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Impact of Weather based Crop Insurance in Karnataka - An Economic Analysis

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ABSTRACT: The study on impact of weather based crop insurance in Karnataka was carried out in North Karnataka because territory receives less rainfall compared to other portion of Karnataka. The districts selected for the study were Dharwad and Gadag of North Karnataka. Simple random method was followed to select the farmers from each district. Thus, 100 respondents were selected from both districts. For the study both primary and secondary data was used. The data were analysed using descriptive statistics and Compound annual growth rate, Relative importance Index, Coefficient of variation and Garrett's ranking technique. The number of ranchers benefited and claims over the time period indicated a positive and significant increase in growth rate at one per cent probability level. Majority of the ranchers in both districts are not aware of who is implementing agency and who pays recompense. In case of source of information, most important one was Grameen bank followed by Commercial and neighbours in case of both Dharwad and Gadag districts respectively. In case of service required for availing insurance, most important one was rural agent at village level in case of Dharwad district but in case of Gadag district RSK place important role in providing information on crop insurance. The major constraints faced by the farmers were not aware of crop insurance procedures and facilities available followed by poor publicity and less time given for opting insurance and time lag in distribution of compensation.

Keywords: WBCIS, compound annual growth rate, relative importance index, constraints.

INTRODUCTION

Crop protection is purchased by agricultural producers and subsidized by the central government, to protect against either the loss of their crops due to natural calamities, such as hail, drought and floods, or the loss of revenue due to decrease in the prices of agricultural commodities.

Indian farming is intensely reliant upon precipitation which generally happens during storm period of around two and half months. The unusual conduct of storm might cause catastrophic events, for example, shortage conditions or dry spell, floods, typhoons and so on Almost 66 per cent of the cropped acreage is helpless against dry spell in various degrees. On a normal 12 million hectares of crop area is impacted every year by these disasters seriously affecting the yields and total agricultural production. Around 66% of the cultivated area has no water system (Anonymous, 1985).

Precipitation during blooming period washes the dusts unfavorably influencing the harvest yield. Overabundance precipitation may antagonistically influence the yield acknowledgment. Weighty downpours might lower the developing yields in the beginning phases and may cause dwelling in the later phases of harvest development. In the catchments weighty downpours might cause floods in the fields. The floods disturb the planting timetable and harm the standing harvests bringing about diminished yield or even absolute loss of yields and ranch pay not withstanding loss of property. Other climate factors that influence yield incorporate daylight, temperature, wind, hails.

Truth be told since days of yore weather conditions has been the significant foe that the ranchers can't handle. It has been laid out that 50% of the varieties in crop yield is because of varieties in precipitation. In any climatic zone crop yield among the homesteads fluctuates with the dirt, geology, culturing activities and utilization of four correlative information sources, to be specific, seed, manure, pesticides and water system (soil dampness). Seed is the list of usefulness which might be acknowledged with the appropriate culturing practices, water system and compost use. Pesticides use evades the misfortune in yield due to irritations and sicknesses. Quantum of these contributions as well as their quality and timings and strategy for use influence the yield acknowledgment. These four elements of reciprocal inputs vary for the individual farms in a year and for a farm over the years.

The low yield of significant harvests implies diminished pay and trouble in organizing the necessities

of life as well as contributions for the following season. The reimbursement of exceptional advances becomes sporadic at times bringing about default. However transformation of advances or their rescheduling helps the ranchers for qualification for new advances from formal sources it may not tackle their liquidity issues totally. At times the ranchers are constrained to strip and discard a few resources made over previous years. Some of the time, they need to turn to exorbitant getting from casual sources.

Crop insurance is one process by which ranchers can settle ranch pay and venture and guard against lamentable impact of misfortunes because of regular perils or low market costs. Weather Based Crop Insurance Scheme (WBCIS) has inherent advantages in comparison to yield index insurance with respect to moral hazard, adverse selection, fast loss assessment and low monitoring costs (Banerjee, 2012, Clarke *et al.*, 2012). It isn't just balances out the homestead pay yet additionally assists the ranchers with starting creation movement following a terrible rural year. It cushions the shock of crop failure by providing farmers with a minimum amount of protection. It spreads the crop failure over space and time and encourages farmers make more investments in agriculture. However, one need to keep in mind that crop insurance should be part of overall risk management strategy. Insurance comes towards the end of risk management process. Insurance is redistribution of cost of losses of few among many and cannot prevent economic loss. Hence the study was taken up to examine the impact of weather based crop insurance scheme in Karnataka.

