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Farmers Risk Perception, Management Strategies and Effectiveness: Evidences from Coconut Farmers of Kerala, India

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***Abstract*:** This paper explains the perceptions of farmers regarding various risk events and conditions causing it, various risk management strategies being adopted by farmers and the effectiveness of these strategies; with the help of primary data collected from 273 coconut farmers of Kerala. Risk management strategies like membership in farmer collective (Producer company), farm diversification and value addition were considered in the study. Efficacy of these chosen risk management strategies were assessed and confirmed with the help of ordered logistic regression analysis. Strategies adopted by farmers were found to be effective in general, and were found to have varying degrees of effectiveness. The study emphasized on the need to have proper mechanism to ensure steady supply of inputs at reasonable prices. With adequate government support, producer companies can emerge as important organization for the betterment of coconut farmers. Guidance and support for farm diversification and value addition may help farmers of perennial crops to cope with income risk and thus to improve their income and livelihood.

***Keywords*:** Coconut, Diversification, Producer company, Risk management, Value-addition

Coconut is an important plantation crop, which is grown in more than 90 countries. India is one among the leading coconut producing countries across the globe. For crops like coconut, adaptability to different risky situations is very less as it is a perennial crop. Farmers can't change the crop if the market price/ climate/ policy is not favorable. This makes the farmers more vulnerable compared to those who are doing cultivation of short-duration crops. Apart from that, owing to limited product diversification and value addition, income from coconut framing is mostly tied to coconut oil prices only– which is often susceptible to the pressure from availability of cheaper sources of oil seeds (MoA 2008, Jayasekhar et al 2016). Kerala is the leading coconut producing state in the country. This small state account for around 37 percent of area and around 31 percent of production of coconut in the country. In Kerala, coconut dominates in the total area under cultivation, and it accounts for nearly 40 percent of net sown area in the state. Among all crops it is the second largest contributor to the state income. Thus, addressing the risk scenario of coconut farming is vital to help the farmers in the state. By keeping this in mind, the present study attempts to provide empirical evidence of occurrence of various risk events as shown by farmers' perception, and the effectiveness of major risk management strategies adopted.

MATERIAL AND METHODS

Present study was conducted in two major coconut producing districts, Calicut and Malappuram districts based on higher area under coconut and also by considering the presence of coconut producer companies, which may be able to help farmers in risk management. Three villages from each district were selected after considering presence of adequate number of both members and non-members of Producer Company. Respondents were selected from these villages after satisfying multiple criteria – like member or non-member of Producer Company, irrigating and not irrigating, etc. Primary data were collected through personal interview method from a total of 273 coconut farmers using a structured pre-tested interview schedule.

Analytical Tools

Farmers' perception of risk: Farmers' perception of risks (reflected through incidence of risk events) was analyzed using percentage and tabular analysis. Farmers were asked about the occurrence and intensity of various risk events during past 5 years. The response percentages were presented as never, low, medium and high. Major risks like a) Production risk encompassing drought, rainfall inadequacy, rainfall untimeliness, pest/ disease attack, lack of technology, lack of technical know-how, inadequacy of inputs, untimeliness of inputs, lack of capital, high temperature, b) Price risk arising from: lack of marketing information, input price hike, failure of institutions, import policies, over supply in the market, substitute products, and change in food habits and; c) Income risk due to price policy of the government,

volatility in input prices, subsidy policies, fluctuations in production and damage of products were considered for the study.

Efficacy of various risk management strategies in managing risks: Major risk management strategies generally adopted by the farmers were identified after discussion with farmers and agricultural professionals in the region. Major three risk management strategies, viz. membership in producer company, farm diversification and selling of value-added products were considered for the analysis. Ordered logistic regression, as used in Oksuzler (2008) was used to study the efficacy of these selected risk management strategies being adopted by farmers. Dependent variable was the trend in income from coconut farming over the past five years in presence of risks. Both adopters and non-adopter farmers of the various risk management strategies were asked about their income trend over the years in presence of risks in farming. Then it was checked whether participation/ adoption of these strategies is helping farmers in managing income risk. Yang (2010) had used binary logistic regression in his study for a similar purpose. Since the response come beyond binary in the present study context, and because this was having a specific order, we used an ordered logistic regression model. The empirical model used in the study is:

$$INC = \beta_0 + \beta_1 PCM + \beta_2 VA + \beta_3 DF + \beta_4 IG + \beta_5 AGE + \beta_6 EDU + \beta_7 MME + \varepsilon$$

Where, INC = Income change over years (1: increasing, 2: no change, 3: decreasing), PCM = Producer Company membership (1 for member, 0 otherwise), VA = Value addition (1: Always, 2: Very often, 3: Cautious, 4: Seldom, 5: Never), DF = Diversification of the farm (1: Always, 2: Very often, 3: Cautious, 4: Seldom, 5: Never), IG = Income group (I for APL, 0 for BPL), AGE = Age of the farmer in years, EDU = Years of education of the farmer, MME = Mass media exposure score. Marginal effects were worked out for meaningful interpretation by means of predicting the effect of use of a particular risk management strategy on the probability of helping farmers to be in increasing income status over the years.

