International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

An Analysis of Enrolment Trends and Loss Ratios under PMFBY and RWBCIS in India

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Abstract:
Crop insurance in India has evolved through several schemes implemented over time. The most recent schemes are Pradhan Mantri Fasal Bima Yojana (PMFBY) and Restructured Weather Based Crop Insurance scheme (RWBCIS), launched in 2016. Since their implementation, PMFBY and RWBCIS have undergone several institutional and operational changes. Therefore, it becomes important to examine how participation pattern and loss ratios have changed over time to understand the current trajectory of the schemes. Using state/UT level data from the PMFBY portal for the period 2018 to 2024, this study analyses the overall, season-wise, and state/UT wise trends in the number of farmers insured, and the loss ratios under PMFBY and RWBCIS. The findings revealed that although the number of farmers insured declined and subsequently recovered during the study period, the pattern of recovery varied across seasons and schemes. A similar variation was also observed in the loss ratios, which differed considerably across schemes and seasons.

Keywords: Pradhan Mantri Fasal Bima Yojana, Restructured Weather Based Crop Insurance Scheme, Participation Pattern, Loss Ratio, India. JEL Code: Q180

1. Introduction

Farmers all over the world are exposed to multiple sources of risk. These risks can be classified as business or market risk, production risk, institutional or legal risk, human or personal risk, and financial risk. Although each type of risk has its own consequences, production risk remains one of the most critical threats to agricultural activities [1]. Climate related hazards such as droughts, floods, and erratic rainfall are some of the major sources of production risk which are causing a devastating impact on agricultural productivity and consequently on farm income [2]. When these hazards occur frequently, they increase the economic vulnerability of agricultural households with small and marginal farmers being the worst affected [3], [4]. This makes effective management of production risk increasingly important, especially in developing countries like India, where the majority of farm households operate on small landholdings and have limited resources to cope with such risks [5], [6], [7]. Under such circumstances, adopting agricultural insurance becomes as an important strategy to mitigate the harsh impact of crop failure due to climate related hazards [8].

In India, several agricultural insurance schemes were introduced over time with each scheme being an improved version of its predecessor. This gradual evolution eventually led to the introduction of Pradhan Mantri Fasal Bima Yojana (PMFBY) and Restructured Weather Based Crop Insurance Scheme (RWBCIS) in 2016 with the objective of providing crop insurance coverage against multiple perils. Since their launch,

both the schemes have continued to evolve through several institutional and operational changes [9], [10], [11]. Although these changes have influenced the implementation of the schemes over time, limited attention has been given to examining their implications for participation and scheme performance. While the existing literature on agricultural insurance in India has made significant contribution to several areas such as demand analysis [12], [13], [14], [15], [16], [17], [18] farmers wellbeing [19], food security [20], farm income [21], farmers production decisions [22], index insurance modelling [23], and insurance payout analysis [24], the trends in the number of farmers insured, state/UT participation pattern, and loss ratios under PMFBY and RWBCIS remain largely unexplored. To address this gap, the present study provides a systematic analysis of these three dimensions and offers a comprehensive empirical overview of the current trajectory of crop insurance schemes in India.

The remainder of the paper is organised as follows. Section 2 describes the data source and methodology used in this study. Section 3 presents the results and finally Section 4 presents the discussion, conclusion and policy relevance of the study.

2. Data Source and Methodology

The study relied exclusively on the officially reported data available on the PMFBY portal (https://pmfby.gov.in/adminStatistics/dashboard) as accessed on 17 February 2026. Although PMFBY and RWBCIS were launched in 2016, consistent and comparable state-wise data were available only from 2018 onward. Therefore, the analysis was restricted to the period from 2018 to 2024. The study utilised three primary variables: i) Number of farmers insured ii) Total premium collected and iii) Total claims paid to assess the current trajectory of the crop insurance schemes.

The trend in the number of farmers insured was analysed in three stages. First, state level data on the number of farmers insured under both the crop insurance schemes (PMFBY/RWBCIS) were extracted for each season (Kharif/Rabi) and year to examine state level trends. Second, the state level data were aggregated to obtain the total number of farmers insured for each season and year which was used to analyse overall seasonal trends. Finally, the Kharif and Rabi seasonal totals were combined to examine the overall annual trend under each scheme.

The analysis of participation pattern of state/UTs in the crop insurance schemes was carried out by preparing a list of participating states/UTs for each year and season based on the PMFBY portal and comparing these lists across years. If a state/UTs did not appear in the dataset for a given season and year, it was classified as non-implementation (NI) for that state, season, and year.

The latter two variables were used to compute the loss ratio for each state, season (Kharif and Rabi), and year. The loss ratio was calculated as [25]:

$$\boldsymbol{Loss\ Ratio_{ist}} = \left(\frac{\boldsymbol{Total\ Claims\ Paid_{ist}}}{\boldsymbol{Total\ Premium\ Collected_{ist}}}\right) \boldsymbol{X\ 100}$$

where $\boldsymbol{i}$ denotes the state, $\boldsymbol{s}$ denotes the season and $\boldsymbol{t}$ denotes the year. In addition, the average loss ratio for each state and season was calculated as the arithmetic mean of annual loss ratios for the years in which the scheme was implemented:

$$\boldsymbol{Average\ Loss\ Ratio_{is}} = \frac{\sum_t \boldsymbol{Loss\ Ratio_{ist}}}{\boldsymbol{T_{is}}}$$

where, T_{is} denotes the number of years the scheme was implemented for state i in season s. Since the average loss ratio may conceal extreme annual loss ratio, the maximum and minimum annual loss ratios were determined for each state and season to capture extreme claim years and better reflect the variability in indemnity patterns.

3. Results

3.1 Overall and Seasonal Trend in the Number of Farmers Insured under PMFBY and RWBCIS

3.1.1 PMFBY

As shown in Table 1, the total number of farmers insured under PMFBY (Kharif and Rabi combined) declined from 37.44 million in 2018 to 25.21 million in 2021. Thereafter, it increased to 36.23 million in 2023, and dropped to 35.54 million in 2024.

