

COMMERCIAL CROPS: RISKS, LOSSES AND LOSS BEARING CAPACITY OF FARMERS

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ABSTRACT

There are some factors in agriculture that can be controlled by treatment in crops on time, after observation of these factors like pests and diseases, irrigation in case of drought, but some risks are there, which can't be controlled like flood, temperature variability, unseasonal/excess rain, hail storms, etc. These risks affect differently to each and every crop based on weather conditions, or quality of the soil. The present study was conducted in Haryana state and focused on the various risk factors, involved in different commercial crops that are most worried by the sample population and highlights the losses, caused by these factors. The study, further point out the loss bearing capacity of the respondents and concluded that, there was a great difference between the actual experienced losses and loss bearing capacity of the farmers. The study also provides suggestion for improving the economic condition of the farmers, all types of risks and crops should be covered under the insurance policies formulated by the government at present, or in the future.

KEYWORDS: Agriculture, Risks, Weather Conditions, Loss Bearing Capacity of Farmers

INTRODUCTION

India has made tremendous progress in the agricultural sector over the last 50 years. Today, we have not only become self reliant in food grains, but have acquired sufficient flexibility to tide, over the adverse conditions. Risk is an integral part of agriculture. Each day, farmers deal with different types of risks, such as production risk, price risk, financial risk etc. The environment of risk is changing. Risk factor is a weather condition or situation, which affects the productivity of the crops. There are different kinds of weather risks, which affect the production of a crop. Each factor is not affecting every crop uniformly. Different risk factors have an effect on various crops, adversely (www.hdoa.hawaii.gov). Commercial crops are those crops, which are grown for sale either in raw form or semi processed form. Major of them are as cotton, sugarcane, cluster bean, jawar, etc. Cotton is the most important commercial crop, not only of India, but also for the entire world. India has the largest area under cultivation and is the largest producer of cotton next, only to China and the USA. Within the country, two third of total area and production is shared by four states. The main states for cotton production are Andhra Pradesh, Telegana, Maharashtra, Gujarat, Punjab and Haryana. Sugarcane is the main source of sugar, gur and khandsari. India has the largest area under sugarcane cultivation, in the world and the second largest producer next to Brazil.

LITERATURE REVIEW

Commercial crops are one of the essential parts of the agriculture sector. Most of the people engaged in commercial crops activities work. Some people self employed in this crops rural and semi-urban livelihood.

In the economic development of World, India level of commercial crops is highly increased in GDP growth rate (Latha *et al.*, 2014). The greater risk that is most worried by the farmers is crop pests and diseases. The volatility of pest and disease incidence that results in crop damage creates more anxiety, among farmers. The pest pressure is high in the commercial crops due to which, fewer farmers adopt commercial cropping. To lower their risk exposure and to increase the probability of a good harvest, farmers turn to using synthetic pesticides in the process of commercialization (Riwthong *et al.*, 2017). The relationship of commercialization to risk and risk management, has received attention. Most of the time, commercialization and changes in risk are difficult to study, as they need longitudinal data. Commercialization is considered as a driver of farm productivity and rising farm household incomes, partly also considering market risk (Jayneet *et al.*, 2011, Pandey, 2006, & Zeller *et al.*, 2013). Risk is regarded as the probability of losses consequence of incomplete control over the processes with which farmers are concerned. The technical risks caused to failure of farming methods, storage and processing, and the natural risks are due to pests and diseases, perishing of products as well as those due to adverse or unfavorable weather conditions. On the other hand, the commercial risks are related to price fluctuations, which tend to be increased, due to long gestation period. Risk associated with decision making, may be reduced by providing information that decreases the uncertainty of that particular decision. Therefore, it is, important that, with improved information made available concerning specific objectives and time frame, the government's land and labor legislation processes are conducted in as transparent a manner as possible (Nicol *et al.*, 2007).

METHODS

The present study is based on primary data. A well structured questionnaire was developed and administered, on the farmers to record the data. The sample was selected randomly from all over in Haryana. Data obtained through the structured questionnaire was analyzed, using simple statistical tools frequency calculation and percentage analysis. These calculations were done with the help of statistical software packages. Ranking of risk factors is based on the responses of the respondents. The current paper has reported the results of a survey of 567 farmers conducted, to investigate the risk factors involved in different food crops. The study further examined the average past losses, experienced by the farmers and loss bearing capacity of the farmers, in the different commercial crops. The study also highlights the difference between the actual average losses, experienced by sample population in the past and their loss bearing capacity.

