

## Decline of Cashew (*Anacardium occidentale*) Cultivation in North Kerala: An Analysis of the Impact, its Determinants and Constraints

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### ABSTRACT

The study measured social and economic benefits accrued from cashew cultivation in relation to decline of cashew cultivation and constraints faced by cashew farmers in North Kerala. An 'ex-post-facto cause to effect' design was used and findings indicated that most cashew farmers derived poor socio-economic benefits particularly with high social benefits in comparison to low economic benefits. High levels of social participation, extension participation, mass media exposure and opinion leadership were measured among majority of the farmers practicing cashew cultivation. Impact on cropping pattern, labour engagement and farm expenditure were found to be low while increase in family incomes and expenditure were reported. The regression analysis revealed that four variables viz., Cosmopolitaness, farm size, number of yielding cashew trees and net income from agriculture as exerting a significant positive contribution towards explaining the variability in socio-economic impact. The variables used in the study could together explain up to 60 percent variability in socio-economic impact. The stepwise regression model developed to predict socio-economic impact explained only up to 45 per cent of the variation in socio-economic impact using the predictors; income from agriculture (X1), number of yielding cashew trees (X2) and cosmopolitaness (X3). The study revealed major constraints faced by farmers like incidence of tea mosquito bug owing to crop loss and death of yielding trees due to cashew stem and root borer attack, low availability of hired labour, poor price and the high price fluctuations in market for raw cashew nut.

**Keywords:** Socio-economic Impact; Determinants; Constraints; Cashew farmers; North Kerala;

Cashew (*Anacardium occidentale* L.) is one among the important commercial crops of Kerala and contributes significantly to national area and production (Sebastian *et. al.*, 2004). Often referred to as 'wonder nut', cashew is one of the most valuable processed nuts traded on the global commodity markets. As an important cash crop, it provides livelihood to the cashew growers, empowers rural women in the processing sector, creates employment opportunities and generates foreign exchange through exports. The crop involves wider social and economic significance in India as cashew plantation engages around 0.3 million people and cashew processing provides employment to another 0.3 million people (NABARD, 2007). Presently, cashew has gained status of a commercial crop through technological

advancements with respect to propagation, production, management and mechanized processing (Sajeev *et. al.*, 2014). This change was fuelled as a result of increasing demand for raw cashew nuts and enhanced interest for its commercialization (Venkattakumar, 2009). Cashew can grow in fairly poor soils with relatively low rainfall, as long as there is a clear dry season of two-four months. These attributes, coupled with low capital requirement for orchard establishment and low nut perishability reducing the coordination requirements for post-harvest activities, have given cashew the reputation of being a poor man's crop (Jaffee, 1995).

The cashew cultivation in India mainly confines to peninsular region covering the states of Kerala,

Karnataka, Maharashtra and Goa along the West Coast, whereas in Tamil Nadu, Andhra Pradesh, Orissa, West Bengal along the East Coast region. It is also grown in plains like Chhattisgarh, Jharkhand, Gujarat, Bihar and Northeast Hill Regions like Meghalaya, Manipur and Tripura and also in Andaman and Nicobar Islands (*DCR, 2011*). In India, it is cultivated in an area of 10.27 lakh ha with a production of 7.25 lakh tonnes and productivity of 706 kg/ha (*DCCD, 2014-15*). India has the maximum area (21.6%) under cashew and is the third largest producer (17.3%) of raw nuts in the world. After Vietnam, the country is the second largest exporter, accounting for 34 percent of the world's export of cashew kernels. India has a comparative advantage in the production and processing of cashew nuts on account of its cheap and skilled labour force. There are 3650 cashew processing industries in the country (both organized and unorganized sector together), with an installed capacity for processing of 15 lakh tonnes, for which the contribution from the indigenous production is only 38 percent (*Yadav, 2010*). India earned Rs. 5488 crores through export of processed cashew kernels and cashew nut shell liquid during 2014-15 (*CEPCI, 2015*).