Season wise data showed that the total number of farmers insured during the Kharif season was consistently higher than during the Rabi season. The total number of farmers insured during the Kharif season declined from 22.59 million in 2018 to 15.50 million in 2021, followed by an increase to 24.07 million in 2024. During the Rabi season, the number of farmers insured declined from 14.84 million in 2018 to 9.32 million in 2019. Thereafter, it increased to 9.85 million in 2020, declined slightly to 9.70 million in 2021, increased again to 13.00 million in 2023, and declined again to 11.47 million in 2024.

3.1.2 RWBCIS

As shown in Table 1, the total number of farmers insured under RWBCIS was 1.95 million in 2018, after which it declined sharply to 0.64 million in 2021. Thereafter, it increased to 1.74 million in 2023 before declining again to 1.34 million in 2024.

Similar to PMFBY, the total number of famers insured during the Kharif season remained consistently higher than during Rabi season. The total number of farmers insured during Kharif season increased from 1.36 million in 2018 to 1.42 million in 2019, after which it declined to 0.37 million in 2021. Thereafter, it increased to 1.20 million in 2023 before declining again to 0.98 million in 2024. During Rabi season, the total number of farmers insured declined from 0.59 million in 2018 to 0.26 million in 2021, increased to 0.53 million in 2023, and then declined to 0.35 million in 2024. Overall, participation under both schemes remained more concentrated in Kharif season than in Rabi season.

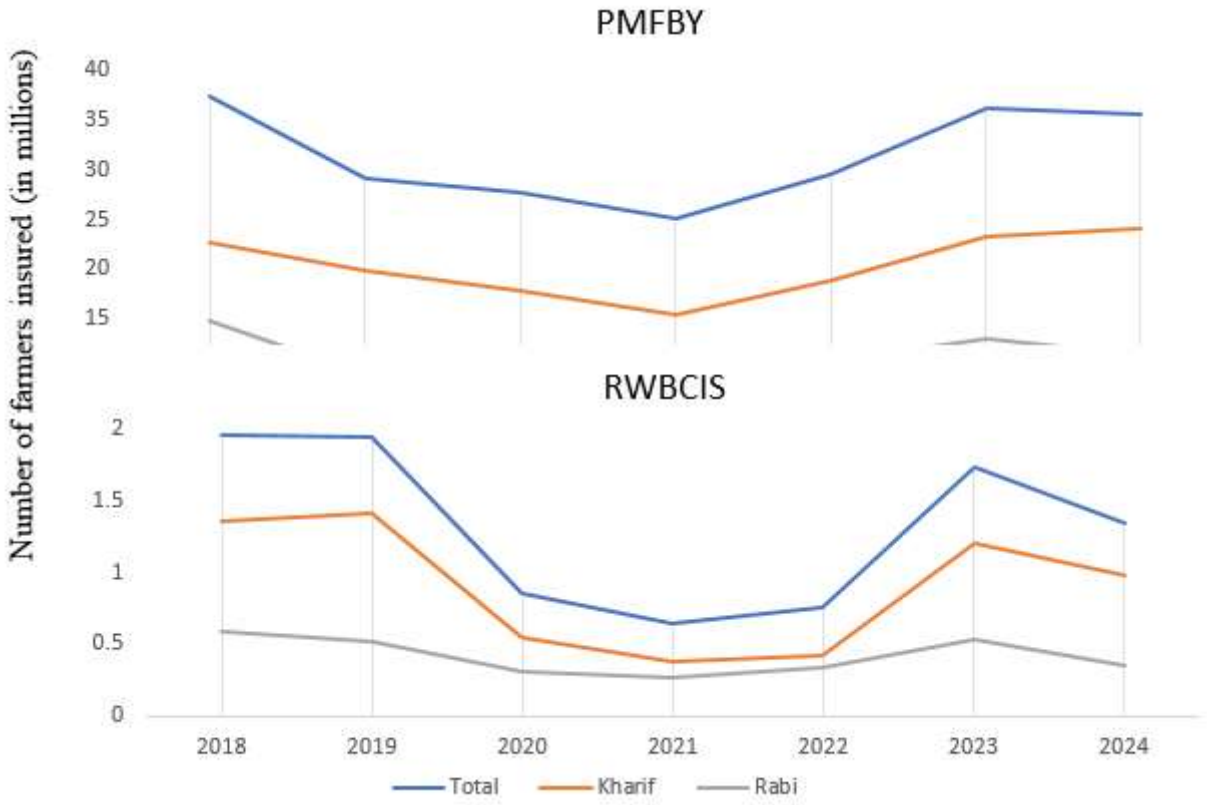
Table 1: Farmers insured under crop insurance schemes 2018–2024

Farmers Insured under PMFBY				**Farmers Insured under RWBCIS**		
Year	**Kharif**	**Rabi**	**Total (Overall)**	**Kharif**	**Rabi**	**Total (Overall)**
2018	22599050	14848311	37447361	1366986	592803	1959789
2019	19862742	9325947	29188689	1421598	522560	1944158
2020	17937127	9859100	27796227	549213	309370	858583
2021	15508670	9708272	25216942	379059	261564	640623
2022	18814901	10733595	29548496	422412	332384	754796
2023	23230638	13001218	36231856	1203184	539929	1743113
2024	24071118	11470117	35541235	988659	358369	1347028

To better illustrate the overall and season wise trends in the number of farmers insured under PMFBY and RWBCIS, the data are presented graphically. Figure 1 shows the overall and season wise trend in the number of farmers insured under PMFBY and RWBCIS. The total number of farmers insured under both PMFBY and RWBCIS showed a declining trend between 2018 and 2021, followed by a recovery in subsequent years. A similar declining trend was also observed at the seasonal level up to 2021; however, the recovery pattern thereafter differed across schemes and seasons. Under PMFBY, participation in the Kharif season recovered to a level above its initial value (2018), whereas in Rabi season it remained below

the initial level. Under RWBCIS, although the number of farmers insured declined and recovered in subsequent years, it remained below the initial level (2018) in both seasons.

