MOST URGENT
TIME BOUND

No. 11019/01/2019- Cr. II (FTS 76227)
Government of India
Ministry of Agriculture & Farmers Welfare
Department of Agriculture & Farmers Welfare

Krishi Bhawan, New Delhi
Dated the 25th October, 2022

1. Principal Secretary (Agri/Coopn/Horti), All States/UTs.
2. Joint Secretary (Insurance), Deptt. of Financial Services, New Delhi.
3. Advisor, Dte. of E&S, Krishi Bhawan, New Delhi.
4. Chief General Manager, Reserve Bank of India, FIDD, Mumbai
5. Managing Director, NABARD, Mumbai.
6. Chairman, Indian Banking Association, Mumbai.
7. Chairman, IRDA, Hyderabad.
8. Director, IASRI, PUSA, New Delhi.
9. Director, MNCFC, PUSA, New Delhi.
10. Director, NRSC, ISRO, Hyderabad.
11. Director General of Meteorology, IMD, Mousam Bhawan, New Delhi.
12. DDG, NSSO, Field Operation Division, Faridabad.
13. Director, National Remote Sensing Centre/Indian Space Research Org.
14. Managing Director, all Nationalised Banks.
15. CEO, Common Service Centre, New Delhi.
16. CMD/MD, all empanelled Insurance Companies.
17. Convener, State Level Bankers Committee – all implementing States/UTs.

Subject : **Study Reports on effective implementation of Pradhan Mantri Fasal Bima Yojana (PMFBY) - reg.**
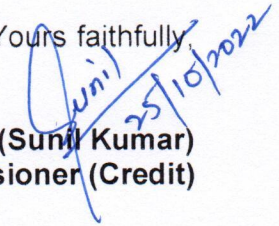
Sir/Madam,

The undersigned is directed to forward herewith copies each of the following two studies carried out for effective implementation of Pradhan Mantri Fasal Bima Yojana (PMFBY):

i. Implementation of PMFBY and recommend the best option for effective implementation especially in most vulnerable districts by National Rainfed Area Authority (NRAA), New Delhi.
ii. Report on PMFBY Impact Assessment by Spectrum Planning (India) Limited, Haryana.

2. In this regard, it is requested to examine these reports and furnish your comments/suggestions specially on the suggestions/recommendations made in the afforsaid studies to this Division **latest by 05.11.2022**, at email ajay.k.singh@nic.in with a copy to k.sunil@nic.in

Yours faithfully,

Encl. As stated above

(Sunil Kumar)
Asstt. Commissioner (Credit)

Copy to PPS to CEO, PMFBY

Report

On

Crop feasibility study to recommend appropriate mechanisms for providing farmers with rational compensation on occurrence of crop losses and identifying vulnerable districts for risk coverage under Pradhan Mantri Fasal Bima Yojna (PMFBY)

Pradhan Mantri Fasal Bima Yojana (PMFBY)

सत्यमेव जयते

**National Rainfed Area Authority
Department of Agriculture & Farmers Welfare
Ministry of Agriculture & Farmers Welfare
September 2022**

FOREWORD

Agriculture, like any other enterprise is risk-prone. Being primarily dependent on nature, it is relatively more prone to risks at production stage and, is also vulnerable post-the harvest due to price fluctuations. The demand of the time is to transform agriculture as a profit generating enterprise, which warrants that a package of risk management instruments is deployed. The risk management is effective when it can help in minimizing the production and income losses.

The Pradhan Mantri Fasal Bima Yojana (PMFBY) rolled out by the Government in 2016 was a paradigm shift from its earlier formats. It aimed at identifying the losses based on various factors beginning with the sowing stage up to a period of 10 days after the harvest, when the crop still lay on the field. Further, it was pivoted on uniform and minimum rates of premium obligations by the farmer, besides deployment of technology for speedy assessment of loss, estimation of compensation & its disbursement. The third important feature of the scheme was transparency in transaction among the principal stakeholders, namely farmers, insurance companies, central and state governments, by providing access to a common Portal.

Since its launch in 2016, concerns relating to increasing rates of premium quotes and, volumes of premium obligations of the governments (both central and state) arose. In response, Government of India amended the PMFBY Guidelines and placed a cap on the obligations of the premium amount to be paid by the Department of Agriculture & Farmers' Welfare (DA&FW) with effect from Kharif 2020. With this, the centre's share of premium commitment is limited to 25 per cent (in irrigated districts) & 30 per cent (in non-irrigated districts) of the gross premium (share of farmers + centre + state) discovered in the market. Further, PMFBY 2.0 also relaxed the compulsory natures of insurance cover in case of loanee-farmers and making it voluntary for all.

The situation, that emerged thereafter (PMFBY 2.0) still left much to be desired. In a market-led risk instrument like PMFBY, the market-discovered premium rate needs to be rational, which is predicated upon competition arising from high volumes of business. In contrast to this requirement, there occurred a declining trend in the number of farmers covered, extent of area insured and even opting out by some of the states. The scheme was also seen to be suffering from increasing quantum of gross premium in relation to that of approved claims. Further analysis showed, that the approved claims were getting concentrated in a few districts of a few states. This may have been rational given that the compensation of the claim settlement was mostly in the regions highly vulnerable to climatic factors. Since the rate of premium was uniform across the districts in the country, the farmers in the less vulnerable districts with nil or low probability of crop loss felt the futility of the scheme, as there was no claim of loss compensation to be made. Hence, the Division in-charge of PMFBY in the Department of Agriculture & Farmers Welfare realised the need for an analysis and restructuring of the scheme.

This responsibility was assigned to a Committee headed by the undersigned, with members drawn from different organizations and universities. The Committee was assigned well defined Terms of Reference (ToR) and, with scope for engaging experts as needed.

Initiating its work, the Committee held several brainstorming sessions by inviting representatives from across the country, which highlighted the critical need for re-structuring of the scheme based on the principles of fairness, transparency, objectivity and equitability in its operation. The Committee concluded, that while agro-ecology is a critical influencer of the crop yield, there are other external factors too that are important and, these include long standing

cultivation practices, varying levels of technology adoption by the farmers etc. The Committee therefore decided on the usefulness of district-crop combination-based yield instability index (YII), as a measure that captured the effect of all factors on yield. Therefore, a Committee of Experts (CoE) was constituted under ICAR-Central Research Institute for Dryland Agriculture (CRIDA), which estimated yield instability index for all major crops of the country. The significance of the district relating to a particular crop was also based on the objective criterion of crop coverage of not less than 10,000 ha. With this, all the districts for all the major crops that account for almost 85-90 per cent of the gross cropped area of the country came to be covered.

This above referred diligent analysis was followed by grouping of all the districts based on degree of vulnerability into three categories, namely low risk, medium risk and high risk. These risk categorizations implied high compatibility, moderate compatibility and low compatibility for the associated risk, respectively. Such a grouping was laboriously undertaken by the second Committee of Experts led by ICAR-National Institute of Agricultural Economics and Policy Research (NIAP). Since the analysis and grouping of the districts are based on time series data (area, productivity & production) for the period 2006-2018, the results are robust. The details may be seen in the various Tables included in Chapter 3. Further, ICAR-NIAP deployed Hodrick-Prescott (HP) filter to remove the trend movements from the time series data on crop productivity. This helped in assessing vulnerability related to yield instability index (YII) and, appreciating the risk in a particular crop.

The challenge to imparting rationality and equitability in application of the premium to the farmers growing different crops under different production environments lay in adopting a system, that enabled customization of the premium subsidy to be paid by the government. The Committee in this regard agreed on two basic criteria to customise the premium subsidy (as a government pay-out) for different district-crop combinations. These are **i)** vulnerability category of the district-crop combinations based on 'single-factor' as the determinant; and **ii)** national priority of the crop as an additional variable to customize the premium based on two-factors as the determinant. The details of the criteria in respect of both these have been explained in Chapter 4. While this methodology enables an objective methodology for customisation of the premium-subsidy as a government pay-out, equitability linked to vulnerability and national priority is ensured by adopting a graded form of premium subsidy.

The guidelines for customisation of such a graded system have been explained in Chapter 4, vide Tables 4.1 and 4.2. Further, for ease of appreciation illustrations have been included in the same chapter based on the actual data collected in respect of few districts and crops from Uttar Pradesh State for the year 2020-21.

One of the Terms of Reference also included examination of various difficulties/complexities witnessed in implementation of the scheme in the districts identified as critical. The Committee of Experts (Sub-group II) was asked to undertake field visits, which it did and discussed with all the stakeholders. A long list of various issues escalated by the stakeholders has been tabulated in Chapter 5 and appropriate solutions suggested. Additionally, recommendations have also been made on the few other issues to improve the efficacy and efficiency of implementation which may be seen in Chapter- 5. Finally, in Chapter 6 the approach to using the contents of the Report has been explained briefly.

I am convinced, that the Study is highly comprehensive and appropriate in delineating vulnerability factors, and identifying the districts and corresponding crops based on low-risk, moderate-risk & high-risk categories. Further, parameter (s)-based decision on the extent/ratio of

eligible subsidy/concession on the premium that may be offered by the government can be built into the system. Keeping in mind the dynamics of the situation, the Committee recommends a range in preference to a specific number, so that government can opt for appropriate premium-subsidy in consonance with various factors, that tend to change with changing times. This will help in rationalizing the level of premium rates to be paid by the farmers of different districts & crops and, introducing equitability & egalitarianism in implementing PMFBY & RWBCIS. This can be expected to generate a more positive response to the scheme from the farmers & states, enabling enhanced volumes of business and, therefore more rational quotes of premium rates by the market players.

This evidence-led Report has been a coordinated & concerted contribution of various members of the Committee, as also of the two Committees of Experts. I place on record the insights & rich inputs brought to bear upon this Report by each of the members of these bodies. I would be failing in my duty, if I do not mention a few names in particular. I congratulate & thank,

- Dr. V K Singh, Director CRIDA and his team comprising Dr. K V Rao, Dr BMK Raju, Dr. CA Rama Rao, Dr. Ravindra Chary, Dr. S K Bal, who carried out data compilation & basic data analytics.
- Dr, Suresh Pal, former Director & Dr. Pratap Brithal present Director NIAP and the team of Dr. Khem Chand, Dr. Raka Saxena & Dr. Vikas Kumar, for building a vulnerability-based categorization of districts paving way for adopting graded system of premium subsidy.
- Team of NRAA that shouldered the bottom line responsibility in getting this work done, while simultaneously making substantiative knowledge contributions. It is the NRAA team led by Shri. Bisweswar Rath, Technical Expert (Water Management), comprising Dr. Satbir Singh, Dr. BL Saraswat, Dr. Alka Samuel, Dr. N. Eazhilkrishna, Dr. A Sivasena Reddy and Dr. Y. Mery Chanu who deserve this appreciation.

Special mention is made of Dr. Ashish Bhutani, former CEO and JS (PMFBY) who identified the challenges and need for restructuring PMFBY which prompted this Study. In his successor, Shri. Ritesh Chauhan, the incumbent CEO & JS (PMFBY), the Committee found an equally concerned & committed officer to promoting a fair & egalitarian crop risk management. Also, I place on record the services of their team comprising Shri. Sunil Kumar, Asst. Commissioner & Ms Kamana Sharma, Dy. Commissioner.

I thank the Department of Agriculture & Farmers Welfare for entrusting this sensitive & important assignment and, offering all necessary support. It has been a learning as we went through this responsibility. It is sincerely hoped that the recommendations would find relevance in offering the farmers an efficient & effective risk management instrument, so critical in an income-led growth strategy.

(Ashok Dalwai)

Contents

Chapter 1

Performance Status of PMFBY and Changes Needed

1.1   Introduction

The risk management of crops through an instrument of crop insurance commenced in the country during 1985 with the introduction of Comprehensive Crop Insurance Scheme (CCIS). This was followed by National Agricultural Insurance Scheme (NAIS) which remained in operation from 1999-2000 to 2012-13. NAIS was a liberalised version, that envisaged coverage of non-loanee farmers along with increase in scope and coverage of risks. Simultaneously, several Pilot Projects (PPs) were also launched to explore feasibility of crop insurance products that were not only better but also more comprehensive. The cumulative outcome was the National Crop Insurance Programme (NCIP), which was launched in 2013-14 with three component schemes namely, Modified NAIS (MNAIS), Weather Based Crop Insurance Scheme (WBCIS) and Coconut Palm Insurance Scheme (CPIS). Soon thereafter, NCIP came to be further restructured and launched as Pradhan Mantri Fasal Bima Yojana (PMFBY) and Restructured Weather Based Crop Insurance Scheme (RWBCIS) in 2016.

Pradhan Mantri Fasal Bima Yojana (PMFBY) was conceived as a milestone initiative to provide the farmers across the country a comprehensive risk-solution based on simplified and minimum premium structure for the farmers and, early settlement of crop assurance claim for the full-insured sum. The scheme enables a comprehensive insurance cover against crop failure with a view to minimizing the loss and stabilising the income of the farmers at a premium rate of 2 per cent (*Kharif* crops), 1.5 per cent (*Rabi* crops) and 5 per cent (annual commercial and horticultural crops). It also lays dividend by digital technology like mobile-based Applications, other technologies including remote sensing /satellite imagery for loss assessment etc. The scheme also brings together all the stakeholders on a common platform by linking them to a National Portal, called National Crop Insurance Portal (NCI-Portal). It is comprehensive enough and covered all non-preventable natural risks - from pre-sowing to post-harvest; even as it emphasizes on facilitating adequate claim amount and timely settlement of claims. The premium cost over and above the farmers' share vis-à-vis the market discovered rate is shared equally by the union and state governments. However, in case of north eastern states, the union government owns higher obligation at 90 per cent.

The basket of crops brought under the scheme is large, encompassing cereals, pulses, oilseeds and annual commercial & horticultural crops, for which past yield data is available and for which requisite number of Crop Cutting Experiments (CCEs) are being conducted under General Crop Estimation Survey (GCES). Notwithstanding a paradigm shift in the design of the 2016 initiative of Pradhan Mantri Fasal Bima Yojana, it does not seem to have met the desired goal, as seen from non-coverage of loanee-farmers (for whom it has never been compulsory); changing compulsory coverage of loanee-farmers to a voluntary option in recent years; dropping out of the scheme by some states; and expression of dissatisfaction from some representatives of people. Lack of awareness, unreliable loss assessment, delay in

claim settlement and felt differences in the benefit of settlement between states are proving to be a concern. Effecting some amendments, the Government launched PMFBY 2.0 with effect from *Kharif* 2020 lets even the loanee farmers to exercise their option to buy insurance cover, which is in deviation of the PMFBY 1.0 launched in 2016, under which coverage of all loanee-farmers was compulsory and automatic.

1.2. Performance of PMFBY (2018 - 2021)

Time series data of PMFBY from 2018 to 2021 indicates, that farmers' participation in the scheme is decreasing both in *Kharif* and *Rabi* seasons as shown in the graph vide the figure 1.2.1. This is contrary to the expectation that the scheme hoped for, when it was launched in 2016. It had assessed that participation of farmers could increase over the years, which would have rationalized the rate of premium price discoveries.

Figure 1.2.1 Year-wise trend of farmers' participation
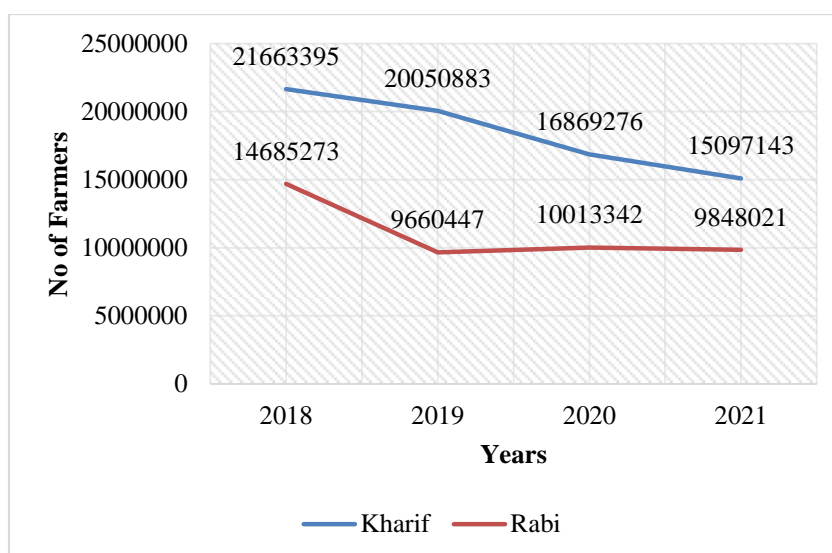
The participation of states/UTs and districts in PMFBY with respect to both *Kharif & Rabi* seasons during the period 2018 to 2021 exhibits a decreasing trend {Fig. 1.2.2(i) (*Kharif*) and Fig. 1.2.2(ii) (*Rabi*)}. This indicates that the, states and the insurance companies (ICs) are facing some operational challenges in implementing the scheme.

Figure 1.2.2(i): Participating number of states & districts in PMFBY (*Kharif*)
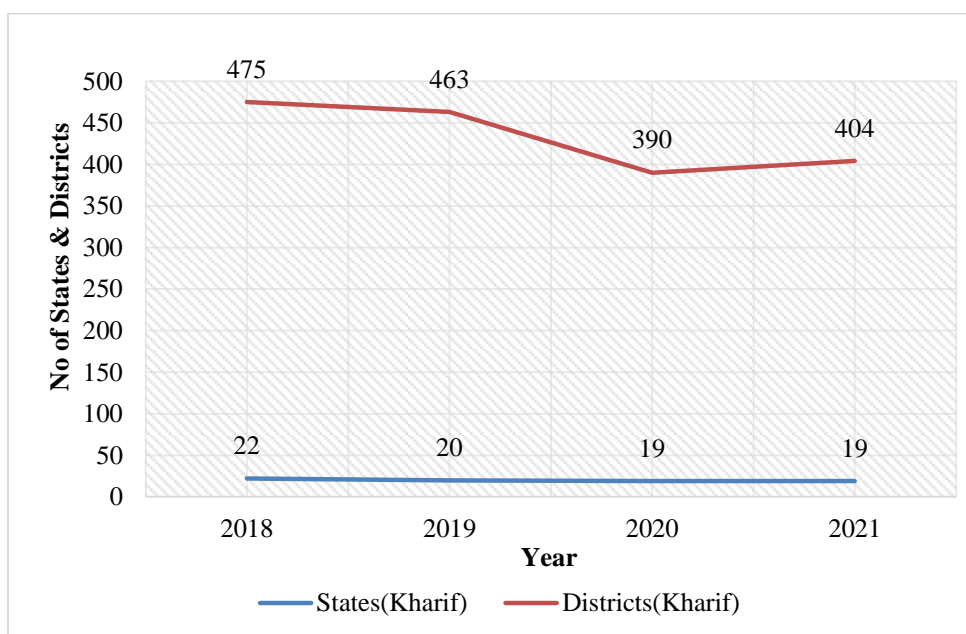
Figure 1.2.2(ii): Participating number of states & districts in PMFBY (*Rabi*)
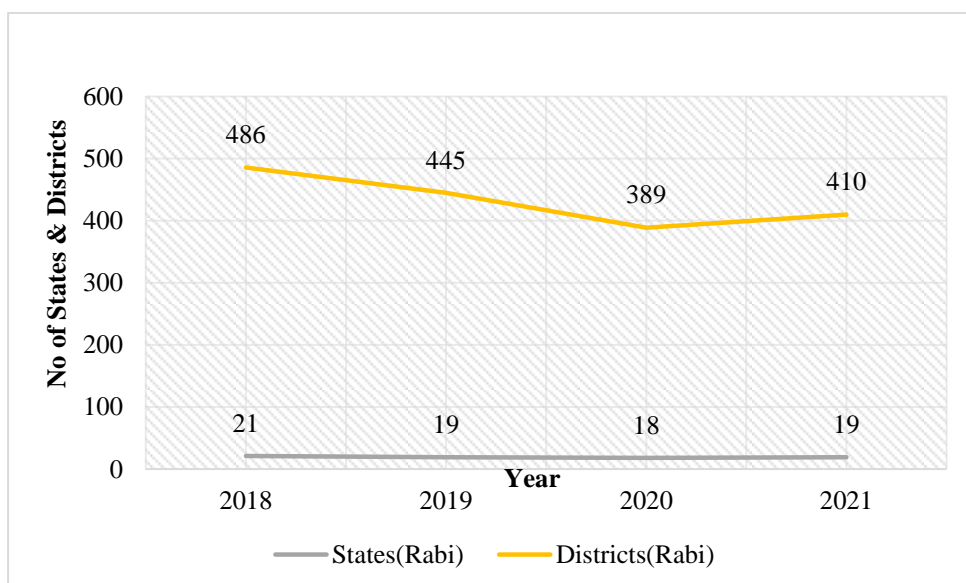
As regards the extent of area insured under PMFBY and RWBCIS, it is a declining trend in respect of both the major crop seasons. This may be seen in Fig. 1.2.3(i) (*Kharif*) and Fig. 1.2.3(ii) (*Rabi*). The declining trends inclusive of **i)** coverage of states & districts; and **ii)** coverage of area insured in *Kharif* & *Rabi* highlight the existence of challenges in realizing the positive intention of the scheme - PMFBY 1.0 and PMFBY 2.0 (as amended).

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Figure 1.2.3(i): Extent of area insured under PMFBY & RWBCIS (*Kharif*)
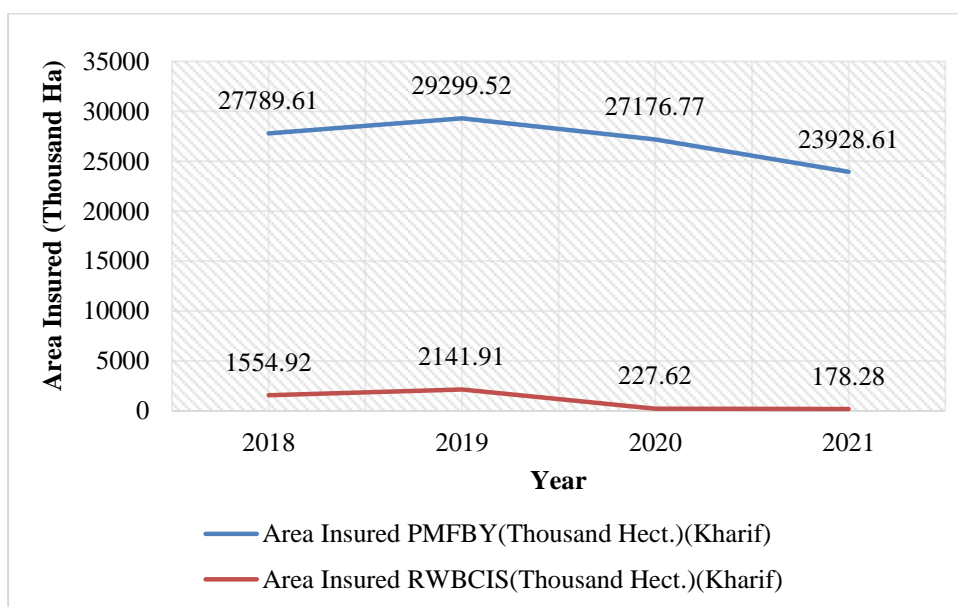
Fig 1.2.3(ii): Extent of area insured under PMFBY & RWBCIS (*Rabi*)
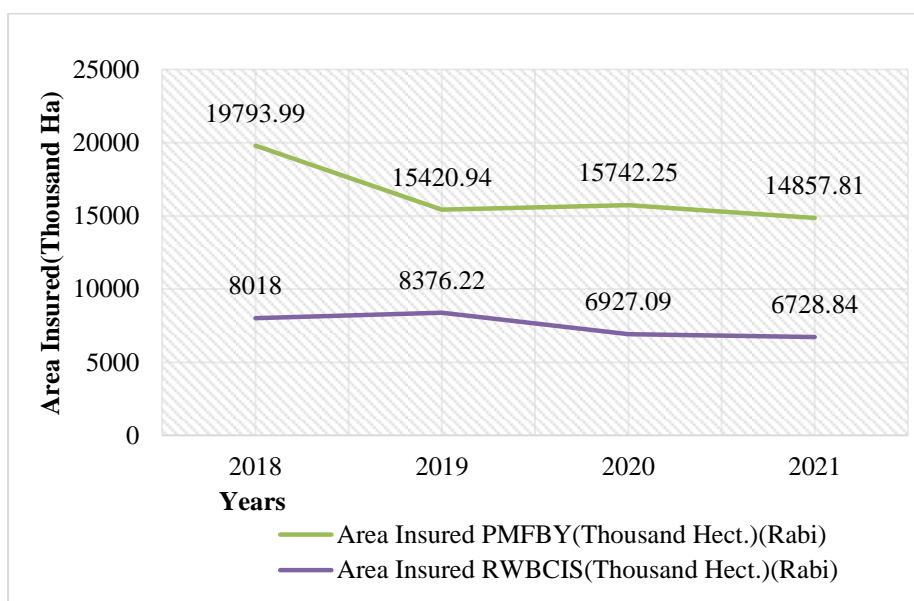
An analysis of the premium contributions made by the three (3) stakeholders (farmers, states/union territories, & centre) shows, that there was an increase in 2018-19 compared to the previous years, which declined slightly for the year 2019-2020 and rose substantively in the following year (2020-21). The graphic representation of this may be seen vide Fig.1.2.4. Further, Fig. 1.2.5 illustrates the consistent increase in the premium outgo (gross premium over the period 2016-17 to 2019-20, which seems to have stabilized in the year 2020-21. The approved claims exhibit an increasing trend from the year 2016-17 to 2018-19, and declining

thereafter (years 2019-20 and 2020-21). The declining ratio of approved claims vis-à-vis the total outgo of premium needs a closer look.

Figure 1.2.4 Trend of premium contribution
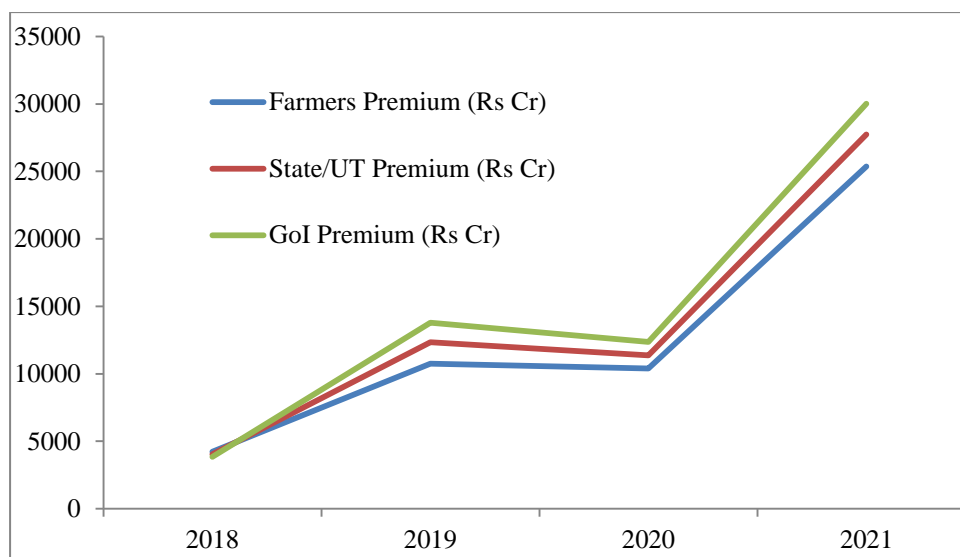
Figure 1.2.5 Trend of insurance claims vis-à-vis premium amount
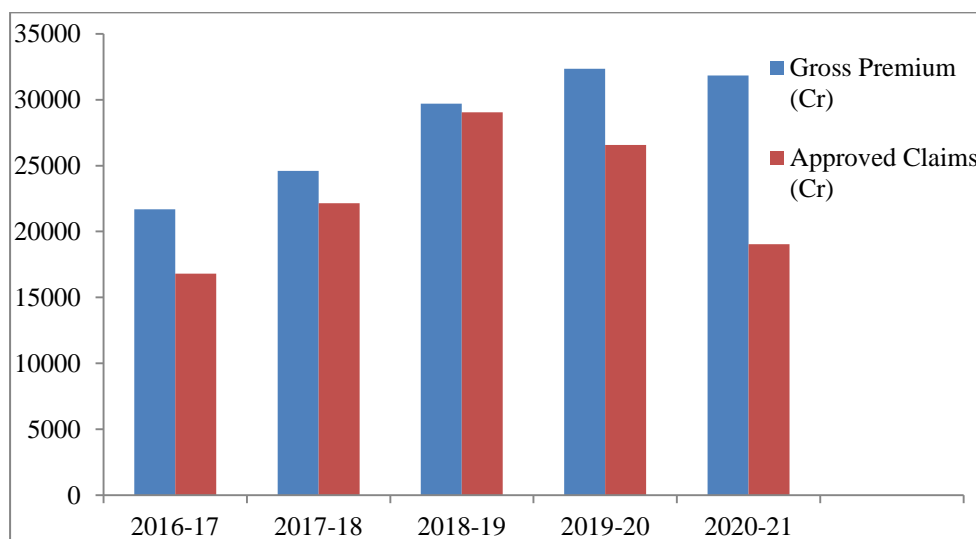
The analysis above throws up the evolving factors over the period of implementation since 2016, that are not favouring the expansion of the scheme to encompass larger number of states/union territories & districts; higher number of crops & area in both *Kharif* & *Rabi* seasons, and the farmers. That, this is happening despite the obligation of the farmers to pay minimal rates of premium, and uniform for all crops in a season warrants re-evaluation. Many states are also gradually opting out of the scheme, because of the obligation to foot increasing & substantial premium share compared to the insurance claims. One major disconcerting note, is the fact of major claims made and settled in case of few states and select districts, leaving others with a sense of discrimination and futility. This may be due to

the inherent distortion that a uniform rate of premium introduces even when agro-ecological and overall production environments differ both within and across the states. This context demands the early resolution of stakeholders' issues by reconfiguring the parameters of subsidy/concession offer on the premium to the farmers by the government under PMFBY. All issues related to stakeholders (farmers, insurance companies, banks, states and central government departments), crop cutting matters, localized loss claims, use of technology, transparency, time bound grievance redressal and payment of claims need to be addressed by adopting scientific analysis of multiple layers of information. An analytics-based interpretation alone can help in structuring a more egalitarian crop insurance scheme.

1.3 Genesis of the Study

As highlighted in the previous section, there do exist challenges that seek appropriate response for a more satisfactory performance of the scheme. An analysis of the scheme performance brought out, that, **i)** cumulative claim ratio is around 80 per cent for the past six seasons from *Kharif* 2016 to *Rabi* 2018-19; **ii)** over 60 per cent of total central subsidy goes to the States of Maharashtra, Gujarat, Madhya Pradesh and Rajasthan, which also attract very high premium rates. The starkness is further pronounced from the case of Maharashtra which accounted for 12 per cent of overall sum insured but gets around 22 per cent of central subsidy and, Gujarat that accounted for 6 per cent of sum insured but gets 12 per cent of central subsidy.

State-wise average actual premium rate realized is around 12 per cent. Some states show higher realisation of premium rates and these include Gujarat (22%), Karnataka (18%) and Tamil Nadu (20%). An analysis of the state-wise sum assured shows higher concentration in the states including Madhya Pradesh (14%), Uttar Pradesh (12%), Rajasthan (11%), and Maharashtra (12%) which cumulatively account for over 52 per cent of the sum insured. However, this seems to be broadly in line with the distribution of gross covered area.

State-wise distribution of central premium subsidy is also skewed as seen from higher sums received by the states, namely Maharashtra (22%), Gujarat (12%), Rajasthan (12%), and Madhya Pradesh (17%) which cumulatively work out to 62 per cent of the total central government premium. Gujarat and Maharashtra which contribute respectively 6 per cent and 12 per cent of the sum insured, receive much higher premium subsidy of 12 per cent and 22 per cent respectively.

Distribution of loanee-farmers in the states indicates that two states, namely Rajasthan and Madhya Pradesh combinedly account for over 53 per cent of the coverage of loanee-farmers. Maharashtra State alone contributes around 7 per cent to the coverage of loanee-farmers. There is skewed distribution in respect of *state-wise distribution of non-loanee* **farmers** too. Maharashtra accounts for over 62 per cent of non-loanee farmers. Two other states, namely west Bengal and Jharkhand had waived the premium to be paid by the farmers. These states are also seen to account for higher ratio of non-loanee farmers against the total number in the country, sharing respectively 11 per cent and 6 per cent share.

State-wise claim ratio in the 8 (eight) out of 27 states/UTs have cumulative claim ratio of over 100 per cent. These states accounted for over 20 per cent of the country's sum insured. Tamil Nadu, Chhattisgarh and Haryana among these account for a more prominent share.

Average claim size varies between Rs. 2,433 in Tripura State to Rs. 27,429 in Tamil Nadu State. There is a positive correlation between high claim states and higher claim size. The average claim size also has positive correlation with the average land holding size. Overall, on an average of 30 per cent of the farmers enrolled get benefit. The proportion of farmers who benefitted is highest in Tamil Nadu at 91 per cent. Higher proportion is also observed in Gujarat, Karnataka, Maharashtra and Andhra Pradesh.

District-wise analysis: Of the 620 districts, as many as 135 show a loss ratio higher than 100 per cent. It means every 1 (one) out of 5 (five) districts presents claim ratio higher than 100 per cent. These districts account for about 25 per cent of area insured, but receive 51 per cent of the claim pay-out.

A list of 50 districts emerges based on criteria of realized premium rate, loss ratio and number of season's claim ratio that are higher than 100 per cent. These 50 districts account for 18 per cent of total area insured, whereas they receive 41 per cent of the claim pay-out. They reveal a combined loss ratio of 179 per cent, while the combined average realised premium is 14 per cent. Average concentration of non-loanee farmers in selected districts stands at 41 per cent whereas, 23 out of 50 districts selected show non-loanee farmers concentration above 50 per cent. Examining the concentration of non-loanee farmers, it is seen than a total of the 114 districts where the ratio of non-loanee farmers is higher than that of loanee-farmers accounts for 82 per cent concentration of non-loanee farmers

Snapshot of high premium rates: It is seen that 14.83 per cent of the area insured attracts over 29 per cent of gross premium in *Kharif* season. In case of *Rabi* season, 6.77 per cent of area insured accounts for over 23 per cent of gross premium. Tamil Nadu which is a major Rabi season state, is the major contributor.

In the light of the above, it was opined:

- That, there exists a felt need to conduct crop suitability study across the chosen districts along with fixing the crop calendar.
- That, there exists scope to promote cropping systems in harmony with location-suitability, and benefit from lesser chance of losses. And, that one can realise a more effective risk management of crops from this, which is an increasing threat on account of climate change.
- That, there exists scope to minimise production risks on account of agro-ecologically sound production systems and achieving thereby a more stable state of income returns.
- That, it is possible to adopt risk management approach, that is preventive of risk occurrence.

In addition to the above, other issues that deserved examination were yield variability; types of crops being insured; and the data set(s) the states are analyzing to decide on the status of crop as major or deserving of notification for coverage under PMFBY.

The Cabinet in its meeting held on 19th February 2020 had approved the proposal on revamping "Pradhan Mantri Fasal Bima Yojna (PMFBY) and "Restructured Weather Based Crop Insurance Scheme (RWBCIS), which *inter-alia* fixed a cap on the Government of India's commitment relating to its share of premium subsidy. As per this, the DAC&FW's share of premium outgo is limited to a maximum of up to 25 per cent (in irrigated districts) and 30 per cent (in non-irrigated districts) of the gross premium (share of farmers + central government + state government) discovered on any crop. This necessitates, that premium price discoveries are rational so that the farmers & state governments are not required to share higher premium burden. Higher premium burden may disincentives both farmers and states to their exit. The Cabinet decision also included that risk mitigation programmes in 151 water-stressed districts shall be comprehensively reviewed to explore the requirements of alternative risk mitigation programmes.

1.4   Constitution of the Committee

In consultation with the CEO, National Rainfed Area Authority (NRAA), the Government in the then Department of Agriculture, Cooperation & Farmers Welfare (DAC&FW) and now Department of Agriculture and Farmers' Welfare (DA&FW) firmed up the composition and mandate of the Committee to study & recommend appropriate amendments to the crop insurance scheme - PMFBY. Accordingly, the Government vide its notifications, dated 11th September 2020 constituted the Committee with composition & Terms of Reference (ToR) as follows:

1.4.1 Committee Composition

(i)	Ashok Dalwai, Chief Executive Officer, NRAA	-	Chairman
(ii)	C.E.O (PMFBY) & JS, Coop. & Credit Division, DAC&FW	-	Member
(iii)	DDG (Crop Science), ICAR	-	Member
(iv)	DDG (Hort.), ICAR	-	Member
(v)	Joint Secretary (Crops), DAC&FW	-	Member
(vi)	Representative of Agromet Div. of IMD	-	Member
(vii)	Director, ICAR-CRIDA	-	Member
(viii)	Representative from ICAR-IASRI	-	Member
(ix)	Director, MNCFC	-	Member
(x)	Representative from SAUs (Tamil Nadu, Maharashtra, Karnataka, Rajasthan, Uttar Pradesh & Madhya Pradesh)	-	Member
(xi)	Technical Expert (WM), NRAA	-	Member

1.4.2 Terms of Reference of the Committee

a) To suggest vulnerability ranking of districts across the country (excluding the urban districts with least agriculture activities, based on objective parameters and recommending the priority districts from the perspective of risk coverage

b) To identify cropping system, suitable to the agro-ecology of particular district and can be considered as rational for coverage under regular crop insurance mechanism; and to suggest list of negative crops or, non-compatible crops in the district, vis-à-vis the agro-ecology and such crops that need to be discouraged under the scheme in normal circumstances

c) To suggest variable/customized cost sharing mechanism/pattern of assistance and approaches for different sets of vulnerability and specific recommendations for coverage of non-compatible crops

d) To examine the complications witnessed in implementation of the scheme in the selected districts identified as critical from crop insurance point of view, and to suggest appropriate remedial measures

e) The Committee may engage an agency for collection of data and information and may also take the services of any hired agency and/or consultants in collating and analysing the information & data including preparation of the report and its periodic supervision

f) The Chairman may co-opt members from other agencies or professionals/experts based on specific requirements emerging during the study period

g) The Committee may hold workshops/conferences & wider consultation if required, to get broader ideas and visions in restructuring the schemes/programmes

h) The ex-officio members of the Committee will be entitled for sitting charges of Rs. 4000/- per day, for which services may be even accessed through e-platform during covid-19 restrictions

i) Any other aspect as found necessary for robustness of the scheme may also be addressed by the Committee

The Committee was mandated to study the operational issues in implementation of PMFBY and recommend appropriate mechanisms for payment of rational compensation to farmers on occurrence of crop losses by adopting agroecology-based crop feasibility. The Committee held a series of meetings on 16th October, 2020; 3rd March, 2021; 30th March, 2021; 18th June, 2021; 4th April 2022 and 20th April 2022 under the chairmanship of CEO, NRAA.

Apart from the above-referred meetings, consultation meetings were held with various stakeholders that included Insurance companies, State governments, Central agencies associated with monitoring, CWCs and farmers on different occasions both virtually and physically. The Committee further constituted 2 (two) Sub-groups with respective mandates to undertake detailed study. One of these sub-groups, namely Sub-group II constituted under ICAR-NIAP, visited Uttar Pradesh, Rajasthan and Haryana among other states and held meetings with various stakeholders (farmers, state officials, field agencies, insurance companies etc.) to understand ground realities relating the scheme and, compile their concerns & suggestions for offering appropriate solutions.

1.5   Constitution of Sub groups

Notwithstanding that the composition of the Committee was diverse & rich enough to examine the issues critically & comprehensively, it was also appreciated, that data collection, collation and analytics, as also field visits would be required to answer some of the specific ToR based on evidence. It was also realised, that this task could be best assigned to professional institutions as it would involve application of the knowledge of agronomy, economics and statistics. Hence, two specific sub-themes were delineated, and two Committees of Experts (CoE) were set up by way of two Sub-groups with respective mandates, as shown in the following sub-sections.

Sub-group I (Technical)

To work on agroecology-based feasibility of agriculture production system and, associated vulnerability to accommodate two deliverables of the Study which are:

   i)   To suggest vulnerability ranking of districts across the country (excluding the urban districts with insignificant agriculture activities) based on objective parameters, and recommending the priority districts from the perspective of risk coverage

   ii)   To identify the cropping system suitable to the agro-ecology of respective district to justify coverage of crops under regular crop insurance mechanism and, to suggest list of negative crops or non-compatible crops in the district which need to discouraged for coverage under the scheme in normal circumstances

1.5.2 Sub-group II (Policy)

To make management and institutional recommendations to accommodate policy related deliverables which are:

   (iii) To suggest vulnerability-based customisation mechanism of premium obligation of the governments (cumulative of both central & state governments), besides making specific recommendation relating to non-compatible crops

(iv) To examine the complications witnessed in implementation of the scheme in the selected districts identified as critical from the perspective of crop insurance, and to suggest appropriate remedial measures

Sub-group I was anchored by ICAR-Central Research Institute for Dryland Agriculture (ICAR-CRIDA), Hyderabad and, Sub-group II was coordinated by ICAR-National Institute of Agriculture Economics and Policy Research (ICAR-NIAP), New Delhi. Notwithstanding this delineation of the tasks, there was some overlap between the two that entailed coordinated working.

This Report has been broadly developed into six chapters, as shown below:

Chapter 1	Performance Status of PMFBY and changes needed
Chapter 2	Nature of Vulnerabilities and Vulnerable Districts
Chapter 3	Yield Instability Index and Vulnerability-based Categorisation of Districts for Major Crops of the Country
Chapter 4	Vulnerability and National Priority - Customisation of Premium Ratios
Chapter 5	Management Reforms: Implementation Challenges and Solutions
Chapter 6	Terms of Reference and Guidance for Reference of the Chapter-wise Recommendations

Chapter 2

Nature of Vulnerabilities and Vulnerable Districts

2.1 Vulnerability in Production System

The agricultural sector is exposed to risks of various natures, intensities and locations across crop calendars and agro-ecologies, because of its primary dependence on climate and biological factors. These risk factors affect the livelihood and incomes of the farmers at large, and the small & marginal farmers in particular. They also undermine the viability of the agriculture as a sustainable production system. Therefore, it is vital in agriculture to delineate and evaluate the risks for proper decision support, by identifying specific needs of particular crop/commodity or region. Hence, it is the more vulnerable districts that deserve attention from the perspective of risks of crop damage/losses arising from extreme climatic events.

The primary risks that the crops stand exposed to arise from poor natural resource base, which is critical for sustenance of any biological activity like agriculture. The natural resource status of a district broadly encompasses rainfall, water availability from surface and sub-surface sources, soil status and its moisture holding capacity etc. In this Report, the vulnerability of districts for different crops across the two major cropping seasons of the country has been assessed based on various factors including agro-ecology, natural resource base, and external influences like farmers' response, price support etc. all of which impact the yield. These factors including localised events that influence yield levels and yield stability find expression through yield instability index (YII). In adopting the basis of YII as an indicator of the vulnerability, this study goes beyond the single parameter of agro-ecology as mandated vide ToR (b). These needed indices for all the major crops across the country have been estimated and discussed in Chapter-3.

2.1.1 Natural resource-based vulnerability

National Rainfed Area Authority (NRAA) had constituted a Task Force to work on **"Revisiting Prioritisation of Rainfed Areas"** with ICAR-Central Research Institute for Dryland Agriculture (ICAR-CRIDA) as the Knowledge Partner. The Study considered 670 agriculture-dominated districts which account for more than 90 per cent of the country's population and area. For purpose of ranking the districts based on vulnerability, the NRAA Study arrived at 'Composite Index (CI)' consisting of two sub-indices, viz., Natural Resources Index (NRI) and Integrated Livelihood Index (ILI).

The parameters considered for **Natural Resource Index (NRI)** were 12 in number as follows:

- Drought frequency (Met)
- Cultivated area and percentage under rainfed condition
- Rainfall

- Status of ground water - groundwater development (utilization and replenishment)
- Status of ground water (recharge from other sources to rainfall on annual scale)
- Available water content of soil
- Variability in NDVI
- Permanent pastures and other grazing lands
- Cultivable waste lands, current fallows and other fallow lands
- Slope/ Topography
- Area under degraded and waste lands
- Barren and uncultivable wasteland

The parameters considered for **Integrated Livelihood Index (ILI)** were 18 in number consisting of socio-economic parameters; infrastructure parameters; and health & sanitation parameters as given below:

Socio economic parameters:

- Small and marginal farmers
- SC/ST population in rural areas
- Workforce engaged in Agriculture
- Rural population density
- Literacy in rural areas
- Number of villages having self-help groups
- Livestock population
- Share of agriculture in District Domestic Product (DDP)
- Per capita income
- Consumption of fertilizer nutrients (NPK)

Infrastructure parameters:

- Number of veterinary centres
- Number of villages with primary school
- Number of villages with all-weather roads
- Regulated markets
- Outstanding agricultural credit

Health and sanitation parameters:

- Number of villages with primary health centre / primary health sub-centre
- Number of households with drinking water facility of tap water from treated source
- Households with good and liveable housing in rural areas etc.

The indices for NRI and ILI were arrived at by summing up the values of relevant normalized indicators multiplied by their respective weights. The NRI and ILI were then rescaled to build

Composite Index (CI) by assigning 2/3 (two-thirds) weight to NRI and 1/3 (one-thirds) weight to ILI using the following formula,

$$CI = [2/3(1\text{-}NRI)] + [1/3(1\text{-}ILI)]$$

NRI considered different dimensions of natural resources, that are mostly appropriate to sustain a biologically driven production system. While this Report ranked all the 670 districts based on vulnerability linked to NRI, it also highlighted 168 numbers as Very high Priority (VHP), holding that, these were critically drought-prone. The rationale was, that poor resource base in these districts would not have sufficient resilience to sustain the negative impact of weather aberrations particularly that of drought and water scarcity, affecting in result agricultural systems in a moderate to severe level for different commodities.

The list of very high priority districts based on NRI is given in Table 2.1.1(i) and its spread across the country is shown in Fig. 2.1.1(i). It may be noted, that this list of 168 exceeds that of 151 numbers of districts referred to in the Cabinet decision on PMFBY, dated 19th February, 2020. This list of 151 was based on ICAR-led National Initiative on Climate Resilient Agriculture (NICRA), which was revised to 168 under the NRAA-led "Prioritisation of Districts for Development Planning in India - A Composite Index Approach".

Table 2.1.1(i). Very high priority districts based on NRI

State	No. of Districts	Districts
Andhra Pradesh	7	Anantapur, Chittoor, Kurnool, Nellore, Prakasam, Vishakhapatnam, YSR Kadapa
Arunachal Pr.	4	Anjaw, Kurung-Kumey, Tawang, Uppar Dibang Valley
Bihar	1	Patna
Chhattisgarh	5	Jashpur, Korba, Koriya, Raj Nandgaon, Surguja
Gujarat	18	Ahmadabad, Amreli, Banas Kantha, Bhavnagar, Botad, Dev Bhoomi Dwaraka, Dohod, Gandhinagar, Gir Somanath, Jamnagar, Junagadh, Kachchh, Morvi, Patan, Porbandar, Rajkot, Sabar Kantha, Surendranagar
Haryana	3	Bhiwani, Mahendragarh, Mewat
Himachal Pr.	3	Kinnaur, Kullu, Lahul & Spiti
Jammu & Kashmir	11	Anantnag, Bandgam, Baramula, Doda, Kargil, Kishtwar, Kupwara (Muzaffaraba), Leh, Poonch, Reasi, Srinagar
Jharkhand	9	Bokaro, Devghar, Dhanbad, Dumka, Garhwa, Gumla, Latehar, Ramgarh, West Singhbhum
Karnataka	21	Bangalore Rural, Belgaum, Bellary, Bidar, Bijapur, Chamrajnagar, Chik Ballapur, Chitradurga, Davanagere, Dharwad, Gadag, Gulbarga, Hassan, Haveri, Kolar, Koppal, Mysore, Raichur, Ramanagra, Tumkur, Yadgir
Madhya	6	Alirajpur, Anuppur, Dindori, Shahdol, Shivpuri, Singrauli

Pradesh		
Maharashtra	23	Ahmednagar, Akola, Amravati, Aurangabad, Bid, Buldana, Dhule, Jalgaon, Jalna, Latur, Nagpur, Nanded, Nashik, Osmanabad, Parbhani, Pune, Ratnagiri, Sangli, Satara, Sindhudurg, Solapur, Washim, Yavatmal
Mizoram	2	Lawngtlai, Saiha
Orissa	3	Kendujhar, Mayurbhanj, Sundargarh
Rajasthan	22	Ajmer, Alwar, Barmer, Bhilwara, Bikaner, Chittaurgarh, Churu, Dungarpur, Ganganagar, Hanumangarh, Jaipur, Jaisalmer, Jalor, Jhunjhunun, Jodhpur, Nagaur, Pali, Rajsamand, Sikar, Sirohi, Tonk, Udaipur
Sikkim	2	North, West
Tamil Nadu	14	Anna, Dharmapuri, Karur, Krishnagiri, Namakkal, Perambalur, Ramanathapuram, Salem, The Nilgiris, Thoothukkudi(Chidam*), Tiruchchirappalli, Tirunelveli Kattabom, Tiruppur, Virudhunagar(Kamara*)
Telangana	8	Jogulamba Gadwal, Mahabubnagar, Nagarkurnool, Nalgonda, Rangareddy, Sangareddy, Siddipet, Vikarabad
Uttranchal	4	Chamoli, Pithoragarh, Rudraprayag, Uttarkashi
West Bengal	2	Puruliya, West Medinipur
Total	**168**	**Covering almost 21 states/UTs in the country**

Source: Prioritisation of Districts for Development Planning in India-A Composite Index Approach

2.1.1(i) Spread of very high priority districts based on NRI

Figure 2.1.1(i): Distribution of very high priority districts based on NRI
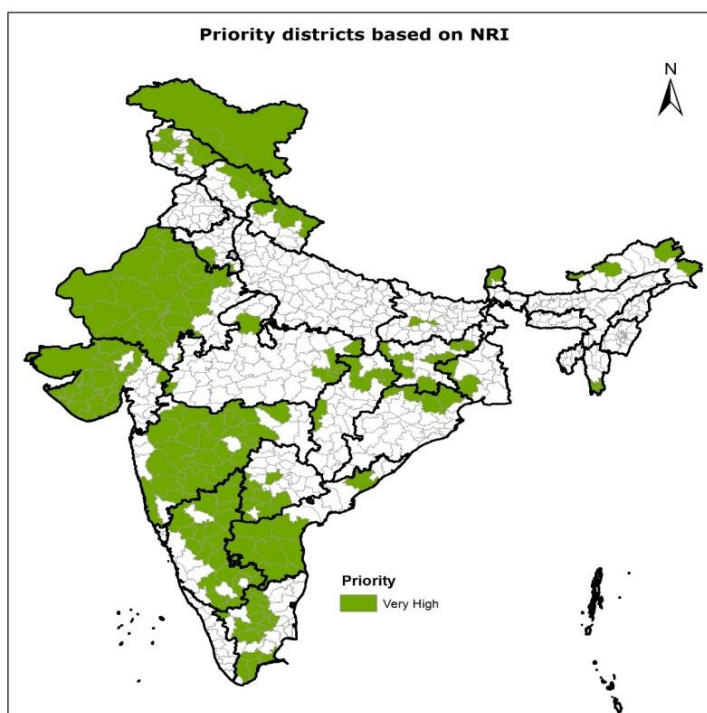
The list of very high priority districts under NRI category as indicated in Table 2.1.1(i) also justifies identification for specific attention, as these cover about 35 per cent of gross sown area (62.4 M ha out of 177.8 M ha) in the country. The Table 2.1.1(ii) that follows indicates that for most of the rainfed dominated crops, the coverage is in the range of 35 to 84 per cent.

Table 2.1.1(ii). Crop-specific coverage in the very high priority NRI districts

Crop	Area (ha) under Very High Priority NRI districts	Total Area (ha)	% of total Area
Bajra	5338258	7491821	71
Barley	300808	646574	47
Jowar	5374830	6375339	84
Maize	4140568	9597513	43
Ragi	518239	926416	56
Rice	8021219	52281453	15
Wheat	4735409	30881584	15
Total cereals	28429331	108200700	26
Cotton(lint)	8084967	11806805	68
Dry Chillies	259410	746667	35
Jute	31744	805638	4
Sugarcane	1129548	4773571	24
Total (Cereals)	*9609346*	*18522483*	*52*
Castor seed	712439	891838	80
Groundnut	4232325	5327465	79
Rapeseed & Mustard	2323892	5803472	40
Sesamum	579396	1584221	37
Soybean	4061196	11625773	35
Sunflower	297891	487817	61
Total oilseeds	*12208749*	*25742337*	*47*
Arhar/Tur	2743218	4601100	60
Gram	4933130	9257899	53
Masoor	433611	1930664	22
Moong	2928999	5068785	58
Urad	1176769	4413787	27
Total pulses	*12215728*	*25272234*	*48*
All Total	**62463154**	**177737755**	**35**

2.1.2 Vulnerable districts from the perspective of localized events

The crops are also vulnerable to various kinds of weather events, that are many a time sporadic and are limited to specific geographies. These negatively impact the crops limited to the local areas, and are discussed in the following sub-sections.

2.1.2.1 Flood

Flood is witnessed in about 214 districts spread across 32 states/UTs of the country. However, if the extent of flood-prone area in a district is grouped into 30 per cent and more of the total area as the determinant of prioritisation of the district for purpose of risk mitigation, then 97 districts spread across 10 states may be considered as most vulnerable to flood.

Table 2.1.2.1(i): State-wise districts most vulnerable to flood

Sl. No	State and number of districts	Districts
1	Punjab (16)	Gurdaspur, Amritsar, Kapurthala, Jalandhar, Hoshiarpur, Shahid Bhagat Singh Nagar, Rupnagar Fatehgarh Sahib, Ludhiana, Moga, Firozpur, Muktsar Faridkot, Mansa, Sangrur, Patiala
2	Haryana (9)	Panchkula, Ambala, Yamunanagar, Kurukshetra, Karnal, Jind, Fatehabad, Jhajjar, Faridabad
3	Uttar Pradesh (23)	Bagpat, Gautam Buddh Nagar, Mathura, Agra, Budaun, Bareilly, Shahjahanpur, Farrukhabad, Bahraich, Balrampur, Gonda, Siddharth Nagar, Maharajganj, Gorakhpur, Kushi Nagar, Deoria, Mau, Ballia, Jaunpur, Ghazipur, Chandauli, Varanasi, Sant Ravidas Nagar
4	Bihar (17)	Champaran(West), Sitamarhi, Madhubani, Supaul, Araria, Kishanganj, Purnea, Saharsa, Darbhanga, Samastipur, Begusarai, Khagaria, Bhagalpur, Lakhisarai, Sheikhpura, Nalanda, Patna
5	Assam (5)	Dhubri, Barpeta, Lakhimpur, Dhemaji, Golaghat
6	West Bengal (14)	Jalpaiguri, Cooch Behar, Dinajpur (Uttar), Dinajpur (Dakshin), Malda, Murshidabad, Birbhum, Burdwan, Nadia, 24-Paraganas (North), Hooghly, Howrah, 24-Paraganas (South), Midnapore
7	Odisha (6)	Balasore (Baleshwar), Bhadrak, Kendrapara, Jagatsingpur, Jajpur, Puri
8	Gujarat (3)	Banaskantha, Patan, Anand
9	Andhra Pradesh (3)	East Godavari, West Godavari, Krishna
10	Kerala (1)	Alappuzha

2.1.2.2 Hail-storms

The severity range of hail events is based on the size of hail, wind, and structures in the path of a hail-storm. Hail-storms can cause extensive damage to field crops, horticulture crops, livestock and poultry besides affecting both urban and rural landscapes. These can cause damage to buildings including roofs, windows, and outside walls.

Major field crops affected negatively due to hail-storm are rice, maize, wheat, mustard, chickpea etc. Horticultural crops that are vulnerable include mango, sweet/mandarin orange,

grapes, lemon, papaya, pomegranate, chilli and tomato. District-wise hail-frequency maps were generated based on the IMD database for the period of 1972-2011. The frequency maps are prepared at the district level, even though the hail is an isolated event visiting some specific geographic point in the district. In a context of this nature, it is to be inferred that the hail-storm event occured in the corresponding district. To reiterate, it is not always necessary that the entire district gets affected due to hails, and in most of the cases the events were very much localized.

Based on the hail frequency, more than 61 per cent of the districts are found to have experienced at least one (1) hail event in a 38-year period. Highest frequency is observed in the northern districts of Vidarbha region of Maharashtra that are adjoining Madhya Pradesh State. This is the region in Deccan plateau, where one sees the moisture-laden warm winds from the Bay of Bengal and cold dry air masses descending from mid-latitudes under the influence of western disturbance converging.

From the analysis, it was observed that the month of March is the one visited by high frequency of hail events is high. The state-wise and district-wise highest number of events that were recorded in the past is listed in the Table 2.1.2.2(i).

Table 2.1.2.2(i): State-wise and district-wise highest number of events recorded during 1972-2011

State	District	No. of events	State	District	No. of events
Maharashtra	Nagpur	40	Rajasthan	Jaipur	24
HP	Shimla	35	HP	Kangra	23
Assam	Kamrup	32	Maharashtra	Nasik	20
Maharashtra	Amravathi	30	Maharashtra	Warda	20
Maharashtra	Akola	27			

Source: Rao et al. (2014)

2.1.2.3 Heat-wave

As per IMD, to declare heat-waves, the following criteria should be met at least in 2 stations in a Met sub-division for at least two consecutive days and, it will be declared on the second day. Forecasts of heat-waves over a sub-division are issued only if at least two of its stations are expected to experience such conditions.

Heat-wave need not be considered till maximum temperature of a station reaches at least 40°C in case of plains and at least 30°C in case of hilly regions

- When normal maximum temperature of a station is less than or equal to 40°C –
  Heat-wave departure from normal is 5°C to 6°C
  Severe heat-wave departure from the normal is 7°C or more
- When normal maximum temperature of a station is more than 40°C –
  Heat-wave departure from the normal is 4°C to 5°C
  Severe heat-wave departure from normal is 6°C or more

- When actual maximum temperature remains 45°C or more irrespective of normal maximum temperature, heat-waves should be declared.

Higher daily peak temperatures, as also longer and more intense heat-waves are becoming more frequent globally due to climate change. India too is feeling the impact of climate change in terms of increased instances of heat-waves which are getting more intense in nature with each passing year, leaving a devastating impact on human life in general and, the domains of agriculture, livestock and fisheries in particular.

For purpose of study relating to this Report IMD-gridded data for the years (1991-2019) and (2011-2019) has been used to identify the districts vulnerable to heat-wave by adhering to the above mentioned IMD guidelines for heat-wave declaration. The same is enclosed as Table-2.1.2.3(i) for plain region and Table-2.1.2.3(ii) for hilly region.

Table 2.1.2.3 (i): Heat-wave experienced more than 4 days per year in districts (plain region)

Sl. No.	State	District
1	Rajasthan	Churu, Karauli, Dholpur, Dausa, Bharatpur, Sikar, SriGanganagar Hanumangarh
2	Madhya Pradesh	Morena. Gwalior. Bikaner, Datia
3	Haryana	Fatehabad Sirsa
4	Punjab	Barnala, Muktsar, Jalandhar, Kapurthala, Mansa Moga, Tarantaran
5	Uttar Pradesh	Jhansi

Source: IMD-gridded data (1991-2019)

Table2.1.2.3 (ii): Heat-wave experienced more than 5 days per year in districts (hilly region)

Sl. No.	State/UT	Districts
1	Jammu & Kashmir	Kupwara, Bandipora, Baramula, Ganderbal, Srinagar, Badgam, Pulwama, Kishtwar, Anantnag
2	Himachal Pradesh	Una, Bilaspur, Hamirpur, Kangra, Solan, Sirmaur, Mandi, Shimla
3	Ladakh	Kargil

Source: IMD-gridded data (1991-2019)

2.1.2.4 Cold-wave

Cold-wave is a seasonal and localized phenomenon prevalent in large part of India with the exception of southern parts of the country. The northern parts of India, especially the hilly regions (Jammu and Kashmir, Himachal Pradesh, Uttarakhand) and the adjoining plains are influenced by transient disturbances in the mid-latitude westerlies. States like Punjab, Haryana, Rajasthan, Delhi, U.P., Bihar and Jharkhand are the ones, that are highly affected

from cold-wave. Few Met- subdivisions of Marathwada, Vidarbha, Saurashtra and Madhya Maharashtra are also sometimes affected by cold-waves. The extent of damage caused by a cold-wave depends on the temperature, length of exposure, humidity levels, and the wind speed at freezing temperature. As per IMD, to declare cold-waves, the following criteria should be met at least in 2 stations in a Met-subdivision for at least two consecutive days and it will be declared on the second day. Forecasts of cold-waves over a sub-division will be issued only if at least two of its stations are expected to experience such conditions. Cold-wave is considered when the minimum temperature of a station is 10°C or less for plains and 0°C or less for hilly regions.

