the variable costs. The cost of hired human labour charge was highest in the large size farms (Rs.29630/ha), compared to medium size farms (Rs.27300/ha) and lowest in small size farms (Rs.20060/ha). Bullock labour is not utilized in the study area because area is highly mechanized. Machinery labour charge for the small, medium and large size farms was Rs.3600.00/ha. The cost of seedlings was highest in the small size farms (Rs.15550/ha) compare to medium size farms (Rs.15550/ha) and lowest in large size farms (Rs.15325.00/ha) respectively. As Arecanut would respond well with farm yard manure so the cost of farm yard manure used was ranged from Rs. 8160.00 (small size farms) to Rs.6925.00 (large size farms). The expenditure on irrigation was highest (Rs.850/ha) for small size farms as compared to medium size farms (Rs.800/ha) and large size farms (Rs.775/ha) respectively. The expenditure on fencing was the highest (Rs.10800/ha) for large size farms as compared to medium size farms (Rs.10000/ha) and small size farms (Rs.9500/ha) respectively. The expenditure on imputed family labour was the highest (Rs.35600.00/ha) for small size farms as compared to medium size farms (Rs.23200.00/ha) and large size farms (Rs.16500.00/ha) respectively. It was also noticed that the highest expenditure on plant protection chemical was seen on small size farms (Rs.12500/ha) as compared to medium (Rs.8000/ha) and large size farms (Rs.7800.00/ha) respectively. Depreciation on fixed resources was Rs.9310 for small, Rs.7600 for medium, Rs.7375 for large size farm groups. Interest on working capital @ 8% was Rs.17132 for small, Rs.15787.20 for medium and Rs. 148884.40 for large size farms group. Interest on fixed capital @ 10% was Rs. 6211 for small, Rs.6040 for medium and Rs.6017.5 for large size farms group. Land revenue paid to government was Rs.300 in different size of farms group. The cost of rental value of own land was Rs.52500/ha in different size of farms group up to gestation period.

Table 2: Cost of Cultivation of Arecanut crop per hectare in different size of farm groups, during bearing period.

Sl. No	Particulars of Farm Operations	Size of farm groups		
		Small	Medium	Large
1	Hired Human Labour Charges	4500.00 (7.12)	8350.00 (13.51)	8750.00 (14.55)
2	Machinery Labour Charges	3600.00 (5.69)	3600.00 (5.82)	3600.00 (5.98)
3	Cost of Farm Yard Manure	5523.00 (8.74)	5350.00 (8.65)	5250.00 (8.73)
4	Cost of Irrigation charges	170.00 (0.26)	175.00 (0.28)	180.00 (0.29)
5	Cost of Plant Protection charges	2500.00 (3.95)	2350.00 (3.80)	2200.00 (3.65)
6	Cost of Miscellaneous charges	1500.00 (2.37)	1500.00 (2.42)	1500.00 (2.49)
7	Interest on Working Capital @ 8%	1423.44 (2.25)	1706.00 (2.76)	1718.40 (2.85)
8	Amortized est. cost	16000.00 (25.32)	16000.00 (25.89)	16000.00 (26.60)
9	Deprecation on Fixed Resources	4500.00 (7.12)	4312.00 (6.97)	4110.00 (6.83)
10	Land Revenue Paid to Government	60.00 (0.09)	60.00 (0.09)	60.00 (0.09)
11	Interest on Fixed Capital @ 10%	3106.00 (4.91)	3087.20 (4.99)	3067.00 (5.10)
12	Rental Value of Own Land	10500.00 (16.61)	10500.00 (16.99)	10500.00 (17.46)
13	Imputed value of Family Labour	9800.00 (15.51)	4800.00 (7.76)	3200.00 (5.32)
	Total Cost of Cultivation	63182.44 (100)	61790.20 (100)	60135.40 (100)

Table 2 shows that among different size of farms during bearing period, total cost incurred by the small size farms were high (Rs.63182.44/ha) as compared to medium and large size farms (Rs.61790.20/ha and Rs.60135.40/ha) respectively. The cost of human labour were the items of cost with major share in the variable costs, because most of the operations like harvesting, and weeding were human labour intensive operations. The distribution pattern of operational cost under various inputs shows that cost of hired human labour was highest in the large size farms (Rs.8750/ha), compared to medium size farms (Rs.8350/ha) and lowest in small size farms (Rs.4500/ha) respectively. As Arecanut would respond well with chemical fertilizer, so the cost of farm yard manure was ranged from Rs. 5523/ha (small size farms) to 5250/ha (large size farms).The expenditure on miscellaneous for small, medium large size farm groups was Rs.1500/ha. It was also noticed that the highest expenditure on plant protection chemical was seen on small size farms (Rs.2500/ha) as compared to medium (Rs.2350/ha) and large size (Rs.2200/ha) farms respectively. Land revenue paid to government was Rs.60 in different size of farms group. The cost of rental value of own land was Rs.10500/ha in different size of farms group.