Figure 1: Overall and seasonal trend in the Number of Farmers Insured under PMFBY and RWBCIS



3.2 State/UT Participation Pattern under PMFBY and RWBCIS

3.2.1 PMFBY

Table 2 shows participation pattern of states and union territory for the period 2018 to 2024. PMFBY was implemented by 20 states and 2 Union Territories in 2018. Although the number of states implementing PMFBY declined to 17 by 2024, the number of Union Territories increased to 3. Among these Assam, Tripura (from Rabi 2018), Andaman and Nicobar Islands (from Kharif 2020), Chhattisgarh, Haryana, Himachal Pradesh, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Uttar Pradesh, and Uttarakhand showed continuous and consistent participation throughout the study period. Goa, despite not participating in one season (Rabi 2020), remained largely consistent. Karnataka and Kerala also showed continuous participation for several years but withdrew in 2023 and 2022, respectively.

International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

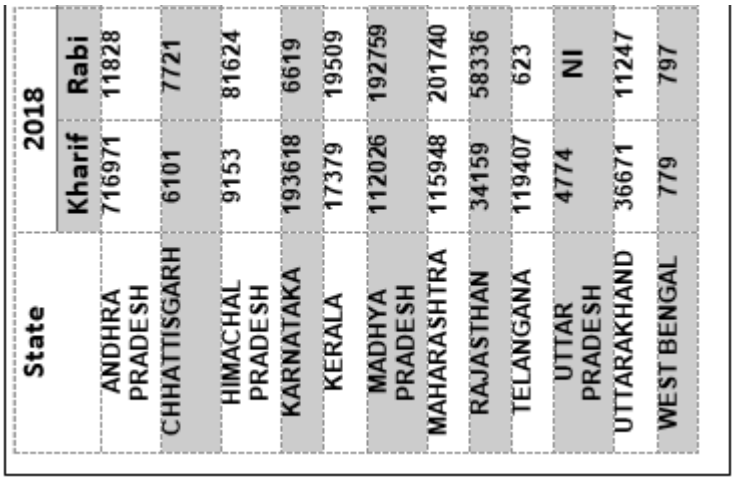
Table 2: State/ UT Participation Pattern in PMFBY

2019		2020		2021		2022		2023		2024	
Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi
NI	NI	263	44	347	169	131	31	186	12	149	31
1030852	NI	NI	NI	NI	NI	2528947	1522732	2268027	1292095	2405480	291180
366657	360274	550307	807163	468539	480593	231020	205598	336780	230875	624990	270637
1324319	135185	1313022	235499	1264404	222040	1310681	267938	1419859	278323	1427360	278039
109	49	33	NI	23	12	196	35	57	22	83	15
2	261	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
683796	690061	642551	565178	528807	511594	527609	489936	249817	230932	373740	354638
87228	88923	85534	84783	87663	84066	94870	92002	95148	96544	96597	103491
NI	NI	NI	NI	49418	37200	47881	40788	160423	77222	140603	58927
881800	41121	NI	NI	NI	NI	NI	NI	NI	NI	2084701	138277
1416719	10611	1344763	161072	690409	171872	1093617	180120	1085154	297799	NI	NI
6008	6831	8691	5062	5160	4790	5145	4450	NI	NI	NI	NI
2521830	2002944	2824498	2151141	2466107	2005739	2432167	2048047	2429672	2026363	2406216	2046148
4733574	653818	4274947	565975	3602696	659723	4354222	403163	7812782	3569371	7541744	2846069
2522	NI	NI	15	2144	121	3173	224	3162	363	4305	NI
605	NI	130	NI	NI	NI	270	67	32943	2252	42842	381
1992223	62559	1585942	52063	1215408	34005	1141752	28144	2254508	132444	2241621	181326
NI	8306	336	9367	2989	10739	2813	10683	2729	10615	3293	11530
2178082	2061937	3039336	2141014	3079803	2353280	3027888	2341414	3052482	2319152	3029839	2292003
NI	21	46	22	2117	49	3181	1366	2992	NI	436	248
142102	1039810	187246	1272754	47270	1363953	NI	1262704	NI	1093563	73629	972328
480235	205452	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
27392	6314	168926	48253	168859	73155	168713	91244	177571	83694	7706	12216
1907316	1904033	1866530	1729817	1781856	1660723	1791054	1677210	1810908	1232794	1531689	1585381
79371	47437	44026	29878	44651	34449	49571	65699	35438	26783	34095	27252
NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

State	2018	
	Kharif	Rabi
ANDAMAN & NICOBAR ISLANDS	NI	NI
ANDHRA PRADESH	830320	463577
ASSAM	24275	46129
CHHATTISGARH	1191580	168584
GOA	320	1
GUJARAT	53	139
HARYANA	636890	672132
HIMACHAL PRADESH	82359	85540
JAMMU AND KASHMIR	83708	66354
JHARKHAND	959240	71314
KARNATAKA	2111355	564692
KERALA	6549	7518
MADHYA PRADESH	3000178	2509388
MAHARASHTRA	4505252	2388824
MANIPUR	NI	NI
MEGHALAYA	NI	NI
ODISHA	1782706	69271
PUDUCHERRY	1	101
RAJASTHAN	2042794	1661415
SIKKIM	188	NI
TAMIL NADU	145269	1153034
TELANGANA	447953	181968
TRIPURA	NI	2015
UTTAR PRADESH	2765878	2646731
UTTARAKHAND	85760	43934
WEST BENGAL	1896422	2045650

