



## Evaluation of Weather Based Crop Insurance Products for *Kharif* Maize

S. Kokilavani<sup>1</sup> and V. Geethalakshmi<sup>2</sup>

<sup>1</sup>Agricultural Meteorology, <sup>2</sup>Agro Climate Research Centre  
Tamil Nadu Agricultural University, Coimbatore - 641003

Weather based crop insurance scheme (WBCIS) products proposed by four insurance providers were compared and evaluated using historical weather data for piloting WBCIS on *kharif* maize in Coimbatore, Dharmapuri, Theni, Tirunelveli and Virudhunagar districts of Tamil Nadu. Productivity of maize is limited by rainfall than by any other weather parameters. Water deficit in different phenological stages viz., vegetative, reproductive and maturity stages had differential impact on the productivity. The strike occurrence was higher for Virudhunagar district compared to Dharmapuri district of AIC. Though the occurrence of strike events were more for phase one of Deficit Rainfall Cover, the rate per mm of rainfall fixed by IFFCO-TOKYO Company was low. The product designed for HDFC-ERGO and MS Cholamandalam was similar while the product for AIC and IFFCO-TOKYO was designed with little variation in context to excess rainfall cover and consecutive dry days. The compensation benefit realized by the farmer of Theni was higher followed by Virudhunagar, since the design for dry days index and rate per mm of rainfall was higher which favoured farmer's benefit.

**Key words:** Insurance companies, product design, strike events, payout, maize

Agriculture provides livelihood for 60 per cent of rural population of India and contributes to 35 per cent of country's Gross National Product (GNP). The greatest risk to crop yields in Indian agriculture is attributed to the variability of seasonal rainfall as well as the uncertainty in the amount and its distribution in a given season (Baweja, 2011). On an average 12 million hectares of crop area is affected annually by the calamities, severely impacting the yields and total agricultural production in India (GOI, 2007-2012). Maize is the third most important cereal crop after wheat and rice in terms of area occupied. Superior position of maize is due to its wide adaptability which is necessary for global food security (Cassman, 1999). Productivity of maize crop depends on water availability at various phenological stages viz., vegetative, reproductive and maturity stages. Water deficit at different phenological stages have different response and can damage the grain yield (Cakir, 2004).

Government of India has introduced the Comprehensive Crop Insurance Scheme (GCIS) in 1985 and subsequently this was replaced by National Agricultural Insurance Scheme (NAIS) in 1999-2000 which was based on crop cutting experiments to assess the crop yield. Despite the large public subsidy a significant majority of India's farmers have remained uninsured largely due to issues in design, particularly the long delays in claims settlement (Mahul *et al.* 2011). Hence, the Government of India and State Governments now started providing the weather based crop insurance programmes from 2007-08.

Weather based Crop Insurance scheme (WBCIS) is a type of Agricultural Insurance, which is a means of protecting the farmers against financial losses due to uncertainty in seasonal rainfall/ unfavourable weather situations (AIC, 2008). The strike or upper threshold of the rainfall corresponds to the 30 year average accumulated rainfall of the district reference weather station while the exit or lower threshold is intended to equal the water requirement of the respective crop necessary to avoid complete crop failure (Senthilnathan *et al.*, 2009).

The sum insured could be the total expenditure or a multiple of it or a proportion of expected income from crop(s) for which premium is paid. The indemnity is payable on the basis of shortfall in average yield from the guaranteed yield (threshold yield). The claims are paid after the loss in yield is ascertained.

Different insurance providers have developed their own WBCIS products for implementation in different districts. In the present study, an attempt was made to compare and evaluate the WBCIS products designed by four insurance companies with respect to *kharif* maize crop in order to arrive a balanced product which would benefit the farmers and at the same time ensure viability of the insurance products.

### Materials and Methods

Government of Tamil Nadu has notified a particular insurance company for a district in which the other insurance company can not function. The study districts, companies notified by the Government of

<sup>1</sup>\*Corresponding author email: kokiacr@gmail.com

Tamil Nadu for the year 2011-12, weather station from where the historical weather data were obtained, the data period, sum insured and farmers premium are given in Table 1. The different weather perils covered under the insurance package were as follows:

#### **Deficit Rainfall Cover (DRC)/ Water Deficit Index(WDI)**

The deficit rainfall based insurance was intended to provide protection to the cultivator against declined rainfall, which was deemed to adversely affect the crop during its cultivation period. Deficit rainfall insurance payouts were linked to accumulated low rainfall. The DRC product given by AIC for Dharmapuri and Virudhunagar districts are described in Table 2a..