Based on departure
- Cold-wave (CW): Negative departure from normal is 4.5°C to 6.4°C
- Severe cold-wave (SCW): Negative departure from normal is more than 6.4°C

Based on actual minimum temperature (for plain stations only)
- Cold-wave: When the minimum temperature is ≤ 4°C
- Severe cold-wave: When the minimum temperature is ≤ 2°C

Cold-wave conditions for coastal stations
- When minimum temperature departure is -4.5°C or less over a station, "Cold - wave" may be described if the minimum temperature is 15°C or less.

In this regard, IMD-gridded data for the years (1991-2019) and (2011-2019) were used to identify the districts vulnerable to cold-wave using the above listed IMD guideline for cold-wave declaration. The same is enclosed as Table-2.1.2.4 (i) for plain region and Table-2.1.2.4 (ii) for hilly region.

Table 2.1.2.4 (i): Cold-wave days (3-5) per year experienced in districts (plain region)

Sl	State/UT	Districts
1	Maharashtra	Nagpur, Amaravati, Wardha, Seoni, Akola, Hingoli, Washim, Yavatmal, Chandrapur, Kumaram Bheem, Adilabad, Buldana, Jalna, Nanded
2	J & K	Jammu
3	Chhattisgarh	Bemetara

Table 2.1.2.4 (ii): Cold-wave days (4-15) per year experienced in districts (hilly region)

Sl	State/UT	Districts
1	J & K	Kulgam, Shopia, Punch, Ramban, Reasi, Doda, Rajauri, Kupwara Udhampur Badgam, Pulwama, Bandipora, Baramula, Ganderbal, Srinagar, Kishtwar
2	Ladakh	Leh, Kargil
3	H.P.	Lahul & Spiti

2.1.2.5 Frost

The principal factor that controls frost formation over a surface is coldness of that surface at or below the freezing temperature. It is observed that when air temperature measured inside a screen at about one-meter height from the surface is around 5°C, there are possibilities that the ground surface/objects attain below-freezing temperature leading to frost. In India, mainly the region that lies north of the Vindhya ranges, particularly the Indo-Gangetic Plains, is vulnerable to frost/freezing injuries, impacting the productivity of vegetables, field crops and fruit orchards. Major parts of Himachal Pradesh, Punjab, Haryana and Uttarakhand along with few pockets of Arunachal Pradesh, Assam, Uttar Pradesh, Bihar and Jharkhand are found vulnerable for days with less than 1°C during winter season. The number of districts that experienced number of days with less than 3°C and 4°C was found higher over the regions of Western Uttar Pradesh and Northern Madhya Pradesh during 2011-2019 in comparison to previous decades.

It is assumed that, chances of frost occurrence are more when air temperature goes below 2^oC. However, frost sometimes occurs even when temperature is 4^oC due to some other factors affecting frost occurrence. Based on minimum temperature below 2^oC and average number of frost days/year (at least two days) during 2011-19, the most vulnerable frost prone districts have been identified and may be seen in Table 2.1.2.5.

Table 2.1.2.5 : Frost-prone districts of India

State-District	Average days / year	State-District	Average days / year
Jammu & Kashmir_Anantnag	51.0	Himachal Pradesh_Bilaspur	5.2
Jammu & Kashmir_Ramban	50.1	Himachal Pradesh_Hamirpur	5.2
Jammu & Kashmir_Kishtwar	49.7	Arunachal Pradesh_Anjaw	5.0
Jammu & Kashmir_Kargil	49.2	Punjab_Amritsar	4.8
Jammu & Kashmir_Badgam	46.8	Punjab_Hoshiarpur	4.3
Jammu & Kashmir_Pulwama	46.8	Himachal Pradesh_Shimla	3.1
Jammu & Kashmir_Northern Areas	46.3	Uttarakhand _Uttarkashi	3.0
Jammu & Kashmir_Leh (Ladakh)	45.3	Himachal Pradesh_Una	2.9
Jammu & Kashmir_Bandipora	45.0	Punjab_Rupnagar	2.8
Jammu & Kashmir_Baramula	45.0	Uttarakhand _Rudraprayag	2.7
Jammu & Kashmir_Ganderbal	45.0	Himachal Pradesh_Sirmaur	2.6
Jammu & Kashmir_Srinagar	45.0	Himachal Pradesh_Solan	2.6
Jammu & Kashmir_Kulgam	43.8	Punjab_Faridkot	2.6
Jammu & Kashmir_Shopian	43.8	Uttarakhand_Chamoli	2.6
Jammu & Kashmir_Kupwara	41.7	Punjab_Muktsar	2.4
Jammu & Kashmir_Punch	34.4	Punjab_Nawanshahr	2.4
Jammu & Kashmir_Reasi	30.3	Punjab_Kapurthala	2.3
Jammu & Kashmir_Doda	29.8	Punjab_Taran Taran	2.3
Jammu & Kashmir_Rajauri	29.3	Punjab_Barnala	2.2
Jammu & Kashmir_Udhampur	29.1	Punjab_Bathinda	2.2

Himachal Pradesh_Lahul & Spiti	25.3	Uttarakhand _Dehradun	2.2
Jammu & Kashmir_Jammu	22.1	Haryana_Sirsa	2.1
Himachal Pradesh_Chamba	21.9	Punjab_Firozpur	2.1
Jammu & Kashmir_Samba	17.6	Punjab_Jalandhar	2.1
Sikkim_North	15.0	Punjab_Moga	2.1
Himachal Pradesh_Kullu	12.7	Haryana_Fatehabad	2.0
Jammu & Kashmir_Kathua	12.1	Punjab_Ludhiana	2.0
Himachal Pradesh_Kangra	10.8	Punjab_Mansa	2.0
Himachal Pradesh_Kinnaur	10.4	Rajasthan_Hanumangarh	2.0
Himachal Pradesh_Mandi	6.4	Uttarakhand _Tehri Garhwal	2.0
Punjab_Gurdaspur	6.0		

Source: Bal et al. (2021)

Chapter 3

Yield Instability Index and Vulnerability-based Categorisation of Districts for Major Crops of the Country

3.1. Agro-ecology and appropriate cropping systems

India is blessed with heterogeneous landforms, a range of climatic conditions from the coastal zones to high mountains, an assortment of geological formations with temperatures varying from arctic cold to tropical hot, and rainfall ranging from extremely arid of a few mm (<100 mm) to per-humid with the world's maximum rainfall (11,873 mm). Such a cauldron of environmental conditions has resulted in diverse soils and, therefore, land use systems exhibiting the unique agro-ecology of a habitat. The current food system (a complex web of production, transport, processing, packaging, storage, retail, consumption, loss and waste) feeds the nation and supports the livelihoods of nearly half of Indian populace. Considering the enormous variability in the geographical, topographical, sociological and environmental elements in different parts of the country, and agriculture continuing to be the key livelihood option for a large section of the rural populace, it is imperative to categorize the major farming practices according to districts and agro-ecological regions & sub-regions in the country. Such a categorization is necessary to realise continuous improvement in agriculture, and make it profitable as well as sustainable. Observed climate change has the potential to affect the food security through increasing temperatures, changing precipitation patterns, and greater occurrence of weather extreme events, all together exacerbating production risks for the farmers.

The marginal and small holdings taken together (0.0-2.0 ha) constituted 86.08 per cent of the total holdings in 2015-16 (Agricultural Census, 2019). Smallholder farmers have been cultivating crops that sometime may not be actually suited to the particular agro-ecological zone. They are also often a victim of climatic variability and need cushioning of their losses. **This is where the concept of agro-ecologically sustainable intensification gains relevance.** Agro-ecology has the explicit objective of strengthening the sustainability of all components of the food system, encompassing the seed and the soil, as also ecological knowledge, economic viability, and social justice.

Despite awareness of the gains an agro-ecologically-synchronous production system can engender, the more common practice in the country as highlighted by the committee on Doubling Farmers' Income (DFI) has been *"any crop, anywhere and at any cost".* Land suitability assessment is a specific type of land evaluation method, proposed by FAO (FAO 1976 & 1983) to assess the resources of an area for specific crop rather than for a general use. It integrates soil characteristics with climate and land use. Soil-site characteristics identify the degree of suitability for land use which aids in crop planning of an area under a suitable site specific crop (Singh *et al.,* 1998 & Sharma *et al.,* 2001). Crops not suitable to a particular agro-ecology are at greater climatic-risk under the fluctuating climatic conditions, particularly if there is an incidence of extreme weather event.

Agriculture sector, including especially crop production is very sensitive to weather and other environmental impacts. The efficiency of production technology is measured by yield (crop output per unit area), but this is considerably influenced by environmental conditions, anomalies, and unexpected stressful events. Therefore, yields fluctuate from year to year, and the applied technology should be prepared to mitigate adverse environmental impacts. Climate change will have a substantial effect on agricultural production. The changing precipitation and heat effects, and especially the increased frequency of extreme weather events may lead to increasing instability of crop yields and require specific support to maintain stable food provisions (Molnár *et al*., 2015). An analysis of instability in crop output, apart from growth, is important for understanding the nature of food security and income stability. The variations in crop output not only affect prices and bring about sharp fluctuation in them but also result in wide variations in disposable income of the farmers (Jain, 2018). Paltasingh & Goyari (2013) calculated instability in subsistence agriculture of Odisha by taking 41 years data from 1970 to 2010 and observed that there is no positive relation between growth and instability and, found that weather variability was the only important factor responsible for higher instability. This frequently results in yield variability or instability at both, the individual farmer and the district levels resulting in income loss to the farmer (for, he may not stand fully compensated even when insured), and monetary loss to the public exchequer, on account of pay out of obligatory premium subsidy, which may not be rational.

Hence, the need for a system-based mechanism of premium subsidy/concession-customisation. The Committee in this context relies upon the measures of yield and their stability/instability, that captures the influence of agro-ecology amongst other factors. This is taken forward to recommend varying grades of crop compatibility including non-compatibility for all the major crops for all the districts showing significant threshold levels of cultivation.

The Yield Stability Index (YSI) is an important index, but it measures only deviations of yields from the yield trend and, does not say anything about the actual level of the yield, or the direction of the trend (increasing or decreasing). Therefore, it is critical to consider both the variables - trend of the yields, and the YSI value to enable a more comprehensive decision-making. The results can be used to design general agricultural support policies including providing protection against the risks that the farmers face. Intervention schemes for insurance structures against very low yields may make the agricultural sector less sensitive to the possible risks related to yield variability (Bacsi & Hollosy 2019). The pathway adopted to ascertain the yield instability is described hereunder.

3.2. Yield Instability Index based on Yield Variability at District level

3.2.1. Annual agricultural crops

Yield Instability Index (YII) is the index chosen to assess the stability of crop production at district level. This is an important parameter, that can be used to guide the production planning, by tailoring various support systems including the crop insurance scheme to

incentivise or disincentivise a particular behaviour among the farmers, by bringing into play **the theory of "Nudge" as advocated by the noble Laureate Economist Richard H Thaler.** There exists scope to deploy subsidy on premium under PMFBY as a tool to drive the desired behaviour, namely, **'Crop production system linked to agro-ecology and other production influencing factors'**. Keeping this in mind, 'Yield Instability Index (YII) was estimated for all the agriculturally significant districts of the country for both *Kharif* and *Rabi* seasons in this Study, Yield Instability index is estimated based on the following formula:

> **Yield Instability Index = Standard deviation of natural logarithm (Yt+1/Yt)**
>
> i.e., $YII = SD\{\ln(Yt+1/Yt)\}$
>
> Where, Yt is the yield in the current year, and Yt+1 is for the next year.

This index is unit-free and very robust; besides, measuring deviations from the underlying trend (log linear in this case).

3.2.2 Criteria used for identifying major districts for a given crop in a given season

i)   For each crop, districts in descending order that cumulatively account for 90 per cent of area under the crop/with at least 10,000 ha area (latest 3 years average) but not less than 1,000 ha area are included in the analysis.

ii) The consideration for final reporting purposes was district-crop combinations having at least four $\{\ln[(yt+1)/yt]\}$ values for computing standard deviation (SD) and the latest year in the data is > 2006.

iii) Time series data on area, production and productivity available from the Ministry of Agriculture and Farmers Welfare was utilised for purpose of computing Yield Instability Index.

3.2.2.1 *Grouping of districts for productivity*

Yields (latest 3 years average) of major districts identified for a crop in a given season were sorted in ascending order, and 5 percentile (5p) & 95 percentile (95p) values of yield computed. Let the difference between 95p and 5p be R.

- All the districts showing yield less than 5p+(R/3) are classified into low productivity category.
- All the districts showing yield in the range of 5p+(R/3) to 5p+(2R/3) are classified into medium productivity category.
- All the districts showing yield more than 5p+(2R/3) are classified into high productivity category.

This categorization manages the outliers or districts with extremely low or high yields by way of trimming top 5 per cent cases and bottom 5 per cent cases. The same procedure is adopted for each crop-season combination.

3.2.2.2 *Grouping of crops based on risk intensity*

The Study estimated the yield instability index based on secondary data of yield of various crops (2006-2018), considered as important from the perspective of crop insurance in different districts of the country. For computation of district-wise variability in yield, the crop risk probability method was also tried, for comparison of the results received using yield instability index. Risk probability is a tool for determination of the likelihood of occurrence of a risk. Hodrick-Prescott (HP) filter was used to remove the trend movements from the time series on crop productivity. The probability of yield of a crop falling below its trend value by 5 per cent or more, and 10 per cent or more, were computed. The estimates of instability indices and probability of shortfall in yield below 10 per cent or more followed almost identical patterns. This validation confirmed the reliability of yield instability index values as ascertaining of the risk in a particular crop. **The districts based on the values of yield instability indices were further categorized as most suitable (Low risk), moderately suitable (Medium risk) and less suitable (High risk) for a particular crop using cumulative square root method of stratification.** The analysis included both *Kharif* and *Rabi* season crops viz., wheat, paddy, barley, maize, sorghum, pearl millet, ragi (finger millet), chickpea, pigeon pea, lentil, green gram, urad, groundnut, soybean, mustard, castor seed, sesame, sunflower, cotton, tobacco, dry chillies, jute, and sugarcane.

It was decided to also examine the crops in terms of their importance for the country, which can vary from time to time based on various factors like domestic & global demand, price, food & nutrition security etc. The Study used demand and supply data from NITI AAYOG Reports to ascertain national priority of a particular crop or crop-groups. India an emerging economy is always faced with increasing pressure on its finances from alternate sectoral demands. Hence the budgetary resources need to be prioritised and used efficiently. As in the case of any scheme, in respect of crop insurance too, the government's obligation relating to premium subsidy needs to be rational and linked to crops on the basis of national priority, determined by food and nutritional security, domestic & global demand, farmers income status etc. Hence, this Report recommends rationalizing of premium subsidy for the crops of lower national priority, as also those grown in medium and high risk zones including in some cases 'Zero' Subsidy. **The approach suggested is a graded system of premium subsidy with highest offer on crops with lowest risk & highest compatibility, and lowest subsidy slab on the highest risk-prone and lowest compatiblity crops.**

Crop yield risk and claim relations

The assumption behind carrying out an analysis of long term crop yield data for instability index values was, that insurance companies might be quoting crop insurance premium based on risk level of the crop for particular state / region / group of districts as one of the criteria. It is common knowledge that high-risk in respect of a particular crop in a given geographic unit

can lead to higher probability of loss and, therefore higher claims of compensation, which strongly influences a decision on the price quote by the insurance companies. The corollary to this is, that the loss ratio (ratio of claim amount & premium) would be higher. While the premium outgo to be paid by the farmers, as also the government (state & centre) would be high, the compensation to be paid by the insurance companies against the loss claims would also be high. This hypothesis needed to be tested and, was done for few select crops – paddy, wheat & bareley.

The actual loss ratio (ratio of claim amount and premium) data received from the Department of Agriculture & Farmers Welfare for different crops was used in estimating the relationship between crop risk i.e. instability index and loss ratio. The data on loss ratio for each district were available for 3 (three) years and, based on this average of loss ratio was calculated for each district to prepare final data series. This made available data series on loss ratio for crops relating to all the major districts (agriculturally significant), where particular crop was cultivated and claims were received by the farmers. As in this study, where analysis of instability index was already based on more than 10 years' data, correlation between instability index values and loss ratio data was worked out, covering three major cereal crops i.e. wheat, paddy and barley.

In all these crops, correlation was positive, but statistically non-significant at 5 per cent probability. It shows that though there is a positive correlation between loss ratio and risk associated with a crop, there may be many other factors that influence rate of premium discovery.

Table 3.2.2.2 (i): Correlation between risk and loss ratio

S. No.	Crop	No of observation	Correlation coefficient	t/z value	p-value	Status of Significance
1	Paddy	56	0.389	0.052	0.479	Non-Significant
2	Wheat	231	0.077	0.005	0.497	Non-significant
3	Barley	29	0.098	0.509	0.615	Non-significant

Source: Estimations by Committee of Experts, Sub-group II

This supports the approach adopted in this Report to recommend graded system premium-subsidies based on vulnerability categorization of the districts. The detailed analysis on instability index, grouping of the state-wise districts for different crops after examining each district for significance based on the area thresholds adopted, area under different risk categories and recommendations of premium subsidy for different crops grown in various seasons are presented in the sections that follow. This will provide a rational evidence-based system of premium subsidy fixation.

3.3. *Kharif* Cereals

3.3.1. Pearl millet/Bajra

During *Kharif* season, pearl millet is grown in about 214 districts covering an area of 7.35 M ha. The states with large acreage of pearl millet include Rajasthan (21 districts with 4.15 M ha), Uttar Pradesh (19 districts with 0.81 M ha), and Maharashtra (12 districts with 0.80 M ha). These three states together account for 84 per cent of the country's Pearl millet growing area. Pearl millet yields across districts vary from 0.16 t/ha to 2.74 t/ha. **The districts have been categorized based on productivity levels into 3 (three) classes, low (<= 1.08 t/ha), medium (1.09 t/ha to 1.84 t/ha) and high (> 1.89 t/ha).** Among the 79 districts, about 26 districts spread across UP (12 districts), Haryana (seven districts) and Gujarat (seven districts) with a total area coverage of 1.8 M ha show higher productivity levels (*i.e.*, > 1.84 t/ha). Another 26 districts with a total cultivated area of 1.6 M.ha located across several states display medium productivity levels. All the remaining districts recorded lower productivity.

Based on the instability index, 40 districts (the highest number) with an area of 29 per cent exhibited low risk. However, medium risk category districts were 28 with 33 per cent area. The remaining 11 prominent districts under bajra covered 30 per cent area. All other districts with insignificant area covered 7 per cent bajra area under cultivation. The risk-wise classification of districts across the states in case of Pearl millet/Bajra crop is presented in Table 3.3.1(i)

Table 3.3.1(i). Pearl millet / Bajra crop: Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
1	Gujarat	Anand, Kheda, Banaskantha, Bhavnagar, Vadodara, Mahesana	Kachchh, Patan		Ahmadabad, Amreli, Aravalli, Bharuch, Botad,Devbhumi, Dwarka,Gandhinagar, Gir Somnath, Tapi Jamnagar,Junagadh, Mahisagar, Morbi, Narmada, Panch Mahals, Porbandar, Rajkot,Sabar Kantha, Surat,Surendranagar,	
		6	2		20	28
		322106	32689			
2	Haryana	Mewat, Gurgaon, Jhajjar, Jind, Mahendragarh, Rewari, Rohtak, Bhiwani	Hisar		Ambala,Charki Dadri, Faridabad, Karnal, Fatehabad, Kaithal, Palwal, Panchkula, Panipat,Sirsa, Sonipat, Yamunanagar	
		8	1		12	21

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
		309923	23474			
3	Karnataka	Bellary	Bijapur, Raichur, Koppal, Bagalkot,Yadgir		Bangalore Rural, Belgaum, Bengaluru Urban, Bidar, Chamarajanagar, Chikballapur, Chitradurga, Shimoga, Davangere, Tumkur Gadag, Gulbarga, Haveri, Ramanagara	
		1	5		14	20
		13637	153227			
4	Madhya Pradesh	Alirajpur, Bhind, Morena	Sheopur		Ashoknagar, Barwani, Burhanpur, Chhatarpur Datia, Dhar,Gwalior, Jhabua, Khandwa, Khargone,Mandsaur, Narsinghpur,Rewa, Satna, Sehore, Umaria Shajapur,Shivpuri, Sidhi,Singrauli,	
		3	1		20	24
		165810	15228			
5	Maharashtra	Pune, Nashik, Jalgaon	Aurangabad, Beed,Osmanabad, Satara, Jalna, Dhule, Ahmednagar, Solapur	Sangli	Akola, Amravati, Buldhana, Chandrapur, Gadchiroli, Hingoli, Latur, Nandurbar, Parbhani, Washim, Yavatmal	
		3	8	1	11	23
		202200	554610	52933		
6	Rajasthan	Dholpur, Alwar	Bharatpur, Karauli, Sawai Madhopur, Dausa, Tonk, Jaipur, Sikar, Nagaur, Jhunjhunu	Hanumangarh, Bikaner, Jodhpur, Jalore, Jaisalmer, Barmer, Churu, Pali, Ajmer, Sirohi	Banswara, Baran, Bhilwara, Bundi, Chittorgarh, Dungarpur, Udaipur Ganganagar, Jhalawar, Kota, Pratapgarh, Rajsamand,	
		2	9	10	12	33
		354280	1631306	2173713		

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
7	Uttar Pradesh	Auraiya, Sambhal, Etah, Agra, Kasganj, Budaun, Aligarh, Mathura, Firozabad, Hathras, Etawah, Allahabad, Bulandshahr, Mainpuri, Kaushambi, Pratapgarh, Kanpur Dehat	Ghazipur, Jalaun		Ambedkar, Nagar, Amethi, Amroha, Azamgarh, Baghpat, Bahraich, Ballia, Banda, Barabanki, Bareilly, Chandauli, Chitrakoot, Deoria, Faizabad, Farrukhabad, Fatehpur, Gautam Buddha Nagar,Ghaziabad, Gorakhpur,Hamirpur, Hapur, Hardoi, Jaunpur, Jhansi, Kannauj,Kanpur Nagar,Kheri, Kushi Nagar,Lucknow, Mau, Meerut, Mirzapur, Moradabad, Unnao, Muzaffarnagar, Rae Bareli, Rampur, Saharanpur, Varanasi Sant Kabeer, Nagar, Sant Ravidas, Nagar, Shahjahanpur, Shravasti, Sitapur, Sonbhadra, Sultanpur	
		17	2		46	65
		776764	30066			
Total districts		40	28	11	135	214
Area (Ha)		2144720	2440600	2226646	543936	7355902
Area (%)		29.16	33.18	30.27	7.39	100

3.3.2. Finger millet/*Ragi*

Finger millet is grown during *Kharif* season over an area of 1.11 M ha spread over 144 districts. Finger millet is one of the major crops of Karnataka (nine districts with 0.47 M ha), Uttarakhand (nine districts with 0.10 M ha), Maharashtra (five districts with 0.073 M ha) and Odisha (three districts with 0.04 M ha). The area under this crop is also substantial in some other states, namely Andhra Pradesh (AP), Gujarat, Jharkhand *etc*. The productivity of finger millet across districts varies between 0.63 t/ha to 4.27 t/ha. **Based on the variability in productivity, the districts are categorized into low (<= 1.17 t/ha), medium (1.18 t/ha to 1.67 t/ha), high (> 1.67 t/ha) productivity levels.**

Among the 38 districts with a total acreage of 0.734 M ha, five districts with an area of 0.096 M.ha spread over Karnataka (three districts with 0.086 M.ha), one district each in Tamil

Nadu and Uttarakhand recorded higher productivity. Additionally, 20 districts with an area of 0.47 M ha spread over Karnataka (nine districts with 0.33 M.ha), Uttarakhand (eight districts with 0.096 M ha) *etc*. recorded medium productivity. Remaining 13 districts with an area of 0.18 M ha spread over Odisha, Maharashtra, Andhra Pradesh, Gujarat, Jharkhand recorded lower productivity.

Analysis of instability index values indicates that 16 per cent, 15 per cent and 36 per cent area of the country's area under Ragi cultivation was in low, medium and high-risk categories respectively. Out of 144 districts in India where finger millet is cultivated, 13 districts each lie in low and medium risk categories and, 12 districts in high-risk category. Remaining districts (106) have insignificant area under finger millet cultivation and, it is difficult to implement crop insurance scheme in these districts. The risk-wise classification of the districts across states in finger millet crop is given in Table 3.3.2(i).

Table 3.3.2(i). Finger millet / Ragi crop: Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
1	Andhra Pradesh		Visakhapatanam, Chittoor	--	Anantapur, East Godavari, Guntur, Kadapa Prakasam, Purulia Spsr Nellore, Srikakulam, Uttar Kashi, Vizianagaram	
			2		10	12
			23560			
2	Gujarat		Valsad, Dang	--	Mahesana, Navsari, West Godavari	
			2		3	5
			16744			
3	Jharkhand			Gumla	Bokaro, Chatra, Dhanbad, Dumka Garhwa, Giridih, Godda, Hazaribagh, Khunti, Koderma, Latehar, Lohardaga, Palamu, Ramgarh, Ranchi, Saraikela, Kharsawan, Simdega, Valsad West Singhbhum	
				1	19	20

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
				4747		
4	Karnataka	--	Mandya, Mysore, Davangere	Tumkur, Chikmagalur, Bangalore Rural, Chamarajanagar, Bellary, Chitradurga, Chikballapur, Hassan, Ramanagara, Kolar, Bengaluru Urban	Belgaum, Dharwad, Gadag, Haveri, Shimoga, Virudhunagar, West Godavari, West Singhbhum	
			3	11	8	22
			76806	396661		
5	Maharashtra	Ratnagiri, Raigad, Kolhapur	Satara, Nashik		Ahmednagar, Buldhana, Dhule, Nandurbar, Palghar, Pune, Sindhudurg, Solapur, Thane, Uttar Kannad	
		3	2		10	15
		41933	30933			
6	Odisha	Koraput, Rayagada	Malkangiri	--	Anugul, Balangir, Bargarh, Deogarh, Dhenkanal Gajapati, Ganjam, Jharsuguda, Kalahandi, Kandhamal, Kendujhar, Khordha, Mayurbhanj, Nabarangpur, Nayagarh, Nuapada, Puri, Sambalpur, Sundargarh, Tumkur	
		2	1		20	23
		35446	4279			
7	Tamil Nadu		Dharmapuri		Ariyalur, Coimbatore, Cuddalore,	

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| Sl. No. | State | Risk-based categories; No. of districts; and Coverage (ha) | | | Districts with insignificant area under the crop | Cumulative no. of districts under cultivation |
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
					Dindigul, Erode, Kanchipuram, Karur, Krishnagiri, Madurai, Nagapattinam, Namakkal, Perambalur, Pudukkottai, Ramanathapuram Salem, Sivaganga, Thane, Thanjavur, Theni, Thiruvallur, Thoothukudi, Tiruchirappalli, Tirunelveli, Tiruvannamalai, Tumkur, Vellore Villupuram, Virudhunagar	
			1		28	29
			4089			
8	Uttaraknad	Pithoragarh, Chamoli, Uttarkashi, Rudraprayag, Almora, Tehri Garhwal, Pauri Garhwal	Bageshwar, Champawat		Dehradun, Nainital, Virudhunagar	
		7	2		3	12
		90807	10219			
9	West Bengal	Darjeeling			Alipurduar, Coochbehar, Dinajpur Uttar, Jalpaiguri, Purulia	
		1			5	6
		7267				
	All India (No. of districts)	**13**	**13**	**12**	**106**	**144**
	Area (ha)	**175453**	**166630**	**401408**	**372726**	**1116217**
	Area (%)	**15.72**	**14.93**	**35.96**	**33.39**	**100**

3.3.3. Maize

Maize is an important cereal crop gaining prominence during the last few years and is cultivated across seasons in many districts. Herein, the maize grown in autumn and *Kharif* season is discussed.

3.3.3.1. *Kharif* maize

Maize is grown in about 9.27 M ha spread over large number of districts (577) covering 21 states across the country. The productivity of maize across the districts is found to be varying from 0.46 t/ha to 9.70 t/ha. **On the basis of productivity levels, the districts are categorized into low (≤2.51 t/ha), medium (2.52 t/ha to 4.01t/ha), high (> 4.01 t/ha) productivity categories.** About 17 districts with an area of 0.37 M ha spread across Tamil Nadu (seven districts with 0.14 M ha), Karnataka (two districts with 0.095 M.ha), AP (one district with 0.066 M.ha) and Telangana (three districts with 0.051 M ha) recorded higher productivity. Another 48 districts with an area of 2.14 M ha consisted of Karnataka (12 districts with 0.93 M ha), U.P. (11 districts with 0.27 M ha), Maharashtra (five districts with 0.34 M ha), M.P. (four districts with 0.27 M ha), Himachal Pradesh (six districts with 0.12 M ha) *etc*. recorded medium productivity. However, the remaining districts recorded low productivity. Majority of the districts located in Arunachal Pradesh, Assam, Chhattisgarh, Gujarat, Nagaland and Sikkim have low productivity values.

The analysis of instability index values indicates that out of 577 districts where maize is grown, the highest number, that is 84 districts with an area of 23.48 per cent lie in low risk category. Medium risk category districts numbering 81 cover largest area accounting for 34.26 per cent of area. The high risk category districts are only 25 with 7.40 per cent area under maize cultivation. The risk-wise classification of districts across the states under maize crop is given in Table 3.3.3.i.

Table 3.3.3(i). Maize Crop: Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
1	Andhra Pradesh	Srikakulam	Anantapur, Vizianagaram, Kurnool		Chittoor, East Godavari, Guntur, Kadapa, Krishna, Prakasam, Spsr Nellore, Vizianagaram, West Godavari	
		1	3		9	13
		12055	70007			
2	Arunachal Pradesh	Lower Dibang Valley			Anjaw, Changlang, Dibang Valley, East Kameng, East Siang, Kra Daadi, Kurung	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
					Kumey, Lohit, Longding, Lower Subansiri, Namsai, Papum Pare, Siang, Tawang, Tirap, Upper Siang, Upper Subansiri, West Kameng, West Siang	
		1			19	20
		8367				
3	Assam	Karbi Anglong			Baksa, Barpeta, Bongaigaon, Cachar, Chirang, Darrang, Dhemaji, Dhubri, Dibrugarh, Dima Hasao, Goalpara, Golaghat, Hailakandi, Jorhat, Kamrup, Kamrup Metro, Karimganj, Kokrajhar, Lakhimpur, Marigaon, Nagaon, Nalbari, Sivasagar, Sonitpur, Tinsukia, Udalguri	
		1			26	27
		10542				
4	Bihar		Katihar, Vaishali, Saran, Purnia, Bhagalpur, Begusarai, Siwan	Samastipur, Khagaria, Muzaffarpur, Purbi Champaran ,	Araria, Arwal, Aurangabad, Banka, Bhojpur, Buxar, Darbhanga, Gaya, Gopalganj, Jamui, Jehanabad, Kaimur (Bhabua), Kishanganj, Lakhisarai, Madhepura, Madhubani, Munger, Nalanda, Nawada, Pashchim Champaran, Patna, Rohtas, Saharsa, Sheikhpura, Sheohar, Sitamarhi, Supaul	
			7	4	27	38
			94729	85425		
5	Chhatisgarh	Surajpur, Kondagaon, Koriya, Kanker, Bastar, Balrampur, Surguja			Balod, Baloda Bazar, Bemetara, Bijapur, Bilaspur, Dantewada, Dhamtari, Durg, Gariyaband, Janjgir-Champa, Jashpur,	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
					Kabirdham, Korba, Mahasamund, Mungeli, Narayanpur, Raigarh, Raipur, Rajnandgaon, Sukma,	
		7			20	27
		82880				
6	Gujarat		Sabarkantha	Panch Mahals, Dohad	Ahmadabad, Anand, Aravalli, Banas Kantha, Bharuch, Bhavnagar, Chhotaudepur, Dang, Devbhumi Dwarka, Gandhinagar, Junagadh, Kachchh, Kheda, Mahesana, Mahisagar, Morbi, Narmada, Navsari, Patan, Rajkot, Surat, Surendranagar, Tapi, Vadodara,Valsad	
			1	2	25	28
			14320	173343		
7	Himachal Pradesh	Sirmaur, Una, Hamirpur, Bilaspur,Shimla Chamba	Kullu, Solan, Kangra, Mandi		Kinnaur, Lahul and Spiti	
		6	4		2	12
		138559	137995			
8	Jammu & Kashmir	Ramban	Kishtwar, Reasi	Kupwara, Baramulla, Rajouri, Udhampur, Kathua, Anantnag, Poonch, Jammu, Doda, Badgam	Bandipora, Ganderbal, Kulgam, Pulwama, Samba, Shopian, Srinagar	
		1	2	10	7	20
		15661	30221	229019		
9	Jharkhand	Godda (A)	Giridih, Dumka, Latehar, Palamu, Garhwa		Bokaro, Chatra, Deoghar, Dhanbad, East Singhbum, Gumla, Hazaribagh, Jamtara, Khunti, Koderma, Lohardaga,	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
					Pakur, Ramgarh, Ranchi, Sahebganj, Saraikela Kharsawan, Simdega, West Singhbhum	
		1	5		18	24
		9211	71515			
10	Karnataka	Bellary, Bagalkot, Belgaum, Shimoga, Chikmagalur, Bangalore Rural, Mysore, Tumkur, Hassan, Gadag, Dharwad	Bijapur, Davangere, Haveri, Koppal, Chamarajanagar, Chikballapur, Chitradurga		Bengaluru Urban, Bidar, Gulbarga, Kodagu, Kolar, Mandya, Raichur, Ramanagara, Uttar Kannad, Yadgir	
		11	7		10	28
		543525	612955			
11	Madhya Pradesh	Mandla, Sidhi, Indore, Anuppur, Vidisha, Raisen, Shahdol, Balaghat, Mandsaur, Ratlam	Dhar, Dewas, Ashoknagar, Shivpuri, Khandwa, Bhopal, Khargone, Umaria, Betul, Dindori, Neemuch, Chhindwara, Jhabua, Singrauli, Ujjain,Barwani, Burhanpur, Shajapur, Guna, Sehore, Seoni	Rajgarh, Alirajpur	Agar Malwa, Alirajpur, Chhatarpur, Damoh, Datia, Gwalior, Harda, Hoshangabad, Jabalpur, Katni, Morena, Narsinghpur, Panna, Rajgarh, Rewa, Sagar, Satna, Sheopur, Tikamgarh	
		11	21	2	19	50
		171543	669385	89715		
12	Maharashtra		Nandurbar, Pune,Buldhana, Nashik, Dhule, Jalgaon, Satara, Ahmednagar, Osmanabad, Jalna, Beed, Aurangabad, Latur, Sangli	Solapur	Akola, Amravati, Bhandara, Chandrapur, Gadchiroli, Gondia, Hingoli, Kolhapur, Nagpur, Nanded, Parbhani, Wardha, Washim, Yavatmal	
		0	14	1	14	29

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
		0	684440	16033		
13	Nagaland	Phek, Zunheboto, Tuensang, Kiphire,			Dimapur, Kohima, Longleng, Mokokchung, Mon, Peren, Wokha	
		4			7	11
		35617				
14	Odisha	Nabarangpur, Gajapati			Anugul, Balangir, Bargarh, Boudh, Deogarh, Dhenkanal, Ganjam, Jajapur, Jharsuguda, Kalahandi, Kandhamal,Khordha, Kendujhar, Koraput, Malkangiri, Mayurbhanj, Nayagarh, Nuapada, Rayagada, Sambalpur, Sundargarh	
		2			21	23
		38199				
15	Punjab	Hoshiarpur, Rupnagar, Pathankot, Nawanshahr			Amritsar, Fatehgarh Sahib, Fazilka, Gurdaspur, Jalandhar, Kapurthala, Ludhiana, Patiala, S.A.S Nagar, Sangrur, Tarn Taran	
		4			11	15
		93333				
16	Rajasthan	Pratapgarh, Chittorgarh, Udaipur, Baran	Jhalawar, Bundi, Banswara, Rajsamand, Bhilwara, Dungarpur	Pali, Tonk, Sirohi, Ajmer	Alwar, Barmer Bharatpur, Bikaner, Churu, Dausa, Dholpur Ganganagar, Hanumangarh Jaipur, Jalore, Jodhpur Karauli, Kota, Nagaur SawaiMadhopur Sikar	
		4	6	4	17	31
		334341	484648	67045		
17	Sikkim	West District, East District		South District	North District	
		2		1	1	4
		22091		13797		

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
18	Tamil Nadu	Salem, Villupuram, Erode	Tiruchirappalli, Cuddalore, Perambalur	Ariyalur	Coimbatore, Dharmapuri, Dindigul, Kanchipuram, Kanniyakumari, Karur, Krishnagiri, Madurai, Nagapattinam, Namakkal, Pudukkottai, Sivaganga,Thanjavur, Theni,Thiruvallur, Thoothukudi, Tirunelveli,Tiruppur, Tiruvannamalai, Vellore, Virudhunagar	
		3	3	1	21	28
		45232	79208	11871		
19	Telanagana	Warangal, Nizamabad, Karimnagar	Rangareddi, Medak, Mahbubnagar		Adilabad, Bhadradri Jagitial, Jangoan, Jayashankar Jogulamba, Kamareddy, Khammam, KomaramBheemAsifabad, Mahabubabad, Mancherial, Medchal, Nagarkurnool, Nalgonda, Nirmal, Peddapalli, Rajanna, Sangareddy, Siddipet, Suryapet, Vikarabad, Wanaparthy, Warangal Urban, Yadadri	
		3	3		24	30
		50509	115673			
20	Uttar Pradesh	Kasganj, Mainpuri, Saharanpur, Etah, Shravasti, Bulandshahr, Hardoi, Jaunpur, Farrukhabad, Bahraich, Kannauj, Auraiya, Kanpur Dehat, Kanpur	Gonda, Sitapur, Lalitpur, Ballia		Agra, Allahabad, Ambedkar Nagar, Amethi, Amroha, Azamgarh, Baghpat, Balrampur, Banda, Barabanki, Bareilly, Basti, Bijnor, Budaun, Chandauli, Chitrakoot, Deoria, Etawah, Faizabad, Fatehpur, Gautam	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
		Nagar, Unnao, Aligarh, Firozabad, Sonbhadra			Buddha Nagar, Ghaziabad, Ghazipur, Gorakhpur, Hamirpur, Hapur, Hathras, Jalaun, Jhansi, Kaushambi, Kheri, Kushi Nagar, Lucknow, Maharajganj, Mahoba, Mathura, Mau, Meerut, Mirzapur, Moradabad, Muzaffarnagar, Pilibhit, Pratapgarh, Rae Bareli, Rampur, Sambhal, SantKabeer Nagar, SantRavidas Nagar, Shahjahanpur, Shamli Siddharth Nagar, Sultanpur Varanasi	
		18	4		53	75
		487211	103797			
21	West Bengal	Purulia, Malda, Darjeeling , Jalpaiguri, Dinajpur Uttar	Dinajpur Uttar		Paraganas North, Alipurduar, Bankura, Birbhum, Coochbehar, Dinajpur Dakshin, Hooghly, Jhargram, Kalimpong, Medinipur West, Murshidabad, Nadia, PaschimBardhaman, Purba Bardhaman	
		4	1		14	19
		68286	8013			
All India (No. of Dist)		**84**	**81**	**25**	**387**	**577**
Area (ha)		**2177626**	**3176905**	**686249**	**3232347**	**9273126**
Area (%)		**23.48**	**34.26**	**7.40**	**34.86**	**100**

3.3.3.2. Autumn maize

Autumn maize is mainly grown in about 22 districts covering an area of 0.33 M ha. The states having substantive area under autumn maize include Bihar (11 districts with 0.19 M ha), Jharkhand (six districts with 0.081 M ha), Odisha (two districts with 0.038 M ha) and

West Bengal (three districts with 0.025 M ha). The Productivity of autumn maize varies from 0.57 t/ha to 8.16 t/ha.

Based on the productivity values, the districts are categorized into low (≤ 2.9 t/ha), medium (2.91 t/ha to 5.16 t/ha), high (> 5.16 t/ha) productivity classes. Among 22 districts, 15 districts with 0.236 M ha spread across Bihar (six districts with 0.13 M ha), Jharkhand (six districts with 0.08 M ha) *etc*. recorded low productivity. An additional of six districts with 0.087 M ha spread over Bihar (four districts with 0.05 M.ha) and one district each in Odisha and West Bengal revealed medium productivity. Only one district in Bihar recorded high productivity.

3.4. Paddy/ Rice

Rice is the dominant cereal crop grown almost throughout the nation in different seasons. Herein, rice grown in *Kharif*, autumn and winter seasons is detailed. Growing season of rice is characterized by sowing time in certain states and harvesting season in various other states. Autumn rice also known as early *Kharif* rice is grown during the period of March/April to July/August. *Kharif* season rice is grown during June/July to Nov/ Dec, whereas winter rice also known as late *Kharif* is cultivated during the months of July/August to Nov./Dec. Some states are home to both, early season and late season rice systems; and these have been analyzed as per the season.

3.4.1 Kharif rice

During the *Kharif* season, rice grows over about 39.6 M ha covering 631 districts. The states with predominant area under *Kharif* rice include Uttar Pradesh (67 districts with 5.9 M ha), Chhattisgarh (27 districts with 3.99 M ha), Punjab (22 districts with 3.02 M ha), Haryana (12 districts with 1.22 M ha), Madhya Pradesh (27 districts with 1.94 M ha), Maharashtra (16 districts with 1.35 M ha), A.P. (13 districts with 1.5 M ha), Karnataka (17 districts with 0.86 M ha) *etc*. The productivity of rice across the districts ranges from 0.329 t/ha to 5.44 t/ha.

Based on the productivity values, districts are grouped into low (≤ 2.2 t/ha), medium (2.21 t/ha to 3.31 t/ha), high (> 3.31 t/ha) productivity categories. Highest productivity seen in case of 61 districts covering about 5.9 M ha, that lie in Punjab (18 districts with 2.53 M ha), Tamil Nadu (19 districts with 1.08 M ha), A.P. (eight districts with 1.03 M ha), Haryana (six districts with 0.61 M ha), Karnataka (four districts with 0.26 M ha) *etc*. have high productivity. Another list of 145 districts with an area of 10.42 M ha speread across U.P. (63 districts with 5.67 M ha), Chhattisgarh (three districts with 0.59 M ha), Gujarat (eight districts with 0.57 M ha), Haryana (eight districts with 0.59 M ha), Karnataka (nine districts with 0.41 M ha), Maharashtra (six districts with 0.43 M ha), Punjab (four districts with 0.49 M ha), Tamil Nadu (five districts with 0.51 M ha) indicated medium productivity. The remaining 102 districts exhibited low productivity.

3.4.2. Autumn rice

As per the national statistics reports, autumn rice is cultivated in 43 districts over 1.35 M ha spread across Bihar, Jharkhand, Odisha, West Bengal, Meghalaya and Kerala. Principal areas of autumn rice are in Bihar (14 districts with 0.51 M ha), Odisha (14 districts with 0.49 M ha), West Bengal (eight districts with 0.18 M ha), Jharkhand (four districts with 0.1 M ha), Kerala (two districts with 0.05 M ha) and Meghalaya (one district with 0.01 M ha).

Rice productivity during autumn season ranges from 0.407 t/ha to 3.115 t/ha. **On the basis of productivity levels, the districts are classified into low (≤ 1.41 t/ha), medium (1.42 t/ha to 2.22 t/ha) and high (>2.22 t/ha) productivity classes.** High productivity of autumn rice is recorded in 10 districts encompassing West Bengal (seven districts with 0.17 M ha), Kerala (two districts with 0.05 M ha) and Meghalaya (one district with 0.01 M ha). Medium productivity is recorded in 13 districts with 0.49 M ha seen in Bihar (11 districts with 0.44 M ha), Odisha (one district with 0.03 M ha) and West Bengal (one district with 0.013 M ha). Low productivity is recorded in 20 districts with 0.63 M ha distributed in Odisha (13 districts with 0.46 M ha), Jharkhand (four districts with 0.10 M ha) and (three districts with 0.07 M ha).

3.4.3. Winter rice

Winter rice (harvest coincides with winter season) also known as late *Kharif* rice is cultivated in 135 districts covering a total acreage of 12.45 M ha. The states raising having major winter rice area include West Bengal (18 districts with 3.75 M ha), Odisha (30 districts with 3.14 M ha), Bihar (38 districts with 2.7 M ha), Assam (26 districts with 1.88 M ha) and Jharkhand (22 districts with 1.01 M ha) etc.

The productivity of winter rice varies from 0.996 t/ha to 3.765 t/ha. **Based on productivity, the districts are categorized into low (≤1.89 t/ha), medium (1.90 t/ha to 2.52 t/ha) and high (> 2.52 t/ha) productivity groups.** High productivity of winter rice is observed in 29 districts with 4.1 M ha West Bengal (12 districts with 2.64 M ha), Bihar (14 districts with 1.24 M ha), Odisha (two districts with 0.2 M ha) etc. Medium productivity is depicted in 53 districts with 4.99 M.ha spread over Assam (18 districts with 1.41 M ha), Odisha (14 districts with 1.63 M ha), Bihar (12 districts with 0.69 M ha) and Jharkhand (three districts with 0.16 M ha). Low productivity is logged in 53 districts with 3.39 M ha in Odisha (14 districts with 1.31 M ha), Jharkhand (19 districts with 0.85 M ha), Bihar (12 districts with 0.76 M ha) and Assam (eight districts with 0.47 M ha).

Out of 631 districts under paddy cultivation (including two/ three seasons), the number of districts bracketed in low, medium and high risk categories respectively stand at 207, 158, & 121. The highest extent of area under paddy cultivation accounting for 42 per cent is held as low risk category, while 19 per cent area falls in high risk category, and 32 per cent under medium risk category. The risk-wise classification of districts across states in case of paddy crop is given in Table 3.4(i).

Table 3.4(i). Paddy Crop (*Kharif*): Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	**Medium**	**High**		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
1	Andhra Pradesh	Spsr Nellore, Kurnool, Guntur, Krishna, Chittoor, Anantapur, Prakasam,	West Godavari, Visakhapatanam, Vizianagaram, East Godavari, Srikakulam, Kadapa			
		7	6			13
		597763	922394			
2	Arunachal Pradesh	Papum Pare, West Siang, Lower Dibang Valley,	East Siang		Anjaw, Changlang, Dibang Vallaey, East Kameng, Kra Daadi, Kurung Kumey, Lohit, Longding, Lower Subansiri, Namsai, Siang, Tawang, Tirap, Upper Siang, Upper subansiri, West Kameng	
		3	1		16	20
		45422	11637			
3	Assam	Golaghat (W), Hailakandi (W) , Karbi Anglong (W), Kamrup (W), Dhemaji (W), Baksa (W), Nalbari (W), Kokrajhar (W), Bongaigaon (W), Nagaon (W), Kamrup Metro (W), Sivasagar (W), Jorhat (W), Chirang (W), Darrang (W), Sonitpur (W), Dibrugarh (W), Barpeta (W), Tinsukia (W), Goalpara (W),	Karimganj(W), Dhubri (W), Lakhimpur(W), Udalguri (W), Cachar (W), Marigaon (W)		Dima Hasao, Hojai, Barpeta, Nalbari, Kamrup Rural, and South Salmara-Mankachar, Charaideo,	
		20	6		7	33
		1472279	404770			

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
4	Bihar	Supaul (W),	Katihar (A), Madhepura(A,W)Rohtas(W), Saharsa(W), Aurangabad (W), Banka (W), Kaimur (Bhabua) (W), Purnia (W), Araria (A), Arwal (W), Gopalganj (A), Paschim Champaran (A), Saran (W), Supaul (A), Kishanganj (W), Darbhanga (W), Munger (W), Patna (W)	Purbi hamparan (A,W), Buxar(W) Jehanabad (W), Madhubani (A, W), Nawada (W), Lakhisarai (W), Bhagalpur (W), Jamui(W), Sitamarhi (A), Nalanda (W), Vaishali (W), Shekhpura (W), Bhojpur (W), Gaya (W), Paschim Champaran(W), Siwan (A, W), Sitamarhi (W), Samastipur (A, W),Sheohar(W), Muzaffarpur (A,W), Khagaria (W), Begusarai (W), Katihar (W), Gopalganj (W), Araria (W), Darbhanga (A)		
		1	20	31	14	38
		72835	1300230	1827984		
5	Chhatisgarh		Mungeli, Surajpur, Bemetara, Baloda Bazar, Kabirdham, Jashpur, Balrampur, Surguja, Sukma, Raigarh, Janjgir-Champa, Dhamtari, Kondagaon, Koriya, Rajnandgaon, Balod, Bijapur, Raipur,Bilaspur	Narayanpur, Bastar, Kanker, Koriya, Mahasamund, Dantewada, Durg, Gariyaband		
			19	8		27
			2974376	1021944		
6	Dadra and Nagar Haveli		Dadra And Nagar Haveli			

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
			1			1
			13989			
7	Gujarat	Navsari, Surat, Valsad, Tapi, Anand	Narmada, Dang, Kheda, Ahmedabad	Panch Mahals, Dohad, Vadodara	Aravali, Banas Kantha, Bhaurch, Chhotaudepur, Gandhi nagar, Mahesana, Mahisagar, Sabar kantha, Surendranagar	
		5	4	3	9	21
		324882		115835		
8	Goa	North Goa, South Goa				
		2				2
		26897				
9	Haryana	Palwal, Ambala, Panipat, Kaithal, Karnal, Jind, Yamunanagar, Hisar, Sonipat, Kurukshetra, Fatehabad, Faridabad	Rohtak, Jhajjhar, Bhiwani	Sirsa	Charkri Dadri, Mewat, Gurgaon, Panchkula, Rewari,	
		12	3	1	5	21
		1061177	87180			
10	Himachal Pradesh	Kangra, Mandi			Bilaspur, Chaba, Hamirpur, Kinnaur, Kullu, Simla, Sirmaur, Solan, Una	
		2			9	11
		51999				
11	Jammu & Kashmir		Samba, Bandipura, Kulgam	Kupwara, Badgam, Baramulla, Jammu, Anantnag, Kathua, Pulwama	Doda, Gandrbal, Kishthwar, Poonch, Rajauri, Ramban, Reasi, Shopian, Srinagar , Udhampur	
		0	3	7	10	20
			41133	209856		
12	Jharkhand		Gumla (A), Sahebganj (W), Pakur (W), Khunti (A), East Singhbum	Ranchi (A,W), West Singhbum (W), Dumka(W),	Dhanbad, Koderma	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
			(W), Simdega (A), Hazaribagh (W),	Godda (W), Giridih (W), Lohardaga (W), Garhwa (W), Chatra (W), Saraikela Kharsawan (W), Khunti (W), Latehar (W), Deoghar (W), Jamtara (W), Ramgarh (W), Palamu (W), Simbega (W), Bokaro (W), Gumla (W),		
			7	19	2	24
			249418	857658		
13	Karnataka	Dakshin kannad, Udupi, Mysore, Davangere, Kodagu, Bellary,Chikmagalur, Mandya, Koppal, Shimoga, Raichur, Uttar Kannada	Yadgir, Hassan	Belgaum, Haveri, Dharwad	Bagalkot, Bangalore Rural, Bengaluru Urban, Bidar, Bijapur, Chamarajanagar, Chikballapur, Chitradurga, Gadag, Gulbarga, Kolar, Tumkur, Ramanagara	
		12	2	3	13	30
		655738	83733	118006		
14	Kerala	Palakkad (Autumn)		Alappuzha (A)		
		1		1	12	14
		36380		10055		
15	Madhya Pradesh		Sehore, Narsinghpur, Betul, Balaghat, Sidhi, Shahdol, Umaria, Raisen, Anuppur, Rewa, Mandla, Damoh, Jabalpur, Dindori, Gwalior, Datia, Chhindwara	Shivpuri, Satna, Panna, Hoshangabad, Seoni, Katni, Singrauli, Sheopur,Jhabua, Tikamgarh	Alirajpur, Ashoknagar, barwani, Bhind, Bhopal, Burhanpur, Chhatarpur, Dewas, Dhar, Guna, Harda, Khandwa, Khargone, Morena,	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
					Rajgarh,Ratlam, Sagar, shajapur, Vidisha	
		0	17	10	19	46
			1348010	587350		
16	Maharashtra	Sindhudurg, Raigad, Ratnagiri	Satara, Nagpur, Sangli, Pune, Thane, Nashik, Bhandara, Gadchiroli, Gondia	Chandrapur, Kolhapur,Ahmednagar, Nandurbar	Amravati, aurangabad, Beed, Buldhana, Dhule, Latur, Nanded, Osmanabad, Plaghar, Parbhani, Solapur	
		3	9	4	11	27
		247700	819533	284567		
17	Manipur	Imphal East, Imphal West,	Bishnupur, Thoubal, Churachandpur, Senapati, Tamenglong, Ukhrul, Chandel			
		2	7			9
		62670	132290			
18	Meghalaya	West Garo Hills (A,W),			East Jaintia Hills, West Khasi Hills	
		2			6	8
19	Nagaland	Kohima, Mon, Phek, Mokokchung, Tuensang, Wokha, Zunheboto, Dimapur, Peren, Kiphire			Longleng	
		10			1	11
		197403				

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
20	Odisha		Koraput (A,W), Kendugjar(A,W), Kandhamal (W), Baleshwar (W), Sonepur (W), Rayagada (W), Mayurbhanj (W), Dhenkanal (W), Sundargarh (W), Deogarh (A), Bhadrak (W), Jajapur (A, W), Kalahandi (A), Gajapati (W), Bargarh(W)	Sambalpur (A,W), Nabarangpur (A,W), Malkangiri (W), Cuttack (W), Jharsuguda (A,W), Nuapada (A,W), Anugul (W), Puri (W), Nayagarh (W), Kendrapara (W), Bargarh (A), Sonepur (A), Ganjam (W), Balangir (A, W), Jagatsinghapur (W), Sundargarh (A), Kalahandi (W), Mayurbhanj (A), Deogarh (W), Boudh (W), Khordha (W)		
			18	26		30
			1653613	1973617		
21	Punjab	Barnala, Sangrur, Kapurthala, Patiala, Hoshiarpur, Moga, Jalandhar, Firozepur, Nawanshahr, Amritsar, Fatehgarh Sahib, Gurdaspur, Bathinda, Faridkot, Rupnagar, Muktsar, S.A.S Nagar, Tarn Taran, Fazilka, Mansa, Pathankot, Ludhiana			Kapurthala	
		22			1	23
		3028667				

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
22	Rajasthan		Ganga nagar , Kota, Hanumangarh, bundi, Baran,	Banswara, Dungarpur	Ajmer, Alwar, Bharatpur, Bhilwara, Bikaner, Chhitrogarh, Dholpur, Jhalwar, Karauli, Pratapgarh, Rajasmand, Sawai Madhopur, Sirohi, Tonk, Udaipur	
			5	2	15	22
			127961	45433		
23	Tamil Nadu	Krishnagiri, Villupuram, Theni, Tiruvannamalai, Dharmapuri, Kanchipuram, Salem,Kanniyaku mariVellore, Thoothukudi, Thiruvallur, Tirunelveli, Karur, Madurai, Erode	Tiruchirappalli, Thanjavur, Cuddalore, Pudukkottai, Virudhunagar,	Ariyalur, Nagapattinam, Thiruvarur, Sivaganga, Ramanathapura m	Coimbatore, Dindigul, Namakkal, Perambalur, The Nil Giris,Tiruppur	
		15	5	5	6	31
		710715	439301	559878		
24	Telanagana	Rangareddi, Nalgonda, Karimnagar, Medak, Mahbubnagar	Warangal, Khammam, Nizamabad		Adilabad, Komaram Bheem Asifabad, Mahabubabad, Mancherial, Medchal, Nagarkurnool, Nirmal, Bhadradri, Peddapalli, Rajanna,Siddipe t, Suryapet, Vikarabad, Wanaparthy, Warangal Urban, Jagitial, Yadadri,	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
					Jangoan, Jayashankar, Jogulamba, Kamareddy	
		5	3		22	30
		189678	187074			
25	Tripura	Dhalai	North Tripura, Sepahijala,		Gomati, Khowai,South Tripua, Unakoti, West Tripua	
		1	2		5	8
		13976	22714			
26	Uttar Pradesh	Bijnor, Saharanpur, Sambhal, Hapur, Bulandshahr, Meerut, Moradabad, Etawah, Pilibhit, Kheri, Rae Bareli, Amroha, Maharajganj, Firozabad, Mainpuri, Kanpur Dehat, Hardoi, Shahjahanpur, Aligarh, Fatehpur, Rampur, Bahraich,Muzaffarnagar, Shamli, Bareilly, Auraiya, Sultanpur, Kanpur Nagar, Barabanki, Sitapur, Faizabad, Budaun, Kaushambi, Lucknow, Etah, Kushi Nagar, Allahabad,	Jaunpur, Ghazipur, Mathura, Mirzapur, Shravasti, Mau, Basti, Azamgarh, Balrampur, Banda,Sant Kabeer Nagar, Deoria,Sant Ravidas Nagar, Sonbhadra, Ballia, jhansi, Siddharth Nagar, Varanasi		Agra, Baghpat, Chitrakoot, Ghaziabad, Hamirpur, Jalaun, Lalitpur, Mahoba	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
		Hathras, Kannauj, AmbedkarNagar, Farrukhabad, Pratapgarh, Gautam Buddha Nagar, kasganj,Gonda, Chandauli, Unnao, Gorakhpur, Amethi,				
		49	18		8	75
		4152197	1712192			
27	Uttarakhand	Pithoragarh,Chamoli, Udham Singh Nagar, Nainital, Haridwar, Tehri Garhwal, Pauri Garhwal, Uttar Kashi, Bageshwar, Almora			Champawat, Dehradun, Rudra Prayag	
		10			3	13
		225492				
28	West Bengal	Hooghly (W), Nadia (A), 24 Paraganas North (A,W), Birbhum (W), Bankura (W), Dinajpur Dakshin (W), 24 Paraganas South (W), Purba Bardhaman (W), Medinipur West (A,W), Darjeeling (W), Jalpaiguri (A,W), Coochbehar (W), Bankura (A), Malda (W),	Medinipur East (W), Howrah (W),	Medinipur East (A)		

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
		Nadia (W), Dinajpur Uttar (W), Murshidabad (A,W), Purulia (W)				
		23	2	1		23
		3597787	323518	12711		
All India (No. of Dist)		**207**	**158**	**121**	**145**	**631**
Area (ha)		**16771659**	**12855070**	**7624892**	**2365542**	**39617163**
Area (%)		**42.33**	**32.45**	**19.25**	**5.97**	**100.00**

Note: W- Winter Rice; A- Autumn Rice

i) In few districts, particular crop is grown in more than one season. Hence, the sum of low, medium and high risk category districts exceeds the total number of districts under paddy cultivation

ii) The seasons other than *Kharif* is indicated with in bracket against the name of district as W for winter, S for Summer and A for Autumn

3.5. Sorghum/Jowar

Sorghum is a dominant cereal crop grown across the rainfed areas of the country during *Kharif* and *Rabi* seasons. However, the total area under the crop is small relative to principal cereals, namely paddy & wheat. Herein, the discussion is limited only to the *Kharif* season. Sorghum is grown over an area of 2.1 M ha in 312 districts.

Sorghum productivity ranges from 0.12 t/ha to 3.13 t/ha. **On the basis of productivity levels, the districts are categorized into low (≤0.94 t/ha), medium (0.95 t/ha to 1.53 t/ha), high (> 1.53 t/ha) productivity classes.**

Of the total 312 districts with an area of 2.1 M ha, 20 districts spread over 0.3 M ha in Madhya Pradesh (six districts with 0.08 M ha), Tamil Nadu (four districts with 0.07 M ha) *etc.* reported higher productivity. Another 34 districts with 0.45 M ha located across Maharashtra (six districts with 0.14 M ha), MP (six districts with 0.08 M ha), U.P. (seven districts with 0.06 M ha) *etc.* witnessed medium productivity. The remaining districts have low productivity levels.

The instability index analysis values reflect that 55 districts with 0.98 M ha spread over 47.45 per cent of net sown area denote low risk regions. Additionally, 28 districts with 0.39 M ha area represent medium risk regions, whereas the remaining 13 districts with 0.47 M ha area

spread across various states are in high risk regions. The risk-wise classification of districts across states in sorghum crop is presented in Table 3.5(i).

