

# Farmers Insurance Analysis

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## **Problem Statement:**

The PMFBY scheme provides farmers with financial security. We will analyse its effectiveness using structured data analysis. We will use SQL queries to extract key insights on premiums, claims, and farmer demographics. The challenge is to process multi-year data efficiently, identify trends, and generate reports that help stakeholders assess the scheme's impact.

## **Tasks:**

You need to perform the following steps for successfully completing this assignment:

- 1) Data Loading
- 2) Filtering Data (WHERE)
- 3) Apply Aggregation (GROUP BY)
- 4) Sorting Data (ORDER BY)
- 5) String Functions
- 6) Joins
- 7) Subqueries
- 8) Advanced SQL Functions (Window Functions)
- 9) Data Integrity (Constraints, Foreign Keys)

## **Dataset:**

The dataset used in this analysis is sourced from the National Data and Analytics Platform (NDAP), which hosts a wide range of government data. Specifically, the data pertains to the Pradhan Mantri Fasal Bima Yojana (PMFBY), a crop insurance scheme. It includes details such as the number of insurance units, premiums paid by farmers, contributions from state and central governments, sum insured, as well as demographic attributes like the gender and category of the farmers. The PMFBY scheme is designed to offer financial protection to farmers against crop losses resulting from natural disasters, pest attacks, or diseases.

	Field	Type	Null	Key	Default	Extra
►	rowID	int	NO	PRI	NULL	
	srcYear	int	YES		NULL	
	srcStateName	varchar(255)	YES		NULL	
	srcDistrictName	varchar(255)	YES		NULL	
	InsuranceUnits	int	YES		NULL	
	TotalFarmersCovered	int	YES		NULL	
	ApplicationsLoaneeFarmers	int	YES		NULL	
	ApplicationsNonLoaneeFarmers	int	YES		NULL	
	InsuredLandArea	float	YES		NULL	
	FarmersPremiumAmount	float	YES		NULL	
	StatePremiumAmount	float	YES		NULL	
	GOVPremiumAmount	float	YES		NULL	
	GrossPremiumAmountToBePaid	float	YES		NULL	
	SumInsured	float	YES		NULL	
	PercentageMaleFarmersCovered	float	YES		NULL	
	PercentageFemaleFarmersCov...	float	YES		NULL	
	PercentageOthersCovered	float	YES		NULL	
	PercentageSCFarmersCovered	float	YES		NULL	
	PercentageSTFarmersCovered	float	YES		NULL	
	PercentageOBCFarmersCovered	float	YES		NULL	
	PercentageGeneralFarmersCo...	float	YES		NULL	
	PercentageMarginalFarmers	float	YES		NULL	
	PercentageSmallFarmers	float	YES		NULL	
	PercentageOtherFarmers	float	YES		NULL	
	YearCode	int	YES		NULL	
	Year_	varchar(255)	YES		NULL	

	Country	varchar(255)	YES		NULL	
	StateCode	int	YES		NULL	
	DistrictCode	int	YES		NULL	
	TotalPopulation	int	YES		NULL	
	TotalPopulationUrban	int	YES		NULL	
	TotalPopulationRural	int	YES		NULL	
	TotalPopulationMale	int	YES		NULL	
	TotalPopulationMaleUrban	int	YES		NULL	
	TotalPopulationMaleRural	int	YES		NULL	
	TotalPopulationFemale	int	YES		NULL	
	TotalPopulationFemaleUrban	int	YES		NULL	
	TotalPopulationFemaleRural	int	YES		NULL	
	NumberOfHouseholds	int	YES		NULL	
	NumberOfHouseholdsUrban	int	YES		NULL	
	NumberOfHouseholdsRural	int	YES		NULL	
	LandAreaUrban	float	YES		NULL	
	LandAreaRural	float	YES		NULL	
	LandArea	float	YES		NULL	

## Performance Analysis / Insights / Results:

The analysis includes data from **27 Indian states** participating in the PMFBY scheme.