In view of the above, the study was focussed on below mentioned adjectives.

1. To assess the performance of weather based crop insurance scheme in Karnataka
2. To assess the knowledge of farmers about the crop insurance scheme
3. To assess the constraints opined by farmers on weather based crop insurance (WBCIS).

METHODOLOGY

In Karnataka, Dharwad and Gadag districts were purposively selected for the study to analyse the impact of weather based crop insurance scheme. From each district, two taluks were randomly selected. Dharwad and Navalgund taluks were selected in Dharwad district and in Gadag district, Gadag and Naragund taluks were selected. For the study both primary and secondary data was used. From each district 50 crop insured farmers were selected by simple random sampling technique. For evaluating the objective of the study, the required data were collected through personal interview method using well-structured and pre-tested schedule. Secondary data relating to physical and financial performance of weather based crop insurance of Karnataka were collected from 2007-2020. From both districts, a total of 100 farmers were selected for the study. The basic instrument used for the study was interview schedule. The questions were related to awareness, Knowledge, socio-economic characteristics etc. The data were analysed using descriptive statistics and Compound annual growth rate, Relative importance Index (RII), coefficient of variation and Garrett's ranking technique etc.

A. Analytical Techniques Employed

Growth rate analysis. In order to analyse the growth in physical and financial performance of weather based crop insurance in Karnataka. Compound growth rates were computed using the following model.

$$Y_t = ab^t e^u$$

Where,

Y_t = dependent variable
a = intercept term/constant term
b = (1+r) and 'r' is the compound growth rate
t = time trend
u = error term

The above model in the Logarithmic form is expressed as, Log Y= log a + t log b + log u

Log a and Log b values were obtained using the ordinary least squares procedures and the R^2 was computed for testing the goodness of fit. Antilog of (Log (b-1))* 100 give the per cent growth rate. Significance of the growth rate was tested using 't' test.

Relative Importance Index (RII). According to Deshetti (2022), the relative importance index approach was used to describe the relative importance of the specific source of information for opting weather based crop insurance by farmers was analysed by using likert scale of five point scale. In addition, the higher value of the index of relative importance (RII) is the critical cause/constraint and is determined by below equation

$$RII = \frac{\sum W}{(A*N)}$$

Where:

RII = is Relative Importance Index
W = weight given to each factor by the respondents from 1, 2, 3, 4 and 5 for strongly agree, agree, undecided, disagree, strongly disagree
A = is the highest weight (*i.e.*, 5 in this case), and
N = is the total Number of respondents

Garrett's ranking technique. Garrett's ranking technique was used to identify the constraints opined by farmers on weather based crop insurance in the study area. Garrett ranking is applied to rank a set of items or factors as perceived by the sample respondents based on certain criteria. The order of merit assigned by the respondents was converted into scores using the formula

Per cent position of each rank = 100 (Rij – 0.5) /Nj

Where,

Rij = the rank of the i^{th} item by j^{th} individual and
Nj = the number of items ranked by the j^{th} individual.

By referring the Garrett's table, per cent position was estimated and converted into score. Then, for each factor the scores of various respondents were added and the mean score was calculated. The factor with the highest mean score was considered to be the most important constraint. Thus, mean score for each constraint was ranked by arranging them in the descending order.

RESULTS AND DISCUSSION

The physical and financial performance of WBCIS in Karnataka (Table 1) revealed that, a total of 39.60 lakh farmers and 9.11 lakh hectares were insured under WBCIS. The Government of Karnataka has 38 per cent share to the total premium collected in the state where as the claims settled are only 21.46 per cent of the claims settled in the state. Out of the 29.60 lakh farmers insured, 22.40 lakh farmers received claims (beneficiaries), which meant 75 per cent of insurers getting indemnity payment in the state. The results on number of ranchers insured, area, sum insured, total premium, number of farmers benefited and claims over the time period indicated a positive and significant increase in growth rate at one per cent probability level (Anonymous, 2021). Similar pattern of results were observed by Jeyanthi (2017).