Table 3.5(i). Sorghum/Jowar crop : Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
1	Andhra Pradesh		Kurnool, Anantapur		Chittoor East Godavari Guntur,Kadapa Krishna,Prakasam Spsr Nellore Srikakulam Visakhapatanam Vizianagaram West Godavari	
			2		11	13
			16459			
2	Gujarat	Surendranagar, Tapi, Surat, Narmada	Patan	Banaskantha	Ahmadabad, Amreli Anand, Aravalli Bharuch, Bhavnagar Chhotaudepur Dang, Devbhumi Dwarka Dohad, Gandhinagar Gir Somnath, Jamnagar Junagadh, Kachchh, Kheda, Mahesana, Mahisagar, Morbi, Navsari, Panch Mahals, Porbandar, Rajkot, Sabar Kantha, Vadodara, Valsad	
		4	1	1	26	32
		42286	5217	10780		
3	Haryana			Rohtak, Jhajjar, Sonipat, Mewat, Palwal	Bhiwani, Rewari Charki Dadri, Faridabad, Gurgaon, Jind, Kurukshetra, Mahendragarh,	
				5	8	13
				52105		

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	**Medium**	**High**		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
4	Karnataka	Bellary, Davangere, Chitradurga, Belgaum, Bidar	Chamarajanagar, Mysore		Bagalkot, Bijapur, Bangalore Rural, Chikballapur, Chikmagalur, Dharwad, Gadag, Gulbarga, Raichur, Hassan, Haveri, Koppal, Mandya, Ramanagara, Shimoga, Tumkur, Uttar Kannad, Yadgir	
		5	2		18	25
		84791	22146			
5	Madhya Pradesh	Sidhi, Chhindwara, Khargone, Rewa, Alirajpur, Singrauli, Dhar, Betul, Khandwa, Burhanpur, Chhatarpur	Gwalior, Barwani, Rajgarh, Bhind		Agar Malwa, Anuppur, Ashoknagar, Bhopal, Damoh, Datia, Dewas, Dindori, Guna, Harda, Indore, Hoshangabad, Jabalpur, Jhabua, Katni, Mandla, Mandsaur , Morena, Narsinghpur, Neemuch, Panna, Raisen, Ratlam, Sagar, Satna, Sehore, Seoni, Shahdol, Umaria, Shajapur, Sheopur, Shivpuri, Vidisha Tikamgarh, Ujjain	
		11	4	0	35	50
		465113	50069	0		
6	Maharashtra	Jalgaon, Washim, Amravati, Satara, Nanded, Nandurbar, Buldhana, Latur, Hingoli, Yavatmal, Beed, Parbhani	Kolhapur, Dhule, Akola, Osmanabad, Sangli		Ahmednagar Aurangabad Chandrapur Gadchiroli Jalna Nagpur Nashik Pune Solapur Wardha	
		12	5	0	10	27

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
		147108	114152	0		
7	Rajasthan	Chittorgarh, Bharatpur	Alwar, Udaipur, Dausa, Rajsamand, Sirohi, Barmer	Nagaur, Bhilwara, Tonk, Ajmer, Pali, Jalore, Jodhpur	Banswara, Baran,Bikaner, Bundi,Churu, Dholpur, Sikar Dungarpur, Ganganagar, Hanumangarh, Jaipur, Jaisalmer, Jhalawar, Karauli, Kota, Pratapgarh, Sawai, Madhopur	
		2	6	7	17	32
		50227	50200	410944		
8	Tamil Nadu	Coimbatore, Dindigul, Thoothukudi, Tiruppur, Krishnagiri, Namakkal, Madurai, Vellore	Tiruchirappalli, Salem, Karur, Dharmapuri		Ariyalur Cuddalore, Erode Kanchipuram, Kanniyakumari Nagapattinam, Perambalur Pudukkottai Ramanathapuram Sivaganga Thanjavur, Theni Thiruvallur, Tirunelveli Tiruvannamalai Villupuram Virudhunagar	
		8	4	0	17	29
		96301	102167	0		
9	Telangana	Rangareddi, Mahbubnagar, Adilabad			Bhadradri, Jagitial, Jangoan, Asifabad, Jayashankar, Jogulamba, Kamareddy, Karimnagar, Khammam, Komaram, Bheem, Mahabubabad, Mancherial, Medak, Medchal, Nagarkurnool, Nalgonda, Nirmal, Nizamabad, Sangareddy, Siddipet, Suryapet, Vikarabad, Wanaparthy,	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	**Medium**	**High**		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
					Warangal, Warangal, Urban, Yadadri	
		3	0	0	25	28
		23386	0	0		
10	Uttar Pradesh	Rae Bareli, Kanpur Dehat, Fatehpur, Hardoi, Kaushambi, Allahabad, Sitapur, Kanpur Nagar, Banda, Amethi	Sultanpur, Chitrakoot, Jalaun, Hamirpur		Agra, Aligarh Ambedkar Nagar, Auraiya Azamgarh, Baghpat Bahraich, Ballia, Balrampur Barabanki Bareilly, Bijnor, Budaun Bulandshahr, Chandauli Deoria, Etah Etawah, Faizabad Farrukhabad, Firozabad Gautam Buddha Nagar Ghaziabad, Ghazipur Gorakhpur, Hathras, Jaunpur Jhansi, Kannauj, Kasganj,Kheri, Kushi Nagar Lalitpur, Lucknow Mahoba, Mainpuri Mathura, Mau Mirzapur, Moradabad, Unnao Pratapgarh Rampur, Sambhal Sant Ravidas Nagar Shahjahanpur, Shravasti, Varanasi Sonbhadra,	
		10	4	0	49	63
		80550	38724	0		
All India (No. of Dist.)		**55**	**28**	**13**	**216**	**312**
Area (ha)		**989762**	**399134**	**473829**	**223044**	**2085769**
Area (%)		**47.45**	**19.14**	**22.72**	**10.69**	**100**

3.6. *Kharif* Oilseeds

Under *Kharif* oilseeds, the four major crops *viz.*, castor, groundnut, soybean and sesame were considered for examination of productivity and instability index. Further, a combined analysis of productivity and instability index was also done for these crops to assess the insurance cover and suggest prioritized crop and risk management interventions. The crop-wise details are briefly presented in the sub-sections that follow.

3.6.1. Castor *(Kharif)*

Castor is an important oilseed crop with industrial value. India ranks first in area, production and productivity of castor in the world. The crop is cultivated both under irrigated (Gujarat and Rajasthan) and rainfed (Telangana and southern states) agroecologies. Castor is cultivated in 0.89 M ha spread over 92 districts in various states.

Based on the productivity levels, 19 predominant castor growing districts are categorized into low (<1.375 t/ha), medium (1.375 t/ha to 2.266 t/ha) and high (>2.266 t/ha). Out of the 19 main castor growing districts, nine had high instability index over 0.52 M ha while five districts recorded medium instability index over 0.1 M ha. Out of 0.13 M ha area in high risk category, Andhra Pradesh and Rajasthan had two districts each, while one district was in Gujarat state. The risk-wise classification of districts across states in castor seed crop is given below in table 3.6.1(i).

3.6.1(i). Castor Seed Crop: Risk wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
1	Andhra Pradesh			Kurnool, Anantapur	Chittoor, East Godavari, Guntur, Kadapa, Prakasam, Nellor,Visakhapatanam Vizianagaram, West Godavari	
				2	9	11
				29941		
2	Gujarat	Mahesana, Patan, Gandhinagar, Vadodara, Kheda, Ahmadabad, Kachchh, BanasKantha, Surendranagar	SabarKantha, Jamnagar	Rajkot	Amreli, Anand, Aravalli,Bharuch, Bhavnagar,Botad, Chhotaudepur, DevbhumiDwarka, Dohad, GirSomnath, Junagadh,Mahisagar, Morbi, Narmada, PanchMahals, Porbandar,Surat,Tapi,	
		9	2	1	18	30

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
		520268	30885	9494		
3	Rajasthan		Jodhpur, Barmer	Jalore, Sirohi	Ajmer, Alwar, Banswara, Baran Bharatpur, Bhilwara Bikaner, Bundi, Chittorgarh, Churu Dausa, Dholpur Dungarpur, Ganganagar Hanumangarh, Jaipur Jaisalmer, Jhalawar Jhunjhunu, Nagaur Pali, Pratapgarh Rajsamand, Sikar Tonk, Udaipur	
			2	2	26	30
			55206	92574		
4	Telangana		Mahbubnagar		Adilabad, Jangoan, Jogulamba, Kamareddy, Yadadri Karimnagar, Asifabad, Komaram, Bheem, Medak, Medchal, Nagarkurnool, Nalgonda,Nizamabad, Rajanna, Rangareddi, Sangareddy, Siddipet, Suryapet,Vikarabad, Wanaparthy,Warangal	
			1		20	21
		12715				
All India (No. Dist)		**9**	**5**	**5**	**73**	**92**
Area (ha)		**520268**	**98806**	**132009**	**146508**	**897591**
Area (%)		**57.96**	**11.01**	**14.71**	**16.32**	**100**

3.6.2. Groundnut *(Kharif)*

Groundnut is a significant oilseed crop in India. During *Kharif*, groundnut is largely cultivated under rainfed condition. *Kharif* groundnut is cultivated in 100 districts covering an area of 0.41 M ha.

On the basis of productivity, 62 predominant *Kharif* groundnut growing districts are categorized into low (<1.238 t/ha), medium (1.238-1.926 t/ha) and high (>1.926 t/ha). The no. of districts under low, medium and high productivity levels are 26 (0.1523 M ha), 17

(0.822 M ha) and 19 (1.025 M ha), respectively. Under low category, larger extent of 0.736 M ha across four districts is in Andhra Pradesh, while 11 districts in Karnataka occupied 0.361 M ha acreage.

Under high productivity category, out of 19 districts, 8 (eight) districts in Gujarat covered an area of 0. 503 M ha followed by Rajasthan with 0.383 M ha in 4 districts and, Tamil Nadu with 0.110 M ha in 5 districts. On the basis of instability index, the 62 predominant *Kharif* groundnut growing districts in various states have been categorized into low instability index recorded in 27 districts (0.74 M ha); medium instability index in 24 districts (1.37 M ha) and high instability index in 11 districts (1.26 M ha). The risk-wise classification of districts across states in Groundnut crop is shown hereunder in Table 3.6.2(i).

Table 3.6.2(i). Groundnut (*Kharif*) crop: Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
1	Andhra Pradesh		Kurnool, Chittoor	Kadapa, Anantapur	East Godavari, Guntur, Krishna, Prakasam, Spsr Nellore, Srikakulam, Visakhapatanam, Vizianagaram, West Godavari	
			2	2	9	13
			211955	523649		
2	Gujarat	Kachchh, Surendranagar	Sabarkantha, Banaskantha	Junagadh, Mehsana, Bhavnagar, Porbandar, Amreli, Rajkot, Jamnagar	Ahmadabad, Anand, Aravalli, Bharuch, Botad, Chhotaudepur, Dang, Devbhumi Dwarka, Dohad, Gandhinagar, Gir Somnath, Kheda, Mahisagar, Morbi, Narmada, Navsari, Panch Mahals, Patan, Surat, Tapi, Valsad	
		2	2	7	21	32
		59470	382457	698999		
3	Karnataka	Belgaum, Davangere	Bijapur, Haveri, Bellary, Gadag, Chamarajanagar, Koppal, Dharwad, Chikballapur, Chitradurga, Tumkur		Bagalkot, Bangalore Rural, Bengaluru Urban, Bidar, Chikmagalur, Gulbarga,Hassan, Kodagu, Kolar,	

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| Sl. No. | State | Risk-based categories; No. of districts; and Coverage (ha) | | | Districts with insignificant area under the crop | Cumulative no. of districts under cultivation |
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
					Mandya, Mysore, Raichur, Ramanagara, Shimoga, Uttar Kannad, Yadgir	
		2	10	0	16	28
		41028.33	362688	0		
4	Madhya Pradesh	Barwani, Chhindwara, Tikamgarh	Shivpuri, Alirajpur		Agar Malwa, Anuppur, Ashoknagar, Balaghat, Betul, Bhopal, Burhanpur, Chhatarpur, Damoh, Datia, Dewas, Dhar, Guna, Gwalior, Hoshangabad, Jabalpur, Jhabua, Katni, Khandwa, Khargone, Mandsaur, Morena, Narsinghpur, Neemuch, Rajgarh, Ratlam, Sagar, Sehore, Seoni, Shahdol, Shajapur, Ujjain, Umaria, Vidisha	
		3	2		34	39
		49757.67	105152.67			
5	Maharashtra	Pune, Kolhapur, Satara, Nashik, Sangli	Dhule	Beed	Ahmednagar, Amravati, Aurangabad, Buldhana, Gadchiroli, Hingoli, Jalgaon, Jalna, Latur, Nagpur, Nanded, Nandurbar, Osmanabad, Palghar, Parbhani, Sindhudurg, Solapur, Wardha	
		5	1	1	18	25
		157966.7	17566.67	24500		
6	Odisha	Bargarh (A)			Anugul, Balangir, Boudh,	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
					Cuttack, Deogarh, Dhenkanal, Gajapati, Ganjam, Jharsuguda, Kalahandi, Kandhamal, Kendujhar, Koraput, Mayurbhanj, Nabarangpur, Nayagarh, Nuapada, Rayagada, Sambalpur, Sonepur, Sundargarh	
		1			21	22
		9163.667				
7	Rajasthan	Sikar, Jodhpur, Hanumangarh, Chittorgarh, Jaipur, Jalore, Churu, Jaisalmer	Sirohi, Dausa, Bikaner, Nagaur	Tonk	Ajmer, Alwar, Banswara, Baran, Barmer, Bharatpur, Bhilwara, Bundi, Dholpur, Dungarpur, Ganganagar, Jhalawar, Jhunjhunu, Karauli, Kota, Pali, Pratapgarh, Rajsamand, Sawai Madhopur, Udaipur	
		8	4	1	20	33
		302611.33	224846.33	12594.67		
8	Tamil Nadu	Villupuram, Vellore, Tiruvannamalai, Salem, Krishnagiri, Erode	Namakkal		Ariyalur, Coimbatore, Cuddalore, Dharmapuri, Dindigul, Kanchipuram, Kanniyakumari, Karur, Madurai, Nagapattinam, Perambalur, Pudukkottai, Sivaganga, Thanjavur, The Nilgiris, Theni, Thiruvallur, Thiruvarur, Thoothukudi, Tiruchirappalli, Tirunelveli,	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
					Tiruppur, Virudhunagar	
		6	1		23	30
		125323	26666			
9	Uttar Pradesh		Jhansi, Lalitpur		Agra, Aligarh, Amethi, Auraiya, Azamgarh, Baghpat, Bahraich, Ballia, Balrampur, Banda, Barabanki, Bareilly, Basti, Bijnor, Budaun, Bulandshahr, Chandauli, Chitrakoot, Deoria, Etah, Etawah, Farrukhabad, Fatehpur, Firozabad, Gautam Buddha Nagar, Ghazipur, Gonda, Gorakhpur, Hamirpur, Hardoi, Hathras, Jalaun, Kannauj, Kanpur Dehat, Kanpur Nagar, Kasganj, Kaushambi, Kheri, Kushi Nagar, Lucknow, Maharajganj, Mahoba, Mainpuri, Mau, Meerut, Mirzapur, Muzaffarnagar, Pilibhit, Pratapgarh, Rae Bareli, Rampur, Saharanpur, Sambhal, Sant Kabeer Nagar,	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
					Sant Ravidas Nagar, Shahjahanpur, Shravasti, Siddharth Nagar, Sitapur, Sonbhadra, Sultanpur, Unnao, Varanasi	
			2		63	65
			34189			
All India (No. of Dist)		**27**	**24**	**11**	**225**	**287**
Area (ha)		**745321**	**1365521**	**1259743**	**815503**	**4186088**
Area (%)		**17.80**	**32.62**	**30.09**	**19.48**	**100**

3.6.3. Soybean *(Kharif)*

Soybean is an important oilseed crop in India that contributes significantly to foreign exchange through export of soymeal. The protein-rich crop contributes to nutritional security. It is mainly a *Kharif* rainfed crop and is largely cultivated in black soils of central and peninsular India. In central India, this crop has improved the socio-economic status of marginal and small farmers, more particularly in Malwa region. Soybean is cultivated in 203 districts covering 11.04 M ha spread across eight states.

Based on the productivity levels, the districts are categorized into low (<0.931 t/ha), medium (0.931-1.318 t/ha) and high (>1.318 t/ha). Of the 78 major districts, 18 were in low and 25 high risk categories while 35 districts were in medium risk category. The risk-wise classification of districts across states in soybean crop is shown in Table 3.6.3(i).

Table 3.6.3(i). Soybean *(Kharif)*: Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
1	Chhattisgarh		Rajnandgaon, Kabirdham, Bemetara		Balod, Baloda Bazar, Balrampur, Bilaspur, Dantewada, Durg, Janjgir-Champa, Jashpur, Kanker, Korba, Korea,	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
					Mahasamund, Mungeli, Raigarh, Raipur,Surajpur, Surguja	
			3		17	20
			88402			
2	Gujarat	Dohad, Tapi			Ahmadabad, Amreli, Anand, Aravalli, Bharuch, Chhotaudepur, Dang, Devbhumi Dwarka, Gandhinagar, GirSomnath, Jamnagar, Junagadh, Kachchh, Kheda, Patan, Vadodara, Rajkot, Surat,Narmada, PanchMahals, Mahisagar	
		2	0	0	21	23
		55564				
3	Karnataka	Dharwad	Belgaum	Bidar, Gulberga	Bagalkot, Chitradurga, Davangere, Gadag, Haveri, Mandya, Shimoga, Uttar Kannad	
		1	1	2	8	12
		35982	87023	150873		
4	Madhya Pradesh	Vidisha, Dhar, Rewa, Dewas, Khargone, Bhopal, Ashoknagar, Khandwa, ,Brunhanpur	Mandsaur, Ratlam, Panna, Neemuch, Chhindwara, Sehore, Damoh, Chhatarpur, Shahdol, Sagar, Barwani, Rajgarh, Tikamgarh, Guna, Narsinghpur	Betul, Raisen, Jabalpur, Alirajpur, Shivpuri, Seoni, Satna, Harda, Hoshangabad	Agar Malwa, Anuppur, Balaghat, Bhind, Datia, Dindori, Gwalior, Indore, Jhabua, Katni, Mandla, Morena, Shajapur, Sheopur, Sidhi, Ujjain, Umaria	
		9	15	9	17	50
		1437881	2300858	1082467		

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
5	Maharashtra	Sangli, Nashik, Kolhapur, Nadurbar	Wardha, Chandrapur, Nagpur, Nanded, Pune,Jalgaon,Dhule,Ahmednagar, Auranagabad	Hingoli, Yavatmal, Parbhani, Washim, Jalna, Beed, Solapur, Amravati, Buldhana, Latur, Akola, Osmanabad	Bhandara, Gadchiroli, Satara	
		4	9	12	3	28
		197657	830670	2640796		
6	Rajasthan	Pratapgarh, Banswara	Chittorgarh, Udaipur, Jhalawar, Kota, Bundi	Baran	Ajmer, Barmer, Bharatpur, Bhilwara, Dausa, Dungarpur, Ganganagar, Hanumangarh, Jaipur, Jhunjhunu, Karauli, Nagaur, Pali, Rajsamand, SawaiMadhopur, Sikar, Sirohi, Tonk	
		2	5	1	18	26
		189743	620760	221733		
7	Telangana		Nizamabad, Adilabad,		Bhadradri, Jagitial, Jangoan, Jayashankar, Jogulamba, Kamareddy, Karimnagar, Khammam, KomaramBheemAsifabad, Mahabubabad, Mahbubnagar, Mancherial, Nirmal, Peddapalli, Rajanna, Medak, Medchal, Nagarkurnool, Nalgonda, Rangareddi, Sangareddy, Siddipet,Warangal Urban, Yadadri	
			2		27	29
			74349			
8	Uttar Pradesh			Lalitpur	Bahraich, Banda, Bareilly, Chitrakoot, Hamirpur, Hardoi,	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
					Jalaun, Jhansi, Kanpur Dehat, Kanpur Nagar, Mahoba, Pilibhit, Rampur, Shahjahanpur	
				1	14	15
				17538		
All India (No of Dist)		18	35	25	125	203
Area (ha)		1916827	4002062	4113407	1006626	11038922
Area (%)		17.36	36.25	37.26	9.12	100

3.6.4. Sesame *(Kharif)*

India is the largest producer of sesame in the world. Sesame contributes immensely to the country's economy through foreign exchange earning. *Kharif* sesame is mainly grown in 353 districts across various states but largely in Rajasthan (0.307 M ha), Uttar Pradesh (0.293 M ha) and Gujarat (0.082 M ha).

Based on the distribution of the productivity levels, the districts are categorized into low (<0.311 t/ha), medium (0.311-0.532 t/ha) and high (>0.532 t/ha) classes. Among the 14 districts with high productivity, five are located in Karnataka, three in Gujarat, one each in Assam, Meghalaya, Odisha, Rajasthan, Tamil Nadu and Uttar Pradesh. The 11 districts in Rajasthan (0.114 M ha) with medium productivity were followed by six districts in Gujarat (0.082 M ha). Of the 99 districts, 50 districts have low productivity (<0.311 t/ha) covering an area of 4.24 lakh ha while 35 districts are under medium category with 0.316 M ha and 14 districts with 0.064 M ha 16 districts in Uttar Pradesh, seven in Maharashtra, four in Andhra Pradesh, three in Chhattisgarh, and one in Karnataka displayed low productivity levels.

The dominant *Kharif* sesame districts (99) have been classified into 39 districts under low risk (<0.52), 49 districts under medium risk (0.52-1.04) and 17 districts under high risk (>1.04) categories. The low instability index 39 districts covers 0.22 M ha while the medium instability index 43 districts cover 0.34 M ha and high instability index 17 districts cover 0.25 M ha. The risk-wise classification of districts across states in sesame crop is shown in Table 3.6.4(i).

Table 3.6.4(i) Sesame *(Kharif)*: Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
1	Andhra Pradesh	Visakhapatanam Vizianagaram	Spsr Nellore, Guntur	Prakasam	Anantapur, Chittoor, East Godavari, Kadapa, Krishna, Kurnool, Srikakulam, West Godavari	
		2	2	1	8	13
		11069	4179	8680		
2	Assam	KarbiAnglong			Baksa, Barpeta, Bongaigaon, Cachar, Chirang, Darrang, Dhemaji, Dhubri, Dibrugarh, DimaHasao, Goalpara,Golaghat, Hailakandi, Jorhat, Kamrup, Kamrup Metro, Karimganj, Kokrajhar, Lakhimpur, Marigaon, Nagaon, Nalbari, Sivasagar, Sonitpur, Tinsukia, Udalguri	
		1			26	27
		3147				
3	Chhatisgarh	Balrampur, Raigarh, Korba, Koriya, Surajpur, Rajnandgaon, Sukma			Balod, Baloda Bazar, Bastar, Bemetara, Bijapur, Bilaspur, Raipur Dantewada, Dhamtari, Durg, Gariyaband, Janjgir-Champa, Jashpur, Surguja Kabirdham, Kanker, Mungeli Kondagaon, Mahasamund, Narayanpur	
		7	0	0	20	27
		13210	0	0		
4	Gujarat	Mahesana, Kachchh	Ahmadabad, Patan, Surendranagar, Amreli, Jamnagar, Bhavnagar	Banaskantha	Anand, Aravalli, Bharuch, Botad, Chhotaudepur, DevbhumiDwarka, Dohad, Gandhinagar, Gir Somnath, Junagadh Kheda, Mahisagar,	

					Morbi, Narmada, Navsari, Panch Mahals, Porbandar, Rajkot, Sabar Kantha, Surat, Tapi Vadodara, Valsad	
		2	6	1	23	32
		54121	35742	6666		
5	Jammu & Kashmir	Samba			Ganderbal, Jammu, Kathua, LehLadakh, Rajauri, Reasi, Udhampur	
		1			7	8
		1667				
6	Karnataka	Chikmagalur, Mysore, Hassan	Bidar, Gulbarga, Mandya, Bellary, Koppal, Raichur	Ramanaga ra	Bagalkot, Bangalore Rural, Belgaum, Bijapur, Bengaluru Urban, Chamarajanagar, Chikballapur, Chitradurga, DakshinKannad, Davangere, Dharwad, Gadag, Haveri, Kolar, Shimoga, Tumkur, Udupi, Uttar Kannad, Yadgir	
		3	6	1	19	29
		11877	23244	2081		
7	Maharashtra	Hingoli, Jalgaon, Buldhana, Gondia, Osmanabad, Beed, Dhule, Latur			Ahmednagar, Akola, Amravati, Aurangabad, Bhandara, Chandrapur, Gadchiroli, Jalna, Kolhapur, Nagpur, Nanded, Nandurbar, Nashik, Palghar, Parbhani, Pune, Raigad, Ratnagiri, Sangli, Satara, Sindhudurg, Solapur, Thane, Wardha, Washim, Yavatmal	
		8			26	34
		21285				
8	Manipur	Churachandpur				
		1			8	9
		1167				
9	Meghalaya	West Garo Hills			East Garo Hills, East Jaintia Hills, East Khasi Hills, North Garo Hills, RiBhoi, South Garo Hills, South West Garo Hills, South West Khasi Hills, West Jaintia Hills, West Khasi Hills	

		1			10	11
		1222				
10	Odisha	Balangir			Anugul, Baleshwar Bargarh, Bhadrak, Boudh, Cuttack, Deogarh, Gajapati Dhenkanal,GanjamJagat singhapur, Jharsuguda, Kalahandi, Kandhamal, Kendrapara, Kendujhar, Khordha, Koraput, Malkangiri, Mayurbhanj, Nayagarh, Nuapada Puri, Rayagada, Sambalpur, Sonepur, Sundargarh	
		1			27	28
		1515				
11	Rajasthan	Karauli	Alwar, Dausa, Bharatpur, Udaipur, Chittorgarh, Bundi, Ganganagar, Baran, Kota, Hanumangarh, Dholpur, Dungarpur, Jaisalmer, Bhilwara	Rajsamand, Bikaner, Churu, Jaipur, Tonk, Ajmer, Jalore, Barmer, SawaiMadhopur, Sirohi, Pali, Jodhpur, Nagaur	Banswara, Jhalawar, Jhunjhunu, Pratapgarh, Sikar, Sirohi	
		1	14	13	5	33
		16837	50508	225691		
12	Tamil Nadu	Cuddalore	Karur		Ariyalur, Coimbatore, Dharmapuri, Dindigul, Erode, Kanchipuram, Krishnagiri, Madurai, Nagapattinam, Namakkal, Perambalur, Pudukkottai, Ramanathapuram, Salem, Sivaganga, Thanjavur, Theni, Thiruvallur, Thiruvarur, Thoothukudi, Tiruchirappalli, Tirunelveli, Tiruppur, Tiruvannamalai, Vellore, Villupuram, Virudhunagar	
		1	1		27	29
		1542	2312			

13	Uttar Pradesh	Rae Bareli, Sonbhadra, Kaushambi ,Fatehpur, Hamirpur, Agra, Firozabad, Budaun, Mirzapur, Hardoi	Farrukhabad, Unnao, Lalitpur, Kannauj, Kanpur Dehat, Chitrakoot, Kanpur Nagar, Sitapur, Mahoba, Jalaun, Banda, Bareilly, Jhansi, Shahjahanpur	Kheri	Aligarh, Auraiya Allahabad, Ambedkar Nagar, Amethi, Amroha, Azamgarh, Bahraich, Ballia, Balrampur, Barabanki, Basti, Bijnor, Bulandshahr, Chandauli, Deoria, Etah, Etawah, Faizabad, Gautam Buddha Nagar, Ghazipur, Gonda, Gorakhpur, Hapur, Hathras, Jaunpur, Kasganj, Kushi Nagar, Lucknow, Maharajganj, Mainpuri, Mathura, Mau, Meerut, Moradabad, Muzaffarnagar, Pilibhit, Rampur Pratapgarh, Saharanpur, Sambhal, Sant Kabeer Nagar, Sant Ravidas Nagar, Shamli, Shravasti, Siddharth Nagar, Sultanpur,Varanasi	
		10	14	1	48	73
		82190	220500	3748		
All India (No. of district		**39**	**43**	**17**	**254**	**353**
Area (000ha)		**220849**	**336485**	**246866**	**928324**	**1732524**
Area (%)		**12.75**	**19.42**	**14.25**	**53.58**	**100**

3.7. *Kharif* Pulses

Pulses are an important source of low-cost proteins that are very important in India. The pulses grown in *Kharif* are pigeon pea (arhar), black gram (urad bean) and green gram (mung bean).

3.7.1. Pigeon pea/Arhar

Pigeon pea is an important pulse crop grown in the country, largely as an intercrop with cereals such as sorghum and maize in different agro-ecological zones in 339 districts. It is mainly cultivated in Madhya Pradesh, Maharashtra, Uttar Pradesh, Karnataka, Gujarat, Andhra Pradesh, Jharkhand, Telangana *etc*. **Based on the distribution of productivity levels, the districts are categorized into low (≤0.773 t/ha), medium (0.774 to 1.229 t/ha) and high (>1.229 t/ha) classes.**

The analysis of instability index indicates that 43 districts (0.70 M ha) had low risk category, while another 47 districts with a total area of 1.74 M ha were categorized under medium risk category and, 27 districts with an area of 1.14 M ha where bracketed as high risk category. The risk-wise classification of districts across states in Pigeon pea crop is shown in Table 3.7.1(i).

Table 3.7.1.(i). Pigeon pea (arhar crop): Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
1	Andhra Pradesh	Guntur	Kurnool, Chittoor	Kadapa, Anantapur, Prakasam	East Godavari, Krishna, Spsr Nellore, Srikakulam, Visakhapatanam, Vizianagaram, West Godavari	
		1	2	3	7	13
		27157	90863	165914		
2	Chhatisgarh	Kabirdham, Rajnandgaon, Balrampur			Balod, Baloda Bazar, Bastar, Bemetara, Bijapur, Bilaspur, Dantewada, Dhamtari, Durg, Gariyaband, Janjgir-Champa, Jashpur, Kanker, Kondagaon, Korba, Korea, Mahasamund, Mungeli, Narayanpur, Raigarh, Raipur, Sukma, Surajpur, Surguja	
		3			24	27
		28969				
3	Gujarat	Dohad, Narmada, Vadodara, Bharuch, Panchmahal, Tapi, Surat, Valsad		Sabarkantha	Ahmadabad, Amreli, Anand, Aravalli, Botad, Banas Kantha, Bhavnagar, Dang, Chhotaudepur, Devbhumi Dwarka, Gandhinagar, Gir Somnath, Jamnagar, Junagadh, Kachchh, Kheda, Mahesana, Mahisagar, Morbi, Navsari, Patan, Porbandar, Rajkot, Surendranagar	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
		8		1	24	33
		215644		8080		
4	Jharkhand	Palamu, Dumka	Simdega, Latehar, Garhwa, Ranchi		Bokaro, Chatra, Deoghar, Dhanbad, East Singhbum, Giridih, Godda, Gumla, Hazaribagh, Jamtara, Khunti, Koderma, Lohardaga, Pakur, Ramgarh, Sahebganj, Saraikela Kharsawan, West Singhbhum	
		2	4		18	24
		30521	28101			
5	Karnataka	Bellary, Raichur	Tumkur, Davangere, Gulbarga, Chitradurga, Koppal, Bijapur, Chikballapur, Belgaum, Yadgir	Bidar, Bagalkot	Bangalore Rural, Bengaluru Urban, Chamarajanagar, Chikmagalur, Dharwad, Gadag, Hassan, Haveri, Kolar, Mandya, Mysore, Ramanagara, Shimoga, Uttar Kannad	
		2	9	2	14	27
		61757	737931	97518		
6	Madhya Pradesh	Burhanpur, Hoshangabad, Khandwa, Balaghat, Narsinghpur, Chhindwara, Vidisha, Shahdol, Barwani, Dewas, Morena, Khargone, Mandla	Raisen, Seoni, Sagar, Sehore, Sidhi, Panna, Chhatarpur, Damoh, Singrauli, Rewa	Betul, Dindori, Anuppur, Jabalpur, Katni, Satna, Umaria	Agar Malwa, Alirajpur, Ashoknagar, Bhind, Bhopal, Datia, Dhar, Guna, Gwalior, Harda, Indore, Jhabua, Mandsaur, Neemuch, Rajgarh, Ratlam, Shajapur, Sheopur, Shivpuri, Tikamgarh, Ujjain	
		13	10	7	21	51
		155775	182949	105729		

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
7	Maharashtra	Nandurbar, Washim, Dhule, Jalgaon	Nashik, Amravati, Yavatmal, Hingoli, Gondia, Buldhana, Bhandara, Chandrapur, Ahmednagar, Sangli, Wardha	Solapur, Beed, Aurangabad, Akola, Nanded, Jalna, Nagpur, Parbhani, Osmanabad, Latur	Gadchiroli, Kolhapur, Palghar, Pune, Raigad, Ratnagiri, Satara, Sindhudurg, Thane	
		4	11	10	9	34
		101463	571675	661155		
8	Rajasthan		Banswara		Ajmer, Alwar, Baran, Bharatpur, Bhilwara, Bikaner, Bundi, Chittorgarh, Dausa, Dholpur, Dungarpur, Ganganagar, Hanumangarh, Jaipur, Jaisalmer, Jalore, Jhalawar, Karauli, Kota, Pali, Pratapgarh, Rajsamand, Sawai Madhopur, Sikar, Sirohi, Tonk, Udaipur	
			1		27	28
			5106			
9	Telanagana		Nalgonda, Adilabad	Rangareddy, Mahbubnagar	Bhadradri, Jagitial, Jangoan, Jayashankar, Jogulamba, Kamareddy, Karimnagar, Khammam, Komaram Bheem Asifabad, Mahabubabad, Mancherial, Medak, Medchal, Nagarkurnool, Nirmal, Nizamabad, Peddapalli, Rajanna, Sangareddy, Siddipet, Suryapet, Vikarabad, Wanaparthy, Warangal, Warangal Urban, Yadadri	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
			2	2	26	30
			33491	74356		
10	Uttar Pradesh	Gonda, Pratapgarh, Jaunpur, Ghazipur, Sonbhadra, Balrampur, Bulandshahr, Rae Bareli, Azamgarh, Mirzapur	Aligarh, Kanpur Nagar, Kaushambi, Allahabad, Hamirpur, Fatehpur, Banda, Ballia	Kanpur Dehat, Chitrakoot	Agra, Ambedkar Nagar, Amethi, Amroha, Auraiya, Baghpat, Bahraich, Barabanki, Bareilly, Basti, Bijnor, Budaun, Chandauli, Deoria, Etah, Etawah, Faizabad, Firozabad, Farrukhabad, Gautam Buddha Nagar, Ghaziabad, Gorakhpur, Hapur, Hardoi,Hathras, Jalaun, Jhansi, Kannauj, Kasganj, Kheri, Kushi Nagar, Lucknow, Maharajganj, Mahoba, Mainpuri, Mathura,Mau, Meerut, Moradabad, Muzaffarnagar, Pilibhit, Rampur, Sambhal, Sant Kabeer Nagar, Sant Ravidas Nagar, Shahjahanpur, Shravasti, Siddharth Nagar, Sitapur, Sultanpur, Unnao, Varanasi	
		10	8	2	52	72
		79277	88222	24228		
All India (No. of district)		**43**	**47**	**27**	**222**	**339**
Area (ha)		**700563**	**1738336**	**1136981**	**1003967**	**4579847**
Area (%)		**15.30**	**37.96**	**24.83**	**21.92**	**100**

3.7.2. Black gram/Urad bean

Black gram is another key *Kharif* pulse after Pigeon pea in the country cultivated in around 4.46 M ha. The 367 blackgram growing districts were from 12 dominant States *viz.*, Madhya Pradesh (36), Uttar Pradesh (23), Maharashtra (20), Rajasthan (13), Chhattisgarh (11), Gujarat (nine), Karnataka (six), West Bengal (five), Andhra Pradesh (four), Tamil Nadu (four), Odisha (three) and Uttarakhand (one). The productivity levels vary between 0.09 t/ha and 1.20 t/ha. **The major 135 blackgram cultivating districts are classified into low productive (<0.455), medium productive (0.455-0.818) and high productive (>0.818)**

areas based on the productivity level. The districts that witnessed low productivity are located in Madhya Pradesh (14), Maharashtra (12), Chhattisgarh (10), Uttar Pradesh (seven), Karnataka (four), Rajasthan (three), West Bengal (one), Gujarat (one) and Andhra Pradesh (one). Some 50 districts fall into the medium productive category (0.453-0.676 t/ha) covering an area of 9.69 lakh ha and the districts were located in Madhya Pradesh (18), Uttar Pradesh (eight), Maharashtra (eight), Gujarat (six), Rajasthan (four), Karnataka (two), Andhra Pradesh (one), Chhattisgarh (one), Tamil Nadu (one) and Uttarakhand (one).

Instability Index analysis revealed that 29 districts (0.87 M ha) are under high risk category while another 49 districts (0.68 M ha) are in medium risk and, 57 districts (0.91 M ha) in low risk categories. The risk-wise classification of districts across states in Black gram/urad crop is presented in Table 3.7.2(i).

Table 3.7.2(i) Black gram/Urad (*Kharif*): Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
1	Andhra Pradesh			Kurnool, East Godavari, Prakasam, Guntur	Anantapur, Chittoor, Kadapa, Krishna, Spsr Nellore, Srikakulam, Visakhapatanam, Vizianagaram, West Godavari	
				4	9	13
				29300		
2	Chhatisgarh	Raigarh, Jashpur, Surajpur, Korba, Mahasamund, Rajnandgaon, Balrampur, Surguja, Koriya, Kondagaon, Kanker			Balod, Baloda Bazar, Bastar, Bemetara, Bijapur, Bilaspur, Dantewada, Dhamtari, Durg, Gariyaband, Janjgir-Champa, Kabirdham, Mungeli, Sukma Narayanpur, Raipur,	
		11			16	27
		76610				
3	Gujarat	Valsad, Dang	Sabarkantha, Ahmedabad, Banaskantha, Junagadh, Patan, Dohad	Mehsana	Amreli, Aravalli, Bharuch, Bhavnagar, Botad, Chhotaudepur, DevbhumiDwarka, Gandhinagar,	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	**Medium**	**High**		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
					GirSomnath, Jamnagar, Kachchh, Kheda, Mahisagar, Morbi, Narmada, Navsari, PanchMahals, Porbandar, Rajkot, Surat, Surendranagar, Tapi, Vadodara	
		2	6	1	23	32
		10649	55502	12610		
4	Karnataka		Mysore, Belgaum,	Bijapur, Chamarajanagar, Gulbarga, Bidar	Bagalkot, Bellary Bangalore Rural, , Bengaluru Urban, Chikmagalur, Chitradurga, Davangere, Dharwad, Gadag, Hassan, Haveri, Mandya, Yadgir Ramanagara, Shimoga, Tumkur,	
			2	4	16	22
			26007	68025		
5	Madhya Pradesh	Guna, Vidisha, Sidhi, Ratlam, Ashoknagar, Rajgarh, Betul, Rewa, Raisen, Shivpuri, Shahdol, Damoh, Satna, Jhabua, Khandwa, Dhar, Tikamgarh, Singrauli, Sagar, Mandsaur, Anuppur, Dindori, Neemuch, Datia, Alirajpur, Chhatarpur	Gwalior, Narsinghpur, Panna, Jabalpur, Khargone, Chhindwara, Seoni, Katni, Barwani, Umaria		Agar Malwa, Balaghat, Bhind, Bhopal, Burhanpur, Dewas, Harda, Hoshangabad, Indore, Mandla, Morena, Sehore, Shajapur, Sheopur, Ujjain	
		26	10		15	51
		642563	97252			

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
6	Maharashtra	Satara, Nashik	Jalgaon, Nandurbar, Washim, Dhule, Hingoli, Nanded, Amravati, Buldhana	Ahmednagar, Akola, Parbhani, Jalna, Latur, Beed, Solapur, Osmanabad, Yavatmal, Sangli	Aurangabad, Bhandara, Chandrapur, Gadchiroli, Gondia, Kolhapur, Nagpur, Palghar, Pune, Raigad, Ratnagiri, Sindhudurg, Thane, Wardha	
		2	8	10	14	34
		8600	147364	159375		
7	Odisha	Nuapada (A), Balangir (A), Bargarh (A)			Anugul, Baleshwar, Boudh, Deogarh, Dhenkanal, Ganjam, Jharsuguda, Kalahandi, Kandhamal, Kendujhar, Mayurbhanj, Nabarangpur, Sambalpur, Sundargarh	
		3			14	17
		17684				
8	Rajasthan		Baran, Udaipur, Jhalawar, Banswara, Kota, Dungarpur	Chittorgarh, Pratapgarh, Tonk, Bundi, SawaiMadhopur, Ajmer, Bhilwara	Alwar, Barmer, Bharatpur, Bikaner, Churu, Dausa, Dholpur, Ganganagar, Hanumangarh, Jaipur, Jalore, Jhunjhunu, Jodhpur, Karauli, Nagaur, Pali, Rajsamand, Sikar, Sirohi	
			6	7	19	32
			192075	339183		
9	Tamil Nadu	Dharmapuri, Tiruvannamalai, Vallupuram	Thanjavur		Ariyalur, Coimbatore, Cuddalore, Dindigul, Erode, Kanchipuram, Kanniyakumari, Karur, Krishnagiri,	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	**Medium**	**High**		
1	2	3	4	5	6	7=(3+4+5+6)
					Madurai, Nagapattinam, Namakkal, Perambalur, Pudukkottai, Ramanathapuram, Salem, Sivaganga, Theni, Thiruvallur, Thiruvarur, Thoothukudi, Tiruchirappalli, Tirunelveli, Tiruppur, Vellore, Virudhunagar	
		3	1		26	30
		19412	7138			
10	Uttar Pradesh	Sambhal, Pratapgarh, Budaun, Sitapur, Fatehpur, Rae Bareli	Barabanki, Banda, Kanpur Nagar, Hardoi, Unnao, Jaunpur, Rampur, Hamirpur, Jalaun, Bareilly, Kanpur Dehat, Lucknow, Amethi, Shahjahanpur	Jhansi, Lalitpur, Mahoba	Agra, Aligarh, Allahabad, Ambedkar Nagar, Amroha, Auraiya, Azamgarh, Baghpat, Bahraich, Ballia, Balrampur, Basti, Bijnor, Bulandshahr, Chandauli, Chitrakoot, Deoria, Etah, Etawah, Faizabad, Farrukhabad, Firozabad, Gautam Buddha Nagar, Ghaziabad, Ghazipur, Gonda, Gorakhpur, Hapur, Hathras, Kannauj, Kasganj, Mirzapur, Kaushambi, Kheri, Kushi Nagar, Maharajganj, Mainpuri, Mathura, Mau, Meerut, Moradabad, Muzaffarnagar, Pilibhit, Saharanpur, SantKabeer Nagar, SantRavidas	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
					Nagar, Shamli, Shravasti, Siddharth Nagar, Sonbhadra, Sultanpur, Varanasi	
		6	14	3	52	75
		88698	137658	263607		
11			PauriGarhwal		Almora, Bageshwar, Chamoli, Dehradun Champawat, Haridwar, Nainital, Pithoragarh, RudraPrayag, Tehri Garhwal, Udam Singh Nagar, Uttar Kashi	
			1		12	13
			3858			
12	West Bengal	Nadia, 24 Paraganas North, Murshidabad, Malda	Purulia		24 Paraganas South, Alipurduar, Bankura, Birbhum, Coochbehar, Darjeeling, DinajpurDakshin, Dinajpur Uttar, Hooghly, Howrah, Jalpaiguri,Jhargram, Kalimpong, Medinipur East, Medinipur West, Purba Bardhaman	
		4	1		16	21
		44937	12785			
All India (No. of Dist.)		57	49	29	232	367
Area (ha)		909153	679639	872100	1999484	4460376
Area (%)		20.38	15.24	19.55	44.83	100

3.7.3. Green gram/ Mung bean

Green gram popularly known as mung bean is widely cultivated over an area of 4.1 M. The major green gram growing states are Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, Tamil Nadu, Uttar Pradesh, Gujarat, Haryana, Telangana and Odisha. In *Kharif*, green gram

is predominantly cultivated in 69 districts of Maharashtra (22), Rajasthan (17), Karnataka (12), Madhya Pradesh (seven), Gujarat (four), Tamil Nadu (three), Telangana (one), Haryana (one), Uttar Pradesh (one) and Odisha (one). Of the total area under the crop, highest area (66%) was in Rajasthan (19.09 lakh ha), followed by Maharashtra (4.10 lakh ha), Karnataka (3.67 lakh ha) and Gujarat (0.92 lakh ha) in that order. The productivity levels varied between 0.10t/ha and 0.76t/ha. The predominant greengram cultivating districts are classified into low (<0.307 t/ha), medium (0.307 - 0.480 t/ha) and high (>0.480 t/ha) categories based on the productivity.

The low productivity districts are from various states including Karnataka (nine), Rajasthan (four), Maharashtra (three), Madhya Pradesh (two), Uttar Pradesh (one) and Tamil Nadu (one). Around 2/5th of the districts (27) are in the medium category covering an area of 7.68 lakh ha with an average productivity of 0.39 t/ha. The districts in the medium category are located in Maharashtra (12), Rajasthan (four), Madhya Pradesh (four), Gujarat (two), Karnataka (two), Haryana (one), Telangana (one) and Tamil Nadu (one). Another 32 per cent of the districts (22) come in the high productivity group covering an area of 14.05 lakh ha with an average productivity of 0.55 t/ha. High productivity districts belonged to Rajasthan (nine), Maharashtra (seven), Gujarat (two), Tamil Nadu (one), Karnataka (one), Madhya Pradesh (one) and Odisha (one).

Instability index was calculated for all the major 68 districts, of which 17 districts which account for 1.37 M ha are included in the high-risk category. Another 21 districts accounting for 0.98 M ha are categorized under medium risk and, 30 districts that account for 0.56 M ha are bracketed as low risk.The risk-wise classification of districts across states in Green gram/mung bean crop is shown in Table 3.7.3(i).

Table 3.7.3(i). Green gram (K) / Mung bean: Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
1	Gujarat	Bharuch, Patan, Kachchh		Banaskantha	Ahmadabad, Amreli, Anand, Aravalli, Bhavnagar, Botad, Chhotaudepur, Dang, Devbhumi Dwarka, Dohad, Gandhinagar, GirSomnath, Jamnagar, Junagadh, Kheda, Mahesana, Mahisagar, Morbi, Narmada, Navsari, PanchMahals, Porbandar, Rajkot, SabarKantha, Surat, Surendranagar, Tapi,	

					Vadodara, Valsad	
		3		1	29	33
		84890		8086		
2	Haryana	Hisar			Bhiwani, CharkiDadri, Fatehabad, Jhajjar, Kurukshetra, Mahendragarh, Mewat, Palwal, Rohtak, Sirsa, Yamunanagar	
		1			11	12
		6393				
3	Karnataka	Yadgir, Mysore, Dharwad, Belgaum	Tumkur, Gulbarga	Bagalkot, Bijapur, Bidar,Gadag, Hasan	Bangalore Rural, Bellary,Bengaluru Urban, Chamarajanagar, Chikmagalur Chitradurga, DakshinKannad, Davangere, Haveri, Koppal, Mandya, Raichur, Ramanagara Shimoga, Udupi, Uttar Kannad	
		4	2	5	16	27
		114693	60264	192391		
4	Madhya Pradesh	Shivpuri, Sidhi, Khargone, Chhatarpur, Dhar, Hoshangabad	Barwani		Agar Malwa, Alirajpur, Anuppur, Ashoknagar, Balaghat, Betul, Bhind, Bhopal, Burhanpur, Chhindwara, Damoh, Datia, Dewas, Dindori, Guna, Gwalior, Harda, Indore, Jabalpur, Jhabua, Katni, Khandwa, Mandla, Mandsaur, Morena, Narsinghpur, Neemuch, Panna, Raisen, Rajgarh, Ratlam, Rewa, Sagar, Satna, Sehore, Seoni, Shahdol, Shajapur, Sheopur, Singrauli, Tikamgarh, Ujjain, Umaria, Vidisha	
		6	1		44	51
		45518	6395			

5	Maharashtra	Jalgaon, Nashik, Nandurbar, Satara, Pune, Yavatmal, Dhule, Washim, Hingoli, Amravati	Nanded, Aurangabad, Solapur, Buldhana, Sangli, Akola, Parbhani, Beed, Osmanabad, Jalna, Latur	Ahmednagar	Bhandara, Chandrapur, Gadchiroli, Gondia, Kolhapur, Nagpur, Palghar, Raigad, Ratnagiri, Sindhudurg, Thane, Wardha	
		10	11	1	12	34
		169307	198414	42779		
6	Odisha	Bargarh (A)			Anugul, Balangir, Baleshwar Bhadrak, Boudh, Cuttack, Deogarh Dhenkanal, Gajapati, Ganjam, Jagatsinghapur Jajapur, Jharsuguda, Kalahandi, Kandhamal Kendrapara, Kendujhar, Khordha, Koraput Malkangiri, Mayurbhanj, Nabarangpur Nayagarh, Nuapada, Puri, Rayagada Sambalpur, Sonepur, Sundargarh	
		1			29	30
		18169				
7	Rajasthan	Hanumangarh, Ganganagar	Jhunjhunu, Sikar, Tonk, Jaisalmer, Nagaur	Pali, Ajmer, Bikenar, Churu, Sirohi,Barmar, Jodhpur,Bhilawara, Jaipur, Jalore	Alwar, Banswara, Baran Bharatpur, Bundi, Chittorgarh Dausa, Dholpur, Dungarpur Jhalawar, Karauli, Kota, Pratapgarh Rajsamand, SawaiMadhopur Udaipur	
		2	5	10	16	33
		89238	697468	1121932		
8	Tamil Nadu	Nagapattinam, Salem	Namakkal		Ariyalur, Coimbatore, Cuddalore, Dharmapuri, Dindigul, Erode, Kanchipuram, Kanniyakumari, Karur, Krishnagiri, Madurai, Perambalur, Pudukkottai, Ramanathapuram,	

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				Sivaganga, Thanjavur, The Nilgiris, Theni, Thiruvallur, Thiruvarur, Thoothukudi, Tiruchirappalli, Tirunelveli, Tiruppur, Tiruvannamalai, Vellore, Villupuram, Virudhunagar	
		2	1	28	31
		17097	5914		
9	Telanagana	Khammam		Adilabad, Bhadradri, Jagitial, Jangoan, Jayashankar,Jogulamba Kamareddy, Karimnagar, Komaram Bheem Asifabad, Mahabubabad, Mahbubnagar, Mancherial, Medak, Medchal, Nirmal, Nagarkurnool, Nalgonda, Nizamabad, Peddapalli, Rajanna, Rangareddi, Siddipet, Sangareddy, Suryapet, Vikarabad,Wanaparthy Warangal, Warangal Urban,Yadadri	
		1		29	30
		11845			
10	Uttar Pradesh		Mahoba	Agra, Aligarh, Allahabad, Ambedkar Nagar, Amethi, Amroha, Auraiya, Azamgarh, Baghpat, Bahraich, Ballia, Banda, Barabanki, Bareilly, Basti, Bijnor, Budaun, Bulandshahr, Chandauli, Chitrakoot, Deoria, Etah, Etawah, Faizabad, Fatehpur, Farrukhabad, Jalaun, Firozabad, Hardoi, Gautam Buddha Nagar, Ghaziabad, Ghazipur, Gonda, Gorakhpur, Hamirpur, Hapur, Hathras, Jaunpur, Jhansi, Kannauj, Kheri, Kanpur Dehat, Kanpur Nagar, Kasganj,	

				Kaushambi, Kushi Nagar, Lalitpur, Lucknow, Maharajganj, Mainpuri, Mathura, Mau, Meerut, Mirzapur, Moradabad, Muzaffarnagar, Pilibhit, Pratapgarh, Rae Bareli, Rampur, Saharanpur, Sambhal, SantRavidas Nagar, Shahjahanpur, Shamli, Shravasti, Sitapur, Sonbhadra, Sultanpur, Unnao, Varanasi	
		1		71	72
		9018			
All India (No. of Dist.)	**30**	**21**	**17**	**285**	**353**
Area (ha)	**557151**	**977473**	**1365189**	**2899813**	**4132263**
Area (%)	**13.48**	**23.65**	**33.04**	**29.83**	**100**

3.8. Cereals *(Rabi)*

3.8.1. Rice

Rice is the major staple food crop occupying top position among all the crops in India. For example, the net cropped area in the year 2020-21 was 45.8 M ha. While the crop is predominantly cultivated during *Kharif*, the area covered in *Rabi* season is substantial too, registering an extent of 5.4 M ha (12%) cultivated mostly under assured irrigation. Rice growing seasons in India go by different names other than *Kharif* and *Rabi* in different regions such as autumn, winter and summer. However, based on sowing window of rice in different states, the area and production relating to these seasons are reported in either *Kharif* or *Rabi* (area sown during March/April is considered as summer but has not been included in this Report, because PMFBY does not cover summer season crops insurance. Rice area reported under summer season (with sowing time between October to February) by DA&FW in 48 districts in the States of Assam, Bihar, Odisha, Uttar Pradesh, West Bengal, Karnataka, Kerala *etc*. is covered as *Rabi* season crop.

3.8.1 Rice (Paddy crop) *(Rabi)*

Two districts in Kerala that reported rice area under winter season are annexed to the group of 20 districts that reported rice area under *Rabi* season. The other states of this group are Andhra Pradesh, Telangana, Karnataka and Manipur. These cumulative 22 districts cover an area of more than 1 M ha. The productivity of the districts varies from 2.5-5.5 t/ha. Thirteen (13) of the 22 districts realizing a productivity range of 3.5-4.5 t/ha are categorized as

medium productivity districts. These districts predominantly belong to Andhra Pradesh and Telangana States. The area under *Rabi* rice in these districts adds up to 0.5 M ha. Seven (7) districts with productivity range of 2.5-3.5 t/ha are labeled as low productivity districts accounting for an area of 0.19 M ha. Two (2) districts of Andhra Pradesh, namely East Godavari and West Godavari accounting for an area of 0.33 M ha with productivity of more than 4.5 t/ha are placed in the high productivity category. The other states of this group are Andhra Pradesh, Telangana, Karnataka and Manipur. There are 48 districts where sowing time of rice ranges from October to February. Harvesting in these districts is generally performed during summer and, the DA&FW/States report the production of this rice under summer season. In the present Report, this rice is considered as *Rabi* rice. The area of *Rabi* rice is about 4.1 M ha with cultivation in 257 districts.

The instability index analysis indicates that 20 districts were in medium risk category, while 17 districts were in low and 33 in high risk categories. Risk-wise classification of districts across states in *Rabi* rice crop is given in Table 3.8.1(i)

Table 3.8.1(i). Paddy crop (*Rabi*): Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
1	Andhra Pradesh	West Godavari, East Godavari, Spsr Nellore, Guntur	Krishna, Anatapur, Chittoor, Kurnool, Prakasam	Kadapa,		
		4	5	1	3	13
		509461	123391	12334		
2	Assam		Nagaon (S), Marigaon (S), Sonitpur (S), Darrang (S)	Kamrup (S), Goalpara (S), Bongaigaon (S), Barpeta (S), Nalbari (S), Lakhimpur (S), Dhubri (S), Kokrajhar (S)		
		0	4	8	15	27
			129034	218535		
3	Bihar			Kishanganj (S), Katihar (S)		
				2	36	38
				39509		
4	Gujarat			Ahmadabad(S)		
				1	13	14
				24047		

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
5	Karnataka		Dakshin Kannad. Davangere (S)	Raichur (S), Bellary (S), Yadgir (S), Koppal		
			2	4	21	27
			48993	80428		
6	Kerala	Thrissur		Alappuzha (S) Palakkad		
		1		2	11	14
		13992		57338		
7	Maharastra		Gondia (S)			
			1		11	12
			17004			
8	Manipur			Thoubal, Imphal West		
				2	0	2
				21173		
9	Odisha			Puri (S), Bargarh (S), Baleshwar (S), Kalahandi (S), Koraput (S), Sonepur (S), Deogarh (S), Jharsuguda (S)		
				8	22	30
				266123		
10	Telanagana	Nalgonda	Karimnagar, Mahbubnagar, Nizamabad,Warangal	Khammam, Medak		
		1	4	2	23	30
		88185	176141	67772		
11	Uttar Pradesh	Pilibhit (S)				
		1			24	25
		10607				
12	Uttrakhand			Udam Singh Nagar (S)		
				1	2	3
				13731		

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
13	West Bengal	Maldah (S), Murshidabad (S), Nadia (S), Hooghly (S), 24 Paraganas South (S), 24 Paraganas North (S), Birbhum (S), Medinipur West (S), Medinipur East (S), Dinajpur Dakshin (S)	Bankura (S), Uttar Dinajpur (S), Jalpaiguri (S), Purba Bardhaman (S)	Coochbehar (S), Howrah (S),		
		10	4	2	6	22
		896794	247832	90985		
All India (No. of Dist)		**17**	**20**	**33**	**187**	**257**
Area (ha)		**1518438**	**742394**	**891976**	**985561**	**4138369**
Area (%)		**36.69**	**17.94**	**21.55**	**23.82**	**100.00**

S- Summer

3.8.2. Wheat

Wheat, an important staple food crop after rice in India is cultivated in more than 30 M ha area during *Rabi* season. The district productivity levels in wheat range from 0.5-5.3 t/ha across the 444 districts across the country. Productivity is low in 94 districts (less than 2.37 t/ha) covering a total area of 4.19 M ha. The regions that comprise this low productivity zone are 15 districts of Madhya Pradesh (1.17 M ha), 26 districts of Maharashtra (1.1 M ha) and nine districts of Bihar (0.5 M ha).

According to instability index analysis, the districts are bracketed under low, medium and high-risk categories at 110, 118 and 95, respectively. The percentage area covered in these three risk categories are 42.87 (low risk), 36.83 (medium risk) and 19.97 (high risk), respectively.

The risk-wise classification of districts across the states in wheat crop is shown in Table 3.8.2(i).