RESULTS AND DISCUSSIONS

To examine the risk factors affecting the productivity of the different commercial crops, the analysis of sampled data was done. There are several risks factors related to the various farming activities. The likely risk factors include floods, drought, unseasonal/ excess rain, hailstorms, windstorm, crust formation, variability in temperature, pests and diseases, etc. All these risks are beyond the control of farmers and affect differently, to each crop. The losses made by these factors need to be managed to stabiles the earnings of the farmers. Initially, we have discussed the crop profile of the sample respondents. In the coming sections, we have described the different risk factors involved in the commercial crops, rank-wise risk factors in different crops grown, average past losses experienced by the respondents in the variable commercial crops and their actual loss bearing capacity has been discussed.

Table 1: Crop Wise Profile of Respondents

Sr. No	Crop	Frequency	Percentage
1.	Cotton	228	40.21
2.	Cluster bean	145	25.57
3.	Sugarcane	42	7.41
4.	Jawar	26	4.59
5.	Berseem	18	3.17
6.	Poplar	08	1.41
7.	Marigold	04	0.71
8.	Safeda	01	0.18
9.	Fruit Trees	01	0.18

The figures given in the table-1, states the crop wise profile of the respondents. It also gives details about the commercial crops, which were grown by the respondents. A variety of commercial crops were grown by the respondents. Cotton is basically a kharif crop. Cotton is the most important fiber crop of India. It not only provides raw material for cotton textile industry, but also its seed is used in Vanaspati oil industry. The cotton seed is also used as part of the fodder for milch cattle, for better milk production. India accounts for 80% of the total guar produced in the world. Growing guar in India is a risky business because; the crop must get the proper amount of monsoon rain that arrives at the proper time in the growing cycle. The leaves and beans of the guar plant have traditionally been used as an animal feed and as a vegetable, for human consumption. Cotton (40.21%) was the highest grown crop by the sample population, followed by cluster bean (25.57%). Sugarcane is the main source of sugar, gur and khandsari. It also provides raw material for the manufacturing of alcohol. It is used for manufacturing of paper. It is also an efficient substitute for petroleum products and a host of other chemical products. Sugarcane was grown by 7.41% farmers in the total sample population. The least grown crops were safeda and fruit trees (0.18%). A proportion of (4.59%) the respondents grew jawar and (3.17%) farmers grew berssem. Thus, we can say that, the major commercial crops grown by the respondents were cotton and cluster bean.

Table 2: Ranking of Different Risk Factors with Regard to Different Crops

Risk	Rank	Cotton	Cluster Bean	Sugarcane	Jawar	Berseem	Poplar	Marigold	Safeda	Fruit Trees
Flood	HW	0.9	-	4.8	7.7	-	12.5	-	-	-
	MW	7.0	7.6	7.1	-	5.6	-	-	-	-
	LW	92.1	92.4	88.1	92.3	94.4	87.5	100.0	100.0	100.0
Drought	HW	14.9	42.8	7.1	3.8	-	-	-	-	-
	MW	28.9	21.4	26.2	11.5	-	25.0	-	-	100.0
	LW	56.2	35.8	66.7	84.7	100.0	75.0	100.0	100.0	-
Crust formation	HW	5.7	4.1	4.5	23.1	-	-	-	-	-
	MW	57.0	22.8	9.1	11.5	5.6	-	-	-	-
	LW	37.3	73.1	86.4	65.4	94.4	-	-	-	-
Fire	HW	3.1	7.6	7.1	3.8	-	12.5	-	-	-
	MW	20.3	6.2	28.6	15.4	-	25.0	-	100.0	-
	LW	76.6	86.2	64.3	80.8	-	62.5	-	-	100.0
Wind storms	HW	23.0	40.4	45.2	42.3	27.8	50.0	75.0	100.0	80.0
	MW	35.0	21.3	19.1	38.5	11.1	12.5	25.0	-	20.0
	LW	42.0	38.3	35.7	19.2	61.1	37.5	-	-	-
Frost	HW	-	-	6.7	-	23.5	-	100.0	-	50.0
	MW	-	-	6.7	-	47.1	12.5	-	-	30.0
	LW	-	-	86.6	-	29.4	87.5	-	100.0	20.0
Pest & Diseases	HW	94.7	88.2	90.5	76.9	55.6	62.5	100.0	-	100.0
	MW	4.0	10.4	7.1	15.4	33.3	12.5	-	100.0	-
	LW	1.3	1.4	2.4	7.7	11.1	25.0	-	-	-
Temperature variability	HW	6.6	9.7	7.1	-	27.8	-	25.0	-	90.0
	MW	19.3	16.5	38.1	34.6	50.0	75.0	75.0	-	10.0
	LW	74.1	73.8	54.8	65.4	22.2	25.0	-	100.0	-
Unseasonal/excess rain	HW	17.1	48.3	14.3	4.0	44.4	12.5	100.0	-	100.0
	MW	37.3	26.9	45.2	48.0	38.9	12.5	-	-	-
	LW	45.6	24.8	40.5	48.0	16.7	75.0	-	100.0	-
Hailstorm	HW	5.3	11.0	2.4	-	-	12.5	-	-	40.0
	MW	17.7	29.0	26.2	30.8	11.1	-	75.0	-	30.0
	LW	77.0	60.0	71.4	69.2	88.9	87.5	25.0	100.0	30.0
Post harvest losses	HW	7.9	9.7	11.9	3.8	16.7	12.5	100.0	-	100.0
	MW	37.3	27.6	59.5	34.6	11.1	50.0	-	-	-
	LW	54.8	62.7	28.6	61.6	72.2	37.5	-	100.0	-
Price	HW	78.1	82.1	31.0	50.0	77.8	100.0	100.0	100.0	100.0
	MW	17.5	15.8	33.3	42.3	11.1	-	-	-	-
	LW	4.4	2.1	35.7	7.7	11.1	-	-	-	-
Animal losses	HW	25.0	75.9	19.0	61.5	66.7	25.0	-	-	20.0
	MW	49.1	20.7	42.9	19.2	27.8	62.5	50.0	100.0	30.0
	LW	25.9	3.4	38.1	19.3	5.5	12.5	50.0	-	50.0
Weed	HW	8.3	58.6	-	19.2	22.2	-	-	-	-
	MW	28.1	20.7	14.3	19.2	11.1	12.5	-	-	-
	LW	63.6	20.7	85.7	61.6	66.7	87.5	100.0	100.0	100.0