#### **Excess Rainfall Cover (ERC)/Excess Rainfall Index (ERI)**

Heavy and continuous rainfall within a short period has the potential to cause severe physiological damage to crops, particularly during the maturity and the harvest stages. The indices that have been designed to capture wet spells, aggregate rainfall over a period of between two and four consecutive days during the crop growth period was considered for the insurance coverage. The ERC product given by AIC for Dharmapuri and Virudhunagar districts are described in Table 3a.

#### **Consecutive Dry Days (CDD)/ Dry Days Index (DDI)**

It was used to construct an index equal to the maximum consecutive dry days within a specified period, where a dry day is defined as a day with total rainfall below a threshold value. This cover offered protection for long dry spells during crop growth period (Clarke *et al.*, 2012)

### **Results and Discussion**

#### **Deficit Rainfall Cover/Water Deficit Index**

Deficit rainfall cover was considered by AIC in 4 phases of crop growth in the two districts viz., Dharmapuri and Virudhunagar. IFFCO-Tokyo had considered the DRC in 3 phases of crop growth for Coimbatore District. HDFC-ERGO and MS-Cholamanfalam have considered WDI only in 2 phases viz., Phase 2 and Phase 3 for Theni and Tirunelveli districts. The strikes occurred during the crop growth period for the deficit rainfall cover/water deficit index are presented in the Figure 1.

**Table 1. Study districts, companies notified for 2011-12, reference weather station and sum insured by different insurance companies**

District	Insurance Company	Name of the weather station	Period	Sum Insured (Rs)	Farmer's premium (Rs)
Dharmapuri	Agricultural Insurance Corporation(AIC)	Regional Research Station, Paiyur	(1981 - 2005)	10000	250
Virudhunagar	AIC	Regional Research Station, Arupukkottai	(1985 - 2010)	10000	250
Coimbatore	IFFCO-TOKYO	Tamil Nadu Agricultural University, Coimbatore Horticulture College and Research Institute,	(1981-2010)	10000	250
Theni	HDFC-ERGO	Periyakulam	(1981-2010)	9000	219
Tirunelveli	MS -Cholamandalam	Rice Research Station, Ambasamudram	(1981-2010)	10000	250

$S_1$  (rainfall < 105 mm but > 25 mm) occurred for five times and in Tirunelveli, for phase II (31<sup>st</sup> Aug – 29<sup>th</sup> Oct),  $S_1$  (rainfall < 40 mm but > 15 mm) and  $S_2$  (rainfall < 15 mm) occurred for four times each and the exit condition (E: Rainfall=0 mm) occurred for only one time in

**Dharmapuri:** In phase I (1<sup>st</sup> Aug – 10<sup>th</sup> Sep), the  $S_2$  (rainfall < 15 mm) occurred for three times

$S_1$  (rainfall < 160 mm but > 70 mm) occurred for 10 times. In phase III (11<sup>th</sup> Oct – 31<sup>st</sup> Oct), the  $S_1$  (rainfall < 50 mm but > 20 mm),  $S_2$  (rainfall < 20 mm) and the exit condition (E: Rainfall=0 mm) occurred for 4, 3 and 1 time respectively. In phase IV (1<sup>st</sup> Nov – 20<sup>th</sup> Nov),  $S_1$  (rainfall < 40 mm but > 15 mm) and  $S_2$  (rainfall < 15 mm) occurred for four times each and the exit condition (E: Rainfall=0 mm) occurred for only one time in 25 years of evaluation period. and in phase II (11<sup>th</sup> Sep – 10<sup>th</sup> Oct), the  $S_1$  (rainfall < 100 mm but more than 40 mm) occurred for six times,  $S_2$  (rainfall < 40 mm) for four times and the exit condition (E: Rainfall = 0 mm) for only one time. For phase III (11<sup>th</sup> Oct – 31<sup>st</sup> Oct), the  $S_1$  (rainfall < 70 mm but > 30 mm) for three times,  $S_2$  (rainfall < 30 mm) for four times and in phase IV (1<sup>st</sup> Nov – 20<sup>th</sup> Nov), the  $S_1$  (rainfall < 50 mm but > 20 mm) occurred for three times and the exit condition (E: Rainfall = 0 mm) occurred for only one time in 26 years of evaluation. Between these two districts of AIC operation, though the crop period is same (1<sup>st</sup> Aug to 20<sup>th</sup> Nov), occurrence of strike values differed at different stages of crop growth. The evaluation revealed that Virudhunagar district has high risk of deficit rainfall compared to Dharmapuri.

