



Social and economic benefits of cashew (*Anacardium occidentale*) cultivation in Dakshina Kannada, Karnataka: An analysis of the impact, its determinants and constraints

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Received: 2 June 2014; Accepted: 9 March 2015

ABSTRACT

The study measured social and economic benefits accrued from cashew (*Anacardium occidentale* L.) cultivation in relation with constraints faced by cashew farmers in the Dakshina Kannada district of Karnataka. An 'ex-post-facto cause to effect' design was used and findings indicated that most cashew farmers derived moderate 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 personal variables, viz. the age of cashew farmer, years of experience in farming, cosmopolitaness and distance of cashew plot from home and one economic variable, i.e. importance given to cashew cultivation 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 67% variability in socio-economic impact. The stepwise regression model developed to predict socio-economic impact explained up to 68% of the variation in socio-economic impact using the predictors; importance given to cashew (X1), years of experience in farming (X2), cosmopolitaness (X3), distance of cashew plot from home (X4), extension participation (X5), land used for other crops (X6) and net income from cashew farming (X7). The study revealed major constraints faced by farmers like poor price quoted by traders and the price fluctuations for raw cashew nut, scarcity of hired labourers, incidence of tea mosquito bug owing to crop loss and death of yielding trees due to cashew stem and root borer attack.

Key Words: Cashew farmers, Constraints, determinants, Socio-economic impact

The cashew (*Anacardium occidentale* L.), often referred to as 'wonder nut', is one of the most valuable processed nuts traded on the global commodity markets. Beginning largely as a neglected crop, it ends up as a favourite snack food all over the world. The average global productivity of cashew is about 500 kg/ha while in India it is about 772 kg/ha (DCCD 2014). 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 little rainfall of 1 000 mm/year with a clear dry season of

two-four months. These attributes, plus the facts that little capital requirement for orchard establishment and low nut perishability minimises the coordination requirements for post-harvest activities, have given cashew the reputation of being a crop which can be taken up successfully in less fertile soils (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, Odisha, 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 9.82 lakh ha with a production of 7.28 lakh tonnes and productivity of 772 kg/ha (DCCD 2014). India has the maximum area (21.6%) under cashew nut and is the third largest producer (17.3%) of raw nuts in the world. After Vietnam, India is the second largest exporter, accounting for 34% of the world's export of cashew kernels. India has a comparative advantage in the production and processing of

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cashew nuts on account of its cheap and skilled labour force. There are 3 650 cashew processing industries in the country (both organized and unorganized sector together), with an installed capacity for processing of 15 lakh tonnes annually, for which the contribution from the indigenous production is only 38% (Yadav 2010). India earned ₹ 4 450 crores through export of processed cashew kernels and cashew nut shell liquid during 2011-12 (CEPCI 2013).

Presently, cashew cultivation receives dwindling importance in response to the price fluctuations in other plantation crops like arecanut, cocoa, rubber and coconut (Venkattakumar and Bhat 2003). The cashew farmers in the region are shifting to rubber plantation and other more remunerative cash crops (Ganapathi and Akash 2013). 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.

MATERIALS AND METHODS

The study was conducted during 2013-14 by Directorate of Cashew Research, Puttur as part of the project 'Impact of Cashew Production Technologies on Area, Production and Productivity of Cashew'. Purposive sampling technique was used to select Dakshina Kannada district of West Coast, since it is a major cashew producing area of Karnataka with presence of two research stations besides other development departments working on cashew and hence having better probability of technology utilization at farm level. Cashew production in this district was found contributing largely for the Karnataka state's production (Dixit *et al.* 1998) making the district a fair choice for the study. Farmers from all the five taluks of the Dakshina Kannada district namely Mangalore, Buntwal, Puttur, Belthangady and Sullia represented the sample.

Detailed pre-tested interview schedule was administered to 75 randomly selected respondents.