	srcStateName ▲
	ANDAMAN AND NICOBAR ISLANDS
	ANDHRA PRADESH
	ASSAM
	CHHATTISGARH
	GOA
	GUJARAT
	HARYANA
	HIMACHAL PRADESH
▶	JAMMU AND KASHMIR
	JHARKHAND
	KARNATAKA
	KERALA
	MADHYA PRADESH
	MAHARASHTRA
	MANIPUR
	MEGHALAYA
	ODISHA
	PUDUCHERRY
	PUNJAB
	RAJASTHAN
	SIKKIM
	TAMIL NADU
	TELANGANA
	TRIPURA
	UTTAR PRADESH
	UTTARAKHAND
	WEST BENGAL

- **Madhya Pradesh** has the highest number of farmers covered, **followed by Maharashtra.**
- Punjab shows the lowest farmer coverage among all states.

	srcStateName	TotalFarmersCovered	TotalSumInsured
▶	MADHYA PRADESH	9097992	8388561.648635864
	MAHARASHTRA	8884773	3979362.9376866817
	UTTAR PRADESH	7135648	3248725.1967037786
	RAJASTHAN	6814358	5358933.851975739
	TAMIL NADU	3921868	2999722.9312981367
	ODISHA	2544665	1356864.0728126587
	HARYANA	2060741	2252538.4811367095
	WEST BENGAL	2054414	842893.1048812866
	CHHATTISGARH	1816123	1098681.305376947
	ANDHRA PRADESH	1810317	1631182.105102539
	ASSAM	1563609	801554.9232140183
	KARNATAKA	697101	3.017999990734097
	TELANGANA	407890	355353.36138916016
	TRIPURA	350733	48555.039628982544
	HIMACHAL PRADE...	268368	30744.95197084546
	JAMMU AND KASH...	126687	71154.90966796875
	JHARKHAND	115997	49250.799642562866
	UTTARAKHAND	107217	47019.862647265196
	KERALA	19711	16469.798140458763
	PUDUCHERRY	11747	14826.837139904499
	MANIPUR	4681	3432.3461450338364
	SIKKIM	2379	393.0649064797908
	MEGHALAYA	651	342.94000148773193
	GUJARAT	405	119.00289852358401
	ANDAMAN AND NI...	359	195.35999369621277
	GOA	79	35.76369971036911
	PUNJAB	36	96.42010091075645

- In Himachal Pradesh, **Kangra** district had a rural population of over 1 million consistently from 2018 to 2021.

	srcYear	srcStateName	srcDistrictName	InsuranceUnits	TotalFarmersCovered	ApplicationsLoaneeFarmers	ApplicationsNonLoaneeFarmers	InsuredLandArea	FarmersPremiumAmount
▶	2018	HIMACHAL PRADESH	Kangra	34	30868	31638	101	11.4	51.27
	2019	HIMACHAL PRADESH	Kangra	34	34564	35348	641	13.36	60.13
	2020	HIMACHAL PRADESH	Kangra	34	32453	33380	160	12.09	72.53
	2021	HIMACHAL PRADESH	Kangra	2	11	11	0	0	0.0203
⚙	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

- Ujjain district (Madhya Pradesh)** recorded the **highest total premium amount** (~3273.09), while **Hugli (West Bengal)** ranked second (~2777.03).
- In **Karnataka**, most districts report **zero farmer premium contributions**, except for **Davangere, Kolar, Mandya, and Hassan**, where premiums were slightly above zero.
- In **2018, 16 states** had insured land areas exceeding 5 hectares.

Result Grid			
Filter Rows:		Export:	Wrap Cell Content:
srcStateName	TotalFarmersCovered	TotalPremium	
JAMMU AND KASHMIR	52842	2472.040069580078	
UTTARAKHAND	19726	668.5700073242188	
HARYANA	665511	26875.559646606445	
RAJASTHAN	1666703	114021.20956420898	
TELANGANA	150069	4464.029975891113	
UTTAR PRADESH	2614548	70172.93009567261	
ASSAM	38635	607.4599914550781	
WEST BENGAL	2038418	49236.04949951172	
JHARKHAND	25538	462.1999969482422	
ODISHA	58010	833.5800018310547	

Result 10 x

Output

Action Output

#	Time	Action	Message
11	10:29:44	SELECT srcStateName, SUM(TotalFarmersCovered) AS TotalFarmersCovered, SUM(GrossPremiumA...	16 row(s) returned

