International Journal of Applied Research 2016; 2(11): 501-505

ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2016; 2(11): 501-505
www.allresearchjournal.com
Received: 11-09-2016
Accepted: 12-10-2016

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Determination of profitability and resource-use efficiency of coconut production in East Godavari district of Andhra Pradesh

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Abstract
The study was attempted to measure and compare the relationship between coconuts out and the various inputs used by coconut growers, elasticity and economic efficiency of resource used in production of coconuts. The study was carried out East Godavari District of Andhra Pradesh, Multistage method was adopted, the forty villages of four mandals viz., P Gannavaram, Ainavilli, Ambajipeta, Kothapeta mandals of East Godavari District has been selected for the study and the data were collected from 400 coconut growers, sample coconut growers were classified as small and large coconut growers. Primary data were basically used with the aid of structured questionnaires administered on coconuts growers using in multistage sampling techniques. The present study was conducted to analyze the cost, returns and resource use efficiency among the beneficiary coconut growers East Godavari District of Andhra Pradesh.

Keywords: Cost, return, efficiency, coconuts growers, resource use, profitability

Introduction
Coconut is an important tree crop with diverse end-uses, grown in many states of India. In India, coconut is grown in an area of 1.90 million hectare, producing 14744 million nuts with a per hectare productivity of 7747 nuts. India contributes about 15.46 per cent in area and 21 per cent in the production of coconut in the World. Coconut is an important plantation crop in Andhra Pradesh grown along the coastal belt and adjoining districts. The major coconut growing districts are East Godavari, West Godavari, Srikakulam, Visakhapatnam, Vizianagaram, Prakasam, Guntur, Chittoor, Krishna, Nellore, Ananthapuram, Kurnool, Cuddapah. Andhra Pradesh is one of the major coconut growing state which accounts for 5.7 per cent in area and 8.4 per cent in production of coconut in the country. It is grown in an area of 121.92 thousand hectares with annual production of 1828.46 million nuts and productivity of 14997 nuts per hectare, which is significantly high when compared with other major coconut producing states in the country. East Godavari, West Godavari and Srikakulam alone contribute for 80 per cent of coconut production in the state.

Review of Literature
Veerapouthiran. R suggests the following strategies to implement drip irrigation which will improve irrigation efficiency to 80 to 90 percent (1) Allocation of government subsidy for drip irrigation (2) simplified procedure for the disbursement of subsidy (3) reduction of gestation period to avail subsidy. He recommends fabrication for applying fertilizers under drip irrigation and fabrication as a new method of weed management. He concludes that drip irrigation system is highly suitable for adoption in growing trees and fruit trees, wide-spaced and commercial crops and that there is great prospect for rapid expansion of area under drip irrigation in the 21st century.
Sivanappan. R.K points out the wastage of scarce water in surface irrigation of coconut fields. In surface irrigation the entire field is flooded to a depth of 5 to 7 cm once in 5 to 10 days depending upon the type of soil. The quantity of water applied works out to more than 200 litres / day or about 1000-1400 liters in 5-7 days. The conveyance loss is about 20-25%. In contrast to this method is the Drip/Micro Sprinkler Method which has increased water use efficiency and water saving is up to 40 to 60% and labour saving up to 90%.

Further Drip Method increases the yield by 30%. This method successfully meets the problem of irrigating sandy tracts. Many progressive farmers of Tamil Nadu and Karnataka have adopted this advanced method of irrigation. Sivanappan feels that the time is not far away when the entire coconut farm in the country will be irrigated by Drip System for its sustainability and to increase yield.

Rajkumar.S and Thamil Selvan. R in their study entitled "Importance of Coconut Cultivation" pointed out the significance of coconut as a source of edible oil and as an agro-based raw material for many industries such as manufacture of shell powder, and handicrafts. Fermented coconut toddy is an intoxicant used widely in the west coast of India. Vinegar and jaggery are important by products of coconut toddy. The tree trunk is used as a building material and for making furniture. Fifty percent of the total coconut production is converted into copra. Coconut crop is raised in India under varying soil and climatic conditions in 17 states and 3 Union Territories. As the coconut tree is versatile in its adaptability to wide range of soil conditions, coconut cultivatiohas begun to spread from the west coast of India to interior regions of Tamil Nadu especially to Erode District and Thanjavur District. [1]