Over the last two decades, cashew cultivation received dwindling importance in response to the price fluctuations in other plantation crops like arecanut, cocoa, rubber and coconut (*Venkattakumar and Bhat, 2003*). Presently, cashew farmers are shifting to rubber plantation and other more remunerative cash crops (*Ganapathi and Akash, 2013*). In Kerala, area under cashew has drastically decreased by 51 percent in the last decade. Presently Kerala has only 43,848 ha of cashew, down from 89718 ha in 2001-02 with Kannur district having major area of 17295 ha (*Anon, 2011*). Recent studies indicated that the levels of technology utilization were significantly low among cashew farmers in this region (*Sajeev et. al., 2015a*).

To improve the cashew cultivation scenario of major cashew-growing regions, assessment of the socio-economic impact created by cashew cultivation, its determinants and constraints faced by cashew farmers in cultivation are very important. To explore the applicability of impact analysis premise in the context of socio-economics of cashew cultivation, a study was undertaken. This study measures the socio-economic impact created by cashew cultivation, its determinants and constraints faced by farmers in cultivation of cashew in the major cashew belt of Kerala.

## METHODOLOGY

The study was conducted by Directorate of Cashew Research, Puttur along with AICRP Cashew Centre, RARS, Pilicode as part of the project 'Impact of Cashew Production Technologies on Area, Production and Productivity of Cashew'. Kannur and Kasaragode districts of north Kerala were purposively selected as they are the major cashew producing districts of Kerala with presence of three cashew research stations nearby besides other development departments working on cashew and hence having highest probability of technology utilization at farm level. Cashew area and production in this region was found contributing largely for the Kerala state's figures (*Salam, 1998 & Anon, 2011*). Farmers from Taliparamba and Kannur taluks of Kannur district and Hosdurg and Kasaragode taluks of Kasaragode district represented the sample.

Detailed pre-tested schedule were administered to 68 respondents spread among four taluks of the Kannur and Kasaragode districts. In the present study, the researchers had no option to manipulate the independent variables, as these had already occurred. Inferences on the relationships between independent and dependent variables had to be drawn on the basis of effects already manifested. Hence an 'ex-post-facto cause to effect' design was applied. The non-manipulative variables that were already evident formed the presumed cause (independent variables).

An interview schedule measuring the socio-economic impact, along with farmer profiles, was developed. The schedule contained 123 questions and took about 45 minutes to elicit information from one household. The instrument was pre-tested on a group equivalent in size to 10% of the sample used in the subsequent research. Based on the results, the schedule was structured, sharpened and standardized. The content validity was ensured by examining the responses for appropriateness and through subsequent discussion with the researchers working on impact analysis at various institutes under the Indian Council of Agricultural Research. The data were collected during March to April, 2013 through questionnaire and personal interviews. Appropriate statistical measures such as Phi, Spearman's rank correlation and regression analysis were employed to arrive at conclusions. Data was analyzed using Microsoft Excel 2007 and IBM SPSS Statistics Ver. 20.

**RESULTS AND DISCUSSION**

*Personal profile of cashew farmers* : The twelve socio-personal variables studied are furnished in Table 1. It can be noted that cashew farmers were equally distributed as far as their age was concerned with mean age of 59 years. Majority had low level of education (7<sup>th</sup> standard pass) (53%) and 90 percent had agriculture as their primary occupation. Most farmers (40%) had high level of experience in farming with an average experience of 32.4 years. Similar findings were made by *Lakshmisha (2000)*, *Shivaramu et. al. (2004)*, *Veerkar et. al. (2006)* and *Venkattakumar (2006, 2008, 2009)*. Cashew farmers were equally distributed with respect to their experience in cashew farming with an average experience of 27.7 years. These findings are in line with that of *Veerkar et. al. (2006)* but in contrast with studies conducted by *Venkattakumar (2006)*. Contact with extension agencies was found to be medium among majority of cashew farmers (60%) while participation in extension programmes was found to be low for almost half of the farmers (50%). These findings are in line with that of *Lakshmisha (2000)* and *Shivaramu et. al. (2004)*. Almost half of the cashew farmers (46%) exhibited medium levels of ICT usage while majority had low level of cosmopolitanness (50%). These findings are in line with earlier findings by *Lakshmisha (2000)*, *Shivaramu et. al. (2004)* and *Venkattakumar (2006)*. Three-fourth (75%) of cashew farmers were giving irrigation for other crops grown by them while 69 percent of them cultivated cashew under rainfed system only. For majority (59%) of farmers, the cashew plots were far from their homes, having an average distance of 1350 m.