Table 3: State/UT Participation Pattern in RWBCIS

2019		2020		2021		2022		20123		2024	
Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Rabi	Kharif	Rabi
558068	NI	NI	NI	NI	NI	NI	NI	192571	800601	15256
6781	7761	9569	5963	11270	8952	16060	13422	8327	7814	5032
12225	82530	6299	61968	8089	55792	9002	56817	58586	5449	61744
238573	NI	282747	8112	171061	7962	203352	11,021	NI	NI	NI
17913	16371	21859	21774	21050	33888	35465	46161	59101	46115	58899
76794	126986	NI	NI	NI	NI	NI	NI	NI	NI	NI
202013	205642	165801	152518	104175	98521	88587	142189	143990	49289	137409
11288	63734	9874	36979	6901	31816	6997	21374	38856	12396	38431
250777	604	NI	NI	NI	NI	NI	NI	NI	NI	NI
5,782	3555	4525	964	5475	1762	4,781	1942	981	4681	596
41384	15377	48539	21092	51038	22871	58168	39458	37517	62314	41002
NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI



State	2018	
	Kharif	Rabi
ANDHRA PRADESH	716971	11828
CHHATTISGARH	6101	7721
HIMACHAL PRADESH	9153	81624
KARNATAKA	193618	6619
KERALA	17379	19509
MADHYA PRADESH	112026	192759
MAHARASHTRA	115948	201740
RAJASTHAN	34159	58336
TELANGANA	119407	623
UTTAR PRADESH	4774	NI
UTTARAKHAND	36671	11247
WEST BENGAL	779	797

A few states completely withdrew from the scheme; these are Gujarat and Telangana from 2020 and West Bengal from 2019. Meanwhile, Andhra Pradesh, Jammu and Kashmir, Jharkhand, Manipur, Meghalaya, Puducherry, Sikkim, and Tamil Nadu exhibited inconsistent participation, frequently withdrawing from the scheme for multiple seasons and rejoining in subsequent seasons.

3.2.2 RWBCIS

Table 3 shows the state-wise participation pattern of RWBCIS. In 2018, 12 states implemented RWBCIS, which declined to 9 states by 2024. Among these, Chhattisgarh, Himachal Pradesh, Kerala, Maharashtra, Rajasthan, and Uttar Pradesh (from Rabi 2018), Uttarakhand exhibited continuous and consistent participation. On the other hand, three states withdrew from the scheme Madhya Pradesh and Telangana from 2020, and West Bengal from 2019. Meanwhile, Andhra Pradesh did not participate between the Rabi season of 2019 and 2022 but rejoined from 2023 onward, while Karnataka participated until the Rabi season of 2023, with absence in Rabi 2019.

3.3 State/UT wise Trend in the Number of Farmers Insured under PMFBY and RWBCIS

This section provides state/UT wise trend analysis of the number of farmers insured under both the crop insurance schemes during the study period. Sparkline graphs were generated in Excel using the data reported in Table 2 for PMFBY and Table 3 for RWBCIS to visually examine the pattern. For each state/UT, the number of farmers insured from 2018 to 2024 was plotted to capture the pattern of change over time. Thereafter, the states/UTs were grouped based on comparison of number of farmers insured between initial year (2018) and final year (2024) to capture broad trend in the number of farmers insured over the study period. A state was classified as showing upward movement if the number of farmers insured in 2024 exceeded the level observed in 2018 indicating a strong recovery, and downward movement if the opposite was observed. Although states/UTs exhibited considerable fluctuations in the intermediate years, the classification reflects whether the final level of participation remained above or fell below the initial level observed in 2018. The classification is visually presented in Figures 2 and 3, where green line graphs indicate states/UTs that showed an overall upward movement in farmer insured between 2018 and 2024, while red line graphs indicate that downward movement over the same period. The red dots represent the data points for each year, while gaps in the sparkline graphs indicate years of non-implementation (NI), reflecting the absence of data for the respective state.

Under PMFBY an upward movement in the number of farmers insured during both Kharif and Rabi seasons was observed in Assam, Chhattisgarh, Himachal Pradesh, Jharkhand, Maharashtra, Manipur,

Meghalaya, Odisha Puducherry, Rajasthan, and Sikkim. In contrast a downward movement during both seasons was observed in Andaman and Nicobar Islands, Haryana, Karnataka, Kerala, Madhya Pradesh, Tamil Nadu, Uttar Pradesh, and Uttarakhand. On the other hand, Andhra Pradesh and Jammu and Kashmir showed an upward movement in the Kharif season but a downward movement in the Rabi season while Goa and Tripura showed an upward movement in the Rabi season but a downward movement in the Kharif season.

Under RWBCIS, Andhra Pradesh, Karnataka, Kerala, and Uttarakhand showed an upward movement in the number of farmers insured during both seasons. In contrast, Himachal Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh showed a downward movement during both seasons. Chhattisgarh however showed an upward movement in the Kharif season but a downward movement in the Rabi season.