**Virudhunagar:** For phase I (1<sup>st</sup> Aug – 10<sup>th</sup> Sep),  $S_1$  (rainfall < 60 mm but > 20 mm) occurred for six times,  $S_2$  (rainfall < 20 mm) for five times and in phase II (11<sup>th</sup> Sep – 10<sup>th</sup> Oct), the  $S_1$  (rainfall < 100 mm but more than 40 mm) occurred for six times,  $S_2$  (rainfall < 40 mm) for four times and the exit condition (E: Rainfall = 0 mm) for only one time. For phase III (11<sup>th</sup> Oct – 31<sup>st</sup> Oct), the  $S_1$  (rainfall < 70 mm but > 30 mm) for three times,  $S_2$  (rainfall < 30 mm) for four times and in phase IV (1<sup>st</sup> Nov – 20<sup>th</sup> Nov), the  $S_1$  (rainfall < 50 mm but > 20 mm) occurred for three times and the exit condition (E: Rainfall = 0 mm) occurred for only one time in 26 years of evaluation. Between these two districts of AIC operation, though the crop period is same (1<sup>st</sup> Aug to 20<sup>th</sup> Nov), occurrence of strike values differed at different stages of crop growth. The evaluation revealed that Virudhunagar district has high risk of deficit rainfall compared to Dharmapuri.

**Coimbatore:** For phase I (1<sup>st</sup> August - 15<sup>th</sup> September), the  $S_1$  (rainfall < 80 mm but > 20 mm) and  $S_2$  (rainfall < 20 mm) occurred for 18 and 3 times respectively. In phase II (16<sup>th</sup> September - 31<sup>st</sup> October), only  $S_1$  (rainfall < 60 mm but > 20 mm) occurred for one time and in phase III (1<sup>st</sup> Nov – 30<sup>th</sup> Nov), also  $S_1$  (rainfall < 40 mm but > 20 mm) occurred for only one time in the 30 years of study period. Though, the strike event occurrence was higher on the whole, the rate per mm of rainfall fixed by the insurance company was meager. This indicates an imbalance between the strike rate and the compensation which would lead less benefit to farmers.

In Theni and Tirunelveli districts, for PII and PIII, the  $S_1$  and  $S_2$  conditions were similar. In

$S_1$  occurred for 10 times.  $S_2$  (rainfall < 25 mm) occurred for only one time in Theni district alone. In Theni, for PIII (1<sup>st</sup> Nov – 30<sup>th</sup> Nov),  $S_1$  (rainfall < 70 mm

**Table 2a. Deficit Rainfall cover (DRC) proposed by AIC for the Dharmapuri and Virudhunagar Districts**

	P-I(1 <sup>st</sup> Aug – 10 <sup>th</sup> Sep)			P-II(11 <sup>th</sup> Sep-10 <sup>th</sup> Oct)			P-III(11 <sup>th</sup> Oct-31 <sup>st</sup> Oct)			P-IV(1 <sup>st</sup> Nov – 20 <sup>th</sup> Nov)		
	S <sub>1</sub>	S <sub>2</sub>	E	S <sub>1</sub>	S <sub>2</sub>	E	S <sub>1</sub>	S <sub>2</sub>	E	S <sub>1</sub>	S <sub>2</sub>	E
<b>Dharmapuri</b>												
DRCRs 5000/ac	< 70 &> 30 mm	< 30 mm	0 mm	< 160 &> 70 mm	< 70 mm	0 mm	< 50 &> 20 mm	< 20 mm	0 mm	< 40 &> 15 mm	< 15 mm	0 mm
Compensation	Rs 8/mm	Rs 23/mm	Rs 1000	Rs 6/mm	Rs 14/mm	Rs 1500	Rs 12/mm	Rs 57/mm	Rs 1500	Rs 12/mm	Rs 47/mm	Rs 1000
<b>Virudhunagar</b>												
DRCRs 5000/ac	< 60 &> 20 mm	< 20 mm	0 mm	< 100 &> 40 mm	< 40 mm	0 mm	< 70 &> 30 mm	< 30 mm	0 mm	< 50 > 20 mm	< 20 mm	0 mm
Compensation	Rs 8/mm	Rs 34/mm	Rs 1000	Rs 8/mm	Rs 26/mm	Rs 1500	Rs 10/mm	Rs 37/mm	Rs 1500	Rs 12/mm	Rs 32/mm	Rs 1000

