Positive perception of Weather Index Based Insurance scheme in Karnataka –A case study of Cotton crop

Mahadevaswamy.M[1], Dr. G.Kotreshwar[2]

[1] *Mahadevaswamy .M Research scholar, DOS in Commerce, Manasa Gangotri, University of Mysore, Mysore*
& Guest faculty, University Evening College, University of Mysore, Mysore
[2] *Professor. DOS in Commerce, Manasa Gangotri, University of Mysore, Mysore*

Abstract: *Lot of factors, ranging from climate variability, frequent natural disasters, uncertainties in yields and prices, weak rural infrastructure, imperfect markets and lack of financial services including limited span and design of risk mitigation instruments such as credit and insurance have affected Indian agriculture which in turn has affected the farmer's livelihood and incomes in India.*
In order to avoid the agriculture risks government and private insurance company are introducing varieties of insurance scheme. These schemes will reduce the financial loss occurred through weather vagaries in agriculture sectors. In the present day's insurance can be divided into two categories namely Crop insurance and weather index based insurance. The present article mainly focuses on impact assessment of weather index based insurance in Karnataka. The primary data was collected through random questionnaire and the secondary data regarding weather index based insurance of five districts namely Chitradurga, Dharwad, Shimog, Davangere and Tumkur were collected from Agriculture Insurance Company of India Limited. Comparative study was made between these data to know the impact of WIBI on cotton farmers. It was observed that cotton farmers in Chitradurga, Dharwad, Shimog, and Davangere, districts show more positive perception than Tumkur district.

I. Introduction

The agriculture sector of India has occupied almost 43 percent of India's geographical area. Agriculture is still the only largest contributor to India's GDP even after a decline in the agriculture share of India. Despite a diminishing share in the India's GDP, agriculture remains a key sector of the economy and continues to play a vital role in driving India's economic growth. About 60 percent of India's population lives in its villages and a majority of rural households depend on agriculture and related activities for their livelihood. The behavior of the summer monsoon has significant implications for the economy and livelihoods in India, particularly in the rural sector. Over 60% of cropped area in India is rainfed, and over 70% of the population depends upon the rural natural resource base for their livelihoods. Droughts and floods have deep impacts on rural households, and great budgetary implications for the government at district, state and national levels. Agricultural activities are exposed to controllable and uncontrollable risks. Controllable risks are typically pests, diseases, weeds, and seed material. Uncontrollable risks are rainfall — it's deficit, excess and distribution, extreme temperature conditions, hail incidences, extreme wind speeds, humidity variations etc. Controllable risks can be mitigated with the use of technology, effective monitoring and appropriate usage of inputs. However, the challenge lies in providing risk mitigation measures for uncontrollable risks. In such a case farmers have to depend on WIBI. This scheme is promising and is achieving its objectives by providing financial relief thereby reducing financial shock to farmers.

II. The Cotton Scenario Of Karnataka

Karnataka occupies 5.54% of cotton crop area in the country in year 2011-12, with a contribution of 14.00 (in lakh bales of 170 kgs) of the production at the all-India level in the same year. Around 20% of its cotton land is reported to be under irrigated conditions.

After Gujarat and Andhra Pradesh, Karnataka has the largest area under hybrid Cotton seed production in India. Karnataka is the first state in south India to produce hybrid cotton seeds for commercial cultivation. Cotton seed production began in Karnataka in early the 1970 years of by migrant farmers from Andhra Pradesh. Slowly local farmers also entered the seed production activity. Cotton is an important commercial crop which can be grown in all parts of Karnataka. It is mainly grown in Dharwad, Gadag, Haveri, Belgaum, Bellary, Bijapur, Shimoga, Chamarajnagar, Mysore, and Davanagere districts. In Karnataka, traditional cotton growing areas included Dharwad, Bijapur, Chitradurg, Bellary, Raichur districts. However, there is a spectacular shift in cotton growing areas in Karnataka. From traditional areas, it has spread to many non-traditional districts like Mysore, Shimoga, Chamarajnagar, Tumkur, Davanagere.