*Economic profile of cashew farmers* : The economic profile of cashew farmers is presented in Table 2 and discussed here. While half of them (50%) gave highest priority to cashew farming, rest was equally divided into low and medium categories. These findings are in contrary with that of *Venkattakumar (2008)*. The average farm size was found to be 4.37 acres while average area of un-used land available for cultivation was found to be 3.19 cents. Majority (82%) had nil or negligible amount of unused land available for cultivation. The study showed that on an average, households had 117 numbers of cashew trees under mean area of 1.71 acres with a mean yield of 6.90 kg/tree. Majority of the farmers (40%) realized only

**Table 1: Socio-personal profile of cashew farmers (No.=68)**

Ind. Variables	Mean	SD	Category	No.	%
Age (Years)	59.0	12.16	Young <53	22	31
			Middle 53-65	25	37
			Old >65	21	32
Education	3.0	1.07	Low <2.82	36	53
			Medium 2.82-3.89	15	22
			High >3.89	17	25
Occupation			Agri.	61	90
			Others	7	10
Experience in farming (Years)	32.4	14.4	Low <25.2	23	34
			Medium 25.2-39.6	18	26
			High >39.6	27	40
Experience in cashew farming (Years)	27.7	13.4	Low <21.0	23	34
			Medium 21.0-34.4	21	31
			High >34.4	24	35
Extension contact	1.74	3.37	Low <0.05	23	34
			Medium 0.05-3.42	41	60
			High >3.42	4	6
Extension participation	3.62	6.24	Low <0.50	34	50
			Medium 0.50-6.74	22	32
			High >6.74	12	18
ICT usage	4.26	1.22	Low <3.65	12	18
			Medium 3.65-4.87	31	46
			High >4.87	25	37
Cosmopolitanness	18.8	14.9	Low <11.32	34	50
			Medium 11.32-26.29	13	19
			High >26.29	21	31
Type of land used for cashew			Fully irrigated	9	13
			Partially irrigated	12	18
			Rain-fed	47	69
Type of land used for other crops			Fully irrigated	51	75
			Partially irrigated	13	19
			Rain-fed	4	6
Distance of cashew plot from home(mt.)	1350	2872	Less/Nil	28	41
			Moderate	26	38
			Large	14	21

moderate yields from cashew with an average net income of Rs. 32,000/year against an average expenditure of Rs. 15,800/year and the levels of yearly investment in agriculture by majority of them (41%) was of Rs. 62,200 with a net income to the tune of Rs. 1,18,800/year.

*Socio-economic impact of cashew cultivation* : Ten major social and economic impact indicators were analysed to arrive at the socio-economic impact of cashew farming among the respondents (Table 3). Study on impact on cropping pattern didn't record much of

**Table 2: Economic profile of cashew farmers (No.=68)**

Dep. Variables	Mean	SD	Category	No.	%
Importance given to cashew	3.35	1.28	L <2.71	17	25
			M 2.71-3.99	17	25
			H >3.99	34	50
Farm size (acres)	4.37	3.00	L <2.87	18	26
			M 2.87-5.87	35	52
			H >5.87	15	22
Cultivable land (cents)	3.19	2.80	A	12	18
			NA	56	82
Area under cashew (acres)	1.71	1.40	L <1.00	22	32
			M 1.00-2.40	34	50
			H >2.40	12	18
Yielding cashew trees (Nos.)	117	98	L <68	26	38
			M 68-166	24	35
			H >166	18	26
Yield of Cashew /tree (kg)	6.9	5.0	L <4.4	23	34
			M 4.4-9.4	27	40
			H >9.4	18	26
Expenditure in agriculture (Rs.)	62200	63000	L <31000	26	38
			M 31000-94000	28	41
			H >94000	14	21
Net income from agri. (Rs.)	118800	111000	L <63000	26	38
			M 63000-175000	26	38
			H >175000	16	24
Expenditure in cashew farming (Rs.)	15800	19000	Low <6000	27	40
			M 6000-25000	25	37
			H >25000	16	23
Net income from cashew farming (Rs.)	32000	46000	L <9000	14	20
			M 9000-55000	44	65
			H >55000	10	15