Minnie Mathew (2008) [4] analyzed the scope for area expansion and improving productivity under coconut cultivation. Despite the many positive developments in the Indian sector in the recent past, there are several serious problems confronting the industry. In India the scope for area expansion under coconut is slowly diminishing. The only way to improve production is by improving productivity. The cluster programme is gaining popularity in view of the gains in productivity, reduction in the cost of cultivation, increased income, community boarding and opportunities for primary processing and building marketable surpluses. For increasing the demand for coconut and coconut products and thereby ensuring remunerative prices to the farmers, a multimedia product promotional campaign has also been carried out. The Government of India and State Governments have taken many steps in favour of the coconut industry including removal of Value Added Tax (VAT) on coconut, copra and other coconut based products and exemption of central excise duty on packed tender coconut water in the last three years, which is reflected in better production and productivity, better farm gate prices, product diversification and a healthy growth.

R. Gopala Krishnan (1993) [5] describes the various financial incentives to the coconut grower. Coconut cultivations in India is mostly confined to coastal belts. However, new areas suitable for coconut cultivation have been located in many States including the non-traditional belts for further expansion. The major lacuna in expanding the area under the crop is the difficulty in raising resources by the small and marginal farmers. Realizing this problem the Coconut Development Board chalked out and implemented a programmed viz,

"Expansion of area under coconut" by providing incentive subsidy to small and marginal farmers. To new planting of coconut by providing financial incentives to the coconut grower. The direct and indirect results of the programme have been quite encouraging. The board through the State Agriculture/Horticulture/ Oilseed Departments implemented the programme. Though the programme was sanctioned in the States of Karnataka, Goa and Tamil Nadu.

K. Satyabalan (1993) [6] has dealt with the yield variation of coconut palms. The number of nuts produced by a coconut palm varies from year to year. Each palm in the garden has different yield capacity and its yield depends mainly on its genotype. Coconut palms are grouped into three yield groups as high yielders (those yielding 80 nuts and above per year), medium yielders (those yielding 40 nuts and above per year) and low yielders (those yielding 10 nuts and above per year).

Methodology

The present study is based on primary data. The present study extends over East Godavari district of Andhra Pradesh. A multistage random sampling design was used. The study purposefully selected four mandals viz., P Gannavaram, Ainavilli, Ambajipeta, Kothapeta. Coconut growers were divided into two categories i.e., small growers and large growers. Data was collected for the explanatory and explained variables with the help of survey method through personal interviews of the farmers selected through mixed sampling for this study relating to the agricultural year 2015-2016. Well structured questionnaire was administered to the 400 coconut growers used for the study.

Statistical Techniques

Cobb-Douglas function to find out input and output relationship (Returns to scale) the CD production function has been used.

The determined of gross return, return to scale and resource-use efficiency were analyzed, using Cobb- Douglas type production function.

The function in log from would be as follows.

Log Y = a+b1 logX1 + b2 logX2+.....+b6 log X6

where,

Y = Yield of coconut per acre (in Rs)

X1 = Watch and ward per acre (in Rs)

X2 = Pesticide per acre (in Rs)

X3 = Manure per acre (in Rs)

X4 = Human Labour per acre (in Rs)

X5 = Irrigation per acre (in Rs)

X6 = Fertilizer per acre (in Rs)

b0, b1, to b6 are the parameters to be estimated.

b0 = Regression Constant b1 to b6= partial elasticity of yield with respect of the factors X1 to X6 respectively.

In order to test the significance of the estimated parameters b1,b2,.....b6, t- test of the following formula is used.

B1 T = ...(2) S b1

Sbi = Standard error of bi

The sum of all the production elasticities of factor inputs indicate returns to scale i.e sb1, = 1,2,6.

If

sbi > 1 increasing return to scale

sbi < 1 Decreasing return to scale

sbi = 1 Constant return to scale.

Efficiency of Resource Allocation

In the present study, in order to test the efficiency, marginal value product of a factor equals its marginal cost. In the present study marginal value product of the inputs X1, X2 ……X6 was calculated by using the following formula.

$$MVPj = Bj\ Pi\frac{Y}{Xi}$$

Where,
MVPj = Marginal value product for input j
Bj = Estimated elasticity co- efficient of variable j
Y = Geometric mean yield (nuts)
Xj = Geometric Mean value of variables.
P = Mean net selling price of coconut (Rs/nuts)
After computing the MVP of various inputs, it was divided by marginal cost of factor cost to arrive at the ratio of marginal value product to factor costs.