Table 3.8.2(i). Wheat crop : Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignicant area under the crop	Cumulative no. of districts under cultivation
		Low	**Medium**	**High**		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
1	Bihar	Kaimur (Bhabua)	Rohtas, Patna, Sheikhpura, Saran, Siwan, Bhojpur, Arwal, Jehanabad,Banka, Munger, Gaya, Buxar, Aurangabad, Nalanda	Lakhisarai, Nawada, Samastipur, Supaul, Madhepura, Jamui, Darbhanga, Begusarai, Muzaffarpur, Bhagalpur, Saharsa, Pashchim Champaran, Madhubani, Kaithar, Vaishali, Kishangar, Araria,Sitamarhi, Gopalganj, Sheohar, Purnia, Khagaria, Purbi Champaran		
		1	14	23		38
		75922	852678	1177357		
2	Delhi	Delhi				
		1			11	12
		17882				
3	Chhatisgarh	Bemetara, Rajnandagaon			Balod, Baloda Bazar, Balrampur, Bastar, Bilaspur, Dantewada, Dhamtari, Durg, Gariyaband, Janjgir-Champa, Jashpur, Kabirdham, Kanker, Kondagaon, Korba, Korea, Mahasamund, Mungeli, Narayanpur,	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
					Raigarh, Sukma, Surajpur, Surguja	
		2			24	26
		31833				
4	Gujarat	Kachchh, Patan, Mahesana, Gandhinagar, Rajkot, Banas Kantha, Vadodara, Sabar Kantha, Bhavnagar, Surendranagar, Kheda	Anand, Ahmedabad, Junagarh, Dohad, Panch Mahal, Bharuch		Amreli, Aravalli, Botad, Chhotaudepur, Dang, Devbhumi Dwarka, Gir Somnath, Jamnagar, Mahisagar, Morbi, Narmada, Navsari, Panch Mahals, Porbandar, Surat, Tapi, Valsad	
		11	6		16	33
		484117	309704			
5	Haryana	Kaithal, Fatehabad, Rewari, Kurukshetra, Jhajjar, Jind, Karnal, Gurgaon, Hisar,Yamunana gar, Sonipat, Rohtak, Panipat, Mewat, Sirsa, Ambala, Palwal		Bhiwani	Charki Dadri, Faridabad, Mahendragarh, Panchkula	
		17		1	4	22
		2358488		182814		
6	Himachal Pradesh			Kullu, Una, Kangra, Shimla, Solan, Sirmaur, Mandi, Chamba, Hamirpur, Bilaspur	Kinnaur, Lahul & Spiti	
				10	2	12
				328951		
7	Jammu &			Reasi, Samba,	Badgam,	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
	Kashmir			Jammu, Kathua, Poonch, Udhampur, Rajauri	Doda, Kargil, Kishtwar, Leh Ladakh, Pulwama, Ramban	
				7	7	14
				273553		
8	Jharkhand		Godda	Palamu	Bokaro, Chatra, Deoghar, Dhanbad, Dumka, East Singhbum, Garhwa, Giridih, Gumla, Hazaribagh, Jamtara, Khunti, Koderma, Latehar, Lohardaga, Pakur, Ramgarh, Ranchi, Sahebganj, Saraikela Kharsawan, Simdega, West Singhbhum	
			1	1	22	24
			12394	11957		
9	Karnataka No of districts		Bagalkot	Belgaum, Bijapur, Gadag, Dharwad	Bellary, Bidar, Chitradurga, Davangere, Gulbarga, Haveri, Koppal, Raichur, Tumkur, Yadgir	
			1	4	10	15
			21631	136871		
10	Madhya Pradesh	Ashoknagar, Khargone, Singrauli	Vidisha, Burhanpur, Datia, Bhopal, Panna, Harda, Neemuch, Hoshangabad, Gwalior, Damoh,	Jhabua, Raisen, Shadol, Mandsaur, Seoni, Dindori, Satna, Guna, Sehore,	Agar Malwa	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
			Alirajpur, Jabalpur, Morena, Khandwa, Betul, Dhar, Sagar, Chhatarpur, Shajapur, Narsinghpur, Umaria, Anuppur, Shivpuri, Ratlam, Sheopur, Sidhi, Rajgarh, Bhind, Dewas, Tikamgarh, Balaghat	Barwani, Rewa, Ujjain, Indore, Chhindwara, Katni, Mandla		
		3	31	16	1	51
		326551	3600163	2041156		
11	Maharashtra		Sangli,Nashik, Jalgaon, Dhule, Nandurbar, Amravati, Pune, Bhandara, Akola, Chandrapur	Ahmednagar, Wardha, Hingoli,Nagpur, Aurangabad, Yavatmal,Nanded, Buldhana, Washim, Parbhani, Solapur,Jalna, Beed, Latur, Osmanabad	Gadchiroli, Gondia, Kolhapur, Palghar, Raigad, Satara, Thane	
		1	10	15	6	32
		34167	396876	669536		
12	Punjab	Firozepur, Faridkot, Fazilka, Barnala, Ludhiana, Muktsar, Patiala, Hoshiarpur, S.A.S. Nagar, Bathinda, Sangrur, Mansa, Jalandhar, Amritsar, Tarn Taran, Fatehgarh Sahib,	Moga	Pathankot		

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
		Kapurthala, Rupnagar, Nawanshahr, Gurdaspur				
		20	1	1		22
		3289333	174667	41000		
13	Rajasthan	Alwar, Bharatpur, Dausa, Jalore, Jaipur, Udaipur, Sirohi,Dholpur, Ganganagar, Jhunjhunu, Hanumangarh	Pali, Sawai Madhopur, Banswara, Baran, Chittorgarh, Jhalawar, Tonk, Rajsamand, Sikar, Karauli, Kota, Jodhpur, Pratapgarh, Bundi, Dungarpur, Bhilwara	Ajmer, Churu, Bikaner, Nagaur, Barmer, Jaisalmer		
		11	16	6		33
		1428824	1463067	277570		
14	Uttar Pradesh	Gonda, Bijnor, Meerut, Ghaziabad, Sultanpur, Muzaffarnagar, Kheri, Shravasti, Bahraich, Baghpat, Faizabad, Barabanki, Aligarh, Bulandshahr, Farrukhabad, AmbedkarNagar ,Sant Kabeer Nagar, Jaunpur, Azamgarh, Pilibhit, Mau, Hardoi, Unnao, Basti, Lucknow, Amroha, Mainpuri, Agra,	Sitapur, Bareilly, Fatehpur, Ghazipur, Mirzapur, Varanasi, Etah, Sonbhadra, Rae Bareli, Auraiya, Kaushambi, Kasganj, Gautam Buddha Nagar, Lalitpur, Mathura, Shahjahanpur, Siddharth Nagar, Firozabad, Gorakhpur, Kushi Nagar, Amethi, Rampur,Hapur, Hamirpur, Moradabad, Allahabad, Maharajganj, Pratapgarh,	Banda, Kanpur Nagar,Kanpur Dehat, Kannauj, Chitrakoot, Jalaun, Sambhal, Mahoba		

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
		Ballia, Balrampur, Shamli, Budaun, Hathras, Deoria, Saharanpur	Chandauli, Sant Ravidas Nagar, Jhansi, Etawah			
		35	32	8		75
		4710820	4237302	883129		
15	Uttarkhand	Naintal, Haridwar, Udamsingh nagar	Pithuragarh, Dhradun,Utar kashi,Chamoli, Tehri Garhwal	Bagheswar, Almora, Pauri Gharwal	Champawat, Rudra Prayag	
		3	5	3	2	13
		170390	86995	63503		
16	West Bengal	Maldah, Birbhum,Dhakhin Dhanjapur, Uttar Dhanijapur, Nadia	Murshidabad		24 Paraganas North, 24 Paraganas South, Alipurduar, Bankura, Coochbehar, Darjeeling, Hooghly, Howrah, Jalpaiguri, Jhargram, Kalimpong, Medinipur East, Medinipur West, Paschim Bardhaman, Purba Bardhaman, Purulia	
		5	1		16	22
		141043	74571			
All India (No. of Dist.)		**110**	**118**	**95**	**121**	**444**
Area (ha)		**13069369**	**11230047**	**6087397**	**101208**	**30488022**
Area (%)		**42.87**	**36.83**	**19.97**	**0.33**	**100**

3.8.3 Barley *(Rabi)*

Barley is one of the major commercial crops grown in the country covering 0.63 M ha spread over 252 districts across the country. Major states engaged in cultivation of this crop include Bihar (four districts with 6,521 ha), Chhattisgarh (one district with 1,152 ha), Haryana (eight districts with 36,823 ha), Himachal Pradesh(seven districts with 18,329 ha), Jammu & Kashmir (three districts with 4,471 ha), Madhya Pradesh (13 districts with 51,614 ha), Punjab

(4 districts with 7,900 ha), Rajasthan (20 districts with 0.26 M ha), Uttar Pradesh (33 districts with 0.14 M ha) and Uttarakhand (six districts with 15,867 ha) *etc*. Productivity of barley across districts ranged from 0.32 t/ha to 4.26 t/ha. **Based on productivity values, the districts have been categorized into low (≤ 1.97 t/ha), medium (1.97 to 2.93 t/ha) and high (> 2.93 t/ha) productivity classes.**

Analysis of instability index values indicates that 18 districts with 0.06 M ha spread over Bihar(one), Chhattisgarh (one), Haryana(one), Himachal Pradesh (six), Madhya Pradesh (four), Uttar Pradesh (three) and Uttarakhand (two) are in high-risk category representing 4 per cent area. Further 37 districts with 0.23 M ha spread over Haryana (three), J&K (three), Madhya Pradesh (three), Punjab (four), Rajasthan (10), Uttar Pradesh (11) and Uttarakhand (three) are in low-risk category and 44 districts with 0.25 Mha ha spread over Bihar (three), Haryana (four), 21282 ha Madhya Pradesh (six), Rajasthan (10), Uttar Pradesh (19) and Uttarakhand (one) are in medium-risk category, representing 14 percent and 15 per cent area respectively. The risk-wise classification of districts across states for the crop is presented in Table 3.8.3(i).

Table 3.8.3(i): Barley (*Rabi*) crop: Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
1	Bihar		Kaimur (Bhabua), Bhojpur, Buxar	Bhagalpur	Arwal, Aurangabad, Banka, Begusarai, Darbhanga, Gaya, Jamui, Jehanabad, Katihar, Khagaria, Madhepura, Madhubani, Muzaffarpur, Nalanda, Nawada, Pashchim Champaran, Patna, Rohtas, Saharsa, Samastipur, Saran, Sheikhpura, Sheohar, Sitamarhi, Siwan, Vaishali	
			3	1	26	30
			5308	1213		
2	Chhatisgarh			Balrampur	Bemetara, Bilaspur, Jashpur, Korba, Korea, Rajnandgaon, Surajpur, Surguja	
				1	8	9
				1152		
3	Haryana	Hisar, Bhiwani, Fatehabad	Sirsa,Jhajjar,Gurgaon,Rewari	Rohtak	Charki Dadri, Faridabad, Jind, Karnal, Mahendragarh, Mewat, Palwal, Panchkula, Sonipat	
		3	4	1	9	17

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
		18793	14885	3145		
4	Himachal Pradesh		Kullu	Mandi,Sirmaur,Kangra,Shimla,Solan, Chamba	Bilaspur, Hamirpur, Kinnaur, Lahul And Spiti	
			1	6	4	11
			2463	15868		
5	Jammu & Kashmir	Kathua, Kishtwar, Doda			Jammu, Leh Ladakh, Rajauri, Ramban, Reasi, Samba, Udhampur	
		3			7	10
		4471				
6	Madhya Pradesh	Chhatarpur,Rewa,Sidhi	Panna, Tikamgarh, Satna, Datia, Khandwa, Shivpuri	Morena, Alirajpur, Singrauli, Bhind	Anuppur, Ashoknagar, Balaghat, Barwani, Burhanpur, Damoh, Dewas, Dhar, Dindori, Guna, Gwalior, Harda, Indore, Jhabua, Katni, Khargone, Mandla, Neemuch, Raisen, Rajgarh, Ratlam, Sagar, Sehore, Shahdol, Sheopur, Ujjain, Umaria, Vidisha	
		3	6	4	28	41
		16141	21282	14192		
7	Punjab	Fazilka, Firozepur, Sangrur, Ludhiana			Barnala, Bathinda, Faridkot, Fatehgarh Sahib, Mansa, Moga, Muktsar, Patiala, Rupnagar, S.A.S Nagar	
		4			9	13
		7900				
8	Rajasthan	Pali,Bundi,Bharatpur, Alwar, Dausa, Jhunjhunu,Udaipur, Sikar, Hanumangarh Ganganagar	Jaipur,Bhilwara,Tonk,Chittorgarh,Pratapgarh,Ajmer,Nagaur,Bikaner,Rajsamand, Churu		Banswara, Baran, Barmer, Dholpur, Dungarpur, Jaisalmer, Jalore, Jhalawar, Jodhpur, Karauli, Kota, Sawai Madhopur, Sirohi	
		10	10		13	33
		125727	137592			

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
9	Uttar Pradesh	Aligarh, Hathras, Etah, Kasganj, Gautam Buddha Nagar, Bulandshahr Ghazipur, Mathura, Agra, Firozabad, Mainpuri	Azamgarh, Mau, Ballia, Amethi, Farrukhabad, Auraiya, Lalitpur Kanpur Dehat, Jhansi, Gorakhpur, Kanpur Nagar, Hardoi, Allahabad, Sonbhadra, Rae Bareli,Mirzapur, Jalaun, Fatehpur, Kaushambi	Chitrakoot, Hamirpur, Mahoba	Ambedkar Nagar, Amroha, Baghpat, Bahraich, Balrampur, Banda, Barabanki, Bareilly, Basti, Bijnor, Budaun, Chandauli, Deoria, Etawah, Faizabad, Ghaziabad, Gonda, Hapur, Jaunpur, Kannauj, Kheri, Kushi Nagar, Lucknow, Maharajganj, Meerut, Moradabad, Muzaffarnagar, Pilibhit, Pratapgarh, Rampur, Saharanpur, Sambhal, Sant Kabeer Nagar, Sant Ravidas Nagar, Shahjahanpur, Shamli, Shravasti, Siddharth Nagar, Sitapur, Sultanpur, Unnao, Varanasi	
		11	19	3	42	75
		53691	71416	14767		
10	Uttarakhand	Chamoli, Pithoragarh,Rudra Prayag	Tehri Garhwal	Almora,Pauri Garhwal	Bageshwar, Champawat, Dehradun, Haridwar, Nainital, Udam Singh Nagar, Uttar Kashi	
		3	1	2	7	13
		6187	1751	7929		
All India (No. of Dist.)		**37**	**44**	**18**	**153**	**252**
Area (ha)		**232910**	**254697**	**58266**	**89597**	**635470**
Area (%)		**36.65**	**40.08**	**9.17**	**14.10**	**100**

3.9. Oilseeds *(Rabi)*

3.9.1. Groundnut (*Rabi* & Summer)

Groundnut has wide adaptability to diverse agro-ecologies, seasons and soil types. It is grown during *Rabi* in a limited area under irrigation. *Rabi* groundnut is cultivated in 214 districts covering 0.75 M ha out of which 38 districts are predominant. **On the basis of productivity, districts were classified with low yields (<2.188 t/ha), medium yields (2.189 to 3.586 t/ha) and high yields (>3.586 t/ha).** On the basis of productivity levels, amongst the 38 major *Rabi* groundnut growing districts, 20 districts produced low yields (<2.188 t/ha), 10 districts medium yields (2.1888 to 3.586 t/ha) and eight districts revealed high yields (>3.586

t/ha). All the districts in Karnataka logged low yields, while Tamil Nadu has eight (8) districts under medium yields category (0.078 M ha), six (6) under high yields (0.039 M ha) and two (2) under low yields (0.006 M ha) categories.

Rabi summer groundnut is predominantly grown in 33 districts covering 0.317 M ha in five states i.e., Maharashtra (12), Karnataka (nine), Gujarat (six), West Bengal (five) and Odisha (one). More than 50 per cent of the area i.e., 0.155 lakh ha is cultivated in Karnataka while Maharashtra covers only 0.065 M ha in nine districts. More than 50,000 ha area is cultivated in eight (8) districts and all are located only in Karnataka. The productivity levels of Rabi groundnut-summer is categorized into three levels i.e., low (<1.452 t/ha), medium (1.452 to 2.212 t/ha) and high (>2.212 t/ha). Low productivity was recorded in 18 districts with larger area (0.210 M ha) followed by medium productivity (12 districts) covering 0.073 M ha while all the 3 districts with high productivity are located in West Bengal (Hooghly, Howrah and Medinipur), albiet with very less area of 0.034 M ha.

The districts with low productivity (<1.452 t/ha) are observed in Karnataka (nine districts 1.55 lakh ha), Maharashtra (eight districts; 0.46 lakh ha) and Odisha with very less area of 0.09 lakh ha in one district. The 12 districts with medium productivity (1.452 to 2.212 t/ha) are located in Gujarat (six), Maharashtra (four) and West Bengal (two) with an area of 0.044,0.019 and 0.010 M ha, respectively.

Based on the instability index, 20 districts are in low risk category; 27 districts were in medium risk category and 19 districts in high risk category. The Table 3.9.1(i) depicts risk-wise classification of districts across states in *Rabi* groundnut crop.

Table 3.9.1(i). *Rabi* **& Summer Groundnut: Risk-wise classification of districts across states**

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	**Medium**	**High**		
1	2	3	4	5	6	7=(3+4+5+6)
1	Andhra Pradesh	SPS Nellor,Chittor, Kurnool, Anatapur	Srikakulam,	Kadapa, Guntur	East Godavari, Krishna, Prakasam, Vizianagaram, Visakhapatanam, West Godavari	
		4	1	2	6	13
		47696	4563	17379		
2	Karnataka	BanasKantha, Kachchh	Tapi, Mahesana, Sabar Kantha	Bhavnagar	Ahmadabad, Amreli, Anand, Aravalli, Bharuch, Botad, Chhotaudepur, Dang, Devbhumi Dwarka, Dohad, Gandhinagar, Gir Somnath, Junagadh, Kheda, Mahisagar, Morbi, Narmada,	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
					Navsari, Panch Mahals, Patan, Rajkot, Surat, Surendranagar, Vadodara, Valsad	
		2	3	1	26	32
		26442	11384	6151		
3	Gujrat	Gadag, Haveri, Bagalkot	Chitradurga, Koppal, Belgaum (R,S), Bellary (R,S), Bijapur (R,S), Raichur (R,S), Gulbarga, Gadag (S), Bagalkot (S)	Yadgir (S), Koppal (S), Gulbarga (S)	Bangalore Rural, Bengaluru Urban, Bidar, Chikballapur, Chikmagalur, Davangere, Dharwad, Hassan, Kodagu, Mysore, Shimoga, Tumkur, Udupi, Uttar Kannad	
		3	9	3	10	25
		38917	189016	67865		
4	Maharastra	Pune, Satara, Dhule	Amravati, Ahmednagar, Solapur, Parbhani, Nanded	Yavatmal, Wardha, Akola, Washim	Aurangabad, Beed, Bhandara, Buldhana, Chandrapur, Gadchiroli, Hingoli, Jalgaon, Jalna, Kolhapur, Latur, Nagpur, Nandurbar, Nashik, Osmanabad, Palghar, Raigad, Ratnagiri, Sangli, Sindhudurg, Thane	
		3	5	4	21	33
		12625	21904	30710		
5	Odisha		Jajapur		Anugul, Balangir, Baleshwar, Bargarh Bhadrak Boudh, Cuttack, Deogarh, Dhenkanal, Gajapati, Ganjam, Jagatsinghapur, Jharsuguda, Kalahandi, Kandhamal, Kendrapara, Kendujhar, Khordha, Koraput, Malkangiri , Mayurbhanj,	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6
					Nabarangpur, Nayagarh, Nuapada, Puri, Rayagada, Sambalpur, Sonepur, Sundargarh	
			1		29	30
			9011			
6	Tamil Nadu	Ariyalur,Kanchipuram, Vellore, Thanjavur	Cuddalore, Thiruvallur, Thiruvarur	Pudukkottai, Salem, Tiruvannamalai, Dindigul, Virudhunagar, Erode, Namakkal, Ramanathapuram,, Villupuram	Coimbatore, Dharmapuri, Kanniyakumari, Karur, Krishnagiri, Madurai, Nagapattinam, Perambalur, Sivaganga, The Nilgiris, Theni, Thoothukudi, Tiruchirappalli, Tirunelveli, Tiruppur	
		4	3	9	15	31
		27092	16835	79804		
7	Telanagana		Mahbubnagar, Warangal, Nalgonda		Adilabad, Bhadradri, Jagitial, Jangoan, Jayashankar, Jogulamba, Kamareddy, Karimnagar, Khammam, Komaram Bheem Asifabad, Mahabubabad, Mancherial, Medak, Nagarkurnool, Nirmal, Nizamabad, Peddapalli, Rajanna, Rangareddi, Sangareddy, Siddipet, Suryapet, Vikarabad, Wanaparthy, Warangal Urban, Yadadri	
			3		26	29
			19866			
8	West Bengal	Nadia, Hooghly (S), Jalpaiguri (S), Howarh (S)	West Medinipur (S), East Medinipur (S) West Medinipur		Paraganas North, Paraganas South, Alipurduar, Bankura, Birbhum, Coochbehar, Darjeeling, Dinajpur Dakshin, Dinajpur Uttar,	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
					Jhargram, Maldah, Murshidaba, Purulia Paschim Bardhaman, Purba Bardhaman,	
		4	2		15	21
		24953	28282			
All India (No of Dist.)		**20**	**27**	**19**	**148**	**214**
Area (ha)		**177725**	**300861**	**201909**	**74097**	**754592**
Area (%)		**23.55**	**39.87**	**26.76**	**9.82**	**100**

R = *Rabi*; S = Summer

3.9.2. Rapeseed-Mustard

Rapeseed-mustard is one of the three major oil seed crops of India. It accounts for about one-fourth of total area and one-third of total oil production share amongst the oilseed crops popular in the country. Primarily, it is a *Rabi* season crop cultivated under protective irrigation and also under rainfed condition in a limited area.

Rapeseed-mustard is cultivated in 5.93 M ha across the country. The productivity of rapeseed mustard predominant 151 districts are categorized into **three (3) levels i.e. low (<0.976 t/ha) in 67 districts, medium (0.976 to 1.415 t/ha) in 37 districts and high (>1.415 t/ha) in 46 districts.**

Based on productivity levels, 150 districts that account for an area coverage of 5.216 Mha, the categorization stands at low productivity (0.912 Mha), medium productivity (1.632 Mha) and high productivity (2.672 M ha)

The major area under low productivity is distributed in Assam (0.278 M ha across all its districts), Madhya Pradesh (0.207 M ha in 14 districts) and Uttar Pradesh (0.156 M ha in 11 districts), West Bengal (0.084 M ha in five districts) and Rajasthan (0.083 M ha in four districts).

Large area of 0.715 M ha in Rajasthan distributed in 12 districts displayed medium productivity (0.976 to 1.415 t/ha) followed by 0.406 M ha in West Bengal (seven districts) and 0.349 M ha in Madhya Pradesh (five districts).

Significantly large area of 1.607 M ha recording high productivity seen in 14 districts in Rajasthan followed by 0. 495 M ha in Haryana (nine districts), 0.329 M ha in Uttar Pradesh (in 17 districts) and 0.195 Mha in Gujarat (four districts).

On the basis of instability index, 151 number of predominant rapeseed-mustard growing districts are classified into low, medium and high categories. A majority of these, numbering 65 districts with an acreage of 35 per cent recorded low instability index, and hence fall in low risk category. The 60 districts with medium risk and 26 districts with high risk occupied an area of 37 and 16 per cent, respectively. The Table 3.9.2(i) presents the risk-wise classification of districts across states in Rapeseed-Mustard crop.

Table 3.9.2(i). Rapeseed-Mustard: Risk wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
1	Assam	Kokrajhar, Nagaon, Nalbari, Darrang, Tinsukia, Dhubri, Sonitpur, Marigaon, Bongaigaon, Golaghat	KarbiAnglong, Kamrup, Chirang, Baksa, Lakhimpur, Goalpara, Jorhat, Dhemaji, Udalguri, Barpeta		Cachar, Dibrugarh, DimaHasao,Hailakandi, Kamrup Metro, Karimganj, Sivasagar	
		10	10		7	27
		135957	141657			
2	Bihar		Samastipur, Begusarai		Araria, Arwal, Aurangabad, Banka, Bhagalpur, Bhojpur, Buxar, Darbhanga, Gaya, Gopalganj, Jamui, Jehanabad, Kaimur (Bhabua), Katihar, Khagaria, Kishanganj, Lakhisarai, Madhepura, Munger, Madhubani, Nalanda, Muzaffarpur, Nawada, PashchimChamparan, Patna, PurbiChamparan Purnia, Rohtas, Saharsa, Saran, Sheikhpura, Sheohar, Sitamarhi, Siwan, Supaul, Vaishali	
			2		36	38
			16207			
3	Chhatisgarh		Balrampur, Surguja		Balod, Baloda Bazar, Bastar, Bemetara, Bijapur, Bilaspur, Dantewada, Dhamtari,	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
					Durg, Gariyaband, Janjgir-Champa, Jashpur, Kabirdham, Kanker, Kondagaon, Korba, Korea, Mahasamund, Mungeli, Narayanpur, Raigarh, Raipur, Rajnandgaon, Sukma, Surajpur	
			2		25	27
			14275			
4	Gujarat	Kachchh, Patan, Mahesana, Banaskantha			Ahmadabad, Amreli, Anand, Aravalli, Bharuch, Bhavnagar, Botad, Chhotaudepur, Dohad, Gandhinagar, GirSomnath, Jamnagar, Kheda, Mahisagar, Morbi, Narmada, Navsari, PanchMahals, Rajkot, SabarKantha, Surat, Surendranagar, Vadodara	
		4			23	27
		195389				
5	Haryana	Mewat, Gurgaon, Rewari, Sirsa	Bhiwani, Fatehabad, Jhajjar, Rohtak, Hisar	Mahendragarh	Ambala, CharkiDadri, Faridabad, Jind, Kaithal, Karnal, Kurukshetra, Palwal, Panchkula, Panipat, Sonipat, Yamunanagar	
		4	5	1	12	22
		146213	268847	91227		
6	Jammu & Kashmir		Kulgam	Pulwama, Anantnag	Badgam, Bandipora, Baramulla, Doda, Ganderbal, Jammu, Kathua, Kishtwar, LehLadakh, Poonch, Rajauri, Ramban, Reasi, Samba, Shopian, Srinagar, Udhampur	
			1	2	17	20
			7012	23064		

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
7	Jharkhand		Palamu, Godda, Garhwa, Hazaribagh	Ranchi, Gumla, Sahebganj, Giridih, Dumka	Bokaro, Chatra, Deoghar, Dhanbad, East Singhbum, Jamtara, Khunti, Koderma, Latehar, Lohardaga, Pakur, Ramgarh, SaraikelaKharsawan, Simdega, West Singhbhum	
			4	5	15	24
			33347	37171		
8	Madhya Pradesh	Shahdol, Balaghat, Rewa, Chhatarpur	Gwalior, Datia, Neemuch, Ratlam, Morena, Tikamgarh, Shivpuri, Bhind, Guna, Umaria, Rajgarh, Dindori	Singrauli, Mandsaur, Mandla, Sheopur, Anuppur	Agar Malwa, Ashoknagar, Betul, Bhopal, Chhindwara, Damoh, Dewas, Dhar, Harda, Hoshangabad, Jabalpur, Jhabua, Katni, Khargone, Narsinghpur, Panna, Raisen, Sagar, Satna, Sehore, Seoni, Shajapur, Sidhi, Ujjain, Vidisha	
		4	12	5	25	46
		38335	462629	101147		
9	Manipur	Bishnupur			Chandel, Churachandpur, Imphal East, Imphal West, Senapati, Tamenglong, Thoubal, Ukhrul	
		1			8	9
		5653				
10	Rajasthan	Jodhpur, Pratapgarh, Jalore, Nagaur, Bhilwara, Bharatpur, Kota, Baran, Udaipur, Karauli	Dausa, Chittorgarh, Dholpur, Tonk, Alwar, Sirohi, Pali, SawaiMadhopur, Jaisalmer, Jaipur	Bundi, Jhunjhunu, Barmer, Bikaner, Hanumangarh, Ganganagar, Sikar, Jhalawar, Ajmer, Churu	Banswara, Dungarpur	
		10	11	10	2	33
		728640	1000851	674662		

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
11	Uttar Pradesh	Kasganj, Balrampur, Etah, Mainpuri, Kheri, Kushi Nagar, Hardoi, Firozabad, Bahraich, Pilibhit, Hathras, Sambhal, Mathura, Budaun, Bulandshahr, Aligarh, Agra, Unnao, Shahjahanpur, Sitapur, Kanpur Nagar, Kannauj	Gonda, Fatehpur, Auraiya, Bareilly, Rae Bareli, Barabanki, Kanpur Dehat, Hamirpur, Farrukhabad, Lalitpur, Jhansi	Etawah, Jalaun, Mahoba	Allahabad, Ambedkar Nagar, Amethi, Amroha, Azamgarh, Baghpat, Ballia, Banda, Basti, Bijnor, Chandauli, Chitrakoot, Deoria, Faizabad, Gautam Buddha Nagar, Ghaziabad, Ghazipur, Gorakhpur, Hapur, Jaunpur, Kaushambi, Lucknow, Maharajganj, Mau, Meerut, Mirzapur, Moradabad, Muzaffarnagar, Pratapgarh, Rampur, Saharanpur, SantKabeer Nagar, SantRavidas Nagar, Shamli, Shravasti, Siddharth Nagar, Sonbhadra, Sultanpur, Varanasi, Rajsamand	
		22	11	3	39	75
		411462	149862	42446		
12	West Bengal	Nadia, Birbhum, Murshidabad, Bankura, DinajpurDakshin, Malda, PurbaBardhaman, 24 Paraganas North, Hooghly, West Medinipur	Dinajpur Uttar, Coochbehar		24 Paraganas South, Alipurduar, Darjeeling, Howrah, Jalpaiguri, Jhargram, Kalimpong, Medinipur East, PaschimBardhaman, Purulia	
		10	2		10	22
		406288	83359			
All India (No. of Dist)		65	60	26	219	370
Area (ha)		2067937	2178046	969717	716468	5932168
Area (%)		34.86	36.72	16.35	12.08	100

3.9.3. Sunflower

Sunflower is a short duration oilseed crop. It has wider adaptability in various agro-ecologies and seasons. Sunflower is cultivated in 127 districts covering 0.22 M ha across the country. Out of 127 districts, 30 districts are predominant and are located across six states *i.e.*, Karnataka (13), Maharashtra (eight), Bihar (three), Andhra Pradesh (two), Tamil Nadu (two), and Haryana (two). Karnataka leads with 0.112 M ha followed by Maharashtra with 0.038 M ha. In all the other states, the area under sunflower is below 10,000 ha. **In the predominant 30 sunflower cultivated districts, the productivity is categorized into three levels *viz.*, low (<0.769 t/ha), medium (0.769 to 1.301 t/ha) and high (>1.301 t/ha).**

Of the 0.175 M ha in the 30 predominant districts, 0.150 M ha *i.e.*, 85.7 per cent area (20 districts) recorded low productivity, while high and medium productivity were revealed over 10.8 per cent (0.019 M ha; 6 districts) and 3.4 per cent (0.006 M ha; 4 districts) of area coverage respectively.

Low productivity was observed over larger area (0.109 M ha) in 11 districts of Karnataka (Belgaum, Bijapur, Bagalkot, Gulbarga, Raichur, Chitradurga, Koppal, Gadag, Dharwad, Bellary) followed by 0.038 M ha in 8 (eight) districts in Maharashtra (Amravati, Nagpur, Hingoli, Nanded, Latur, Satara, Osmanabad and Solapur) and one (1) district in Tamil Nadu (Thothukudi) with insignificant area of 0.002 M ha. A small extent of 0.019 M ha under high productivity, was recorded in three districts in Bihar (0.008 Mha - Supaul, Purnia and Madhepura), two districts in Haryana (0.006 Mha - Ambala and Kurukshetra) and one district in Andhra Pradesh (0.005 Mha - Kadapa). Medium productivity was recorded in four districts *i.e.*, two districts in Karnataka (Bagalkot and Havari; 0.003 M ha), one each district in Andhra Pradesh (Kurnool; 0.001 M ha) and Tamil Nadu (Virudnagar; 0.003 M ha).

Based on instability index, the 30 predominant sunflower growing districts are categorized as low-risk (10 districts; 0.033 Mha), Medium risk (11 districts; 0.069 Mha) and high risk (9 districts; 0.073 Mha). The risk-wise classification of districts across states in sunflower crop is given in Table 3.9.3(i).

Table 3.9.3 (i). Sunflower crop: Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	1	2
1	Andhra Pradesh		Kadapa, Kurnool		Anantapur, Chittoor, East Godavari, Guntur, Krishna, Prakasam, Spsr Nellore,	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*1*	*2*
					Srikakulam, Visakhapatanam, Vizianagaram, West Godavari	
			2		11	13
			6231			
2	Bihar	Purnia, Madhepura, Supaul			Araria, Begusarai, Bhagalpur, Buxar, Darbhanga, Jehanabad, Kaimur (Bhabua), Katihar, Khagaria, Madhubani, Muzaffarpur, Nalanda, Nawada, Pashchim Champaran, Patna, Purbi Champaran, Rohtas, Saharsa, Samastipur, Saran, Sheikhpura, Sheohar, Vaishali	
		3			**23**	26
		8116				
3	Haryana	Ambala, Kurukshetra			Panchkula, Yamunanagar	
		2			**2**	4
		6146				
4	Karnataka	Bagalkot(S) Belgaum(S)	Haveri, Raichur, Chitradurga, Gulbarga(R), Bagalkot®, Bijapur	Bellary, Gadag, Koppal, Dharwad, Koppal	Bangalore Rural, Bengaluru Urban, Bidar, Tumkur, Chamarajanagar, Chikballapur, Chikmagalur, Davangere, Hassan, Mandya, Mysore, Ramanagara, Shimoga, Uttar Kannad, Yadgir	
		2	6	5	13	26
		7886	51284	52943		

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*1*	*2*
5	Maharashtra	Amaravati, Hingoli, Nagpur	Nanded, Latur, Satara	Osmanabad, Solapur	Ahmednagar, Akola, Aurangabad, Beed, Bhandara, Buldhana, Chandrapur, Dhule, Gadchiroli, Jalgaon, Jalna, Kolhapur, Nandurbar, Nashik, Palghar, Parbhani, Pune, Ratnagiri, Sangli, Sindhudurg, Thane, Wardha, Washim, Yavatmal	
		3	3	2	24	32
		10630	11393	16427		
6	Tamil Nadu			Virudhunagar, Toothkudi	Ariyalur, Coimbatore, Cuddalore, Dharmapuri, Dindigul, Erode, Kanchipuram, Karur, Krishnagiri, Madurai, Namakkal, Perambalur, Pudukkottai, Ramanathapuram, Salem, Thanjavur, Theni, Thiruvallur, Tiruchirappalli, Tirunelveli, Tiruppur, Tiruvannamalai, Vellore, Villupuram	
				2	24	26
				4037		
7	West Bengal		24 South Paraganas	Bankura		
			1	1	21	23
All India (No. of districts)		**10**	**11**	**9**	**97**	**127**
Area (ha)		**32778**	**68908**	**73407**	**53386**	**228479**
Area (%)		**14.35**	**30.16**	**32.13**	**23.37**	**100.00**

3.10. Pulses *(Rabi)*

3.10.1 Chick pea/Gram

Chick pea is one of the most nutritious and valued crops in India and ranks third after the beans. It is being cultivated in 372 districts with 9.52 M ha across different states in the country. Among the major chickpea growing states, 150 predominant districts were identified and analyzed for productivity and instability. Productivity varies between 0.28 t/ha and 1.78 t/ha. These 150 districts are in Madhya Pradesh (49), Maharashtra (26), Rajasthan (24), Uttar Pradesh (13), Karnataka (12), Gujarat (seven), Chhattisgarh (seven), Andhra Pradesh (six), Telangana (two), Haryana (two), West Bengal (one) and Jharkhand (one).

Among the 150 districts analyzed, 53 districts recorded low yield at less than 0.852 t/ha and covered an area of 38.02 lakh ha. These districts are in Madhya Pradesh (16), Maharashtra (16), Karnataka (11), Gujarat (three), Andhra Pradesh (three), Rajasthan (two), Chhattisgarh (one) and Haryana (one). While 70 districts clubbed in the medium productivity category (0.852 - 1.220 t/ha) covering an area of 41.58 lakh ha are in the states of Madhya Pradesh (29), Rajasthan (14), Maharashtra (nine), Chhattisgarh (six), Uttar Pradesh (five), Gujarat (two), Andhra Pradesh (two), Haryana (one), Karnataka (one) and Jharkhand (one). Another 27 districts which recorded high productivity (>1.220 t/ha) cover an area of 6.66 lakh ha. These districts belong to Uttar Pradesh (eight), Rajasthan (eight), Madhya Pradesh (eight), Telangana (two), Gujarat (one), West Bengal (one), Andhra Pradesh (one) and Maharashtra (one).

Productivity of 18 districts covering an area of 1.6 M ha is highly instable (>0.55), 56 districts with medium instability and covered an area of 4.24 M ha area. Among the 150 districts, 58 districts that reflected low instability covered an area of 2.69 M ha. The percentage area occupied in low, medium and high risk categories was 28, 45 and 18 respectively. Table 3.10.1(i) shows the risk-wise classification of districts across states in chick pea/gram *(Rabi)* crop

Table 3.10.1.i. Chick pea/Gram crop: Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	**Medium**	**High**		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
1	Andhra Pradesh		Guntur, Prakasam, Kurnool	Anantapur, Kadapa	Chittoor, East Godavari, Krishna, Spsr Nellore, Visakhapatanam, Vizianagaram, West Godavari	
			3	2	7	12
			308574	152103		
2	Chhatisgarh	Rajnandgaon, Kabirdham, Mungeli	Durg, Bemetara, Balad		Baloda Bazar, Balrampur, Bastar, Bilaspur, Dantewada, Dhamtari,	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
					Gariyaband, Janjgir-Champa, Jashpur, Kanker, Kondagaon, Korba, Korea, Mahasamund, Narayanpur, Raigarh, Raipur, Surajpur, Surguja	
		3	3		19	25
		171915	114383			
3	Gujarat	Dohad, Dang, Junagadh, Ahmedabad	Patan	Surendernagar	Amreli, Anand, Aravalli Banas Kantha, Bharuch, Bhavnagar, Botad, Chhotaudepur, Devbhumi Dwarka, Gandhinagar, Gir Somnath, Jamnagar, Kachchh, Kheda, Mahesana, Mahisagar, Morbi, Narmada, Navsari, Panch Mahals, Porbandar, Rajkot, Sabar Kantha, Surat, Tapi, Vadodara, Valsad	
		4	1	1	27	33
		105282	14692	12838		
4	Haryana	Hisar	Bhiwani		Charki Dadri, Fatehabad, Jhajjar, Jind, Karnal, Kurukshetra, Mewat, Mahendragarh, Panipat, Panchkula, Rohtak, Sirsa, Yamunanagar	
		1	1		13	15
		11586	36525			
5	Jharkhand	Palamu			Bokaro, Chatra, Deoghar, Dhanbad, Dumka, East Singhbum, Garhwa, Giridih, Godda, Gumla, Hazaribagh, Jamtara, Khunti, Koderma, Latehar, Lohardaga, Pakur, Ramgarh, Ranchi, Sahebganj, Saraikela Kharsawan, Simdega, West Singhbhum	
		1			23	24
		11876				

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
6	Karnataka		Raichur, Gulbarga, Bidar, Belgaum, Bellary, Yadgir	Bagalkot, Bijapur, Gadag, Chitradurga, Koppal, Dharwad	Bangalore Rural, Bengaluru Urban, Chamarajanagar, Chikballapur, Chikmagalur, Davangere, Hassan, Haveri, Mandya, Mysore, Ramanagara, Shimoga, Tumkur, Uttar Kannad	
			6	6	14	26
			550471	659964		
7	Madhya Pradesh	Gwalior, Hoshangabad, Dhar, Datia, Khargone, Sidhi, Rajgarh, Khandwa, Narsinghpur, Sehore, Bhopal, Balaghat, Bhind, Indore, Shivpuri, Neemuch, Satna, Mandsaur, Seoni, Katni, Ujjain, Jhabua, Harda, Rewa, Sheopur, Dewas, Mandla	Panna, Vidisha, Raisen, Ratlam, Chhindwara, Betul, Ashoknagar, Shajapur, Guna, Dindori, Jabalpur, Chhatarpur, Tikamgarh	Sagar, Damoh, Singrauli	Agar Malwa, Alirajpur, Anuppur, Barwani, Burhanpur, Morena, Shahdol, Umaria	
		27	13	3	8	51
		1389407	1110738	305782		
8	Maharashtra	Pune, Nashik, Nandurbar, Jalgaon, Sangli, Yavatmal, Wardha, Nagpur, Chandrapur, Satara, Buldhana,	Ahmednagar, Dhule, Beed, Washim, Solapur, Parbhani, Aurangabad, Nanded, Latur	Osmanabad, Hingoli, Jalna, Akola	Bhandara, Gadchiroli, Gondia, Kolhapur, Palghar, Raigad, Ratnagiri, Thane	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
		Amravati				
		12	9	4	8	33
		726134	806863	311027		
9	Rajasthan	Kota, Tonk, Sikar, Baran, Jhalawar, Sawai Madhopur	Jhunjhunu, Nagaur, Bhilwara, Jaisalmer, Ganganagar, Bundi, Jaipur, Bikaner, Pali, Ajmer	Hanumangarh, Churu	Alwar, Banswara, Barmer, Bharatpur, Chittorgarh, Dausa, Dholpur, Dungarpur, Jalore, Jodhpur, Karauli, Pratapgarh, Rajsamand, Sirohi, Udaipur	
		6	10	2	15	33
		230953	835077	244917		
10	Telanagana		Adilabad		Bhadradri, Jagitial, Jangoan, Jayashankar, Jogulamba, Kamareddy, Karimnagar, Khammam, Komaram Bheem Asifabad, Mahabubabad, Mahbubnagar, Medak, Mancherial, Medchal, Nagarkurnool, Nalgonda, Nirmal, Nizamabad, Peddapalli, Rajanna, Rangareddi, Sangareddy, Siddipet, Suryapet, Vikarabad, Wanaparthy, Warangal, Warangal Urban, Yadadri	
			1		29	30
			28977			
11	Uttar Pradesh	Mirzapur, Sonbhadra,Kanpur nagar	Lalitpur, Hamirpur, Jalaun, Chitrakoot, Kanpur Dehat, Jhansi, Fatehpur, Banda, Mahoba		Agra, Aligarh, Allahabad Ambedkar Nagar, Amethi, Auraiya, Azamgarh, Baghpat, Bahraich, Ballia, Balrampur, Barabanki, Bareilly, Basti, Bijnor, Budaun, Bulandshahr, Chandauli, Deoria, Etah, Etawah, Faizabad, Farrukhabad, Firozabad, Ghazipur, Gonda, Gorakhpur, Hapur, Hardoi,	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
					Hathras, Jaunpur, Kannauj, Kasganj, Kaushambi, Kheri, Kushi Nagar, Lucknow, Maharajganj, Mainpuri, Mathura, Mau, Meerut, Moradabad, Muzaffarnagar, Pilibhit, Pratapgarh, Rae Bareli, Rampur, Saharanpur, Sant Kabeer Nagar, Sant Ravidas Nagar, Shahjahanpur, Shamli, Shravasti, Siddharth Nagar, Sitapur, Sultanpur, Unnao, Varanasi	
		3	9		59	71
		39770	437356			
12	West Bengal	Birbhum			24 Paraganas North, 24 Paraganas South, Alipurduar, Bankura, Darjeeling, Dinajpur Dakshin, Dinajpur Uttar, Hooghly, Howrah, Jalpaiguri, Jhargram, Maldah, Medinipur West, Murshidabad, Nadia, Paschim Bardhaman, Purba Bardhaman, Purulia	
		1			18	19
		10214				
All India (No of Dist)		**58**	**56**	**18**	**240**	**372**
Area (ha)		**2697137**	**4243656**	**1686631**	**901090**	**9528514**
Area (%)		**28.31**	**44.54**	**17.70**	**9.46**	**100.00**

3.10.2. Lentil/Masoor dal

The extent of area under lentil cultivation in the country is 1.43 M ha spread across 292 districts and is majorly cultivated in the States of Madhya Pradesh, Uttar Pradesh, Bihar, Chhattisgarh, Haryana, Punjab, Maharashtra and Rajasthan. There are 95 major districts

cultivating lentil with productivity levels varying between 0.38 t/ha and 1.44 t/ha. These districts belong to Madhya Pradesh (30), Uttar Pradesh (29), Bihar (17), West Bengal (seven), Rajasthan (five), Chhattisgarh (two), Jharkhand (two), Assam (two) and Uttarakhand (one). These are classified as low (<0.832 t/ha), medium (0.832 - 1.059 t/ha) and high (>1.059 t/ha).

Productivity is low (<0. 832 t/ha) in 39 out of 95 districts that were assessed. These 39 districts account for an area of 5.45 lakh ha from Madhya Pradesh (18), Uttar Pradesh (eight), Bihar (four), West Bengal (three), Assam (two), Chhattisgarh (two) and Jharkhand (two). The districts (38) with medium productivity (0.832 - 1.059 t/ha) covering an area of 3.06 lakh ha are situated in the States of Uttar Pradesh (11), Madhya Pradesh (10), Bihar (eight), West Bengal (four), Rajasthan (four) and Uttarakhand (one). The remaining 18 districts that recorded a high productivity of >1.059 t/ha cover an area of 2.48 lakh ha. High productivity districts are distributed across Uttar Pradesh (10), Bihar (five), Madhya Pradesh (two) and Rajasthan (one).

Based on the instability index computed, among the major 95 districts, 25 districts reported high instability covering an area of 0.33 M ha. Further, 37 districts were identified as districts with medium instability accounting for an area of 0.54 M ha. It was also seen that 33 lentil growing districts recorded low instability covering an area of 0.39 M ha. The districts in low, medium and high risk categories covered an area of 28, 38 and 23 per cent, respectively. The risk-wise classification of districts across the states in respect of lentil crop is presented in Table 3.10.2(i).

Table 3.10.2(i). Lentil/ Masoor dal: Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
1	Assam	Barpeta		Baksa	Bongaigaon, Cachar, Chirang, Darrang, Dhemaji, Dhubri, Dibrugarh, DimaHasao, Goalpara, Golaghat, Jorhat, Kamrup, Kamrup Metro, KarbiAnglong, Karimganj, Kokrajhar, Lakhimpur, Marigaon, Nagaon, Nalbari, Sivasagar, Sonitpur, Tinsukia, Udalguri	
		1		1	24	26
		5204		2770		

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
2	Bihar	Aurangabad, Patna, Bhojpur,Arwal, Jehanabad	Rohtas, Madhubani, Sheikhpura, Nawada, Gaya, Jamui	PurbiChamparan, Buxar, Nalanda, Kaimur (Bhabua), Lakhisarai, PaschimChamparan	Araria, Banka, Begusarai, Bhagalpur, Darbhanga, Gopalganj, Katihar, Khagaria, Kishanganj, Madhepura, Munger, Muzaffarpur, Purnia, Saharsa, Samastipur, Saran, Sheohar, Sitamarhi, Siwan, Supaul, Vaishali	
		5	6	6	21	38
		57430	26715	40311		
3	Chhatisgarh	Bemetara, Rajnandgaon			Balod, Baloda Bazar, Balrampur, Bastar, Bilaspur, Dhamtari, Durg, Gariyaband, Janjgir-Champa, Jashpur, Kabirdham, Kanker, Kondagaon, Korba, Korea, Mahasamund, Mungeli, Narayanpur, Raigarh, Raipur, Surajpur, Surguja	
		2			22	24
		5089				
4	Jharkhand	Godda		Palamu	Bokaro, Chatra, Deoghar, Dhanbad, Dumka, East Singhbum, Garhwa, Giridih, Gumla, Hazaribagh, Jamtara, Khunti, Koderma, Latehar, Lohardaga, Pakur, Ramgarh, Ranchi, Sahebganj, SaraikelaKharsawan, Simdega, West Singhbhum	
		1		1	22	24
		3184		3735		

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
5	Madhya Pradesh	Chhindwara, Mandla, Raisen, Seoni, Vidisha, Sidhi	Sehore, Bhind, Panna, Shahdol, Ashoknagar, Sagar, Shajapur, Damoh, Chhatarpur, Narsinghpur, Rajgarh, Satna, Mandsaur, Shivpuri, Katni, Rewa	Datia,Umaria, Anuppur,Jabalpur,Bhopal,Singrauli,Tikamgarh,Dindori	Agar Malwa, Balaghat, Betul, Dewas, Dhar, Guna, Gwalior, Hoshangabad, Indore, Jhabua, Khandwa, Morena, Neemuch, Ratlam, Sheopur, Ujjain	
		6	15	9	16	46
		110130	249350	131534		
6	Rajasthan	Pratapgarh	Bhilwara, Bundi, Tonk	Jhalawar	Ajmer, Alwar, Baran, Bharatpur, Bikaner, Chittorgarh, Dausa, Dholpur, Ganganagar, Hanumangarh, Jaipur, Jalore, Jhunjhunu, Jodhpur, Karauli, Kota, Nagaur, Pali, SawaiMadhopur, Sikar	
		1	3	1	20	25
		9516	36372	11123		
7	Uttar Pradesh	Kheri, Balrampur, Gonda, Sitapur, Shahjahanpur, Siddharth Nagar, Shravasti, Ballia, Hardoi, Ghazipur, Mirzapur, Barabanki, Maharajganj, Sonbhadra, Kushi Nagar	Bahraich, Chandauli, Budaun, Sultanpur, Bareilly, Faizabad, Lalitpur, Jalaun	Hamirpur, Jhansi, Allahabad, Banda, Chitrakoot, Mahoba	Agra, Aligarh, Ambedkar Nagar, Amethi, Amroha, Auraiya, Azamgarh, Baghpat, Basti, Bijnor, Bulandshahr, Deoria, Etah, Etawah, Farrukhabad, Fatehpur, Firozabad, Gautam Buddha Nagar, Ghaziabad, Gorakhpur, Hapur, Hathras, Jaunpur, Kannauj, Kanpur Dehat, Kanpur Nagar, Kasganj, Kaushambi, Lucknow, Mainpuri, Mathura, Mau, Meerut, Moradabad, Muzaffarnagar, Pilibhit, Pratapgarh, Rae Bareli, Rampur, Saharanpur, Sambhal, SantKabeer	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
					Nagar, SantRavidas Nagar, Shamli, Unnao, Varanasi	
		15	8	6	46	75
		190468	123100	137210		
8	Uttarakhand	Pithoragarh			Almora, Bageshwar, Chamoli, Champawat, Dehradun, Haridwar, Nainital, PauriGarhwal, RudraPrayag, TehriGarhwal, Udam Singh Nagar, Uttar Kashi	
		1	0	0	12	13
		3856	0	0		
9	West Bengal	24 North Paraganas	Birbhum, Nadia, Malda, Dinajpur Dakshin, Murshidabad	Purba Bardhaman	24 Paraganas South, Alipurduar, Bankura, Coochbehar, Darjeeling, Dinajpur Uttar, Hooghly, Howrah, Jalpaiguri, Jhargram, Medinipur East, Medinipur West, PaschimBardhaman, Purulia	
		1	5	1	14	21
		9938	100582	6658		
All India (No of Dist)		**33**	**37**	**25**	**197**	**292**
Area (ha)		**394814**	**536120**	**333340**	**164491**	**1428765**
Area (%)		**27.63**	**37.52**	**23.33**	**11.51**	**100.00**

3.10.3. Black gram/Urad bean *(Rabi)*

Black gram is an important pulse crop cultivated in both *Kharif* and *Rabi* seasons in 145 districts across the country spread over an extent of 0.94 M ha. The major black gram growing states in *Rabi* season are Madhya Pradesh, Andhra Pradesh, Tamil Nadu and Odisha. In the *Rabi* season, productivity levels vary between 0.245 t/ha and 1.36 t/ha. Out of 145 districts, there are 32 major black gram cultivating districts which are classified as low (<0.585 t/ha), medium (0.585-0.848 t/ha) and high (>0.848 t/ha) productive districts.

Amongst the 32 major districts assessed, 16 districts with low productivity cover an area of 2.61 lakh ha. These districts are from Andhra Pradesh (five), Odisha (five), Tamil Nadu (four), Assam (one) and Madhya Pradesh (one). Another 15 districts from Tamil Nadu

(eight), Assam (four) and Andhra Pradesh (three) with an area of 2.19 lakh ha are placed in medium productivity category with the productivity range of 0.585-0.848 t/ha. Around six districts distributed in Andhra Pradesh (four), Tamil Nadu (one) and West Bengal (one) logged high productivity of >0.848 t/ha cover an area of 3.06 lakh ha.

Out of 32 major districts under *Rabi* urad crop, 11, 15 and 6 districts falls in low, medium and high risk categories, respectively, with highest area of 48.83 percent in medium risk category. It was followed by low risk category (17.78 %) and high-risk category (13.84 %) area.

Risk-wise classification of districts across states in *Rabi* urad crop is depicted in Table 3.10.3(i)

Table 3.10.3(i). Urad crop *(Rabi)*: Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
1	Andhra Pradesh	Srikakulam, Vizianagaram, Kurnool	Visakhapatanam, Krishna, Chittoor, Kadapa, Prakasam, Guntur, Spsr Nellore	West Godavari, East Godavari	Anantapur	
		2	8	2	1	13
		68403	254758	41114		
2	Assam	Dhubri, Sonitpur, Jorhat, Barpeta, Lakhimpur			Baksa, Bongaigaon, Cachar, Chirang, Darrang, Dhemaji, Dibrugarh, DimaHasao, Goalpara, Golaghat, Hailakandi, Kamrup, Kamrup Metro, KarbiAnglong, Karimganj, Kokrajhar, Marigaon, Nagaon, Nalbari, Sivasagar, Tinsukia, Udalguri	
		5			22	27
		29054				
3	Madhya Pradesh	Balaghat			Agar Malwa, Anuppur, Betul,	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
					Bhopal, Chhatarpur, Chhindwara, Damoh, Dindori, Harda, Hoshangabad, Jabalpur, Katni, Khandwa, Mandla, Mandsaur, Narsinghpur, Raisen, Sagar, Sehore, Seoni, Shahdol, Shajapur, Tikamgarh, Ujjain, Vidisha	
		1			51	52
		3969				
4	Tamil Nadu	Thiruvarur, Tiruvannamalai	Cuddalore, Dindigul, Virudhunagar, Nagapattinam, Ariyalur, Thanjavur, Villupuram	Tiruchirappalli, Ramanathapuram, Thoothukudi, Tirunelveli	Coimbatore, Dharmapuri, Erode, Kanchipuram, Kanniyakumari, Karur, Krishnagiri, Madurai, Namakkal, Perambalur, Pudukkottai, Salem, Sivaganga, Theni, Thiruvallur, Tiruppur, Vellore	
		2	7	4	17	30
		60215	205684	89351		
5	West Bengal	Murshidabad			Alipurduar, Bankura, Coochbehar, Darjeeling, Dinajpur Uttar, Hooghly, Jalpaiguri, Kalimpong, Medinipur West, Nadia,	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
					PurbaBardhaman, Purulia	
		1			22	23
		5973				
All India (No. of Dist.)		11	15	6	113	145
Area (ha)		167614	460441	130465	184376	942897
Area (%)		17.78	48.83	13.84	19.55	100

3.10.4. *Rabi* Green gram/ Mung Bean

Green gram, popularly known as mung dal is one of the main *Rabi* pulse crops cultivated in few states like Madhya Pradesh, Odisha, Tamil Nadu and Andhra Pradesh. The productivity of *Rabi* green gram varies between 0.228 t/ha and 0.919 t/ha. The area under green gram in *Rabi* includes of 1.00 M ha across 121 districts and 23 districts are predominant, which are situated in Andhra Pradesh (eight), Tamil Nadu (eight), Madhya Pradesh (four) and Odisha (three). **In *Rabi*, only 1/3rd of the *Kharif* districts cultivate green gram and based on productivity, the districts were classified into low (<0.453 t/ha), medium (0.453 - 0.676 t/ha) and high (>0.676 t/ha). Out of 23 districts assessed, 12 districts are in the low productivity group with an area of 0.188 M ha and productivity of <0.453 t/ha.** These districts are located in Tamil Nadu (five), Madhya Pradesh (four) and Odisha (three). Another eight districts with an area of 0.94 lakh ha grouped into medium productivity category with productivity range of 0.453 – 0.676t/ha include districts from Andhra Pradesh (six) and Tamil Nadu (two). Only around six districts recorded high productivity covering an area of 0.03 M ha with the productivity of >0.676 t/ha and the districts exist in Andhra Pradesh (02) and Tamil Nadu (01).

The districts were also analyzed for the instability in yield and, found that the productivity of 3 (three) districts was highly instable (high risk) covering an area of 0.03 M ha. Further, 7 (seven) districts recorded medium instability and covered an area of 0.14 M ha. Besides, 13 districts revealed low instability and covered an area of 0.19 M ha. The risk-wise classification of districts across states in *Rabi* mung crop is given in Table 3.10.4(i).

Table 3.10.4(i). Green gram (R)/mung bean: Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
1	Andhra Pradesh	Srikakulam, Visakhapatanam, Vizianagaram, Spsr Nellore	Guntur, East Godavari, Krishna,West Godavari		Anantapur, Chittoor, Kadapa, Krishna, Kurnool, Prakasam	
		4	4	0	5	13
		52097	53808	0		
2	Madhya Pradesh	Hoshangabad, Narsinghpur, Sehore, Raisen				
		4	0	0	48	52
		41369	0	0		
	Odisha	Ganjam, Kalahandi, Nayagarh			Anugul, Balangir, Baleshwar, Bargarh, Boudh, Cuttack, Deogarh, Dhenkanal, Gajapati, Jajapur, Jharsuguda, Kandhamal, Kendujhar, Khordha, Koraput, Malkangiri, Mayurbhanj, Nabarangpur, Nuapada, Puri, Rayagada, Sambalpur, Sonepur, Sundargarh	
		3	0	0	24	27
		80338	0	0		
4	Tamil Nadu	Thiruvallur, Cuddalore	Thiruvarur, Virudhunagar, Nagapattinam	Thanjavur, Thoothukudi, Tirunelveli	Ariyalur, Coimbatore, Dharmapuri, Dindigul, Erode, Kanchipuram, Kanniyakumari, Karur, Krishnagiri, Madurai, Nagapattinam, Namakkal, Pudukkottai, Ramanathapuram, Salem, Sivaganga, Theni, Tiruchirappalli, Tirunelveli, Tiruppur,	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
					Tiruvannamalai, Vellore, Villupuram	
		2	3	3	21	29
		18659	84419	33525		
All India (No. of Dist)		13	7	3	98	121
Area (000ha)		192463	138227	33525	639733	1003947
Area (%)		19.17	13.77	3.34	63.72	100

3.11. Commercial Crops

3.11.1. Cotton

Cotton is one of the major fiber crops grown in the country, largely under rainfed conditions with a cultivated area of about 11.9 M ha spread over 228 districts. Cotton is mainly cultivated in Maharashtra (20 districts with 4.25 M ha), Gujarat (19 districts with 2.01 M ha), Karnataka (13 districts with 0.55 M ha), Rajasthan (10 districts with 0.48 M ha), Telangana (eight districts with 0.69 M ha), Haryana (seven districts with 0.59 M ha), Madhya Pradesh (nine districts with 0.57 M ha), Andhra Pradesh (eight districts with 0.56 M ha), and Punjab (four districts with 0.29 M ha). Cotton productivity across the dominant districts varies from 0.11 t/ha to 0.82 t/ha.

Cotton productivity across these dominant districts varies from 0.11 t/ha to 0.82 t/ha. **Based on productivity levels the districts have been categorized into low (<= 0.36 t/ha), medium (0.37 t/ha to 0.53 t/ha), high (> 0.53 t/ha) productivity levels.**

Amongst the 99 major districts, 44 districts with a total area of 5.1 M ha housed mainly in Maharashtra (15 districts with 3.5 M ha), Madhya Pradesh (nine districts with 0.57 M ha), Rajasthan (seven districts with 0.41 M ha), Telangana (seven districts with 0.34 M ha), Karnataka (seven districts with 0.26 M ha), Andhra Pradesh (two districts with 0.06 M ha) recorded low productivity. About 35 districts with a total area of 3.6 M ha existing in Gujarat (11 districts with 1.67 M.ha), Maharashtra (four districts with 0.79 M.ha), Karnataka (four districts with 0.17 M ha), AP (four districts with 0.29 M ha) *etc*. recorded medium productivity. Another 20 districts with a total area of 1.32 M ha spread in Gujarat (eight districts with 0.35 M ha), Haryana (three districts with 0.35 M ha), A.P. (two districts with 0.2 M ha), and Punjab (two districts with 0.19 M ha) recorded higher productivity levels.

Cotton growing districts located in Maharashtra, M.P. and Rajasthan and to a large extent in Karnataka recorded low to medium productivity levels. The States of Gujarat, Haryana, Punjab *etc*. revealed medium to higher productivity levels.

Analysis of instability index values indicates that the 37 districts were in medium risk category, while 31 each were in low and high risk categories. The risk based categorization of districts based on area coverage is low-risk disticts (42 per cent), medium-risk (23 percent) and high-risk (19 per cent). Table 3.11.1(i) reflects the risk-wise classification of districts across states in cotton (lint) crop.

Table 3.11.1(i). Risk-wise classification of districts across states in Cotton (Lint) crop

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
1	Andhra Pradesh	Krishna, Kurnool, Prakasham	Guntur, Kadapa, Vizagnagaram,Anatapuram,East Godavari		Chittoor, Spsr Nellore, Srikakulam, Visakhapatanam, West Godavari	
		3	5		5	13
		305922	254790			
2	Gujarat	Patan, Mahesana,Narmada, Kachchh, Vadodara, Bharuch, Kheda Ahmedabad, Gandhinagar,	Sabarkantha, Panchmahal, Bhavnagar, Junagadh, Banaskantha, Surendranagar, Amreli, Porbandar	Jamnagar, Rajkot	Anand, Aravalli, Botad, Dohad, Chhotaudepur, Devbhumi Dwarka, GirSomnath, Mahisagar, Morbi, Surat, Tapi	
		9	8	2	11	30
		479090	1144717	405605		
3	Haryana	Jind, Bhiwani, Fatehabad,Rohtak, Sirsa, Hisar	Kaithal		CharkiDadri, Faridabad, Gurgaon, Jhajjar, Karnal, Mahendragarh, Mewat, Palwal, Panipat, Rewari, Sonipat	
		6	1		11	18
		576347	10383			
4	Karnataka	Bellary, Raichur,Bijapur, Belgam,Chitradurga	Gulbarga, Haveri, Dharwad, Mysore, Yadgir, Gadag	Chamarajanagar	Bagalkot, Bangalore Rural, Bidar, Chikballapur, Chikmagalur, Davangere, Hassan, Koppal, Ramanagara, Shimoga, Tumkur, Uttar Kannad	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
		5	7	1	11	24
		181633	357072	10858		
5	Madhya Pradesh			Alirajpur, Burhanpur, Jhabua, Ratlam, Barwani, Dhar, Khandwa, Khargone, Chhndiwara,	Betul, Dewas, Harda, Indore, Mandsaur, Neemuch, Seoni	
				9	7	16
				568707		
6	Maharashtra		Nandurbar, Hingoli, Washim	Nagpur,Wardha, Nanded, Akola, Chandrapur, Jalgaon, Beed, Osamanbad, Yavatmal, Aurangabad, Buldhana,Dhule, Amravati, Parbhani Ahmednagar, Nashik, Jalna,	Bhandara, Gadchiroli, Kolhapur, Latur, Sangli, Satara, Solapur	
			3	17	7	27
			200409	4047072		
7	Punjab		Bathinda, Mansa, Fazilka, Mukteswar		Barnala, Faridkot, Moga, Patiala, Muktsar, Sangrur	
			4		5	9
			289000			
8	Rajasthan		Pali, Nagaur, Alwar, Ganganagar, Chittorgarh, Jodhpur, Hanumangarh, Bhilwara, Ajmer	Banswara	Baran, Barmer, Bharatpur, Bikaner, Bundi, Churu, Dausa, Dholpur, Dungarpur, Jaipur, Jaisalmer, Jalore, Jhalawar, Jhunjhunu, Karauli, Kota, Pratapgarh, Rajsamand, SawaiMadhopur,	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
					Sikar, Sirohi, Tonk, Udaipur	
			9	1	23	33
			466142	10784		
9	TamilNadu			Virudhunagar	Ariyalur, Coimbatore, Cuddalore, Dharmapuri, Dindigul, Erode, Kanchipuram, Karur, Krishnagiri, Madurai, Nagapattinam, Namakkal, Perambalur, Pudukkottai, Ramanathapuram, Salem, Sivaganga, Thanjavur, Theni, Thiruvarur, Thoothukudi, Tiruchirappalli, Tirunelveli, Tiruppur, Tiruvannamalai, Vellore, Villupuram	
				1	27	28
				12118		
10	Telanagana	Warangal, Nalgonda, Khammam, Karimnagar, Rangareddy, Mahbubnagar, Adilabad			Bhadradri, Jagitial, Jangoan, Jayashankar, Jogulamba, Kamareddy, KomaramBheem Asifabad, Mahabubabad, Mancherial, Medak, Medchal, Nagarkurnool, Nirmal, Nizamabad,	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
					Peddapalli, Rajanna, Sangareddy, Siddipet, Suryapet, Vikarabad, Wanaparthy, Warangal Urban, Yadadri	
		8			22	30
		674114	11314			
All India (No. of Dist)		31	37	31	129	228
Area (ha)		2217106	2733827	5055144	1895389	11901466
Area (%)		19.00	23.00	42.00	16.00	100.00

3.11.2. Sugarcane

Sugarcane is one of the major commercial crops grown in the country covering 4.7 M ha spread over 341 districts. The major states involved in cultivation of this crop include U.P. (37 districts with 2.14 M ha), Maharashtra (18 districts with 0.82 M ha), Karnataka (nine districts with 0.40 M ha), Tamil Nadu (six districts with 0.15 M ha), Gujarat (five districts with 0.15 M.ha), Bihar (four districts with 0.21 M ha) *etc*. The productivity of sugarcane across the districts ranged from 28.35 t/ha to 112 t/ha. **Based on productivity values, the districts have been categorized into low (≤60.10 t/ha), medium (60.2 to 82.3) and high (> 82.30 t/ha) productivity classes.**

Of the total 102 dominant districts, 28 districts with 1.59 M ha spread over U.P. (seven districts with 0.72 M ha), Maharashtra (six districts with 0.42 M ha), Karnataka (three districts with 0.23 M ha), Tamil Nadu (six districts with 1.42 M ha) recorded high productivity levels. Another 56 districts with 2.35 M ha spread over U.P. (30 districts with 1.42 M ha), Maharashtra (three districts with 0.22 M ha), Karnataka (five districts with 0.16 M ha), Bihar (one district with 0.14 M ha) *etc*. recorded medium productivity. The remaining 18 districts with 0.33 M ha existing in Maharashtra (nine districts with 0.18 M ha), Bihar (three districts with 0.07 M ha) *etc*. displayed low productivity levels.