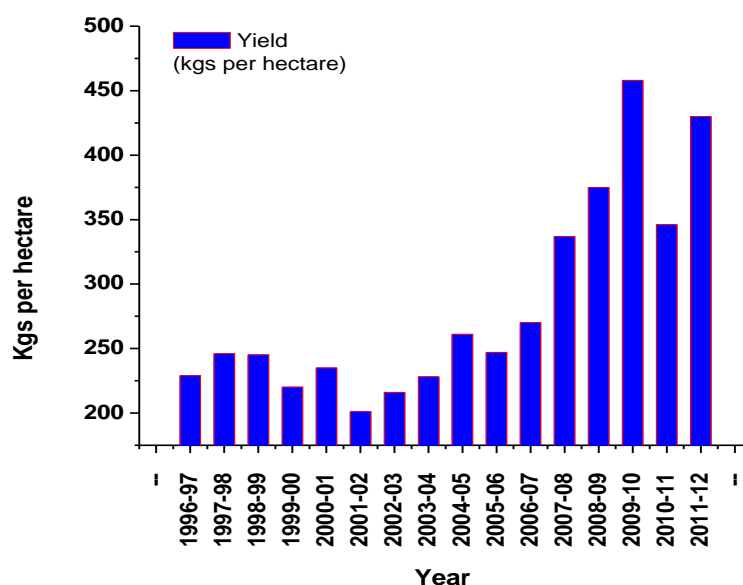***Cotton yields in Karnataka over the years***

      Area, Production and Yield of cotton in the state over the years has numbers reported by Office of the Textile Commissioner, Mumbai.

year	Area (in lakh hectares)	Production (in lakh bales of 170 kgs)	Yield (kgs per hectare)
1996-97	6.68	9.00	229
1997-98	5.18	7.50	246
1998-99	6.08	8.75	245
1999-00	5.40	7.00	220
2000-01	5.60	7.75	235
2001-02	5.91	7.00	201
2002-03	3.93	5.00	216
2003-04	3.13	4.20	228
2004-05	5.21	8.00	261
2005-06	4.13	6.00	247
2006-07	3.78	6.00	270
2007-08	4.03	8.00	337
2008-09	4.08	9.00	375
2009-10	4.55	12.25	458
2010-11	5.45	11.10	346
2011-12	5.54	14.00	430

Source: Office of the Textile Commissioner, Mumbai.
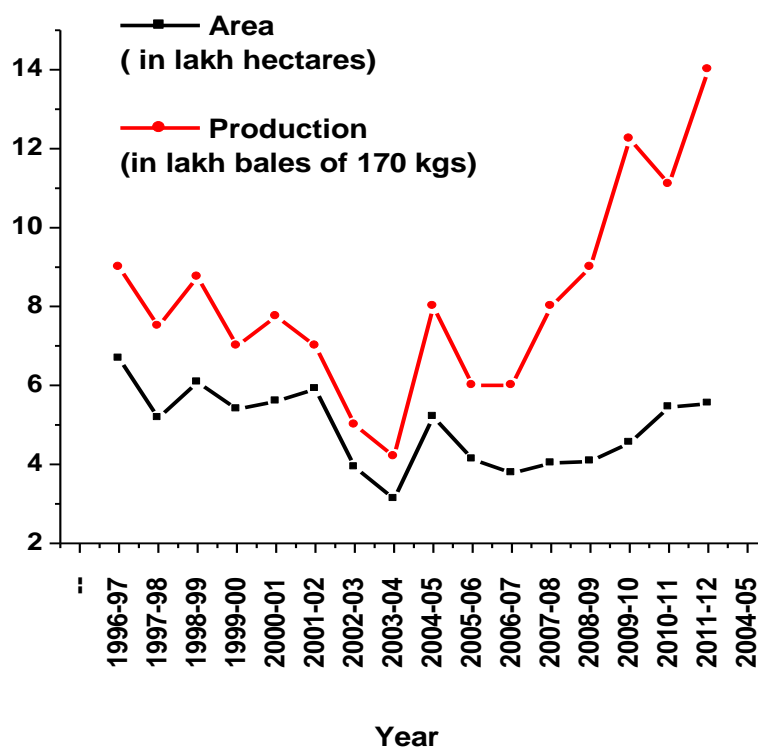
Graphical Representation of Area and Production of cotton in the state over the years has numbers reported by Office of the Textile Commissioner, Mumbai.

Graphical Representation of Yield of cotton in the state over the years has numbers reported by Office of the Textile Commissioner, Mumbai.

