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Performance and progress of crop insurance scheme (PMFBY) on paddy farming in Tiruvannamalai District of Tamil Nadu

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Abstract

Agriculture, a significant economic sector, is usually seen as an industry. It is vulnerable to a variety of natural disasters. Insurance is a vital tool for providing protection during dangerous operations, and it plays an important role in agricultural output. The specific objective of the study has assessed a Performance and Progress of crop insurance (PMFBY) on paddy farming in the study area with insured and non-insured farmer response. The study is based on the data collected from 80 insured farmers and 40 non-insured farmers in Tiruvannamalai District of Tamil Nadu resulted sample design of 120 respondent. That total number of farmers covered under the scheme was 11670 in 1084 notified villages of Kharif 2016. Tamil Nadu has benefited from the scheme with coverageof 0.13 lakh farmers and 0.31 lakh ha. In Tiruvannamalai district paddy crop contribute the major area of 76.01 percent to total coverage under crop insurance scheme. Paddy yield from the sample farmers ranges from 36 to 42 quintals per hectare with an average yield of 38.90 quintals per hectare. The yield instability of index for paddy crop in last 3 years, last 5 years and last 10 years were 0.0132, 0.0036 and 0.0167 respectively. Hence it could be concluded that there is occurrence of yield risk in the district. The actual yield of paddy was 41.90 quintals per hectare in the year 2019-20. But the sample farmers mean yield was 38.90 quintal per hectare and coefficient of variation was 3.96. Therefore it could be concluded that average yield loss from sample farmers was 1.34 quintal per hectare and it represent of 3.56 percent of yield loss among the sample farms. This indicates that there was medium risk in yield of Paddy.

Key words: Crop Insurance, Agriculture, Natural Hazards, Risk Management, Yield Instability Index, Paddy and PMFBY.

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Agriculture, a significant economic sector, is usually seen as an industry. It is vulnerable to a variety of natural disasters. Insurance is an important tool for providing protection in dangerous situations, and it plays an important role in agricultural production decisions, chemical usage decisions, cultivation techniques, and cropping pattern decisions. Natural catastrophes such as droughts, floods, cyclones, storms, landslides, and earthquakes have a significant impact on agricultural productivity and farm revenue in India. Agriculture's vulnerability to these catastrophes is exacerbated by the breakout of diseases and man-made disasters such as fire, the selling of counterfeit seeds, fertilizers, and pesticides, price collapses, and so on. All of these occurrences have a significant impact on farmers in terms of productivity and farm revenue, and they are beyond the farmers' control. Crop insurance is acknowledged as a fundamental tool for sustaining farm income stability through supporting technology, boosting investment, and enhancing credit flow in the agricultural industry. It promotes self-reliance and self-esteem among farmers by allowing them to seek compensation for crop losses as a matter of right (Chandrakanth, 1976). Thus, crop insurance softens the blow of crop loss by protecting farmers from natural disasters beyond their control. In recent years, the Indian Central Government and state governments have established a number of crop insurance plans.

The crop insurance policy has helped Tamil Nadu, with a total coverage of 10 lakh farmers and 1.7 million acres. However, the low enrolment of farmers (7% of all farmers in the country in 2007-08) refers to the state's crop insurance's poor performance. Tamil Nadu has a significant number of agriculture-dependent farmers (8 million), who generate 75 million tonnes of food grains from 3 million hectares of cultivable land; efforts must be taken to improve the crop insurance scheme's performance (www.tn.gov.in). Because rice is the state's principal crop and it suffers from unpredictable weather, this study examined the Performance and Progress of Crop Insurance Scheme (PMFBY) on Paddy Farming in Tiruvannamalai District of Tamil Nadu. To assist farmers in dealing with crop losses, the Government of India introduced its flagship plan, the Pradhan Mantri Fasal Bima Yojana (PMFBY), beginning with the 2016 kharif season. The National Agricultural Insurance Scheme (NAIS) and the Modified National Agricultural Insurance Scheme (MNAIS) were superseded by PMFBY. For the preparation of the manuscript relevant literature[1-14] has been consulted.

