

Determinants of Instantaneous Disposal of Coconut Harvest in Kerala

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ABSTRACT

The agricultural sector is shrinking across all developing state economies in recent times and very few crops sustained a substantial portion of the sector. The state of Kerala was a notable producer of coconut - a perennial cash crop. The crop has both economic and socio-cultural underpinnings in the state. Currently, coconut farming in the state is declining, particularly as an aftermath of the popularity of rubber as a cash crop in the state during the 1980s and 1990s. Value addition of coconut remains traditional in the state, strictly confining to copra or coconut oil. This paper assesses the scenario of coconut value addition, the choice of farmers in this regard and related concerns. It is found that most of the farmers are not ready to do value addition, even if they are offered substantial assistance. By employing a logistic regression method, the determinants of the choice between value addition and no value addition of the coconut harvest have been tested and the results show that the farmers' socio-economic traits and farm traits have a statistically significant impact on the decision about coconut value addition.

Key words: Coconut, Value addition, Kerala, Logistic regression

India is the third-largest country in coconut production in the world, with a volume of 13 billion nuts per annum (Asian and Pacific Coconut Community Statistics, 2015). Coconut is grown in more than 20.96 lakh hectare in the country with an estimated 23.79 billion nuts with estimated productivity of 11350 nuts per hectare (2017-18). Traditionally, the coastal regions of the country, including Kerala, are the pockets of coconut cultivation. Although Kerala tops in terms of area under coconut, states like Tamil Nadu, Karnataka, Andhra Pradesh and West Bengal have higher productivity than Kerala [1].

Coconut cultivation in Kerala is largely in the hands of small and marginal farmers. It is the most popular homestead crop [2] in the state which is thus having a profound influence on the day-to-day life of farmer households in Kerala. It is estimated that more than 95 per cent of coconut trees in Kerala are grown in the front and back yards of homesteads [3]. However, fragmented it is, Kerala had always enjoyed a better image among Indian states, both in area and production of coconut. People traditionally used to make use of each and every part of a coconut palm at any form of availability, apart from the coconut yield. These uses range from fuel for cooking to the roofing of village houses. However, this socio-cultural bond with coconut has vanished over time due to changing trends in agriculture in the state. Certainly, the popularity of rubber as a commercial crop post-1940s and its peaks post-1970s resulted in a transition of the coconut fields to rubber plantations.

Over the last four decades, coconut production is declining in the state. The contribution of Kerala to the national coconut production in terms of area under cultivation has declined gradually from 69.4 per cent of the national production in 1960-61 to 46.7 per cent in 1990-91, to 42.17% in 1999-2000 [4], to 41.51% in 2009-10 and 38.49% in 2017-18 [1] (CDB Statistics 2018). On the whole, it shows that the share of Kerala's coconut cultivation in the country had contracted from 69 per cent (1955-56) to 38 per cent (2013-14) over six decades (Directorate of Agriculture, Kerala 2016). It implies that the coconut production in the state declined by half while coconut production in other states was increasing at a faster rate coupled with a corresponding change in the utilization of coconut crop.

Worldwide, most of the coconut growing countries have profited from the production and export of diverse coconut products rather than dealing with raw coconut or coconut oil as such. However, Kerala has not marked any noticeable progress in the utilization of the multiple products of coconut palm for value addition both at the farm household and community levels. This has happened mainly because of the low priority assigned to technological research in the national and state-level research establishments. Kerala has not made tangible progress in product diversification and by-product utilization in the coconut industry except for traditional activities such as oil milling and coir processing. As a result, coconut oil (produced out of copra which is the primary form of coconut value addition) continues to be the only major commercial product having an influence on the farm level price of coconut. Coconut oil which was once considered to be indispensable in certain end uses has lost its engage during the last two to three decades and is presently exchangeable with other oils and fats at will, the price being the determinant factor.

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Global and Indian Scenario

The reviews and discussions in existing literature show that coconut and economics of coconut were subjects of interest ever since the 1960s [5] and the trend remains at all levels viz., world, national and local. At the world level, research is certainly concentrated on leading coconut producing countries such as Indonesia [6-7], Philippines [8-10], Malaysia [11], Thailand [12], Sri Lanka [13-14] Samoa, etc. This literature ranges through various dimensions such as the economics of running a plantation, the environmental conditions and farming practices related to scientifically-based coconut agronomy, arguments for value addition and pros and cons of international treaties. Also, most of them mark a positive growth of coconut crop and related economics.

At the national level, [15] is one of the forerunners in this regard to provide all dimensions of coconut crop and its merchandise in India including the cultural, agronomic, industrial and economic aspects. His approach on factors of productivity increase of coconut crop later gained global importance. Among the earlier studies in the Indian context, [16] observed that the first incentive to large-scale production of the coconut was the use of coconut for soap manufacturing, followed by the use of coconut oil for margarine. As a result of these incentives, huge areas of new coconut plantations were planted by the end of the 19th century.