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 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 personal variables studied are furnished in

Table 1 Socio-personal profile of cashew farmers (n=75)

Independent variables	Mean	SD	Category	Respondents	
				f	%
Age (Years)	46.5	12.93	Young <40	24	32
			Middle age 40-53	25	33
			Old >53	26	35
Level of education	3.77	1.19	Illiterate	3	4
			Primary	11	15
			Secondary	7	9
			High School	34	45
			PUC	4	5
			Degree	11	15
			PG	5	7
Primary occupation			Agriculture	70	93
			Others	5	7
Experience in farming (Years)	23.5	13.54	Low <17	21	28
			Medium 17-30	36	48
			High >30	18	24
Experience in cashew farming (Years)	10.5	7.24	Low <7	31	41
			Medium 7-14	23	31
			High >14	21	28
Extension contact	3.03	6.29	Low	51	68
			Medium	17	23
			High	7	9
Extension participation	6.69	7.36	Low	15	20
			Medium	48	64
			High	12	16
ICT usage	10.03	5.90	Low	17	23
			Medium	42	56
			High	16	21
Cosmopolitaness	7.81	5.13	Low	27	36
			Medium	27	36
			High	21	28
Land used for cashew			Fully irrigated	2	3
			Partially irrigated	5	7
			Rain-fed	68	90
Land used for other crops			Fully irrigated	57	76
			Partially irrigated	8	11
			Rain-fed	10	13
Distance of cashew plot from home (Meters)	427	850	Less	2	3
			Moderate	60	80
			Large	13	17

Table 1. It can be noted that cashew farmers were equally distributed as far as their age was concerned with mean age of 47 years. Majority were high school pass (45%) while 93% had agriculture itself as their primary occupation. Most farmers (48%) had medium level of experience in farming with an average experience of 23.5 years in agriculture. These findings are in agreement with that of Lakshmisha (2000), Shivaramu *et al.* (2004), Veerkar *et al.* (2006) and Venkattakumar (2006, 2008, 2009). Majority (41%) had low experience in cashew farming with an average experience of 10.5 years only. These findings are in agreement with that of Venkattakumar (2006) but in contrast with studies conducted in the region by Veerkar *et al.* (2006).

Contact with extension agencies was found to be low among majority of cashew farmers (68%) while participation in extension programmes was found to be medium for almost two-third of the farmers (64%). These findings are in agreement with that of Lakshmisha (2000) and Shivaramu *et al.* (2004). More than half of the cashew farmers (56%) exhibited medium levels of ICT usage, whereas in case of cosmopolitanness, majority were equally divided into low and medium categories (36%). These findings are contrary to earlier ones by Lakshmisha (2000), Shivaramu *et al.* (2004) and Venkattakumar (2006). While three-fourth majority (76%) of cashew farmers was giving irrigation for other crops grown by them, 90% of them cultivated cashew under rainfed system only. The average distance of cashew plots from farmers' homes were found to be around half a kilometer (427 m).

Economic profile of cashew farmers

The economic profile of cashew farmers is presented in Table 2 and discussed here. Around half of the farmers (48%) grew 3-4 crops on an average in their farms while almost three-fourth of them (72%) gave least priority to cashew farming. These findings are in agreement with that of Venkattakumar (2008). The average farm size was found to be 1.9 acres while average area of unused land available for cultivation was found to be 86 cents. Majority (55%) had nil or negligible amount of unused land available for cultivation. The study showed that households had an average number of 173 cashew trees with a mean yield of 2.92 kg/tree. More than half of the cashew farmers (55%) realized only moderate yields with an average net income of ₹ 29 664/ha/year against an average expenditure of ₹ 9 293/ha/year. Majority (46%) made low levels of yearly investment in agriculture of ₹ 90 981/ha/year with a net income to the tune of ₹ 240 540/ha/year.