Note: P- Phase; S<sub>1</sub>- Strike 1; S<sub>2</sub>-Strike 2; E- Exit

**Table 2b. Deficit Rainfall cover (DRC) proposed by IFFCO-Tokyo for Coimbatore District**

DRC	PI(1 <sup>st</sup> Aug – 15 <sup>th</sup> Sep)		PII(16 <sup>th</sup> Sep – 31 <sup>st</sup> Oct)		PIII(1 <sup>st</sup> Nov – 30 <sup>th</sup> Nov)	
	S <sub>1</sub>	S <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>
Max. Pay out	< 80 &>		< 60 &>		< 40 &>	
Rs 2000/ac	20 mm	< 20 mm	20 mm	< 20 mm	20 mm	< 20 mm
Compensation	Rs 7/mm	Rs 20/mm	Rs 7/mm	Rs 20/mm	Rs 5/mm	Rs 20/mm

HDFC-ERGO and MS- Cholamanadalam have considered only two phases (P-II and P-III) for paying compensation towards deficit rainfall which is notified as Water Deficit Index(WDI). The product is given in Table 2c.

**Table 2c. Water Deficit Index (WDI) proposed by HDFC-ERGO for Theni District and MS-Cholamandalam for Tirunelveli District**

Tirunelveli (Max. Payout – Rs. 4000 / ac)	PII(31 <sup>st</sup> Aug – 29 <sup>th</sup> Oct)		PIII(30 <sup>th</sup> Oct – 28 <sup>th</sup> Nov)	
	S <sub>1</sub>	S <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>
WDI	105 &> 25 mm	< 25 mm	< 70 &> 20mm	< 20 mm
Compensation	Rs 10/mm	Rs 86/mm	Rs 10/mm	Rs 25/mm

AIC has suggested Strike 1 (S<sub>1</sub>), Strike 2 (S<sub>2</sub>) and Exit (E) for giving compensation. But the other three companies viz., IFFCO-TOKYO, HDFC ERGO and MS- Cholamanadalam have proposed only S<sub>1</sub> and S<sub>2</sub>. The product given by IFFCO-TOKYO for Coimbatore is given in Table 2b.

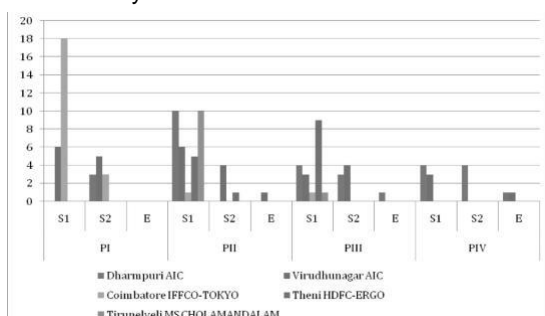
but > 20 mm) occurred for nine times and in Tirunelveli, for phase III (30<sup>th</sup>Oct – 28<sup>th</sup>Nov), S<sub>1</sub> (rainfall < 75 mm but > 20 mm) for only one time in the 30 years of

study period.

#### Excess Rainfall Cover/Excess Rainfall Index

(in any 4 consecutive days)

In Dharmapuri, For phase I, the strike of > 170 mm rainfall occurred for five times and in phase II, the strike of > 180mm rainfall for two times and in phase III, the strike of > 120mm rainfall for four times in 25 years. In Virudhunagar, for phase I, the strike of >130 mm rainfall occurred for only one time. In phase II, the strike of >150 mm rainfall for three times and exit condition of >250 mm rainfall for only one time. In phase III, the strike of > 120 mm rainfall for three times in 26 years of evaluation.