Analysis of instability index values indicate, that 20 districts with 0.63 M ha spread over Chattisgarh (01), Maharashtra (06), Haryana (07), Tamilnadu (01) and Gujarat (05) are in high-risk category. Further 54 and 28 districts representing 59 per cent and 19 per cent area, respectively are in low and medium risk categories. The risk-wise classification of districts across states in Sugarcane crop is presented in Table 3.11.2(i)

Table 3.11.2(i). Sugarcane crop : Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
1	Andhra Pradesh	East Godavari, Chittoor, West Godavari, Krishna, Vizianagaram,	Visakhapatanam		Anantapur, Guntur, Kadapa, Kurnool, Prakasam, Spsr Nellore, Srikakulam,	
		5	1		7	13
		61022	31978			
2	Assam	Karbi Anglong			Baksa, Barpeta, Bongaigaon, Cachar, Chirang, Darrang, Dhemaji, Dhubri, Dibrugarh, Dima Hasao, Goalpara, Golaghat, Hailakandi, Jorhat, Kamrup, Kamrup Metro, Karimganj, Kokrajhar, Lakhimpur, Marigaon, Nagaon, Nalbari, Sivasagar, Sonitpur, Tinsukia, Udalguri	
		1			26	27
		7852				
3	Bihar		Paschim Champaran, Gopalganj, Sitamarhi, Purbi Champaran		Arwal, Aurangabad, Banka, Begusarai, Bhagalpur, Bhojpur, Buxar, Darbhanga, Gaya, Jamui, Jehanabad, Kaimur, Katihar,Khagaria, Kishanganj, Madhepura, Madhubani, Munger, Muzzaffarpur, Nalanda, Nawada, Patna, Purnia, Rohtas, Saharsa, Samastipur, Saran, Sheikhpura, Sheopar, Siwan, Supaul, Vaishali	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
			4		32	36
			212310			
4	Chhatisgarh			Kabirdham	Balod, Baloda Bazar, Balrampur, Bastar, Bilaspur Bemetara, Durg, Dhamtari, Gariyaband,Janjgir-Champa Jashpur, Kanker(North Bastar), Kondagaon, Mungeli, Mahasamund, Narayanpur, Raigarh, Raipur, Rajnandgaon, Sukma, Surajpur, Surguja	
				1	22	23
				23474		
5	Gujarat			Valsad, Surat, Bharuch, Navsari, Tapi	Amreli, Anand, Bhavnagar, Botad, Dang, Gir Somnath, Jamnagar, Junagadh, Kheda, Mahisagar, Morbi, Narmada, Rajkot, Surenderanagar, Vododra	
				5	15	20
				149648		
6	Haryana			Rohtak, Sonipat, Yamunanagar Karnal, Kurukshetra, Ambala, Panipat	Bhiwani, Charki Dadri, Faridabad, Fatehabad, Hisar, Jhajjar, Jind, Kaithal, Mewat, Palwal, Panchkula, Sirsa	
				7	12	19
				82103		
7	Karnataka	Mandya, Bagalkot	Dharwad, Belgaum, Bellary, Bidar, Bijapur, Gulbarga, Haveri		Bangalore, Chanarajanagar, Chilmagalur, Chitradurga, Dakshin Kannad, Davangare, Gadag, Hassan, Kolar,	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
					Koppal, Mysore, Ramanagara, Shimoga, Tumkur, Udupi, Uttar Kannad, Yadgir	
		2	7		17	26
		115578	287657			
8	Madhya Pradesh		Narsinghpur, Betul		Anuppur, Balaghat, Bhopal, Barwani, Burhanpur, Chhatarpur, Chhindwara, Damoh, Datia, Dewas, Dhar, Guna, Gwalior, Harda, Hoshangabad, Indore, Jabalpur, Khandwa, Khargone, Mandla,Morema, Raisan, Sagar, Seore, Sheopur, Shivpuri, Tikamgarh, Ujjain, Vidisha	
			2		29	31
			57000			
9	Maharashtra	Sangli, Nandurbar, Satara, Kolhapur	Yavatmal, Latur, Jalna, Osmanabad, Nanded, Parbhani, Beed, Aurangabad	Hingoli, Pune, Nashik, Ahmed-nagar, Solapur, Jalgaon	Akola, Amravati,Bhandara, Buldhana, Chandrapur, Dhule, Gadchiroli, Gonda, Nagpur, Ratnagiri, Sindhudurg, Washim, Wardha,	
		4	8	6	13	31
		298261	173751	351281		
10	Punjab	Hoshiarpur, Gurdaspur, Jalandhar			Amritsar, Barnala, Fatehgarh Sahib, Fazilka, Kapurthala, Ludhiana, Nawanshar, Pathankot, Patiala, Rupnagar, S A S Nagar, Sangrur, Tarn Taran	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
		3			13	16
		54333				
11	Tamil Nadu		Cuddalore, Salem, Villupuram, Namakkal, Dharmapuri, Erode	Tiruvannamalai	Ariyallur, Coimbatore, Dindigul, Kanchipuram, Karur, Krishnagiri, Madurai, Nagalpattinam, Perambalur, Pudukkottai, Ramanthapuram, Sivaganga, Thanjavur, The Nilgiris, Theni, Thiruvallur, Thiruvarur, Thoothukudi, Tiruchirappalli, Tirunelveli, Tiruppur, vellore, Virudhunagar	
			6	1	23	30
			126302	23621		
12	Uttar Pradesh	Shamli, Amroha, Sambhal, Azamgarh, Bulandshahr, Shahjahanpur, Hardoi, Meerut, Saharanpur, Baghpat, Hapur, Muzaffarnagar, Kushi Nagar, Bijnor, Rampur, Barabanki, Basti, Bareilly, Moradabad, Ghaziabad, Balrampur, Sitapur, Kheri,			Agra, Aligrah, Allahabad, Amethi, Auraiya, Ballia, Banda, Chandauli, Chitrakoot, Etah, Etawah, Fathepur, Firozabad, Gautam Budh Nagar, Gorakhpur, Hamirpur, Hathras, Jalaun, Jhansi, Kannauj, Kanpur Dehat, Kanpur Nagar, Kaushambi, Lalitpur, Lucknow, Mahoba, Mainpuri Mathura, Mau, Mirzapur, Pratapgah, Rae Bareli, Rampur, Sant Kabir Nagar, Sant Ravidas Nagar, Siddharth Nagar, Sonbhadra, Unnao, Varanasi	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
		Kasganj,Gonda, Deoria, Budaun Shravasti, Maharajganj, Farrukhabad, Jaunpur, Bahraich, Pilibhit, Ambedkar Nagar, Faizabad, Sultanpur, Ghazipur				
		37			38	75
		2136557				
13	Uttarakhand	Udham Singh Nagar, Haridwar			Champawat, Dehradun, Nainital	
		2			3	5
		85724				
All India (No. of Dist.)		54	28	20	239	341
Area (ha)		2759327	888998	630127	421507	4699959
Area (%)		58.71	18.92	13.41	8.97	100

3.11.3. Jute

Jute is one of the major fibre crops grown in the eastern region of the country covering 0.70 M ha spread over 54 districts. The major states involved in cultivation of this crop encompass Assam (3 districts with 0.03 M ha), Bihar (5 districts with 0.08 M ha), West Bengal (10 districts with 0.45 M ha) *etc*. Productivity of Jute across districts ranged from 0.77 t/ha to 3.5 t/ha. Based on productivity values, the districts have been categorized into low (<1.69 t/ha), medium (1.69 to 2.55 t/ha) and high (> 2.55 t/ha) productivity classes.

Analysis of instability index values indicate, that, five districts with 0.0**8** M ha spread over Bihar are in high-risk category representing 12 per cent area. Further, six districts with 0.37 M ha spread over West Bengal are in low-risk category and 7 districts with 0.11 M ha spread over Assam(3) and West Bengal(4) are in medium-risk category representing 53 per cent and 16 per cent of area respectively. The risk-wise classification of districts across states for the crop is presented in Table 3.11.3(i).

Table 3.11.3(i): Jute crop : Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
1	Assam		Dhubri,Nagaon, Marigaon		Baksa, Barpeta, Bongaigaon, Cachar, Chirang, Darrang, Dhemaji, Dibrugarh, Dima Hsao, Goalpara, Golaghat, Hailkandi, Jorhat, Kamrup, Kamrup Metro, Karbi Anglong, Karimganj, Kokrajhar, Lakhimpur, Nalbari, Sivasagar, Sonipat, Tinsukia, Udalguri,	
			3		24	27
			30464			
2	Bihar			Araria, Supaul, Katihar, Kishanganj, Purnia	Madhepura, Saharsa, Samastipura	
				5	3	8
				84758		
3	West Bengal	Dinajpur Dakshin, 24 Paraganas North, Nadia, Murshidabad, Hooghly, Jalpaiguri	Coochbehar, Dinajpur Uttar,Purba Bardhaman, Maldah		Paraganas South, Alipurduar, Bankura, Birbham, Darjeeling, Howrah, Medinipur East, Medinipur West, Paschim Bardhaman,	
		6	4		9	19
		372036	78281			
All India (No. of Dist.)		**6**	**7**	**5**	**36**	**54**
Area (ha)		**372036**	**108745**	**84758**	**70082**	**701000**
Area (%)		**53.00**	**16.00**	**12.00**	**10.00**	**100**

3.11.4. Tobacco (*Rabi*)

Tobacco is one of the major commercial crops grown in the country covering 0.41 M ha spread over 56 districts. Major states hosting cultivation of this crop include Andhra Pradesh (4 districts with 0.07 M ha), Gujarat (5 districts with 0.11 M ha), Uttar Pradesh (3 districts with 0.02 M ha) *etc*. Productivity of tobacco across districts ranged from 1,125 t/ha to 4.288

t/ha. **Based on productivity values, the districts have been categorized into low ($\leq$ 2.3 t/ha), medium (2.3 to 3.3 t/ha) and high (> 3.3 t/ha) productivity classes.**

Analysis of instability index values indicates 4 (four) districts with 0.05 M ha spread over Andhra Pradesh (two), Gujarat (one) and Uttar Pradesh is in high-risk category representing 12 per cent area. Further three districts with 0.11 M ha spread over Andhra Pradesh (one), Gujarat (one) and Uttar Pradesh (one) are in low-risk category and five districts with 0.06 M ha spread over Andhra Pradesh (one), Gujarat (three) and Uttar Pradesh (one) are in medium-risk category representing 27 per cent and 14 per cent respectively. The risk-wise classification of districts across states for the crop is presented in Table 3.11.4(i)

Table 3.11.4(i): Tobacco (*Rabi*) crop : Risk-wise classification of districts across states

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
1	Andhra Pradesh	Prakasam	Kurnool	West Godavari, Spsr Nellore	Ananta Pur, Chitoor, East Godavari, Guntur, Kadapa, Krishna, Visakhapatanam, Vizianagaram	
		1	1	2	8	12
		43555	5823	27446		
2	Gujarat	Anand	Kheda,Banas Kantha, Gandhinagar	Mahesana	Ahamdabad, Aravalli, Jamnagar, Mahisagar, Panch Mahals , Patan, Sabar Kantha, Vadodra,	
		1	3	1	8	13
		59795	45439	14716		
3	Uttar Pradesh	Etah	Kasganj	Farrukhabad	Aligarh, Ambedkar Nagar, Amroha, Baghpat, Basti, Barabanki, Budaun, Etawah, Faizabad, Gonda, Ghazipur, Hamirpur, Hardooi, Jalaun, Jaunpur, Kannauj, Kanpur Nagar, Kaushambi,	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
					Kheri, Mahoba, Mainpuri, Rae Bareli, Shahjahanpur, Sitapur, Sultanpur, Unnao	
		1	1	1	28	31
		8671	7008	6765		
All India (No. of Dist.)		3	5	4	44	56
Area (ha)		112022	58269	48927	195782	415000
Area (%)		27.00	14.00	12.00	47.00	100

3.11.5. Dry Chillies

Dry Chillies constitute one of the major commercial crops grown in the country, covering 0.69 M ha spread over 374 districts. Major states engaged in cultivation of this crop comprise Andhra Pradesh (11 districts with 0.16 M ha), Assam (six districts with 0.001 M ha), Karnataka (18 districts with 0.01 M ha), Gujarat (two districts with 0.10 M ha), Haryana (one district with 0.001 M ha), Madhya Pradesh (nine districts with 0.05 M ha), Manipur (three districts with 0.005 M ha), Rajasthan (three districts with 0.004 M ha), Tamil Nadu (six districts with 0.03 M ha), Telangana (three districts with 0.03 M ha), Uttar Pradesh (3 districts with 0.005 M ha) and West Bengal (14 districts with 0.05 M ha) *etc*. Productivity of dry chillies across the districts ranged from 0.09 t/ha to 7.39 t/ha. **Based on productivity values, the districts have been categorized into low (≤1.89 t/ha), medium (1.89 to 3.42 t/ha) and high (> 1.89t/ha) productivity classes.**

Analysis of instability index values indicates, that 12 districts with 0.1 M ha spread over Karnataka (six), Haryana (one), Madhya Pradesh (one), Manipur (one), Rajasthan (one) and Tamil Nadu (two) are in high-risk category representing 15 percent area. Further 34 districts with 0.14 M ha spread over Andhra Pradesh (four), Assam (six), Gujarat (two), Madhya Pradesh (one), Manipur (one), Rajasthan (one), Tamil Nadu (one), Telangana (two), Uttar Pradesh (three) and West Bengal (13) are in low-risk category and 33 districts with 0.26 M ha spread over Andhra Pradesh (seven), Karnataka (12), Madhya Pradesh (seven), Manipur (one), Rajasthan (one), Tamil Nadu (one) and West Bengal (one) are in medium-risk category representing 20 percent and 35 percent respectively. The risk-wise classification of districts across states for the crop is presented in Table 3.11.5(i).

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Table3.11.5.i: Risk-wise classification of districts across states in Dry Chillies crop

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
1	Andhra Pradesh	Krishna, West Godavari, Srikakulam, Kadapa	Chittoor, Krnool, Guntur, Prakasam, Spsr,Nellore, East Godavari, Anantapur		Visakhapatanam, Vizianagaram,	
		4	7		2	13
		16575	144404			
2	Assam	Cachar, Nagaon, Dhubri, Kamrup, Barpeta,, Sonitpur			Baksa, Bongaigaon, Chirang, Darrang, Dhemaji, Dibrugarh, Dima Hasao, Goalpara, Golaghat, Hailakandi, Jorhat, Kamrup Metro, Karbi Anglong Karimganj, Kokrajhar, Lakhimpur, Marigaon, Nalbari, Shivasagar, Tinsukia, Udal Guri	
		6			21	27
		11046				
3	Karnataka		Hassan,Bijapur, Gulbarga, Mysore, Koppal, Bagalkot, Belgaum, Chamarajanagar Raichur, Haveri Yadgir,Tumkur,	Davanger, Bellary, Chitradurga, Chikmagalur Gadag, Dharwad	Bangalore Rural, Bengaluru Urban, Bidar, Chikballapur, Dakshin Kannad, Gadag, Kolar, Mandya, Ramanagara, Shimoga ,Udupi	
			12	6	11	29
			32650	73492		
4	Gujarat	Anand, Vadodara			Ahmadabad, Amreli, Banas Kantha, Bhavnagar, Chhotadudepur, Devbhumi Dwarka, Dohad, Jamnagar, Kachchh, Kheda, Mahisagar, Navsari, Patan, Porbandar, Rajkot, Surat, Surendranagar,	
		2			24	26
		6903				

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
5	Madhya Pradesh	Khandwa	Chhindwara,Chhatarpur, Betul, Khargone, Jhabua, Dhar, Ratlam	Barwani	Agar Malwa, Alirajpur, Anuppur, Ashokngar, Balaghat, Bhopal, Bhurhanpur,Damoh, Datia, Gwalior, Hoshangabad, Jabalpur, Katni, Mandla, Mandsaur, Morena, Narsinghpur, Neemuch, Panna, Raisen, Rajgarh, Rewa, Satna, Sehore, Seoni, Shajapur, Sheopur, Shivpuri, Sidhi, Singrauli, Tikamgarh, Ujjain, Umaria, Vidisha,	
		1	7	1	42	51
		7403	40898	7406		
6	Manipur	Thoubal	Tamenglong	Churachandpur	Bishnupur, Chandel, Churachandpur, Imphal East, Imphal West, Thubal, Ukhrul,	
		1	1	1	6	9
		1150	1143	2760		
7	Rajasthan	Sawai Madhopur	Bhilwara	Jodhpur	Ajmer, alwar, banswara, baran, barmer, bharatpur, bundi, chittorgarh, churu, dausa, dholpur, dungarpur, ganganagar, hanumangarh, jaipur, jaisalmer, jalore, jhalawar, jhunhunu, karauli, kota, nagaur, pali, pratapgarh, rajsamand, sikar, sirohi, tonk, udaipur,	
		1	1	1	30	33
		2537	1098	1208		
8	Tamil Nadu	Virudhunagar	Vellore, Ramanathapuram, Dindigul	Tuticorin, Sivaganga	Ariyalur, Coimbatore, Cuddalore, Dharmapuri, Erode, Kanchipuram,	

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Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	Medium	High		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
					Kanniyakumari, Karur, Krishnagiri, Madurai , Nagapattinam, Namakkal, Perambalur, Pudukkottai, Salem, Thanjavur, The Nilgiris , Theni , Thiruvallur, Thiruvarur, Tiruchirappalli, Tirunelveli, Tiruppur, Tiruvannamalai, Villupuram,	
		1	3	2	25	31
		1431	18826	16527		
9	Telangana	Warangal, Khammam	Nalgonda		Adilabad, Bhadradri, Jagitial, Jangoan, Jayashankar, Jogulamba , Kamareddy, Karimnagar, Komaram Bheem Asifabad, Mahabubabad , Mahbubanagar, Mansherial, Medak, Medchal, Nagarkurnool, Nirmal, Nizamabad, Peddapalli, Rajanna, Rangareddi, Sangareddy, Siddipet, Suryapet, Vikarabad, Wanaparthy, Warangal Urban, Yadadri,	
		2	1	0	29	32
		30799	3089			
10	Uttar Pradesh	Fatehpur, Kanpur Nagar, Firozabad			Agra, Aligarh, Allahabad, Ambedkar Nagar, Amethi, Amroha, Auraiya, Azamgarh, Baghpat, Bahraich, Ballia, Balrampur, Banda,	

Sl. No.	State	Risk-based categories; No. of districts; and Coverage (ha)			Districts with insignificant area under the crop	Cumulative no. of districts under cultivation
		Low	**Medium**	**High**		
1	*2*	*3*	*4*	*5*	*6*	*7=(3+4+5+6)*
					Barabanki, Bareilly, Bijnor, Budaun, Bulandshahr, Chandauli, Chitrakoot, Deoria, Etah, Etawah, Faizabad, Farrukhabad, Goutam Buddha Nagar, Ghaziabad, Ghazipur, Gonda, Gorakhpur, Hamirpur, Hapur, Hardoi, Hathras, Jalaun, Jaunpur, Jhansi, Kannauj, Kanpur Dehat, Kashanj, Kaushambi, Kheri, Kushi Nagar, Lalitpur, Lucknow, Maharajganj, Mahoba, Mainpuri, Mathura, Mau, Meerut, Mirazapur, Moradabad, Muzaffarnagar, Pilibhit, Pratapgarh, Rae Bareli, Rampur, Saharanpur, Sambhal, Sant Kabeer Nagar, Sant Ravidas Nagar, Shahajahanpur, Shamli, Shravasti, Sitapur, Sonbhadra, Sultanpur, Unnao, Varanshi	
		3			70	73
		5377	0	0		
11	West Bengal	Purba Bardhaman, Dinajpur Dakshin, Maldah, Coochbehar,	Purulia		Alipurduar, Birbhum, Darjeeling, Hoogly, Howrah, Jhagram, Kalimpong, Paschim Bardhaman,	

| Sl. No. | State | Risk-based categories; No. of districts; and Coverage (ha) | | | Districts with insignificant area under the crop | Cumulative no. of districts under cultivation |
		Low	Medium	High		
1	2	3	4	5	6	7=(3+4+5+6)
		Bankura, Murshidabad, Jalpaiguri, Medinipur West, Nadia, Medinipur East, 24 Paraganas North, 24 Paraganas South, Dinajpur Uttar				
		13	1		19	33
		55721	1143			
All India (No. of Dist.)		**34**	**33**	**11**	**296**	**374**
Area (ha)		**135540**	**262838**	**99196**	**196426**	**694000**
Area (%)		**19.53**	**37.87**	**14.29**	**28.30**	**100.00**

Chapter 4

Vulnerability and National Priority- Customisation of Premium Ratios

4.1 Crop Vulnerability, National Priority and Insurance Premium

Based on location-specific crop suitability as explained in Chapter-3, crops/cropping systems have been hierarchically categorised based on vulnerability as highly suited (Low Risk), moderately suited (Medium Risk) and least suited (High Risk). The category of vulnerability is now proposed as a determinant of the decision on the extent/ratio of eligible subsidy/concession on the premium, that may be offered by the government, and built into the system. This will help in rationalizing the level of premium rates to be paid by the farmers of different districts and crops to realize an equitable & positive rate of return on the investments by the farmers. Concurrently, this implies the differentiated rate of subsidy / concession that the government (centre & state combined) will be obliged to pay to the farmers based on the district & crop. A rationalised system of premium obligations split between the farmers & the government linked to district vulnerability & national priority linked to the crop will impart greater fairness, equitability and rational to the insurance scheme. Even as this criteria-based system of premium eligibility is adopted, the concomitant benefits could be several, and one of the more important of these being agro-ecologically synchronous crop planning, driving sustainability thereby. This can be expected to serve as an effective risk-negotiating instrument and more in the nature of risk-preventive (minimisation) intervention.

As explained in Chapter-1, the Sub-group II constituted by the Committee and, led by ICAR-NIAP was entrusted to examine crop-wise & district-wise intensity of vulnerability and recommend graded /customised mechanism of subsidy/concession to be offered by the government. They were to use the data on varying vulnerabilities and non-compatibility of crops worked out for all the agriculturally significant crops in different districts across the country.

Accordingly, Sub-group-I led by ICAR-CRIDA compiled time series data on area, yield and production for all the major crops raised in all the districts of the country in different cultivation seasons of the year, for the period 2006 to 2018. The data covered all the major cereals, pulses, oilseeds, fibre and cash crops. Further, CRIDA calculated Yield Instability Index (YII) based on yield variability at district level for all the crops, and share this valuable information with Sub-group II, NIAP.

The NIAP, thereafter applied cumulative square root method of stratification and classified all the districts of the country into low, medium and high risk zones based on Yield instability index values. The stratification was made crop-wise and district-wise, so that the premium subsidy to be offered by the government can be customised as per the criteria adopted.

Linked to crop-wise district-categorisation, two formulae have been suggested based on vulnerability analysis and national priority to decide on the government's obligation of premium support to the farmers for different crops linked to the district where grown. This will translate into the total financial outgo from the government (centre & state combined). While the vulnerability-factor will remain more consistent, the second parameter, namely

'national priority' being more dynamic will vary from time to time. This entails the need to adopt a more flexible approach in customising the premium subsidy/concession. The present times for example, demand accelerated production of pulses, oilseed crops and millets. These crops can be encouraged through a more liberally subsidized insurance premium, if required by over-ruling the risk categorisation of the district, which may suggest lower subsidy support on the premium. On the contrary, the crops with high instability/vulnerability & consistently less suitable to particular region/district and, not a national priority can be discouraged by reducing subsidy on crop premium without compromising national food security. This Report makes suggestions accordingly.

The analysis included both *Kharif* and *Rabi* season crops viz.,
  i) Cereals - wheat, paddy, barley, maize, sorghum, pearl millet and ragi (finger millet)
  ii) Pulses - chickpea, pigeon pea, lentil, green gram and urad
  iii) Oilseeds - groundnut, soybean, rapeseed & mustard, castor, sesamum, sunflower, safflower and linseed
  iv) Fiber crops - jute and cotton
  v) Commercial crops - tobacco, dry chillies and sugarcane

Budgetary allocations relating to crop insurance-linked premium can be sought for or made as per premium slabs adopted based on two following criteria:
  i) Vulnerability
  ii) National priority

The Study used demand and supply data from NITI AAYOG Reports to evaluate national priority of a particular crop or crop groups.

4.1.1 Customization of eligible premium ratios

The customization can be done based on either 'Vulnerability' as a single factor or a combination of two factors, namely,
- Category of vulnerability
- Scale of national priority

The factors that determine national priority could be several, some of which include,
- Self-sufficiency for domestic consumption
- Harvest export potential
- Sustainable production
- Nutrition security
- Any other

4.1.2 Categorization of the two determining factors

- Vulnerability
  - ✓ Low vulnerability ≈ High crop compatibility
  - ✓ Medium vulnerability ≈ Moderate compatibility
  - ✓ High vulnerability ≈ Least compatibility

- National priority
  - ✓ High priority
  - ✓ Medium priority
  - ✓ Low priority

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Further, both the criteria of categorization based on vulnerability and national priority will apply specifically to the crop/crop-group and the district. Customization of the eligible premium ratio (as a payment obligation of the government to the farmers) when deduced based on either of the two criteria (as laid down vide see 4.1.3) will then get location-specific, crop-specific & season-specific, and therefore acquire rationality.

4.1.3   Guiding principles for customization

4.1.3 (i). Based on vulnerability as a single-factor determinant
Please see Table 4.1 for details

4.1.3 (ii). Based on two-factors as determinant
Please see Table 4.2 for details

Table No. 4.1:   Vulnerability as the single-factor determinant of customization of premium

Name of the District: ----------------   Name of the Crop: ---------------------

Sl. No	Vulnerability category and crop compatibility	Customization formula
1.	Low risk ≈ High compatibility of crop	X
2.	Medium risk ≈ Moderate compatibility of crop	X-10 to 25 per cent of X
3.	High risk ≈ Least compatibility of crop	X- (>25 to 50 per cent of X)

Where 'X' is {('B' Discovered market premium) - ('A' Upper limit of premium to be paid by the farmer in different seasons/crops in case of low-risk situation)}

(e.g. 'A' upper limit of premium paid by farmers is currently 2% for *Kharif*, 1.5% for *Rabi* and 5% for annual commercial & horticultural crops)

Table No. 4.2:   Two factors-based matrix as the determinant of customization of premium

Name of the District: ------------------------   Name of the Crop: -----------------------

Sl. No	Intensity of vulnerability	National Priority		
		High	**Medium**	**Low**
1.	Low risk (High crop compatibility)	X	X-Y	X- (1.5Y to 2Y)
2.	Medium risk (Moderate crop compatibility)	X-Y	X- (1.5Y to 2Y)	X- (2.5Y to 3Y)
3.	High risk (Least crop compatibility)	X- (1.5Y to 2Y)	X- (2.5Y to 3Y)	Nil

Where,

(i)   X = ('B' Discovered market premium) - ('A' Upper limit of premium to be fixed by the farmer in different seasons and for different crops in case of low-risk situation)
(e.g. upper limit of premium paid by farmers is currently 2 % for *Kharif*, 1.5 % for *Rabi* 5% for annual commercial & horticultural crops)

(ii)   Y = A range of 10 to 25 per cent of 'X'

Illustrations for customisation

In order to illustrate the estimation of government payout as premium-subsidy based on the Guidelines vide Table 4.1 (one-factor criterion) and 4.2 (two-factors criteria), actual cases have been taken representing different categories of risk and national priority.

May refer to Tables 4.1(i) and 4.1 (ii) for *Kharif & Rabi* seasons respectively in accordance with Guidelines vide Table 4.1 (single – factor criterion). May refer to Table 4.2 (i) and 4.2 (ii) for *Kharif & Rabi* season respectively in accordance with Guidelines vide Table 4.2 (two-factor criteria).

Urad *(Kharif):* Illustration for customization of premium for different districts of Uttar Pradesh for the year 2020-21

District	Fatehpur	Hamirpur	Jhansi
Intensity of vulnerability	Low	Medium	High
Insured amount(₹)	34736	26,539	21,911
Premium (%) (market discovered)	17.0	15.0	16.9
Premium amount (₹) (B)	5,905	3981	3,703
Farmer share (%) (fixed by government)	2.0	2.0	2.0
Farmer share (₹) (A)	695	531	438
X (B-A) (₹)	5,210	3,450	3,265

Table 4.1(i). Customisation of premium based on single-factor criterion as per Table 4.1

District	Vulnerability category & crop compatibility	Customization formula	Customized premium (₹)
Fatehpur	Low risk ≈ High compatibility of crop	X	₹ 5210
Hamirpur	Medium risk ≈ Moderate compatibility of crop	(X)-(15% of X)	₹2932
Jhansi	High risk ≈ Least compatibility of crop	(X)-(35% of X)	₹2122

Assumption: i) Maximum premium payable by the farmer under low-risk (high-compatibility) situation is 2 per cent; ii) Medium risk (Moderate compatibility of crop): less of 15 per cent from X; iii) High risk (Least compatibility of crop) less of 35 per cent from X; iv) Market discovered premium price – actuals for the district in the Kharif season 2020-21

Table. 4.2(i). Customisation of premium based on two factor criteria as per Table 4.2

District	Intensity of vulnerability	Y	National Priority		
			High	Medium	Low
Fatehpur	Low risk (High crop compatibility)	₹782	₹ 5210 (X)	₹4428 (X-Y)	₹3646 (X-2Y)
Hamirpur	Medium risk (Moderate compatibility)	₹518	₹2932 (X-Y)	₹2414 (X-2Y)	₹1896 (X-2Y)
Jhansi	High risk (Least crop compatibility)	₹490	₹2285 (X-3Y)	₹1795 (X-3Y)	Nil

Assumption: i) Recommended value of Y is 15 per cent (from the range of 10-25 percent); ii) Deduction slab for medium risk (moderate compatibility of crop) is 2Y (from the range of 1.5Y to 2Y); iii) Deduction slab for high risk (least compatibility of crop) is 3Y (from the range of 2.5Y to 3Y); iv) Market discovered premium price – actuals for the district in the Kharif season 2020-21

Wheat *(Rabi):* **Illustration for customization of premium for different districts of Uttar Pradesh for the year 2020-21**

District	Sant Kabeer Nagar	Bareilly	Chitrakoot
Intensity of vulnerability	Low	Medium	High
Insured amount(₹)	61,708	66,732	49,222
Premium (%) (market discovered)	8.00	8.00	8.93
Premium amount (₹) (B)	4,937	5,339	4,381
Farmer share (%) (fixed by government)	1.5	1.5	1.5
Farmer share (₹) (A)	926	1001	738
X (B-A) (₹)	4,011	4,338	3,643

Table 4.1(ii). Customisation of premium based on single-factor criterion as per Table 4.1

District	Vulnerability category & crop compatibility	Customization formula	Customized premium (₹)
Sant Kabeer Nagar	Low risk ≈ High compatibility of crop	X	₹ 4,011
Bareilly	Medium risk ≈ Moderate compatibility of crop	(X)- (15% of X)	₹ 3,687
Chitrakoot	High risk ≈ Least compatibility of crop	(X)-(35% of X)	₹2,367

Assumption: ***i)*** *Maximum premium payable by the farmer under low-risk (high-compatibility) situation is 1.5 per cent;* ***ii)*** *Medium risk (Moderate compatibility of crop): less of 15 per cent from X;* ***iii)*** *High risk (Least compatibility of crop) less of 35 per cent from X;* ***iv)*** *Market discovered premium price – actuals for the district in the Kharif season 2020-21*

Table. 4.2(ii). Customisation of premium based on two-factor criteria as per Table 4.2

District	Intensity of vulnerability	Y	National Priority		
			High	Medium	Low
Sant Kabeer Nagar	Low risk (High crop compatibility)	₹602	₹4,011 (X)	₹3,409 (X-Y)	₹2,807 (X-2Y)
Bareilly	Medium risk (Moderate compatibility)	₹651	₹3,687 (X-Y)	₹3,036 (X-2Y)	₹2,385 (X-2Y)
Chitrakoot	High risk (Least crop compatibility)	₹546	₹2,551 (X-3Y)	₹2,005 (X-3Y)	Nil

Assumption: ***i)*** *Recommended value of Y is 15 per cent (from the range of 10-25 percent);* ***ii)*** *Deduction slab for medium risk (moderate compatibility of crop) is 2Y (from the range of 1.5Y to 2Y);* ***iii)*** *Deduction slab for high risk (least compatibility of crop) is 3Y (from the range of 2.5Y to 3Y);* ***iv)*** *Market discovered premium price – actuals for the district in the Kharif season 2020-21*

The vulnerability-based categorization of the districts for all the important crops of the country, that together account for major percentage of the arable land have been reflected in tabular form for each of these crops. Chapter-3 includes all these details, which along with categorization of national priority of the crop under consideration may be utilized for customization of the premium-subsidy linked to two factors–based matrix.

Whenever the Division (in charge of crop insurance in DA&FW) does not feel the importance or necessity of having 'national priority' as a determining factor, it may then deploy 'vulnerability category' as the sole determinant.

These suggestions are made in recognition of the fluid state of production and socio-economic environment in the country, and the advantages of a flexible system in responding to an ever-dynamic situation.

The crop-group for which categorization has been made and included in Chapter-3 are as follows:

4.2 Cereals

Rice makes for the highest contribution to the food grain basket of the country, and is critical to the nation's food security. But facing high risk (implying low compatibility) in some districts, farmers need to be discouraged from growing more paddy or even encouraged to diversify into alternate crops, preferably that are low water duty in demand. This will help in rationalizing water use, and correcting the produce supply in synch with demand. As per NITI Aayog Report (Demand and supply projections towards 2033, NITI Aayog, February 2018), paddy supply in the country will be surplus by more than 20 million tons by 2032. A special campaign for diversification towards more suitable and alternates like oilseeds, pulses and horticulture crops may be initiated, so that farmers' income gets stabilized. The insurance premium subsidy for paddy may be reduced by **10-25 per cent** in medium risk districts and **>25-50 per cent** in high-risk districts, compared to the 'X' fixed for low-risk category district. Customisation can be further fine-tuned based on national priority as shown vide the matrix in Table 4.2.

Wheat is also an important crop with respect to national food security and, is one of the important cereal crops cultivated across the states. As per NITI Aayog Report (Demand and supply projections towards 2033, NITI Aayog, February 2018), wheat supply in the country will be surplus by more than 43 million tons by 2032. Though, the importance of wheat is significant from the perspective of the country's food security, some districts suffer from higher risk, and therefore are less suitable for continuing with wheat cultivation. Hence, the farmers are better discouraged from growing more wheat and, diversification initiated towards pulses, oilseeds & horticulture to minimize the production losses, price disequilibrium and optimize incomes. The insurance premium subsidy for wheat may be reduced by **10-25 per cent** in medium risk districts and **>25-50 per cent** in high risk districts, in comparison to 'X' fixed for low-risk category districts. Further, the customization can be fine-tuned by considering the national priority categorization of the wheat crop in accordance with the principle laid down in the matrix vide Table 4.2.

Maize is another important cereal crop and is used for human consumption, and also as livestock feed. Maize is not procured unlike paddy & wheat and, is therefore market-dependent for price discovery. It is seen to experience price fluctuations including price crash due to demand-supply gaps. The insurance premium subsidy for maize may be reduced by

10-25 per cent in medium-risk districts and **>25-50 per cent** in high-risk districts and alternate crops encouraged to stabilize farmers' income.

Nutria-cereal crops are good for human diet given their high energy and nutritional value and are equally good as livestock fodder, but have lost area to other crops over the last four decades. Their coverage was a meager 11.27 per cent of gross cropped area (2018-19), and accounted for only 15.10 per cent of total food grain production (2018-19) in the country. But there is plenty of scope to promote these crops as alternative to high risk crops that are not ecologically conducive to the region. Though in most districts with limited natural resources, nutria-cereals can be cultivated with minimum risks, yet there are few districts, which may witness moderate to high risk. Considering the fact that millets earlier called coarse cereals have since 2018 come to be notified as nutria-cereals, they are now considered as a national priority. As per NITI Aayog Report (Demand and supply projections towards 2033, NITI Aayog, February 2018) coarse/nutria- cereals supply in the country will be deficit by more than 2 million ton by 2032. **Hence, nutria-cereals deserve a favorable premium subsidy/concession regime as per guideline vide Table 4.2.**

4.3 Pulses

Pulses are grown across the states, but percentage share in the gross cropped area of the country was 14.84 (2018-19) only and, accounted for 7.74 per cent share in total food grain production (2018-19). Presently there is a deficit in the supply vis-à-vis the demand in the country. However, in the NITI Aayog Report (Demand and supply projections towards 2033, NITI Aayog, February 2018), it has been projected that supply of pulses in the country will be surplus in 2032. Pulses production has been on a increasing trend since 2016-17 as it came to be given special attention and supported by improved technology & favourable price support (higher MSP & robust procurement under PM-AASHA) and imports have come down. Pulses are a rich & low-priced nutrition provider. Their segment is important for the nutritional security of a large section of population. **Hence, a favorable insurance premium subsidy may be continued with in case of pulses even in the districts categorized as high-risk.** In such high-risk districts, there should be due attention to adopt appropriate agronomic & input management practices. Guidelines as in **Table 4.2** may be adopted but with a much more liberal approach than indicated therein.

4.4 Oilseeds

Oilseeds are grown only in 12.62 per cent of gross cropped area (2018-19) and oilseed production from the cultivated area is 34.68 million tons (2020) and meets just 69 per cent of total demand (2019-20) in the country. As per NITI Aayog Report (Demand and supply projections towards 2033, NITI Aayog, February 2018), oilseeds supply in the country will be deficit by more than 24 million tons by 2032.

Oilseed crops are important and are mainly grown in rainfed regions of the country for use as human consumption, besides many of its by-products being used in industries.

As seasonal oilseed crops are important for meeting the country's edible oil demand, and are job creators at their post-harvest processing stage besides supporting higher income return for the farmers, it is suggested to continue to provide liberal insurance premium subsidy for all the oilseeds. Further, it is suggested, that in case of oilseeds with less water requirement like sesamum, soyabean, linseed, sunflower, rapeseed, mustard etc., subsidy on premium may be liberal even in high-risk districts. But in case of groundnut, premium subsidy may be reduced

by **10-25 per cent** in medium-risk districts and **>25-50 per cent** in high-risk districts, as the crop depletes ground water. **However, given the national priority of getting over with import-dependency, a more liberal concession regime may be needed in case of all oilseeds including groundnut as per guideline vide Table 4.2.** While reducing premium subsidy possibility of alternate crops in same season may be considered.

4.5 Sugarcane

Sugarcane is an important cash crop and helps in meeting sugar requirement of India. It is also important for producing ethanol, whose ratio of blending with petrol has been enhanced to 20 per cent as per the National Bio-fuel Policy, 2018. The supply demand situation of sugarcane was estimated by Kumar *et al.* (2010) up to 2025 under four different scenarios. These are, i) Scenario 1 – baseline assumption, where there is annual growth of input-output prices, area and TFP (Total Factor Productivity); ii) Scenario 2 – baseline assumption, where there is no growth of TFP (Total Factor Productivity); iii) Scenario 3 – baseline assumption, where there is no growth of area; iv) Scenario 3 – baseline assumption, where there is no growth of TFP and area. It is highly likely that sugarcane would be short in supply of demand in the coming years if scenarios emerge 3&4, but there may be surplus under scenarios 1 & 2.

The growing of sugarcane in water deficit regions is proving to be environmentally unsustainable because of high water consumption & lowering of underground water tables. Hence, growing of sugarcane in high-risk regions may be discouraged and a special campaign for diversification towards deficit commodities like millets, oilseeds & pulses and other commodities like maize & horticulture as a measure to achieve higher & stable farmers' income while adopting sustainable production practices. In order to promote judicious use of water, micro-irrigation systems like drip irrigation may become the norm in all sugarcane cultivation areas.

The insurance premium subsidy for sugarcane may be reduced by **10-25 per cent** in medium-risk districts and **>25-50 per cent** in high-risk districts as suggested vide Table 4.1. If the sugar supply is entering into surplus situation, total concession on premium may be withdrawn by considering it as a non-compatible crop in case of high-risk districts. In determining the national priority of sugarcane, its value as an ethanol producer may also be kept in mind. The issues to be considered are National Biofuel-Policy, 2018. Targeted blending of ethanol with petroleum products and the achievement as on date. The country as on date is chasing a target of 20 per cent of blend and the reported achievement is 10 per cent.

4.6 Chilli

Chili is an important cash crop in India and is grown for its pungent fruits, which are used as both green and ripe (dried form) to impart pungency to the food. As this crop provides cash income to large number of small and marginal farmers, the insurance premium subsidy for dry chillies may be continued even in medium and high-risk region. However, from the perspective of sustainability, premium concession may be reduced as suggested in Table 4.1; or when higher production is felt necessary from the perspective of national priority, then premium customization guidelines as vide Table 4.2 may be followed. National priority in this case may also emerge, if demand for chilli grows from the industry sector (cosmetics etc.).

4.7 Cotton

Cotton is one of the most important fibre and cash crops of India and, plays a dominant role in the industrial and agricultural economy of the country. It provides the basic raw material (cotton fibre) to feed the cotton textile industry. This crop is important for meeting the country's demand for textile industry, that generates jobs and foreign exchange via exports. The crop is mainly grown in semi-arid regions of the country. The insurance premium subsidy as suggested in Table 4.1 may be reduced by **10-25 per cent** in medium-risk districts and **>25-50 per cent** in high-risk districts subject to possibility of alternative crops in these districts. Further, farmers may also be subsidised for use of micro-irrigation in cotton field for efficient use of ground water. The guidelines as vide Table 4.2 may be adopted in the alternate when cotton production is considered nationally important.

4.8 Jute

Jute, being one of the major cash and fibre crops grown in West Bengal, covers about 0.34 per cent of total cropped area (2018-19). West Bengal alone shares about three-fourth of the total production of the country. The Jute-Rice, a very popular cropping system in *Terai* Zone of West Bengal, is predominantly cultivated by the marginal and small farmers. Jute is one of the most important fibre and cash crops of India and, plays a dominant role in the industrial and agricultural economy of the country. Jute textile industry is one of the major industries in the Eastern India, particularly in West Bengal. It supports around 40 lakh farm families and provides direct employment to 2.6 lakh industrial workers and 1.4 lakh in the tertiary sector. **Insurance premium subsidy may be continued with in consonance with Table 4.2, at it is a source of income and employment for large number of poor farmers.**

4.9 Tobacco

Tobacco is one of the most economically significant agricultural crops in the world. It is a drought tolerant, hardy and short duration crop which can be grown on soils where other crops cannot be cultivated profitably. In India, Tobacco crop is grown over area of 0.45 M ha (0.27% of the net cultivated area) producing ~ 750 M kg of tobacco leaf. India is the second largest producer and exporter after China and Brazil respectively. The production of flue-cured Virginia (FCV) tobacco is about 300 million kg from an area of 0.20 M ha, while 450 M kg non-FCV tobacco is produced from an area of 0.25 M ha. In the global scenario, Indian tobacco accounts for 10 per cent of the area and 9 per cent of the total production. Tobacco provides livelihood security to 36 million people including 6 million farmers and 20 million farm labour engaged in tobacco farming besides 10 million people working in processing, manufacturing and exports, in the country. Bidi rolling alone provides employment to 4.4 million people and, 2.2 million tribals are involved in tender leaf collection. The main beneficiaries are the small and marginal farmers, rural women, tribal youth and weaker sections of the society. Annually, tobacco contributes INR 4,400/- crores towards foreign exchange earnings accounting for 4 per cent of the country's total agri-exports and INR 14,000 crores to excise revenue which is more than 10 per cent of the total excise revenue collection from all sources (Source: https://ctri.icar.gov.in/for_tobacco_Economy.php). Considering its economic importance, insurance premium subsidy may be continued with. **Given such an important contribution to the national revenues, but considering it as sin crop, the guidelines as vide Table 4.2 may be adopted in customizing the premium concession slabs.**

Conclusion

An objective and transparent system of customising the premium subsidy on different crops under different situations based on one-factor criterion or two-factors criteria has been suggested vide Tables 4.1 and 4.2. In calculating the different slabs of premium subsidy, the following may be kept in mind

i) Calculating the level of 'X' is important, where under the Government to begin with decides on the upper limit of the premium to be paid by the farmers (A) under situations of low-risk or high compatibility of the crop. And, the value of (B) will emerge from the market-determined price discovery mechanism, which will obviously vary across the districts.

ii) In regards to factor 'A' (upper end of the premium to be paid by the farmer under the situation of low-risk and high-compatibility district-crop combination), it is advised to offer a minimal rational & uniform rate for various seasons as now, namely *Kharif, Rabi* and annual horticultural and commercial crops. It is however clarified, that the existing rates may be retained or modified as the government decides appropriate from time to time. This base rate needs careful examination as it impacts the premium subsidy that will be available to the farmers under medium-risk & high-risk categories under both methodologies of customization: single-factor and two-factors based formulae. One important aspect, that needs to be considered in fixing the base rate 'A', is the national priority of the crop.

iii) The two ranges of **i)** 10-25 per cent; and **ii)** >25-50 per cent suggested for deduction from 'X' vide Table 4.1 (single-factor criterion), can be more flexible.

The ranges can be modified and adopted as:

a) Up to 25 per cent (single-factor criterion)
b) Up to 50 per cent (two-factor criteria)

Likewise in case of customization vide Table 4.2, factor 'Y' can be modified and adopted as up to 50 per cent in place of 10-25 per cent.

Chapter 5

Management Reforms: Implementation Challenges and Solutions

5.1   Background

The reformulated Pradhan Mantri Fasal Bhima Yojana (PMFBY), launched on 13th January 2016, was conceived as a milestone initiative to provide a simplified and comprehensive risk negotiation window to the farmers at the lowest and uniform rates of premium for different seasons across the country. The main aim was to reduce the premium burden on farmers and ensure early and timely settlement of crop assurance claim for the full sum insured. In essence, the Government promised an affordable and evidence-based crop insurance scheme to ensure comprehensive risk cover for crops against all non-preventable natural risks, encompassing pre-sowing to post-harvest phases and, to provide adequate compensation for the loss incurred through a system of proportionate & timely claim settlement. Under the scheme, the premium cost over and above the farmer's share is equally subsidized by the state and central governments. However, in case of North Eastern States, Government of India shares 90 per cent of the premium subsidy to promote the uptake in the region.

This scheme when launched in 2016 was initially made compulsory for loanee-farmers benefitting from Crop Loan/Kisan Credit Card (KCC) account for notified crops and remained voluntary for others. The scheme covers all food & oilseeds crops and annual commercial/horticultural crops for which past yield data is available and for which requisite number of Crop Cutting Experiments (CCEs) are being conducted under General Crop Estimation Survey (GCES). The PMFBY though well intentioned and sincerely operated, seems to be facing field challenges as manifest in its limited reach in terms of crop coverage, farmers & geographic spread. The hoped for coverage of non-loanee farmers free of their volition did not happen. In fact, some states have opted out during this short period of implementation. Lack of appreciation of the market-linked operation scheme has led to the farmers viewing the scheme more in the nature of an assured return against the premium paid by them. Given this mis-perception of the scheme it had to be responded to by changing some important features of the scheme as initially encased. The central government revamped PMFBY to some extent and introduced PMFBY 2.0 with effect from 2020 *Kharif* season, under which even the loanee-farmers were given the option of free choice, of insurance cover.

5.2 Ensuring Egalitarian and Effective Implementation

The farmers would see greater value of the crop insurance scheme like PMFBY, if they benefit from timely & proportionate compensation of the income losses they suffer on account of the notified risks. This warrants more truthful, speedy & accurate assessment of loss, followed by speedy settlement of claims. The farmers also feel left out when genuinely suffered losses are not compensated, which of course from the governance perspective is natural, since the loss assessment is "Area & Yield indexed Estimate". **The solution to this**

lies in adopting smaller geographic units as 'Insurance Units'. It should not go beyond a village, in any case. Yet, this may not yield a composite solution.

More importantly, the farmers and their representatives feel that there is inter-district & inter-state variation in the benefit received by the farmers from the scheme. This opinion has a factual basis, as the features of the scheme apply uniformly across the country, when in reality production environments differ visibly.

The share of premium obligation of the farmers is minimal, but being uniform, the outcome of benefit turns out to be inequitable & disproportionate. Taking the case of irrigated & non-irrigated systems, the farmers under the irrigated cultivation system or the well-distributed rainfall regions who are less likely to suffer yield & income losses can be expected to feel absence of any benefit from the insurance cover they would have bought. The concentration of claim settlements, that is seen in a few districts is a reflection of this hiatus in the basic feature of the scheme. These claim settlements could be genuine, given that the farmers in these districts could be raising their crops under more challenging circumstances. But, this genuineness may not be appreciated by farmers elsewhere who may be experiencing a sense of cross-subsidising the farmers in the more difficult production-region/states/districts.

When such a perceived sense of discrimination / differentiation happens, one can expect drop in the number of farmers opting for insurance. Such a declining trend can cause decline in the number of bids offered by insurance companies (ICs), and consequently higher premium quotation on account of lower competition.

In a market-led insurance cover, the secret to discovering rational & competitive premium quotes amongst other factor lies in achieving:

- Higher participation of farmers
- Greater coverage of cropped area
- Larger number of bid responses

While uniformity of features of a scheme is good, as it keeps the scheme-features simple, it may not measure up to fulfill the basic objectives of the scheme in an equitable & egalitarian manner. **Hence, some differentiation becomes essential, keeping the same as minimal as possible.**

5.3 Five-pronged Strategy as a Response

It is in the context, that the following five-pronged strategy is suggested for ensuring egalitarian and effective implementation:

i) Addressing the challenges of the scheme
ii) Strengthening the state government capacity
iii) Increasing the scheme penetration
iv) Targeting competitive environment for the scheme
v) Enhanced use of technology

All these are discussed in the sub-sections 5.3.1 to 5.3.5, that follow

5.3.1 Addressing the challenges of the scheme

The management issues under PMFBY&RWBCIS are related to promotion, registration, crop cutting experiments (CCEs), loss assessment, localized claim disbursement, and claim disbursement to farmers. Major issues/hurdles/constraints observed in relation to the scheme including its implementation were discussed with stakeholders in various meetings held online and offline in Rajasthan, Haryana and Uttar Pradesh. These meetings were anchored by the Sub-group II members.

From different meetings/interactions/workshop/focus group discussions, the operational issues and challenges were compiled & prioritized for offering optimal solutions. The different stakeholders, who were interacted with, included the officials/representatives of various Departments including the Revenue Department, Banks, Insurance companies, , Farmers and Common Service Centres (CSCs). The solutions recommended will help in resolution of important issues and enable expansion of the scheme.

Issues and Solutions		
Stakeholder	**Issues**	**Solutions recommended**
A. Scheme Penetration		

1.Farmers	**1.1.Promotion/advertisement of the scheme:** Important details of the scheme are not completely known to majority of the farmers	• Notices should be displayed at important places in villages and communication made before holding the promotional meetings in the villages. At least two promotional meetings/ year should be held for a detailed description of the scheme in the village along with display of promotional material at important public places in the village including Gram Panchayats, Farmers Service Centres (FSC's), PACSs/LAMPCSs, market centre etc.
		 • Extensive use of digital technology
		   ✓ Video & Audio clippings shared on mobile
		   ✓ TV discussions
		   ✓ Posting on the dedicated National Crop Insurance Portal (NCIP or NCI-Portal hereafter)

	1.2.Regular information about the scheme to registered farmers: It	• It needs to be improved through regular messages and voice calls using registered mobile number, to keep the farmers abreast of changes about the scheme, progress and

	needs to be enhanced	• support for farmers • May use the facility of Kisan Call Centres (KCCs) to enable registered farmers to seek clarity & status relating to the scheme by using the Toll-free number. The KCCs may be supported backend by connecting them to the Project Monitoring Unit (PMU) of the PMFBY
	1.3. Display of list of benefitted farmers in village panchayat office: It is helpful for motivation and promotion of scheme	• It is good to display the list of claims received and farmers benefitted at different locations including GP office. • The list may also be made available on the National Crop Insurance Portal (NCI-Portal) for free and open access.
2. Common Service Centres (CSCs)	**2.1 Promotion by CSCs among non-loanee farmers:** The promotion/advertisement of CSCs among non-loanee farmers will help in increasing registration of non loanee farmers	• Promotion for on-boarding of non-loanee farmers by the CSCs, as also their self-registration be encouraged to enhance scheme coverage. Given that, insurance coverage is not compulsory in case of loanee-farmers too, they too need to be reached out. • The CSCs may be incentivized to promote & escort the farmers by linking honorarium payment to the number of registration made by them (both loanee and non-loanee)
3. State Government/ Agricultural Department	**3.1. Awareness creation among farmers:** More awareness needed about the different aspects of scheme among farmers	• Awareness generation calls for comprehensive and consistent use of mass media & audio-video channels for popularising the scheme features including changes, if any & advantages • Orientation & training of peoples' representatives of PRIs (Panchayat Raj Institutions), so that they can take the message to the people. They can become effective ambassadors of PMFBY. • Similar orientation & training programme for the members of the FPOs, SHGs, Watershed Development Committees etc. will strengthen the process of reaching out to all the farmers. • Orientation & training programme for all the officials of field agencies of the state departments, banks, and insurance companies.