change as only 10 per cent of farmers increasing area under cashew over the years (0.05 acres) while only negligible per cent (7) of them purchased new lands (0.32 acres) for cashew cultivation. Impact on labour engagement was also low with only 25 per cent farmers hiring labour for cashew and only 9 per cent of them opting for increased family labour engagement (0.40). The hiring of labour was noticed particularly for harvesting operations with farmers mostly engaging one to two labourers during this period. A large majority (94%) reported no change in farm expenditure due to cashew cultivation, while 46 per cent of farmers reported an increase in farm income due to cashew cultivation. Farmers reported an average increase of Rs. 410/year in farm expenditure and Rs. 5240/year in farm income due to cashew cultivation. Resultant increase in family incomes was also reported by 36 per cent of the farmers

**Table 3: Socio-Eco. impact of cashew cultivation (No.=68)**

Impact Indicators	Increased		No change		Increase
	No.	%	No.	%	
<i>Impact on cropping pattern</i>					
Area under cashew cultivation over years	7	10	61	90	0.05 Acre
Purchase of new land and cashew cultivation	5	7	63	93	0.32 Acre
<i>Impact on labour</i>					
Hired labour engagement	17	25	51	75	4-5 Nos
Family labour	6	9	62	91	0-1 Nos
<i>Impact on farm expenditure</i>					
Cashew cultivation and farm expenditure	4	6	64	94	Rs. 410
<i>Impact on farm income</i>					
Cashew cultivation and farm income	31	46	37	54	Rs. 5240
<i>Impact on family income</i>					
Cashew cultivation and family income	31	46	37	54	Rs. 4320
<i>Impact on family expenditure</i>					
Profit from cashew cultivation and family expenses	7	10	61	90	Rs. 460
<i>Impact on social participation</i>					
Cashew cultivation and participation in social events	41	60	27	40	1.60
<i>Impact on extension contact</i>					
Contacts with extension agency and Res. Institutes	32	47	36	53	1.47
<i>Impact on mass media exposure</i>					
Cashew cultivation and mass media exposure	32	47	36	53	1.47
<i>Impact on opinion leadership</i>					
Cashew cultivation and opinion leadership in his/her area	37	54	31	46	0.54

\* for last 10 years of cashew cultivation for those respondents who reported an increase in indicators

**Table 4: Classification of farmers based on social and economic impact (No.=68)**

Categories	Social Impact			Economic Impact			Socio-economic Impact		
	No.	%	Range	No.	%	Range	No.	%	Range
Low	31	45.58	<1.07	32	47.05	<0.56	31	45.58	<0.79
Medium	5	7.35	1.07-1.47	24	35.29	0.56-3.76	24	35.29	0.79-2.86
High	32	47.06	>1.47	12	17.64	>3.76	13	19.12	>2.86
Mean		1.27			2.16			1.83	
SD		0.39525			3.194884			2.073558	

**Table 5. Relationship and contribution of personal variables towards Socio-economic impact (No.=68)**

Socio-personal variables	'r' value	'b' value
Age	.069 <sup>NS</sup>	1.487 <sup>NS</sup>
Level of Education	-.014 <sup>NS</sup>	.682 <sup>NS</sup>
Primary Occupation	.007 <sup>NS</sup>	-.745 <sup>NS</sup>
Experience in farming	.124 <sup>NS</sup>	-1.179 <sup>NS</sup>
Experience in cashew farming	.117 <sup>NS</sup>	.942 <sup>NS</sup>
Extension contact	.222 <sup>NS</sup>	-1.340 <sup>NS</sup>
Extension participation	.312 <sup>**</sup>	1.375 <sup>NS</sup>
ICT usage	.210 <sup>NS</sup>	-.273 <sup>NS</sup>
Cosmopolitaness	.275 <sup>**</sup>	-2.116 <sup>**</sup>
Land used for cashew	-.030 <sup>NS</sup>	-.526 <sup>NS</sup>
Land used for other crops	.114 <sup>NS</sup>	1.294 <sup>NS</sup>
Distance of cashew plot from home	-.095 <sup>NS</sup>	-.622 <sup>NS</sup>

\*\* - Significant at 5 % level, \* - Significant at 10 % level

to the average of Rs. 4320/year followed by an average increase of Rs. 460/year in their family expenditure. *Sajeev et al. (2015a)* had reported low productivity of cashew farms in the region along with heavy price fluctuations in raw cashew nut market resulting in low economic benefits. However, earlier studies in neighbouring states of Karnataka and Maharashtra revealed better economic impact among cashew farmers (*Venkattakumar, 2006*), (*Veerkar et al., 2006*), (*Sajeev et al., 2015b*).