**Fig.1. Comparison of strike events for Deficit Rainfall Cover/ Water Deficit Index**

**Coimbatore:** For phase I and II, the strike condition of > 125 mm rainfall in two consecutive days did not occurred even once. The phase one falls in the middle of south west monsoon season where the total amount of monsoonal rainfall received over

**Table 3a. Excess Rainfall cover (ERC) proposed by AIC for the Dharmapuri and Virudhunagar Districts**

ERC	PI(1 <sup>st</sup> Aug – 20 <sup>th</sup> Sep)		PII(21 <sup>st</sup> Sep -31 <sup>st</sup> Oct)		PIII(1 <sup>st</sup> Nov – 30 <sup>th</sup> Nov)	
	Strike	Exit	Strike	Exit	Strike	Exit
Max. Payout:	Rainfall in 4 consecutive days					
Rs 3500/ac						
Dharmapuri	> 170 mm	> 270 mm	> 180 mm	> 280 mm	> 120 mm	> 220 mm
Virudhunagar	> 130 mm	> 230 mm	> 150 mm	> 250 mm	> 120 mm	> 220 mm
Compensation	Rs 10/mm	Rs 1000	Rs 10/mm	Rs 1000	Rs 15/mm	Rs 1500

HDFC-ERGO(Theni) and MS- Cholamanadalam(Tirunelveli) proposed Excess Rainfall Cover in the name of Excess Rainfall Index(ERI). The product of the mentioned companies and the product given by IFFCO-TOKYO (Coimbatore) are given in Table 3b.

**Table 3b. Excess Rainfall Cover/ Excess Rainfall Index for Coimbatore, Theni and Tirunelveli Districts**

Coimbatore (Rs 6000/ac)	(Rainfall in 2 consecutive days)		
	PI(1 <sup>st</sup> Aug – 15 <sup>th</sup> Sep)	PII(16 <sup>th</sup> Sep – 31 <sup>st</sup> Oct)	PIII(1 <sup>st</sup> Nov – 30 <sup>th</sup> Nov)
ERC	>125 mm	>125 mm	>125 mm
Compensation	Rs 6/mm	Rs 6/mm	Rs 6/mm
<b>Theni (Rs 3000/ ac)</b>	PI(10 <sup>th</sup> Aug – 10 <sup>th</sup> Sep)	PII(11 <sup>th</sup> Sep -31 <sup>st</sup> Oct)	PIII(1 <sup>st</sup> Nov – 30 <sup>th</sup> Nov)
ERI	>50 mm	>120 mm	>75 mm
Compensation	Rs 10/mm	Rs 10/mm	Rs 10/mm
<b>Tirunelveli (Rs 3000/ac)</b>	PI(1 <sup>st</sup> Aug – 30 <sup>th</sup> Aug)	PII(31 <sup>st</sup> Aug – 29 <sup>th</sup> Oct)	PIII(30 <sup>th</sup> Oct – 28 <sup>th</sup> Nov)
ERI	>80 mm	>125 mm	>125 mm
Compensation	Rs 10/mm	Rs 10/mm	Rs 10/mm

CDD= maximum number of consecutive days with  $r_{actual} < r_{threshold}$

The product offered by different insurance companies are given in Table 4.

30 years was 184 mm. Phase two coincides with the lag phase of south west monsoon and start of north east monsoon. Hence the strike condition need to be modified accordingly. In phase III, the strike of > 100 mm rainfall in two consecutive days occurred for two times in 30 years of evaluation.

(in any 2 consecutive days)

**Theni:** For phase I (10<sup>th</sup>Aug – 10<sup>th</sup>Sep), the strike of > 50 mm rainfall occurred for five times and in phase II, the strike of >120 mm rainfall for six times and for phase III, the strike of > 75 mm rainfall occurred for nine times in 30 years of evaluation.