III. Study Area

In the present work perception of farmers towards WIBI was studied through random questionnaire from some selected Districts in Karnataka namely   at Chitradurga, Dharwad, Shimog, Davangere and Tumkur. Chitradurga district is an administrative district of Karnataka state in southern India. The city of Chitradurga is the district headquarters. The Latitude and Longitude of Chitradurga district is 14.1823070″ and 76.54882320″ respectively occupying an area of about 8,440Km^2. The Latitude and Longitude of Davangere can be read as 14.46634380″ and 75.92383970″ respectively. Davangere district has healthy climate. The Southern part of the district has a more pleasing weather. European firm exploited the situation and started a cotton mill, which led to a boom of cotton mills in Davanagere. Cotton is grown in abundance as the soil of Davanagere is most suitable for the cotton cultivation. The Latitude and Longitude of Shimoga district is 13.850000″ and 75.5966667″ respectively. Shimoga district being a part of the Malnad area, receives good monsoon rainfall during the months from June to October. The average yearly temperature of Shimoga District is around 26° C and has increased substantially over the years in some regions of Shimoga district. The Latitude amd Longitude of Tumkur is 13.34222220″ and 77.10166670″ respectively. Tumkur district occupies an area of 10,598 km². The climate in Tumkur is classified as a tropical savannah climate that has a very distinct wet season. Tumkur has a moderate climate overall, with hot summers and moderate and mild winters.

IV. Weather Index Based Insurance Scheme (Wibis)

Weather index based insurance scheme is one the insurance which proves the financial security from the weather vagaries for the agriculture sector. This scheme will cover the risk of weather parameters such as shortage or heavy rain fall, natural calamities like rising temperatures, erratic rainfall pattern, snow, storms, wind velocity, fog, and increase in the severity of droughts, floods and cyclones.
This scheme has also various benefits.

More transparence

One of the most benefits in this is more transparence. It means weather data can not be manipulated either by insurance company as well as insurance purchaser. This data is easy to assess by anybody at any time in local weather station which is run by the government undertaking.

Low administration cost

Like Crop insurance, in WIBI scheme farmer's field verification is not necessary. The scheme is analyzed through weather parameter accurately and hence this scheme of insurance is considered as low administration cost.

Reduced the adverse selection of the policy

WIBI scheme are designed to compensate the loss caused due to natural vagaries and not for any other purpose and hence it reduces the adverse selection of the policy in case if farmers opt for WIBI scheme.

Timely settlement

WIBI scheme is more attractive to the farmers because timely settlement of their financial loss occurs during the year.

V. Objective Of The Study

The main objective of the study of the article is to analyze the Positive perception of weather based insurance scheme in Karnataka with special reference to Cotton crop. WIBI is new technique for avoiding the natural vagaries for agriculture sector. This study is help full to know the farmers response towards the scheme and how is mitigate the financial loss occurring through natural vagaries.

VI. Research Methodology

The primary data regarding positive perception of weather index based insurance from the five districts at Chitradurga, Dharwad, Shimog, Davangere and Tumkur. The information was collected through questionnaire and interaction with the Cotton farmers. Secondary data were collected various source like Agriculture Insurance Company of India Limited, internet, journals, and publications. Primary data and secondary data are analyzed thoroughly to achieve the objective of the study.

VII. Data Analysis

The data collected through random questionnaire from five districts among 121 farmers were segregated first in terms of their positive and negative perception towards WIBI. To know the difference among groups in terms of Age, Education, Experience, land hold, gender etc., with respect to positive perception of farmers towards WIBI, annova test was carried out.

VIII. Data Analysis And Interpretation

The Primary data collected from the respondent were analyzed with the help of statistical tool, and the result are tabulated which is given in Table 1.

Table 1 Farmer's positive response with respect to WIBI scheme in Karnataka (selected Districts)

Particulars	Categories	Chitradurga district	Davangere district	Davangere district	Tumkur district	Davangere district	Total
Gender	Male	13	11	14	6	17	61
	Female	5	3	5	2	5	20
	Sub-Total	18	14	19	8	22	81
Age	18-30	3	2	4	-	2	11
	31-45	7	9	6	5	9	36
	46-60	6	3	8	3	7	27
	Above 60	2	-	1	-	4	7
	Sub-Total	18	14	19	8	22	81
Education	Matriculation	4	2	4	1	4	15
	PUC	5	6	4	2	9	26
	Degree	2	-	3	2	3	10
	Post Graduate	1	1	-	1	2	5
	Uneducated	6	5	8	2	4	25
	Total	18	14	19	8	22	81
Land Holding	Small Growers	7	5	8	3	8	31
	Large Growers	11	9	11	5	14	50
	Sub-Total	18	14	19	8	22	81
Experience	Below10 ears	5	2	3	2	4	16
	11-20	2	5	7	4	5	23
	21-30	3	3	4	1	6	17
	31-40	6	3	2	1	4	16
	Above 40	2	1	3	0	3	9
	Sub-Total	18	14	19	8	22	81

