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Assessing the Impact of the Restructured Weather Based Crop Insurance Scheme on Pomegranate Growers

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ABSTRACT

Agriculture is highly vulnerable to climatic risks such as drought, unseasonal rainfall, hailstorms, temperature fluctuations, and pest and disease outbreaks, which significantly affect the productivity and profitability of high-value fruit crops like pomegranate. These weather-induced uncertainties often lead to substantial yield and income losses, threatening the livelihoods of growers. The restructured weather-based crop insurance scheme (RWBCIS) provides financial protection by compensating farmers for weather-related losses based on predefined weather indices, thereby reducing production risks and income instability. For current study Pomegranate beneficiary farmers are assessed to study the impact of RWBCIS in the year 2022 in Solapur district, Maharashtra. Total 150 sample were selected (75 beneficiary and 75 non-beneficiary farmers) from three talukas. Tools like Crop diversification, cropping intensity and Incremental crop benefit ratio were used to assess the impact. The results showed there is a significant between the Crop diversification, cropping intensity and Incremental crop benefit ratio between beneficiary and non-beneficiary farmers. The incremental cost benefit ratio depicted more difference between beneficiary and non-beneficiary farmers(1.70). Credit worthiness of beneficiary farmers is more when compared to non- beneficiary farmers in case of Pomegranate beneficiaries. Administration and implementation of the scheme in Solapur area should be maintained in similar way with more transparency and credibility.

Keywords: Climate risks, RWBCIS, Pomegranate, Weather, Beneficiaries

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INTRODUCTION

Agriculture is one of the most climate-sensitive sectors of the Indian economy, providing livelihood to nearly half of the country's population while contributing significantly to national food security and rural development (Government of India, 2025; IPCC, 2023). However, the sector is increasingly exposed to weather-related risks such as erratic rainfall, drought, floods, hailstorms, heat waves, and unseasonal temperature fluctuations. Climate variability has become more frequent and intense in recent decades, adversely affecting crop productivity, farm income, and the socio-economic well-being of farming households (IPCC, 2023; FAO, 2022). Horticultural crops, particularly fruit crops, are highly vulnerable because they require favourable weather conditions throughout their growth cycle. Even minor deviations in weather parameters during flowering, fruit setting, or harvesting stages can lead to substantial yield and quality losses (Birthal et al., 2019). Pomegranate (Punica granatum L.) is one of India's most important commercial fruit crops due to its high export potential, nutritional value, and profitability. India is the world's largest producer of pomegranate, with Maharashtra, Karnataka, Gujarat, Andhra Pradesh, and Telangana being the major producing states (National Horticulture Board, 2024). Despite its economic importance, pomegranate cultivation is highly susceptible to weather abnormalities such as prolonged dry spells, excessive rainfall, high humidity, frost, heat stress, and hailstorms. These adverse weather events not only reduce yield and fruit quality but also increase the incidence of pests and diseases such as bacterial blight and fruit cracking, resulting in significant economic losses for farmers (Birthal et al., 2019). Agricultural insurance has emerged as an effective risk management strategy to safeguard farmers against production uncertainties arising from adverse weather conditions. Recognizing the limitations of conventional yield-based insurance, the Government of India (GoI) introduced the restructured weather based crop insurance scheme (RWBCIS) to provide timely financial assistance based on objectively measured weather parameters (Government of India, 2025). Under RWBCIS, compensation is determined using predefined weather indices such as rainfall, temperature, humidity, and wind speed rather than individual crop loss assessments. This weather-index approach minimizes delays in claim settlement, enhances transparency, reduces administrative costs, and provides quicker financial relief to affected farmers (Mishra, 2016). The scheme is particularly suitable for horticultural crops like

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pomegranate, where direct yield estimation is often difficult and weather parameters closely influence crop performance. The adoption of RWBCIS is expected to strengthen farmers' resilience by reducing financial vulnerability, encouraging investment in improved production technologies, enhancing access to institutional credit, and promoting sustainable orchard management (Hazell, 1992; Government of India, 2025). Nevertheless, the effectiveness of the scheme largely depends on farmers' awareness, enrolment, claim settlement efficiency, and overall satisfaction with its implementation. Assessing the impact of RWBCIS on beneficiary pomegranate farmers is therefore essential to understand its contribution towards income stability, risk reduction, and climate adaptation. The findings of such studies can provide valuable insights for policymakers, insurance agencies, extension personnel, and researchers to improve the design and implementation of weather-based crop insurance programmes, thereby enhancing the resilience and sustainability of pomegranate cultivation under changing climatic conditions.