Post that, especially in the wake of new economic policy liberalization in India and the post-reform period witnessed exploration of multiple dimensions of the sector such as production [17-20], irregularity and fluctuation of coconut oil price [21], export and import [22-29] value addition [30-31], food and medicinal values [32-34], organic farming [35-36], technology integration [37].

The Kerala Context

Following the national scenario, the literature on coconut crop in the state can be traced back to the 1980s and the crop was cultivated across all regions in Kerala, with a regional asymmetry. Owing to coconut cultivation in inappropriate land, there has been a decline in production in southern Kerala against rise in production in northern Kerala (Malabar) for the period from 1955-56 to 1978-79 [38]. Studies found that the prices of coconut oil and copra in different markets across the state are moving in close coordination with each other across different markets in Kerala and the price in the Kochi market has an impact over other markets [39]. The centrality of the Kochi market was also found by [40] and he noted that the market price of coconut oil always enjoyed a price premium over groundnut oil. During this period, various new value addition options in coconut started gaining attention [41] and development programs for promoting coconut production in Kerala found to be are beneficial [42].

However, the coconut economy of Kerala was badly affected by the new economic policy of the 1990s and there was a decline of about 41 per cent in prices [43]. Opening of the domestic market for global players has negatively affected the coconut farmers as it resulted in a sudden fall in price at peak production season coupled with flooding of cheap import substitutes [44]. However, since the lean season of Kerala coincided with the peak season of other domestic regions and vice versa, the domestic seasonal price fluctuations and expansion of coconut in other regions of the country, especially in Tamil Nadu had little impact on Kerala's coconut market [45]. Moreover, right against the bloom of coconut plantations in the early 19th century [16], there were symptoms

of the declining trend in coconut production in the state by the early 21st century itself, coupled with productivity constraints such as root wilt attack [46]. There was a marked decline in three major coconut producing states of India viz. Kerala, Karnataka and Tamil Nadu, while Andhra Pradesh remained with a positive growth [47]. The cluster program introduced by CDB in Kerala and scaling up of cluster model by various extension agencies resulted in enhancement of coconut yield by 90-100 per cent and intercropped area by two to four times [48-51].

Apart from the traditional value addition of coconut, need for modern value addition on account of the health and nutritional aspects [52], quality aspect [53], natural health awareness aspect [54] of coconut have been discussed during the recent times. These discussions have also incorporated the need to call for farm and community level government interventions and awareness campaigns. At the same time, marketing of coconut and coconut products were not that easy at a consistently profitable line in the state. This occurred as an outcome of many reasons ranging from seasonal fluctuations to international policies. Majority of farmers prefer to sell raw coconuts in de-husked form and mostly from the farm itself [55]. It was also found that the producer's share in consumers' price was only 60 per cent on average, implying a high price spread among intermediaries.

The rich research in the field is, however, concentrate on coconut price-market affairs, value addition, cultivation models and biological issues. Farmers' stand on the value addition of coconut in the state has not been explored while many studies keep on suggesting novel avenues to deal with coconut value addition. The peculiar socio-cultural situation and pattern of coconut cultivation in Kerala demands a specific analysis of the viability and popularity of the proposed value additions in the sector. These situations pose the ground for the study that, to understand how coconut farmers are dealing with value addition avenues available for them, and what determines their choices with the same. Thus, this paper aims to find out the determinants of coconut value addition choice among cultivators, to arrive at the relevant policy implications.

MATERIALS AND METHODS

This paper is extracted from a major project titled 'Problems and Prospectus of Procurement, Value Addition and Marketing of Coconut in Kerala & Lakshadweep', under the Ministry of Agriculture, Government of India conducted by Agro Economic Research Centre (AERC) Chennai [56]. The idea of this paper has been conceived from the understanding that the majority of farmers (70 per cent) are hesitant to do any value addition with coconut, even if they are offered with assistance, through a field survey conducted for the aforesaid study (Table 1). Malappuram, the top-ranked district in coconut cultivation tops in 'unwillingness' towards value addition also. Thiruvananthapuram, the bottom-ranked district in coconut cultivation among sample districts however reports the major share of 'willingness' to do value addition (42.5 per cent) among others.

This paper is confined to the state of Kerala as the field of investigation, being the top coconut producing Indian state [1]. A primary survey approach has been adopted to collect data from coconut farmers in the state. Information from 300 coconut farmers from five sample districts of Kerala has been collected through a structured questionnaire. The district selection is based on the ranking of coconut production in the

state. The top five coconut producing districts of Kerala namely Malappuram, Kozhikode, Kannur, Thrissur and Thiruvananthapuram are the sample districts selected on the basis of this criterion (Table 2). This selection is judicious in terms of geographical distribution as well. Among the five selected districts, three belong to northern Kerala

(Malappuram, Kozhikode and Kannur) and two belong to southern Kerala (Thrissur and Thiruvananthapuram). Two sample villages in each district were identified in consultation with the CDB, on the basis of concentrated pockets of production and value addition through Coconut Produce Companies (CPCs).