IX. Hypothesis

To examine whether the Cotton growers differ in their perception towards weather risk on the basis of their age, education, land holding and experience the following null and alternative hypotheses are formulated:

H$_0$: There is no significant difference in the opinion of Cotton farmers on the basis of their age, education, land holding and experience with respect to their perception towards WIBI.
H$_1$: There is significant difference in the opinion of Cotton farmers on the basis of their age, education, land holding and experienc with respect to their perception towards WIBI.

The above data regarding age is tested using ANOVA and the results are as below:

ANOVA					
Table 2. ANOVA Test Statistics for perception towards WIBI with respect to age					
	Sum of Squares	df	Mean Square	F	Sig. (P)
Between Groups	110.950	3	36.983	10.958	.000
Within Groups	54.000	16	3.375		
Total	164.950	19			

As shown in table 2 the F value and P value are 10.958 and .000respectively. The results indicate that there is no significant difference in the opinions of cotton farmers on the basis of their age with respect to their perceptions towards WIBI as the observed value is less than 0.05. After analyzing the results of ANOVA, the decision is to accept the null hypothesis: "There is no significant difference in the opinion of Cotton farmers on the basis of their age with respect to their perception towards WIBI" and reject the alternative hypothesis "There is significant difference in the opinion of farmers on the basis of their age with respect to their perception towards WIBI".

Education

Table 3. ANOVA Test Statistics for perception towards WIBI with respect to education					
	Sum of Squares	df	Mean Square	F	Sig. (P)
Between Groups	67.760	4	16.940	5.395	.004
Within Groups	62.800	20	3.140		
Total	130.560	24			

As given in table 3 the F value and P value are 5.395 and .004 respectively. Based on the results obtained we can say that there is no significant difference in the opinions of cotton farmers on the basis of their Education with respect to their perceptions towards WIBI as we observe that the value is less than 0.05. Since the P value is less than 0.05 the decision is to accept null hypothesis which states that "There is no significant difference in the opinion of Cotton farmers on the basis of their education with respect to their perception towards WIBI" and have reject the alternative hypothesis "There is significant difference in the opinion of farmers on the basis of their education with respect to their perception towards WIBI".

Land Hold

Table 4. ANOVA Test Statistics for perception towards WIBI with respect to Land Hold					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	36.100	1	36.100	4.599	.064
Within Groups	62.800	8	7.850		
Total	98.900	9			

According to table 4 the F value and P value of ANOVA Test for perception towards WIBI with respect to land hold is 4.599 and .064 respectively. Based on the results obtained it is clear that there is significant difference in the opinions of cotton farmers on the basis of their Education with respect to their perceptions towards WIBI as we observe that the value is greater than 0.05

Since the P value is greater than 0.05 the decision is to reject null hypothesis and to accept the alternative hypothesis stating "There is significant difference in the opinion of farmers on the basis of land hold with respect to their perception towards WIBI".

Experience

Table 5. ANOVA Test Statistics for perception towards WIBI with respect to Experience					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	19.760	4	4.940	1.803	.168
Within Groups	54.800	20	2.740		
Total	74.560	24			

As shown in table 5 the F value and P value are 10.958 and .168respectively. The results indicate that there is significant difference in the opinions of cotton farmers on the basis of their experience with respect to their perceptions towards WIBI as the observed value is greater than 0.05.

After analyzing the results of ANOVA, the decision is to reject null hypothesis: and to accept alternative hypothesis which states that "There is significant difference in the opinion of farmers on the basis of their experience with respect to their perception towards WIBI".

X. Conclusion

WIBI is most essential for farmers to mitigate vagaries caused by nature. The above studies illustrates that there is no significant difference among positive perception of farmers with in groups with respect to age and education, where as among groups regarding experience and land holding there is significant difference. These studies depicts that WIBI is more help full for farmers to avoid the losses which are caused by weather risk. Since WIBI is recent and new type of insurance scheme to mitigate agriculture risk which is based on weather data collected from the local rainfall station and not on the basis of farmer's field verification, awareness has to be created among farmers with respect to this type of insurance policy so that they can be benefited.