RESULTS AND DISCUSSION

Socio-economic characteristics of the sample farmers: Socio-economic profile of respondent farmers is mentioned in Table 1.

Farmers' Perception of Risks in Farming

Farmers' perception of production risk: Lack of financial capital was perceived as the most frequently occurring risk aspect by most coconut farmers. 24 percent farmers opined that this problem affect them most frequently. High temperature and drought were the other major issues that affect coconut farmers most frequently. This will negatively affect nut production in a great extent, and many times premature nuts will fall down and thus, much yield loss will be there as a result of high temperature and drought. Rainfall inadequacy and untimeliness of rainfall were perceived as a low to medium level risk by most of the coconut farmers. Since coconut is a perennial crop and a sturdy palm, it may not be much visible to the farmers the ill-effects caused by rainfall anomalies. As the nut production takes place throughout the year, obviously rainfall anomalies will have its impact on yield. Also, the effect of such a negative rainfall anomaly might not be felt immediately, but after a few months only.

Farmers' perception of price risk: Nearly 33 percent coconut farmers reported input price hike as high risk. Though output price is increasing, it is not catching up the rate of increase in input prices and thus resulting in income loss to the farmers. Oversupply in the market was perceived as another frequent issue by 32 percent coconut farmers. As mostly farmers sell through the local traders, over supply create less

Table 1. Socio-economic characteristics of the sample farmers

Characteristics		Number
Sample farmers (No.)		273
Average age (years)		56.93
Average education (years)		8.60
Average household size (No.)		4.44
Average number of trees (No.)		49.92
Irrigation status (%)	Irrigating	38.83
	Not irrigating	61.17
Income groups (%)	BPL	33.33
	APL	66.67
Farm income trend for past 5 years (%)	Increasing	68.50
	No change	21.61
	Decreasing	9.89
Producer company membership (%)	Member	46.89
	Non-member	53.11
Value addition of products (%)	Always	35.53
	Very often	4.40
	Cautious	13.92
	Seldom	12.82
	Never	33.33
Diversification of farm (%)	Always	9.52
	Very often	20.88
	Cautious	7.69
	Seldom	21.98
	Never	39.93

demand and less price for the product in many occasions. Though import policies of government have a higher impact on coconut prices, only 12.36 percent farmers perceived this as a frequent risk aspect. Factors like availability of substitute products in the market and change in food habits of the consumers were not felt as a frequent issue by the farmers. Most of the farmers reported that they never faced this issue. Though farmers didn't perceive substitute products and change in food habits as a major risk phenomenon, cheap oil sources like palm oil is a major competitor for coconut oil. Coconut price is tightly linked with coconut oil price. Also, other oils like sun flower oil is also getting acceptance slowly.

Farmers' perception of income risk: Among the various factors that affect income change of farmers (Table 4), subsidy policies by government was the major factor reported by most of the farmers (29.09 percent) as a major issue. This was followed by volatility in input prices (23.27 percent), price policy by the government (18.55 percent) and fluctuations in production (17.09 percent). Farmers were complaining about the shooting up of fertilizer prices and the less amount of support they receive through schemes. Procurement prices were low earlier, but now it increased. But they face lot of difficulties in getting the money through government procurement. Damage of products was not seen as a major issue by most of the farmers. It was affecting most farmers in a low to medium extent only.

Table 2. Farmers' perception of occurrence of production risk

Risks	Respondents affected (%)			
	Never	Low	Medium	High
Drought	20.00	34.91	32.73	12.36
Rainfall inadequacy	4.36	49.82	39.64	6.18
Rainfall untimeliness	8.00	68.00	22.18	1.82
Pest/ disease attack	35.64	37.82	15.27	11.27
Lack of technology	50.91	32.73	14.91	1.45
Lack of technical know how	54.91	29.82	12.73	2.55
Inadequacy of inputs	43.27	40.36	11.27	5.09
Untimeliness of inputs	50.18	36.36	9.45	4.00
Lack of capital	67.27	2.55	5.82	24.36
High temperature	55.64	10.91	21.09	12.36

Table 3. Farmers' perception of occurrence of price risk

Risks	Respondents affected (%)			
	Never	Low	Medium	High
Lack of marketing information	41.09	43.64	11.27	4.00
Input price hike	7.27	25.45	34.18	33.09
Failure of institutions	64.73	12.00	16.36	6.91
Import policies	54.55	17.45	15.64	12.36
Over-supply in the market	49.45	9.09	9.09	32.36
Substitute products	76.36	18.91	4.73	0.00
Change in food habits	72.36	21.45	6.18	0.00

Table 4. Farmers' perception of occurrence of income risk

Risks	Respondents affected (%)			
	Never	Low	Medium	High
Price policy of the Government	44.00	17.09	20.36	18.55
Volatility in input prices	14.18	32.00	30.55	23.27
Subsidy policies	29.82	13.82	27.27	29.09
Fluctuations in production	7.27	35.64	40.00	17.09
Damage of products	49.82	35.27	10.91	4.00