MATERIALS AND METHODS

For assessing the impact of RWBCIS we have selected Pomegranate in fruit crops because there were more number of beneficiary farmers under these fruit crop. The sampling frame consists of Pomegranate farmers belonging to Solapur districts. In Pomegranate crop, three tehsils were selected based on maximum no. of beneficiaries namely Sangola, Mohol and Pandarpur. From Sangola tehsil, three villages Ajanle, Sangewadi and Devale were selected. Similarly in Mohol tehsil, three villages namely Pokharapur, Adhegaon and Patkul were opted. In Pandarpur also three villages were selected namely Bandi-shegaon, Gadegoan and Sonke. Tehsils and villages were selected purposively based on maximum number of beneficiaries under the scheme. Total 75 beneficiary and non-beneficiary farmers were selected from Solapur district for Pomegranate growers. The total sample size was 150.

Crop diversification

Crop diversification refers to addition of new crops to the field in order to mitigate the risk and maintain a stable income throughout the year. Accordingly, to measure the crop diversification of beneficiary and non-beneficiary farmers, Simpson index of crop diversification was calculated. Values of Simpson index near to one indicate good crop diversification.

Simpson Index of Crop Diversification (Kumar & Gupta, 2015).

$$SID = 1-\sum(aj/A)2$$

Where,

aj is the area under the jth crop

A is the gross cropped area

Cropping Intensity (%)

$$CI = \frac{\text{Gross cropped area}}{\text{Net cropped area}} \times 100$$

Credit worthiness

Credit worthiness is farmer's ability to repay the loan and also, when the farmer wants to avail the loan, he gets the loan without much difficulty based on his credit history. Based on the loan amount disbursed, farmer's source of credit and their repayment frequency were taken into consideration for measuring the credit worthiness of the farmers.

Incremental Cost Benefit Ratio (Preethi & Sasane, 2024)

Incremental Cost Benefit Ratio is a method is used to determine the margin by which beneficiary farmers are profitable or not than non-beneficiary farmers after availing PMFBY.

ICBR = Gross Returns (Beneficiary) – Gross Returns (Non-beneficiary) / Gross expenditure (Beneficiary) – Gross Expenditure(Non-beneficiary)

RESULTS AND DISCUSSION

Crop diversification

The table 1 shows the cropping pattern of beneficiaries and non- beneficiaries farmers. Cropping intensity of the beneficiary farmers is 131 percent and for non-beneficiaries farmers is 111 percent. There is 4.06 percent change in cropping intensity between beneficiaries and non-beneficiaries farmers. From the table 3 it is evident that the Net cropped area and gross cropped area of beneficiaries' farmers is 169.2 and 221.6 respectively. In case of non- beneficiaries farmers Net cropped area and Gross cropped area is 156.7 and 173.9 respectively .After calculating the simpson index of crop diversification, it is found that for insured farmers the index is 0.84 and for non-insured farmers , the index is 0.73.

To see whether the difference in cropping intensity and crop diversification is statistically significant or not Z- test was carried.

Table 1. Cropping pattern of pomegranate beneficiary farmers

Crop	Beneficiaries (n=75)		Non- beneficiaries (n=75)	
	Area (ha)	Percentage (%)	Area (ha)	Percentage (%)
Vegetables	20	9.02	15.9	9.13
Pulses	8.4	3.79	5.2	2.98
Cereals	66.10	29.82	70	40.22

Crop	Beneficiaries (n=75)		Non- beneficiaries (n=75)	
	Area (ha)	Percentage (%)	Area (ha)	Percentage (%)
Flowers	1.70	0.76	0	-
Oilseeds	3	1.35	0	-
Summer Groundnut	2	0.90	0	-
Sugarcane	5.6	2.52	0	-
Fruits	113.6	51.26	83.1	47.75
GCA	221.6		173.9	
NCA	169.2		156.7	
Cropping intensity	131		111	

Table 2. Extent of diversification in Insured and non-insured farmers in pomegranate

Farmers	Cropping pattern(ha)					
	Vegetable	Maize	Flowers	Sunflower	Pulses	Jowar/ Bajra
Insured	20	24.9	1.7	3	8.4	28.7
Non Insured	15.9	28	0	0	5.2	31.8

Farmers	Cropping pattern(ha)						
	Wheat	Summer GN	Sugarcane	Pomegranate	Grape	Banana	Papaya
Insured	12.5	2	5.6	87.2	13.4	7.8	5.2
Non Insured	10.2	0	0	75.4	5.7	0	2

Table 3. Simpson Index of crop diversification

Particulars	NCA	GCA	Simpson index of crop diversification
Beneficiaries	169.2	221.6	0.84
Non- Beneficiaries	156.7	173.9	0.73