Table 1: Physical and financial performance of WBCIS in Karnataka from 2007 to 2020.

Year	No. of farmers insured	Area Insured (Lakh Ha)	Sum Insured (₹ in Lakhs)	GOK Share in Lakhs)	Total Premium (₹ in Lakhs)	No. of Benefited farmers	Claims settled in (₹in Lakhs)	Claims to sum assured ratio %	Beneficiary ratio (%)
2007-08	43790.00	0.501	5301.19	280.66	703.07	35275	524.10	9.89	80.55
2008-09	28627.00	0.437	4412.247	152.91	443.77	21719	389.12	8.82	75.87
2009-10	108229.00	1.319	16110.489	577.52	1726.16	71004	1638.04	10.17	65.61
2010-11	58281.00	0.731	11107.929	340.66	1157.86	32205	291.68	2.63	55.26
2011-12	156373.00	1.979	24795.170	826.44	2575.06	122124	1002.52	4.04	78.10
2012-13	212188.00	2.6774	38210.110	1241.79	4290.9	205928	4354.60	11.40	97.05
2013-14	213575.00	2.798	13375.54	1184.39	4028.52	191479	3995.99	29.88	89.65
2014-15	174761.00	1.77581	95152.07	2912.68	11652.9	124083	6504.13	6.84	71.00
2015-16	274648.20	73204.29	159063.65	11253.56	31318.39	191888.8	23650.61	14.87	69.87
2016-17	219718.56	58563.43	127250.92	9002.85	25054.72	153511.04	19960.49	15.69	69.87
2017-18	284937.00	171552.00	175179	12979	34432	191747	50566	28.87	67.29
2018-19	510696.00	241725.24	256255.64	25160.53	63141.26	436153	82623.61	32.24	85.40
2019-20	674197.00	366014.34	414709.96	44617.10	109980.37	463112	92236.57	22.24	68.69
Total	**29,60,002**	**9,11,072**	**13,40,924**	**1,10,530**	**2,90,505**	**22,40,229**	**2,87,737**	**15.20**	**74.94**
CAGR	**1.24****	**3.92****	**1.45****	**1.59****	**1.57****	**1.24****	**1.65****	-	-
Coefficient of variation (CV)	**81.16**	**168.21**	**119.81**	**154.58**	**144.82**	**80.86**	**146.18**	-	-

Note: ** denotes significant at 1 per cent level, * denotes significant at 5 per cent level

The socio economic characteristics of the insured farmers were discussed which are presented in the (Table 2). It is noticed that, average age of the farmers in both Dharwad and Gadag was between 47 to 49 years and indicated of their middle age and that the farmers in this age are capable of taking or withstanding the risks in farming. The experience in farming did not show any significant difference among the district selected for the study. The average family size varied between six and eight. The size of the family as social indicator implied of the presence of relatively larger sized households typically found in the study area. Majority of the sample farmers were studied up to high school (39.17%) followed by primary education (37.50%). Nearly 15% of sample ranchers have studied up to college and only 8% of sample farmers are illiterate implied of better literacy among farmers across study areas. In the present scenario, everyone wants to be literate because of the awareness about the importance of the education. The average size of the land holding of crop insured farmers revealed that majority about (77.70%) of landholding of farmers was rainfed and (22.30%) was irrigated area. However, farm size and crop income, which generally corresponds to farm size, were significantly higher in Dharwad district compared to Gadag district.

The average amount of money taken from commercial bank was ranged between (50 % to 69 %) in the selected districts of study area. In case of Dharwad, 31 per cent of the farmers borrowed money from cooperative societies while in case of Gadag, 50 per cent of farmers borrowed from private money lenders. The survey also depicted that over all major source of income is from crop ₹14,033 followed by livestock (₹ 3,033) and other source (₹2,850). However, comparison between both the districts indicated that Dharwad district ranchers have higher income from crop enterprise compared to Gadag and the same trend was observed in livestock and other source of income. This might be mainly because of higher land holding in Dharwad. Though WBCIS crop protection scheme is operating from 2007-08 in the study area majority of respondent (>80%) farmers in both the districts are not aware that who is implementing agency and who pay's recompense. Almost all respondents in Gadag and Dharwad are in the wrong perception that banks will pay compensation (between 70 % to 84%) and are the implementing agency (Table 2).