Figure 2: State/UT wise pattern in the number of farmers insured under PMFBY

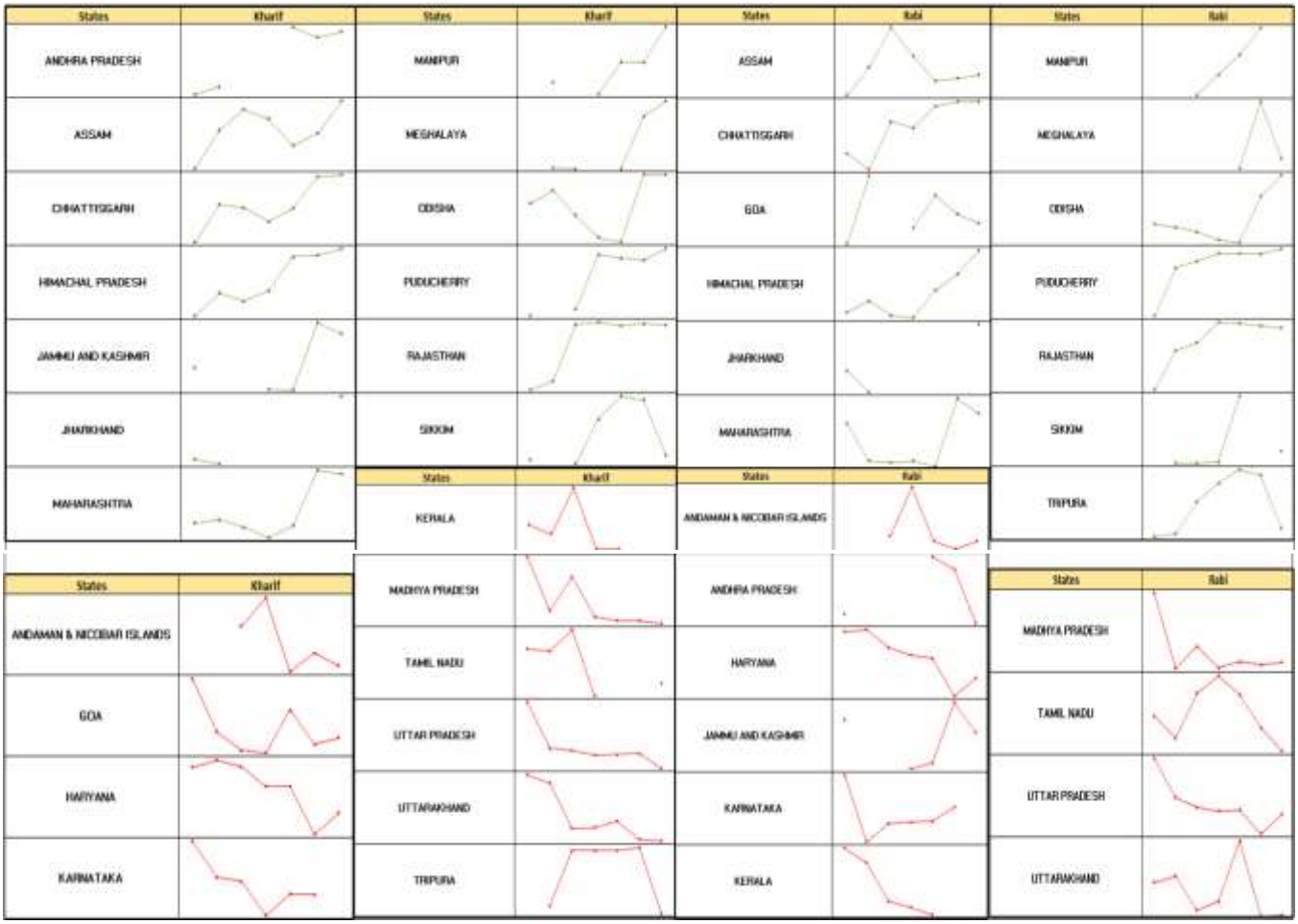
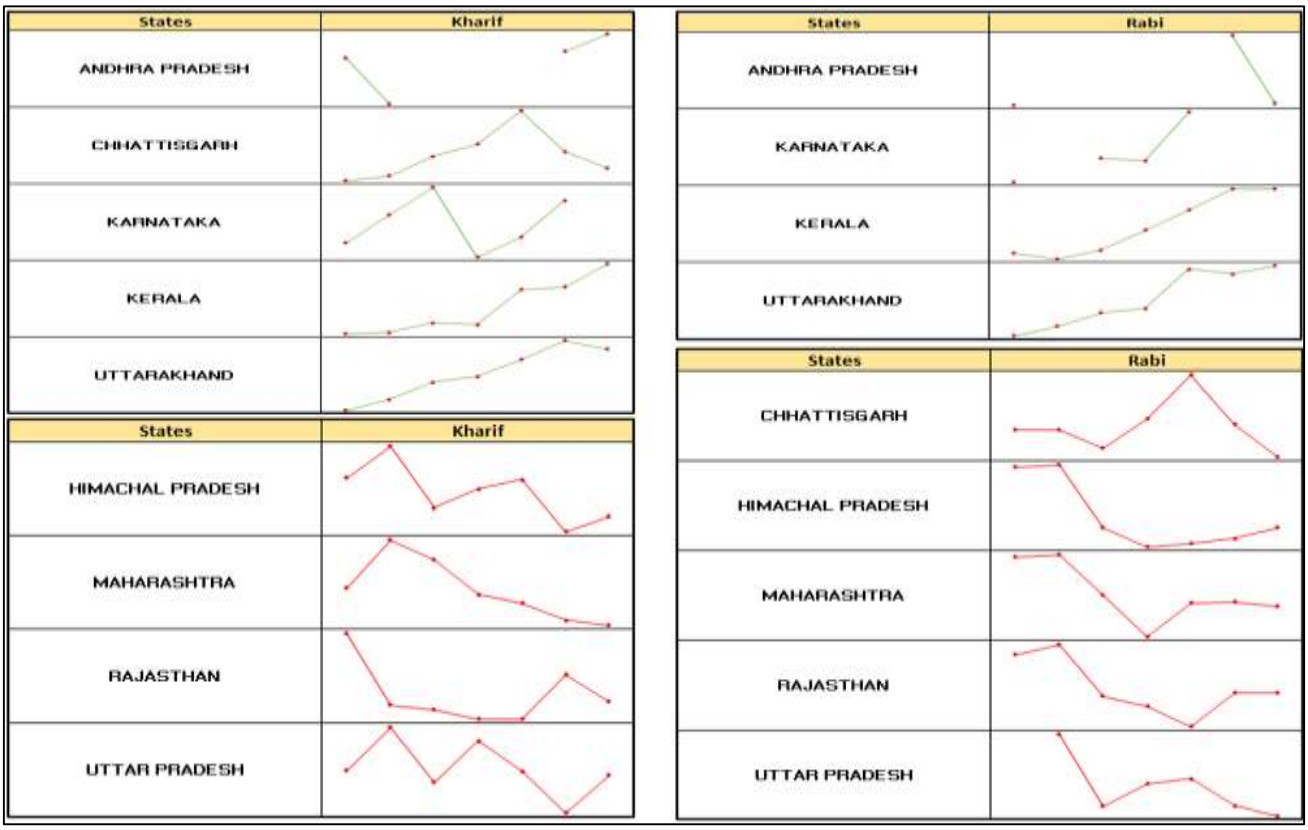