Analysis and Discussion

The findings of the present study as well as relevant discussion have been summarized under the following heads:

Costs and Returns from coconut production in the study area

Table 1: Cost of Production of coconut

Sl. No	Cost of Component	Amount Rs. Per acre	Percentage
1	Total Variable Cost	54125	68.57
	Fixed Cost		
1	Land Tax	260	0.32
2	Rental Value of Land	6200	7.85
3	Other Fixed Cost	15245	19.31
4	Annual Share of Net Establishment cost	3102	3.92
I	Total Fixed Cost	24807	31.42
II	Total Cost of Production	78932	100.00

Source: Primary Data.

The above table 1, shows that the cost of production of coconut per acre was worked out to Rs. 78932. The total variable cost per acre was worked out to Rs. 54125, which constituted 68.57 per cent of the total cost of production. It was found that the total fixed cost was worked out to Rs.24807 per acre constituting 31.42 per cent of the total cost of production.

The imputed rental value of land was also the components of the total fixed cost. The rental value of land may depend upon the level of fertility of the land and its proximity to approach road and market centers. It was observed that the rental value of land was worked out to Rs. 6200.00 per acre, constituting 7.85 per cent of the total cost of production. The second important component of the total fixed cost was the annual share of net establishment cost. On an average, the annual share of net establishment cost was worked out to Rs. 3102 per acre accounting to 3.92 per cent of the total cost of production. Amount of other fixed cost in fixed cost was worked out to Rs.15245 per acre and its contribution to the total cost of production was 19.31 per cent. The land tax formed only a negligible share in the total cost of production.

Table 2: Estimated COBB – Douglas type Production function for Small Coconut Growers

Sl. No.	Variable	Elasticity Co- efficient	Standard error	'E' value
1	Intercept (bo)	8.5460	2.0250	8.254
2	Watch and ward (X1)	0.0824*	0.0340	3.540
3	Pesticide (X2)	0.0748^{NS}	0.0565	2.914
4	Manure (X3)	0.2100*	0.0912	3.059
5	Labour (X4)	0.0324^{NS}	0.0741	0.540
6	Irrigation (X5)	0.0420^{NS}	0.0451	2.178
7	Fertilizer (X6)	0.4500*	0.0712	6.415
8	Returns	-	-	-
	R^2 : 0.857, F:-Test :48.653, No. of observation: 230, Significant at 1% level of Probability, NS : Not Significant			

Source: Primary data.

Table 2, shows that the small coconut growers in the study area are concerned about six independent variables they are watch and ward, pesticide, manure, labour, irrigation and fertilizer. Among these independent variables watch and ward, manure and fertilizer but irrigation, labour and pesticide are not significant inputs. The level of watch and ward utilized has significantly influenced the yield of coconut. The yield is expected to increase by 0.0824 per cent from its mean level for every one per cent increase in the level of labour utilized keeping all other factors constant. In the same way the elasticity co-efficient for the cost of manure was 0.210, which indicates that by increasing the expenditure on manure by one per cent the yield of coconut would increase by 0.210 per cent keeping all other factors constant. The co-efficient of fertilizer 0.45 was significant at one per cent level. This indicate that for every one per cent increase from the present level of fertilizer and irrigation the yield would increase by 0.45 per cent from their mean value ceteris paribus. The analysis illustration that the small growers in the study area have better scope for increasing the yield of coconut by the effective utilization of fertilizer.

Table 3: Estimated COBB – Douglas type Production function for large Growers

Sl. No.	Variable	Elasticity Co- efficient	Standard error	't' value
1	Intercept (bo)	14.2650*	0.7800	21.256
2	Watch and ward (X1)	0.4400^{NS}	0.452	2.671
3	Pesticide (X2)	0.0200^{NS}	0.0341	0.384
4	Manure (X3)	-0.2370*	0.0824	-3.340
5	Labour (X4)	0.2870*	0.0784	4.180
6	Irrigation (X5)	0.0275^{NS}	0.0815	0.815
7	Fertilizer (X6)	0.2575*	0.0912	3.231
8	Returns	-	-	-
	R^2 : 0.925, F:-Test :71.254, No. of observation: 170, Significant at 1% level of Probability, NS : Not Significant			

Source: Primary data.

Table 3 shows that the small coconut growers in the study area are concerned about five independent variables three measures of variables namely manure, labour and fertilizer were found to be significant at one per cent level. The elasticity co-efficient for the cost of manure was (–) 0.2370 which indicated an increase in the expenditure use of manures to increase the yield over the mean level. The elasticity co-efficient of labour was 0. 2870 which indicates an increase of labour by one per cent which may result in an increase in coconut yield by 0.2370 per cent ceteris paribus.

