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Factors Affecting Adoption of Crop Insurance in Bihar

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ABSTRACT

Multistage Stratified Random Sampling was used for selecting two villages in each of the three Agro-Climatic Zones of Bihar. From each selected village, 100 farmers were interviewed. Based on the data collected on age, education and category, multiple regression equation was fitted. Age, education and category contributed significantly on adoption of crop insurance. Age being the most important factor of adoption contributed about 50% towards adoption. It was observed that younger farmers with larger land holding adopt more crop insurance. It was also observed that with the increase in bank branches, adoption rate increased ($r = 0.982$). Further it was found that the factors age, education and category were not independent.

Keywords : Indemnity, premium, threshold yield, insurance

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INTRODUCTION

Crop production is not merely an occupation, but a livelihood for Indian farmers. Nearly 75% of the total Indian population and 89.53% of total population of Bihar lives in rural areas where primary occupation is crop cultivation. Crop provides food for our growing population and the country utilizes crop products as raw materials for agro-based industries. Hence large investment in agriculture is important for the development of the country. Primary constraint in maximization of crop production is a large scale crop failure due to frequent occurrence of various natural calamities such as flood, drought, pests and diseases. Such crop failures adversely affect the resource poor farmers in India. In such a situation crop insurance can provide economic security to the farmers. It can help in maintaining their income level, increase risk bearing ability and thereby encourage large investment in agriculture, ultimately, resulting in improved crop yield and higher agricultural production.

The performance of crop insurance is successful in developed countries like USA or Canada mainly due to more equality of land distribution. The Indian scenario is different, where nearly 14% of the medium and large farmers account for 61% of the total area operated. On the other hand 51% of the sub-marginal and marginal farmers operate only 9% of the total area operated. So for the scheme to be successful land inequalities should be reduced through tenancy reforms(Rao *et al*, 1988). Yet despite relatively high claim Premium ratios, farmers have not joined National Agriculture Insurance Scheme in large number. Its coverage is limited to about 10% of the total farmers.

Based on past records the coverage of farmers is very small in Bihar compared to other states of our country. This situation can be attributed to various reasons. Village level study on impact of crop insurance has been done in Bihar. It is imperative as to why the farmers of Bihar are not opting for crop insurance. In order to investigate various issues, a micro level study on crop insurance has been carried out in 2006-07. Two villages from each zones of the state of Bihar have been selected and a pilot study of hundred farmers was carried out.

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Comprehensive Crop Insurance Scheme (C.C.I.S.)

C.C.I.S. had been in operation in India since kharif 1985 to protect the farmers against crop loss due to natural calamities. This scheme covered 16 states of the country. It worked on area-based, credit-linked and was voluntary in nature.

It covered loanee farmers only. The premium rates were 2% (wheat, paddy and millets) and 1% (oilseeds and pulses) of the sum insured. The crops covered under the scheme were wheat, paddy, millets (including maize), oilseeds and pulses. The indemnity (Eq. 1) was calculated as

$$\text{Indemnity} = \frac{\text{Shortfall in yield}}{\text{Threshold yield}} \times \text{Sum insured for the farmer} \quad (\text{Eq. 1})$$

Table 1 : List of selected Villages in different Zones of Bihar

S.N.	Zones	Districts	Blocks	Selected villages
1	South Bihar Plains	Munger	Dharhara	BahaChauki/ Hemjapur
2	South Bihar Plains	Lakhisarai	Suryagarha	Salempur /Jagdishpur
3	North Bihar Plains	Muzaffarpur	Muraul	Muraul
4	North Bihar Plains	Samastipur	Pusa	Mahmada
5	North Eastern Bihar Plains	Begusarai	Sahebpur Kamal	Chauki
6	North Eastern Bihar Plains	Khagaria	Khagaria	Chandra Nagar Ranko

Table 2 : Numbers of farmers adopting crop insurance

ZONE : South Bihar Plains (Village : Salempur / Jagdishpur, District : Lakhisarai, Block :Suryagarha)

Particulars	No. of farmers not opted crop insurance	No. of farmers opted crop insurance	Chi square
Total farmers(100)	53	47	
Caste			
Sah	05	05	0.040 N.S.
Kurmi	08	07	
Bhumihar	40	35	
Edu. Qualification			
Up to matriculation	30	10	24.261 **
I. A.	18	12	
B. A. & above	05	25	
Age			
Upto 40 yrs	06	20	14.552 **
40 to 60 yrs	18	15	
60 yrs and above	29	12	
Income(Rs.) '00000 Rs			
Up to 30	20	05	10.611 **
30-45	05	10	
45 & above	28	32	
Category of farmers			
Marginal	20	06	9.217 **
Small	17	16	
Big	16	25	

Note - ** highly significant, * significant and NS non-significant.