Figure 3: State/UT wise pattern in the number of farmers insured Under RWBCIS



3.4 Pattern of Loss Ratio under PMFBY and RWBCIS

3.4.1 PMFBY (Kharif)

Table 5 presents the loss ratios of all States/UTs under PMFBY (Kharif) during the study period. Kerala, Puducherry, Uttarakhand, Tamil Nadu, Himachal Pradesh, Meghalaya and Haryana had average loss ratios exceeding 100 percent. The indemnity payments in these regions on average surpassed the premiums collected. It was further observed that Goa, Madhya Pradesh, Jammu and Kashmir, Jharkhand, Tripura, Chhattisgarh, Maharashtra, Andhra Pradesh, Assam, Telangana, Rajasthan, Uttar Pradesh and Odisha, had average loss ratios less than 100 percent however, in some years, the loss ratio exceeded 100 percent as indicated by the maximum value. This pattern suggests that even states/UTs with moderate average performance experienced occasional spikes in indemnity payment. The remaining states/UT i.e. Manipur, Andaman and Nicobar Islands, Karnataka and Sikkim had loss ratios less than 100 percent in terms of both average and maximum values.

3.4.2 PMFBY (Rabi)

Under PMFBY (Rabi), the pattern of loss ratios presented in Table 6 was broadly similar to that observed during Kharif season. The states/UTs in which the average loss ratio exceeded 100 percent were Sikkim, Chhattisgarh, Odisha, Kerala and Himachal Pradesh. States with average loss ratios less than 100 percent and maximum values above 100 percent was observed in Telangana, Tamil Nadu, Assam, Haryana, Rajasthan, Andhra Pradesh, Maharashtra, Jharkhand and Uttarakhand. The remaining states/UTs i.e. Madhya Pradesh, Uttar Pradesh, Puducherry, Tripura, Andaman and Nicobar Islands, Jammu and Kashmir, Manipur, Goa, Karnataka and Meghalaya had loss ratios less than 100 percent in terms of both average and maximum values.

3.4.3 RWBCIS (Kharif)

Under RWBCIS (Kharif), as presented in Table 7, only two states Madhya Pradesh and Uttar Pradesh had average loss ratios exceeding 100 percent. States with average loss ratios less than 100 percent and maximum values above 100 percent includes Uttarakhand, Kerala, Rajasthan, Himachal Pradesh, Andhra Pradesh and Maharashtra. The remaining states Telangana, West Bengal, Chhattisgarh and Karnataka had loss ratios less than 100 percent in terms of both average and maximum values.

3.4.4 RWBCIS (Rabi)

The loss ratio pattern under RWBCIS rabi as observed from Table 8, was broadly similar to that of RWBCIS kharif. States where the average loss ratio exceeded 100 percent are Madhya Pradesh and Maharashtra. States with average loss ratio less than 100 percent and maximum value more than 100 percent was observed in Kerala, Rajasthan and Uttarakhand. Other states with loss ratios less than 100 percent in terms of both average and maximum values included Telangana, Uttar Pradesh, Himachal Pradesh, Chhattisgarh, Andhra Pradesh, Karnataka and West Bengal.

The loss ratio under both the crop insurance schemes showed substantial variation across states and over time. While some states consistently experienced loss ratios greater than 100 percent across multiple years, others experienced high loss ratios only in specific years, while a few remained relatively stable throughout the study period.

Table 5: State wise Loss Ratio % (PMFBY) Kharif)

State	2018	2019	2020	2021	2022	2023	2024	Sum of Loss Ratio	Average Loss Ratio	Max	Min	Range
	Kharif	Kharif	Kharif	Kharif	Kharif	Kharif	Kharif					
KERALA	357.11	251.81	230.31	801.46	59.17	NI	NI	1699.87	339.97	801.46	59.17	742.29
PUDUCHERRY	0.00	NI	449.50	0.00	375.50	144.27	205.94	1175.21	195.87	449.50	0.00	449.50
UTTARAKHAND	145.87	37.55	13.48	587.19	186.55	137.81	27.87	1136.32	162.33	587.19	13.48	573.71
TAMIL NADU	166.62	135.73	109.90	53.18	NI	NI	284.91	750.34	150.07	284.91	53.18	231.72
HIMACHAL PRADESH	362.63	128.85	86.01	96.76	53.89	154.51	42.36	924.99	132.14	362.63	42.36	320.26
MEGHALAYA	NI	200.46	187.81	NI	18.79	136.80	67.41	611.26	122.25	200.46	18.79	181.67
HARYANA	141.33	68.12	104.53	158.52	209.41	38.54	33.76	754.22	107.75	209.41	33.76	175.65
GOA	302.88	38.73	0.00	0.00	0.00	0.00	263.37	604.98	86.43	302.88	0.00	302.88
MANIPUR	NI	90.55	NI	91.40	84.79	88.95	71.96	427.65	85.53	91.40	71.96	19.44
MADHYA PRADESH	51.27	217.36	150.29	32.35	27.18	42.74	62.80	583.98	83.43	217.36	27.18	190.18
MAHARASHTRA	87.22	125.75	20.39	83.62	91.22	101.75	61.69	571.64	81.66	125.75	20.39	105.36
RAJASTHAN	111.00	96.87	65.13	109.15	46.89	86.28	41.46	556.79	79.54	111.00	41.46	69.53