Table 4. Testing significance of selected impact indicators

Sr. No.	Particulars	Beneficiaries (n=75)	Non Beneficiaries (n=75)	Difference	Percent Change	Z value
1.	Cropping Intensity	123	119	5	4.06	4.45*
2.	Crop Diversification	0.72	0.70	0.02	2.77	1.87*

Table 4 shows the Z-test carried out to test the significant difference between the beneficiaries and non-beneficiaries, it is revealed that at 5 percent level of significance there is significant difference between the cropping intensity and crop diversification between the two groups. The results are contradicting with the findings of Vardhan et al. (2012). In there study they found that the non-insured farmers practised a more diversified crop combination than that by the insured farmers. Insured farmers may have adopted diversified cropping and higher cropping intensity due to enhanced risk-bearing capacity and improved access to institutional support

Credit worthiness

Credit worthiness is farmers ability to repay the loan and also, when the farmer wants to avail the loan, he gets the loan without much difficulty based on his credit history. Based on the loan amount disbursed, farmers source of credit and their repayment frequency, are taken into consideration for measuring the credit worthiness of the grape farmers. Table 4 shows the results of the same.

Table 5. Credit worthiness of pomegranate growers

Particulars	Beneficiary (n=75)	Non Beneficiary (n=75)
Loan amount disbursed (Rs)	23600000	18270000
Loanee	72	68
Non Loanee	3	7
Commercial Banks	51(70.83%)	40(58.82%)
RRB	12(16.66%)	15(22.05%)
Co-operative societies	9(12.5%)	13(19.11%)
Other sources	0	3(4.41%)
Regular	37(51.38%)	29(42.64%)
Occasional	24(33.33%)	22(32.35%)
Very Rare	11(15.2%)	17(25%)

* Significant at 0.05 level of probability

From the table 5 we can find that the loan disbursed is Rs. 23600000 and Rs. 18270000 for beneficiary and non-beneficiary farmers respectively. By looking at the loan amount disbursed, we can say that beneficiary farmers are having more access to credit when compared to non-beneficiary farmers. Majority of the farmers source of credit is commercial banks(70.83%) , followed by Regional Rural Banks (16.66%), Co-operative societies(12.5%) and other sources like money lenders, friends , relatives is 0 per cent. When coming to Non insured farmers majority of the farmers source of credit is commercial banks (58.82%), followed by Regional Rural Banks (22.05%), Co-operative societies (19.11%) and other sources is

14.66 percent. Beneficiary farmers are able to avail more loans from commercial banks when compared to the non-beneficiary farmers. 84.66 percent of the beneficiary farmers are repaying loan regularly or occasionally when compared to 74.99 per cent. The amount of loan taken from other sources is more in case of non-beneficiary(25%) farmers compared to beneficiaries (15.2%). We can conclude from the above discussion that the credit worthiness of beneficiary farmers is more when compared to non- beneficiary farmers in case of Pomegranate beneficiaries.

Incremental Cost Benefit Ratio

Table 6 reveals that Gross returns for hectare of Non-beneficiary and beneficiary farmers are Rs 10.52 lakhs and 15.25 lakhs respectively. The added returns for beneficiary farmers are Rs. 4.72 lakhs. The gross expenditure per ha of beneficiary farmers is Rs 8.49 lakhs and 5.71 lakhs respectively. It's interesting to note that the gross expenditure is more for beneficiary farmers , and the added cost for the same is Rs 2.77 lakhs . When ICBR Ratio is calculated the ratio is found to be 1.70. We can conclude that beneficiary farmers are having more margin when compared to non-beneficiary farmers because of availing the scheme.

Table 6. Incremental cost benefit ratio of pomegranate growers

S. No.	Particulars	Non-insured (n=75)	Insured (n=75)
1.	Gross Returns Rs/ha	10,52996	15,25,569
2.	Added Returns Rs/ha	-	4,72,573
3.	Gross expenditure Rs/ha	5,71,869	8,49,663
4.	Added cost Rs/ha	-	2,77,794
5.	ICBR		1.70

CONCLUSION

The study demonstrates that the Restructured Weather Based Crop Insurance Scheme (RWBCIS) positively influences cropping intensity, crop diversification, creditworthiness, and profitability among pomegranate farmers. For further smooth functioning of the scheme, during the crop loss assessment stage there must be co-ordination between the insurance agents, agriculture officials and farmers to assess the crop loss in appropriate manner. Poor management and implementation can cause potentially promising scheme to face failure. Administration and implementation of the scheme in Solapur area should be maintained in similar way with more transparency and credibility. Further there is huge gap raising the claim and actual receiving the insurance amount, hence the process of claim settlement should be faster, so that farmers can get the insurance amount when in need. For further fruitful results maintenance of the weather stations should be looked after and establishment of weather stations at village level should be set up. Mass awareness programs and use of electronic media are recommended to raise awareness of the scheme.

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