XI. Supplementary Data

Agriculture Insurance Company of India Limited (AIC)

This is an alternative Scheme for NAIS framed by Government of India and was launched in the country during Kharif 2007. The scheme is compulsory for loanee farmers and voluntary for non-loanee farmers. All the payable claims shall be the responsibility of the Insurance Companies. . It currently provides an area and weather based crop insurance programs to almost 500 districts of India. The following districts have taken for analysis the impact on WIBI scheme implemented by Agriculture Insurance Company of India Limited in Karnataka.

The performance of WIBI scheme implemented and performed by Agriculture Insurance Company of India Limited in Karnataka. Inorder to know the impact on WIBI scheme in Karnataka secondary data was collected from Agriculture Insurance Company of India Limited. This data involves few districts of Karnataka namely Chitradurga, Dharwad, Shimog, Davangere and Tumkur. These district data is helpful to know the performance performed by Agriculture Insurance Company of India Limited particularly with Cotton crop.

Chitradurga district (Rain fed)

Year	Season	Cotton	No. of farmers	Area insured in ha.	Sum insured	Farmers premium	Subsidy	Gross premium	Claims	Farmer benefits
2008	kharif	Cotton (R)	3	5.00	60000	3600	3600	7200	6345	3
2009	kharif	Cotton (R)	6	13.87	166440	9986.4	9986.40	19972.80	0.00	0
2011	kharif	Cotton (R)	361	533.62	6403440	384206.40	38426.40	768412.80	777477.05	341
Dharwad district (Rain fed)										
2009	kharif	Cotton (R)	737	1413.11	1695732	1017439.20	1017439.20	2034878.40	473743.48	123
2010	kharif	Cotton (R)	1861	2151.89	25822680	1549360.80	1549360.80	3098721.60	148154.43	630
2011	kharif	Cotton (R)	2481	2847.24	34166880	2050012.80	2050012.80	4100025.60	1945060.87	2410
Shimog didtrict (Rain fed)										

2009	kharif	Cotton (R)	6	5.83	69960	4197.6	4197.6	8395.20	5363.60	6
2010	kharif	Cotton (R)	3	3.65	43800	2628.00	2628.00	5256.00	0.00	0
Davangere district (rain fed)										
2010	kharif	Cotton (R)	372	772.21	9266520	555991.20	555991.20	1111982.40	966396.21	304
211	kharif	Cotton (R)	819	1036.81	12441720	746503.20	746503.20	1493006.40	657999.06	819
2012	kharif	Cotton (R)	272	443.17	5318040	319082.40	319082.40	638164.80	Under progress	
Davangere district (irrigated)										
2010	kharif	Cotton (I)	220	435.81	8716200	522972.00	522972.00	1045944.00	643498.44	188
2011	kharif	Cotton (I)	357	563.13	11262600	675756.00	675756.00	1351512.00	561721.46	357
2012	kharif	Cotton (I)	78	118.01	236020	141612.00	141612.00	2832224.00	Under progress	
Tumkur district (irrigated)										
2010	kharif	Cotton (I)	15	16.47	329400	19764.0	19764.00	39528.00	2146.76	15

Source: Agriculture Insurance Company of India Limited.

REFERENCE

[1.] Barrett and Barnett et al (2007) "Index Insurance for Climate Risk Management & Poverty Reduction": working paper
[2.] Barnett.B.J. and Mahul.O (2008), "Weather Index Insurance for Agriculture and Rural Areas in Lower Income Countries".
[3.] Gine.X , Townsend.R and Vickery.J, (2007), " Patterns of Rainfall Insurance Participation in Rural India", A Research paper
[4.] Giné, Menand et al.,(2010) " Micro insurance: A Case Study of the Indian Rainfall Index Insurance Market" page 18
[5.] Gurdev Singh (2010), Crop Insurance in India. W.P. No. 2010-06-01
[6.] Manfredo.M.R and. Richards.T.J. (2009), 'Hedging with weather derivatives: a role for options in reducing basis risk' Applied Financial Economics, 2009, 19, 87–97
[7.] Reshmy .N (2010) 'Crop Insurance in India:Changes and Challenges' Economic & Political Weekly February 6, 2010 vol xlv no 6 page19-22
[8.] Sinha.S (2004), 'Agriculture Insurance in India. Scope for Participation of private Insurers', Economic and Political Weekly June 19, 2004. 2605-2612
[9.] Skees.J.R and Hess.U (2003)' Evaluating India's Crop Failure Policy: Focus on the Indian Crop Insurance Program' page VII.