Table 1 Farmers' willingness to stop immediate disposal if necessary assistance given

Particulars	Thiruvananthapuram	Thrissur	Malappuram	Kozhikode	Kannur	Kerala
Willing (Percent)	42.5	28.9	16	21.7	42.9	30.4
Not Willing (Percent)	57.5	71.1	84	78.3	57.1	69.6

Table 2 District ranking in coconut production – Kerala (2018)

Rank	Districts	Region	Area ('000 Ha)	Production (in million nuts)	Yield (Nuts/ha)
1	Malappuram	North Kerala	109	947	8670
2	Kozhikode	North Kerala	128	852	6672
3	Kannur	North Kerala	90	645	7139
4	Thrissur	South Kerala	90	608	6780
5	Thiruvananthapuram	South Kerala	71	572	8009
6	Kasargod	North Kerala	60	508	8515
7	Palakkad	North Kerala	61	493	8145
8	Kollam	South Kerala	55	427	7721
9	Ernakulam	South Kerala	46	241	5197
10	Alappuzha	South Kerala	39	219	5680
11	Kottayam	South Kerala	28	149	5282
12	Pathanamthitta	South Kerala	16	137	8465
13	Idukki	South Kerala	17	95	5537
14	Wayanad	North Kerala	11	48	4565

Source: CDB Statistics 2018

RESULTS AND DISCUSSION

The demographic profile of coconut farmers in Kerala is summarized in (Table 3). The state is historically renowned for its human development and out-migration across the globe for decades. As a result, the agricultural sector in the state is shrinking both in terms of its size and share of contribution to the economy. One of the major reasons for this situation is that the younger generation is largely diverted from the sector, culturally and professionally. The average age of farmers' ranges from mean 55 years to 70 years in the five sample districts. Further, about 88% of farmers are having schooling up to higher secondary level and those who have graduation and post-graduation are just 12%. That means the youth with

higher education are not interested in the cultivation. Lack of modernization in the agricultural sector would have resulted in the diversion of youth from the sector. It also shows the typical male domination in the field as in case of any other field, accounting for 97 per cent male farmers as against a mere 3 per cent women's presence. Once again, improved women's education and cultural barriers could be the reasons behind the fewer women participation in coconut fields. At the same time, it is surprising that coconut farming in the state is largely followed in 'homestead' style, typically in the backyards and women farmers are still found 'missing'. The average size of a coconut cultivating family is five members out of which two are working members on average. These patterns are consistent across all five sample districts.

Table 3 Farmers' demographic profile

Particulars	Thiruvananthapuram	Thrissur	Malappuram	Kozhikode	Kannur	Kerala (Total)
Age (Average)	55.0	60	57	70	56	59.6
Gender (%)						
a) Male	100	90.8	94.7	98.3	100	96.8
b) Female	0	9.2	5.3	1.7	0	3.2
Educational Attainments (%)						
a) Basic Schooling	12.31	15.4	2.7	3.4	3.6	7.5
b) Secondary Schooling	26.16	23.1	32.0	44.1	44.6	34.0
c) Higher Secondary Schooling	38.46	27.7	46.7	47.5	38.9	39.9
f) Graduation	21.54	0.0	13.3	5.1	7.1	9.4
g) Post Graduation and Above	12.31	0.0	2.7	0.0	0.0	3.0
Size of the family (Average No.)	4	3	6	5	5	5
Size of working members (Average No.)	2	2	3	2	2	2

The (Table 4) summarizes the landholding and livelihood patterns of coconut farmers in Kerala. It is evident that the small (47.14 per cent) and marginal farmers (38.94 per

cent) constitute the lion share of the coconut farmers in the state together (86 per cent). Among the sample districts, Thrissur has maximum marginal farmers (90 per cent) while

Malappuram has the least (2.7 per cent). At the same time, the maximum small farmers are in Malappuram (58.3 per cent) against Thrissur (6.2 per cent). Under the large farmers' category also, Malappuram tops (38.7 per cent) against Thiruvananthapuram and Thrissur (3.1 per cent). This implies that the coconut cultivation in the state is also fragmented like other crops and northern districts such as Malappuram and Kannur have larger (large and small farmers against marginal farmers) areas under cultivation. The dominance of the northern region of the state has been marked since the 1950s to 1980s [15], and the trend remains the same.