Table-2, states the different kinds of risks which affect their crop. In this table, the percentage is used to know the weightage assigned to risks and their rankings. In case of cotton, pest and diseases were a major concern. Price variation is also an important concern in cotton. In case of cluster bean (88.2%) pests and diseases was the highly worried risk factor, followed by price (82.1%) in cluster bean. The next worried risk factor was animal losses (75.9%) in cluster bean and price. Thus, we can say that, the price for their crops is the major problem for the farmers. The farmers did not get right prices for their produce. Pests and diseases affected a lot of the productivity of sugarcane (90.5%). Price is a concern in sugarcane market. The figures explain that, the respondents were highly worried about pests and diseases in the crop of jawar (76.9%). The second concerned risk factor was animal loss in jawar. If we give a look at the crops like berseem, poplar, marigold and safeda; farmers were highly anxious on the prices of these crops. They wanted high prices for their crop, but they did not get. In case of berseem, animal loss was also a concerned risk factor. So, the farmers wanted to cover this risk in their crop insurance policy. It was clearly observed from the data that, highly risky factor in marigold was the price. The next risk factor concerned was pest and diseases. There are some risks that can be controlled by treatment in crops on time, after observation of these risks like pests and diseases, irrigation in case of drought, but some risks cannot be controlled.

Table 3: Ranking of Risk Factors Involved in Different Crops

Sr. No	Crop	Risks Involved		
		R ₁	R ₂	R ₃
1.	Cotton	Pest & diseases	Price	Animal losses
2.	Cluster bean	Pest & diseases	Price	Animal losses
3.	Sugarcane	Pest & diseases	Wind storms	Price
4.	Jawar	Pest & diseases	Animal losses	Price
5.	Berseem	Price	Animal losses	Pest & diseases
6.	Poplar	Price	Pest & diseases	Wind storms
7.	Marigold	Price / Frost / Pest & diseases/Unseasonal/excess rain/Post- harvest losses	Wind storms	Temperature variability
8.	Safeda	Price/Wind storms	Fire/Animal losses /Pest & diseases	Flood / Drought / Frost/Temperature variability/ Unseasonal/excess rain/Hail storm/Post- harvest losses/Weed
9.	Fruit Trees	Pest & diseases /Price /Unseasonal/excess rain/ Post- harvest losses	Temperature variability	Wind storms

The figures explain different kinds of risks, which affect the production of a crop. It can be clearly observed from the data that, in case of cotton, cluster bean, sugarcane, jawar and fruit trees, pests and disease was the highly worried risk factor, while in the crops like berseem, popular, marigold and safeda, price was the risk factor, about which farmers were highly worried and concerned. In case of cotton and cluster bean, the second highest risk was price of the produce followed by the losses made by the animals in their crop. Thus, we can say that, a price for their crops is the main problem for the farmers. They hardly got the reasonable prices for their produce. Pests and diseases affected a lot on the productivity of sugarcane. The main risk factor was pests and diseases in the crops of jawar and tomato. Post-harvest losses like rain, theft and fire in crops, after harvesting and before selling were also an important risk factor. If we give a look at the crops like berseem, poplar and safeda for all the crops, farmers were highly anxious for the prices of these crops. They wanted high prices for their crops, but they did not get. So, the farmers wanted to cover this risk in their crop insurance policy.