Table 3 : Numbers of farmers adopting crop insurance

ZONE: South Bihar Plains (Village: BahaChauki/Hemjapur, District:Munger, Block: Dharhara)

Particulars	No. of farmers not opted crop insurance	No. of farmers opted crop insurance	Chi square
Total farmers(100)	65	35	
Caste			
sah	08	05	16.688 **
Kurmi	51	15	
Others	06	15	
Edu. Qualification			
Up to matriculation	33	08	7.809 *
I. A.	17	12	
B. A. & above	15	15	
Age			
Up to 40yrs	13	16	8.693 *
40 to 60 yrs	24	12	
60 yrs and above	28	07	
Income(Ag) '00000 Rs			
Up to 30	33	07	9.937 **
30-45	09	05	
45 and above	23	23	
Category of farmers			
Marginal	30	07	8.665 *
Small	21	12	
Big	14	16	

Note - ** highly significant, * significant and NS non-significant.

This scheme had some limitations, (1) Coverage of limited number of crops and exclusion of some important cash crops like sugarcane, potato and cotton. (2) Coverage of rain fed crops only such as oilseeds, pulses and millets and (3) coverage of loanee farmers only. Due to the above limitations C.C.I.S. was stopped.

Table 4 : Numbers of farmers adopting crop insurance

ZONE: North Bihar Plains (Village: Mahmada, District: Samastipur, Block: Pusa)

Particulars	No. of farmers not opted crop insurance	No. of farmers opted crop insurance	Chi square
Total farmers(100)	60	40	
Caste			
Kushwaha	05	08	9.104 *
Bhumihar	19	20	
Yadav	22	07	
Others	14	05	
Edu. Qualification			
Up to matriculation	30	11	11.756 **
I. A.	17	07	
B. A. & above	13	22	
Age			
Up to 40yrs	15	17	6.973 *
40 to 60 yrs	20	16	
60 yrs and above	25	07	
Income(Ag) '00000 Rs			
Up to 15	21	05	8.961 *
15-30	18	10	
30-45	06	06	
45 and above	15	19	
Category of farmers			
Marginal	38	11	12.932 **
Small	13	14	
Big	09	15	

Note - ** highly significant, * significant and N.S. non-significant.

National Agricultural Insurance Scheme (N.A.I.S.)

N.A.I.S. was introduced in the country since 1999-2000 Rabi season after replacing CCIS. This scheme is available for all farmers (loanee as well as non loanee)and covers all food crops (cereals, millets and pulses), oilseeds and annual horticultural/commercial crops. Among the annual horticultural/commercial crops about

eleven crops namely sugarcane, potato, cotton, ginger, onion, turmeric, chilies, jute, tapioca, annual banana and pineapple covered since 2005. This scheme also works on area based and unit of insurance is Gram Panchayat. Under the scheme the premium rates are 3.5% (of sum insured) for bajra and oilseeds, 2.5% for other

Table 5 : Numbers of farmers adopting crop insurance

ZONE: North Bihar Plains (Village: Muraul, District: Muzaffarpur, Block: Muraul)

Particulars	No. of farmers not opted crop insurance	No. of farmers opted crop insurance	Chi square
Total farmers(100)	60	40	
Caste			
Sah	10	06	0.645 N. S.
Yadav	12	10	
Bhumihar	08	06	
Kushwaha	20	13	
Others	10	05	
Edu. Qualification			
Up to matriculation	40	08	21.260 **
I. A.	11	15	
B. A. & above	09	17	
Age			
Up to 40yrs	16	18	4.613 N.S.
40 to 60 yrs	22	14	
60 yrs and above	22	08	
Income(Ag) '00000 Rs			
Up to 30	28	05	12.784 **
30-45	08	10	
45 and above	24	25	
Category of farmers			
Marginal	32	11	11.005 **
Small	21	14	
Big	07	15	

Note - ** highly significant, * significant and N.S. non-significant.

kharif crops; 1.5% for wheat and 2% for other Rabi crops. A 50% subsidy in the premium is given to the marginal and small farmers. At present the scheme is being implemented in 25 states and union territories (except Arunachal Pradesh, Manipur, Mizoram, Nagaland and Punjab)

Bharati *et al.*, (1999) found the superiority of all possible regression analysis over the usual regression analysis and stepwise regression

analysis. Ifft (2001) found that the main flaws of the National Agriculture Insurance Scheme are the goal of financial viability, its mandatory nature, its failure to address adverse selection, arbitrary premiums and the area approach. Pandey *et al.*, (2004) observed that the crop insurance schemes are not successful in India