As expected, the proportion of people who took agriculture as their prime job is comparatively less (47%) than those who take it as a secondary/subsidiary job (53 per cent). Following the dominant trend under the area of cultivation, Malappuram has 92 per cent of its farmers being the prime category while Thiruvananthapuram has the least prime farmers (28%). It once again shows the regional patterns evidently. Among those who are not primarily a farmer, the majority did not reveal their nature of work, marking themselves 'others' (59%). In the remaining 40 per cent of

secondary farmers, most of them are either a retired hand (13 per cent) or doing a private job as the mean of livelihood (13 per cent). Five per cent of government employees and five per cent out-migrants mark themselves as secondary farmer. This situation translates into the reality that more than half of the coconut farmers are just maintaining their coconut farms as inherited. Also, it is noteworthy that about 19 per cent of them are/were government servants (working and retired) and 5 per cent of them are employed abroad, which means around 25 per cent of the reported respondents do not depend on coconut farming as a mean of livelihood since they got a good pay otherwise. Just to connect to the regional disparity context, two northern districts viz Malappuram and Kozhikode don't report any government service person as a farmer, while both the southern districts viz Thiruvananthapuram and Thrissur reports top proportions in the government service person as farmer category. It can be inferred as the educational and social development disparity between the regions where northern Kerala (Malabar) is historically a backward region. A larger number of farmers and the farming area in this region is another indicator connecting to this.

Table 4 Land holding and livelihood patterns (Values in Percent)

Particulars	Thiruvananthapuram	Thrissur	Malappuram	Kozhikode	Kannur	Kerala (Total)
Area under coconut cultivation						
a) Below 1-hectare (Marginal)	67.7	90.8	2.7	44.1	30.4	47.14
b) Between 1 and 2 hectares (Small)	29.2	6.2	58.3	49.2	51.8	38.94
c) Above 2 hectares (Large)	3.1	3.1	38.7	6.8	17.9	13.92
Agriculture as prime job						
a) Yes	27.7	29.2	92.0	55.9	30.4	47.04
b) No	72.3	70.1	8.0	44.1	69.6	52.82
	If other job as prime job					
a) Govt. Service	6.15	15.4	0	0	5.4	5.39
b) Pvt. Service	32.3	9.2	5.3	0	17.9	12.94
c) Business	3	1.5	0	10.2	7.1	4.36
d) Job Abroad	3.8	6.2	0	13.6	0	4.72
e) Retired	26.6	3.1	2.7	33.9	0	13.26
f) Others	28.15	64.6	92	42.3	69.6	59.33

The decision on how to deal with the harvest is crucial for the value addition of a crop. Harvests that are sold out directly from the field are a negative indicator for the value addition scenario. The coconut harvest and disposal profile of Kerala is given in (Table 5). It is evident that around two-thirds of the total farmers are disposing of their harvest immediately, leaving no room for a question on value addition (64 per cent). Among the districts, Kannur and Malappuram districts report with 100 per cent immediate disposal, showing 'no value addition benefit' thoughts in the region (northern districts). Apparently, both the southern districts viz.

Thiruvananthapuram and Thrissur shows a relatively very good coconut storing profile with 71% and 88% of the farmers from respective districts are not disposing of the harvest immediately. This indicates the scope of value addition in the region and maybe the supporting facilities available for the same. This scenario indicates two dimensions of the problem. First, the storing and value addition is not an easy task for the farmers with the given labour shortage and high labour cost in Kerala. Second, the regional disparity remains in the choices of farmers, further pointing to the asymmetrical access to information, skills and resource mechanisms.

Table 5 Coconut harvest and disposal profile (All Values in Percent)

Particulars	Thiruvananthapuram	Thrissur	Malappuram	Kozhikode	Kannur	Kerala (Total)
Immediately disposing coconut on harvest	29.23	12.3	100	76.3	100	63.6
Not immediately disposing coconut on harvest	70.77	87.7	0	23.7	0	36.4

In order to identify various socio-economic determinants of the popular 'immediate disposal choice' of coconut farmers on the harvest, which leaves no room for thoughts on value addition, a logistic regression model (reporting coefficients) is employed. The choice dichotomy (disposing coconut immediately on harvest and otherwise) is taken as the qualitative dependent variable. All the inferences

are made by keeping 'not doing immediate coconut disposal' as the reference group. Seven important explanatory variables are fitted to the equation (Box 1), to check their impact on the decision making by farmers. The choice of the variables selected for the study is influenced by the literature and the AERC methodology [56]. The logistic regression results are shown in (Table 6).

Table 6 Logistic estimates of determinates of instantaneous disposal of coconut harvest

Variables	Logistic regression coefficients
Gender	2.22***
Age	-0.03***
Income from coconut	3.25***
Area under coconut	1.22**
Agriculture as prime job	0.85***
Selling to cooperative society	0.65
Selling to dealer	-1.15*
Selling to city market	-1.17
Market information from peers	0.92***
Market information from dealers	1.45***
Market information from city market	-0.48
Market information from news papers	0.43
Market information from radio	-0.95
Market information from TV	-1.74*
Market information from CDB	-2.46***
Market information form KAU	0.26
Constant	0.20

*Significant at 1 per cent level

**Significant at 5 per cent level

***Significant at 10 per cent level

The analysis shows that there is a 2.2 times higher chance that male farmers dispose of coconut on harvest when compared to female farmers. This result is significant at the 10 per cent level. It implies that the male farmers, who are the majority, usually tend to dispose of coconut on harvesting. The given small scale or homestead nature of coconut value addition may be one of the reasons that female farmers reported with less chance of immediate disposal. As there are no large-scale coconut value addition profiles in the state, the results reflect the general attitude and marginalization of the value addition avenues.