Table 2: Socio-economic characteristics of sample farmers of study area.

Sr. No.	Particulars	Dharwad	Gadag	Over all
1.	**Age (years)**	48.56	46.75	47.66
2.	**Experience in farming (years)**	24.83	23.16	24.00
3.	**Education (%)**			
	a. Illiterate	5.01	11.66	8.34
	b. Primary	31.66	43.33	37.50
	c. Secondary	45	33.33	39.17
	d. College & above	18.33	11.66	15.00
4.	**Family size (No.)**	6.8	8.32	7.56
5.	**Land holding (Acre)**			
	Rainfed	5.14 (73.74)	4.2 (83.17)	4.67 (77.70)
	Irrigation	1.83 (26.26)	0.85 (16.83)	1.34 (22.30)
	Fallow	-	-	-
	Sub Total	6.97 (100)	5.05 (100)	6.01 (100)
6.	**Household Income (₹)**			
	Crops	15465 (68.83)	12600 (72.58)	14033 (70.46)
	Livestock	2653 (15.24)	2640 (15.21)	2647 (15.23)
	Others	3580 (15.93)	2120 (12.21)	2850 (14.31)
	Sub total	22,470 (100)	17,360 (100)	19,915 (100)
7.	**Average amount barrowed (₹)**			
	Commercial/ Grameen bank	26960 (68.67)	24696 (49.69)	25828 (58.07)
	Cooperative societies	12300 (31.33)	-	6150 (13.83)
	Private money lender/others	-	25000 (50.31)	12500 (28.10)
	Sub total	39,260 (100)	49,696 (100)	44,478 (100)

Note: Figures in parentheses indicate respective percentages

Views of sample ranchers were solicited various proportions of assurance. These include motivation and experience with agricultural insurance and opinion on premium rate. More than three fourth of the insurance beneficiaries mentioned that bank compulsion was the motivation for opting insurance. Financial security, good experience from others was the region for opting crop protection in this regard the Table 3 shows that The borrowers were asked what type of agriculture insurance they know, who is the implementing agency and who pay's compensation.

From the Table 4 revealed that, the source of information opting weather based crop insurance was analysed by using relative importance index (RII) and Garrett ranking technique to identify most important one. In case of source of information, most important one was Grameen bank followed by Commercial and neighbours in case of both Dharwad and Gadag districts respectively. In case of service required for availing insurance, most important one was rural agent at village level in case of Dharwad district but in case of Gadag district RSK place important role in providing information on crop insurance. Similar observations were observed by Raju *et al*. (2007), Goudappa *et al.* (2012) and Sharma *et al.* (2006).

After the cursory look at the Table 5, it is revealed that, in case of Dharwad and Gadag districts, the major constraints faced by the ranchers were not aware of crop protection procedures and facilities available ranked I followed by inadequate publicity and less time given for opting insurance (II rank), time lag in distribution of compensation (III rank). The other problems in the order of their importance were procedural difficulties and complex procedure, difficult to produce no dues certificate from other bank, no compensation received even though loss occurred, biased assessment and time consuming. The results are also similar with results found by Goudappa *et al.* (2012) and Sharma *et al.* (2006).

Table 3: Knowledge of the farmers about weather based crop insurance in the study area.