		• Online training content may be customised based on specific requirements • Adequate & dedicated budgetary provision should be made to enable these roll out of awareness programmes.
	3.2. Manpower support with IAs: Shortage of manpower impacts the promotion of scheme, estimation of losses and thus, timely payments of claims	• There should be sufficient number of field staff/trained manpower deployed by the Insurance companies (ICs) @ at least two field officers per Block for undertaking field visits/interaction/official work. • A scale-based minimum number of manpower to be deployed should become a condition in the tender.
B. Registration		
1. Farmers	**1.1.Registration process in banks:** The majority of the farmers are satisfied with the simple and automatic registration process in the scheme for loanee farmers. There are issues around wrong registration of crops that are actually grown in the field as bankers generally use the crop information mentioned in the farmers' loan file, while crops grown in the field may be different.	• Before finalizing the registration process, farmers should be consulted for verifying actual crops grown vis-a-vis the Khasra numbers to avoid complications at the time of claim settlement. • It would help in making the farmers realise the importance of integrity in mentioning the crop details in applications, that they file for different purposes – crop loan, PMFBY etc. Consistency across the schemes is important. • Digitaisation of all the schemes as taken up by DA&FW under its AgriStack/DigiStack initiative will enable cross-DB (database) verifications. • Adoption of Crop Survey Application as already done by states like Karnataka will improve data integrity. Based on this corrections to the crop entry can be effected • Inter-operability of different databases will ensure accuracy
	1.2.Registration process of non loanee farmers: Proper motivation of non-loanee farmers for	• Registration process of non-loanee farmers may also be facilitated at CSC, PACs, local Bank etc. who may be paid service charges by the Insurance companies (ICs) as an incentive/service fee. • Promote online registration via self-

	registration	registration. • Promotional activities that will generate awareness about PMFBY among the farmers at large
	1.3.Name and address entry in registration: There are issues of wrong entry of name of farmer and address and rejection of claim by insurance companies due to these mistakes	• With typing of Aadhar number, khasra number, automatic fetching of other details of farmers in NCI-Portal should be enabled. The insurance companies should re-verify details with bankers/registration agency before rejecting claims on the basis of such errors.
	1.4.Crop name and plot name entry in registration: There are issues in the wrong registration of name of crop/plots	• There should be automatic linkage of land records with NCI-Portal in all areas/regions. Further crop/plot number may be enquired/verified from farmers/other sources before finalizing registration
2.Common Service Centres	**2.1.Verification mechanism for documents:** Submission of fake/manipulated documents leads to problems in claim settlement and moral hazards	• There should be mechanism for verification of documents submitted by non-loanee farmers, and provision made for levy of penalty / punishment/ black listing when farmers submit fake documents • While this may be more probable in case of non-loanee farmers, same diligence will be needed in every case including loanee-farmers
	2.2.Higher upload space in NCI-Portal for submission of documents: Non readable/incorrect documents of farmers, software space is too less for uploading scanned copy of original documents; and size minimization of scanned document beyond a certain level for purpose of	• Non-readable/incorrect documents of farmers should be returned immediately with a message and, Portal space for uploading of the document by the CSCs enhanced.

	uploading degrades its readability	
	2.3.Timeline in returning/rejection of wrong/incorrect document by NCI-Portal: There is delay in returning/rejection of registration for correction from NCI-Portal.	• A rational timeline may be laid down for return of wrong document/information submitted by CSCs related to registration of non-loanee farmers, so that the application may be submitted within stipulated time • This will hold good when loanee-farmers too use CSC facility for registration
	2.4.Timeline for resubmission of document/informatio n by CSCs: There is delay in resubmission of corrected document/information by CSCs on NCI-Portal and the farmers' registration/claim is rejected	• There should be timeline laid down for return of corrected document/information by CSCs to NCI-Portal for proper registration. The CSCs should also play proactive role in protecting the interests of farmers, so that their claims are not rejected • Repeated error or beyond the prescribed-threshold level errors should invite penalty
	2.5.Payments to CSCs: Delay in payments for registration	• The payment to CSC for registration of non-loanee farmers should be made within two months • An online system may be put in place, so that DBT becomes the norm
3. State Government/ Agricultural Department	**3.1. Registration process of non-loanee farmers:** Proper motivation to non-loanee farmers for registration is needed	• Registration process of non-loanee farmers may be facilitated through online self-registration, and registration at village institutions like GP, CSC, PACS etc.
4. Insurance Companies	**4.1.Documents for rent/lease/tenant:** Due to incomplete knowledge and non-availability of proper document for rent/lease/tenant farmers registration is	• Guideline for rent/lease/tenant certificate should be clear, as this document is valid for consideration as tenant certificate. Cancellation of registration creates dissatisfaction among farmers. • The DA&FW may therefore issue comprehensive guidelines in this regard in due consultation with the Department of Land

	cancelled	Resources • It would be good to promote adoption of Model Land Lease Act shared by NITI Aayog, with the states
	4.2.Moral hazards: Wrong submission of information, land utilized for other than cultivation purpose is also registered for insurance in anticipation of more claims	• Provision of wrong information to attempt unethical claim settlement can be checked by popularizing land survey App. Any such moral breach more than once by any farmer/registrant should render him ineligible for full premium concession due to him. • A system of penalty may be in-built.
5.Banks	**5.1. Registration of farmers:** Delay in registration of farmers due to lack of integration of Aadhar, land records and mobile number. All the bankers during discussion raised this point relating to time taking process of registering all details of the farmers in the NCI-Portal, which as a result is causing the staff to commit mistakes during registration.	• Updating and digitization of land records in all the states and linking these records with NCI-Portal; auto-fetching of farmers' data linked to Aadhar number for higher accuracy, faster registration and transfer of data will bring efficiency in the system. Further, NCI Administrator should interact with bankers to streamline the registration process • Land record details, Aadhar number & mobile number should become mandatory fields for successful registration
	5.2.Mechanism for correction of errors in the portal: Errors in registration causes losses to farmers	• There should be mechanism/ provision in the NCI-Portal for correction of errors in registration by banks/CSCs/ others through correction/editing window and its time duration must be decided after interaction with these agencies. The District level Monitoring Committee (DLMC) may be given some proportionate powers for taking final decision on these issues as many a time, farmers' claims are rejected due to errors in registration. Such a situation may cause avoidable

		escalation of the pressure to higher levels seeking resolution
	5.3.Registration of land and claim distribution in joint ownership: Problem in registration and claim distribution	• It may be examined whether a joint bank account number should be sought for in case of joint ownership of land. • In the alternate, the Bank account number provided by the registering farmer should be assumed as final in distribution of claims.
	5.4.Certification of crops taken by loanee farmers: Certification of crops grown actually by the farmers is difficult task	• Truthful reflection of the crop grown is critical • Promoting adoption of Crop Survey Apps across all the states is important, based on which, entries may be verified post the registration**. Examples include**: Haryana Govt. scheme 'Meri Fasal Mera Byora' is a good case for replication, and linkage to farmer's registration in NCI-Portal for reflecting accurate information on crops cultivated. Further, access to this crop information may be provided to ICs, Banks and CSCs for minimization of mismatch in crops in case of disputes.
	5.5.Submission of registration data and premium: Delay in submission of registration data and premium to ICs leads to cancellation of farmer's registration and further no claims can be made in case of losses	• Better coordination is required between Banks and Insurance companies. All the technical issues must be resolved and, in no case should the farmer suffer. His claims should be settled in time and correctly. • If all the stakeholder / actors are enabled open access via the common platform, then information transmission between/among them becomes easy & timely and will minimise information mismatch.
	5.6. Penalty for wrong entry in registration: The penalty for wrong entry of farmers detail/ or delay in submission of records is too high and it leads to continuous pending of	• More interaction is required with bankers on this issue and penalty for wrong entry may be limited to interest on premium paid by farmers • The system of penalty must be accompanied by a system of incentive on the work being carried out.

	cases.	
	5.7. Honorarium to concerned bank officials: Honorarium is provided to the Head office of the bank for registration, but and registration officers do not get anything of it	• The honorarium for registration may be directly provided to concerned officials involved in registration of farmers. This will motivate them to work for quality output as it is an additional assignment.
C. Premium		
1. Farmers	**1.1. Premium rates for farmers for important crops:** Majority of the farmers are satisfied about premium rates for different crops. However, some small holder-farmers have suggested for reduction of premium rates for crops.	• In order to retain the simplicity of the premium structure, differentiation based on factors like land holding size etc. is not advisable. As recommended in this Report, the only determinant(s) of premium differentiation advised is/are vulnerability of the District and National priority with reference to the crop. (Refer Chapter 4 for details)
	1.2. Return of premium amount: If the farmer's registration is rejected, the premium amount is held for long	• If the farmer's registration is rejected due to some reason, the premium amount should be returned within a prescribed time frame, failing which the agency concerned may be held accountable. • Rejection should result in automatic transfer of Premium amount on the lines of DBT linked to the Bank Account of the Insurance Company.
2. Insurance Companies	**Higher actuarial premium for some crops:** Greater risk in certain crops has led to higher premium	• This Report recommends graduated/customised premium concessions linked to risk vulnerability of the crop in the district and national priority of the crop. If this is followed, premium discovery will be more rational (Refer Chapters 3 & 4 for details).
D. Loss Assessment		
1. Farmers	**1.1. Loss estimation process in localized claims:** Loss estimation process is generally	• Sufficient number of trained manpower should be deployed by the insurance companies to complete the survey work within the minimum prescribed time period in case of claims

	delayed and it hinders farmers in clearing the field for next crop sowing. Some time, survey takes 2-3 months	relating to localised events. Further, use of suitable digital technologies may be encouraged to complete the survey work within the earliest possible time to settle the claims • The bid document must demand a minimum number of manpower & technology to be deployed through inserting a provision; also provision made for levying penalty for delay in completing the survey • If the farmer is not able to take up timely cultivation in the following season, because of the delay in completing the process of survey, the system should compensate him proportionate to the loss.
	1.2. Information about CCEs process: Lack of farmers confidence in the transparency of CCEs	• It is necessary to rationalise the numbers of CCEs based on remote sensing data to facilitate efficiency. Please refer solution suggested to issue vide Sl. nos. D 2.2 and 2.3 • Introduce a system of second assessment through a third party by generation of random locations • Proper communication should be made in the village through various rural institutions for conduct of transparent CCEs • May be broadcast as widely as possible using all centres of information-diffusion like CSCs, Portal etc.
2. State Government/ Agricultural Department	**2.1. Duration of CCEs for early, timely and late-season crop :** A single CCEs duration is not sufficient for all varieties of same crop	• This is a good suggestion and deserves close look. • With advice from NARS (ICAR&SAUs), an appropriate time schedule for different crops based on their period of maturity may be decided. In any given season, crops of varying duration are raised by the farmers.
	2.2. Delay in conduct of CCEs and its report: Delay in conduct of CCEs and its reporting and accuracy issues due to	• Application of technological approaches like smart sampling, two-step yield estimation, and direct yield estimations etc. is useful. Crop losses due to localised climatic events such as hailstorms, landslides, small floods and post-harvest losses, where CCE data do not play a

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	shortage of staff, payments.	role, need to be supported by a mobile-based App. The methodology should be modified to cover more insurance units for CCEs to capture heterogeneity in particular area.
	2.3. Transparent and reliable CCEs: Farmers should be able to trust the system transparency in conduct of CCEs under the scheme. Proper information needs to be circulated in village during CCEs	• The G.P Sarpanch or his/her nominee and two other lead farmers may be invited to be present during conduct of CCEs. • Information on CCEs should be shared with members of village bodies like G.Ps / PACSs & other cooperatives / CSCs / FPOs / SHGs / WDCs • Post the information on the NCI-Portal • Although there are several satellites today that can support crop insurance sector, it is recommended that a dedicated constellation of 3-4 satellites of high to moderate resolution (10-30 m) with 10-days frequency and, with multispectral optical sensors, two microwave satellites, and one hyper-spectral satellite may be deployed to increase the precision of crop yield estimates/loss assessment at the village scale.
	2.4. Honorarium for CCEs and outsourcing: Delay in Payment of honorarium for CCEs and such other activities should be avoided	• Honorarium to organizers/workers involved in CCEs should be transferred within two months. Provision of outsourcing the staff for conduct of CCEs should be made. • The transfer of honorarium should be online
3. Insurance Companies	**3.1. Use of technology in Crop cutting experiments:** Large no. of CCEs and human intervention lead to mistakes in CCEs	• Number of CCEs should be rationalised by adopting smart sampling techniques developed by ICAR-IASRI. After testing for efficacy of this technique, it may be scaled up to larger area. Also see Sl. nos. D 2.2 & 2.3 • Similarly, satellite-based technology may also be used on pilot basis and its shortcomings addressed. Full scale application of remote sensing will rationalize the number of CCEs to be taken up. This will improve the cost & quality of CCEs to be actually undertaken

	3.2. Use of technology for survey: Localised/ post-harvest survey and CCE record on App	• All localized/post-harvest survey & CCE activities must be recorded on particular App simultaneously by Agriculture Department and ICs. Video-recording should be mandatory.
	3.3. Survey report: Survey form should be uploaded in time	• Survey forms in case of localized events/post-harvest loss must be uploaded on PMU portal and handed over to ICs within seven days from the date of survey
	3.4. Loss estimation and settlement of claims: Delay in loss estimation due to large no. of surveys are to be conducted in certain time period for localized claims settlement	• This can be resolved by enhanced use of technology and proportionaly higher deployment of trained manpower as suggested in response to Sl. nos. D1 and E 1.1

E. Claim Settlement

1. Farmers	**1.1. Payments of claims for losses:** Delay in payment of claims is reported by farmers	• Timely payment of claims for losses is suggested as the most important intervention for increased adoption of the scheme. The maximum period for distribution of claims should be two months, so that the money can be used by the farmers for the following crop season. • The points of delay may be identified and issues resolved. The delays could be on account of delay in conduct of CCEs, which suggests the need for rationlising the total number of CCEs to be conducted by using remote sensing technology. • The location of the CCE may be a computer generated random number to maintain objectivity & transparency. • Delay could also be due to errors in entry of details - name, crop etc. These need to be taken care of. • Time schedules be fixed for all these activities, so as to complete CCEs within the threshold timeline.

		• Estimation of loss may also be time-scheduled. This will be possible if the entire process beginning with deciding on CCE locations is digitized and online monitoring is undertaken. This too can be AI-enabled, so that an alarm is raised in case of delay at different levels.
2. State Government/ Agricultural Department	**2.1. Priority for settlement of localized claim:** Delay in localized claim settlement. This delays in sowing of next crop	• With the use of remote sensing/drone technology/smart sampling/outsourcing etc. the process of claim settlement relating to localised events should be prioritised and expedited • Further, refer D 1.1
	2.2. Central toll free number for complaints for Localised claims/losses: There are different numbers for complaints for localized claims/losses	• A Central toll free number to receive complaints in respect of localised claims/losses and redressal is necessary • It should be multi-language complaint • The-Kisan Call Centre (KCC) infrastructure can be used effectively too • Also see F 2.2- Haryana Model
3. Insurance Companies	**3.1. Field/ Khasra no. column on NCI-Portal:** Without this information claim settlement is difficult	• Khasra number column should be marked as a mandatory field on NCI-Portal at the time of enrolment
	3.2. Access to farmers' mobile for communication: Special access to farmers mobile for timely and regular communication	• In NCI-Portal, mobile details of the farmers are not visible. The access to farmers mobile through some agency may be facilitated for timely communication with them, when required for collection of document and timely claim payment. • However, care should be taken to ensure that this mobile no. is not misused for promotion of other insurance products by companies; or access abused. Such a facility can be provided only after due security code is inserted, That ensures respect of farmer's privacy.
	3.3. Intimation of localised losses intimation on NCI-	• Registration of intimations of the localised losses on NCI-Portal be made compulsory for tracking and avoiding the delay between loss

	Portal: Delay in loss intimation causes difficulty in claim settlement	assessment & intimation
	3.4. Disbursement of subsidies: It is observed that the Insurance Agencies/ Companies (IAs/ICs) did not process the claims as the premium subsidy which is the major portion of the premium amount is not placed with them in time	• After submission of the registration details by ICs, the transfer of premium subsidies should be made by concerned state/UT and central government at the earliest. To expedite the process of disbursement of claims, the registration number of farmers should be considered without cross-checking further details.
4. Banks	**4.1. List of beneficiary farmers, claim amount and reason for no claim:** It is difficult to answer farmers queries without access to the list of beneficiaries, claim amount and reason for no claim	• List of beneficiary farmers, non-beneficiary farmers, claim amount and reasons for rejection of claim should be provided to banks by ICs for resolution of complaints and information to farmers. • If Aadhar number, mobile number and Bank Account number are linked, it will become easier for the Bankers to share the message with the farmers.
	4.2. Promotion of linkage of Aadhar number with banks: There is delay in claims payment for some farmers due to non-linkage of Aadhar with banks accounts	• The process of linkage of Aadhar number with Bank accounts must be completed for timely claims payment. This can be made a mandatory field for registration.
F. Stakeholders coordination and Complaint redressal		
1. Farmer	**1.1. Survey of farmers' feedback by Insurance companies:** The responses of farmers are not collected and	• Insurance companies should regularly interact with farmers by scheduling minimum number of meetings for feedback, which should be collected and verified. • Further, District Level Monitoring Committee (DLMC) and State Level Monitoring

	verified.	Committee (SLMC) should compile farmers' response on regular basis. It is equally important to act upon the feedback received. • There can be a window on the NCI-Portal for the farmers to share their feedback
2. State Government/ Agricultural Department	**2.1. Coordination among all stakeholders:** Non-coordination in flow of information among all stakeholders leads to delay/inefficiency	• There should be higher coordination with respect to flow of information among all stakeholders through regular meeting/ facebook/ whatsapp groups interactions etc. • This will supplement the convergence of all information, with open access to NCI-Portal to all the stakeholders
	2.2. Central complaints compilation system: Central complaints compilation system of Haryana is useful	• There is need for a digitally-enabled centralised system of grievance compilation and redressal. • Complaints compilation model of Haryana State can be studied and followed in other states. It is mainly used for localized claim settlement. • This is another illustration of a best practice, worthy of sharing and adoption in other states
	2.3. Access to NCI-Portal at district level: such an access should be facilitated	• The DLMC and others responsible for implementation at the district level should have access to NCI-Portal. This will help in resolution of minor errors at district level itself and in time.
	2.4. Active grievance redressal committee at district level : Resolution of complaints of farmers are delayed	• The DLMC should be empowered suitably to impart it greater dynamism in redressal of complaints of farmers. Non-empowerment leads to non-redressal of complaints in time, resulting in their escalation and concentration at higher levels, making response difficult and delayed. It then takes long time in settlement and, the resultant time lag discourages farmers in sustaining their interest. • The DLMC may be restructured as District Level Monitoring Authority (DLMA) with the power to settle certain nature of issues as the final authority. The nature of issues including financial matters can be identified for

		delegation to DLMC after duly empowering them. In regards to financial matter, the threshold of delegation may be laid down
3. Insurance Companies	**3.1. Information to ICs by banks:** Information gap causes misunderstanding between banks and insurance companies. It is farmers who suffer in result, when their claims are declined.	• ICs should be informed regularly on status of transfer of data/premium by the Banks through NCI-Portal. Regular interaction may help in resolving many technical issues, that may occur during data/ premium transmission. • Access to common Portal (NCI-Portal) by all the actors of the scheme will help in regular data cleansing and updation. • Auto-generated messaging facility on the registered number of the farmers may become the norm. This will stimulate the farmers to approach the concerned (ICs & Banks) for corrections
	3.2. Information on Change in bank details to ICs: Change in Bank details e.g. IFSC code etc. leads to communication gap among two agencies	• Change in Bank details e.g. IFSC code etc. after merger of banks /address etc should be fetched automatically by ICs
G. Other Issues		
1. Farmers	**1.1. Inclusion of important crops** Most of the farmers are satisfied with the number of crops in the scheme. However, during interaction meetings inclusion of some left over crops with significant area/ revenue were suggested	• As suggested by the farmers, there is scope for inclusion of annual horticultural crops (vegetables) & sugarcane. • The scheme enables inclusion of annual horticultural & commercial crops under PMFBY. To promote inclusion of vegetables and fruit crops, data on average yields needs to be firmed up. • Chapter 3 explains the area-based consideration of crop-district combinations to determine the significance of crops. Adherence to the recommendations as vide Chapter 3 will enhance farmers' satisfaction with respect to crop inclusion.

	1.2. Losses due to water stagnation in paddy during harvesting : Paddy can also meet crop loss due to standing water during harvesting	• Water stagnation of paddy crop when it is at mature stage and is ready for harvesting is harmful. Hence, yield loss due to regular water stagnation for a period up to 10 days before and during harvesting deserves to be considered for settlement of loss claim. • It is advisable to obtain technical inputs from ICAR /SAUs to accept the number of days of water stagnation that negatively impact the yield and, the percentage of yield that is lost. Based on this time threshold may be adopted.
2. Common Service Centres	**2.1. Training of CSCs personnel:** Regular training of CSC staff	• Regular training of CSC personnel may be undertaken by the concerned agencies with a view to upgrading their capacity to respond to efforts to solve practical problems relating to farmers' registration and linkages etc. • It would help to develop a Training Manual for CSCs and others from the State departments, Banks, Insurance companies etc. • A regular training schedule may be adopted for continuous up gradation of field capacity.
3. State Government/ Agricultural Department	**3.1. Outsourcing of an activity:** In the scheme, most activities are urgent and are to be performed in short period. Performance of that activity needs extra manpower for short period.	• In case of insufficiency of time, various activities may be executed through outsourcing for e.g. registration, CCEs, localized claim estimation etc. • The outsourcing may be permitted under strict supervision by laying down conditions, that will help in monitoring the quality and objectives of the scheme. Fairness will need to be ensured through proper checks.
	3.2. Qualification of staff of survey agency: Higher efficiency and prevention of delay in survey is required	• The survey staff of the agency should be well qualified/trained for higher proficiency & speed in execution of their duties • Minimum qualification of the staff to be hired by the agency may be prescribed as a condition. • The agencies should be required to train their manpower through a customised training programme which may be developed by DA&FW. Refer G 2.1.

	3.3. Timely and reasonable payment to field officials/staff of ICs/IAs: Low payments hamper quality of data	• The field officials/staff of Survey agency should be paid reasonable emolument/ honorarium in proportion to the nature of work, and time they invest. This should also include travel allowance to cover field visits. • The payment should be made in time & digitally transferred.
	3.4. Infrastructure support with IAs: Shortage of infrastructure including IT office/vehicle/ weather station at Block/Panchayat level impacts the promotion of scheme, estimation of losses and thus, timely payments of claims	• The minimum required hard infrastructure including vehicle, automatic weather stations (AWSs etc.) in addition to office & manpower, as also maintenance of the infrastructure should be laid down as a condition in the bid document for selection of ICs. • The existing Guidelines on setting up and renewal protocol of AWG stations may be revisited and liberalised to promote ease of doing business. It would help to promote AWGs through private sector in addition to strengthening of public sector infrastructure • Government agencies namely, line departments at the District, Block and GP levels need to be supported in up grading their IT infrastructure and software. More importantly, they need to be trained in use of IT infrastructure
	3.5. PMFBY Portal friendliness: As per the participants in the meeting, the system is not friendly. It is rather complicated.	• The Portal version may be upgraded for high speed, ease, simplicity and with higher upload facility, so that it is appreciated as friendly by all the stakeholders. • Training of the field staff in use of IT infrastructure and NCI-Portal would be useful.
	3.6. Successful model/activity of PMFBY in states: Successful models of PMFBY should be followed in other states	• Innovative learnings/success cases identified in various states should be shared with other states for adoption. For example, successful claim settlement model of Karnataka can be analysed for its implementation in other states. • A system of compiling best practices should be put in place. All these can be shared in the NCI-Portal.

	3.7. Budget provision for other stakeholders at district level: Budget constraints for other stakeholders at district level for promotion, supervision and redressal of issues	• There should be budget provision made available to the public sector agencies including the Departments of Agriculture & Horticulture at District/ Block/ G.P levels; as also KVKs to undertake promotion and supervision of scheme implementation, and also redressal of issues & grievances. • It may be necessary to support engagement of technical manpower. The states may be encouraged in this regard • The states/UTs must replicate the Project Management Unit (PMU) under a CEO, as adopted by DA&FW at the centre

5.3.2 Strengthening the state government capacity

The capacity of the state-level machinery responsible for efficient implementation of PMFBY needs to be strengthened all along the insurance chain. For this purpose, customized orientation and training content, inclusive of digital dimensions may be developed, and regular programmes organized at scheduled intervals. These programmes can be of hybrid mode - physical and virtual to enlarge the scope of outreach.

Strengthening of state capacity should be understood as inclusive of agencies/officials responsible for various aspects of the scheme at different levels - GPs, Taluk/Block office, District and State machineries. The peoples' representatives, particularly at GP and Taluk/Block levels will also need to be covered.

Assessment of crop losses remains one of the major issues in PMFBY& RWBCIS. As per the Guidelines, the Insurance Companies shall compulsorily use technology/mobile applications for monitoring of crop health/crop cutting experiments (CCEs)/reporting of crop losses, crop survey etc. in coordination with the concerned states machinery. The states need to facilitate Insurance Companies with Satellite Imagery wherever required and also facilitate usage of Drones by way of prior approval of agency from which such data can be sourced.

Involvement of local level institutions is extremely important in ensuring peoples' participation, and building requisite trust in the process. Local revenue functionaries (for example, Revenue Inspector etc.) may be involved and given time bound targets to assess the crop losses at plot level and made accountable for ensuring payment within given timeframe. The KVKs can also be mainstreamed with the district-level line departments for assessing the losses. Remote sensing based assessments can be validated at the ground level with local institutions to build more reliable insurance chain.

The use of remote-sensing, drones, satellite imagery and digitisation of land records should be urgently promoted for effective implementation of the PMFBY. The states must promote

all these practices by supporting infrastructure, training programmes, enabling access to sources of data like remote-sensing etc. It must be realized that risk management would be a major support for the farmers, and the states would be saving money they now need to spend in compensating farmers through relief. Strengthening of PMFBY/Risk Management ecosystem in essence amounts to a more rational approach to compensating the farmers, and building in them the confidence of negotiating risks that are common in agriculture.

The states may be encouraged to set up a special cell or single window system for PMFBY along with the fixation of premium and insurance amount, so that larger numbers of farmers are able to appreciate the advantage of risk cover under PMFBY.

There is a need for creating **Corpus Fund** to strengthen & sustain this scheme, and reduce the financial burden on government. Such a Fund can be created at both national and state levels, since both have the obligation of financial outgo.

In order to institutionalise the system and ensure smooth operation of the scheme implementation, the states must establish dedicated platforms at both state & district levels. Both these must be robust, facilitated by empowered authority, professional manpower to fit the specific domains, infrastructure etc. Insurance itself is a complex & challenging field. Crop insurance is much more complex & challenging particularly in India on account of 120 million number of land holdings, small & marginal nature of farmers and multiple cropping system. Such an environment needs institutions built on appropriate structures & systems. **Hence, it is suggested that 'State Risk Management Authority (SRMA) and District Risk Management Authority (DRMA) are set up by the states.**

5.3.3 Increasing the scheme penetration

This requires creating a dynamic database across regions on crops & corresponding risks, varietal alternatives, alternative cropping systems with economic analysis, market demand etc. for effective risk management. The vulnerability categorization of the agriculturally significant districts across the country based on various crops as elaborated in Chapter -3 of the Report has a great potential in promoting agro-ecologically sound production systems. **The first principle of any risk management is to promote preventive practices. The key performance Indicator (KPI) for measuring the success of PMFBY has to be the rate of crop failure**, it has been able to prevent and not the number of claim settlements that emerge and are settled. This approach entails promotion of production systems guided by intensity of vulnerability of a crop or group of crops to the locational production environment. Awareness programmes need to be carried out to increase the penetration of crop insurance to create a new and higher demand. It is also necessary to create a competitive environment that will invite greater participation of Insurance companies, so that premium rates see downward pressure stimulated by competition.

It is important to cover every individual farmer of the country under the insurance scheme irrespective of its region and the agro-ecological conditions in the long run, with a view to promoting market-led and farmer-participative risk management system. The farmers should

be incentivized with a healthy system of compensation of the potential losses linked to risks associated with nature (pre- & production-stage) as well as price fluctuations (post-production stage). The ease of doing business for the market-participants namely the insurance agencies is also critical to create a virtuous cycle.

This is feasible if the volume of business rises on account of farmer participation. Equally important is system efficiency, which upholds truthful and timely loss assessment, claim settlement, grievance redressal and ease of doing business ambience for the insurance agencies too.

The solutions suggested to various other challenges escalated by various stakeholders and, captured vide the section 5.3.1 will need to be adopted appropriately to enhance scheme penetration. These solutions encompass manpower, infrastructure, technology, structures & systems.

5.3.4 Targeting the competitive environment for the scheme

There should be strict compliance with timelines for claim settlement to ensure proportionate and timely compensation to farmers. It has been reported that the payment of the claims often get delayed due to lack of transmission of yield data, late release of their share of premium subsidy by some states, yield-related disputes between insurance companies and states, non-receipt of account details of some farmers to enable transfer of claims, NEFT related issues, etc. While private insurance companies investing in the scheme will continue to be 'for-profit', they must guarantee efficiency and transparency.

The claim-settlement chain or the logistics behind transferring the compensation must be improved to process claims faster. Besides, revenue-protection insurance must be implemented, which will allow farmers to protect their income in times of harvest loss.

An important element of competitiveness is that the system is fair and rule/guidelines-bound, so that the market participants like the Insurance Companies (ICs) feel attracted. This necessitates that while they are made to adhere strictly to all the conditions laid down and consented to in the work order/agreement, including the government agencies not asking for the Agreement. It is important to be diligent & adherent to the terms & conditions by all parties concerned including government agencies and insurance agencies. Only then will the system stability and system confidence grow up to the advantage of the farmers in the long run.

5.3.5 Enhanced use of Technology

Use of satellite data and drone

The Insurance Companies (ICs) should rely on technology (remote sensing, drones. Digital etc.) and mobile applications for monitoring of crop health/crop cutting experiments (CCEs)/reporting of crop losses, crop survey etc. in coordination with the concerned states machineries. The states should also facilitate Insurance Companies with Satellite Imagery

wherever required. With the adoption of drone policy in the country recently, application of drone technology has become feasible from the perspective of both technology and investment.

The states may facilitate usage of Drones, particularly in case of localized events which are generally not properly captured in satellite images. This will help in timely declaration of affected area. Analytical models may be developed for different crops linked with colour intensiveness backed by long term data of crop yield assessment for expediting the yield estimation and, reducing the number of crop cutting experiments. Similar models may be developed to interpret images captured by drone for crop yield assessment.

Network of Weather Stations

A wide network of automatic weather stations (AWSs) is necessary to capture ground level data, that is more truthful. This is of critical importance, given the increasing diversity and occurrence of weather extremes on account of climate change. It would help to enable establishment of such a facility @ one per Gram Panchayat. This can be achieved by recognizing facilities set up by different authorities/organization, namely IMD, states, local bodies, academic & research institutions, as also by the private sector. It will help to invite private sector investment in this domain by liberalizing the provisions under which, the private players now establish and renew operation of their weather stations. It is therefore, strongly suggested to effect recovery amendments to the DA&FW's **Guidelines for setting up Automatic Weather Stations (AWSs) and Automatic Rain Gauges (ARGs) by private agencies and their accreditation, standarisation, validation and quality management of weather data etc. '2017'**

Further, all these broad-based facilities may be notified as eligible to generate, feed and share the data with a centralized database at the state and national levels for analytics & interpretation. The declaration of a particular climatic event can be based upon fulfillment of certain basis parameters as defined by the IMD.

Strengthening of the network of weather stations would facilitate promotion of RWBCIS, which is based on weather-index, in contrast to area and yield-based index under PMFBY. In the long run and particularly with increasing area coverage of annual commercial and horticultural crops, RWBCIS would only be a optimal choice, which will demand strengthening of the network of AWSs.

Integration of land records

Integration of land records with the National Crop Insurance Portal (NCI-Portal) can bring down the chances of multiple insurances for a single plot of land. This must receive priority attention. The support of the Department of Land Resources (DoLR) is critical to achieve this across the states and union territories.

Use of innovative technologies in conduct of CCEs

Yield data obtained from the CCEs though accurate but laborious and time-consuming, results in delay in settlement of claims. The Department of Agriculture and Farmers (DA&FW) has been conducting large scale pilot studies (Pilot studies 2019 and Pilot studies *Kharif* 2020) through technology organizations (government/private/national/ international) since 2019 to estimate crop yield at Village/GP level using innovative technologies under the coordination of Mahalanobis National Crop Forecast Centre (MNCFC), New Delhi. Before enlisting large scale application of this technology, its results may be discussed with all stakeholders and they taken into confidence. The application of these innovative technologies will be highly helpful in minimizing delay and errors in CCEs and lead to timely disbursal of claims to farmers. Rationalisation of the number of CCEs to be taken up will help in saving cost, saving time and improving quality of results.

Creation of a robust database for different Automatic Weather Stations (AWSs)

The Radio Detection and Ranging (RADAR) application can be used as an effective technique for improving the efficacy of the weather-based data for forecasting purpose. This will enhance accuracy in capture of weather data and decrease the chances of inter-village variability to the minimum. It is helpful to promote deployment of geo-spatial technologies such as Remote Sensing & GIS (Geographic Information System) along with various other emerging technologies like artificial intelligence, block chain technology, big data analytics, as also computer-based applications based on open-source architecture to monitor the real-time risks related to crop-yields and incomes to the farmers. Private agencies having domain knowledge & practical experience in this field may also be facilitated to partner in planning and execution. Needed policy framework to this effect may be adopted.

Optimization of CCE methodology for higher accuracy

The number of Crop Cutting Experiments (CCEs) has increased many folds which has not only become unmanageable for the states, particularly in the context of reducing manpower, but is also resulting in significant increase in non-sampling errors. ICAR-Indian Agricultural Statistical Research Institute (ICAR-IASRI) sought to address this concern by undertaking a study entitled **"Integrated Sampling Methodology for Crop Yield Estimation using Remote Sensing, Field Surveys and Weather Parameters for Crop Insurance" in 2018-19**. The study was funded by Ministry of Agriculture and Farmers Welfare (MoA&FW), Government of India. The results showed that the number of Crop Cutting Experiments (CCEs) can be reduced significantly (around 30% or even lesser) with less than 10 per cent standard error at Gram Panchayat level.

However, this methodology is yet to reach the implementation stage and is in need of further research and development using drones, advanced sample survey techniques etc. The proposal in this regard submitted to Department of Agriculture & Farmers Welfare for non-cereal crops (*Kharif* 2021 and *Rabi* 2021-22) deserved consideration. **Given the delay in its approval, it may be worth considering to support the study for the season *Rabi* 2021-22**

and *Kharif* **2023**. In the opinion of ICAR-IASRI, the CCE methodology needs to be optimized/minimized using innovative technology for estimation of crop yield across crop & seasons.

Artificial Intelligence (AI) based analysis

It is an innovative policy technique that will automatically trigger during the catastrophic events to facilitate fair, transparent and timely payouts. It is a digital platform wherein the crop insurance policies are plugged into smart contracts on a block chain and indexed to local weather. This pilot scheme, proposed by **Sprout Insure** is underway in Kenya insuring around 1.2 million farmers from April 2020 onwards. Along with Sub-Saharan Africa, West Africa, East Africa and South East Asia, India also have potential for replication of this model.

Such an instrument can be beneficial for the famers, thanks to the potential reduction in transaction costs and premium it can effect, besides its ability to minimise the claim cycle. The long term estimations of this integrated insurance platform model shows a reduction of policy issuing cost by 41 per cent, a premium reduction up to 30 per cent and a reduced claim cycles, from 3 months to 1(one) week. Besides, the model has the potential for increasing the much needed transparency and bridging the trust deficit. The templates for block chain-based insurance products provide the tools for creating customized insurance product with the flexibility to offer weather-indexed crop insurance at scale.
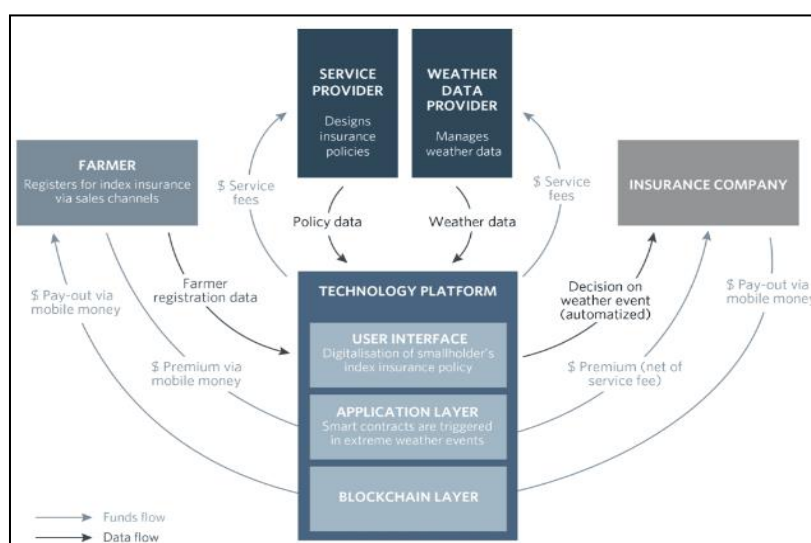
5.4. Risk Management Authority

PMFBY and RWBCIS are market-led government subsidized crop risk management tools. The sustainability & success of such a scheme is predicated upon all the stakeholders - the three principal stakeholders in particular - the farmers, the state and the insurance company adhering to the letter & spirit of the scheme framework. Such a system should not entertain

of any intervention. Simultaneously, it is necessary to recognize farmers as weakest of these 3 (three) principal stakeholders. Hence they will need content guidance, advice & grievance redressal with the odds thrown in their favour within, of course, the maximum latitude that Scheme-Guidelines provide.

For the system to be resilient, speedy and fair it is necessary to put in place Empowered bodies at district, state and national levels. It is hence suggested to restructure the existing bodies into:

District:	District Risk Management Authority (DRMA)
State:	State Risk Management Authority (SRMA)
Nation:	National Risk Management Authority (NRMA)

These may be set up by pooling available manpower, resources & infrastructure supported by technical staff taken on contract. More importantly, these Authorities need to empowered to hear and dispose-off the grievances & issues including those involving finances exercising the delegated powers.

The Ministry is also operating other schemes like online trade (eNAM), contract farming & services, privatised services (e.g. soil testing) which bear high probability of generating disputes. In due course, more such market-led initiations of the government can be expected which too will demand speedy resolution of disputes.

The suggested PMFBY/RWBCIS - Authorities will facilitate to own such additional responsibilities, with appropriate amendments.

In fact, the DFI Committee has suggested constitution of such duly empowered Authorities at different levels.

Chapter 6

Terms of Reference and Guidance for Reference of the Chapter-wise Recommendations

6.1 The Committee was assigned specific terms of reference (ToR). Of the 8 (eight) specifically listed ToR, 4 (four) demand specific deliveries by the Committee, and the remaining four provide the support system. These have been examined and appropriate recommendations made. Further, the Committee has also made necessary recommendations on related matters, not specifically listed taking advantage of the latitude provided for this.

6.2 The ToR-wise guidance on the reference to different chapters with respect to the recommendations is as follows:

ToR (a): All the agriculturally significant districts of the country have been categorized for each of the crops, whose cultivation is significant in the respective districts.

Further, the vulnerability of the districts and concomitant compatibility in respect of different crops has been clearly defined in terms of 3 (three) categories:

- Low-risk ≈ high crop compatibility
- Medium-risk ≈ moderate crop   compatibility
- High-risk ≈ low crop   compatibility

May refer to Chapter-3 which contains series of Tables, that reflect the district-crop-combination-wise categorization under respective states.

ToR (b): Appropriateness/suitability of the crop (s) to a particular district has been indicated in Chapter-3.

It may be noted that suitability is linked to intensity of vulnerability. The nature of correlation between the risk category and crop-compatability is as follows

- Lower the risk, higher the crop compatibility
- Higher the risk, lower the crop compatibility
- Medium risk indicates moderate compatibility of crop

ToR c): Chapter-4 may be referred to, for appreciation of the customization of the premium-subsidy. And the formulae recommended for calculating the graduated

levels of premium subsidy as an obligation of the government (combined for central & state).

More specifically, sub-sections 4.1.1, 4.1.2 and 4.1.3 may be referred to, in order to appreciate the principles adopted for evolving the premium-subsidy formulae. Further, Tables 4.1 (single-factor based determinant) and 4.2 (two-factors based determinant) vide sub-section 4.1.3 may be referred to, for the two (2) formulae recommended for working out the graded premium obligation of the government.

The non-compatibility of crops in a district is indicated by high risk and low national priority **(where the government's offer of premium concession is the least or nil)**

ToR (d): Chapter-5 may be referred to, for purpose of appreciating various concerns/ constraints/challenges that different stakeholders (farmers, insurance companies, state governments, CSCs and others) face in implementing the scheme. These challenges have been compiled by Sub-group II by undertaking field visits and interacting with the concerned stakeholders. In respect of each of these identified issues, appropriate solutions/ remedial measures have also been suggested and exhibited in a tabular form in this chapter. These apply to the country as a whole, though the degree of application may vary from district to district.

Annexure 1

Demand-supply scenario of important crops/ crop groups

A: Trend of stock of supply and demand of rice (million tons)

Year	Supply	Demand	Gap between Supply and demand
2016	110.15	104.00	6.15
2017	112.08	104.00	8.08
2020	118.06	110.00	8.06
2021	120.12	111.00	9.12
2028	135.62	119.50	16.12
2029	138.00	119.50	18.50
2032	145.36	125.00	20.36

Note: Supply - Production Estimates Based on Growth Trends at All India (Exponential Growth Rate of   Past 10 Years); Demand for Foodgrains based on Actual Consumption in 2011 NSS Family Budget Survey

Source: Demand and supply projections towards 2033, NITI Aayog, February 2018

B: Trend of stock of supply and demand of wheat (million tons)

Year	Supply	Demand	Gap between Supply and demand
2016	98.38	91.00	7.38
2017	101.45	91.00	10.45
2020	111.23	97.50	13.73
2021	114.69	99.00	15.69
2028	142.17	110.50	31.67
2029	146.60	110.50	36.10
2032	160.74	117.50	43.24

Note: Supply - Production Estimates Based on Growth Trends at All India (Exponential Growth Rate of   Past 10 Years); Demand for Foodgrains based on Actual Consumption in 2011 NSS Family Budget Survey

Source: Demand and supply projections towards 2033, NITI Aayog, February 2018

C: Trend of stock of supply and demand of coarse cereals/nutria cereals (million tons)

Year	Supply	Demand	Gap between Supply and demand
2016	44.19	40.50	3.69
2017	45.33	40.50	4.83
2020	48.97	46.50	2.47
2021	50.26	48.00	2.26
2028	60.50	60.50	0.00
2029	62.15	60.50	1.65
2032	67.46	69.50	-2.04

Note: Supply - Production Estimates Based on Growth Trends at All India (Exponential Growth Rate of Past 10 Years); Demand for Foodgrains based on Actual Consumption in 2011 NSS Family Budget Survey

Source: Demand and supply projections towards 2033, NITI Aayog, February 2018

D: Trend of stock of supply and demand of pulses (million tons)

Year	Supply	Demand	Gap between Supply and demand
2016	22.95	23.00	-0.05
2017	23.80	24.00	-0.20
2020	26.55	24.50	2.05
2021	27.55	24.50	3.05
2028	35.73	28.00	7.73
2029	37.10	28.00	9.10
2032	41.55	29.50	12.05

Note: Supply - Production Estimates Based on Growth Trends at All India (Exponential Growth Rate of Past 10 Years); Demand for Foodgrains based on Actual Consumption in 2011 NSS Family Budget Survey

Source: Demand and supply projections towards 2033, NITI Aayog, February 2018

E: Trend of stock of supply and demand of oilseeds (million tons)

Year	Supply	Demand	Gap between Supply and demand
2016	32.10	46.43	-14.33
2017	32.70	47.43	-14.73
2020	34.68	50.00	-15.32
2021	35.40	51.79	-16.39
2028	41.29	62.50	-21.21
2029	42.27	63.50	-21.23
2032	45.44	69.64	-24.20

Note: Supply - Production Estimates Based on Growth Trends at All India (Exponential Growth Rate   of Past 10 Years)

Source: Demand and supply projections towards 2033, NITI Aayog, February 2018

Area and production of major crops in India

A : Share of different crops in gross cropped area (per cent)

Crop	Percentage distribution in GCA	
	2017-18	2018-19
Rice	24.01	22.47
Wheat	16.27	14.92
Jowar	2.76	2.08
Bajra	4.10	3.62
Maize	5.15	4.59
Ragi	0.66	0.45
Small Millets	0.30	0.23
Barley	0.36	0.29
Coarse Cereals	13.32	11.27
Cereals	53.60	48.66
Tur (Arhar)	2.43	2.32
Gram	5.79	4.86
Urad	2.90	2.85
Moong	2.33	2.42
Lentil (Masur)	0.85	0.69
Other *Kharif* Pulses	1.03	0.88
Other *Rabi* Pulses	1.02	0.82
Pulses	16.36	14.84
Foodgrains	69.96	63.50
Groundnut	2.68	2.41
Castorseed	0.45	0.38
Nigerseed	0.12	0.08
Sesamum	0.87	0.72
Rapeseed & Mustard	3.28	3.12
Linseed	0.18	0.09
Safflower	0.05	0.02
Sunflower	0.16	0.13
Soybean	5.67	5.66
Edible Oilseeds	12.81	12.15
Non Edible Oilseeds	0.63	0.47
Total Nine Oilseeds	13.45	12.62
Sugarcane	2.60	2.58
Cotton	6.90	6.42
Jute	0.38	0.34
Mesta	0.03	0.02
Jute & Mesta	0.41	0.36
Other crops	6.68	14.53
Total	100.00	100.00

Source : Directorate of Economics & Statistics, DAC&FW.

B: Share of different crops in total food grain production (per cent)

Crops	Share of crops in food grains production		
	2017-18	2018-19	2019-20
Rice	39.56	40.84	39.96
Wheat	35.04	36.32	36.26
Jowar	1.69	1.22	1.60
Bajra	3.23	3.04	3.48
Maize	10.09	9.72	9.67
Ragi	0.70	0.43	0.59
Small Millets	0.15	0.12	0.12
Barley	0.62	0.57	0.58
Coarse Cereals	**16.48**	**15.10**	**16.05**
Total Cereals	**91.08**	**92.26**	**92.26**
Tur (Arhar)	1.51	1.16	1.31
Gram	3.99	3.48	3.72
Urad	1.23	1.07	0.70
Moong	0.71	0.86	0.84
Lentil (Masur)	0.57	0.43	0.37
Other *Kharif* Pulses	0.29	0.22	0.29
Other *Rabi* Pulses	0.62	0.51	0.50
Pulses	**8.92**	**7.74**	**7.74**
Foodgrains	**100.00**	**100.00**	**100.00**

Source: Directorate of Economics & Statistics, DAC&FW.

F.No. 12-1/2020-NRAA
Government of India
Ministry of Agriculture & Farmers Welfare
Department of Agriculture, Cooperation & Farmers Welfare
(National Rainfed Area Authority)

NASC Complex, 2nd Floor,
DPS Marg, Pusa, New Delhi
Dated 11th September, 2020

ORDER

The Union Cabinet while approving the proposal of the Department of Agriculture, Cooperation and Farmers Welfare on revamping of "Pradhan Mantri Fasal Bima Yojana (PMFBY) and "Restructured Weather Based Crop Insurance Scheme (RWBCIS)" agreed for Central share of subsidy on premium under these schemes limited to the crop(s) having gross premium up to a maximum of 25% and 30% in irrigated and non-irrigated areas/districts, respectively. It was also decided, that risk mitigation programmes in 151 water stressed districts will comprehensively be reviewed to explore the requirements of alternative risk mitigation programmes, if any, in these areas separately.

A meeting was held on 11th February 2020 under the Chairmanship of CEO, NRAA to discuss the issues related to high premium crops as well as skewed nature of claim distribution along with other challenges prevalent under the two Crop Insurance Schemes. Based on the discussions it was decided to undertake a comprehensive study on identified districts including crop feasibility study and possible alternate mechanisms for providing farmers with a rational compensation on occurrence of crop losses. On the request of the Department of Agriculture, Cooperation & Farmers Welfare, NRAA will carry out the study engaging a committee of experts for the purpose. The constitution of the committee is as under:-

(i)	Chief Executive Officer, NRAA	-	Chairman
(ii)	C.E.O (PMFBY) & JS, Coop. & Credit Division, DAC&FW	-	Member
(iii)	DDG (Crop Sc.), ICAR	-	Member
(iv)	DDG (Hort.), ICAR	-	Member
(v)	Joint Secretary (Crops), DAC&FW	-	Member
(vi)	Representative of Agromet Div. of IMD	-	Member
(vii)	Director, ICAR-CRIDA	-	Member
(viii)	Representative from ICAR-IASRI	-	Member
(ix)	Director, MNCFC	-	Member
(x)	Representative from SAUs(Tamil Nadu, Maharashtra, Karnataka, Rajasthan, Uttar Pradesh & Madhya Pradesh)	-	Member
(xi)	Technical Expert (WM), NRAA	-	Member

2.   The terms of the reference of the Committee shall be as under:-
   (a) To suggest vulnerability ranking of districts across the country (excluding the urban districts with least agriculture activities) based on objective parameters and recommending the priority districts from the perspective of risk coverage.
   (b) To identify cropping system, suitable to the agro-ecology of particular district, and can be considered as rational for coverage under regular crop insurance mechanism; and to suggest list of negative crops or, non-compatible crops in the district, vis-a-vis the agro-ecology and such crops need to be discouraged under the scheme in normal circumstances.

(c) To suggest variable/customized cost sharing mechanisms/pattern of assistance and approaches for different sets of vulnerability and specific recommendations for coverage of non-compatible crops.

(d) To examine the complications witnessed in implementation of the scheme in the selected districts identified as critical from crop insurance point of view, and to suggest appropriate remedial measures.

(e) The Committee may engage an agency for collection of data and information and may also take the services of any hired agency and/or consultants in collating and analysing the information & data including preparation of the report and its periodic supervision.

(f) The Chairman may co-opt members from other agencies or professionals/experts based on specific requirement emerging during the study period.

(g) The Committee may hold workshops/conferences, and wider consultations, if required, to get broader ideas and visions in re-structuring the schemes/programmes.

(h) The ex-officio members of the Committee will be entitled for sitting charges of Rs. 4000/- per day, for which services may be even taken through e-platform during COVID19 restrictions.

(i) Any other aspect as found necessary for robustness of the Scheme may also be addressed by the Committee.

3. NRAA has been authorised by Credit Division of DAC&FW to meet the expenditure from the Head of Account of PMFBY i.e. Major Head: 2401, Minor Head: 110 Crop Insurance, 13-Pradhan Mantri Fasal Bima Yojana, 130028-Professional Services vide letter No. 11019/01/2019-Credit II(E 76227) dated 8th September 2020 for the following items subject to actuals.

a. Sitting charges of professionals/ex-officio members
b. Engagement of DEO/programmers
c. Travel cost for collecting information
d. Workshop/consultation
e. Contingency and institutional charges including report preparation

4. The committee may complete the study and submit its report within a period of 6 months to DAC&FW, from the date of issue of this notification.

(B Rath)
Technical Expert (WM)

Distribution:
All Members of the Committee

Copy to:
(i) Secretary, DAC&FW, Krishi Bhawan, New Delhi
(ii) Secretary & DG, DARE, Krishi Bhawan, New Delhi
(iii) Secretary, Ministry of Water Resources, River Development & Ganga Rejuvenation.
(iv) CEO, NRAA, New Delhi
(v) SS&FA, DAC&FW, Krishi Bhawan, New Delhi
(vi) AS (RFS)/AS(Credit), DAC&FW, Krishi Bhawan, New Delhi
(vii) JS (Crops), DAC&FW; Krishi Bhawan, New Delhi
(viii) JS (RFS), DAC&FW, Krishi Bhawan, New Delhi
(ix) Director (Finance), DAC&FW, Krishi Bhawan, New Delhi
(x) US(Credit-II), DAC&FW w.r.t. letter No. 11019/01/2019-Credit II(E 76227) dated 8th September 2020
(xi) US(Cash &Welfare), DAC&FW, Krishi Bhawan, New Delhi
(xii) PAO(Sectt.I), DAC&FW, Krishi Bhawan, New Delhi

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References

Aggarwal, P.K., Chand, R., Bhutani, A., Kumar, Vijay, Goel, S.K., Rao, K.N., Poddar, M.K., Sud, U.C., Krishna Murthy, Y.V.N., Ray, S.S., Murthy, C.S., Sikka, A., Shirsath, P.B., Mishra, J.P., Choudhury, M., Chaudhury, O.P., Joshi, A.K., Sen, G., Tarpara, C.N., Kumar, D., Sahoo, R.N., Kumar, N.S., Yadav, A.K., Singh, T.P., Kannan, H., Satish Raju, G., Sudhakar, M., Singh, K.K., Agarwal, N., Reddy, P.K., Shukla, A., Shanbaug, A., Srivastava, A.K., Mehta, S., Gupta, P.K., Gopalakrishnan, A., Chandel, B.S., Duggal, R.K., Deshmukh, V., Kotwaliwale, N., Vora, P., Kumar, S. and Lochan, R. (2016) Report of the Task Force on 'Enhancing Technology Use in Agriculture Insurance'. NITI (National Institute for Transforming India) Aayog, Government of India.

Agricultural Census. (2019) Agricultural Statistics at a Glance. Directorate of Economics & Statistics, Ministry of Agriculture and Farmers Welfare, Government of India. 315p.

Aryal, J., Sapkota, T., Khurana, R., Chhetri, A., Rahut, D., Jat, M. (2020) Climate change and agriculture in South Asia: Adaptation options in smallholder production systems. *Environment, Development and Sustainability*, 20:5045–5075.

Bacsi, Z. and Hollósy, Z. (2019) A yield stability index and its application for crop production. *Analecta Technica Szegedinensia*. DOI: 10.14232/analecta. 2019.1.11-20

Bal, S.K., Dhakar, R., Mishra, A., Vijaya Kumar, P., Sandeep, V.M., Pramod, V.P., Sarath Chandran, M.A., Subba Rao, A.V.M., Gill, K.K., Prasad, R. (2021). Developing frost prediction models using multivariate statistical techniques for two diverse locations of Northern India. *Theoretical and Applied Climatology*. 146, 1097-1110. https://doi.org/10.1007/s00704-021-03786-8

Bal, S.K., Saha, S., Fand, B.B., Singh, N.P., Rane, J., Minhas, P.S. (2014). Hailstorms: Causes, Damage and Post-hail management in Agriculture. NIASM Technical Bulletin No.5, ICAR-National Institute of Abiotic Stress Management, Malegaon, Baramati, Pune Maharashtra, India p.44. doi: 10.13140/2.1.4841.7922

Chand, R. and Raju, S.S. (2009) Instability in Indian agriculture during different phases of technology and policy, *Indian Journal of Agricultural Economics*, 64:187-207.

DES (2021) Crop production statistics for selected states, crops and range of year, Directorate of Economics & Statistics, Department of Agriculture & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India. https://aps.dac.gov.in/APY/Public_Report1.aspx

FAO (1976) A Framework for Land Evaluation. FAO Soils Bulletin No. 32, Rome, Italy.

FAO (1983) Guidelines: Land evaluation for rainfed agriculture. FAO Soils Bulletin. No. 52, Rome, Italy.

Ghazanfar, S., Wen, Z.Q., Abdullah, M., Lati, M. (2014) An Analysis of the Farmers' Community Perception and Awareness About Crop Insurance as a Risk Coping Strategy: A case from Pakistan. *European Researcher*, (79): 7-2.

Ghosh, R. K., Gupta, S., Singh, V. and Ward, P.S. (2020) Demand for Crop Insurance in Developing Countries: New Evidence from India. *Journal of Agricultural Economics*, 72(1):293-320. DOI: 10.1111/1477-9552.12403.

Government of India, Report of the Working Group on Risk Management in Agriculture for Eleventh Five Year Plan (2007-12), Planning Commission, New Delhi.

Government of India, State-wise Progress of CCIS from *Kharif* '85 to *Kharif* 1999 .

Gulati, A. Terway, P., Hussain, S. (2018) Crop insurance in India: Key issues and way forward, Working Paper, 352, Indian Council for Research on International Economic Relations (ICRIER), New Delhi.

Jain, A. (2018) Analysis of Growth and Instability in Area, Production, Yield and Price of Rice in India. *Social Change and Development*. 15(2): 46-66.

Krishna, V., Aravalath, L., Vikraman, S. (2019) Does caste determine farmer access to quality information. *PLoS One*, 14(1), e0210721. https://DOI.org/10.1371/journal.pone.0210721.

Kumar, P., Shinoj, P., Raju, S.S., Kumar, A., Rich, K. M. and Msangi, S. (2010) Factor Demand, Output Supply Elasticities and Supply Projections for Major Crops of India. *Agricultural Economics Research Review*, 23:1-14.

Maruthi, I. (2020) Uptake analysis of Pradhan Mantri Fasal Bima Yojana in Karnataka. Project report submitted to Agricultural Development and Rural Transformation Centre Institute for Social and Economic Change. Dr. V.K.R.V. Rao Road, Nagarabhavi Bangalore.

Matsuda, A., Kurosaki, T. (2019) Demand for temperature and rainfall index insurance in India. *Agricultural Economics*, 50(3), 353–366.

Molnár, T. K. and Molnárné, B. (2015) A szélsőséges időjárási jelenségek hatásai (Impacts of extreme weather phenomena – In Hungarian). *Deturope*. 7(1):79-94.

Mosley, P., Krishnamurthy, R. (1995) Can crop insurance work? The case of India. *The Journal of Development Studies*, 31(3):428–450.

Mukherjee, S., Parthapratim, P. (2019) On improving awareness about crop insurance in India. *Review of Agrarian Studies*, 9(1): 46–68.

NRAA (2020) Prioritization of Districts for Development Planning in India- A Composite Index Approach, NRAA, DACFW, Government of India, 110 P.

Paltasingh Kirtti Ranjan and Goyari Phanindra. 2013. Analyzing growth and instability in subsistence Agriculture of Odisha: evidence from major crops. *Agricultural Economics Research Review*. 26: 67-78.

Pancharatnam, P., Mahendiran, S, Rao, M.B.V., Prasad, S.R., Seetharaman, B., Jha, J., Sowmya and Thyagarajan, R. (2020) Understanding the potential of crop insurance in India: A study of the Prime Minister's Crop Insurance Scheme, Process Evaluation Report. New Delhi: International Initiative for Impact Evaluation (3ie). https://DOI.org/10.23846/TW13PE02

Panda, A., Sharma, U., Ninan, K., Patt, A. (2013) Adaptive capacity contributing to improved agricultural productivity at the household level: Empirical findings highlighting the importance of crop insurance. *Global Environmental Change*, 23:782-790.

Patil, V., Veettil, P. C. and Yashodha,Y. (2021) Understanding farmers' low uptake of crop insurance in India: A discrete choice experiment approach. Paper presented in International Conference of Agriculture Economists 17-31 August 2021.

Paul, M., J., Nisha A (2020) Crop Insurance in India: Evolution, Issues and Way Forward. *Journal of Critical Reviews*. 7(11):2851- 2869.

Praduman Kumara, P. Shinoja, S.S. Rajua, Anjani Kumara, Karl M. Richb and Siwa Msangic (2010). Factor Demand, Output Supply Elasticities and Supply Projectionsfor Major Crops of India. Agricultural Economics Research Review,Vol. 23, pp 1-14

Rahman,M. M., Ghosh, B. C., Chowdhury, M.K. I. (2014) Problems and Prospects of Weather Index Based Crop Insurance in Developing Countries: A Case for Rural Farmers in Bangladesh. IOSR *Journal of Humanities and Social Science* (IOSR-JHSS), 19(1):44-53.

Raju, S.S. and Chand, R. (2008) Agriculture Insurance in India: Problems and Prospects, NCAP Working Paper No. 8, New Delhi.

Ranjan, P. K. and Phanindra, G. (2013) Analyzing growth and instability in subsistence Agriculture of Odisha: Evidence from major crops. *Agricultural Economics Research Review*. 26: 67-78.

Rao, N. M. (2020) Farmers Perception and Awareness About Agriculture Insurance Scheme - A Study of North Karnataka. *Journal of Management and Science*. 10(3):33-40.

Rao, VUM, Bapuji Rao, B., Sikka, AK., Subba Rao, AVM., Singh R., Maheswari. M. (2014). Hail storm threat to Indian Agriculture: A historical perspective and future strategies. Central Research Institute for Dryland Agriculture, Hyderabad - 500059, 44 pp.

Ray, S.K. (1983) Growth and Instability in Indian Agriculture, Institute of Economic Growth, Delhi (mimeo).

Report of the Committee to Review the Implementation of Crop Insurance Schemes in India. Department of Agriculture & Cooperation, Ministry of Agriculture, Government of India. May 2014. PK Mishra- Chairman.

Report of the task force on Enhancing technology use in agriculture insurance. National Institute for Transforming India (NITI) Aayog Government of India. December, 2016. P.K Aggarwal-Chairman, Task Force.

Sharma, R. K., Swami, B. N., Giri, J. D., Singh, S. K. and Shyampura, R. L. (2001) Soils of Haldi Ghati region of Rajasthan and their land suitability for different land uses. *Agropedology*. 11:23-28.

Singh, K., Swami, B. N., Giri, J. D., Shyampura, R. L. and Singh, S. K. (1998) Characteristics and soil suitability evaluation for maize. Paper presented at the 16th World Congress of Soil Science, Montpellier, France.

Singh, P. Ranjan, K. and Phanindra, G. (2013) Analyzing growth and instability in subsistence Agriculture of Odisha: evidence from major crops. *Agricultural Economics Research Review*. 26: 67-78.

Sirimanne, S., Srivastava, S., Kim, S. E., Li, H. M. D., Firer, A., and Sinha, S. (2015) Building Resilience to Droughts: Scaling up Weather Insurance in China, India, and Thailand. Case studies presented during the INR 1.3 AP session on Building Resilience to Water-Related Disasters in the Asia-Pacific Region 7th World Water Forum 2015 12–17 April 2015, Daegu and Gyeongbuk Republic of Korea.

Sona, H., Muniraju, Y. (2018) Status of crop insurance in India: A study with reference to Kodagu district of Karnataka state. *International Journal of Management Studies*, 3(9), 1–9.

Swain, M. and Patnaik, S. (2016) Performance Assessment of Crop Insurance Schemes in Odisha in Eastern India. South Asian Network for Development and Environmental Economics (SANDEE) PO Box 8975, EPC 1056, Kathmandu, Nepal.

Tiwari, R. , Chand, K. and Anjum, B. (2020) Crop Insurance in India: A Review of Pradhan Mantri Fasal Bima Yojana (PMFBY). *FIIB Business review*. DOI: 10.1177/2319714520966084

Vyas, S., Tobias, D., Kropff, M., Aggarwal, P. and Meuwissen, M.P.M. (2021) Mapping global research on agricultural insurance. Environ. Res. Lett. 16, 103003. DOI https://iopscience.iop.org/article/10.1088/1748-9326/ac263d.

Ward, P., Makhija, S. (2018) New modalities for managing drought risk in rainfed agriculture: Evidence from a discrete choice experiment in Odisha, India. *World Development*, 107, 163–175.

World Bank (2003) Piloting Weather Insurance Scheme in India, August 27, 2003, web.worldbank.org.