Analysis of social impact presented a better picture in comparison to economic impact as majority (60%) of the farmers had reported the increased social participation while nearly half (47%) majority could increase their contacts with extension agencies and research institutes due to cashew cultivation. Majority (47%) reported increase in their mass media exposure while a majority (54%) reported an increase in their opinion leadership status due to cashew cultivation. *Venkattakumar (2006, 2008)* and *Sajeev et. al. (2015b)* had earlier reported similar levels of social impact among cashew farmers of Kerala, Karnataka

**Table 6: Relationship and contribution of economic variables towards Socio-economic impact (No.=68)**

Economic variables	'r' value	'b' value
Importance given to cashew	-.052 <sup>NS</sup>	.002 <sup>NS</sup>
Farm size	.392 <sup>**</sup>	-.405 <sup>**</sup>
Area under cashew	.468 <sup>**</sup>	.164 <sup>NS</sup>
No: of yielding cashew trees	.472 <sup>**</sup>	.584 <sup>**</sup>
Expenditure in agriculture	.385 <sup>**</sup>	.207 <sup>NS</sup>
Net income from agriculture	.525 <sup>**</sup>	.569 <sup>**</sup>
Expenditure in cashew farming	.360 <sup>**</sup>	-.049 <sup>NS</sup>
Net income from cashew farming	.439 <sup>**</sup>	-.114 <sup>NS</sup>
Cultivable land available	-.084 <sup>NS</sup>	.120 <sup>NS</sup>
Yield of Cashew/tree	.498 <sup>**</sup>	.082 <sup>NS</sup>

NS – Non-Significant, \*\*Significant at 5 % level, \*Significant at 10 % level

and Maharashtra. It can clearly be seen that the social benefits of cashew cultivation are far more than the economic benefits.

Classification of cashew farmers based on the social and economic benefits showed that nearly half of the cashew farmers (47%) belong to high social impact category while in case of economic impact majority (47%) belonged to low benefits category. Overall, nearly half of the cashew farmers (46%) recorded low levels of socio-economic impact (Table 4) accrued from cashew cultivation.

*Determinants of socio-economic impact* : Correlation and regression analysis were employed to ascertain the relationship between impact and socio-economic variables and their contribution in explaining the variability in impact respectively. The results are presented separately for socio-personal variables and economic variables in Tables 5 and 6.

*Relationship and contribution of personal variables towards Socio-economic impact* : The correlation analysis identified that two personal variables viz. extension participation and cosmopolitaness of cashew farmers had a significant relationship with socio

**Table 7. Models predicting Socio-economic Impact: Step-wise regression analysis**

Model		<i>Coefficients<sup>a</sup></i>				
		Unstandardized Coefficients		Standardized Coefficients	't' value	Sig.
		B	Std. Error	Beta		
3	(Constant)	.549	.337	1.630	.108	
	AGRINC	.813	.200	.440	4.055	.000
	CSWTR	.010	.002	.482	4.176	.000
	CSMPLTN	-.045	.015	-.330	-2.969	.004

a. Dependent Variable: SEI

<i>Model Summary</i>					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
3	.673 <sup>c</sup>	.452	.427	1.5699725	

c. Predictors: (Constant), AGRINC, CSWTR, CSMPLTN

economic impact. The regression analysis revealed that only one variable i.e. cosmopolitanism and distance of cashew plot from home had a significant positive contribution towards socio economic impact (Table 5).

*Relationship and contribution of economic variables towards Socio-economic impact* : The study identified eight economic variables viz; farm size, area under cashew, number of yielding cashew trees, expenditure in agriculture, net income from agriculture, expenditure in cashew farming, net income from cashew and cashew yield as having significant relationship with socio economic impact. The regression analysis reveals that three variables i.e. farm size, number of yielding cashew trees and income from agriculture exerts a significant positive contribution towards explaining the variability in socio economic impact (Table 6). The socio-personal and economic variables used in the study could together explain upto 60 percent variability in socio economic impact ( $R^2 = 0.580$ ).