Table 4: Average Loss Experienced by Farmers in the Past

Sr. No	Crop	Average Loss (%)	Risks Involved		
			R ₁	R ₂	R ₃
1.	Cotton	50.29	Pest & diseases	Price	Animal losses
2.	Cluster bean	40.66	Pest & diseases	Price	Animal losses
3.	Sugarcane	31.00	Pest & diseases	Wind storms	Price
4.	Fruit trees	30.0	Pest & diseases /Price /Unseasonal/excess rain/ Post harvest losses	Temperature variability	Wind storms
5.	Marigold	25.00	Price / Frost / Pest & diseases/Unseasonal/ excess rain/Post harvest losses	Wind storms	Temperature variability
6.	Berseem	22.00	Price	Animal losses	Pest & diseases
7.	Poplar	20.63	Price	Pest & diseases	Wind storms
8.	Safeda	20.00	Price/Windstorms	Fire/Animal losses /Pest & diseases	Flood / Drought / Frost/Temperature variability/ Unseasonal/excess rain/Hail storm/Post harvest losses/Weed
9.	Jawar	19.80	Pest & diseases	Animal losses	Price

The data given in table-4 highlights the highest amount of losses experienced by the sample farmers, which were in cotton (50.29%) followed by cluster bean (40.66%), sugarcane (31.0%) and fruit trees (30.0%). In these four crops, the highest risk factor was connected with pests and diseases. In case of cotton and cluster bean, price was ranked the second highest risk factor. Price was also insured by the government, but it was not up to the expectation of the farmers. Sometimes, farmers have stored their produce for a long time in a hope for increase in the prices. In this way, cost of storage also increased their total cost of production in different crops. The third factor aroused due to animal losses in cotton and cluster bean. Average losses experienced by the sample farmers were in jawar (19.80%), safeda (20.00%), poplar (20.63%) and berseem (22.00%). In case of marigold, berseem, poplar and safeda, price assigned was the main risk factor.

Table 5: Loss Bearing Capacity of Farmers in Different Crops

Extent of Loss	Percentage of Respondents								
	Cotton	Cluster Bean	Sugarcane	Jawar	Berseem	Poplar	Marigold	Safeda	Fruit Trees
Up to 10%	3.29	10.98	2.44	44.44	25.00	-	-	-	-
Up to 9%	3.70	26.01	17.07	48.89	-	-	-	-	5.26
Up to 8%	7.00	43.93	31.71	62.22	50.00	-	50.00	-	-
Up to 7%	8.23	51.45	34.15	-	-	3.03	-	8.82	-
Up to 6%	18.11	83.24	73.17	75.56	-	18.18	100.00	20.59	-
Up to 5%	49.38	93.06	80.49	95.56	75.00	36.36	-	44.12	26.32
Up to 4%	56.38	94.22	97.56	-	-	75.76	-	70.59	-
Up to 3%	77.37	95.38	100.00	97.78	-	81.82	-	73.53	63.16
Up to 2%	90.12	95.95	-	100.00	-	84.85	-	88.24	94.74
Up to 1%	100.00	100.00	-	-	100.00	96.97	-	97.06	100.00

As we see in the table, only 3.29% of farmers were there, who could bear the loss upto 10% in cotton. Above this limit, they were unable to manage the losses using their own domestic resources. If they experienced the losses above 10%,

then they would go for another loan to manage them. So, it would further worsen their financial condition. For cluster bean, 10.98% farmers could bear 10% losses. Sugarcane is a commercial and cash crop. All the farmers could bear the losses up to 3% in sugarcane. Only, 2.44% respondents had the capacity of bearing losses up to 10%, followed by 17.07% up to 9%. For fruit trees, 5.26% respondents had the capacity of bearing loss up to 9%. In case of jawar (44.44%) and berseem (25.00%), farmers could bear the losses up to 10%. The reason may be large amount of net returns from these crops when compared to their cost of cultivation. Poplar and safeda were the main agro-forestry trees, which were grown as block plantation or in the form of partial crop, with the main agricultural crops i.e. on the boundaries of the farm. The highest limit of the respondents of bearing losses in these trees was up to 7%. In case of marigold, the loss bearing capacity of the respondents was up to 8%. All the farmers could afford the loss up to 6%, in marigold.