Table 6 : Numbers of farmers adopting crop insurance
ZONE : North Eastern Bihar Plains (Village: Chauki, District: Begusarai, Block: Sahebpur Kamal)

Particulars	No. of farmers not opted crop insurance	No. of farmers opted crop insurance	Chi square
Total farmers(100)	40	60	
Caste			
Yadav	10	07	4.813 N.S.
Kurmi	24	48	
Others	06	05	
Edu. Qualification			
Up to matriculation	20	14	8.035 *
I. A.	11	21	
B. A. & above	09	25	
Age			
Up to 40yrs	7	32	16.839 **
40 to 60 yrs	13	18	
60 yrs and above	20	10	
Income(Ag) '00000 Rs			
Up to 15	14	08	17.075 **
15-30	10	05	
30-45	07	11	
45 and above	09	36	
Category of farmers			
Marginal	21	11	13.526 **
Small	10	20	
Big	09	29	

Note - ** highly significant, * significant and N.S. non-significant.

unless specific peril schemes such as rainfall insurance are given due importance. Vyas *et al.*, (2004) suggested to increase the adoption of crop insurance by improving the market penetration, rationalizing premium payments, improving indemnity assessment and payment, revisiting financial arrangements etc. It was suggested to frame bankers and farmers for improving adoption of crop insurance. It was also recommended to pay "No Claim Bonus" to the farmers. They also

recommended to improve and timely conduct of "Crop cutting experiments" in the area and timely payment of indemnity.

Shaiket *al.*, (2005) explained the reasons of relatively low participation in crop insurance programme. It was pointed out that due to dramatic

Table 7: Numbers of farmers adopting crop insurance
ZONE: North Eastern Bihar Plains (Village: Chandra Nagar Ranko, District: Khagaria, Block: Khagaria)

Particulars	No. of farmers not opted crop insurance	No. of farmers opted crop insurance	Chi square
Total farmers(100)	43	57	
Caste			
Chaurasia	08	12	0.124 N.S.
Yadav	11	15	
Kushawaha	24	30	
Edu. Qualification			
Up to matriculation	20	10	11.261 **
I. A.	12	17	
B. A. & above	11	30	
Age			
Up to 40yrs	7	31	16.001 **
40 to 60 yrs	15	14	
60 yrs and above	21	12	
Income(Ag) '00000 Rs			
Up to 15	14	10	9.764 **
15-30	9	5	
30-45	9	11	
45 and above	11	31	
Category of farmers			
Marginal	21	14	8.925 *
Small	13	16	
Big	09	27	

Note - ** highly significant, * significant and NS non-significant

increase of subsidies during mid of late 1990's, the revenue insurance was widely adopted and participation rates were much higher.

MATERIALS AND METHODS

Agro climatically, Bihar is divided mainly into three zones. North Bihar Plains- Zone I consists of West Champaran, East Champaran, Siwan, Saran, Sitamarhi, Siwhar, Muzaffarpur, Vaishali, Madhubani, Darbhanga, Samastipur, Gopalganj

and Begusarai districts. North Eastern Bihar Plains- Zone II consists of Khagaria, Purnea, Katihar, Saharsa, Supaul, Madhepura, Arraria and Kishanganj districts. South Bihar Plains- Zone III consists of Rohtas, Bhojpur, Buxar, Bhabhua, Arwal, Patna, Nalanda, Nawada, Shekhpura,

Table 8: Pooled data of six selected villages (Salempur, BahaChauki, Muraul, Mahmada, Chauki and Chandra Nagar Ranko)

Particulars	No. of farmers not opted crop insurance	No. of farmers opted crop insurance	Chi square
Total farmers(100)	53.50	46.50	
Edu. Qualification			
Up to matriculation	28.83	10.16	12.923 **
I. A.	14.33	14.00	
B. A. & above	10.34	22.34	
Age			
Up to 40yrs	10.67	22.33	10.692 **
40 to 60 yrs	18.66	14.84	
60 yrs and above	24.17	9.33	
Category of farmers			
Marginal	27.00	10.00	10.845 **
Small	15.83	15.33	
Big	10.67	21.17	

Note - ** highly significant, * significant and N.S. non-significant

Jahanabad, Aurangabad, Gaya, Munger, Bhagalpur, Banka, Jamui and Lakhisarai districts.

To carry out the investigation, two districts from each Agro-Climatic Zone have been selected randomly. From each selected district, one block was selected randomly. From each selected block, one village was selected randomly. Households of each village were stratified according to land holding category (marginal, small and big farmers) and sample of 100 households were selected in proportion.