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ABBREVIATIONS & ACRONYMS

AI	Artificial Intelligence
AWS	Automatic Weather Stations
CI	Composite Index
CW	Cold-wave
CPIS	Coconut Palm Insurance Scheme
CCIS	Comprehensive Crop Insurance Scheme
CCEs	Crop Cutting Experiments
COE	Committee of Experts
CRIDA	Central Research Institute for Dryland Agriculture
DA&FW	Department of Agriculture & Farmers Welfare
DFI	Doubling Farmers Income
DLMC	District level Monitoring committee
FAO	Food and Agriculture Organization
FPOs	Farmer Producer Organizations
GCES	General Crop Estimation Survey
HP	Hodrick-Prescott
IASRI	Indian Agricultural Statistics Research Institute
ICAR	Indian Council for Agricultural Research
ILI	Integrated Livelihood Index
IMD	India Meteorological Department
KVKs	Krishi Vigyan Kendras
KCC	Kisan Credit Card
MoA&FW	Ministry of Agriculture and Farmers Welfare
MNCFC	Mahalanobis National Crop Forecast Centre
MNAIS	Modified National Agricultural Insurance Scheme
NAIS	National Agricultural Insurance Scheme
NRAA	National Rainfed Area Authority
NCIP	National Crop Insurance Programme
NIAP	National Institute of Agriculture Economics and Policy Research
NRI	Natural Resources Index
NDVI	Normalized Difference Vegetation Index
NRI	Natural Resources Index
NEFT	National Electronic Funds Transfer
PPs	Pilot Projects
PMFBY	Pradhan Mantri Fasal Bima Yojana
PACS	Primary Agricultural Credit Societies
RWBCIS	Restructured Weather Based Crop Insurance Scheme
RADAR	Radio Detection and Ranging
SD	Standard Deviation
SCW	Severe Cold-wave
SLMC	State Level Monitoring Committee
SHGs	Self Help Groups
TOR	Terms of Reference
WBCIS	Weather Based Crop Insurance Scheme
YII	Yield Instability Index
YSI	Yield Stability Index

Glimpse of interactions
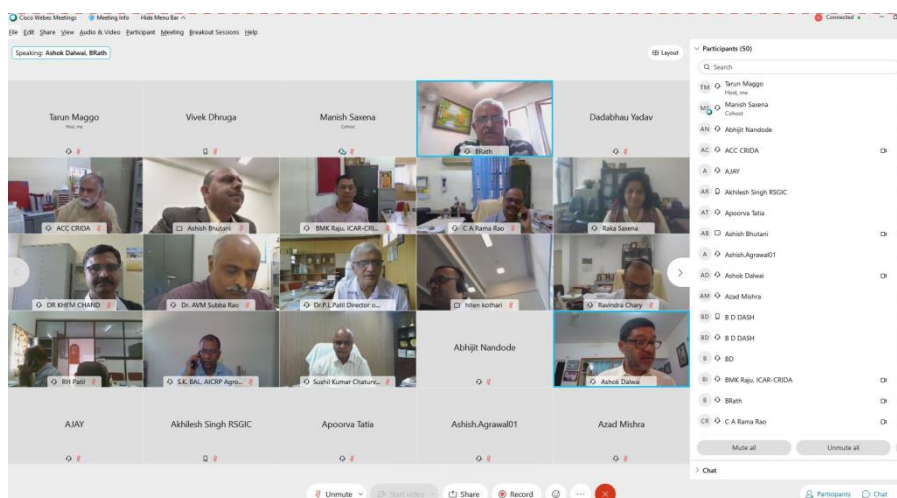
Virtual meeting of the Committee of Experts constituted to study the operational issues in implementation of PMFBY and recommend appropriate mechanisms for a rational compensation to farmers on occurrence of crop losses adopting agro-ecology based crop feasibility to benefit the most vulnerable districts.
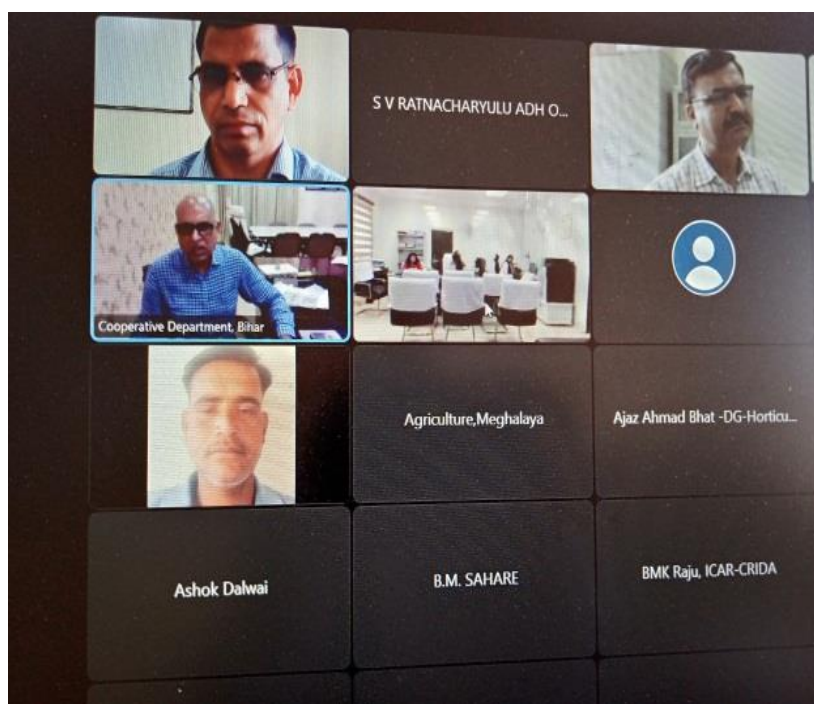
Stakeholders meeting on 4th April 2022 under chairmanship of Dr Ashok Dalwai

Interaction meeting with Agriculture/Horticulture Directors at state level on 20th April 2022

Meeting with Insurance companies, 8th April 2022, NRAA

Interaction with farmers, District Bulandshahr

Government of India
Ministry of Agriculture and Farmers Welfare,
Department of Agriculture, Co-operation and Farmers Welfare

Final Report on PMFBY Impact Assessment

S PIL

Spectrum Planning (India) Limited

Head Office:

A- 50, Ashoka Enclave – II, Sector – 37, Faridabad – 121003 (Haryana)
Phones: + 91 – 129 – 2250086, 4128748 Fax: + 91 – 129 – 2250086
E-mail:info@spectrumplanningindia.com, infospil@gmail.com
Web: www.spectrumplanningindia.com

Abbreviations

AIC	**Agriculture Insurance Company**
AWS	Automatic Weather Station
ARG	Automatic Rain Gauge
AY	Actual Yield
BC	Banking Correspondent
BRSFY	Bihar Rajya Fasal Sahayat Yojana
CBS	Core Banking System
CCE	Crop Cutting Experiment
CCIS	Comprehensive Crop Insurance Scheme
CSC	Common Service Centre
DAC&FW	Department of Agriculture and Farmers Welfare
DAO	District Agriculture Officer
DGRC	District Level Grievance Committee
DLMC	District Level Monitoring Committee
DLTC	District level Technical Committee
GCA	Gross Cropped Area
GDP	Gross Domestic Product
GoI	Government of India
IC	Insurance Companies
IEC	Information Education and Communications
ICT	Information Communication Technology
IMF	Insurance Marketing Firm
IRDA	Insurance Regulatory Development Authority
IASRI	Indian Agricultural Statistics Research Institute
KCC	Kisan Credit Card
MNAIS	Modified National Agriculture Insurance Scheme
NAIS	National Agriculture Insurance Scheme
NCIP	National Crop Insurance Portal
NDVI	Normalized Difference Vegetation Index and Normalized Difference Wetness Index
NRSC	National Remote Sensing Centre
OGs	Operational Guidelines
PACS	Primary Agriculture Co-operative Society
PMFBY	Pradhan Mantri Fasal Bima Yojana
PRI	Panchayati Raj Institutions
SAC	Space Application Centre
SC	Scheduled Caste
SGRC	State Level Grievance Committee
SI	Sum Insured
SLBC	State Level Banker's Committee
SLCCCI	State Level Co-ordination Committee on Crop Insurance
SMA	Short Messaging Service
ST	Scheduled Tribe
ToR	Term of Reference
TY	Threshold Yield
UT	Union Administration
UAV	Unmanned Arial Vehicle
RWBCIS	Restructured Weather Based Crop Insurance Scheme
VLE	Village Level Entrepreneur
WBCIS	Weather Based Crop Insurance Scheme

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Executive Summary (PMFBY Impact Assessment)

Agriculture, with its allied sectors, is the main livelihood source for 70 percent of the rural households in India. It contributes 16.5% in the national Gross Domestic Product (GDP) and engages about 50% of the workforce (Economic Survey of India, 2019-20). Risks associated with changing weather conditions and calamities like flood, drought, cyclones, earthquakes, landslides, avalanches, forest fires, etc. are major cause of crop failures and yield losses. This is adversely impacting socio-economic settings of the dependent farming communities.

Crop Insurance is an important risk mitigation tool in protecting farmers from any unforeseen crop loss caused by natural calamities. Comprehensive Crop Insurance Scheme (CCIS) was first launched in India in 1985 thereafter, over a period of time different schemes were launched and modified from time to time. Pradhan Mantri Fasal Bima Yojana (PMFBY) was launched from Kharif 2016, to address the issues of crop related risk in a holistic manner. PMFBY is the world's third largest crop insurance programme aimed at providing risk cover to the farmers against the non-preventable natural risks. The scheme provides comprehensive risk coverage from pre-sowing to post-harvest risks events associated during complete crop growth cycle. Field crops like cereals, pulses, oilseeds and some annual commercial crops are covered under PMFBY while horticulture crops like fruits and vegetable crops are covered under Restructured Weather Based Crop Insurance Scheme (RWBCIS).

PMFBY has achieved considerable success since its launch. The scheme has been notified by 27 States and Union Territories, with more than 200 notified crop combinations, insuring 30% of the Gross Cropped Area (GCA) in the country. There is significant increase in claim ratio over a period of time. It has increased from 77% in 2016-17, 87% in 2017-18 and was 97% in 2018-19. Similarly, number of farmers benefitted have increased from 150 lakh in 2016-17 to 177.7 lakh in 2018-19.

Some of the major challenges faced during the scheme implementation include delay in claim settlement beyond prescribed timelines by the implementing Insurance Companies (ICs), delay in release of State share of premium subsidy and delay in providing CCE data by State Governments to the Insurance Companies, low level of awareness about the scheme provisions among the beneficiaries and poor grievance redressal mechanisms at the field level to address farmer's complaints. Government

of India (GoI) has constantly worked on improving the PMFBY operational system. It has been regularly interacting with various stakeholders to get their feedback on the implementation issues. Revised Operational Guidelines were issued with stringent seasonality discipline for all implementing stakeholders, which came into effect from 1st October 2018.

PMFBY- Impact Assessment

With completion of three years of PMFBY implementation (2016-2018 covering six seasons of Kharif and Rabi), it was pertinent to undertake evaluation of crop insurance scheme for further streamlining the scheme implementation in response to the needs of the ultimate beneficiaries, the farmers. Impact Assessment study on PMFBY was planned with the key objective to assess effectiveness of crop insurance scheme during three years of implementation on broad parameters. This includes premium rate, publicity and awareness, enrolment process, claim settlement process, Transparency & Accountability (Grievance redressal, Performance of Insurance companies), significance of National Crop Insurance Portal, use of technology and overall effectiveness of scheme implementation structure. A mix of approaches was used in the methodology viz., household survey of farmers, interaction with stakeholders and analysis of secondary data while carrying out an assessment. Study was conducted in 11 States and 1 UT and 33 districts in the country. A total of 5609 farmer households were covered during primary survey and three case studies were also covered as a part of the field work.

Highlights of key findings for areas of enquiry are as described:

1. Enrolment Process

    a) More than 5.5 crore farmer applications are enrolled under the scheme every year. The scheme has observed substantial increase in voluntary uptake with 40% enrolment of non-loanee farmer applications in Rabi 2018-19. It has increased from 177.7 lakh in Rabi 2016-17 to overwhelmingly high at 220.2 lakh in Rabi 2018-19. This is on one of the significant achievements in terms of acceptance of the scheme among farmers. This can be attributed to efforts of various State governments in publicizing the scheme through various means like conducting farmer camps as a special drive to enroll non- loanee farmers. Government of India also brought in CSC channel for enrolment of non-loanee farmers leading to significant increase in non-loanee enrolment in subsequent seasons. Substantial increase in number of non-loanee farmers is observed in

the States of Jharkhand, Maharashtra, Andhra Pradesh, Karnataka and Tamil Nadu.

b) Among various enrolment channels used by farmers, 46% farmers are getting enrolled through banks and 36% through CSC and 16% through PACS. Banks are the main channel of enrolment in the States of Andhra Pradesh, Chhattisgarh, Haryana, J&K, Madhya Pradesh, Odisha and UP. PACS is the primary channel of enrolment for 80-90% farmers in Jharkhand and Tamil Nadu. In Maharashtra, major enrolment of non-loanee farmers flows through CSC (64%).

c) For reporting of genuine farmer data during enrolment various checks and balances were applied. This covered, compulsory capturing of Aadhaar details of enrolling farmers (since Kharif 2017) and its authentication from UIDAI website was followed from Kharif 2018 season. Entry of farmers data on the National Crop Insurance Portal was also initiated from Kharif-17.

d) Major issue that was raised by the loanee farmers was about not getting any acknowledgment receipt from the banks after deduction of farmer share of premium. For redressal of this issue, GoI collaborated with the Postal Department and the implementing Insurance Companies were advised to send acknowledgement receipts to all the loanee farmers through inland letters after the approval of the farmer application on his/her residential address from Kharif 2018.

2. Premium Rates

a) The average actuarial premium rates quoted by the insurance companies increased from 11% in 2016-17 to 13 % in 2018-19. This happened mainly because of increase in sum insured caused due to increase in scale of finance for different crops over a period. Further, average premium rates in Kharif season were on higher side, in the range of 12-15% while in Rabi for season it is on the lower side and stands at around 8-9%. However, premium rates district- crop combination varies from state to state. Some of the State Governments have raised the concern related to high premium rates in some crops and districts which is impacting overall state share of subsidy bill.

b) Under PMFBY, farmers are paying only nominal amount as a farmer share of premium. The farmers' share is limited to 2% for Kharif, 1.5% for Rabi and 5% for horticulture and annual commercial crops. The difference between actuarial

premium rates and the premium rate payable by farmer is shared equally between the Central and the State Governments on 50:50 basis.

c) The analysis indicates that on an average every farmer has paid a premium between Rs. 677- Rs. 867 per hectare as a farmer share of premium during Kharif and Rabi seasons. Similarly, per farmer gross premium amount for taking crop insurance varies from Rs 3,559 to Rs 5,558 per hectare. Very importantly it may be noted that the farmers are paying less than Rs 1000 as a farmer share of premium to avail crop insurance.

3. Robustness of Implementation Structure

PMFBY is a multi-stakeholder scheme, where major implementing partners are Government of India, State Governments and Administration of Union Territories, Banks, and Primary Agriculture Co-operative Societies (PACS), Common Service Centre (CSC) and Insurance Companies (ICs) and farmers. GoI takes regular feedback from various stakeholders through various platforms which includes meetings, weekly video conferencing, review conferences at national level, meeting of National Level Monitoring Committee (NLMC) etc. The feedback and inputs received through these platforms are incorporated at various stages of policy and field level implementation. Revised Operational Guidelines (OGs) of PMFBY/RWBCIS, 2018, clearly outlines the roles and responsibilities of each of the stakeholders and timelines for each important process is specified in the seasonality discipline.

a) Feedback of farmers on their experience about different stakeholders is as summarized.

- Role of the Government officials (State, District and Block level) is seen quite positive in most of the States like Tamil Nadu, Odisha, Maharashtra, Haryana, Chhattisgarh, and Andhra Pradesh. In these States farmer's satisfaction level is between 80-100%. The high level of satisfaction about Government functionaries is probably the result of their regular interaction with the farmers through local camps, field visits and by addressing farmers grievances proactively.

- Farmers in the States of Tamil Nadu, Haryana, Chhattisgarh, and Andhra Pradesh are highly satisfied with role and performance of banks in PMFBY implementation. In Jharkhand also satisfaction level is high, which is pertaining to (PACS), from where maximum enrolment is coming in the State.

- Farmers in the States of Tamil Nadu, Maharashtra are highly satisfied with the services and support provided by CSC during enrolment period. Services of

CSC/VLE needs to be strengthened in the States of Uttar Pradesh, Haryana, Rajasthan, Madhya Pradesh.

- PRIs in Maharashtra and Chhattisgarh States are found to be playing active role in mobilizing farmers and making them aware about PMFBY. However, greater efforts are required to be made to encourage PRI participation in publicity and enrolment in all implementing States.

b) Key issues raised by the farmers with respect to implementation structure are as mentioned:

- Farmers are not satisfied with the fact that the implementing Insurance Company changes in their district season after season.
- Farmers raised the issue of delayed settlement of claims both area-based claims as well as localized/post-harvest claims by the Insurance Companies.
- Farmers of almost every State showed displeasure about non-availability of adequate grievance redressal mechanism at the field level for dealing with farmer's complaints.
- Several farmers raised the issue of non-functional toll-free numbers of the insurance companies which leads to difficulty in lodging crop loss intimations for localized calamities and post-harvest losses and in obtaining any information about their claims.
- Farmers shared that many of them are unaware about the rejection of their applications by Insurance Companies until claims are received by fellow farmers/villagers.

4. National Crop Insurance Portal (NCIP)

NCIP has been developed by GoI and was introduced from Kharif-17 for facilitating smooth implementation of PMFBY for providing a single platform for all stakeholders. This portal has been envisaged to provide end to end IT solution by automating all process involved under PMFBY right from digitization of State notification, enrolment, approval of farmer application, premium and subsidy reconciliation etc. New modules are added regularly as per the requirements of the stakeholders. The farmer can also register himself/herself directly through this portal. The entire enrolment process is carried on through this portal.

5. Claim Settlement Process

- Overall claim ratio shows a progressive increase from 77% in FY 2016-17 to 97% in FY 2018-19 indicating significant benefits to the affected farmers by adequately supporting them financially in the event of crop loss.

- The analysis significantly demonstrates that the claim ratio when calculated on the farmer share of premium shows that the farmers are receiving substantial benefits in terms of claims against minimal payment of premium. The claim ratio is in the range starting from 262% to as high as 620% in Kharif 2017 when compared to farmer share of premium.

- Percentage of farmers getting benefitted when compare to total number of insured farmers also increased from 26% in FY 2016-17 to 32% in FY 2018-19 (figures for FY 2018-19 are yet to be finalized).

- Total 41% of the farmers surveyed (5609) received the claim amount under PMFBY/RWBCIS. This include, 25% of the loanee farmers and 16% of non-loanee farmers. Maximum loanee farmers in receipt of claims are from the States of Andhra Pradesh, Chhattisgarh, Haryana, Odisha and Tamil Nadu. While non-loanee farmers from the States of Tamil Nadu, Odisha and Andhra Pradesh have reported to receive the claim amount under PMFBY/RWBCIS.

- Analysis shows that per farmer average claim varies from Rs. 8,611 to Rs.11,916 during Kharif season and it comes out to be between Rs.10,661 to Rs.19,758 during Rabi season. (Per farmer average claim received by a beneficiary farmer is worked out by dividing total claim amount paid with number of beneficiary farmers who have received claim in all the three seasons of assessment for the states covered in study).

- It is phenomenal to see claim ratio exceeding 100 per cent in as many as nine States out of the total of 12. In Tamil Nadu claim ratio exceeded 100% for all the six seasons which is a record among all States. Season-wise highest claim ratios which is more than 200% is observed in the States of Tamil Nadu, Kerala, Chhattisgarh, Odisha, Haryana and Karnataka.

- 4 States out of 12, have shown higher number of beneficiary farmers as well as higher percentage of total insured farmers namely, Tamil Nadu, Maharashtra, Chhattisgarh and Rajasthan. Average claim amount is 4.7 times of premium paid by farmers.

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- Highest claim amount per farmer- Rs 53,848 was received in Tamil Nadu in Kharif 2016. In Maharashtra, number of farmers benefiting were highest i.e., 50.2 lakhs in Kharif 2018 with claim amount of Rs 8120 per beneficiary farmer.

- Overall satisfaction of farmers is evident in States where claim ratio has been high (in States of Tamil Nadu, Odisha, Haryana and Chhattisgarh) and the reverse in States where claims ratio was lower (UP, Jharkhand, J&K, Assam).

- A total of 83% of loanee farmers and 81% of non-loanee farmers are found to be satisfied with the claim amount they have received.

- Majority of States have indicated delay of more than 2/3 months mounting up to 6 months in many instances which is the main reason of dissatisfaction among the farmers. At all India level, 42% of the claims were disbursed during 3-6 months, 23% claims were disbursed between 2-3 months and 21% claims took more than 6 months to get settled.

- State-wise analysis shows that Uttar Pradesh is the best performing State where 81% claims were settled within 1 month of prescribed date. Significant claims were settled between 3-6 months in the States of Maharashtra, Rajasthan, Tamil Nadu, Chhattisgarh and Odisha.

- Direct transfer of claim to farmers bank account under DBT Policy of GoI has eliminated delay to a large extent by way of eliminating ghost beneficiaries.

6. Use of Technology

PMFBY recognizes the need for technological interventions in crop insurance to make the insurance mechanism more efficient, transparent and farmer friendly.

- GoI, has rolled out nine pilot studies on optimization of CCEs using modern technologies. The nine pilot studies were conducted in 23 districts spread across 11 States. This will help in possible reduction of 49-54% in CCE numbers as is evident during Kharif study and reduction of 35-47% in CCEs is found possible during Rabi study. Number of CCEs can be reduced significantly with less than 10% standard error at GP level.

7. Transparency and Accountability

Since, multiple stakeholders are involved during various stages of implementation therefore it becomes important to have a strong mechanism to address the grievances of various stakeholders that arise during the implementation of the scheme.

a) Grievance Redressal Mechanism

- Three-tiered structure has been put in place for grievance redressal under PMFBY. For any grievance, farmer may approach or contact District Agriculture Officer (DAO) and lodge his complaint. DAO is expected to resolve the grievance within 7 days, failing which or in case of dissatisfaction, the matter may be put up before District level Grievance Redressal Committee (DGRC).

- 45% loanee and 71% non-loanee Farmers in the studied States, first approach local agriculture department at district or block level for any of its complaints/grievances.

- The representatives of the Insurance Companies are scantly placed and their whereabouts are not known to the farmers. This is turning out a major disconnect between all other stakeholders and Insurance Companies at field level implementation, especially attending farmer grievances and co-ordination with field functionaries of the State Government at district and block level.

- Farmers complaint about functionality issues pertaining to toll free numbers of implementing Insurance Companies. Implementing Insurance Companies need to ensure functioning of Toll-Free numbers and proper responses from its Tele-executives' effective usage in resolving issues/queries raised by the farmers.

- ICs need to build internal capacity of the staff engaged in crop insurance implementation. ICs to set up adequate infrastructure in districts, develop working relationship with all the stakeholders and work towards reducing the grievances specially from farmers.

b) Performance of Insurance Companies

- All Insurance Companies have not utilized the allocated budgeted amount towards awareness and publicity.

- Lack of manpower at IC's end for co-witnessing Crop Cutting Experiments (CCEs) at the time of harvest is a major issue raised by the State Government officials.

- Feedback from Farmers' Survey shows that out of 12 State/UT surveyed in the study, 3 States namely, Tamil Nadu, Jharkhand and Chhattisgarh are found to be satisfied with IC's performance in scheme implementation. Three States namely, Rajasthan, Maharashtra and MP are found to be in mid zone of acceptance. Six States namely, Odisha, J&K, Haryana, Assam, Andhra Pradesh and Uttar Pradesh have expressed dissatisfaction on performance of ICs.

C) Farmer's willingness to continue with scheme

- More than 70% farmers would like to continue in the scheme in the next year which is very significant. This shows that slowly farmers are realizing the benefits of crop insurance.

- Extended coverage of crops, lower premium and higher sum assured have resulted in higher claim amount benefitting large number of farmers in stabilizing their income from agriculture.

- Focused Group Discussions reveal that the timely payment of claims is helpful in terms of providing cash in hand for fulfilling agriculture as well as family needs.

- Assam, Jharkhand, and Andhra Pradesh government initiative for bearing the farmers share has also resulted into tremendous participation of non-loanee farmers.

8. Publicity and Awareness

Government of India, in its revised Operational Guidelines, 2018, has made it mandatory for Insurance Companies to spend 0.5% of total gross premium towards awareness creation, publicity, training and capacity building activities at the field level. Any unspent amount is required to be deposited by the Insurance Companies in the IEC Pool Fund of Government of India.

- All India analysis shows that average shortfall in spending on IEC activities by the Insurance Companies is worked out to be more than 50% for three seasons. This is a major indication that awareness and publicity need more focused attention and adherence to the laid down operational guidelines.

- Among other Insurance Companies, Agriculture Insurance Company (AIC) has reported highest shortfall, close to 40 % and more, in all three years wherein highest shortfall of 52% was reported in 2019. It is a serious concern as AIC is the largest public sector Insurance Company and holds maximum crop insurance business.

a) Awareness among farmers

- More than 50% of the surveyed loanee farmers are aware about various channels of enrolment, implementing Insurance Companies, Grievance redressal and

- Insurance Company's toll-free numbers and claim settlement process. Less than 50% of the farmers are aware about enrolment cut-off dates, premium amount, Sum Insured, and risk covered. Only 32% of the loanee farmers are were about acknowledgement receipts send by Insurance Companies.

- Analysis of responses from non-loanee farmers shows that More than 50% of the non-loanee farmers are aware about toll-free numbers of Insurance Companies, various channels of enrolment, cut off dates for enrollment, premium amounts, sum Insured, implementing Insurance Companies, risk covered and grievance process.

b) Mode of awareness

- Banks and PACS are the major source of information for 50% loanee farmers and Govt. officials at State/District/Block level in 43% loanee farmers.

- Govt officials at State/district/block level have played crucial role in making 48% non-loanee farmers aware about scheme provisioning mainly in the States of AP, JH, Haryana, and Tamil Nadu, followed by Odisha, CG and Rajasthan.

- State-wise effectiveness of information sources shows that banks were leading in creating awareness among both loanee as well as non-loanee farmers, particularly in Chhattisgarh, MP, Maharashtra, Rajasthan & UP.

- CSC/VLEs' were found to have made good effort to some extent in Maharashtra, Odisha and Tamil Nadu.

- Fellow farmers / Progressive farmers were found to be influential in popularizing the scheme in Assam and Haryana.

- Role of Insurance Company representatives in the field and Toll-Free number of Insurance Companies in disseminating scheme information is found to be very negligible. This is a cause of concern considering prime responsibility of Insurance Companies in publicizing the scheme.

9. Way Forward

Government of India has tried to provide various risk hedging mechanisms first through National and State Disaster Relief Funds and later through various provisions of crop insurance schemes. Over the last 30 years, the country has seen major improvements in the crop insurance schemes and the same has become more comprehensive and more transparent. Working upon the following areas will be pivotal in taking the PMFBY scheme to next level through effective implementation.

- Integration of digitized Land Records of the State Governments with the National Crop Insurance Portal is critical for reducing issues like higher insured area than sown area, multiple uptakes of credit and hence multiple insurances for the same parcel of land and restricting ghost farmers from enrolling in the scheme.

- State Government to analyze district-wise crop suitability and crop diversification for notifying major crops grown in a district under crop insurance-PMFBY/RWBCIS.

- Adequate efforts are required to strengthen RWBCIS implementation for the crops so that load of conducting enormous CCEs may be reduced.

- Damage caused by wild animals, fire, cold waves, and frost to crops should also be considered at the individual/farm level risks.

- Incentivize groups of SC/ST farmers or women farmers and promote group insurance.

- Robust assessment of crop loss should be done. Auditing and multi-level checking to ensure credibility of data and testing incorporating technology such as remote sensing, drones and online transmission of data.

- Alternate channels for non-loanee enrolment may be identified.

- Developing innovative, unique insurance products as well as enhance use of technology in implementing and monitoring crop insurance needs to be strengthened.

Chapter 1: Introduction

Agriculture, with its allied sectors, is the largest source of livelihoods in India. 70 percent of its rural households still depend primarily on agriculture for their livelihood, with 82 percent of farmers being small and marginal[1]. Gross Cropped Area (GCA) in the country is 198.36 million hectares, which constitutes 60.4 percent of the total geographical area (328.37 million ha). Gross irrigated area in the country stood at 96.46 million hectares, (48.6% of the GCA) in 2014-15[2].

Farmers are the major contributors in the Indian economy despite several challenges faced by them in securing decent household income for themselves. Agriculture and allied sector contribute 16.5% in the national Gross Domestic Product (GDP) and engages about 50% of the workforce.[3] Any adverse impact on agricultural production has wide social and financial repercussions on the country as a whole; impacting rural income levels, Gross Domestic Product (GDP) and poverty rates.

Crop failures and yield losses triggered by the vagaries of nature are the major causes of farm distress. India being a geographically large country, it is characterized by diverse climatic conditions wherein the risks associated with agriculture include calamities of varied nature like flood, drought, cyclones, earthquakes, landslides, avalanches, forest fires, etc. More than 50% of the cultivable area is vulnerable to drought. Around 75% of the Indian coastline is prone to cyclones and tsunami. 12% of land is flood prone and hilly areas are at risk from landslides and avalanches[4].

Crop Insurance is an important mitigation tool to protect the farmers from any unforeseen crop loss caused by natural calamities. Comprehensive Crop Insurance Scheme (CCIS) was first launched in India in 1985 thereafter, over a period different schemes have been launched, after modification to the previous ones to provide insurance cover for the crop loss. These include National Agriculture Insurance Scheme (NAIS) in 1999, Weather Based Crop Insurance Scheme (WBCIS) in 2007, Modified National Agriculture Insurance Scheme (MNAIS) in 2010. To address the

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[1] FAO, India at a glance, http://www.fao.org/india/fao-in-india/india-at-a-glance/en/

[2] Agriculture Statistics at a Glance, 2018, Ministry of Agriculture and Farmers welfare, DAC&FW, GoI

[3] Economic Survey of India, GoI, 2019-20

[4] https://nidm.gov.in/easindia2014/err/pdf/country_profile/India.pdf

crop risk issues in a holistic manner Pradhan Mantri Fasal Bima Yojana (PMFBY) was launched from Kharif 2016.

1.1 Overview of the Scheme

Pradhan Mantri Fasal Bima Yojana (PMFBY) is the world's third largest crop insurance programme aimed at providing risk cover to the farmers against the non-preventable natural risks. The scheme provides comprehensive risk coverage from pre-sowing to post-harvest losses risks associated with unseen natural events like droughts, dry spells, floods, inundation, landslides, natural lightning, hailstorms, unseasonal rainfall, cyclone, and damages caused due to widespread pest attack and diseases etc. The scheme has been launched with the aim to provide crop insurance cover to maximum number of farmers at reasonable premium rates with paltry sum to be paid by the farmers in the form of farmer's share of premium. The difference between actuarial premium rates and the farmer rates is shared equally between the Central and the State Governments on 50:50 basis. The farmers' share is limited to 2% for Kharif, 1.5% for Rabi for cereals, pulses, and oilseed crops and 5% for horticulture and annual commercial crops. The scheme covers all those crops that are notified by the implementing States / UTs under the scheme. Field crops like cereals, pulses, oilseeds, and some annual commercial crops are covered under PMFBY while horticulture crops like fruits and vegetable crops are covered under Restructured Weather Based Crop Insurance Scheme (RWBCIS).

Till Rabi-19-20 farmers availing seasonal crop loans (loanee farmers) were compulsorily covered under PMFBY scheme, however from Kharif-2020 the scheme has been revamped and the scheme has been made voluntary for the loanee farmers wherein the farmers can opt-out from the scheme. The participation of non-loanee farmers is voluntary. The scheme is implemented on an 'area approach' where insured unit is usually the village panchayat level for the major crops.

The scheme promotes sustainable agriculture production through following key objectives:

➢ Providing financial support to farmers suffering crop loss/damage arising out of unforeseen events,

➢ Stabilizing the income of the farmers to ensure their continuance in farming,

➢ Encouraging farmers to adopt innovative and modern agricultural practices,

- ➢ Ensuring flow of credit to the agriculture sector which will contribute to food security, crop diversification and enhancing growth and competitiveness in agriculture sector besides protecting farmers from production risks.

Restructured Weather Based Crop Insurance Scheme (RWBCIS), protects the farmers from damage to horticulture crops resulting from adverse weather conditions caused due deviations in rainfall, temperature, wind, humidity etc. RWBCIS uses weather parameters as "proxy" for crop yields in compensating the cultivators for crop losses. Term Sheets/Pay-out structures are developed to the extent of losses deemed to have been suffered using the weather triggers. The scheme is implemented mainly in states like Maharashtra, Rajasthan, Madhya Pradesh, Chhattisgarh, Kerala, Himachal Pradesh, Uttarakhand, Karnataka, Uttar Pradesh.

PMFBY is a multi-stakeholder scheme, involving all stakeholders which play crucial role in PMFBY implementation right from enrolment till settlement of claims. There are 18 empaneled insurance companies, 540 banks and 45,000 Common Service Centers (CSC) across 27 States and UT's. Besides, there are various committees constituted at that State and District level to augment robust implementation of PMFBY.

Since its launch, PMFBY achieved considerable success. The scheme has been notified by 27 States and Union Territories, with more than 200 notified crop combinations, insuring 30% of the Gross Cropped Area (GCA) in the country. The Government aims to bring 50% Gross Cropped Area in India under the ambit of crop insurance. **More than 5.5 crore farmer applications are enrolled under the scheme every year. Around 5.64 crore applications were reported in the year 2018-19 covering both the Kharif and Rabi seasons. Voluntary uptake of the Scheme has also increased with highest 40% enrolment of non-loanee farmer applications in Rabi 2018-19.** CSC channel has been very effective in enrolling non-loanee farmers.

The sum insured has increased from Rs 2.06 lakh crore during 2016-17 to Rs 2.26 lakh crore in 2018-19, which ensures larger risk coverage and claim pay-outs in the event of crop loss. **There is significant increase in claim ratio over a period, it has increased from 77% in 2016-17, 87% in 2017-18 and was 97% in 2018-19. Similarly, number of farmers benefitted have increased from 150 lakh in 2016-17 to 177.7 lakh in 2018-19.** Various technological interventions have also been implemented like administration through National Crop Insurance Portal, use of Crop

Cutting Experiment (CCE) Agri App for capturing yield data at field level, use of Remote Sensing Technology and Satellite imagery from crop loss assessment.

GoI, allocated budget of Rs 5,500 crore in 2016–17, which increased to Rs 14,000 crore in 2019-20. Almost, an equal amount is being allocated by the implementing State Governments towards scheme implementation.

1.2 Issues and Challenges

Major challenges faced during scheme implementation are as mentioned: -

1. Delay in claim settlement beyond prescribed timelines by implementing Insurance Companies (ICs).
2. Delay in release of State share of premium subsidy and delay in providing CCE data by State Governments to the Insurance Companies.
3. Low awareness about the scheme provisions among the beneficiaries.
4. Lack of knowledge amongst different stakeholders about their roles and responsibilities in scheme implementation.
5. Limited inclusion of women farmers, sharecroppers, and tenant farmers.
6. Inadequate deployment of manpower by ICs at district and block level.
7. Poor resource allocation by ICs towards awareness generation at the field level.
8. Lack of initiative shown by the banks in the enrolment of non-loanee farmers.
9. Poor compliance of mandatory Aadhaar capturing by banks.
10. Delay in remittance of premium to Insurance Companies and late data entry by banks on PMFBY portal.
11. Multiple insurance on same parcel of land by farmers leading to over-insurance.
12. Poor grievance redressal mechanisms at the field level to address farmer's complaints

Government of India (GoI) has been constantly working on improving PMFBY operational system. It issued revised Operational Guidelines, with stringent seasonality discipline for all implementing stakeholders, that came into effect from 1st October 2018. Acceptance about the scheme among farming community, however, would largely depend upon the accuracy of yield assessment and with prompt claim settlement.

To streamline the scheme implementation coordinated efforts of all stakeholders plays vital role. Successful implementation of the Schemes requires regular review and feedback mechanisms. Hence, DAC&FW has been holding weekly video conferences

bringing all stakeholders on one platform for comprehensive review of the scheme, weekly meetings with Insurance Companies, quarterly National Review Conference, and the Annual National Level Monitoring Committee meeting.

1.3 Impact Assessment of PMFBY/RWBCIS

Since, its launch from Kharif 2016 season, the scheme has completed six seasons i.e., Kharif & Rabi 2016-17, 2017-18, and 2018-19. Hence, this period can be considered as an appropriate time to take a stock of things, the achievements, the challenges- gaps to be overcome and what more to be done to succeed to meet farmer's expectations. This study has been conducted to assess the status of PMFBY implementation in three years of implementation. Impact Assessment of PMFBY has been carried out on various parameters including as outlined in the ToR- premium rate, publicity and awareness, enrolment process, claim settlement process, Transparency & Accountability (Grievance redressal, Performance of Insurance companies), significance of National Portal, Use of Technology, and overall effectiveness of scheme implementation structure.

Chapter 2: Methodology and Approach

2.1 Scope of Service as per Term of Reference (ToR)

The objective of this impact assessment study is to assess the effectiveness of the crop insurance schemes PMFBY and RWBCIS based on the various key parameters, to understand the performance of scheme implementation in terms of its intended outputs and outcomes and to assess the contribution of the schemes in the larger interest of the farmers. The evaluation period covers scheme implementation for 3 years period - 2016/17, 2017/18 and 2018/19.

Following are the possible areas of enquiry as outlined in the study ToR to conduct

1. Knowledge and awareness among the farmers about the features of the scheme.
2. Affordability of the premium rates to be paid by the farmers
3. User-friendliness in enrolment process for participation in the scheme
4. Robustness of existing implementation structure for engaging different stakeholders
5. Functionality of Data Systems and National PMFBY portal
6. Effectiveness of claim computation and claim settlement process
7. Use of technology for crop yield estimation
8. Transparency and accountability in various processes of scheme implementation

2.2 Methodology and Approach

A detailed framework was prepared comprising of set of questions and information to be obtained from primary surveys and using secondary sources for each of the areas of enquiry mentioned above. Accordingly, a mix of approaches viz., household survey of farmers, interaction with stakeholders and analysis of secondary data were adopted.

The study involved mixed methods of data collections-

a) Farmers' household survey:

For primary household survey, structured questionnaire was prepared to cover farmers' views on various facets of the scheme implementation, satisfaction levels as well as issues/concerns and suggestions for improvement. It also captures socio-economic data including land and crop details of the farmers. The farmers were selected in a manner to ensure adequate coverage of various strata like socio-economic status (especially SC/ST/Women), loanee farmers as well as non - loanee farmers.

b) Primary stakeholder interviews:

Number of stakeholders were identified, who are playing vital roles and thus, are critical for the implementation of the scheme. Detailed questionnaires and schedules were prepared for each category and face to face interaction was planned for each selected states /districts. Some part of the interaction, however, had to be done over phone due to sudden spread of pandemic leading to lockdown. Interactions were conducted with more than 110 stakeholders from various domain areas of scheme implementation. Feedbacks of different categories of stakeholders from states/UT have also been collated. Responses on issues and concerns along with their suggestions have been presented in a separate section of the report. These form an important repository of suggestions and ground level practical issues experienced by specific stakeholders.

The tools used for conducting interviews of primary stakeholder included direct and open-ended questions to relevant State authorities, insurance companies and other nodal agencies engaged in PMFBY implementation. Key stakeholders interacted through interview include: -

- State and district level officials from Department of Agriculture,
- Officials of District Level Monitoring Committee (DLMC)
- Representatives of Insurance Companies at regional offices and field offices
- Members of State Level Coordination Committee on Crop Insurance (SLCCCI),
- Members of State and District Level and State level Grievance Redressal Committees (SGRC/DGRC),
- Officials of State Level Banker's Committee (SLBC),
- Officials of banks and Primary Agriculture Credit Society (PACS)
- CSC and VLEs
- GoI officials at DAC&FW

c) Use of secondary data:

Secondary data sources used were mainly compiled from GoI and State Governments, as well as published reports and research papers.

2.3 Sampling Plan

Following steps were taken for sample selection for conducting Impact Assessment study on PMFBY.

a. Majority of bigger states implementing PMFBY/RWBCIS have been included

b. Selection of 11 States and 1 UT

c. Most of the draught prone and flood prone States have been covered in the sample e.g., Odisha, Andhra Pradesh, Maharashtra, Karnataka & Tamil Nadu

d. State wise sample size based on proportion of farmers insured in the State / UT were finalized with minimum sample of 100 farmers per State.

e. Subsequently, selection of districts/ villages / households for representative sampling was completed in consultation with State / District Agriculture officers

f. The following socio- economic representation of farmers was included in the sampling plan –

   ▪ Loanee/Non-Loanee farmers

   ▪ SC / ST and women farmers

   ▪ Non-loanee farmers Share-cropper farmers / Tenant farmers

2.4 Sample Size – Selection of States and Districts

States were selected for the study from each of the agro-climatic zones in the country, so that each of the zone may be represented by at least one State. Final sample covered 11 States and one UT and 33 districts. A total of 6150 farmer households spread across the selected States and UTs were planned to be covered. However, 5609 farmer households have been covered due to COVID-19, lockdown declared during the study period.

Table below mention state wise, districts selected, sample planned, and actual sample covered in the study.

Table 2.1 Sample Plan

#	State /UT	Districts Covered	Planned Sample Size	Actual Sample Size	Remarks
1	Andhra Pradesh	Anantapur, Krishna, Visakhapatnam	300	304	
2	Assam	Barpeta, Darrang, Nagaon	100	103	
3	Chhattisgarh	Durg, Koriya, Rajanandgaon	200	205	
4	Haryana	Faridabad, Hisar	200	200	
5	Jammu & Kashmir	Jammu, Samba	100	101	
6	Jharkhand	Deoghar, Ranchi	200	200	
7	Madhya Pradesh	Betul, Chindwara, Seoni	1000	1007	

#	State /UT	Districts Covered	Planned Sample Size	Actual Sample Size	Remarks
8	Maharashtra	Bhandara, Buldhana, Wardha, Yavatmal	1500	1600	
9	Odisha	Ganjam	300	75	Less Due to lockdown
10	Rajasthan	Bikaner, Jaipur, Kota	1000	497	Less Due to lockdown
11	Tamil Nadu	Thiruvarur, Thoothukudi, Tiruvallur	250	256	
12	Uttar Pradesh	Banda, Hamirpur, Jhansi, Mahoba	1000	1061	
	Grand Total	**33**	**6150**	**5609**	

Within the sample States, districts located in various agro-climatic zones in the country were selected. The study focused on selection of calamity prone districts. Agro-climatic zone wise distribution of districts is described in the following table.

Table 2.2 Selection of Districts in sample plan

#	Agro Climatic Zone	Number of districts selected	Names of the districts
1	Agro Climatic Zone 1	2	Jammu, Samba
2	Agro Climatic Zone 2	3	Barpeta, Darrang, Nagaon
3	Agro Climatic Zone 6	2	Hisar, Faridabad
4	Agro Climatic Zone 7	6	Rajnandgaon, Durg, Koria, Deogarh, Ranchi, Bhandara
5	Agro Climatic Zone 8	9	Betul, Chindwara, Seoni, Jaipur, Kota, Banda, Hamirpur, Jhansi, Mahoba
6	Agro Climatic Zone 9	3	Buldhana, Wardha, Yavatmal
7	Agro Climatic Zone 11	6	Krishna, Vishakhapatnam, Ganjam, Thiruvarur, Thoothukudi, Tiruvallur
8	Agro Climatic Zone 14	1	Bikaner

Table 2.3 Representation of Loanee and Non-loanee Framers in total farmers interviewed

State	Grand Total	Loanee Farmers	% of Loanee Farmers	Non Loanee Farmers	% of Non-loanee farmers
Andhra Pradesh	304	295	97%	9	3%
Assam	103	58	56%	45	44%
Chhattisgarh	205	3	1%	202	99%
Haryana	200	135	68%	65	33%
Jammu & Kashmir	101	49	49%	52	51%
Jharkhand	200	22	11%	178	89%
Madhya Pradesh	1007	477	47%	530	53%
Maharashtra	1600	512	32%	1088	68%
Odisha	75	66	88%	9	12%
Rajasthan	497	185	37%	312	63%
Tamil Nadu	256	128	50%	128	50%
Uttar Pradesh	1061	666	63%	395	37%
Grand Total	**5609**	**2596**	46%	**3013**	54%

As evident from the Table 2.3, out of 5609 farmers interviewed during the field survey, 46% (2596) were loanee farmers and 54% (3013) were non-loanee farmers. Details of State-wise representation of loanee and non-loanee farmers shows that more loanee farmers were covered in the states of Andhra Pradesh, Odisha, Haryana, Uttar Pradesh. Non-loanee count was higher in the select states of Chhattissgarh, Jharkhand, Maharashtra, and Rajasthan.

2.5 Data Analysis

Based on secondary data, in depth data analysis were carried out on various parameters like data of farmers enrolment, area insured, sum insured, farmers' premium, claims, payment, number of farmers benefited etc. Comparative assessment of the surveyed data with the National level statistics has also been taken up for drawing inferences in certain cases. Further, the data and information collected and compiled from varying qualitative and quantitative sources was triangulated for assessing scheme performance in a comprehensive manner. State-specific analysis was also attempted for better understanding of the scheme implementation in selected States in terms of issues and challenges faced as well as the best practices followed by them.

2.6 Case Studies

Three case studies were identified during the study, which have certain unique features that may be replicated in other States / districts for effective scheme implementation

- A PMFBY Success Story - Tiruvallur District, Tamil Nadu

- PMFBY Implementation – Few Learnings from Assam
- Impactful Awareness Campaign - Tamil Nadu Experience

Chapter 3: Impact Assessment on Performance Parameters

Impact Assessments are formal, evidence-based procedures that assess the performance. It usually focuses on a wider range of issues such as the appropriateness of the intervention design, the cost and efficiency of the intervention, its intended effects and how to use the experience from this intervention to improve the design of future interventions. Broadly, it aims to understand to what extent and how a scheme intervention addressed problems and larger issues it was intended to deliver.

This chapter mainly delves into detailed assessment of PMFBY/RWBCIS implementation to gauge the impact of the scheme on identified performance parameters. Areas identified are critically examined using secondary data and primary stakeholder survey and interactions with key stakeholders. Detailed analysis also includes key findings and suggestions under respective sections.

Objective of the assessment covered in this chapter is to identify the barriers and challenges from the point of view of participating stakeholders on one hand and to get policy insights and recommendations for improving scheme implementation especially sorting out various operational challenges. Major areas of enquiry identified for analysis include,

1. Enrolment process
2. Affordability of premium rates
3. Robustness of existing implementing structure engaging different stakeholders
4. Functionality of data systems and facilitation through National Crop Insurance Portal
5. Claim computation and claim settlement process
6. Use of technology for yield estimation
7. Transparency and accountability with respect to addressing grievances of all stakeholders in general and farmers in particular
8. Publicity and awareness activities (IEC)

Before we move forward to detailed analysis let's try to understand how PMFBY/RWBCIS schemes are implemented, its implementation cycle, engagement of different stakeholders and their key roles at various levels starting from tendering and bidding, publicity, enrolment, reconciliation, risk coverage, claim computation, claim settlement to grievance redressal.

The figure below describes broad PMFBY implementation cycle.

Figure 3.1 PMFBY Implementation Cycle
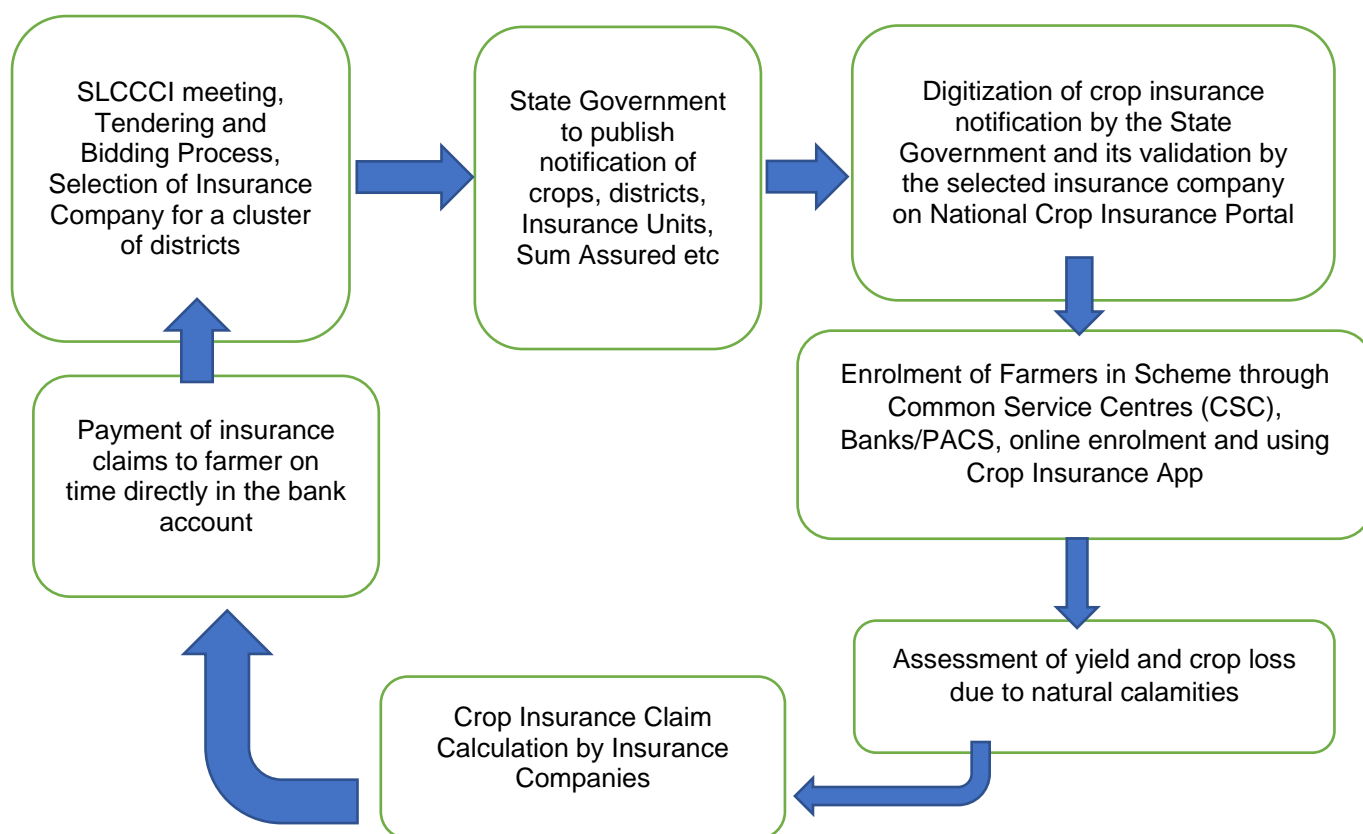
In every implementing State, State Level Co-ordination Committee on Crop Insurance (SLCCCI) is constituted to oversee notification of Crops to be included under crop insurance, districts to be covered, clustering of districts based on the high, medium, and low risk category, district specific Sum Insured for various crops, Insurance Units, determining Indemnity levels etc. On this basic premise State Government issue tender for inviting bids from Insurance companies. Based on lowest actuarial premium rate quoted; L 1 Insurance Company is selected from the Insurance companies participated in the biding process for a cluster. After selection of Insurance Companies, State Government issues detailed notification describing, notified crops, districts covered, sum insured, indemnity level, premium rates, cut-off date of enrollment, documents required for participation, details of implementing Insurance Company etc. This notification is then digitized on the National Crop Insurance Portal by the State Government and is validated by the implementing Insurance Companies. This facilitates easy enrollment of farmers from varying sources through CSC, banks, online enrolment, and through designated Insurance Intermediaries. Farmer share of premium is remitted to Insurance Companies. Insurance Companies then carry out

reconciliation drive for premium remitted and farmer details entered on portal and complete verification of farmer applications.

Once enrollment is over, crop growth is observed against any loss from the perils listed under risk category during cropping cycle. Loss assessment and yield estimation for the crops grown is conducted for various risk coverage including prevented sowing, mid-season adversity, localized calamities, post-harvest losses etc. as per protocols detailed out in Operational Guidelines. State Government provide final yield estimation data based on crop cutting experiment to implementing Insurance Companies for area-based claim calculation. Insurance Companies calculate claims for eligible farmers by comparing shortfall in threshold Yield (TY) and Actual Yield (AY) and transfer the claim amount directly in the bank account of eligible farmer.

3.1 Enrolment Process

After the notification is issued by State Government regarding crops and areas to be covered under crop insurance for kharif /rabi season, all farmers including sharecroppers and tenant farmers are eligible to apply for crop insurance at a fixed premium rate. Earlier crop insurance was compulsory for those farmers who had taken short term/seasonal agriculture loan (or holders of Kisan Credit Card), from Kharif 2020, such loanee farmers can also opt out of the Scheme.

A Loanee farmer can enroll in the scheme through Banks from where he/she has taken a KCC loan. Non-loanee farmers have various methods for enrolment: through CSC, through insurance intermediaries appointed by insurance companies, online application on PMFBY Portal. It is observed that farmers tend to come for enrolment during last week of enrolment and some of them come without having/opening Savings Bank account. Aadhaar mismatch and insufficient documents are the main reasons for applications getting reverted / rejected by the insurance companies. Therefore, it is imperative to create awareness among farmers for submitting correct documents at the time of enrolment.

Insurance Company verifies and approves the farmer application if it finds all information with uploaded documents on NCIP in order. The farmers can check the status of their application on PMFBY portal any time using his/her application number. Only farmers whose data is uploaded on the National Crop Insurance Portal are eligible for Insurance coverage and it makes the basis for the premium subsidy calculation from State and Central Government.

Table 3.1 Farmer coverage (in Lakh)

Season	Loanee Farmers Insured	Non-Loanee Farmers Insured	Total Farmers Insured
Kharif 2016	304.9	102.6	407.5
Kharif 2017	247.1	109.6	356.7
Kharif 2018	224.5	119.4	343.9
Rabi 2016-17	142.5	35.2	177.7
Rabi 2017-18	141.7	33.1	174.8
Rabi 2018-19	130.4	89.9	220.2

Figure 3.2 Analysis of Farmer's Enrolment
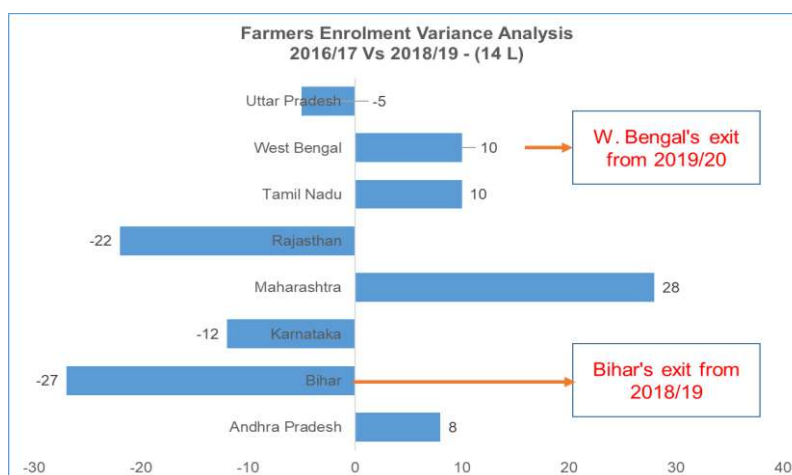
As observed from the table above, over all farmer coverage including loanee and non-loanee has declined from 407.5 lakh in Kharif 2016 to 343.9 lakh in Kharif 2018. Major decline is seen in coverage of loanee farmers. On the other hand, **coverage of non-loanee farmers, has shown substantial rise especially during Rabi season. It has increased from 177.7 lakh in Rabi 2016-17 to overwhelmingly high at 220.2 lakh in Rai 2018-19. This is on one of the significant achievements in terms of acceptance of the scheme among farmers.**

A similar trend is observed among the 12 States covered in the study.

Figure 3.3 Loanee and Non-Loanee Enrolment

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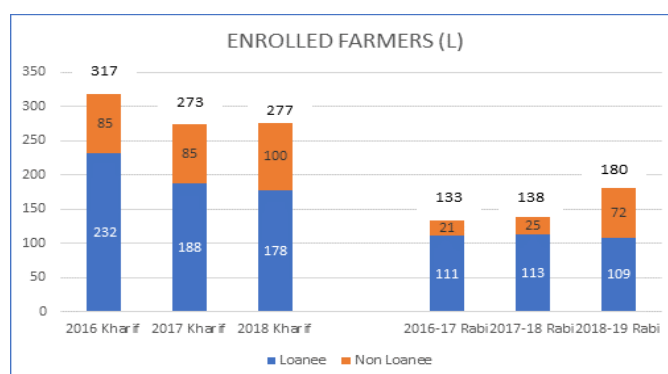
Decline in coverage of loanee farmers is also attributed to sanitization of farmer's data on account of validation through Aadhaar as capturing Aadhaar number has been made compulsory since Kharif-17 and its authentication on UIIAD website was followed from Kharif 2018 season. Various loan waiver programs were announced by the States of Maharashtra, Rajasthan, and Uttar Pradesh in 2017 which rendered loanee farmers ineligible for crop insurance. Further, de-notification of Sugarcane crop in 2017 by the Government of Uttar Pradesh led to the exit of nearly 2.5 lakhs farmers from PMFBY. Land record integration with NCIP in the States of Maharashtra (from Rabi 2019-20) and Orissa (from Kharif-2020) has also helped in reducing duplicity which was observed in earlier seasons wherein some farmers obtained multiple insurance on the same parcel of land.

There has been rise in the enrolment of the non-loanee category of farmers in crop insurance schemes. **This can be attributed to efforts of various State governments in publicizing the scheme through various means like conducting farmer camps as a special drive to enroll non- loanee farmers. Government of India also brought in CSC channel for enrolment of non-loanee farmers leading to significant increase in non-loanee enrolment in subsequent seasons.** Common Service Centre (CSC) is a special purpose vehicle under the aegis of ministry of electronics and information technology which provides various services related to Government schemes and programs to the villagers in the village itself. CSC is operated by local person called Village Level Entrepreneur (VLE). There is a strong network of 3.6 lakhs CSC/VLEs which are actively providing various online public utility and financial services to the citizens. Out of these 3.6 lakhs CSC/VLE, approximately 40,000 are active in providing non loanee enrollment services.

Examples of few States with extensive increase in enrolment of non-loanee farmers can be seen in the table.

Table 3.2 % Increase in Non-Loanee Farmers

States	Season	% NL Increase
Jharkhand	Kharif 2018	88%
Maharashtra	Kharif 2018	83%
Andhra Pradesh	Rabi 2018/19	81%
Karnataka	Rabi 2018/19	88%
Maharashtra	Rabi 2018/19	95%
Tamil Nadu	Rabi 2018/19	80%

Jharkhand, Maharashtra, Andhra Pradesh, Karnataka, and Tamil Nadu are the leading states with enrolment of non-loanee farmers. It is also seen that enrolment in Kharif will remain much high as compare to rabi season as most of the KCCs are issued/renewed in the start of the year. Majority of the farmers grow crops in Kharif season. Sowing in Rabi season is done only in areas with assured irrigation facility.

Figure 3.4 State Wise, Season Wise, Loanee / Non Loanee Enrolled Numbers (12 surveyed States / UT)
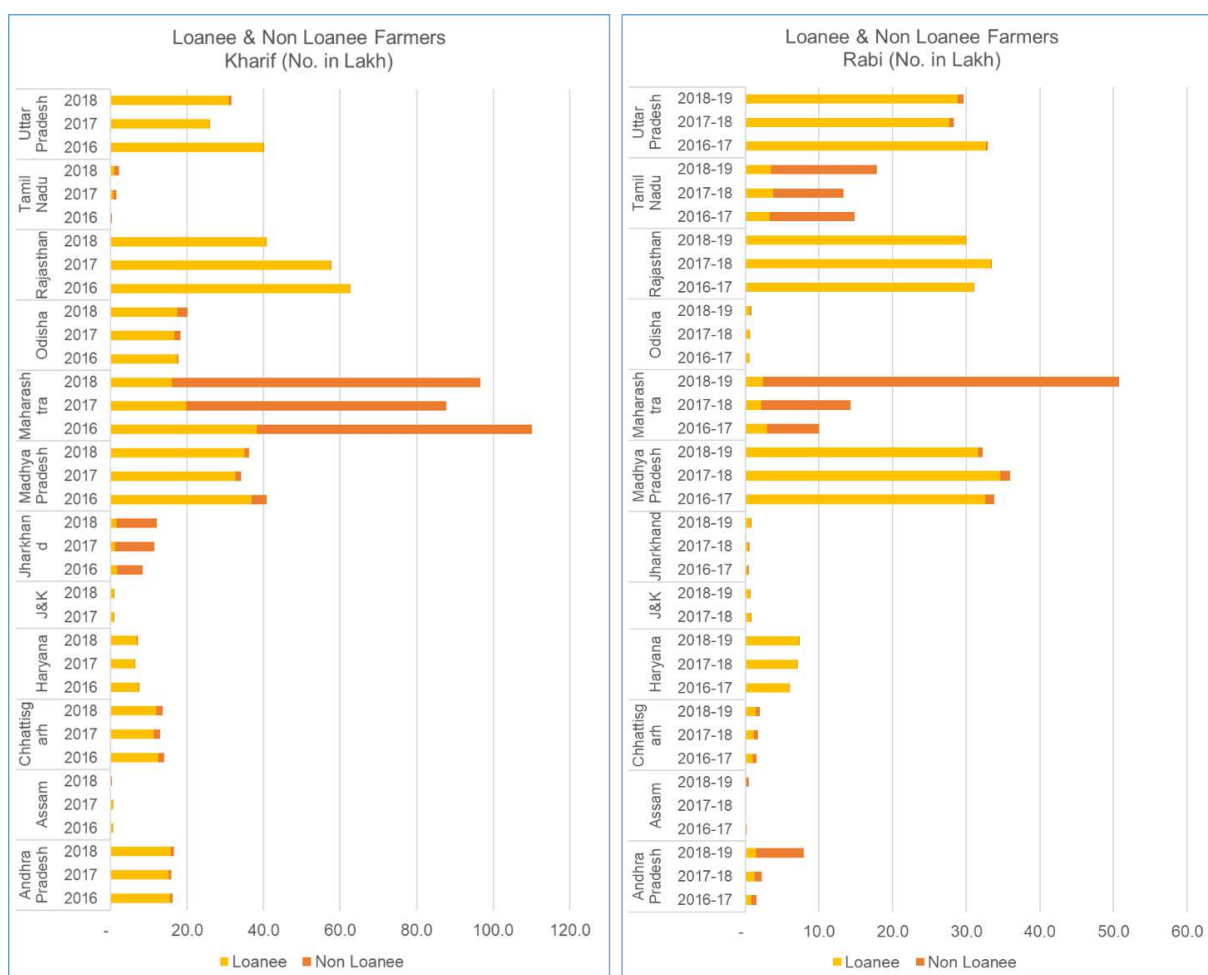
Out of the 12 States/UTs studied, Maharashtra and Jharkhand (both States together contribute around 90% of non-loanee coverage) lead in non-loanee enrolment in Kharif season. More than 50% of the non-loanee farmer enrolment in the country comes from Maharashtra State. During Rabi season - Maharashtra, Tamil Nadu and Andhra Pradesh contributed towards majority of the non-loanee enrolment. A major revelation comes through the study which shows an increase in Rabi enrolment when there is a severe drought in kharif season. It can be witnessed from the data of Maharashtra state which shows tremendous increase in enrolment in Rabi 2018-19 season when compare to last two years in anticipation of prevented sowing conditions.

Feedback on 6 facets of enrollment captured through primary survey are shown below.