JAMMU AND KASHMIR	50.53	NI	NI	213.71	16.20	44.75	42.60	367.78	73.56	213.71	16.20	197.51
UTTAR PRADESH	56.00	109.20	35.09	95.57	94.85	52.67	66.97	510.34	72.91	109.20	35.09	74.10
TELANGANA	116.50	20.17	NI	NI	NI	NI	NI	136.67	68.33	116.50	20.17	96.33
JHARKHAND	191.18	7.62	NI	NI	NI	NI	0.00	198.80	66.27	191.18	0.00	191.18
TRIPURA	NI	86.89	40.65	30.60	6.45	13.74	187.36	365.69	60.95	187.36	6.45	180.91
CHHATTISGARH	129.13	56.48	50.53	82.81	17.99	14.14	8.52	359.60	51.37	129.13	8.52	120.61
ODISHA	101.34	51.19	39.31	81.29	45.21	15.87	10.05	344.25	49.18	101.34	10.05	91.28
ANDHRA PRADESH	123.40	72.36	NI	NI	30.28	4.46	5.65	236.16	47.23	123.40	4.46	118.94
WEST BENGAL	42.07	NI	NI	NI	NI	NI	NI	42.07	42.07	42.07	42.07	0.00
ASSAM	2.27	43.19	45.71	119.13	12.40	49.17	21.69	293.56	41.94	119.13	2.27	116.87
ANDAMAN & NICOBAR ISLANDS	NI	NI	0.00	0.00	0.00	56.43	49.32	105.75	21.15	56.43	0.00	56.43
GUJARAT	0.00	0.00	NI	NI	NI	NI	NI	0.00	0.00	0.00	0.00	0.00
KARNATAKA	0.00	0.00	0.00	0.00	0.00	0.00	NI	0.00	0.00	0.00	0.00	0.00
SIKKIM	0.00	NI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 6: State wise Loss Ratio % (PMFBY Rabi)

State	2018 Rabi	2019 Rabi	2020 Rabi	2021 Rabi	2022 Rabi	2023 Rabi	2024 Rabi	Sum of Loss Ratio	Average Loss Ratio	Max	Min	Range
SIKKIM	NI	0.00	2820.87	0.00	0.00	NI	97.13	2918.01	583.60	2820.87	0.00	2820.87
CHHATTISGARH	82.18	1081.77	141.50	224.02	117.96	143.11	49.51	1840.06	262.87	1081.77	49.51	1032.26
ODISHA	360.54	914.77	83.03	65.66	117.58	9.25	17.53	1568.36	224.05	914.77	9.25	905.52
KERALA	30.26	25.77	120.26	499.80	121.88	NI	NI	797.98	159.60	499.80	25.77	474.03
HIMACHAL PRADESH	405.07	415.40	125.55	31.07	57.35	2.32	0.99	1037.73	148.25	415.40	0.99	414.41
WEST BENGAL	91.97	NI	NI	NI	NI	NI	NI	91.97	91.97	91.97	91.97	0.00
TELANGANA	157.56	25.43	NI	NI	NI	NI	NI	182.99	91.49	157.56	25.43	132.13
TAMIL NADU	160.57	59.71	84.97	27.96	31.01	69.24	104.63	538.08	76.87	160.57	27.96	132.61
ASSAM	29.10	97.80	74.03	226.92	14.58	20.02	50.82	513.28	73.33	226.92	14.58	212.33

HARYANA	51.87	87.76	44.60	77.69	146.93	35.01	30.33	474.18	67.74	146.93	30.33	116.60
RAJASTHAN	56.94	94.14	61.78	44.20	102.28	62.25	41.07	462.67	66.10	102.28	41.07	61.21
ANDHRA PRADESH	213.92	NI	NI	NI	3.95	23.49	0.00	241.36	60.34	213.92	0.00	213.92
MAHARASHTRA	143.26	22.89	8.61	15.62	95.17	32.83	10.05	328.43	46.92	143.26	8.61	134.65
JHARKHAND	115.07	16.13	NI	NI	NI	NI	0.00	131.20	43.73	115.07	0.00	115.07
UTTARAKHAND	2.41	59.71	59.83	47.31	101.66	24.73	9.61	305.26	43.61	101.66	2.41	99.26
MADHYA PRADESH	94.59	5.42	26.95	57.60	28.00	20.13	17.59	250.27	35.75	94.59	5.42	89.17
UTTAR PRADESH	2.71	46.84	26.09	24.00	28.36	45.55	36.09	209.64	29.95	46.84	2.71	44.13
PUDUCHERRY	0.00	0.00	0.00	50.52	0.00	50.65	94.61	195.78	27.97	94.61	0.00	94.61
TRIPURA	22.25	76.75	23.70	7.73	30.96	0.62	12.68	174.68	24.95	76.75	0.62	76.12
ANDAMAN & NICOBAR ISLANDS	NI	NI	0.00	0.00	0.00	0.00	81.24	81.24	16.25	81.24	0.00	81.24
JAMMU AND KASHMIR	11.03	NI	NI	11.97	14.51	9.57	30.03	77.12	15.42	30.03	9.57	20.46
MANIPUR	NI	NI	0.00	0.00	57.68	0.00	NI	57.68	14.42	57.68	0.00	57.68
GOA	0.00	0.00	NI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GUJARAT	0.00	0.00	NI	NI	NI	NI	NI	0.00	0.00	0.00	0.00	0.00
KARNATAKA	0.00	0.00	0.00	0.00	0.00	0.00	NI	0.00	0.00	0.00	0.00	0.00
MEGHALAYA	NI	NI	NI	NI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