**Tirunelveli:** For phase I (1<sup>st</sup> Aug – 30<sup>th</sup>Aug), the strike of > 80 mm rainfall and in phase II, the strike of >

**Table 4. Consecutive Dry Days (CDD) / Dry Days Index (DDI) given to study districts**

AIC	Dharmapuri & Virudhunagar, Starting 10 <sup>th</sup> Sep, Max. Payout : Rs 1500/ac
	If rainfall (> 2.5 mm) do not occur in the first 20 consecutive days, Rs 400 is paid(S <sub>1</sub> )
	If rainfall (> 2.5 mm) do not occur in the first 25 consecutive days, Rs 650 is paid. (S <sub>2</sub> )
	If rainfall (> 2.5 mm) do not occur in the first 30 consecutive days, Rs 900 is paid.(S <sub>3</sub> )
	If rainfall (> 2.5 mm) do not occur in the first 35 consecutive days, Rs 1200 is paid.(S <sub>4</sub> )
	If rainfall (> 2.5 mm) do not occur in the first 40 consecutive days, Rs 1500 is paid.(S <sub>5</sub> )
IFFCO-TOKYO	Coimbatore, Starting 1 <sup>st</sup> Sep, Max. Payout : Rs 2000/ac
	If rainfall (> 2.5 mm)do not occur in the first 20 consecutive days, Rs 300 is paid (S <sub>1</sub> )
	If rainfall (> 2.5 mm) do not occur in the first 30 consecutive days, Rs 700 is paid (S <sub>2</sub> )
	If rainfall (> 2.5 mm) do not occur in the first 40 consecutive days, Rs 1250 is paid (S <sub>3</sub> )
	If rainfall (> 2.5 mm) do not occur in the first 45 consecutive days, Rs 2000 is paid(S <sub>4</sub> )
HDFC-ERGO	Theni, starting 11 <sup>th</sup> Sep to 31 <sup>st</sup> Oct, Max. Payout: Rs. 3000 / ac
	If rainfall (> 2.5 mm) do not occur in the first 29 consecutive days, no money is paid(S <sub>1</sub> )
	If rainfall (> 2.5 mm) do not occur from 30 to 39 consecutive days, Rs 1000 is paid(S <sub>2</sub> )
	If rainfall (> 2.5 mm) do not occur for 40 to 49 consecutive days, Rs 2000 is paid(S <sub>3</sub> )
	If rainfall (> 2.5 mm) do not occur for more than 50 consecutive days, Rs 3000 is
MS Cholamandalam	paid(S <sub>4</sub> ) Tirunelveli, Starting 31 <sup>st</sup> Aug to 29 <sup>th</sup> Oct, Max. Payout : Rs. 3000 / ac
	If rainfall (> 2.5 mm) do not occur in the first 29 consecutive days, no money is paid (S <sub>1</sub> )
	If rainfall (> 2.5 mm) do not occur from 30 to 44 consecutive days, Rs 500 is paid(S <sub>2</sub> )
	If rainfall (> 2.5 mm) do not occur for 45 to 54 consecutive days, Rs 1500 is paid(S <sub>3</sub> )
	If rainfall (> 2.5 mm) do not occur for more than 55 consecutive days, Rs 3000 is paid(S <sub>4</sub> )

125 mm did not occur even once. The reason attributed for Coimbatore holds true for this district wherein the south west monsoon rainfall over 30 years was 96 mm. Hence, the strike values need to be modified. In phase III, the strike of > 125 mm rainfall for three times in 30 years (Fig 2).

With respect to ERC/ERI (where in aggregate rainfall of four cumulative days were followed by AIC and two consecutive days by IFFCO-TOKYO while any two cumulative days for remaining companies which made difference in strike occurrence and payout.

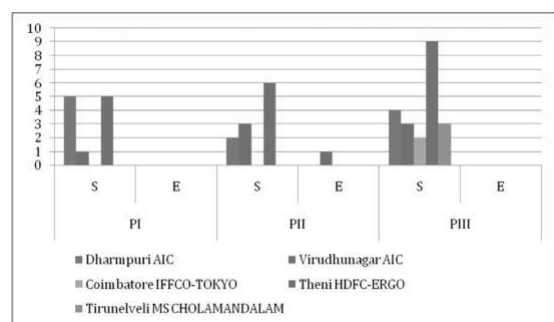
**Consecutive Dry Days/ Dry Days Index**