Sr. No.	Particulars	Dharwad						Gadag					
		Aware fully		Aware partially		Not aware		Aware fully		Aware partially		Not aware	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
A	**Crop Insurance**	15	30.00	23	46.00	12	24.00	7	14.00	36	72.00	7	14.00
B	**Components of crop insurance**												
	Extent of coverage	11	22.00	25	50.00	14	28.00	7	14.00	14	28.00	29	58.00
	Premium to be paid	7	14.00	34	68.00	9	18.00	3	6.00	7	14.00	40	80.00
	Last date of insuring crops	18	36.00	15	30.00	17	34.00	10	20.00	13	26.00	27	54.00
	Procedure for insuring crops	-	-	7	14.00	43	86.00	-	-	-	-	50	100.00
	Method of loss and compensation determined	-	-	3	6.00	47	94.00	-	-	-	-	50	100.00
C	**Implementing agency**												
	Weather based crop insurance	15	30	6	12.00	29	58.00	7	14.00	10	20.00	33	66.00
	Agriculture department	4	8	6	12.00	40	80.00	4	8.00	6	12.00	40	80.00
	Banks	42	84	5	10.00	3	6.00	35	70.00	9	18.00	7	14.00
D	**Agency paying Compensation**												
	Agricultural department	13	26	7	14.00	30	60.00	4	8.00	2	4.00	44	88.00
	Horticultural department	-	-	-	-	-	-	-	-	-	-	-	-
	Agricultural insurance corporation	16	32	11	22.00	23	46.00	6	12.00	4	8.00	40	80.00
	Grameen bank	38	76	4	8.00	8	16.00	32	64.00	8	16.00	10	20.00
	Commercial bank	17	34	9	18.00	24	48.00	13	26.00	6	12.00	31	62.00

Note: Figures in parentheses indicate respective percentages

Table 4: Source of information for opting weather based crop insurance.

Sr. No.	Particulars	Dharwad		Gadag	
		Relative Importance Index %	rank	Relative Importance Index %	rank
1.	**Source of information**				
	a. Commercial Bank	42.00	II	50.00	III
	b. Grameen Bank	85.00	I	78.00	I
	c. Neighbors/fellow farmer	36.00	III	52.00	II
	d. Agriculture/horticulture departments	28.00	IV	18.00	V
	e. NGO's	9.00	VI	7.00	VI
	f. News paper	13.00	V	19.00	IV
2.	**Service required for availing insurance**				
	a. Rural agent at village level	75	I	65	III
	b. RSK	60	III	72	I
	c. Bank/Cooperative society	48	IV	52	IV
	d. Agriculture/horticulture Universities	66	II	68	II
	e. Talati/Gram sevak	32	V	45	V

Table 5: Constraints opined by farmers on weather based crop insurance.

Sr. No.	Particulars	Dharwad		Gadag	
		Mean score	Rank	Mean score	Rank
1.	Lack of publicity and less time given for opting insurance	85.00	II	82.00	II
2.	Not aware of crop protection procedures and facilities available	92.00	I	87.00	I
3.	Procedural difficulties and complex procedure	75.00	IV	69.00	V
4.	Difficult to submit no dues certificate from other bank	67.00	VII	72.00	IV
5.	Time consuming	45.00	IX	53.00	IX
6.	Biased Assessment	69.00	VI	61.00	VII
7.	No compensation received even though loss occurred	72.00	V	67.00	VI
8.	Indiscriminate in assessing loss	57.00	VIII	55.00	VIII
9.	Time lag in distribution of compensation	78.00	III	80.00	III

CONCLUSION

There is need to establish separate crop protection wing in Department of Agriculture to overcome the existing problems in the present scheme. More than 80 per cent of interviewees expressed that Department of Agriculture is not properly implementing the scheme. Further, the ranchers expressed that they don't know any procedure to apply and other information about crop protection. Hence, there is need to create awareness about weather based crop protection through effective use of RSK service, KVKs or appointing weather based crop protection agent like LIC agent to provide insurance service at the ranchers door step as suggested by majority of the ranchers. Most of the ranchers were studied upto primary education and don't understand the procedures and other requirements of formal financial institutions. While the institutional loanees are unknowingly insured under the WBCIS, about 50 per cent of the Non-loanee ranchers avail insurance voluntarily in Karnataka by creating awareness programmes. This is quite indicative of the enormous insurance potential that exists for addressing the needs of the farming community and enhancing the overall efficiencies, which can mitigate the adverse impacts of variability, which is on the individual farmers. Need to formulate suitable policy measures in such way that Non-loanee ranchers should be encouraged more by providing doorstep service and subsidy in premium payment.

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