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Evaluation of impact of national agriculture insurance scheme (NAIS) in India with special reference to Jabalpur Division of Madhya Pradesh

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Abstract

Agriculture insurance acts like a stimulus package for the farmers to combat the risk of agriculture vagaries. National Agriculture Insurance Scheme (NAIS) is a way out for stimulating the farmer from the inadequate finance available to meet the hardships.

Objective: To look into the role of government to implement agriculture insurance scheme and to discuss the problem and prospect of national agriculture insurance scheme in state and in Jabalpur Division.

Methods: The analysis has been carried with Multiple regression analysis using SPSS, Farmers insured has been taken as dependent variable on independent parameters like area insured, farmers benefitted, claims received, premium, subsidy received, sum insured, through multiple regression analysis weight age was calculated for each parameter which effects the dependent parameters to maximum.

Findings: There are various parameters available on the basis of which the farmers' adoption to this scheme depends. In the model the dependent variable is considered Farmers insured which is dependent upon area insured, sum insured, Premium subsidy, Claims received and Farmers benefitted. The paper helps in analyzing the extent to which these farmers taking insurance depends upon, for this multiple regression model using ordinary least square method has been adopted. The salient features of NAIS does not analyze that to which extent farmers insured is affected due to other various parameters and to what extent in different seasons. This has not been incorporated in designing the NAIS policy if such a system should be incorporated then agriculture insurance will be more adaptable.

Improvements: Farmers are very responsive towards gross premium, Government role should be more elaborated in providing proper subsidy to farmers for agriculture insurance and it should be framed according to seasons, delay in claim payments should be minimized, if all these policies will be properly implemented then agriculture insurance will be have effective impact.

***Keywords*:** Agriculture insurance, Rabi and Kharif season, SPSS, Multiple regressions, Parameters effecting.

1. Introduction

In rural India, households that depend on income from agriculture (either self-employed or as agricultural labour), accounted for nearly 70% of the population. Seventy five percent of all rural poor are in households that are dependent on agriculture, in some way or other. Households that were self-employed in agriculture, account for 28% of all rural poor, while households that were primarily dependent on agriculture as labour, account for 47% of all rural poor. All these facts show the need for the development of agricultural sector in India. Agriculture share in GDP has declined from over half at Independence to less than one-fifth in 2006-07, agriculture remains the predominant sector in terms of employment and livelihood with more than half of India's workforce engaged in it as the principal occupation. Agriculture is the base of development for other sectors as it provide raw materials to all other sectors therefore its growth is very essential. Therefore it is necessary that it should have minimum negative effect and steps should be taken to reduce the risk arising in this sector. The enterprise of agriculture is subject to lot many uncertainties.

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Still, more people in India earn their livelihood from this sector, than from all other economic sectors put together. Agricultural associated with several risks which include adverse changes in both input and output prices, Agricultural risk can be categorized as production risk, price or market, financial or credit, and institutional risks, on the policies as well as on the resources of the government.

These risk leads to another risk of permanent income due to fluctuations in farm income as result to variability in crop yield and from commodity price fluctuation. Agricultural production is unstable because of its dependence on weather and inherent biological uncertainties in managing crops. In India, more than half of the farming is practiced as rain-fed agriculture and is at the mercy of the weather. The technological advances and institutional support have made little impact on the risk factor in farm production and done little to raise the risk bearing capacity of the farmers. One major impediment here is that by and large financial facilities are utterly inadequate amongst the Indian farmers. Thus, because of these drawbacks, the policy makers of the country have sought to insurance of crops as a feasible measure to combat against the risks and hazards and provide protection to the farmers. This will encourage them to carry on with their productive effort, which not only improve the wellbeing of the farmers but also ultimately helps in stabilizing the agricultural output [1].