Objective of the study :

To analyze the Performance and Progress of Crop Insurance Scheme (PMFBY) on Paddy Farming in Tiruvannamalai District of Tamil Nadu.

Paddy is the major crop in North Eastern Zone of Tamil Nadu. In North Eastern zone, Thiruvannamalai district was purposively selected because it is one of the environmentally vulnerable district. Among the 18 Blocks of Tiruvannamalai district, Kilpennathur and Thurinjapuram blocks were selected based on the existence of more number of farmers adopting Crop Insurance Scheme for Paddy Cultivation. Kharif is the main Crop cultivation Season and most severely affected by natural

calamities such as drought, pest and diseases, Farmers raising Kharif crops were considered for this study. Four villages were selected at random in each selected block. From that ten insured farmers and five non-insured farmers were selected at random in each of the four villages. Thus the sample design resulted to sample size of forty insured and twenty non-insurers in each block. Thus, 120 holdings in total from the 2 selected blocks were selected for the present study.

Tools of analysis :

1). *Co-efficient of variation :*

Co-efficient of variation for productivity of paddy over the year were estimated to know the nature of instability by using the formula,

$$C.V. = \frac{\text{Standard Deviation } (\sigma)}{\text{Mean } (\mu)} \times 100$$

2). *Instability index*

The following risk indicators were used to quantify the risk associated with agriculture and specific crops:

Instability Index = natural logarithm standard deviation (Yt+1 /Yt)

Where Yt represents crop yield in the current year and Yt+1 represents crop yield in the following year. This index measures deviations from the underlying trend (log linear in this example) and is unit free and extremely resilient. When there are no departures from the trend, the ratio Yt+1 / Yt remains constant, and the standard deviation is 0. As the series swings more, so does the ratio of Yt+1/Yt, and the standard deviation rises.. Time series data is used to estimate this index.

Performance of Crop Insurance Scheme (PMFBY) in Thiruvannamalai District

1. Progress of Crop Insurance Scheme (PMFBY) in Thiruvannamalai District

Table-1. Season–wise Progress of Crop Insurance Scheme (PMFBY) in Tiruvannamalai District during 2019-20

Season	Name of the Crop	No. of Farmers	Area (ha)	Sum Insured (Rs in lakhs)	Premium (Rs in lakhs)
Kharif	Paddy –I	2093 (2.62)	1817.99 (3.56)	1040.79 (12.98)	19.76 (5.06)
	Groundnut	135 (0.17)	129.14 (0.25)	66.50 (0.83)	1.28 (0.33)
	Banana	5 (0.006)	2.13 (0.004)	-	0.11 (0.03)
	Paddy –II	54615 (68.33)	34125.17 (66.75)	3810.1 (47.52)	278.17 (71.18)
	Total	**56848 (71.12)**	**36074.43 (70.56)**	**4917.39 (61.33)**	**299.32 (76.59)**

Rabi	Paddy –III	4159 (5.20)	2818.25 (5.51)	375.75 (4.69)	22.96 (5.87)
	Banana	231 (0.29)	119.35 (0.23)	-	6.27 (1.60)
	Groundnut	4497 (5.63)	2819.18 (5.51)	688.28 (8.58)	20.89 (5.35)
	Tapioca	12 (0.02)	8.96 (0.02)	-	0.16 (0.04)
	Black Gram	14111 (17.65)	9245.83 (18.09)	2029.82 (25.32)	41.11 (10.52)
	Gingelly	70 (0.09)	37.02 (0.07)	6.86 (0.09)	0.10 (0.03)
	Total	**23080 (28.88)**	**15048.59 (29.44)**	**3100.71 (38.67)**	**91.49 (23.41)**
Total	**Grand Total**	**79928 (100.00)**	**51123.02 (100.00)**	**8018.1 (100.00)**	**390.81 (100.00)**

Source: District Central Co-operative Bank, Tiruvannamalai District.

It could be seen from the Table-1 the more number of farmers adopted crop insurance scheme for Paddy crop (76.15 percent), followed by Block gram (17.65 percent) and Groundnut (5.8 percent). Among this, paddy is the major crop during Kharif and Rabi season. In these seasons, paddy crop covered the major area of 38761.41 ha and 60867 numbers of farmers covered also high in this scheme under Kharif season.

