Technical Note
For
“Pradhan Mantri Fasal Bima Yojana (PMFBY) - Uttarakhand”

Name of Insurer	: Kshema General Insurance Limited
Line of Business	: Crop Insurance
Product	: PMFBY – Uttarakhand
Name of the Appointed Actuary	: Piyush Jain
Version	: 1.0

Section 1. General Information

Sl. No.	Description	Details
1.1	Brand name of Product	PMFBY
1.2	New or Modification of existing Product	New
1.3	Period of Policy	3 years
1.4	Category of Product	Indemnity Policy
1.5	Type of policy	Group Pricing with Individual Enrolment
1.6	Target Group	Farmers
1.7	Is the Product Reinsurance driven?	No
1.8	Add-ons that will be sold alongside:	**Mandatory** - Prevented Sowing, Mid-Season Adversity, Post Harvest Losses, Localized Risks
1.9	Crops Covered	Rice, Fingermillet, Wheat, Lentils

Section 2. Summary of Benefit Structure

For the base cover, reimbursement will be based on crop yield as follows:

*Sum Insured * (Threshold Yield (TY) – Actual Yield (AY))/TY*

For Add-on covers, please refer PMFBY Operational Guidelines for details of benefit structure.

Section 3. Data used

3.1 Source of Data

10-year yield data by Crop, District and Insurance Unit received as part of the tender has been used for pricing purpose.

L1 premium rates based on past PMFBY bids available internally with the company based on prior research has been used to supplement the rates received using the yield-based rates.

3.2 Data Checks, Adjustments and experience

i) The yield data has been received from government and has been assumed to be accurate and correct. Any issues or anomalies identified as part of the analysis were submitted as queries to the tendering authority for response or corrections.

ii) L1 premium rates are also based on public information from the tendering authority. Sense checks were carried out on the rates and no major outliers were noticed.

Section 4. Assumptions and Methodology

i) Burning cost model has been used where historical claim cost has been simulated using the TY in the tender document and AY for past 10 years (9 years for Rabi crops) using the formula:

$$\text{Max}(0, (TY - AY) / TY)$$

ii) The above calculation is done for each crop using average yields at Level 4 for Insurance Units. This is then aggregated to district level assuming same exposure in each Level 4 area within a district.

iii) For Kharif crops (Rice and Fingermillet), a simple average of last 10 years claim cost as modelled above is taken as the expected claim cost.

iv) For Wheat, a simple average of 8 years (i.e. last 9 years excluding 2015-16) has been used. 2015-16 was a severe El-Nino impacted year with extremely low yields. It is assumed that such severity event will no occur over the coverage period of the tender.

v) Lentils form a small part of the overall contract. A risk premium of 10% of sum insured has been assumed for this crop based on materiality.

vi) Add-on perils are assumed to have an immaterial impact on pricing and no loading has been added to the rates for these.

Section 5. Gross Premiums

i) The overall risk premium for entire contract was 4.94% of sum insured. The following loadings were added:
   - Expected Loss Ratio – 83.86%
   - Bank Charges & Commission – 1.18% of Gross Premium (4% of the Farmer share)
   - Marketing Expenses – 0.5% of Gross Premium (minimum mandatory charges)
   - Management Overheads – 3% of Gross Premium
   - Cost of Reinsurance – 10.91% (assuming 80% quota share with 2.5% reinsurance commission)
   - Profit Margin – 0.55% (assuming
   - Investment Income – Nil investment income has been assumed.

ii) The Gross Premium rates as a proportion of sum insured will remain fixed over a period of 3 years. Further, no underwriter or other discretion is allowed in the rates.

Section 6. Rating Factors

i) The tender requires premium rates by district and crop. These rates will then be applied to area and sum insured.

ii) Based on limitations of the tender, the rates have been calculated by district and crop and no additional rating factors have been modelled.

Section 7. Discounts/loadings/Cancellation & Terminations

Not Applicable

Section 8. Business Projections

i) Projections for at least 3 years in respect of each cover - Expected business in terms of premium income, expected loss ratios, combined ratio & profit Margin.

Table 1: Business Projections.

Amount in Rs. Crores

Item	Financial Year 1	Financial Year 2	Financial Year 3
Gross Written Premium	10.54	10.54	10.54
Expected Ultimate Loss ratio (inclusive of IBNR)(Gross)	83.86%	83.86%	83.86%
Profit margin	0.55%	0.55%	0.55%
RSM	1.33	1.33	1.33
Capital Required for this product at 150% of RSM	1.99	1.99	1.99

ii) The company has its entire capital available to support the written business and there is no risk to solvency position based on the IRDAI(ALSM of General Insurance Business) Regulations 2022.

Section 9. Profit test, Sensitivity/Scenario test

i) The data and assumptions used for the calculation of Pure Risk Premium are is volatile and the actual experience can vary from the expected experience. Every 1% change on the loss ratio will lead to c.0.2% change in the profit margin.

ii) The company is in the process of procuring the reinsurance treaty and the reinsurance cost and retention rates are as per the latest expectations based on discussions till the timing of this note.

iii) It has been assumed that 80% quota share will be obtained by the company, with the reinsurer paying a 2.5% commission of the premium ceded to Kshema General Insurance.

iv) Every 10% increase in retention by the company (from the current 80%) will lead to a 1.36% increase in the profit margin in the base scenario. However, this will lead to higher exposure for the company to any adverse claims experience covered by this policy.

v) Any change in commission, marketing expenses or management overheads will directly impact the profit margins of the company.

Please note that all movements and impacts quoted above are in percentage points (i.e. as a proportion of premium) and not as a proportion of the metric mentioned.