The level of fertilizer applied also significantly influenced the yields of coconut. The analysis indicated that every one per cent increase in the cost of fertilizer ceteris paribus. Could increase the yield by 0.2575 per cent from its mean level.

F- Value

The F - values of the equation derived for Small and large famers share were 85.7 and 92.5 which were highly significant at 1 percent level implying that all the explanatory variables were important for explaining the variations in gross returns of coconut growers.

A complete result would be helpful to frame a generated design about the influence of each variable over coconut yield in the study area and this the calculated results for overall sample growers are presented in Table

Table: 4: Estimated COBB – Douglas type production function for Over Growers

Sl. No.	Variable	Elasticity Co- efficient	Standard error	't' value
1	Intercept (bo)	9.4540	0.8400	18.645
2	Watch and ward (X1)	0.0841	0.0350	4.385
3	Pesticide (X2)	0.0045	00500	0.215
4	Manure (X3)	0.0514	0.8014	0.719
5	Labour (X4)	0.0215	0.0314	0.714
6	Irrigation (X5)	0.0450	0.0315	3.345
7	Fertilizer (X6)	0.4520	0.0435	10.485

Source: Primary data.

Table 4 indicate that the co-efficient of determination (R2) was 0.77 indicating that 77.9 per cent of variation in the output of coconut could be explained by the entire six variables included in the production function. The F- value indicated that the fitted cob. Douglas type production function was significant at one per cent level and is valid to draw influence. The value of regression constant was statistically significant. On the subject of production elasticities out of the six independent variables watch and ward irrigation and fertilizer would influence the output as in the case of other types of growers in a significant manner. The yield of coconut could be increased by 0.0681 per cent 0.039 per cent and 0.332 per cent by one per cent increase in the present level of watch and ward, irrigation and fertilizer respectively allowing the respective input to vary while the other factors remain constant.

Table 5: The nature of Return to scale

Sl. No.	Particulars	Sum of the Production Elasticity	Nature of Return to scale
1.	Yield for small growers	0.7584	Decreasing
2.	Yield for large growers	0.4102	Decreasing

Source: Primary Data.

Table 5 shows that the sums of the production elasticity's for yield of the small and large coconut growers were 0.7584, 0.4102 and which indicates decreasing return to scale.

Resource Use Efficiency

Resource Use Efficiency means how efficiently the coconut growers can use his available resources in production process. It is very important because our resource is very limited. For calculating resource use efficiency we consider five factors watch and ward, pesticide, manure, labour, irrigation, fertilizer

Determination of the Level of Resource use

One of the methods of assessing the level of resource use efficiency in agricultural production is by determining the ratio of the Marginal Value Produced (MVP) to Marginal Factor Cost (MFC). Under this method, the decision rules are that, when;

MVP/MFC >1, the level of resource use is below the optimum level, implying under utilisation of resources

MVP/MFC < 1, the level of resources use in above the optimum level, implying over utilisation of resources.

MVP/MFC = 1, the level of resource use is at optimum implying efficient resource utilisation.

Where:

MVP = value of change in output resulting from a unit change in variable input (N)

(MFC) = price paid for the unit of variable input (N).

Table 6: Marginal value productivity of the Resource in small growers

Sl. No.	Variables	Geometric mean	Average physical product (Rs)	Elasticity Coefficient	Marginal physical product	Marginal value of product	Marginal Input cost (Rs)	MVP MIC
1	Yield	98210	-	-	-	-	-	-
2	Watch & ward	4580.54	28.459	0.069	2.485	8.727	0.54	16.1611
3	Pesticide	4519.54	32.454	0.065	2.548	9.254	0.74	12.5054
4	Manure	9845.16	11.4689	0.185	2.418	9.525	0.42	22.6785
5	Labour	18456.89	6.9845	0.424	2.39	8.725	0.12	72.7083
6	Irrigation	2545.60	39.0056	0.045	2.451	9.254	0.95	9.7410
7	Fertilizer	8254.58	19.5654	0.540	5.651	25.544	0.48	53.210

Source: Primary data.