2. *Crop- wise coverage of PMFBY in Thiruvannamalai District :*

Table-2. Crop- wise coverage of PMFBY in Thiruvannamalai District during 2019-20

Name of the Crop	No. of Farmers	Area (ha)
Paddy I	2093 (2.62)	1817.99 (3.57)
Paddy II	54615 (68.45)	34125.17 (66.92)
Paddy III	4159 (5.21)	2818.25 (5.52)
Total	**60867 (76.28)**	**38761.41 (76.01)**
Groundnut	4497 (5.64)	2819.18 (5.53)
Black Gram	14111 (17.69)	9245.83 (18.13)
Gingelly	70 (0.09)	37.02 (0.07)
Banana	231 (0.28)	121.48 (0.24)
Tapioca	12 (0.02)	8.96 (0.02)
Total	**79788 (100.00)**	**50993.88 (100.00)**

Source: District Central Co-operative Bank, Thiruvannamalai District.

It could be seen from the Table 2 that paddy was the main crop in the study area which occupied almost 76 per cent of the total area as well as no of farmers covered under the Pradhan Mantri Fasal Bima Yojana Scheme. Black Gram crop ranks second with minor contribution of 17.69 percent followed by Groundnut, Banana, Gingelly and Tapioca accounting for 5.64, 0.28, 0.09 and 0.02 percent respectively.

3. *Number of farmers covered under crop insurance scheme (PMFBY) :*

Table-3. Number of farmers, notified villages under Crop insurance scheme (PMFBY) in Tiruvannamalai District- Kharif 2020

S. No	Name of Block	Villages Notified (Nos.)	Beneficiary Farmers (Nos.)
1	Tiruvannamalai	97 (8.95)	111 (0.95)
2	**Kilpennathur**	**59 (5.44)**	**2035 (17.43)**
3	**Thurinjapuram**	**56 (5.17)**	**1855 (15.89)**
4	Chengam	85 (7.84)	237 (2.03)
5	Pudupalayam	36 (3.32)	694 (5.96)
6	Thandarampattu	63 (5.81)	717 (6.14)
7	Polur	99 (9.13)	1796 (15.39)
8	Kalasapakkam	52 (4.80)	1960 (16.79)
9	Chetpet	76 (7.01)	1419 (12.16)
10	Arni	30 (2.77)	210 (1.80)
11	West Arni	18 (1.66)	78 (0.67)
12	Vandavasi	87 (8.03)	87 (0.75)
13	Thellar	38 (3.51)	79 (0.68)
14	Peranamallur	66 (6.09)	97 (0.83)
15	Cheyyar	98 (9.04)	56 (0.48)
16	Anakkavur	33 (3.04)	120 (1.03)
17	Vembakkam	91 (8.39)	119 (1.02)
	Total	**1084 (100.00)**	**11670 (100.00)**

Source: District Central Co-Operative Bank, Tiruvannamalai District.

It could be seen from the Table 3 that total number of farmers covered under PMFBY was 11,670 in 1084 notified villages of Kharif 2020 season. Among the blocks, the highest number of beneficiaries (17.43 per cent) and (5.44 per cent) number of villages covered in Kilpennathur block followed by Kalasapakkam (16.79 per cent of farmers with 4.80 per cent of villages) and Thurinjapuram (15.89 per cent of farmers with 4.80 per cent of villages). This scheme was implemented through Primary Agricultural Co-Operative Society with the guidance of District Central Co-Operative Bank.

4. *Analysis of Risks involved in Paddy production :*

Yield Variation of Paddy in Tiruvannamalai District :

Table-4. Yield Variation of Paddy in Tiruvannamalai District

S. No	Particulars	Mean Yield (qt/ha)	Standard deviation (qt/ha)	Coefficient of variation (%)
1	Last 3 years (2018-2020)	41.00	0.69	1.68
2	Last 5 years (2016-2020)	40.24	1.16	2.88
3	Last 10 years (2011-2020)	40.04	1.15	2.87
4	Sample farmers	38.90	1.67	3.96

Source: Joint Directorate of Agriculture office, Tiruvannamalai District.