As already noted in the previous segment (Table 2), farmers in the state are happening to be elderly. The farmers' age is significantly (at 10 per cent level) and negatively influencing the decision on coconut disposal on Harvest. There is a three per cent less chance of coconut disposal on harvest as the age of the farmer increases. It implies that the relatively young aged farmers are favouring disposal of coconut rather than value-adding, while old aged farmers are relatively better in taking chances of value addition of coconut. It is a paradox. Usually, the younger generation in any sector is expected to be experimental and exploring more avenues. The incidence of coconut farming/maintenance by heredity and access to another job as prime one (as widely reported in (Table 3) could be the reasons behind the negative attitude of the relatively young farmers.

It is also evident that the higher price for coconut in the market reduces the chances of value addition, as expected. The chances of coconut dispose of on harvest will increase by 3.25 times as the coconut income share increases. This result is significant at the 10 per cent level. It implies that the risk averting behaviour of farmers is reflected as the value-adding context of Kerala is not so supportive. For instance, copra making - the basic value addition of coconut - has to face the threat of six months lasting monsoon in the state. In the absence of a mechanized system of drying, the farmers are then forced to sell the harvest. Financially it is not viable to have a drier for each farmer. Moreover, the majority of the farmers are producing on a marginal or small-scale farming which makes it impossible to move further when they are not

even able to make copra. Further, storing coconut for a relatively long time in anticipation of value addition exposes the harvest to the danger of reduced price in future. Free flow of cheap coconut from neighbour states like Tamil Nadu can worsen the case. Hence, farmers generally tend to sell their harvest immediately when there is a fair price.

Contrary to the general assumption that the large farmers go for value addition, results show that the chances of coconut disposal on harvest increases by 1.2 times as the area under coconut increases and this result is also significant at a 10 per cent level. It may also be backed by the facts that most of the coconut plantations are inherited and the farmers now just maintain the same. Moreover, the aforesaid danger of neighbouring states coconut flooding in the domestic market and huge investment required for any value addition mechanisms makes the context unattractive. Further, labour wage and the labour shortage is notorious in Kerala and the large scale ventures will also have to face the threat of labour unions, being a pro-communist party state.

In the same line, agriculture as the prime job is yet another reason for immediate coconut disposal on the harvest. Most of the farmers whose primary occupation is reported as agriculture are tend to dispose of coconut on harvest than others at a rate of 85 per cent. This result is also significant at the 10 per cent level. It is once again proving that coconut farmers' choice to dispose of harvest immediately is sustained. Primary farmers are more prone to sell coconut without value addition. The reasons are twofold. One is that the primary farmers are solely dependent on farming income so that they are disposing of the harvest immediately for money. On the other hand, farmers who have some other job as their primary occupation may not have such urgent money requirements so that they are relatively ready to hold the harvest for some time.

When compared to the farmers who sell their harvest to the local village dealer, there is 1.15 times less chance to dispose of coconut immediately on harvest by those farmers who sell their harvest to the intermediary dealer. This result is significant at a 1 per cent level. Farmers who sell their harvest to the city market directly show the same trend, however, the result is not significant statically. Farmers who are selling their harvest to the cooperative societies show a positive trend that there is a 65 per cent higher chance for coconut disposal on the harvest. However, this result is also insignificant statically. This situation implies that the city and dealer markets are not so attractive destiny for coconut farmers when compared to village dealers and cooperative societies. This may because that the exploitation of farmers' harvest is naturally low among nearby village dealers and cooperative societies being farmers' consortiums.

Source of market information is very important for any crop which influences the decision to sell the harvest. When compared to a situation where CPCRI is the source of market information for farmers, there is 1.74 times less chance of immediate coconut disposal by farmers who use TV as their primary source of market information. In the same line, there is 2.46 times less chance of immediate disposal by farmers who use Coconut Development Board (CDB) as their primary source of market information. Both these results are statistically significant at the 10 per cent level and 1 per cent level respectively. Farmers who are using radio and city market as their source information also showcase the lesser chance of disposing of coconut immediately, but these results are statistically insignificant. On the other hand, market information from a fellow farmer increases the chance of immediate disposal by 92 per cent and the result is statistically

significant at the 10 per cent level. In the same way, market information from a dealer also perpetuates a 1.45 times higher chance of immediate disposal and the result is statistically significant at a 10 per cent level. Farmers who use dealers, newspaper and Kerala Agriculture University (KAU) as their primary source of information also shows the increased

chances to dispose of immediately, however with no significance statistically. It implies that the influence of fellow farmers could be the prime reason behind the popularity of immediate disposal of coconut on the harvest. This bandwagon effects make it a popular myth that it is better not to go for coconut value addition.