Table 6 shows that the ratio of marginal value products to the factor cost were 16.161, 12.504, 77.708, 22.678, 9.714 and 53.210 respectively for watch and ward, pesticide, manure, labour, irrigation and fertilizer. It is inferred from the table that there was wide scope for increasing the use of watch and ward, pesticide, manure, labour, irrigation and fertilizer to increase the return from coconut cultivation, as the ratio of marginal value product to factor cost was more than unity. It was also revealed that, every rupee additionally spent on fertilizer and manure, worked yield Rs. 53.61 and Rs. 22.67 respectively worth of output.

Table 7: Marginal value productivity of the Resource in large growers

Sl. No.	Variables	Geometric mean	Average physical product (Rs)	Elasticity Coefficient	Marginal physical product	Marginal value of product	Marginal Input cost (Rs)	MVP MIC
1	Yield	95481.5	-	-	--	-	-	
2	Watch & ward	4545.50	28.4544	0.059	1.725	6.546	0.55	11.9018
3	Pesticide	4445.66	29.4540	0.008	0.156	0.945	0.65	1.4538
4	Manure	9945.65	12.5141	-0.187	-1.564	-8.545	0.48	-17.8020
5	Labour	18487.60	7.7841	0.168	1.459	7.535	1.55	4.8612
6	Irrigation	3145.155	40.4581	0.015	0.540	3.549	0.75	4.732
7	Fertilizer	8145.15	18.4545	0.165	2.154	10.546	0.48	21.9708

Source: Primary data.

Table 7 indicate that the ratio of marginal value products to the factor cost were 11.90, 1.45,- 217.80, 4.86, 4.73 and 21.97 respectively for watch and ward, pesticide, manure, labour, irrigation and fertilizer to increase the return from coconut cultivation, as the ratio of marginal value product to factor cost was more than unity. It was also revealed that every rupee additionally spent on watch and ward and fertilizer, would yield Rs. 11.90 and Rs. 21.97 respectively worth of output.

Findings and Recommendations

- Since the availability of water is insufficient, the purchase of water from fellow farmers is inadequate. As a result there is a sizable reduction in the output. In order to increase the water resources, the Government should come forward to help the farmers through subsidy for digging well or bore well.
- The study indicated that the cost of production of coconut is high. Among the cost, the cost of watch and ward, labour and fertilizer is more.
- If the farmers undertake subsidiary occupations like dairying, natural manures, dung etc., that can be used for banana cultivation.
- The cost of fertilizers and pesticides is more as the farmers buy them from private traders. The Government should come forward to supply them through agricultural co-operative organisations either as subsidies or at reasonable price.
- The productivity of coconuts can be increased by promoting irrigation, introducing improved varieties of coconuts and encouraging the farmers to make use of them.

Conclusion

It was recommended that farm mechanization be promoted and encouraged among coconut growers by developing and disseminating simple machines to forestall labour shortage. This will not only ensure greater productivity and efficiency but will attract youth into the agricultural sector. Net cost of production was the highest for the large growers compared to small coconut growers. More farm lands should be put into coconut production in the study area and control diseases Again, policies designed to enhance the use of less production inputs by the coconut growers in the district would lead to increase in coconut production and increased profitability of the crop in the district. Non-Governmental Organisations (NGOs), research institutes and relevant financial agencies operating in the area should encourage indigenous investors with adequate credit, subsidized cost of farm inputs and ensure training workshops to disseminate findings on resource allocation and utilization strategies, to enable efficient utilization of resources.

Reference

1. Veeraputhiran R. Drop Irrigation for Sustainable water management, Kisan World. 2005; 32(1):49-51.
2. Sivanappan RK. Drip Irrigation for Coconut for Increased Yield, Kisan World. 2004; 31(10):47-48.
3. Raj Kumar S, Thamilselvan R. Importance of Coconut Cultivation", Kisan World. 2005; 32(5):58.
4. Minnie Mathew. Coconut Development in India- a recap, Indian Coconut Journal. 2008, 2-7.
5. Gopala Krishnan R. An appraisal of the project for expansion of area under coconut implemented by the Coconut Development Board, Indian Coconut Journal. 1993, 9-18.
6. Satyabalan K. Yield variation in West Coast Tall coconut palms yield attributes which cause variation in Annual yield of nuts in the palms of different yield groups, Indian Coconut Journal. 1993, 5-8.
7. Getnet Geremew. Efficiency of Resource Use in Coffee Growing Area: The case of Smallholder Farmers in Ghibi Woreda Unpublished M.sc. Thesis Presented to the School of Graduate Studies of Alemaya University. 1994.