It could be seen from Table 4 that the mean yield was maximum in last 3 years category to the tune of 41.00 quintals per hectare and where as in last 10 years category the mean yield was 40.04 quintals per hectare. The coefficient of variation in yield of paddy was 1.68 per cent in last 3 years. It was increased to 2.87 per cent, 2.88 per cent in last 10 years and 5 years respectively. But the actual yield of paddy was 41.90 quintals per hectare, in the year 2019-20. In depth observations from the sample farmers its ranges from 36 to 42 quintals per hectare with an average yield of 38.90 quintals per hectare. It shows the vast yield variation among the sample farmers in the district. The coefficient of variation of crop during 2019-20 was comparatively higher than the previous year's variation and the mean yield also decreased in the year. Hence it could be concluded that the prevalence of production risk of the crop was higher in the sample farmers. The Standard Deviation is less in the Mean yield of Paddy in last three years (2018-20), hence comparatively stable yield compared to last 5 years (2016-20), last 10 years (2011-20) Mean yield.

Yield Instability Index of Paddy Crop in Tiruvannamalai District :

Table-5. Yield Instability Index of Paddy in Tiruvannamalai District

S. No	Particulars	Instability Index
1	Last 3 years (2018-2020)	0.0132
2	Last 5 years (2016-2020)	0.0036
3	Last 10 years (2011-2020)	0.0167

Source: Joint Directorate of Agriculture office, Tiruvannamalai.

It could be seen from the Table 5 that yield instability of index for paddy crop in last 3 years, last 5 years and last 10 years were 0.0132, 0.0036 and 0.0167 respectively. Hence it could be concluded that there is occurrence of yield risk in the district.

Paddy yield variation of sample farmers in Tiruvannamalai District :

Table-6. Paddy yield variation among sample respondents in Tiruvannamalai District

S. No	Particulars	Last 10 years (2011-2020)	Last 5 years (2016-2020)	Last 3 years (2018-2020)	Sample farmers
1	Mean Yield (qt/ha)	40.04	40.24	41	38.90
2	Standard deviation (qt/ha)	1.15	1.16	0.69	1.67
3	Coefficient of variation (%)	2.89	2.88	1.68	3.96
4	Normal yield (qt/ha) (1)	-	-	-	40.24
5	Mean actual yield (qt/ha) (2)	-	-	-	38.90
6	Average yield loss (qt/ha) (1-2)	-	-	-	1.34
7	Percentage of yield loss	-	-	-	3.56

(Normal yield= five years (2016-20) average yield in the district, Mean actual yield= sample farmers average yield (2019-29), Average yield= Normal yield – Mean actual yield)

It could be seen from Table 6 that actual yield of paddy was 41.90 quintals per hectare in the year 2019-20. But the sample farmers mean yield was 38.90 quintal per hectare and coefficient of variation was 3.96. Therefore it could be concluded that average yield loss from sample farmers was 1.34 quintal per hectare and it represent of 3.56 percent of yield loss among the sample farms. This indicates that there was medium risk in yield of Paddy.

The study concluded that the more number of farmers adopted crop insurance scheme (PMFBY) for Paddy crop (76.15 percent), followed by Block gram (17.65 percent) and Groundnut (5.8 percent). Among this, paddy is the major crop during Kharif and Rabi season. In these seasons, paddy crop covered the major area of 38761.41 ha and 60867 numbers of farmers covered also high in this scheme under Kharif season. The total number of farmers covered under PMFBY was 11,670 in 1084 notified villages of Kharif 2020 season. Among the blocks, the highest number of beneficiaries (17.43 per cent) and (5.44 per cent) number of villages covered in Kilpennathur block followed by Kalasapakkam (16.79 per cent of farmers with 4.80 per cent of villages) and Thurinjapuram (15.89 per cent of farmers with 4.80 per cent of villages). This scheme was implemented through Primary Agricultural Co-Operative Society with the guidance of District Central Co-Operative Bank.

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