State	Kharif 2018	Kharif 2019	Kharif 2020	Kharif 2021	Kharif 2022	Kharif 2023	Kharif 2024	Sum of Loss Ratio	Average Loss Ratio	Max	Min	Range
MADHYA PRADESH	216.44	94.88	NI	NI	NI	NI	NI	311.32	155.66	216.44	94.88	121.56
UTTAR PRADESH	52.17	53.29	143.59	63.62	172.31	345.53	216.24	1046.76	149.54	345.53	52.17	293.36
UTTARAKHAND	110.31	107.46	99.38	22.55	76.98	83.35	191.93	691.96	98.85	191.93	22.55	169.38
KERALA	61.62	126.18	169.99	0.69	161.88	150.22	0.00	670.57	95.80	169.99	0.00	169.99
TELANGANA	81.49	84.28	NI	NI	NI	NI	NI	165.76	82.88	84.28	81.49	2.79
WEST BENGAL	78.48	NI	NI	NI	NI	NI	NI	78.48	78.48	78.48	78.48	0.00
MAHARASHTRA	101.62	102.21	10.42	88.89	44.85	101.95	95.10	545.03	77.86	102.21	10.42	91.78

HIMACHAL PRADESH	98.74	99.42	21.27	27.20	74.90	119.62	0.00	441.16	63.02	119.62	0.00	119.62
RAJASTHAN	101.63	19.50	29.52	0.19	87.51	168.54	0.00	406.89	58.13	168.54	0.00	168.54
CHHATTISGARH	33.98	82.35	52.72	66.83	44.93	46.19	64.35	391.35	55.91	82.35	33.98	48.37
ANDHRA PRADESH	107.61	103.41	NI	NI	NI	0.00	0.00	211.02	52.75	107.61	0.00	107.61
KARNATAKA	0.00	0.00	0.00	0.00	0.00	0.00	NI	0.00	0.00	0.00	0.00	0.00

State	Rabi 2018	Rabi 2019	Rabi 2020	Rabi 2021	Rabi 2022	Rabi 2023	Rabi 2024	Sum of Loss Ratio	Average Loss Ratio	Max	Min	Range
MADHYA PRADESH	124.26	156.97	NI	NI	NI	NI	NI	281.23	140.62	156.97	124.26	32.71
MAHARASHTRA	125.16	73.50	53.99	122.82	114.40	116.47	119.50	725.85	103.69	125.16	53.99	71.17
KERALA	52.38	104.66	117.38	97.89	109.76	172.25	0.00	654.32	93.47	172.25	0.00	172.25
UTTARAKHAND	98.58	89.81	74.83	70.61	66.10	147.83	92.84	640.60	91.51	147.83	66.10	81.73
TELANGANA	80.90	74.90	NI	NI	NI	NI	NI	155.80	77.90	80.90	74.90	6.00
RAJASTHAN	166.24	135.47	68.65	0.84	118.15	53.75	0.00	543.10	77.59	166.24	0.00	166.24
UTTAR PRADESH	NI	79.85	59.35	49.97	8.52	73.62	53.79	325.11	54.19	79.85	8.52	71.32
HIMACHAL PRADESH	0.00	4.83	75.85	86.22	65.72	90.50	0.00	323.12	46.16	90.50	0.00	90.50
CHHATTISGARH	66.01	43.69	29.85	56.27	34.90	17.77	50.54	299.02	42.72	66.01	17.77	48.24
ANDHRA PRADESH	81.38	NI	NI	NI	NI	0.00	0.00	81.38	27.13	81.38	0.00	81.38
KARNATAKA	0.00	NI	0.00	0.00	0.00	NI	NI	0.00	0.00	0.00	0.00	0.00
WEST BENGAL	0.00	NI	NI	NI	NI	NI	NI	0.00	0.00	0.00	0.00	0.00

4. Discussion and Conclusion

Crop insurance in India has evolved through several schemes implemented over time. The most recent initiatives are Pradhan Mantri Fasal Bima Yojana (PMFBY) and Restructured Weather Based Crop Insurance Scheme (RWBCIS), launched in 2016. Since their implementation, both schemes have undergone several administrative and operational changes and therefore, examining how trend in the number of farmers insured and loss ratios have evolved over time becomes important for understanding the current trajectory of these schemes. Using state level data for the period 2018 to 2024 from PMFBY portal, this study presents a descriptive analysis of overall, state wise, and season wise trend in the number of farmers insured, along with an analysis of loss ratios.

The findings of this study have important policy relevance. Although the overall number of farmers insured under both crop insurance schemes showed decline followed by recovery during the study period,

examination of seasonal trends revealed a different pattern. While the declining phase was broadly similar across both seasons and schemes, the nature of recovery differed. Under PMFBY, weaker recovery was observed during Rabi season, while under RWBCIS, weaker recovery was observed across both seasons. Since these seasonal observations are based on aggregates across states, a more nuanced understanding emerges from the state/UT-level analysis. While the number of farmers insured in some states/UTs showed upward movement during the study period, the concern lies in the regions where downward movement was observed. Although there could be several factors as stated in [26] explaining these downward movements, there is a need for state/UT level studies to better understand the reasons behind such trends. In addition, the frequent entry and exit of states/UTs from these schemes points towards the importance of examining the factors influencing such decisions. Finally, the pattern of loss ratios indicated considerable variation in indemnity outgo across regions. While part of this variation may be attributed to the nature of agricultural risk in those regions, the persistence of loss ratios greater than 100 percent in certain states and in specific years raises important questions about the underlying factors. These observed pattern of loss ratios may be explained by several factors such as adverse selection and moral hazard [27], [28], [29] as well as premium mispricing [30], [31], [32]. While the present study does not empirically study these mechanisms in the context of PMFBY and RWBCIS, the findings highlight the need for closer examination of the factors for such sustained financial imbalance in specific regions. Nevertheless, the study has certain limitations. The study relies exclusively on data obtained from the PMFBY portal. The results reflect the figures reported at the date of data extraction; therefore, any reporting gap or subsequent revisions or updates to the dataset are beyond the scope of this study.

Authors contribution: *Conceptualization, A.K.S.; methodology, A.K.S.; formal analysis, A.K.S.; investigation, A.K.S.; data curation, A.K.S.; writing—original draft preparation, A.K.S.; visualization, A.K.S.; validation, A.K.S. and A.R.; writing—review and editing, A.R.; supervision, A.R. All authors have read and agreed to the published version of the manuscript.*

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