Socio-economic impact of cashew cultivation

Ten major social and economic impact indicators were studied to arrive at the socio-economic impact of cashew farming among the respondents (Table 3). Study on the impact on cropping pattern didn't indicate much of change with only 17% of farmers increasing area under cashew over the years (1.5 acres) while only negligible per cent (3%) of them purchased new lands (2 acres) for cashew cultivation. Impact on labour engagement was also low with only 20% farmers hiring labour for cashew and only one tenth of them opting for increased family labour engagement (11%). The hiring of labour was noticed particularly for plant protection and harvesting operations with farmers mostly engaging one to two labourers during this period. While a large majority (85%) reported no change in farm expenditure due to cashew cultivation, 43% of farmers reported an increase in farm income due to cashew cultivation. Farmers reported an average increase of ₹ 2 272/year in farm expenditure and ₹ 4 188/year in farm income due to cashew cultivation. Resultant increase in family incomes was also reported by 36% of the farmers to the

Table 2 Economic profile of cashew farmers (n=75)

Independent variables	Mean	SD	Category	Respondents	
				f	%
No. of crops grown	3.28	1.62	Less <2	20	27
			Moderate 2-4	36	48
			High >4	19	25
Importance given to cashew	1.56	1.0	Least	54	72
			Moderate	8	11
			High	11	14
			Very High	2	3
Farm size (acres)	1.9	0.82	Low <2.5 ha	31	41
			Medium 2.5-5 ha	23	31
			High >5 ha	21	28
Cultivable land available (cents)	0.86	1.29	Low <0.21	41	55
			Medium 0.21-1.51	20	27
			High >1.51	14	18
Yielding cashew trees (Nos.)	173	220	Low <63	26	35
			Medium 63-283	38	51
			High >283	11	14
Yield of Cashew/tree (kg)	2.92	2.09	Low >3.96	23	31
			Moderate 3.96-1.87	27	36
			High <1.87	25	33
Expenditure in agriculture (₹)	90 981 64 037		Low <52523	35	46
			Medium 52523-129258	20	27
			High >129258	20	27
Net income from agriculture (₹)	240540 149649		Low <124032	37	49
			Medium 124032-357048	20	27
			High >357048	18	24
Expenditure in cashew farming (₹)	9293 11028		Low <3780	28	37
			Medium 3780-14806	31	41
			High >14806	16	21
Net income from cashew farming (₹)	29664 70426		Low <5994	29	39
			Medium 5994-64602	40	53
			High >64602	6	8

average of ₹ 4 259/year followed by an average increase of ₹ 2 666/year in their family expenditure. Sajeev *et al.* (2014) 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 like Kerala and Maharashtra revealed better economic impact among cashew farmers (Venkattakumar 2006, Veerkar *et al.* 2006).

Analysis of social impact presented a better picture in comparison to economic impact with majority (61%) of the farmers reporting increased social participation while nearly two-third (67%) majority could increase their contacts with extension agencies and research institutes due to cashew cultivation. Majority (56%) reported increase in their mass media exposure while a large majority (63%) reported an increase in their opinion leadership status due to cashew cultivation. Venkattakumar (2006, 2008) earlier reported

Table 3 Socio-economic impact of cashew cultivation (n=75)

Impact Indicators	Increased		No change		Mean*
	f	%	f	%	
<i>Impact on cropping pattern</i>					
Area under cashew cultivation over the years	13	17	62	83	1.5 Ac
Purchase of new land and cashew cultivation	2	3	73	97	2.0 Ac
<i>Impact on labour engagement</i>					
Hired labour engagement for cashew	15	20	60	80	1-2 Nos
Family labour engagement for cashew	8	11	67	89	1 Nos
<i>Impact on farm expenditure</i>					
Cashew cultivation and farm expenditure	11	15	64	85	₹ 2 272
<i>Impact on farm income</i>					
Cashew cultivation and farm income	32	43	43	57	₹ 4 188
<i>Impact on family income</i>					
Cashew cultivation and family income	27	36	48	64	₹ 4 259
<i>Impact on family expenditure</i>					
Profit from cashew cultivation and family expenses	15	20	60	80	₹ 2 666
<i>Impact on social participation</i>					
Cashew cultivation and participation in social events	46	61	29	39	
<i>Impact on extension contact</i>					
Contacts with extension agency and research institutes	50	67	25	33	
<i>Impact on mass media exposure</i>					
Cashew cultivation and mass media exposure	42	56	33	44	
<i>Impact on opinion leadership</i>					
Cashew cultivation and opinion leadership in his/her area	47	63	28	37	