Box 1 Variable definitions

Variable	Operational definition
Dependent variable	
Coconut Disposal on Harvest	A dichotomous variable takes the value one if the farmer chose to dispose of coconut immediately on harvesting and zero otherwise.
Explanatory variables	
Gender	A dichotomous variable that takes the value 1 if the responding farmer is male, and 0 if female.
Age	The age of responding farmers at the time of the survey has been taken in completed years as a continuous variable
Income from Coconut	The total amount of income from a coconut at the time of the survey, as reported by the responding farmers.
Area under Coconut	Size of the coconut plantation in acres at the time of the survey.
Agriculture as Prime Job	A dichotomous variable that takes the value 1 if the responding farmer's prime job is agriculture (not necessarily coconut alone), and 0 otherwise.
Selling to Village Dealer	A dichotomous variable that takes the value 1 if the responding farmer is primarily selling his harvest to the village market, and 0 otherwise.
Selling to Cooperative Society	A dichotomous variable that takes the value 1 if the responding farmer is primarily selling his harvest to a cooperative society, and 0 otherwise.
Selling to Dealer	A dichotomous variable that takes the value 1 if the responding farmer is primarily selling his harvest to a coconut dealer (local dealer/intermediary), and 0 otherwise.
Selling to City Market	A dichotomous variable that takes the value 1 if the responding farmer is primarily selling his harvest to the city / major market by themselves, and 0 otherwise.
Market Information from Peers	A dichotomous variable that takes the value 1 if the responding farmer primarily gathers coconut market information from their fellow farmers, and 0 otherwise.
Market Information from Dealers	A dichotomous variable that takes the value 1 if the responding farmer primarily gathers coconut market information from coconut dealers, and 0 otherwise.
Market Information from City Market	A dichotomous variable that takes the value 1 if the responding farmer primarily gathers coconut market information from City Markets by themselves, and 0 otherwise.
Market Information from News Papers	A dichotomous variable that takes the value 1 if the responding farmer primarily gathers coconut market information from News Papers, and 0 otherwise.
Market Information from Radio	A dichotomous variable that takes the value 1 if the responding farmer primarily gathers coconut market information from Radio, and 0 otherwise.
Market Information from TV	A dichotomous variable that takes the value 1 if the responding farmer primarily gathers coconut market information from TV, and 0 otherwise.
Market Information from CDB	A dichotomous variable that takes the value 1 if the responding farmer primarily gathers coconut market information from CDB and its Publications, and 0 otherwise.
Market Information form KAU	A dichotomous variable that takes the value 1 if the responding farmer primarily gathers coconut market information from Kerala Agricultural University (KAU) and its Publications, and 0 otherwise.
Market Information form CPCRI	A dichotomous variable that takes the value 1 if the responding farmer primarily gathers coconut market information from Central Plantation Crops Research Institute (CPCRI) and its Publications, and 0 otherwise.

On the whole, it is evident that the gender, age, income from coconut and primacy of agriculture as the mean of livelihood has a statistically significant influence on farmers' decision to dispose of the harvest which gives no room for value addition. Typically, a younger male farmer who has a relatively larger coconut field and coconut related income in addition to another job (prime job) is more likely to dispose of the coconut harvest immediately. Typically, the fellow farmers and certain other sources of market information such as dealers motivate farmers' intention to dispose of the harvest immediately.

CONCLUSIONS

The coconut sector's prominence in Kerala is shrinking

gradually as in the same line of the agricultural sector in general which were already mentioned in literature. The symptoms of declining coconut cultivation in the state have been mooted in the early 21st century itself and gradually accelerated as time filed. This situation is supplemented by other factors also. Of them, the younger generation's deviation from the agricultural sector and lack of modernization in the agricultural sector found to be the prime culprits of the situation which resulted in a situation where farmers are generally old aged males. Moreover, more than half of the coconut farmers are just maintaining their coconut farms as inherited and most of them are having another mean of livelihood to rely on. Much in the same line of recent literature, the value addition of coconut remains an unpopular idea in the state, and the existing nominal value addition is

bound to copra or coconut oil only. Most of the coconut farmers in the state are not ready to do any form of value addition with coconut harvest. This choice remains unchanged even if they are offered the required assistance. The farmers' younger age, gender as male, a higher proportion of income from coconut, higher area under coconut cultivation and primacy of agriculture as the mean of livelihood are found to be important and significant influencers on the decision on instantaneous disposal of coconut harvest and no preference for value addition. Hence a comprehensive approach is required to revamp the coconut sector in the state. It should start from scratch that awareness about the coconut value addition has to be created first. Secondly, the authority should

offer the necessary infrastructure to motivate the value addition process, as most of them require a huge investment that a typical small farmer cannot afford in person. This infrastructural development can be done through CPCs or through the Self-Help Groups or through any similar mechanisms. Further, the marketing of value-added products must also be guaranteed or at least supported by the authority. Kerala's relative advantages in tourism, handicrafts and Ayurveda sectors can be clubbed to the coconut sector and can be exploited for this purpose. Transparency and availability if both cultivations related and market-related information are crucial for the revival of the sector, which should be assured for the farmers.