Chi-square test of independence was applied to know the association between the factors such as cast, age, education, income from agriculture and land holding category on impact of adoption of crop insurance. Thereafter multiple regression model was fitted to know the contribution of individual factors. Adoption statistics of farmers of the selected villages as well as of Bihar state were also worked out and presented in table 2 to 8.

RESULTS AND DISCUSSION

In case of Salempur/Jagdishpur villages (South Bihar Plains), age, education, income and category of farmers showed significant effect on adoption of crop insurance (Table 2). In BahaChauki/Hemjapur (South Bihar Plains), cast, age, education, income and category of farmers showed significant effect on adoption (Table 3).

In Mahmada village (North Bihar Plains) cast, age, education, income and category of farmers showed significant effect on adoption (Table 4).

Table 9 : Score on age, education and category of farmers on adoption of crop insurance based on pilot survey

Sl. No.	Age	Mid Value of age	Edu. Qfy.	Cate- gory	Not Insu- red	Insu- red	Ado- ption
1	18-40	29	1	1	6	7	53.85
2	18-40	29	1	2	3	6	66.67
3	18-40	29	1	3	3	11	78.58
4	18-40	29	2	1	17	17	50.00
5	18-40	29	2	2	3	16	84.21
6	18-40	29	2	3	3	19	86.33
7	18-40	29	3	1	13	10	42.60
8	18-40	29	3	2	7	28	80.00
9	18-40	29	3	3	10	32	76.19
10	40-60	50	1	1	38	5	11.63
11	40-60	50	1	2	10	8	44.45
12	40-60	50	1	3	13	5	27.78
13	40-60	50	2	1	17	6	26.09
14	40-60	50	2	2	11	5	31.25
15	40-60	50	2	3	8	5	38.46
16	40-60	50	3	1	4	5	55.56
17	40-60	50	3	2	6	8	57.14
18	40-60	50	3	3	4	26	86.67
19	60-80	70	1	1	49	5	9.26
20	60-80	70	1	2	31	6	16.22
21	60-80	70	1	3	17	11	39.29
22	60-80	70	2	1	12	6	33.33
23	60-80	70	2	2	13	6	31.58
24	60-80	70	2	3	6	8	57.15
25	60-80	70	3	1	3	5	62.50
26	60-80	70	3	2	10	8	44.45
27	60-80	70	3	3	4	5	55.56
28	total	-	-	-	321	279	46.50

RESULT

Characters	Value of b	St. Reg. Coeff.	Contribution
Age	-0.734	-0.549	46.16
Education	11.819	0.431	28.45
Category	11.166	0.407	25.39

Constant = 40.372, $R^2 = 0.654$ and F-value = 14.472

In Muraul village (North Bihar Plains), education, income and category showed significant effect on adoption (Table 5).

In Chauki village (North Eastern Bihar Plains), age, education, income and category showed significant effect (Table 6).

In Chandra Nagar Ranko (North Eastern Bihar Plain), age, education, income and category showed significant effect (Table 7).

On pooling the data for entire Bihar state, adoption of age, education and category showed significant effect (Table 8).

All possible multiple regression analysis was carried out with independent variables such as age, education, income, cast and category and adoption percentage as dependent variable. The all possible analysis resulted in best model with subset of independent variables age, education and category. It was found that age being the most important factor of adoption contributed alone about 50% where as education and category separately contributed about 25% (Table 9).

In order to know the dependence of the factors age, education and category chi square test of independence was applied and observed that these factors depend on each other. Adoption rate also increases with increase in bank branches in the villages ($r = 0.982$).

CONCLUSION

To identify the factors affecting adoption of crop insurance in Bihar, a multi-stage stratified random sampling scheme consisting of different Agro-Climatic Zones; districts, blocks, villages and farmers as different stages of sample selection, were carried out with a sample of size of 600. Under survey study of crop insurance in Bihar, it was observed from the result that the adoption behavior of crop insurance of the farmers increased significantly with increase in educational qualification, land holding and

declining trend was observed in case of older farmers in all most all the villages. Income from agriculture also showed significant effect on adoption of crop insurance. In pooled analysis similar pattern of result was observed. Adoption rate also increases with increase in bank branches in the villages of Bihar ($r = 0.982$). When dependence of the factors age, education and category was applied, it was found that these factors depend on each other.

Suggestions for improving the crop insurance adoption rate in Bihar

- Creating awareness among farmers
- Innovative thinking to facilitate this scheme like Life Insurance
- More subsidy on premium for small and marginal farmers
- Payment of "No Claim Bonus"
- Timely conduct of crop cutting experiment
- Consideration of pre-sowing and post-harvest loss coverage
- Timely claim payment
- Ownership of land holding
- Sensitizing the official for effective implementation of the scheme
- Crop insurance for late planting and replanting should be introduced in the country

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