For Dharmapuri and Virudhunagar districts, consecutive dry days was covered only for a period of 71 days (from 1<sup>st</sup> Sep – 10<sup>th</sup> Nov) in the growing season. During that period, the strike S<sub>1</sub> to S<sub>5</sub> was considered as rainfall of < 2.5 mm occurred consecutively for 20 (S<sub>1</sub>) /25 (S<sub>2</sub>) /30 (S<sub>3</sub>) /35 (S<sub>4</sub>) /40

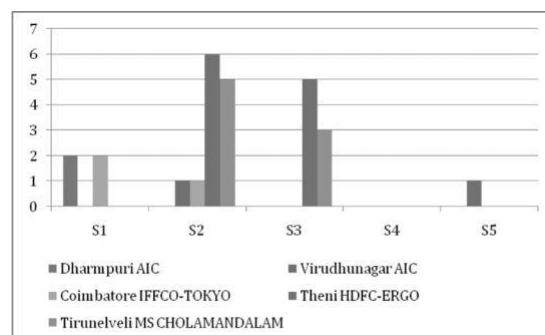
days(S<sub>5</sub>) respectively. In the 25 years of evaluation, only S<sub>1</sub> occurred for two times and for Virudhunagar district, S<sub>2</sub> and S<sub>5</sub> occurred one time each in 26 years of evaluation,

Coimbatore: CDD was covered only for 61 days (1<sup>st</sup> September - 31<sup>st</sup>October) in the growing season. During that period, the strike S<sub>1</sub> to S<sub>4</sub> was considered as rainfall of < 2.5 mm occur consecutively for 20 (S<sub>1</sub>) / 30 (S<sub>2</sub>) / 40 (S<sub>3</sub>) / 45 (S<sub>4</sub>). S<sub>1</sub> occurred for two times and S<sub>2</sub> for one time in the 30 years of evaluation.

For Theni and Tirunelveli districts, dry days index was covered under phase II. For Theni, the strike S<sub>1</sub> to S<sub>4</sub> was considered as rainfall of < 2.5 mm occur for 29 days(S<sub>1</sub>), 30 to 39 days (S<sub>2</sub>)/40 to 49 days(S<sub>3</sub>)/ and > 50 days(S<sub>4</sub>). For Tirunelveli, S<sub>1</sub> condition remained same as that of Theni. Remaining strike conditions were 30 to 44 days (S<sub>2</sub>)/45 to 54 days(S<sub>3</sub>)/ and > 55 days(S<sub>4</sub>). No money was paid for S<sub>1</sub> condition. In Theni, S<sub>2</sub> occurred for six times while S<sub>3</sub> occurred



**Fig .2. Comparison of strike events for Excess Rainfall Cover/ Excess Rainfall Index**



**Fig.3. Comparison of strike events for Consecutive Dry Days/ Dry Days Index**

**Table 5. Hypothetical premium payment and compensation benefit by farmer (in rupees)**

Weather perils	DRC/ WDI	ERC/ ERI	CDD/ DDI	TOTAL		Limited to 25 years	
				Prem-ium	Payout	Prem-ium	Payout
Dharmapuri	15934	2408	800	6250	19142	6250	19142
Virudhunagar	16474	2742	2150	6500	21367	6250	20544
Coimbatore	5994	551	1300	7500	7845	6250	6538
Theni	6762	7303	16000	6582	30065	5475	25054
Tirunelveli	3247	1294	7000	7500	11541	6250	9618

for five times while in Tirunelveli, S<sub>2</sub> occurred for five times while S<sub>3</sub> occurred for three times (Fig. 3).

On comparison of CDD/DDI, among the different companies, cumulative days of the strike event were considered by AIC and IFFCO-TOKYO while the strike events between particular days in the phase was considered in the remaining companies. With respect to DDI, HDFC-ERGO provide good compensation between particular days in the phase and this increased the payout benefit of the farmer.

The examination of five districts covered by four agricultural insurance companies on hypothetical premium payment and amount of compensation received over 25 years are given in Table 5. To arrive a good comparison among the different companies, the period was limited uniformly to 25 years.

A farmer at Theni district was highly benefitted followed by Virudhunagar and Dharmapuri district. farmer's at Coimbatore and Tirunelveli did not get compensation as compared to the mentioned

districts. In this study, Virudhunagar district was pronounced for high deficit rainfall risk wherein the farmers enrolled in the WBCIS, were highly benefitted by receiving timely payout for the weather peril concerned

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