LITERATURE CITED

1. Anonymous. 2018. CDB Statistics. Coconut Development Board India, Kerala.
2. Andrews S, Kannan E. 2016. Land use under homestead in Kerala: The status of homestead cultivation from village study, WP No. 369, Institute for Social and Economic Change, Bangalore.
3. Anonymous. 2016. Directorate of Agriculture, Government of Kerala. An Analytical Study of Study on Agriculture in Kerala, Thiruvananthapuram, January 2016.
4. Thomas MM, Sebastain KS, Vasanth KVC, Swami GMS. 2005. Indian Coconut Economy: A Positive Outlook for the year 2005. *Indian Coconut Journal* 35: 4-13.
5. Piggott CJ. 1964. *Coconut Growing*. Oxford University Press.
6. Davis TA, Sudasrip H, Darwis SN. 1985. An Overview of Research Activities. Coconut Research Institute, Manado, Indonesia.
7. Herman. 2007. Strengthening the competitiveness of coconut industry through Regional Strategic Alliances Forum. *COCOINFO International* 14: 2-7.
8. Agustin YTV. 2004. Coconut industry overview and status. *The Philippine Journal of Coconut Studies* 29(1/2): 52-57.
9. Carandang EV. 2005. Philippine coconut R & D and its opportunities. *Philippine Journal of Coconut Studies* 30(1/2): 13-26.
10. Susan MR, Flordeliza AL. 2009. Market integration and efficiency in spatial markets of copra in the Philippines. *Cord* 25(1): 78-88.
11. Syed K, Wazir S. 1997. Technologies on environment friendly young tender coconuts, environment-friendly coconut and coconut products, Philippines Asian Pacific Coconut Community 1997 Edited by Romula. N. Arancon. Jr. pp 34-42.
12. Santhosh N, Latha B. 2004. Price spread of coconut in the central region of Kerala. *Journal of Tropical Agriculture* 42(1/2): 73-75.
13. Samarajeewa SR. 2002. An econometric analysis of consumer demand for coconuts in Sri Lanka. *Cord* 18(2): 24-36.
14. Pathiraja PMEK, Fernando MTN, Jayasendera JMMA. 2008. Processing of virgin coconut oil in Sri Lanka using cold extraction method- An economic analysis. *Cord* 24(1): 79-89.
15. Thampan PK. 1975. *The Coconut Palm and its Products*. Green Villa Publishing House.
16. Das PK. 1985. Trends in oil production and Trade world. *Oeaginear* 40: 2.
17. Singh HP. 1998. Coconut industry in India- Challenges and opportunities. *Indian Coconut Journal* 29(4): 4-11.
18. Aravindakshan M. 1995. Challenges to the coconut industry in India and strategy for making it globally competitive in the 21st Century. *Indian Coconut Journal* 26(3): 8-16.
19. Haridoss R, Chandran C. 1997. Price behaviour of coconut and coconut oil in Tamil Nadu. *Indian Coconut Journal* 27(10): 5-7.
20. Namasivayam N, Richard PV. 2004. Trend analysis of coconut production in India. *Journal of Plantation Crops* 32(3): 64-67.
21. Singh RK, Subburaj B. 2002. Pricing the coconut in Tamil Nadu: An analysis. *Indian Coconut Journal* 33: 1-5.
22. Thampan PK. 1990. Coconut industry in India, Asian and Pacific coconut community, Coconut Development Board, Ministry of Agriculture, India.
23. Markose VT. 1999. Coconut industry in revival path, The Hindu Survey of Indian Agriculture (Eds) Ram N., Kasthuri and Sons Ltd., Chennai, India. pp 104-106.
24. Rathiha R, Edwin GM. 2002. Strategies of coconut price stabilization: A study. *Southern Economist* 41: 17-19.
25. Srinivasan PV. 2004. Managing price volatility in an open economy environment: The case of edible oils and oilseeds in India, Markets, Trade and Institutions Division, International Food Policy Research Institute, Washington D.C. USA. pp 72.
26. Vasu KI, Thampan PK. 2003. Coconut for Rural. Proceedings of the International Coconut Summit, by Dr. Ponniah Rethinam, Executive Director, APCC, Jakarta. pp 1-299.
27. Kumar PR, Jha SK. 2005. WTO and internal factors, which impact on the oil seed economy of India. The Fourth International Crop Science Conference, September 2004, Brisbane, Australia.
28. Rathinam P. 2005. Coconut: Steps for yield increase. The Hindu Survey of Indian Agriculture. (Eds) N. Ram, Kasthuri and Sons Ltd, Chennai, India.
29. Elias G. 2018. Economics of coconut products- An analytical study. *Commerce Spectrum* 5(2): 39-44.
30. Nampoothri KVK. 1998. Milestones in Coconut Research, Indian Coconut Research. *Indian Coconut Journal* 29(4): 28.
31. Singh RK. 2002. *Provides Food, Drink and Raw Material*. The Hindu Survey of Agriculture. pp 109-111.
32. Thampan PK. 1996. Coconut for Prosperity, Peekay Tree Crops Development Foundation M.I.G. 141, Gandhi Nagar, Kochi. pp 1-271.