1.1. Status of agriculture in Madhya Pradesh

Madhya Pradesh is the second largest state in the country in terms of area with a total geographical area of 308 lakh hectares constituting 9% of the total geographic area of the country and ranks at sixth position with the total population of 72 million, out of which 72% resides in rural areas [2,3]. According to Census 2011, 69.8 % of the total workers and 85.6 % of the total workers in rural areas are dependent on agriculture for livelihood in Madhya Pradesh. This comprises 31.2% **(**Source: Estimates of Gross/Net State Domestic Products and Per Capita Income 2004-05 to 2013-14 by Directorate of Economics and Statistics, GoMP) cultivators and 38.6% agriculture labours. The sector is also contributing 24.9% to State's GDP at constant prices (2004-05 prices) and 33.6% at current prices. The trend in this sector has shown stabilization from 2004-05 to 2012-13 with little yearly fluctuations and the advanced estimates shows even higher share of 27.38% from agriculture and allied sectors. Hence, the positive and consistent growth rate of this sector is of immense importance to drive the state economy, especially the rural economy. Nearly three-fourth holdings of the state are small and marginal in nature and possessing only 26% of the land area. Two-third of the gross cropped areas is rainfed showing great dependence on fluctuation of the monsoon and frequent natural calamities. Hence agriculture in Madhya Pradesh can be more prone to risk.

1.2. Land holdings in Madhya Pradesh

Operational landholdings in Percentages of marginal holdings have increased from 35.5% in 1995-96 to 38.6% in 2001; Small holdings have shown an increase of 4%points over the same period. The average landholding size has also decreased from 2.6 ha to 2.2 ha over this period. Thus, the majority of the farmers come in the category of marginal and small. Nearly 71% of the farmers are marginal and small [4].

1.3. Division profile of Jabalpur division

Jabalpur Division is geographically situated in the Central part of the state. It consists of Eight Districts Jabalpur, Katni, Narsinghpur, Seoni, Chhindwara, Balaghat, Mandla, Dindori. This region in commonly known as Mahakoushal region. Jabalpur Division has total area of 59577 square km area. It has total reported area under agriculture of 431782 hectare.

Table 1. Land holdings of farmers in Jabalpur Division

Size of land	Number of farmers	Area (in ha.)	Average land holdings
Marginal	260	119.6	0.46
Small	120	154	1.28
Medium	110	396	3.6
Large	10	158.2	15.82
Total	500	827.8	21.16

Source: Primary data collection by author

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The Table 1shows the land holdings of farmers, in the study the sample size has been 500 out of which the maximum number of farmers are marginal and the lowest number of farmers is large, area wise maximum land holdings are of medium farmers and then large farmers. Proportionally marginal farmers are more in number but they hold small area as compared to number, this can also be shown through the average land holdings which are very less for marginal farmer's i.e 0.48 and it is highest for large farmer's i.e, 15.2.The marginal farmers are in the worst condition as they have higher dependency on land i.e, number of farmers depending on farming is more as compared to area, whereas the medium farmers have more land as compared to number of farmers.

2. Objectives and Research Methodology adopted

i) To analyse the parameters of NAIS that effects the farmers decision in taking loan , ii) measuring the extent to which each parameter effects farmers taking insurance, iii) Season wise (Kharif and Rabi) parameters which effect farmers in NAIS.

1. **Type of research adopted:** Descriptive research.
2. **Identifying and selecting the research problem**

It has been identified through literature survey that nearly 70% of the population is dependent on agriculture. Hence agriculture is a focused area of research in which farmer income and welfare is greatly affected due to weather vagaries. It is therefore the responsibility to enhance their income. The research problem therefore selected is related to agriculture insurance with specification to the scheme i.e, National agriculture insurance scheme.

3. **Selecting the research design**

Design adopted for exploratory research by surveying literature, doing experience survey, and analysis of insight-stimulating examples by adopting a questionnaire method and interviewing the farmers who have taken agriculture insurance.

4. **Sampling:** Non-Probability sampling in which Convenience sampling method will be adopted.
5. **Sample size**

500 sample units will be taken from the farmers insured under National agriculture insurance scheme. Sample has been taken from all the 8 districts namely: Balaghat, Chhindwara, Dindori, Jabalpur, Katni, Mandla, Narsinghpur and Seoni of Jabalpur division on the basis of developed and underdeveloped tehsils. Sample size = 500, with this sample size the sample has been taken through convenient sampling method and the Jabalpur Division consist of 8 districts, each district as named above has been divided into two categories i.e, Developed and underdeveloped and one each tehsil has been taken and equal number of samples have been taken from each category of tehsils in each district. Samples will be selected according to the total population of farmers categorized according to the parameters set:

1. Insured farmers and uninsured farmers According to the size of land holdings.
2. Data is also to be taken season wise i.e, Kharif and Rabi season to analyse which season takes maximum insurance.