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

similar levels of social impact among cashew farmers of Kerala 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 accrued shows that nearly half of the cashew farmers (47%) belong to high social impact category while in case of economic impact large majority (80%) belonged to low benefits category. Overall, nearly half of the cashew farmers (47%) had medium levels of socio-economic impact (Table 4). It may be noted that the low level of economic impacts are compensated to a large extent by the high social impact due to 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 three personal variables, viz. years of experience in farming, extension participation and cosmopolitanism of cashew farmers had a significant relationship with socio economic impact. The regression analysis revealed that four variables, viz. the age of cashew farmer, years of experience in farming, 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 six economic variables, viz importance given to cashew, cultivable land available, number of yielding cashew trees, expenditure in agriculture, net income from agriculture and expenditure in cashew farming as having significant relationship with socio economic impact. The regression analysis reveals that one variable, i.e. importance given to cashew 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 ($R^2 = 0.670$).

Table 4 Classification of farmers based on social and economic impact (n=75)

Categories	Social impact			Economic impact			Socio-economic impact		
	f	%	Range	f	%	Range	f	%	Range
Low	23	31	<0.715	60	80	<0.101	24	32	<0.493
Medium	17	22	0.715-1.445	2	3	0.101-1.329	35	47	0.493-1.299
High	35	47	>1.445	13	17	>1.329	16	21	>1.299
Mean	1.080	0.715	0.896						
SD		0.731			1.228			0.806	

Table 5 Relationship and contribution of personal variables towards Socio-economic impact (n=75)

Socio-personal variables	'r' value	'b' value
Age	0.061 NS	-0.321*
Level of Education	0.087 NS	0.127 NS
Primary Occupation	0.038 NS	-0.030 NS
Experience in farming	0.251*	0.516**
Experience in cashew farming	-0.013 NS	-0.066 NS
Extension contact	0.195 NS	-0.067
Extension participation	0.263*	0.318 NS
ICT usage	0.055 NS	-0.101 NS
Cosmopolitaness	0.331**	0.215*
Land used for cashew	-0.172 NS	-0.107 NS
Land used for other crops	0.017 NS	-0.147 NS
Distance of cashew plot from home	-0.203 NS	-0.273*

NS – Non-significant, *** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level

Table 6 Relationship and contribution of economic variables towards socio-economic impact (n=75)

Economic variables	'r' value	'b' value
No: of crops grown	-0.186 NS	0.054 NS
Importance given to cashew	0.522**	0.297**
Farm size	0.089 NS	-0.102 NS
Cultivable land available	0.256*	0.143 NS
No: of yielding cashew trees	0.519**	0.106 NS
Yield of cashew/tree	0.025 NS	-0.028 NS
Expenditure in agriculture	0.415**	0.014 NS
Net income from agriculture	0.451**	0.137 NS
Expenditure in cashew farming	0.326**	0.232 NS
Net income from cashew farming	0.205 NS	-0.039 NS

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

Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.880 ^a	0.774	0.670	0.4697879

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, seven models were tested to examine the variation in adoption among the respondents (Table 7). Model 7 explained up to 68% of the variation in socio-economic impact using the predictors; importance given to cashew (X1), years of experience in farming (X2), cosmopolitaness (X3), distance of cashew plot from home (X4), extension participation (X5), land used for other crops (X6) and net income from cashew farming (X7) (Table 7). The model 7 also had the lowest standard error of the estimate (0.462) thus making it the best model suited to predict adoption of pest management technologies by