Section 10. Reserves

Following Reserves are planned to be maintained by the company:

i) Unearned Premium Reserves (UPR) – Using the 365th method
ii) Additional Unexpired Risk Reserves (AURR) – If required based on updated view of all assumptions by the company.
iii) Outstanding Case Reserves (OCR) – As per the assessment by the claims department.
iv) Incurred but not reported (IBNR) – Standard Actuarial Techniques of Expected Loss Ratio Method, Bornheutter-Ferguson method, chain ladder method etc. will be used for projection of IBNR.

Section 11. Premium tables / rate chart

Below are the rates as a proportion of sum insured. No taxes are applicable on these.

Cluster Number	Season	Product	District	Crop	Premium Rate (%)
1	Kharif	PMFBY	Chamoli	Paddy (Hill)	2.00
1	Kharif	PMFBY	Dehradun (Hill)	Paddy (Hill)	2.00
1	Kharif	PMFBY	Dehradun (Plain)	Paddy (Dhan)	8.00
1	Kharif	PMFBY	Haridwar	Paddy (Dhan)	4.00
1	Kharif	PMFBY	Pauri Garhwal	Paddy (Hill)	4.50
1	Kharif	PMFBY	Rudraprayag	Paddy (Hill)	2.00
1	Kharif	PMFBY	Tehri Garhwal	Paddy (Hill)	4.50
1	Kharif	PMFBY	Uttarkashi	Paddy (Hill)	2.40
2	Kharif	PMFBY	Almora	Paddy (Hill)	6.00
2	Kharif	PMFBY	Bageshwar	Paddy (Hill)	2.80
2	Kharif	PMFBY	Champawat	Paddy (Hill)	6.78
2	Kharif	PMFBY	Nainital (Hill)	Paddy (Hill)	8.00
2	Kharif	PMFBY	Nainital (Plain)	Paddy (Dhan)	3.50
2	Kharif	PMFBY	Pithoragarh	Paddy (Hill)	2.00
2	Kharif	PMFBY	Udhamsinghnagar	Paddy (Dhan)	2.50
1	Kharif	PMFBY	Chamoli	Fingermillet (Ragi/Mandika) - Hill	2.00
1	Kharif	PMFBY	Dehradun (Hill)	Fingermillet (Ragi/Mandika) - Hill	9.00
1	Kharif	PMFBY	Pauri Garhwal	Fingermillet (Ragi/Mandika) - Hill	2.00
1	Kharif	PMFBY	Rudraprayag	Fingermillet (Ragi/Mandika) - Hill	2.00
1	Kharif	PMFBY	Tehri Garhwal	Fingermillet (Ragi/Mandika) – Hill	4.12
1	Kharif	PMFBY	Uttarkashi	Fingermillet (Ragi/Mandika) - Hill	2.00
2	Kharif	PMFBY	Almora	Fingermillet (Ragi/Mandika) - Hill	4.16
2	Kharif	PMFBY	Bageshwar	Fingermillet (Ragi/Mandika) - Hill	4.16
2	Kharif	PMFBY	Champawat	Fingermillet (Ragi/Mandika) - Hill	4.16
2	Kharif	PMFBY	Nainital (Hill)	Fingermillet (Ragi/Mandika) - Hill	5.00
2	Kharif	PMFBY	Pithoragarh	Fingermillet (Ragi/Mandika) - Hill	3.00
1	Rabi	PMFBY	Chamoli	Wheat (Hill)	9.00
1	Rabi	PMFBY	Dehradun (Hill)	Wheat (Hill)	9.00
1	Rabi	PMFBY	Dehradun (Plain)	Wheat	9.00
1	Rabi	PMFBY	Haridwar	Wheat	9.00
1	Rabi	PMFBY	Pauri Garhwal	Wheat (Hill)	9.00
1	Rabi	PMFBY	Rudraprayag	Wheat (Hill)	9.00
1	Rabi	PMFBY	Tehri Garhwal	Wheat (Hill)	9.00
1	Rabi	PMFBY	Uttarkashi	Wheat (Hill)	9.00
2	Rabi	PMFBY	Almora	Wheat (Hill)	12.00
2	Rabi	PMFBY	Bageshwar	Wheat (Hill)	12.00
2	Rabi	PMFBY	Champawat	Wheat (Hill)	12.00
2	Rabi	PMFBY	Nainital (Hill)	Wheat (Hill)	12.00
2	Rabi	PMFBY	Nainital (Plain)	Wheat	12.00
2	Rabi	PMFBY	Pithoragarh	Wheat (Hill)	12.00
2	Rabi	PMFBY	Udhamsinghnagar	Wheat	3.00
1	Rabi	PMFBY	Pauri Garhwal	Lentil (Masu)	12.50
2	Rabi	PMFBY	Pithoragarh	Lentil (Masu)	12.50

Annexure – 2

I, Piyush Jain, the Appointed Actuary, certify that, in my opinion, the premium rates, advantages, terms and conditions of the above product/add-on are workable and sound, the assumptions are reasonable and premium rates are fair.

The rates, terms and conditions of the above-mentioned product are determined on technically sound basis and are sustainable on the basis of the information andclaims experience available.

I further certify that premium is adequate to cover the claims cost. Also, where the premium is not deemed adequate, there will be a premium deficiency reserve, which is provisioned separately.

PIYUSH JAIN

Digitally signed by PIYUSH JAIN
Date: 2023.06.13 13:28:07 +05'30'

Signature of the
Appointed Actuary

Countersigned by:

Signature of CEO

Signature of PMC

Place: Hyderabad

Date: 14-06-2023