6. **Statistical tools adopted: Multiple Regression analysis**

This tool helps in establishing the responsiveness of two or more than two independent variable on the dependent variable. In this research this tool helps in knowing the effect on dependent variable i.e, Farmers insured by the independent variables, i.e; Area insured, Claims, Premium, Subsidy and Farmers benefitted. Multiple regressions have been done through Statistical Programme of Social Sciences (SPSS) and it also calculates the maximum responsiveness on farmers insured by the above mentioned independent variables season wise.

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7. Multiple regression models: Analyzing relationship between variables of National Agriculture insurance scheme (NAIS) of Jabalpur Division

The analysis in this section will highlight the relationship between the variables i.e dependent variable (farmers insured) and independent variable (area insured, sum insured, gross premium received, subsidy, claims received, farmers benefitted). Ordinary least square method has been adopted for analyzing the multiple relations between variables. The analysis has been done with software package; SPSS. The results obtained have been presented in the following Table 2.

Null hypothesis: H_0: β=0 i.e. there is no change in farmers insured due to independent variables.

Alternative hypothesis: β≠0 i.e. changes are significant in farmers insured due to the variables entered are area insured, gross premium, subsidy, claims received, sum insured and farmers benefitted which are independent factors and the variables tested for dependency on the above independent factors is farmers insured.

8. Multiple regression analysis of Kharif season: Analyzing the Interrelationship between the variables in Jabalpur Division

Table 2. Multiple Regression coefficients of Kharif season using SPSS

Model	Unstandardized Coefficients		Standardized Coefficients	Students t – test value	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	B			Lower Bound	Upper Bound
Constant	-8307.743	9448.998		-.879	.420	-32597.165	15981.680
Area	.526	.064	.764	8.288	.000	.363	.690
Sum	.000	.000	-2.372	2.202	.079	.000	.000
Gross Premium	.005	.002	2.807	2.495	.055	.000	.010
Subsidy	-.002	.001	-.156	2.721	.042	-.004	.000
Claim	.000	.000	-.229	2.124	.087	.000	.000
Farmers benefitted	.121	.107	.143	1.131	.309	-.154	.396

The Table 2 calculates the coefficients contributing to variation in the dependent variable i.e, Farmers insured. The partial regression coefficient are β_1 , β_2 , β_3, β_4, β_5, β_6 stating the variables Area insured, Sum insured, Gross premium, Subsidy, Claim received and farmers benefitted respectively. The independent variables i.e, gross premium, area insured and farmers benefitted shows positive change in the dependent variable i.e, farmers insured. Whereas sum insured, subsidy and claim received have shown negative effect on farmers insured. Analyzing the t-test value at 5 % significance level it has been observed that with 13 degree of freedom the tabulated value is 2.15 for two tail test , looking at the Table 3 it was observed that the variables i.e , Area insured, sum insured , gross premium and subsidy are the variables in which we reject the null hypothesis and accept the alternative hypothesis as β≠0 for the above mentioned variables which symbolizes that there has been a significant change in the dependent variable due to these independent variable , though the variables such as sum insured and subsidy have shown negative change in farmers insured.

*Table 3. Model summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.996	.991	.980	3048.72330

**Values are based on author's calculation*

Table 4 shows the value of R^2 shows the goodness of fit i.e, the data fitted the regression equation in a proper manner. If R^2 is 991 or 99.1% which shows that all the variables taken i.e independent explained variables account for 99% variation in the dependent variable i.e, farmers insured.

The tabulated F value for the above data at 5 % significance level and with 6,7 degree of freedom is 3.58 and the calculated value is 93.154 , hence comparing the two values. $F_{(calculated)} > F_{(tabulated)}$, so we reject the null hypothesis and accept that the regression is significant , that is, The regression coefficients are a significant factor causing variation in dependent variable (Y) ie, farmers insured.