Table 7. Models predicting socio-economic impact: Step-wise regression analysis

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. error	Beta		
7 (Constant)	-0.125	0.248		-0.504	0.616
IMPCSW	0.378	0.062	0.484	6.115	0.000
FRMNGEXP	0.018	0.004	0.301	4.529	0.000
CSMPLTNS	0.033	0.012	0.210	2.880	0.005
PLOTDIST	0.000	0.000	-0.277	-3.736	0.000
EXTNPRTPN	0.024	0.008	0.214	2.831	0.006
OTHCRLND	-0.174	0.072	-0.168	-2.425	0.018
INCM	6.273E-007	0.000	0.179	2.215	0.030

$$SEI = -0.125 + 0.484X1 + 0.301X2 + 0.210X3 - 0.277X4 + 0.214X5 - 0.168X6 + 0.179X7$$

Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate
7	0.843 ^e	0.711	0.680	0.4622349

Predictors: (Constant), IMPCSW, FRMNGEXP, CSMPLTNS, PLOTDIST, EXTNPRTPN, OTHCRPLND, INCM

farmers. The model is fitted as: $SEI = -0.125 + 0.484X1 + 0.301X2 + 0.210X3 - 0.277X4 + 0.214X5 - 0.168X6 + 0.179X7$. The 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 12 constraints as reported by farmers and are classified under technical, management, economic/marketing and processing constraints (Table 8). Majority (83%) reported wide price fluctuations in market for raw cashew nut as the major constraint (Rank 1). Lack of cashew farmer associations/groups and availability of cashew nuts from African nations allow cashewnut processors to manipulate the raw cashewnut prices. Scarcity of hired labour was the second 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. Attack of tea mosquito bug and resultant crop loss (41%) and death of yielding trees due to cashew stem and root borer attack (35%) were also major technical constraints (Rank 3 and 4). This is a matter of concern since cashew yields are largely influenced by the attack of tea mosquito bug (TMB) while attack of Cashew stem and root borer (CSRB) eliminates the crop itself. These findings are in agreement with Ganapathi and Akash (2013), Venkattakumar (2008), Akinwale and Ayodele (1999) and Dixit and Rao (1999).

Flower drying (Rank 5) and poor yield in some varieties (Rank 6) like NRCC selection-2 (flower drying), VRI-3, V-

Table 8 Constraints faced by farmers in cashew cultivation (n=75)

Constraints	Rank	f	%
<i>Technical constraints</i>			
Attack of tea mosquito bug and resultant yield loss	3	31	41
Death of yielding trees due to cashew stem and root borer attack	4	26	35
Flower drying in certain varieties	5	15	20
Poor yield of certain varieties	6	13	17
Poor soils in cashew orchards	12	3	4
<i>Management constraints</i>			
Collection of nuts from large plantations/theft	7	10	13
Monkey menace during fruiting	10	4	5
<i>Economic/Marketing constraints</i>			
Poor price/ price fluctuation	1	62	83
Low availability of hired labour	2	53	71
Price control/manipulation by processors	8	9	12
Lack of cashew farmer associations/groups	9	9	12
<i>Processing constraints</i>			
No value for cashew apple/wastage of cashew apple	11	3	4

4 and V-7 (poor yield) were also major constraints. Problems in collection of nuts from large plantations and the resultant theft due to delay or inaccessibility was another constraint reported by farmers. Similar constraints were reported by Aravindakshan and Beevi (1992), Salam *et al.* (1992), Nirban and Sawant (2000), Mandavkar *et al.* (2003) and Veerkar *et al.* (2006). Price control and manipulation by cashew processors were also identified as a constraint by certain section of farmers. Cultivation of cashew in poor soils and wastage of cashew apple due to lack of processing avenues were the other constraints cited by farmers.

It is concluded from the present study that a majority of cashew farmers had derived moderate 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 farmers' decision regarding continued adoption of cashew production technologies as well as migration to other remunerative crops. The major constraints faced by cashew farmers revealed by the study calls for government intervention in price fixation of cashew and formation of cashew farmers associations. Also, since cashew yields are largely influenced by the attack of tea mosquito bug (TMB) and cashew stem and root borer (CSRB), for most varieties, strategic measures have to be taken to improve the utilisation of pest management technologies in this region. 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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