Efficacy of risk management strategies: The ordered logistic regression indicate that the risk management strategies adopted by the farmers viz, membership in producer company, value addition of products and farm diversification positively influences increasing income over the years. This indicates they were effective in managing income risk faced by the farmers (Table 6),

Table 6. Efficacy risk management strategies adopted: Ordered logistic regression

Variable		Coefficient	Std. Error
Producer company membership		-0.862**	0.354
Value addition of products	Always	-2.224***	0.406
	Very often	-2.161***	0.832
	Cautious	-2.058***	0.569
	Seldom	-1.728***	0.505
	Never	(base)	
Diversification of farm	Always	-1.716**	0.562
	Very often	-0.787*	0.444
	Cautious	-0.610	0.720
	Seldom	-0.620	0.404
	Never	(base)	
Income group		-0.189	0.317
Age		0.004	0.023
Education		0.038	0.086
Mass media exposure		-0.190*	0.108
Log likelihood: -174.20, Prob>Chi^2: 0.000			

Note: ***, ** and * denote significance at 1 percent, 5 percent and 10 percent levels respectively

Being a member of Producer Company is associated with being 12.5 percent more likely to be in the increasing income status, 6 percent less likely to be in the stagnant income status and 6 percent less likely to be in the decreasing income status compared to the nonmembers. Membership in a farmer collective like producer company helps the farmers in getting good quality farm inputs at proper time and reasonable price, technical guidance and an assured market by means of procurement. Through this form of farmer collectives, farmers can reap benefits of economies of scale. Also, farmers have opportunities to get higher income by production and marketing of various coconut products through the company. This might have helped them to improve their income over years and to overcome risky situations.

Value addition is an important strategy for coconut farmers to ensure better income (CACP 2017). All the four categories of adoption of value addition gave significant results compared to those who never adopted value addition (base category). Those who always prepare value added products were found 41 percent more likely to report increasing income, 25 percent less likely to be in stagnant income and 16 percent less likely to be in decreasing income category compared to those who never adopted value addition. Similar pattern was found for other categories also, but with comparatively less probability as it proceeds from those who always adopt to those who seldom adopt. While coming to the diversification of farm; those who always adopt farm diversification were found 23

Table 7. Efficacy risk management strategies adopted: marginal effects from ordered logistic regression

Variable		Income increasing	No change in income	Income decreasing
Producer company		0.125**	-0.065**	-0.060**
Value addition of products	Always	0.412***	-0.253***	-0.159***
	Very often	0.404***	-0.247***	-0.157***
	Cautious	0.391***	-0.237***	-0.154***
	Seldom	0.344***	-0.201***	-0.143***
	Never	(base)	(base)	(base)
Diversification of farm	Always	0.234***	-0.137***	-0.096***
	Very often	0.121*	-0.062	-0.058**
	Cautious	0.095	-0.048	-0.047
	Seldom	0.097	-0.049	-0.048
	Never	(base)	(base)	(base)
Income group		0.027	-0.014	-0.013
Age		-0.001	0.0003	0.0003
Education		-0.005	0.003	0.003
Mass media exposure		0.028*	-0.014*	-0.013*

Note: ***, ** and * denote significance at 1 percent, 5 percent and 10 percent levels respectively

percent more likely to be in increasing income category, 14 percent less likely to be in stagnant income category and 10 percent less likely to be in decreasing income category compared to those who never adopted farm diversification. Those who adopt it very often were found 12 percent more likely to be in increasing income group and 5.8 percent less likely to be in decreasing income status compared to the base category. Krishnakumar et al (2013) also had reported higher income realized by coconut farmers in Kerala through farm diversification interventions. A number of crops like tubers, spices, flower crops, etc. can be cultivated in coconut plantations, which will help to get a stable additional income. Also, intercultural activities for these intercrops may improve yield of coconut palms also. Unit increase in mass media exposure was found to be associated with 2.8 percent more likely to be in the increasing income status, 1 percent less likely to be in the stagnant income status and 1 percent less likely to be in the decreasing income status. Mass media exposure is an important way for farmers to get updated about better farming techniques, various schemes and a lot of valuable information, which can help them to improve their farm yield and profitability, and also to cope up with risky situations. Thus, these information obtained through mass media exposure might have helped the farmers to improve farm income over the years.

CONCLUSIONS

Risks are inherent in agriculture, and farmers of perennial crops like coconut face difficulty to make adjustments in order to cope with risky events. Lack of financial capital, high temperature and drought were the major issues leading to production risk. Price risk was arising mainly as a result of input price hike. Subsidy policies by the government, price volatility, price policies and fluctuations in production were the major causes of income risk. Government policies need to be streamlined so as to give maximum benefit to the target farmers. Interventions are needed to address capital issue of farmers and for availability of inputs at reasonable and steady price. Joining in farmer collectives (Producer Company), value addition and farm diversification were the major risk management strategies being adopted by the farmers. While looked at the efficacy of these strategies adopted, all these three strategies and also mass media exposure were found to be effective in managing income risk faced by farmers. With adequate government support, producer companies may can better help farmers further. Guidance and support for farm diversification and value addition will help farmers of perennial crops to cope with income risk and thus to improve their income and livelihood.

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