- The **highest average insured land area** was recorded in **2020**, while **2018** showed the **lowest**.

srcYear	AverageInsuredLandArea
2018	37.878552367563046
2019	38.264534640478175
2020	80.33767358140678
2021	38.54617980123473

- Bid district (Maharashtra)** had the **highest number of farmers covered** (1,430,532) where insurance units were greater than 0.
- Latur district (Maharashtra)** ranked second with **1,184,066 farmers covered**.

srcDistrictName	TotalFarmersCovered
Bid	1430532
Latur	1184066
Nanded	739712
Osmanabad	700623
Jalna	666086
Ujjain	630787
Solapur	563903
Rajgarh	557778
Dewas	549528
Parbhani	544741
Sehore	529484

- Kodagu and Dakshina Kannada (Karnataka)** had **zero farmers covered**, despite having non-zero insurance units. In these two districts, farmer coverage is nearly negligible, even though insurance units are greater than zero.

	srcDistrictName	TotalFarmersCovered
	Thanjavur II	4
	Thiruvavur II	4
	Bathinda	2
	Kheda	1
	DakshinaKannada	0
	Kodagu	0

- **Thane district (Maharashtra)** had the **highest total population** in 2020, followed by **Jaipur (Rajasthan)**.

	srcDistrictName	TotalPopulation
▶	Thane	8070032
	Jaipur	6626178
	Allahabad	5954391
	Azamgarh	4613913
	Lucknow	4589838

- Grouped data by state and district shows **Karnataka and Uttar Pradesh** reporting the **lowest farmer premium amounts** (as low as 0.0002 and 0.0003). Coverage Ratio is nothing but how well Total population is covered for that particular state with respect to farmers in that state.
- The **coverage ratio** (farmers covered vs total population) was **highest in Chhattisgarh** for 2020.
- **Tripura** ranked **2nd and 3rd** in coverage ratio for the years **2020 and 2021** respectively.

	srcStateName	srcYear	TotalFarmersCovered	TotalPopulation	CoverageRatio
▶	CHHATTISGARH	2021	1269118	25545198	0.0497
	TRIPURA	2020	172048	3673917	0.0468
	TRIPURA	2021	170345	3673917	0.0464

- There are **60 districts** whose names begin with the letter '**B**' and **193 districts** that end with '**pur**' across India.
- **Bid (Maharashtra)** had the **highest Farmers' Premium Amount**, exceeding **₹20 crores**, and also the **highest Sum Insured**.

	srcStateName	srcDistrictName	Year_	TotalPopulation	HighestFarmersPremium
▶	MAHARASHTRA	Bid	Calendar Year (Jan - Dec), 2019	2583421	7244.42
	HARYANA	Sirsa	Calendar Year (Jan - Dec), 2020	1295189	5805.97
	MAHARASHTRA	Latur	Calendar Year (Jan - Dec), 2019	2454196	4860.57
	HARYANA	Hisar	Calendar Year (Jan - Dec), 2020	1743931	4672.9

- Maharashtra has the highest SumInsured amount with the highest FarmersPremiumAmount.

	srcStateName	SumInsured
▶	MAHARASHTRA	275019

## Conclusion:

- Punjab recorded the lowest number of farmers enrolled under PMFBY, indicating either low awareness or limited reliance on agriculture in the region.
- Maharashtra's Bid district had the highest number of farmers covered, showing strong engagement with the scheme in that area.
- Higher premium amounts in some districts may suggest frequent crop failures, possibly due to local climate challenges or natural disasters.
- Certain high-risk districts showed little to no insurance uptake, highlighting the need for better awareness and outreach among farmers.
- From 2018 to 2020, there was a steady increase in average insured land area, reflecting improved understanding and adoption of the scheme.
- Districts like Kodagu and Dakshina Kannada had minimal or no farmer coverage, which may be due to limited farming activity.
- There is a clear opportunity to expand the scheme in underrepresented areas through farmer education and a simplified enrolment process.
- Increasing insurance coverage in densely populated states is essential to support food production and protect farmers from financial losses.