*Predicting socio-economic impact: Step-wise regression models* : Stepwise regression was used to check the extent to which the selected models explained the variation in socio economic impact. In this analysis, three models were tested to examine the variation in socio-economic impact among the respondents (Table 7). Model 3 explained up to 45 per cent of the variation in socio-economic impact using the predictors; income from agriculture (X1), number of yielding cashew trees (X2) and cosmopolitanism (X3) (Table 7). The model 3 also had the lowest standard error of the estimate (1.569). The model is fitted as:  $SEI = -0.549 + 0.440X1 + 0.482X2 - 0.330X3$ . However, models with more set of variables have to be tried upon for

better explanation of the variability in socio-economic impact. The present model can be used to measure socio-economic impact of cashew cultivation under similar agro-ecological situations.

*Constraints faced by farmers in cashew cultivation*: The socio-economic impact of cashew cultivation is largely influenced by the constraints faced by farmers. The present study revealed seven constraints as reported by farmers and are classified under technical, economic/marketing and processing constraints (Table 8). Attack of tea mosquito bug and resultant crop loss (44%) and death of yielding trees due to cashew stem and root borer attack (35%) were the major technical constraints (Rank 1 & 2) faced by cashew farmers of north Kerala. This is a matter of concern since cashew yields are largely influenced by the attack of Tea

**Table 8: Constraints faced by farmers in cashew cultivation (No.=68)**

Constraints	Rank	No.	%
<i>Technical Constraints</i>			
Attack of Tea Mosquito Bug and resultant yield loss	1	30	44
Death of yielding trees due to Cashew Stem and Root Borer attack	2	24	35
Poor yield from existing seedling progenies/varieties	5	8	12
<i>Economic/Marketing Constraints</i>			
Low availability of hired labour	3	18	26
Poor price/ price fluctuation	4	15	22
Lack of cashew farmer association	6	6	9
<i>Processing constraints</i>			
No value for cashew apple/wastage of cashew apple	7	5	7

Mosquito Bug (TMB) while attack of Cashew Stem and Root Borer (CSRB) eliminates the crop itself. Low availability of hired labour was the third biggest constraint reported (71%). Migration of workforce to urban areas, easy job availability through MNREGA scheme and respectable job avenues in many private firms for women have acted as reasons for low availability of workforce in villages. Poor price coupled with high price fluctuations in market for raw cashew nut was reported as the fourth major constraint (22%). These findings derive support from *Ganapathi and Akash (2013)*, *Venkattakumar (2008)*, *Akinwale and Ayodele (1999)* and *Dixit and Rao (1999)*. Poor yield in some varieties (Rank 5) and lack of farmer associations (Rank 6) were also major constraints. Lack of cashew farmer associations/groups and availability of cashew nuts from African nations allow cashew nut processors to manipulate the raw cashew nut prices. Similar constraints were reported by *Aravindakshan and Beevi (1992)*, *Salam et al. (1992)*, *Nirban and Sawant (2000)*, *Mandavkar et al. (2003)*, *Veerkar et al. (2006)* and *Sajeev et al. (2015)*.

## CONCLUSION

The purpose of this study was to analyse the social and economic benefits accrued by farmers from cashew cultivation, its determinants and the constraints faced by them in Kannur and Kasaragode districts of Kerala, India. The results reveal that a majority of cashew farmers had derived low socio-economic benefits with particularly high social benefits in comparison to low economic benefits. This is a matter of concern since economic impact largely influences farmer decision regarding continued adoption of cashew production technologies as well as migration to other remunerative crops. Since cashew yields are largely influenced by the attack of Tea Mosquito Bug (TMB) and Cashew Stem and Root Borer (CSRB), strategic measures have to be taken to improve the utilisation of pest management technologies in this region. The study calls for government intervention in price fixation of cashew and formation of cashew farmers associations. The findings are intended to help research and development agencies in targeting their efforts towards increased socio-economic impact from cashew cultivation.

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