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*Table 4. Analysis of variance (ANOVA)**

Model	Sum of Squares	Degree of freedom	Mean Square	F-ratio
Regression	5.195000	6	8.658000	93.154
Residual	46473568.683	7	9294713.737	
Total	5.241000	13		

9. Multiple regression of Rabi season

The variables entered are area insured, gross premium, subsidy, claims received, sum insured and farmers benefitted which are independent factors and the variables tested for dependency on the above independent factors is farmers insured.

Table 5. Mutiple Regression Coefficients of Rabi season using SPSS

Model	Unstandardized Coefficients		Standardized Coefficients	Student's t-test value	Sig.
	B	Std. Error	B		
(Constant)	2949.194	2019.048		1.461	.204
Area insured	.322	.048	.723	6.641	.001
Sum insured	.000	.000	-9.919	-3.951	.011
GrossPremium	.029	.007	10.915	4.047	.010
Subsidy	-.022	.010	-.264	-2.227	.076
Claim	-.001	.000	-1.394	-3.445	.018
Farmers benefitted	1.486	.550	.982	2.700	.043

Tables 5 and 6 calculate the coefficients contributing to variation in the dependent variable i.e, Farmers insured. The partial regression coefficient are β_1 β_2 , β_3, β_4, β_5, β_6 stating the variables Area insured, Sum insured, Gross premium, Subsidy, Claim received and farmers benefitted respectively. The independent variables i.e, gross premium, area insured and farmers benefitted shows positive change in the dependent variable i.e, farmers insured. Whereas sum insured, subsidy and claim received have shown negative effect on farmers insured. Analyzing the t-test value at 5 % significance level it has been observed that with 13 degree of freedom the tabulated value is 2.15 for two tail test , looking at the table above it was observed that the variables i.e all the variables : Area insured , Gross premium , farmers benefitted, subsidy, sum insured and claims received are the variables in which we reject the null hypothesis and accept the alternative hypothesis as $\beta \neq 0$ for the above mentioned variables which symbolizes that there has been a significant change in the dependent variable due to these independent variable , all the variables have contributed significantly to change in farmers insured in Rabi season. The Area insured, gross premium and farmers benefitted are the main reasons for bringing change in the dependent variable i.e, farmers insured , due to gross premium maximum changes can be seen in farmers insured as β=10.915, thereafter farmers benefitted and area insured has positive changes in farmers insured. Premium paying capacity is the most important factor which contributes significantly in farmer's decision to take insurance.

*Table 6. Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.990	.981	.958	1507.13547

The value of R^2 for rabi season which shows the goodness of fit i.e, the data fits the regression equation in a proper manner. If R^2 is981 or 98.1% which shows that all the variables taken i.e independent variables account for 98.1% variation in the dependent variable i.e, farmers insured.

*Table 7. Analysis of variance (ANOVA)**

Model	Sum of Squares	Degree of freedom	Mean Square	F-ratio
Regression	5.776000	6	96260346.899	42.378
Residual	11357286.603	7	2271457.321	
Total	5.889000	13		

**Values Based on author's calculation*

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Table 7 explains the Analysis of variance (ANOVA) which is an important statistical tool, which splits the total variation of dependent variable around its mean into the components which may be attributed to specific causes.In regression analysis the total variation is divided into explained variation and unexplained variation , hence through this analysis we can analyze the degree of variation caused in the dependent factor either due to explained (regression coefficients) or due to unexplained (residual coefficients) variables. This has been done with the analysis of the above table and through F test.

The tabulated F value for the above data at 5 % significance level and with 6,7 degree of freedom is 3.58 and the calculated value is 42.378 , hence comparing the two values .

$F_{(calculated)} > F_{(tabulated)}$, so we reject the null hypothesis and accept that the regression coefficients are a significant factor causing variation in dependent variable (Y) i.e, farmers insured. Changes in dependent variable have occurred mainly due to these above factors rather than other factors

3. Results

1. For Kharif season

The reasons for the above change can be understood from farmers point of view which on analyzing shows that farmers decision for taking insurance cover depends mainly on Firstly, how much area is getting insured, secondly, premium being paid by farmers has shown maximum effect on the dependent variable this variable shows that the farmers willingness to pay should match the amount to be paid for the scheme to be acceptable. Thirdly, farmer is not very aware about subsidy being provided to them and is also not aware about the sum insured factor as they are unaware about the documentation to an extent. Hence for kharif season the most important variable which needs attention is to make farmers aware about each and every aspect of the insurance policy and making the premium amount more approachable to farmers in terms of willingness to pay.