33. Vaidyar. 2002. Medicinal uses of coconut. *Indian Coconut Journal* 33(24): 9.
34. Preethi VP. 2017. Economic analysis of production, marketing and price behavior of coconut. *M. Sc. Thesis*, Kerala Agricultural University, Thrissur, Kerala.
35. Thampan PK. 1997. *Gains from Organic Farming*. The Hindu Survey of Indian Agriculture. pp 89-93.
36. Thamban, KP, Jaganathan D. 2016. Coconut production in Kerala. *Indian Coconut Journal* 47: 10-15
37. Bavappa KV. 1997. Handbook of Agriculture (Facts and Figures for farmers, students and all interested in Farming). Indian Council of Agricultural Research, New Delhi. pp 908-920.
38. Thampan PK. 1980. Technological yield constraints in coconut culture in Kerala State and strategy for improving productivity. *Indian Coconut Journal* 9: 8.
39. Thomas M. 1994. Economics of marketing of coconut in Kerala, JNU New Delhi. *Indian Coconut Journal* 37(9): 2.
40. Thampan PK. 1988. Coconut Oil in India. Its Price Behaviour in the Last Decade, Glimpses of Coconut Industry in India. (Eds) Mohammad E. and Nandakumar T. B.), Coconut Development Board, Kochi, India.
41. Narayana D, Nair KN, Sivanandan P, Shanta N, Rao GN. 1991. Coconut development in Kerala—Ex-Post Evaluation, Centre for Development Studies, Thiruvananthapuram.
42. Jhanadevan R. 1993. An analysis of selected development programmes for promoting coconut production in Kerala, College of Agriculture, Vellayani, Thiruvananthapuram, Kerala. pp 1-198.
43. Shyijumon CS, Michel RM. 2008. Fading Glory of Coconut: Analysis of Coconut Sector in Kerala, ISDA Journal January-March & April-June, Thiruvananthapuram.
44. Mathew, Thomas M. 2009. Dynamism returns to coconut farming. *Indian Coconut Journal* 52(7): 2-7.
45. Singh HP. 2003. Augmentation of coconut marketing. Proceedings of the National Seminar on Augmentation of Coconut Marketing, October 11-12, 2003, Hyderabad, India. pp 221-232.
46. Srinivasan N. 2002. Coconut leaf rot complex and perspectives for the disease control. *Indian Coconut Journal* 32(9): 2.
47. Anonymous. 2003. Foretell Business Solutions Private Limited, Strategies for Positioning of Coconut Oil in the Emerging Scenario, Coconut Development Board. pp 1-45.
48. Anithakumari P. 2008. Clustering coconut farmers- A successful extension approach for enhancing adoption and income from marginal and small holdings. *Cord* 24(2): 29-39.
49. Swapna S, Thomas EK. 2009. Impact assessment of cluster approach in integrated coconut management. *Indian Coconut Journal* 52(7): 8-14.
50. Yathirajan M, Alagar K. 2016. Analysis of factors of cultivators in coconut cultivation- A study with reference to Tenkasi Taluk. *International Journal of Business and Economic Research* 2(1): 73-82.
51. Rajmohan K. 2011. The coconut mission in Andaman and Nicobar Islands. *Kissan World* 38(3): 25-27.
52. Kumar BM. 2007. Coconut-based agroforestry for productive and protective benefits. In: Coconut for Rural Welfare. Proceedings of International Coconut Summit 2007, Kochi, India. (Eds) Thampan P.K. and Vasu K.I. Asian and Pacific Coconut Community, Jakarta, Indonesia. pp 87-98.
53. Peiris TSG, Fernando MTN, Samarajeewa SS. 2004. Factors influencing the use of coconut oil by the householders in Sri Lanka and their policy relevance to popularize the consumption of coconut oil. *Cord* 20(2): 12-20.
54. Patrick. 2010. Market for tender coconut water in Kerala. *Indian Coconut Journal* 52(9): 6-10.
55. Durgamani MK, Jayalakshmi G, Sunathy. 2009. Uses of coconut oil. *Kisan World* 36(10): 29-31.
56. AERC Chennai. 2018. Problems and prospects of procurement, Value addition and Marketing of Coconut: The Cases of Kerala and Lakshadweep, AERC Study No. 164, University of Madras, Chennai, December 2018.