Difference between Average Losses Experienced by the Farmers in the past and their Actual loss Bearing Capacity

The data compares the loss bearing extent of farmers and the maximum average losses, that were experienced by farmers in the past in various commercial crops, even if they are growing that crop at present or they have grown it in past. The figures indicate a large gap between loss bearing capacity and the average losses occurred in the past. The gap suggests the need for instruments to cover the risk factor or situations, which are causing such losses.

Table 6: Average Past Losses Experienced and Loss Bearing Capacity of Farmers

Crops	Loss bearing capacity										Average past losses (%)
	Up to 10%	Up to 9%	Up to 8%	Up to 7%	Up to 6%	Up to 5%	Up to 4%	Up to 3%	Up to 2%	Up to 1%	
Cotton	3.29	3.70	7.00	8.23	18.11	49.38	56.38	77.37	90.12	100.00	50.29
Cluster bean	10.98	26.01	43.93	51.45	83.24	93.06	94.22	95.38	95.95	100.00	40.66
Sugarcane	2.44	17.07	31.71	34.15	73.17	80.49	97.56	100.00	-	-	31.00
Fruit trees	-	5.26	-	-	-	26.32	-	63.16	94.74	100.00	30.0
Marigold	-	-	50.00	-	100.00	-	-	-	-	-	25.00
Berseem	25.25	-	50.00	-	-	75.00	-	-	-	100.00	22.00
Poplar	-	-	-	3.03	18.18	36.36	75.76	81.82	84.85	100.00	20.63
Safeda	-	-	-	8.82	20.59	44.12	70.59	73.53	88.24	100.00	20.00
Jawar	44.44	48.89	62.22	-	75.56	95.56	-	97.78	100.00	-	19.80

The figures given in table-6, compares the maximum limit of average losses, experienced by the farmers in the past and the loss bearing capacity of farmers, with regard to different crops. It shows a significant difference between the actual losses and bearing capacity of the farmers. As we see, in the cotton crop, only 3.29% of farmers were there who could bear the loss upto 10%. An average loss of 50.29% was experienced by farmers in the past in cotton crop. In the case of cluster bean, 10.98% farmers could bear 10% losses against the actual loss occurred in past in cluster bean was 40.66%. All the farmers could afford the loss upto 6% in marigold. The maximum number of farmers (44.44%) could bear the losses upto 10% in case of jawar, followed by berseem (25.25%). Sugarcane is a commercial cash crop. All the farmers could bear the losses up to 3% in sugarcane. For fruit trees, 5.26% respondents had the capacity of bearing loss up to 9%. The maximum limits of loss bearing of the farmers were up to 7% in poplar as well as in safeda and the actual average past losses in poplar were 20.63% and in safeda, these were 20.00%. The percentage of farmers with loss bearing capacity up to 10% was more in case of jawar, followed by berseem (25.25%) and cluster bean (10.98 %).

CONCLUSIONS

The study concluded that, cotton (40.21%) was the highest grown crop followed by cluster bean (25.57%). The farmers (7.41%) grew sugarcane and 7.41% were involved in growing potato and barley. The least grown crops were safeda and fruit trees (0.18%). In case of cotton, price matters a lot after pest and diseases. Animal loss was also an important risk factor in cotton. Farmers never got those prices for these crops as they wanted. Thus, in case of cotton, price matters a lot. Pests and diseases affect a lot on the productivity of sugarcane (90.5%). In case of cluster bean, pest and disease was the highly worried risk factor. The next risk factor after the price was animal loss, in cluster bean. The main risk factor in jawar was pests and diseases, after the animal loss. The crops like berseem, poplar, safeda, marigold and fruit trees, for almost all the crops, farmers were highly anxious for the prices of these crops. Price for their crops was the main problem, for the farmers. They did not get right prices for their produce. Only 3.29% of the farmers were there, who could bear the loss of upto 10% in cotton. An average loss of 50.29 % was experienced by farmers in the past, in cotton crop. In cluster bean, 10.98% farmers could bear 10% losses and the actual loss occurred in past in cluster bean was 40.66%. Thus, there was a great difference between the actual losses and bearing capacity of the farmers. If the government wants to improve the economic condition of the farmers, there is an urgent need to take sufficient and effective measures, to secure the farmers from these risks. Almost all types of risks and crops should be covered under the insurance policies, formulated by the government, at present or in the future.

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