2. For Rabi season

The reasons for the above change can be understood from farmers point of view which on analyzing shows that farmers decision for taking insurance cover depends mainly on Firstly, premium to be paid which should match farmers willingness to pay premium, Secondly, area insured is another factor which contributes significantly in farmers decision to take insurance. Thirdly, farmers also take insurance according to the trust built due to farmers benefitted in the previous season. Fourthly, other factors like subsidy provided, sum insured and claims received have contributed to change in farmers insured but it has bought a negative change. Hence for Rabi season, premium paid is the most important factor which contributes significantly to change farmer's decision, along with area insured and farmers benefitted. These factors should be made more effective to contribute significantly in farmer' suplift and also to enhance their decision to take more crop insurance.

4. Conclusion

Multiple regression analysis has been done to check for the factor contributing to the changes in dependent factor i.e, farmer insured. Gross premium is brining maximum change in farmers insured followed by area insured in Rabi season and Kharif season both. Positive changes have been observed in farmers insured by farmers benefitted also but sum insured, subsidy and claims received have been negatively affecting farmers insured in both seasons. This shows that if government along with the implementing agency tries to bring changes in the working of the above negatively effecting factors, by providing more subsidies effectively to farmers, providing increased sum insured value, and improving the indemnity amount releasing procedure through banks. To make changes in the scheme it is important to incorporate which factor needs more attention in which season and how it is to be dealt season wise. It has been found in the research by primary data collection of Jabalpur Division that out of the sample size 500, 167 take crop insurance and 333 are noninsured in Kharif season. Similarly in Rabi season out of the sample size of 500, 72 farmers are taking insurance and 428 are noninsured, this shows that more efforts are required in rabi season to make the policy more effective, thereby benefitting farmers and also the government.

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5. Suggestions

1. Farmers are very responsive towards gross premium among all the factors hence it is equally important to decide upon the premium rate on the basis of farmer's willingness to pay and capacity to pay.
2. Government should take more initiatives in making the scheme more effective for farmers especially by maintaining the rise in number of farmers insured and at an increasing rate.
3. Farmers have shown responsive change with time in Area insured, if area insured increases for farmers at lesser premium farmers will take more crop insurance as with time farmers have shown positive changes in it.
4. Gross premium is a factor for which farmers have been very responsive overtime at Madhya Pradesh level and at Jabalpur level but more at state level. Hence bringing small change in it might affect the farmer's decision of taking crop insurance drastically. Government should keep such responsiveness in mind.
5. Government role in providing subsidy to farmers is very important and with time subsidy provided has not shown significant change; hence government should provide more subsidy to make the policy more effective.
6. Delays in claim received by farmers should be looked upon and should be made more effective by providing proper guidelines and quick implementation model with proper training to employees of banks / financial intermediaries.
7. Improvement in scheme should be made according to Rabi and Kharif season.

6. References

1. Agriculture insurance in India: Problems and prospect. https://ideas.repec.org/p/ess/wpaper/id4840.html. Date accessed: 2012.
2. Annual report, Department of agriculture and cooperation, Ministry of Agriculture. 2010-11.http://agricoop.nic.in/sites/default/files/Annual%20Report%20201011%20English%20OK.pdf. Date accessed: 03/2011.
3. M.S. Hasanbadi. An economic analysis of crop insurance for onion in Dharwad district. Agriculture Economics. 2005; 1-74.
4. Planning Commission Government of India. http://planningcommission.nic.in/plans/stateplan/sdr.php?state=b_sdrbody.htm. Date accessed: 18/09/2014.
5. Agriculture insurance company India ltd. https://en.wikipedia.org/wiki/Agriculture_Insurance_Company_of_India. Date accessed: 17/01/2019.

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