Table 3: Average Costs and Returns in Arecanut crop per hectare in different Size of Farms Group

Sl. No	Particulars	Size of Farms Group		
		Small	Medium	Large
1	Total Cost of cultivation	63990.51	61426.42	59282.66
2	Yield in quintal per hectare	66.52	82.17	93.48
3	Gross Returns per hectare in rupees	232826.09	287608.70	327173.90
4	Net Returns per hectare	168835.58	226182.30	267891.30
5	Cost of Production per quintal	961.95	747.55	634.17
6	Price Per quintal	2739.13	2739.13	2739.13

In this section cost and returns of different periods of growth are discussed. The cost incurred and returns obtained in Arecanut were showed in Table 3. The annual costs per hectare were higher in the first 5 years mainly because of more labour required during this period for application of fertilizers, FYM, PPC, weeding, and irrigation etc. The per hectare cost remained the same from 6th to 23rd year during bearing period of orchards, since, they were applying the same quantity of inputs and also the labour employment remained same for different operations during this period.

Average Costs and Returns in Arecanut cultivation upto 23 years among different size of farms group (Table 3), the total cost of cultivation incurred by the small farms were high (Rs. 63990.51/ha) as compared to medium (Rs. 61426.42/ha) and large farms (Rs. 59282.66/ha). The gross returns obtained per hectare by large size farms were high (Rs. 327173.91/ha) as compare to small and medium size farms (Rs. 287608.70/ha) and (Rs. 232826.09 /ha) respectively. The net returns per hectare obtained by large size farms were high (Rs. 267891.30/ha) as compared to medium and small size farms (Rs.226182.30/ha) and (Rs. 168835.58/ha) respectively. The yield was highest in case of large size farms 93.48 quintal/ha as compared to medium (82.17 quintal/ha) and small size farms (66.52 quintal/ha) respectively. Average cost of production per quintal was Rs. 839.12/quintal. Average Price per quintal was Rs. 2739.13/quintal.

Table 4: Cost Concepts in Arecanut crop per hectare in different Size of Farms Group

Sl. No	Cost Concepts	Size of Farms Group		
		Small	Medium	Large
1	Cost A_1	22179.51	32186.42	36765.16
2	Cost A_2	22179.51	32186.42	36765.16
3	Cost B	28390.51	38226.42	42782.66
4	Cost C	63990.51	61426.42	59282.66

Table 4 shows that Cost Concepts on different size of farms group per hectare. Cost A_1 was highest in large size farms (Rs.36765.16/ha) followed by medium size farms (Rs.32186.42/ha) and lowest in small size farms

(Rs.22179.51/ha) respectively. Cost A_2 in small, medium and large size of farms groups was Rs. 22179.51/ha, Rs.32186.42/ha and Rs.36765.16/ha respectively. Cost B was highest in large size farms (Rs. 42782.66/ha) as compared to medium size farms (Rs. 38226.42/ha) and lowest in small size of farms (Rs. 28390.51/ha) respectively. Cost C was highest in small size farms (Rs. 63990.51/ha) and lowest in large size farms (Rs. 59282.66/ha).

Table 5: Measures of Farm Profitability in Arecanut crop per hectare in different Size of Farms Group

Sl. No	Particulars	Size of Farms group		
		Small	Medium	Large
1	Gross Returns	232826.09	287608.70	327173.90
2	Farm Business Income	210646.58	255422.28	290408.74
3	Farm Investment Income	175046.58	232222.28	273908.74
4	Net Returns	168835.58	226182.30	267891.30
5	Family Labour Income	204435.58	249382.28	284391.24

Table 5 shows that Measures of Profitability in Arecanut cultivation in different size of farms group. The gross returns obtained per hectare by large size farms were high (Rs.327173.91/ha) as compare to medium and small size farms (Rs.287608.70/ha and Rs.232826.09/ha) respectively. Farm business income in small, medium and large size of farms group was Rs.210646.58/ha, Rs.255422.28/ha and Rs. 290408.74/ha respectively. Farm investment income was highest in large size farms (Rs. 273908.74/ha) as compared to medium size farms (Rs.232222.28/ha) and lowest in small size farms (Rs.175046.58/ha) respectively. The net returns per hectare obtained by large size farms were high (Rs.267891.30/ha) as compared to medium and small size farms (Rs.226182.30/ha and Rs. 168835.58/ha) respectively. Family labour income was Rs.204435.58/ha for small size farms group, Rs.249382.28/ha for medium size farms group and Rs.284391.24/ha for large size of farms group.

Conclusion

Arecanut is a highly remunerative crop this was the reason behind rapid expansion of area under arecanut despite the high establishment cost and five years of gestation period. The resources was under used, indicating that the scope for increased used of the resources to increase arecanut production. The irrigation, chemical fertilizer, use of compost and application of pesticide are very important in increasing the productivity of arecanut plantation. In the establishment of arecanut plantation the first and foremost thing is raising quality seedling / procuring seedlings from a well known orchard. Efforts must be made to raise and distribute quality seedlings at subsidized rates, which will ensure not only cent percent sustainability but also will help to increase production and productivity of palms.

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