Table 3.3 Feedback on Enrolment

Enrolment Process	measures	STATE WISE (YES %)												Total (%)
		AP	AS	CH	HR	JK	JH	MP	MH	OD	RJ	TN	UP	
Enrolment Channel - Where did you pay the premium?	Bank	100	00	83	100	100	12	65	36	67	51	20	75	46
	IC Representative	0	100	0	0	0	1	0	0	0	0	2	0	2
	CSC	0	0	17	0	0	7	35	64	11	9	5	6	36
	PACS	0	0	0	0	0	N	0	0	22	40	73	19	16
Any extra amount charged to you by CSC	Y	11	0	NA	0	0	NA	0	9	0	0	24	0	6
	N	89	100	NA	100	100	NA	100	91	100	100	76	100	94
How do you find the process of insuring crop under PMFBY/ RWBCIS?	Easy	100	47	68	92	100	23	97	8	78	81	77	97	44
	Difficult	0	53	32	8	0	77	3	92	22	19	23	3	46
Are you aware of the cutoff dates for enrolment under PMFBY/ RWBCIS?	Y	11	24	53	100	44	39	11	89	67	3	66	10	59
	N	89	76	47	0	56	61	89	11	33	97	34	90	41
Did you receive any acknowledgement receipt for receipts/inland letters?	Y	78	0	42	11	0	29	6	41	78	8	70	12	31
	N	22	100	58	89	100	71	94	59	22	92	30	88	69
Did you receive SMS?	Y	89	29	33	82	0	49	3	62	78	79	69	1	46
	N	11	71	67	18	100	51	98	38	22	21	31	99	54

a) Enrolment Channels –

Among various enrolment channels used by farmers for enrollment, 46% farmers are getting enroll through banks and 36% through CSC and 16% through PACS. Enrolment channels vary from State to State. Banks are the main channel of enrolment in the States of Andhra Pradesh, Chhattisgarh, Haryana, J&K, Madhya Pradesh, Odisha and UP. PACS is the primary channel of enrolment for 80-90% farmers in Jharkhand and Tamil Nadu. In Maharashtra, record enrolment, mainly of non-loanee farmers flows through CSC (64%), where all CSC centers are fully functional and VLEs are well aware of the enrolment process.

Figure 3.5 Enrolment Channels
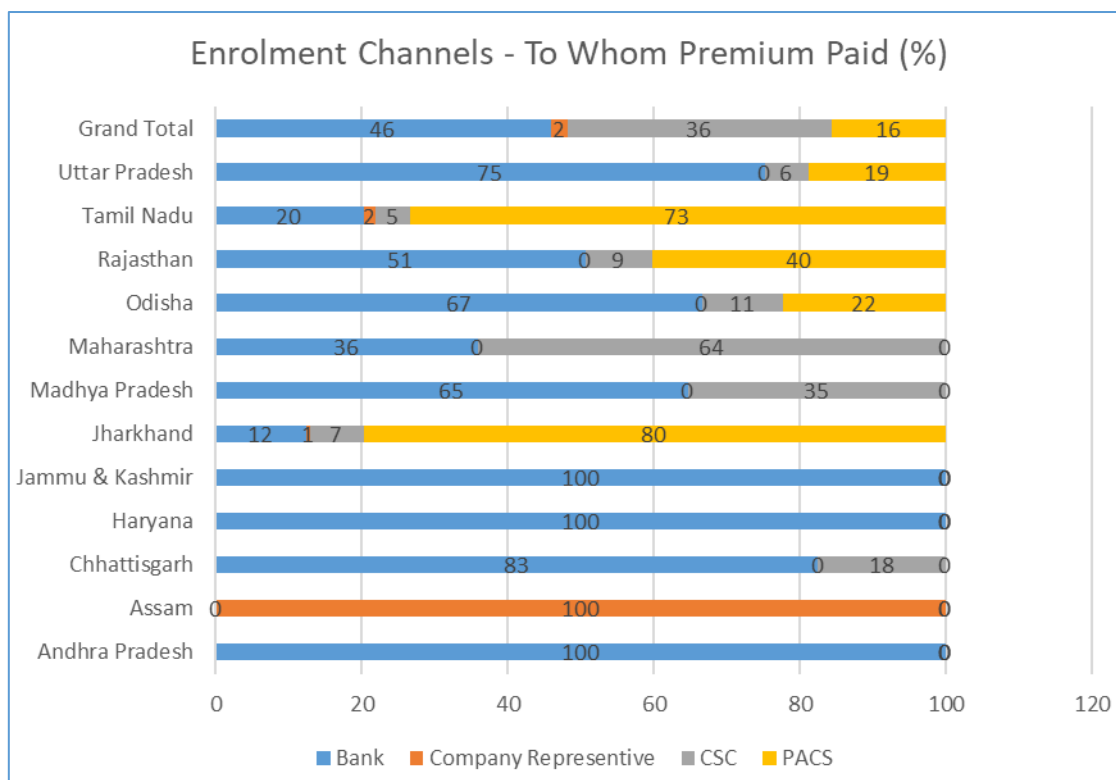
Enrolment process for non-loanee farmers is perceived to be a challenge due to various documentary requirements. Though CSC/VLS channel has tried to bridge the gap yet there are instances where in some of the States (Andhra Pradesh, Chhattisgarh, Jharkhand, Maharashtra, and Tamil Nadu) few VLEs do charge additional fee for farmers registration. There is a need to involve various other channels such as IRDA approved intermediaries such as Insurance Marketing firm (IMF), Agents and Brokers etc. along with existing channel of CSC. Banks can also explore their respective Banking Correspondent (BC) model for non-loanee enrollment with prior approval from concerned authorities.

b) Process of enrolment under PMFBY/RWBCIS

The required documents for non-loanee farmers are Land Records, Bank Account passbook, updated Aadhaar details and premium amount need to be paid. For loanee farmers no documents are required except updated Aadhar details. All other information is already available with the banks while issuing KCC. Documentation requirement is felt to be manageable by farmers in the states of Andhra Pradesh and Haryana followed by Madhya Pradesh, Odisha, Tamil Nadu, Uttar Pradesh, Rajasthan, and Maharashtra. Farmers who have faced difficulty in submitting proper documents while enrolling under PMFBY are from the States of Jharkhand, J&K, Chhattisgarh, and Assam.

Figure 3.6 Documentation for PMFBY/RWBCIS

Documentation OK (%)

State	Percentage
Uttar Pradesh	76%
Tamil Nadu	77%
Rajasthan	73%
Odisha	78%
Maharashtra	71%
Madhya Pradesh	79%
Jharkhand	22%
Jammu & Kashmir	62%
Haryana	93%
Chhattisgarh	57%
Assam	50%
Andhra Pradesh	98%
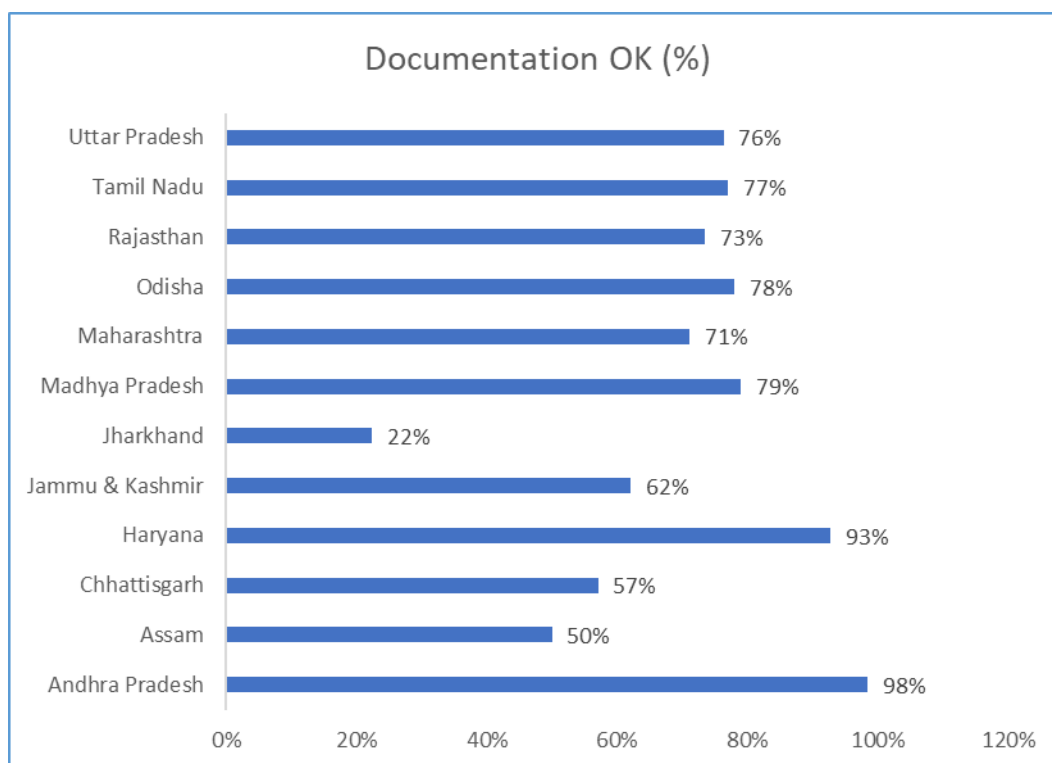
c) Acknowledgement Receipts

Farmers welcome the process of initiating the acknowledgement receipts for loanee farmers however, it is yet to reach majority of farmers in time, as reported by 68% farmers.

d) SMS

Similar, experience is felt with delivery of SMS to loanee farmers where delayed response is a matter of concern. Farmers from 7 out of 12 States reported to receive SMS in- AP, Assam, HR, JH, MH, Odisha, RJ and TN

e) Feedbacks from Stakeholders

- In some cases, Banks either have not captured Aadhar details at all or have not captured updated Aadhar details leading to rejection of applications in some of the States.
- Bank IFSC Code on front page of Passbook is missing in case of Co-operative Bank accounts which leads to incomplete entry of bank details and hence claim settlement also gets delayed.
- No acknowledgement receipt is given separately for premium deduction by Banks to loanee farmers.
- Delay in payment of commission by ICs to Banks leading to discontent and demotivation at banks' end.

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- In some cases, there is a delay on Bank's end in uploading loanee farmers data on NCIP. Few banks do not share farmer details even after cut- off date for electronic remittance of premium is over.

- Farmers are unable to get enrolled if the State Government has committed errors in village mapping during digitization of Notification. Problems like missing villages or village mapped in wrong hierarchy have been reported by the stakeholders.

- In some of the States, ICs insist on Crop Cultivation Certificate (Sowing Certificate) signed by Village Administrative Officer for non-loanee farmer enrolment, this causes further delay in enrolment/registration process.

- VLEs/CSC reported that often farmers visit CSC/VLE for crop insurance without opening a savings bank account and without one or all required documents.

- Sometimes, name of the farmer is wrongly spelt by the VLE while enrolment. This leads to rejection of application by some insurance companies and farmers are deprived of claims.

- Last minute rush by non-loanee farmers for enrolment at CSC centers leads to mistakes at CSC end while filling the application on NCIP. Approximately 5 to 10 percent of applications get reverted by ICs for want of proper documentation.

- Some ICs are reverting applications after few weeks, sometimes as late as 6 months and not immediately after registration. VLEs find it difficult to contact concerned farmers to get the correct information.

- Over insurance in some of the pockets is a major issue where same parcel is getting insured by the farmers from different sources.

Suggestions

- Correct data entry should be done by Banks and VLEs. Especially the names of the farmer should be matched with what is written on passbook, Aadhaar and land documents.

- CSC/VLE needs to put correct details of land holding segregating the land among various owners, in case of joint land holding.

- Farmers should be allowed to submit self-certified declaration for the crop sown details and in case of joint land holdings.

- Seasonality discipline should be strictly adhered to by the Banks and other intermediaries in timely remittance of premium to insurance companies and uploading farmer details on NCIP.

- CSC system should be strengthened to manage last minute rush of non-loanee farmers.

- Loanee farmers should certify crop sown in every season if there is a change in crop from previous sown crop or mentioned at the time of issuance of KCC.

- Early enrolment by farmers can be incentivized to avoid last minute rush.

- Insurance companies in coordination other stakeholders should drive major campaigns during the enrolment period in every crop season by using participatory videos, and other ICT tools such as voice blasts, IVRS and SMS, to increase awareness and insurance literacy.

- There should be provisions for on-the-spot enrolment in crop insurance with the use of customized mobile App.

- Banks should update their records as per updates in Farmers Aadhaar Card to avoid mismatch.

3.2 Premium Rates

Key feature of the schemes- PMFBY/RWBCIS is the nominal premium rate to be paid by the participating farmers. Premium rates are uniform for all category of farmers weather loanee or non-loanee and for crop categories- cereals, pulses, oilseeds, and commercial and horticulture crops in Kharif and Rabi seasons. Farmers need to pay only 2% of Sum Insured as a premium for all Kharif crops and 1.5% for all Rabi crops. In case of annual commercial and horticultural crops, the premium to be paid is maximum up to 5%. The difference between actuarial premium rates and the farmer share of premium is shared equally between the Central Government and the State governments on 50: 50 basis.

The actuarial premium rates are determined by insurance companies by accounting into various risks, variation in yield and Sum Insured (SI) indemnity levels[5] provided by the State Government. Sum Insured is decided by District level Technical Committee (DLTC) for a crop for a district and is almost equal to scale of finance for that crop in that district. The State Government calls for tenders and selects implementing Insurance Company based on lowest premium rate quoted by various participating insurance companies, that are empaneled with GoI.

Table 3.4 Average Actuarial Premium Rate Trend (All India)

Season	Sum Insured (Rs crore)	Gross Premium (Rs Crore)	Average Premium Rate
Kharif 2016	1,32,306	16,031	12%

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[5] Indemnity level refers to the highest amount that the policy will pay out (claim) regarding any loss in an event. In crop insurance, there are three levels of indemnity, e.g., 90%, 80% and 70%, which are corresponding to low, medium, and high-risk coverage

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Season	Sum Insured (Rs crore)	Gross Premium (Rs Crore)	Average Premium Rate
Rabi 2016-17	74,309	5,905	8%
2016-17 Total	**2,06,615**	**21,937**	**11%**
Kharif 2017	125425.05	18812.07	15%
Rabi 2017-18	79,119	6,535	8%
2017-18 Total	**2,04,544**	**25,347**	**12%**
Kharif 2018	136446.7	20731.93	15%
Rabi 2018-19	89,611	8,108	9%
2018-19 Total	**2,26,058**	**28,840**	**13%**

The table above describe all India trend in sum insured, gross premium and average premium rate for 3 years. As evident from the table, sum insured has increased from Rs 2.06 crore in 2016-17 to Rs 2.26 crore in 2018-19. Sum insured is now closer to the cost of cultivation. It has gone up from Rs 20,500/- per hectare of land during kharif 2015, to Rs 40,000/- per hectare in kharif 2018. This has subsequently resulted in increase in premium rates. **The average actuarial premium rates quoted by the insurance companies increased from 11% in 2016-17 to 13 % in 2018-19.** This happened mainly because of increase in sum insured which further shows rise due to increase in scale of finance for different crops over a period. The scale of finance for different crops in a district is decided every year by District Level Technical Committee (DLTC). **Further, average premium rates in Kharif season were on higher side, in the range of 12-15% while in Rabi for season it is on the lower side and stands at around 8-9%.**

Figure 3.7 Total Sum Insured (12 surveyed States / UT)
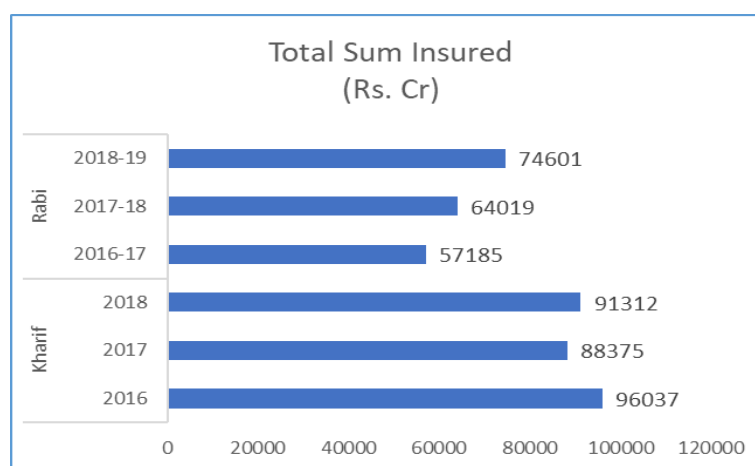
Against the crop insurance status and trend observed during Kharif and Rabi season over three years, the sum insured in money value for 12 States accounted Rs. 96,037 Cr for Kharif during 2016. Next year, the amount decreased but it came up again during 2018 accounting to a sum of Rs.91,312 Cr. The dip in sum insured and farmers

enrolled in Kharif 2017 can be attributed to various loan waiver schemes across many States and introduction of Aadhaar based enrolment.

The sum insured scenario with respect to Rabi season, however, maintains rising trend over the years as was observed with farmers' enrolment trend. In monetary terms, it accounted for Rs. 57,185 Cr during 2016-17 and increased to Rs. 74,601 Cr during 2018-19. This has the implication of late rains in Kharif season in rainfed areas/partially irrigated areas which push the farmers to do sowing in Rabi season.

Figure 3.8 Season Wise Sum Insured / Ha / Farmer (12 Surveyed States / UT)
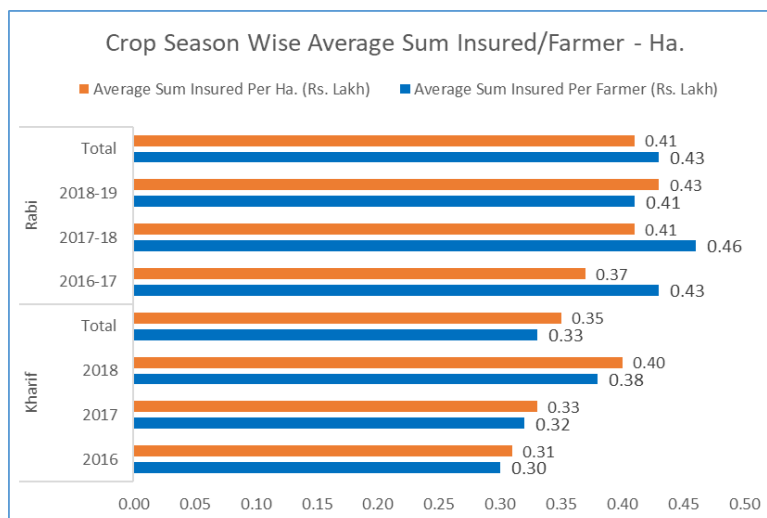
The figure above describes, sum insured per ha and per farmer count for six seasons across the three years. It reveals that every year there is rise in the average sum insured either per farmer or per ha count in both Kharif and Rabi seasons, however, it is on higher side in Rabi season. This is because Rabi crops are primarily grown in those areas where there is assured irrigation or in some parts of southern India which receive rainfall due to NE monsoon.

Figure 3.9 Farmers Premium and Gross Premium (in 12 States)
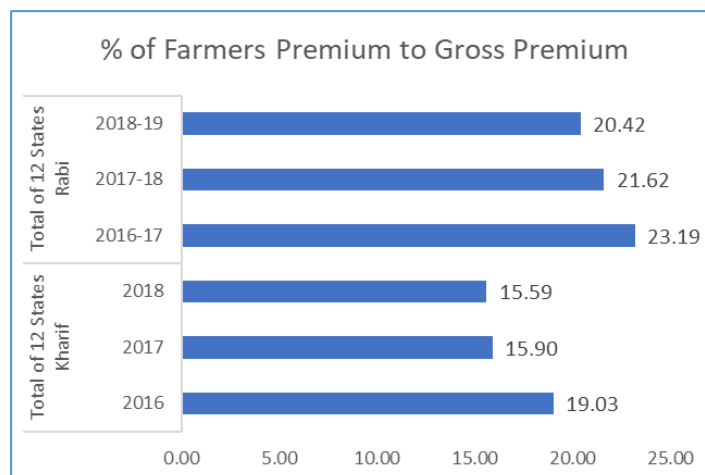
It is observed that farmers' share of premium for Rabi crop is higher than the Kharif crop by a margin of about 5 per cent. This is because less actuarial premium rates quoted by the insurance companies compared to Kharif season. Also, as explained above, Rabi crops have generally assured irrigation, hence, claim payment experience of insurance companies is supposedly good as less claims are paid. It is encouraging to observe that farmers' share of premium rate is decreasing every year.

Figure 3.10 Average Farmer Premium and Gross Premium during Kharif and Rabi season

Avg. Farmer Premium & Gross Premium during Kharif & Rabi (Rs.)
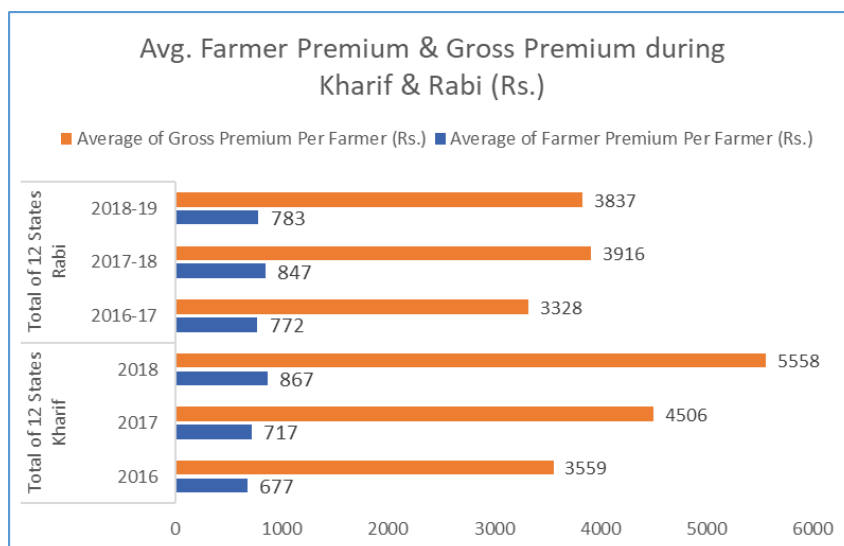
The analysis indicates that on an average every farmer has paid between Rs 677- Rs 867 per ha as a farmer share of premium during Kharif and Rabi seasons. Similarly, per farmer gross premium amount for taking crop insurance varies from Rs 3559 to Rs 5558 per ha. It is important to observe that the farmers are paying less than Rs 1000 as a farmer share of premium to avail crop insurance. This amount is substantially low when compared to premium sharing burden born by the Central and State Government and benefit received by farmers as claims in the event of crop loss.

c) High Premium rates in select crops

State Government officials during interaction highlighted few issues about high Premium Rates quoted by Insurance Companies for few crops in some of the States/districts as highlighted in the table below.

Table 3.5 High Premium Rates in select districts for select crops

State/UT Name	District Name	Season	Scheme	Crop Name	Area Insured	Premium Rate
Gujarat	Jamnagar	Rabi 2018	PMFBY	WHEAT IRRIGATED	12,727	48.50%
Gujarat	Rajkot	Kharif 2018	PMFBY	Groundnut	278,400	49.40%
Karnataka	Belagavi	Kharif 2018	PMFBY	Green Gram (Moong Bean/ Moong)-Rainfed	21,579	42.00%
Maharashtra	Ahmednagar	Kharif 2018	WBCIS	Pomegranate	24,137	62.00%
Maharashtra	Ahmednagar	Rabi 2018	PMFBY	Onion	12,413	39.00%
Maharashtra	Jalgaon	Rabi 2018	WBCIS	Banana - Tissue Culture	40,535	38.00%
Maharashtra	Nanded	Rabi 2018	PMFBY	Bengal Gram (Chana)	150,876	40.50%
Maharashtra	Sangli	Kharif 2018	WBCIS	Pomegranate	17,694	57.81%
Maharashtra	Solapur	Kharif 2018	WBCIS	Pomegranate	20,210	54.20%
Rajasthan	Jaisalmer	Kharif 2018	PMFBY	Guar	165,730	44.20%
Rajasthan	Jaisalmer	Kharif 2018	PMFBY	Pearl Millet (Bajra)	44,730	54.80%
Tamil Nadu	Tirunelveli	Rabi 2018	PMFBY	Maize (Makka)	16,467	35.00%
Uttarakhand	Dehradun	Rabi 2018	WBCIS	Apple - 15 To 40 Years	144,964	30.00%

Crops with premium rate more than 25% and area insured is more than 10,000 ha are considered as high premium crops. It is clear from the above table that premium rate for Bajra crop in Jaisalmer district of Rajasthan was as high as 54.8% quoted in Kharif 18 season under PMFBY. Similarly, it was 62% for Pomegranate in Ahmednagar district under RWBCIS in Kharif 18. Farmer share of premium rate is already on the higher side for horticulture and commercial crops when compared with premium rates of field crops. However, under both schemes premium rate higher than 50-60% is not a rational phenomenon, where farmer is paying Rs 50-60 for the sum insured of Rs 100. This not only question affordability but also feasibility of insurance product both for farmer and Government. Ideal premium rates are considered in the range of 25-30% on upper limit and it will only then have a greater acceptability.

Figure 3.11 Affordability of premium amount.

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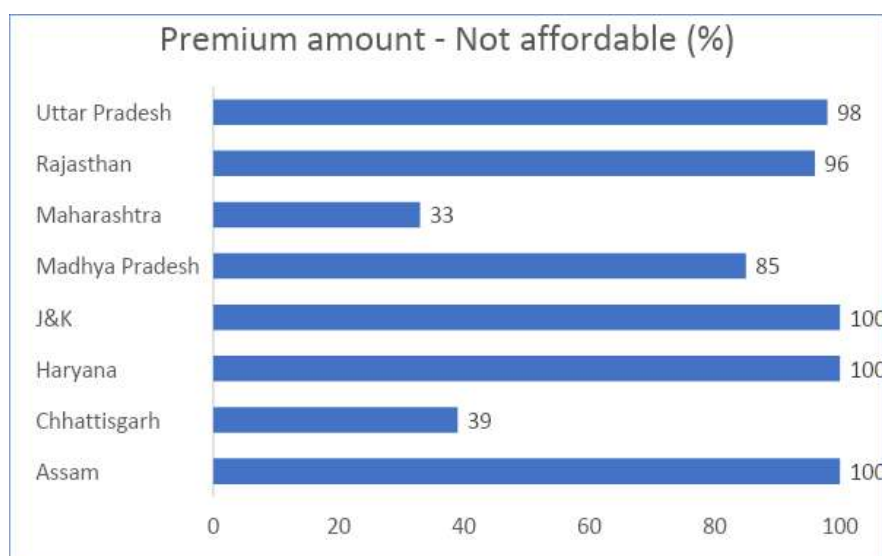
It is revealed from the primary survey that majority of farmers expressed their view that the premium amount is still not affordable, which is already on the lower side as discussed in the above section. Affordability can be seen in terms of various aspects such as, affordability in relation to claim received and affordability for horticulture crops. Only farmers in Maharashtra and Chhattisgarh seems to be OK with the premium amount, they need to pay for crop insurance.

Key Issues

- The Sum Insured is now closer to the cost of cultivation than before. It has gone up from Rs 20,500 per hectare of land during kharif 2015, to Rs 40,000 per hectare in kharif 2018. Higher sum insured ensures more claims to the farmers in case of crop loss.

- High actuarial premium rate, resulting in rising burden of state share of subsidy is one of the prime factors for few States for taking exit from the scheme.

- The actuarial premium rate for a crop may vary significantly across districts for the same crop, as the indemnity levels in each of the district could be different.

- It is felt that in some States, major enrolment is happening in those districts where there is a history of higher claim settlement, which increases premium rates in subsequent seasons.

Suggestions

1. Non-loanee farmer's premium should be deducted from their savings account in bank to avoid cash transactions. A module may be developed on NCIP to avoid cash transaction at farmers' end.

2. Provision of at least two insurance companies in a cluster of districts in one State is likely to help the scheme to benefit from competition; however, it will increase the complexity of administration of the scheme. Instead, an insurer may be appointed only for loanee farmers. For non-loanee farmers, the field should be open for all insurers. The non- loanee farmers can be given an option of choosing their insurer/intermediary.

3. State Governments may be encouraged to include all notified crops- bad risk as well as good risk crops to optimize actuarial premium rate.

4. Since, farmers generally see premium deductions as a form of investment and in case if there are no inflow of money in terms of claim settlement (whether the farmer is eligible or not) or lesser claim is paid, then a strong negative perception is built against crop insurance. Delayed claim payments reinforce

negative perceptions further. The perception of crop insurance as "Money Back Policy" needs to change via effective IEC activities.

5. A detailed analysis needs to be carried out for understanding high premium rates quoted in select crops in select district and a necessary course correction may be proposed to keep a check on shooting premium prices.

3.3 Robustness of Implementation Structure

PMFBY/RWBCIS is a multi-stakeholder scheme of Government of India involving Central Government, States and UTs, empaneled Insurance Companies, banks and FIs and its numerous branches and active CSCs. Implementation process has already been detailed out in the beginning of the third chapter.

The scheme implementation structure seems to be well designed, and robust. Following a detailed consultation with all implementing stakeholders and learning from the scheme implementation experience, Operational Guidelines (OGs) of PMFBY/RWBCIS were revised with effect from 1st October 2018 from Rabi 2018-19 season. There is enough clarity of the roles and responsibilities of each of the stakeholders, which have been outlined in detail in the operational guidelines. Timelines of each important process is specified in the seasonality discipline. However, at times poor execution and diffused accountability contributes to loss of robustness. Given below are some operational issues observed and accordingly suggestions from different stakeholders have also been included in this chapter.

3.3.1 State wise number of districts- Implementation Spread

Penetration measured in terms of number of districts in each State where PMFBY has been introduced looks promising. Though the targets of farmers' enrolment and insured area are yet to be achieved.

Table 3.6 Data of number of districts for States are given below -

#	State Name	Total No. of Districts	KHARIF - 2018 No. of District PMFBY	KHARIF - 2018 No. of District RWBCIS	Rabi - 2018-19 No. of District PMFBY	Rabi - 2018-19 No. of District RWBCIS	#	State Name	Total No. of Districts	KHARIF - 2018 No. of District PMFBY	KHARIF - 2018 No. of District RWBCIS	Rabi - 2018-19 No. of District PMFBY	Rabi - 2018-19 No. of District RWBCIS
1	Andhra Pradesh	13	13	9	13	13	12	Maharashtra	36	34	25	32	30
2	Assam	33	25		27		13	Meghalaya	11	6		10	
3	Chattishgarh	28	27	27	25	27	14	Odisha	30	30		30	
4	Goa	2	2				15	Puducherry	4	2		3	
5	Gujarat	33	33		32		16	Rajasthan	33	33	19	33	22
6	Haryana	22	22		22		17	Sikkim	4	4			
7	Himachal Pradesh	12	10	10	11	12	18	TamilNadu	37	30		31	
8	Jammu And Kashmir	20	10		10		19	Telengana	33	30	29	30	30
9	Jharkhand	24	24		24		20	Uttar Pradesh	75	75	14	75	
10	Kerala	14	14	12	14	12	21	Uttrakhand	13	13	11	13	13
11	Madhya Pradesh	52	51	51	51	51	22	West Bengal	23	22	20	22	22

Since, 2016 PMFBY scheme has been implemented in 27 States and UTs and RWBCIS scheme is in implementation in 12 States. Bihar State moved out of the scheme from Kharif 2018 and started its own scheme- Bihar Rajya Fasal Sahayata Yojana (BRFSY). The difference between BRFSY and PMFBY is that nature of BRFSY is more of Financial Assistance scheme, whereas PMFBY is an Insurance Scheme based on actuarial premium rates.

3.3.2 Feedback of farmers

Feedback of farmers on their experience about different stakeholders is as mentioned.

a) Government Officials

Figure 3.12 Farmer Satisfaction with respect to Govt Officials
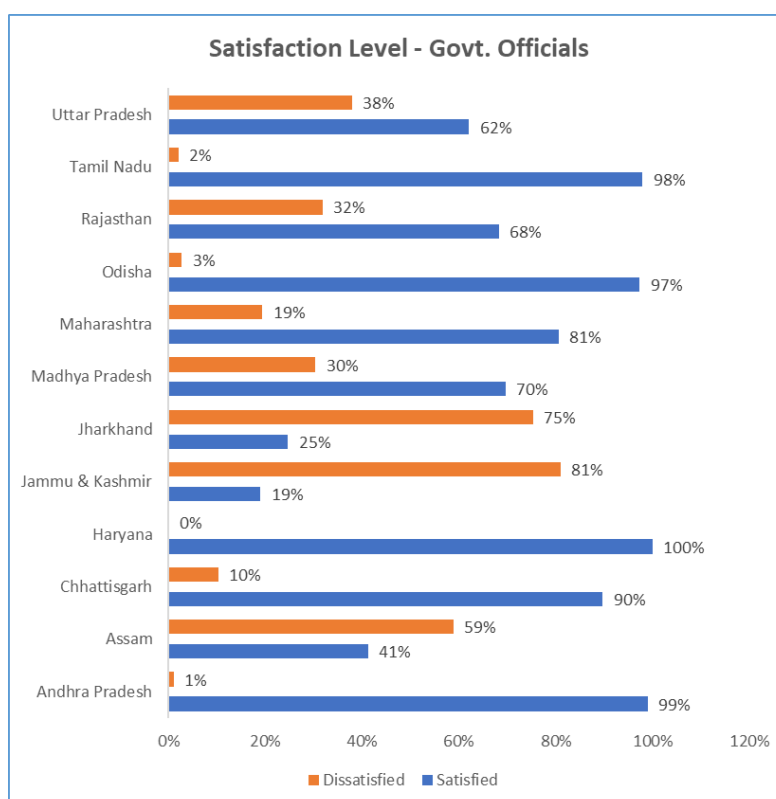
Role of Government officials (State, District and Block level) is seen quite positively in most of the States like Tamil Nadu, Odisha, Maharashtra, Haryana, Chhattisgarh, and Andhra Pradesh. In these states farmer's satisfaction level is between 80-100%.

The high level of satisfaction about Government functionaries is probably the result of regular interaction with the farmers through camps and by addressing farmers grievances proactively.

In case of Uttar Pradesh, Rajasthan, and Madhya Pradesh, more is expected out of from the State Government officials. State machinery from Assam, Jharkhand and J&K need to work hard in terms of reaching out to farmers for explaining scheme provisioning and help in resolving grievances of farmers.

b) Banks

Figure 3.13 Farmer Satisfaction with respect to Banks
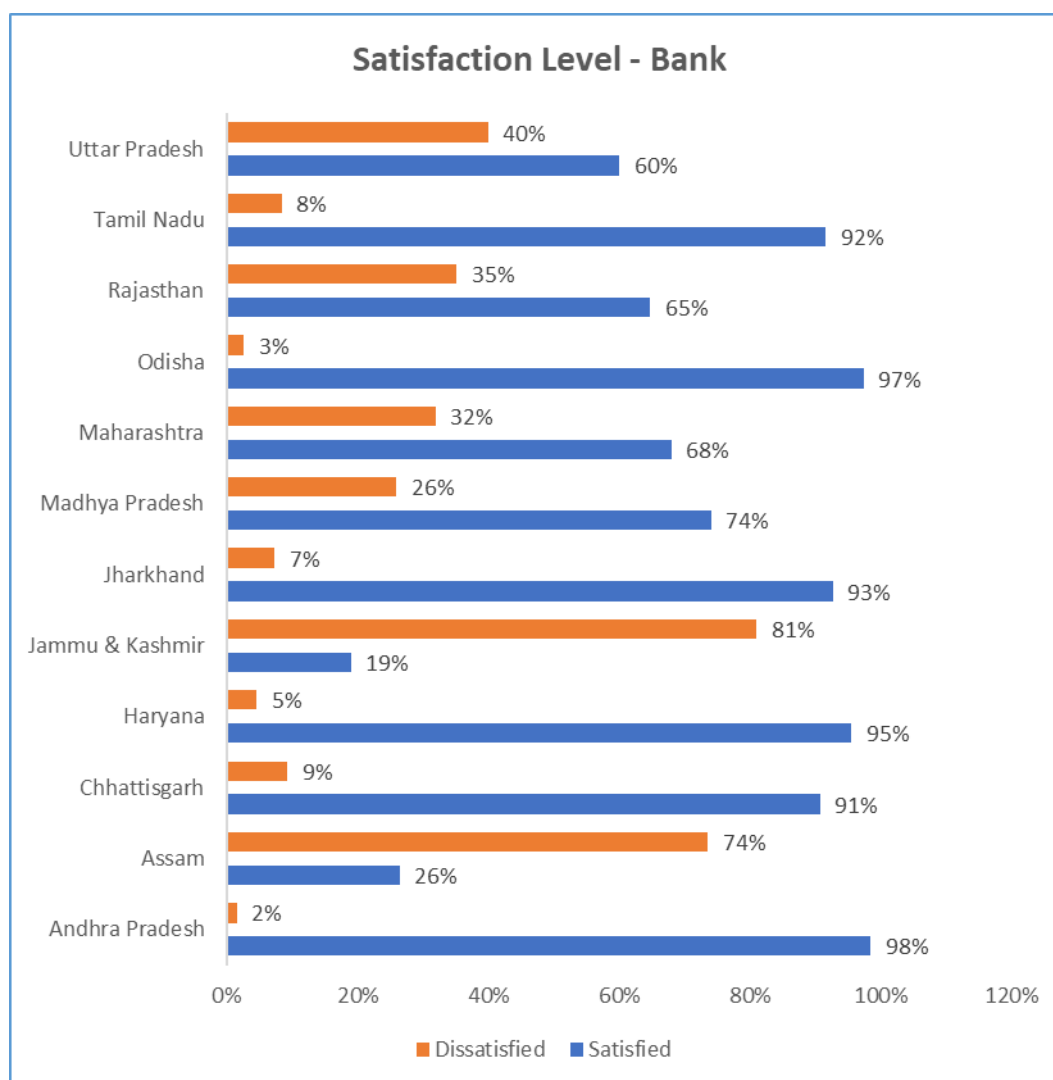
Satisfaction Level - Bank

State	Dissatisfied	Satisfied
Uttar Pradesh	40%	60%
Tamil Nadu	8%	92%
Rajasthan	35%	65%
Odisha	3%	97%
Maharashtra	32%	68%
Madhya Pradesh	26%	74%
Jharkhand	7%	93%
Jammu & Kashmir	81%	19%
Haryana	5%	95%
Chhattisgarh	9%	91%
Assam	74%	26%
Andhra Pradesh	2%	98%

Farmers in the states of Tamil Nadu, Haryana, Chhattisgarh, and Andhra Pradesh are highly satisfied with role and performance of banks in PMFBY implementation. In Jharkhand also satisfaction level is high, which may be pertaining to PACS, from where maximum enrolment is coming in the state.

In the States of Jammu & Kashmir, Uttar Pradesh, Rajasthan, and Assam banks need to work on more responsiveness towards farmers by offering better services to the farmers.

c) CSC

Figure 3.14 Farmer satisfaction with respect to CSC
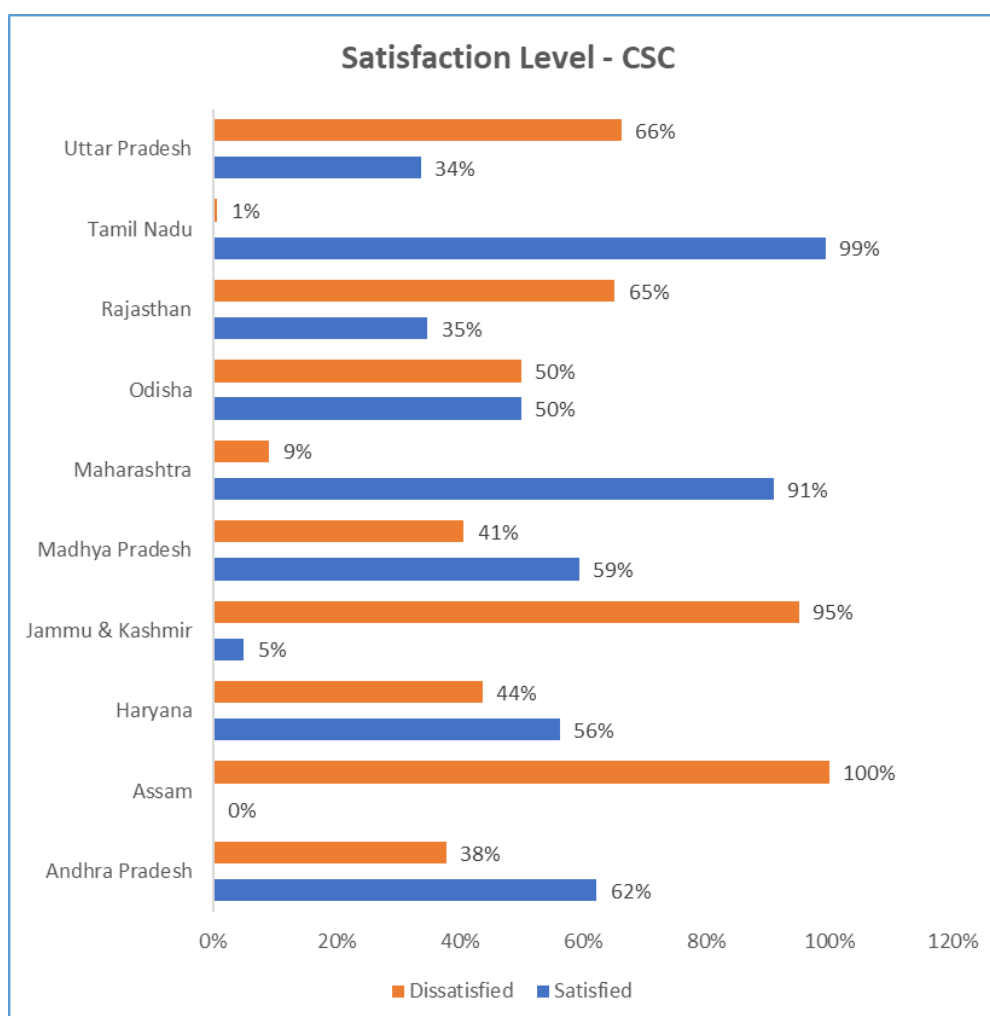
Farmers in the states of Tamil Nadu, Maharashtra are highly satisfied with the services and support provided by CSC during enrolment period. Services of CSC/VLE needs to be strengthened in the States of Uttar Pradesh, Haryana, Rajasthan, Madhya Pradesh. Services of CSC are most wanting in the States of In Jammu & Kashmir and Assam state.

d) PRI role in awareness generation

Participation of PRI in awareness creation is low in 3 out of 5 States. PRIs in Maharashtra and Chhattisgarh States are found to be playing active role in mobilizing farmers and making them aware about PMFBY. Efforts are to be made to encourage PRI participation in publicity and enrolment in all implementing States. PRI representatives are influential opinion makers with having good mass connect at the ground level.

Figure 3.15 Involvement of PRIs in Awareness Generation
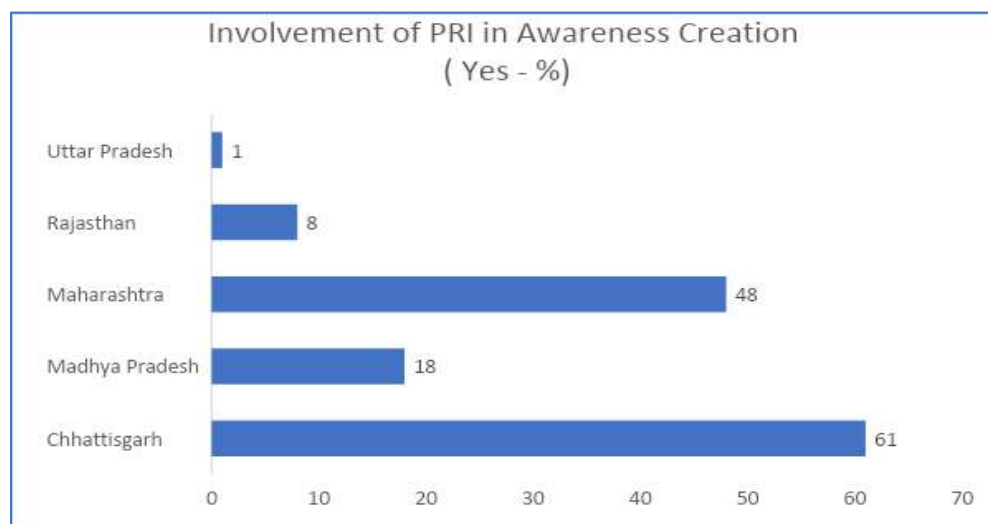
Some of the prominent issues raised by farmers are as follows:

- Farmers are found to be disturbed with the fact that the implementing insurance company changes in their district season after season.
- Farmers raised the issue of delayed settlement of claims both area-based claims as well as localized/post-harvest claims.
- Farmers raised the issue of no insurance availability for some vegetables and horticulture crops under PMFBY/RWBCIS.
- Farmers of almost every State showed displeasure about non-availability of adequate grievance redressal mechanism.
- Farmers showed displeasure on the component of lesser cost of cultivation in Scale of finance which is leading to lesser sum Insured.
- Number of farmers raised the issue of non-functioning of toll-free numbers of insurance companies which leads to difficulty in lodging crop loss intimations for localized calamity and post-harvest losses, obtaining information on claim status and addressing queries during enrolment period.

- Farmers in some States raised the matter of difficulty in enrolment as non-loanee farmer because of the number of documents required to be submitted to insurance companies. For example, it is very difficult for them to get their latest land record documents and bifurcation of land area for insurance purpose among various members of the undivided family.

- Discontent among the farmers was reported related to threshold Yield as well as existing weather parameters (related rainfall, temperature, and wind speed) to and defined triggers based on it.

- Farmers have also raised concern about quality of yield estimation through CCEs and expressed their displeasure about the role of State Government and Insurance Companies.

- Farmers shared that many of them are unaware about rejection of their applications by Insurance Companies until claims are received by fellow farmers/villagers. Moreover, farmers are not knowing the reasons for rejection and there is no mechanism for reviewing the rejected application if there is no fault at farmer's end.

3.3.3 Issues raised by the Stakeholders

Feedback from other key stakeholders namely, SLCCI, State Government, Banks, CSC, Insurance Companies is elaborated in the following sections. This comprise of both Issues/concerned raised and suggestions given by the respective stakeholders.

a. SLCCCI:

Present scheme has higher budget burden on State when compared with overall budget of the Agriculture Department of the State. In many States budget allocation for crop insurance schemes is more than 50% of the agriculture department's budget.

b. Banks:

Banks are major bridge between farmers and insurance companies and are very important for successful implementation of the scheme. Following issues were raised by the Banks-

- Banks found the work relating to crop insurance as an additional task to their regular banking activities.

- After the introduction of NCIP, initially banks complained about training and low connectivity. However, later they are found to accept the NCIP. However, some banks still face issues pertaining to understanding about scheme implementation.

- Rural branches of banks also shared the challenge of availability of banking staff in their branches.

- Banks also complained about non-availability of detail information relating to claim amount received by them from insurance companies which renders them incapable of transferring the amount to beneficiary farmers unless they approach Insurance Companies and get timely response. This leads to unnecessary delays at banks' part. Banks also have to face the agitations or wrath of farmers about claim settlement details, which banks are not equipped to share with farmers.

- Delay in release of service charges to banks by insurance companies also lowers the motivation of banks in PMFBY implementation.

- Banks have also raised displeasure for making them accountable and being penalized on issues relating to debit/remittance of farmer premium and for discrepancies found in the farmers data entered by the banks. According to the banks Insurance Companies are equally responsible for not verifying/processing farmer applications in timely manner.

- Poor response from Insurance Companies in terms of information support, handholding and training is a major concern shared by the banks.

c. Insurance Company

- Frequent changes and incorrect village mapping leading to wrong underwriting, rejection of applications and consequentially depriving the farmers of genuine claims.

- Due to delayed tender in some States, the Insurance companies faced issues of finalization of State/districts and sometime found to be working in their less preferred States as their preferred States have either delayed the tender or delayed the selection procedure.

- After reduction of insurance unit to Gram Panchayat, insurance companies struggle with Basis Risk. The historic data available with States was up to block level and insurance companies were needed to take up underwriting at Gram panchayat level. So, the basis of underwriting remained at Block level however,

level of claim settlement became GP level. This is leading to inaccurate underwriting in some of the clusters.

- Number of insurance companies complained about not getting timely schedule of CCEs depriving them from co observance.

- Delay in release of State share of subsidy which in turn burdened the solvency ratio as well as cash flow of insurance companies.

- Moral hazard/Political threat perceived by insurance companies in some of the districts.

- Number of insurance companies raised the issue of lesser number of active CSCs in their area of operation. In fact, in some of the big States such as UP, Rajasthan, Madhya Pradesh etc., there is hardly any network of functional CSC/VLEs for PMFBY implementation.

d. State Government

Following issues were raised by the State Governments:

- Number of participating Insurance Companies have gone down, citing higher losses incurred in few of the implementing districts. As a result, State Government need to go for re-tendering process quite often.

- State Government found to spend significant time in tendering and retendering process every year. With limited manpower and skills available, this is hampering time devoted to monitoring of the scheme.

- Moral hazard/Political threat perceived by insurance companies in some of the districts.

- Many States complained about lesser number of functional field offices and lack of adequate number of manpower in field from insurance companies. They also blamed that all CCEs are not getting co-observed by the insurance companies in adequate numbers.

- States also complained about insurance companies raising dispute on the yield data after a significant time lag and blame insurance companies for using yield disputes as a tactic for delaying the claims.

- Many States have reported issues in handling localized calamities by insurance companies like delayed processing of crop loss intimations received in physical forms, speed of conducting joint surveys for loss assessment and delay in settlement of claims under localized calamities/post-harvest losses.

- For Loanee farmers, scheme is compulsory, but many eligible farmers are left un-insured on some or other pretext. Non-compliance of compulsory insurance,

particularly from the good risk areas/ for good crops is resulting into accumulation of majority of bad risks with the insurance companies which leads to further increase in premium rates in subsequent seasons and hence subsidy burden is increased. Main reasons found for this exclusion of loanee farmers are non-availability of Aadhaar details, their KCC is falling in the category of substandard/Defaulter category. Farmers specially in highly irrigated areas are not willing to take an insurance cover and give it in writing to the bank branches.

- Number of States are found to be in financial crisis and due to which State share of premium subsidy is often delayed leading to delay in claim settlement to eligible farmers. This also results into lesser number of insurance companies participating in the tendering process. Since a significant proportion of budget of Agriculture Department goes into the allocation of crop insurance schemes, Finance Department of the State Government often raises queries. This is because other departmental schemes are also getting impacted. Finance department also requires relevant statistics so that previous seasons can be reconciled.

e. CSC

Over the last few seasons, CSC has become a prominent channel for enrollment of non-loanee farmers in the scheme. Given their vast network, it is now possible to provide last mile connectivity to small and non-loanee farmers. This is clearly evident from the continuous increase in the proportion of non-loanee farmers in total number of farmers enrolled in the scheme from CSC as source of enrolment. Following are their issues raised by CSC:

- CSC complained of last-minute rush of farmers very close to cut off date of enrolment.

- They also complained about deficiency of documents at the end of farmers which results into rejection of the applications at a later stage and farmers blame them for not getting the claims.

- In case of applications reverted by insurance companies, CSC gets to know about them quite late. Also, for reverted applications, farmers either do not turn up or do not submit the revised documents despite multiple follow ups.

- CSCs are not able to capture correct land area of insuring farmers in States, where there are joint land holdings, leading to further rejection of application by ICs.

- Late notification by some of the State Governments such as Rajasthan and Madhya Pradesh leave hardly any time for CSCs to mobilize farmers and enroll them under PMFBY.

- Sometimes speed of portal also aggravates the problem of last-minute rush of the farmers.

- CSCs also complained about inadequate support from insurance companies in providing IEC material such as banners, posters, leaflets etc. for awareness generation.

- Some CSCs complained about the fees per application being not sufficient when compared with the time they need to put in for document verification, uploading and filling of application for every farmer.

Suggestions

The suggestion put forth by all major stakeholders in the respect of issues highlighted by them is as mentioned.

a. SLCCCI

- In the areas where, premium rates under PMFBY are very high can look for alternate ways of risk hedging or can shift some of the crops to RWBCIS.

- Since the implementation of crop insurance includes various processes and involvement of various stakeholders, it is recommended that SLCCCI should be more empowered to have seamless coordination among various stakeholders including various departments/agencies engaged in conducting CCEs.

- An immediate study should be carried out to include more and more crops suitable to the local geographies for overall increase in gross cropped area under the scheme. Necessary push be given by DAC&FW department to the respective SLCCCIs for inclusion of all such crops and budgetary allocation accordingly.

- Panchayati Raj Institutions and progressive farmers need to be involved at different stages of implementation. They are the opinion makers, leaders, motivators and maintain very cordial relations with all farmers in their area. It is recommended that SLCCCI should leverage their presence in publicity and forming various committee members where government infrastructure is not available. Members of Gram Panchayat can also play a significant role in localized calamities and mid-season claim surveys.

b. Banks

- To reduce the workload of rural bank branches, it is suggested to integrate Core Banking Systems (CBS) with NCIP, which will reduce several transactional efforts on bank branch side.

- It is also suggested to automate claim calculation and settlement through NCIP which will exempt bank branches for calculation/transfer of claims. At the same time, insurance companies should also share farmer wise details, working of claims settled at the level of bank branch by keeping district and State Government officials in loop. They can use their own website for publishing this calculation in public domain.

- Timely release of service charges to banks will also motivate them for increasing the enrolment.

- Rural Bank Branches can ask for one additional manpower for one month in each season of the year from their Regional Offices to cater the increased load during enrolment period.

- Though training is already happening, yet Insurance Companies need to provide as many trainings as possible and handholding support in terms of providing vernacular language-based training material and handholding at local level.

c. Insurance Companies

- The State Government should fix the Village Mapping for a particular season before enrolment to remove the discrepancies of incorrect village mapping

- Tendering procedure and finalization of insurance companies should be completed three months before the cutoff date of enrolment. This will give them enough time to deploy adequate manpower, carry out trainings and IEC activities and opening of functional offices at district and block level.

- Insurance companies suggested that they should be provided with GP level data from the time when the State Government has started recording it at GP level. More weightage will be given to recent data while underwriting the risks.

- Insurance Companies suggested to make a WhatsApp group in which their representative and Government officials responsible for CCEs should be there. This will help them in getting live schedules for Co-observance of CCEs.

- A very strong suggestion from all insurance companies is for release of State share of subsidy well in time so that they can settle the claims in time as well as maintain their solvency ratios. They suggested that the state government

should ensure timely allocation of budget under the crop insurance head so that premium subsidies can be paid in time.

- Insurance companies also suggested that yield data from CCEs should be submitted to them without waiting for its last date of submission of yield data. In fact, the State government can share crop wise yield data without waiting for harvesting and yield compilation for all the crops.

d. Farmers

- Insurance companies should inform banks and other intermediaries about the claim calculation and settlement details.

- Contact number of field functionaries of insurance company should be available easily and in public domain.

- Same insurance company should work for at least 2-3 years in an area.

- Insurance company should proactively come forward to settle the claims (including localized and post-harvest claims) of eligible farmers and inform the concerned farmers through relevant means such a SMS etc.

- It was suggested to State Government in various platforms to cover a greater number of crops under the scheme.

- Insurance companies and State governments need to establish and strengthen the grievance redressal mechanism.

- It is strongly suggested by the farmers that the toll-free numbers of insurance companies should be functional throughout the year and their queries should be addressed in vernacular language and service request/docket number should be provided to them.

3.4 National Crop Insurance Portal (NCIP)

As discussed in previous chapters Pradhan Mantri Fasal Bima Yojana (PMFBY) is a multi-stakeholder's scheme where every stakeholder plays a crucial role in implementation of the scheme. To bring all stakeholders viz.: Farmers, Financial Institutions, Insurance Companies and Government agencies on a single platform, Government of India took an initiative to develop National Crop Insurance Portal (NCIP). This portal is a web based, integrated IT solution which attempts to provide end to end IT solution by automating all process involved under PMFBY. The portal was introduced from Kharif-17 and the first step was to bring the entire enrollment data under its ambit. Gradually other modules were developed to reduce the any kind of manual intervention.

Figure 3.16 National Crop Insurance Portal (NCIP)

The stakeholders are required to register themselves on NCIP as users. The farmer can also register himself/herself. It allows role-based registration of two categories: Admin and User. The Admin of all Stakeholders viz., banks, insurance companies, State Governments is approved by GoI on portal. Admin can further create users at their next hierarchy and the Users can also self-register into portal subject to approval by its respective Admin. The hierarchy of users is as follows: GoI Admin – Stake Holder Admin – Stake holder User. Registered Users are provided with Secured login, linked with Mobile/Aadhaar Number and mobile OTP based, for all Stakeholders viz, Central Government, State Governments, Banks, empaneled Insurance Companies and their designated field functionaries to enable them to enter/upload/download the requisite information. CSC portal is integrated with NCIP. VLEs login into CSC portal and are directed to NCIP for enrolment of non-loanee farmers.

Figure 3.17 Stakeholder Login on NCIP

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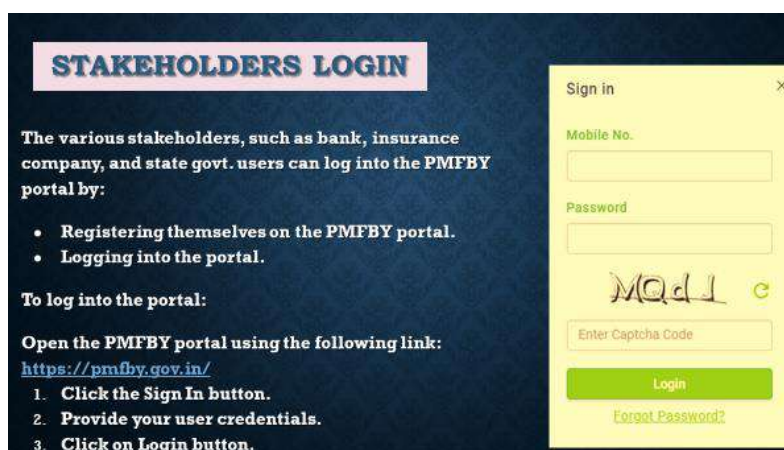
The process of Fasal Bima on National Portal starts with State Government preparing the Notification. Implementing States during each crop season, kharif and Rabi are required to digitize and upload Notification on the web Portal displaying information like notified areas, crops, sum insured, Government subsidy, and premium to be paid by farmers and name of the selected Insurance Company in the village insurance unit etc. This Notification is the base for enrolling farmers applications for crop insurance. Farmers applications for crop insurance can be entered only for notified locations and notified crops in NCIP.

Loanee farmers who have availed seasonal agriculture loan/KCC from Bank can be enrolled for crop insurance by the corresponding Bank. Before the cut-off date for electronic remittance of premium, the bank debits insurance premium amount from farmer's account and the same is required to be remitted to the concerned Insurance Company. The banks then map the UTRs on the portal through which premium is debited to the company and the company finalizes the status of applications. Insurance Company enters the details of UTR through which farmers premium is received.

Non-loanee farmers can voluntarily take crop insurance from the banks, Common Service Centre (CSC), Insurance Company intermediary or can self-apply for crop insurance using farmer corner on www.pmfby.gov.in. Land documents, Bank Account Passbook are mandatory documents and Aadhaar number capturing is mandatory requirement for non-loanee farmers applying for crop insurance. The documents are required to be uploaded on NCIP for getting for getting registered as a non-loanee farmer. In case of enrolment through CSC, insurance premium is collected by VLE in cash from farmer and VLE remits the premium to CSC using money from his own wallet. After successful payment, receipt is printed and handed over to the Farmer. Insurance Companies receives premium money from CSC centrally (not from VLE directly). On receipt of premium the insurance company scrutinizes the farmer applications with the uploaded documents on NCIP and can revert / reject / approve farmer application. VLE can view revert applications and work upon the objections therein and upload again for approval. VLE can also take a list of all approved / rejected applications.

Farmers can also get enrolled directly online on NCIP using the tab- Farmer corner. Only farmers whose data is uploaded on the National Crop Insurance Portal are

eligible for Insurance coverage and the premium subsidy from State and Central Government is released accordingly.

It is responsibility of State Government to ensure that all historical information pertaining to crop-wise, area-wise yield, weather, sown area, coverage and claims, calamity years and actual yield is made available on the National Crop Insurance Portal for the purpose of Threshold Yield (TY) calculation etc. but State finds it difficult to complete this task. It is State / UT Government responsibility to conduct required number of CCEs for notified crops in notified areas. The experimental plot is harvested and yield in Kg/Ha is uploaded on NCIP using CCE Agri App. CCEs are essential to estimate the actual yield (AY), thereby computing the crop loss and insurance claim payable to farmers.

Other facilities available on NCIP include-

a. Insurance Premium Calculator:

Once the requisite information like season, year, scheme, State, district, notified crop and area is entered in tab of Insurance Premium Calculator, important handy details required for enrolling under PMFBY are reflected. This includes name of implementing Insurance Companies, Sum Insured, Actuarial Premium Rate, farmer share of premium to be paid for a notified crop, Premium paid by the Government and cut-off date for enrollment.

Figure 3.18 Insurance Premium Calculator

b. Tracking of farmer's Application:

Non-loanee farmer can track status of his /her application on NCIP using the tab Application Status using the receipt number mentioned in the receipt he/she get from CSC/VLE at the time of enrollment. Similarly, the loanee farmer can track the status on the basis on the information on the acknowledgement receipts dispatched by the Insurance Companies to loanee farmers. Application status, like submission of application, payment and approval by Insurance Companies can be viewed as described in the figure below.

Figure 3.19 Farmer Application tracking on NCIP
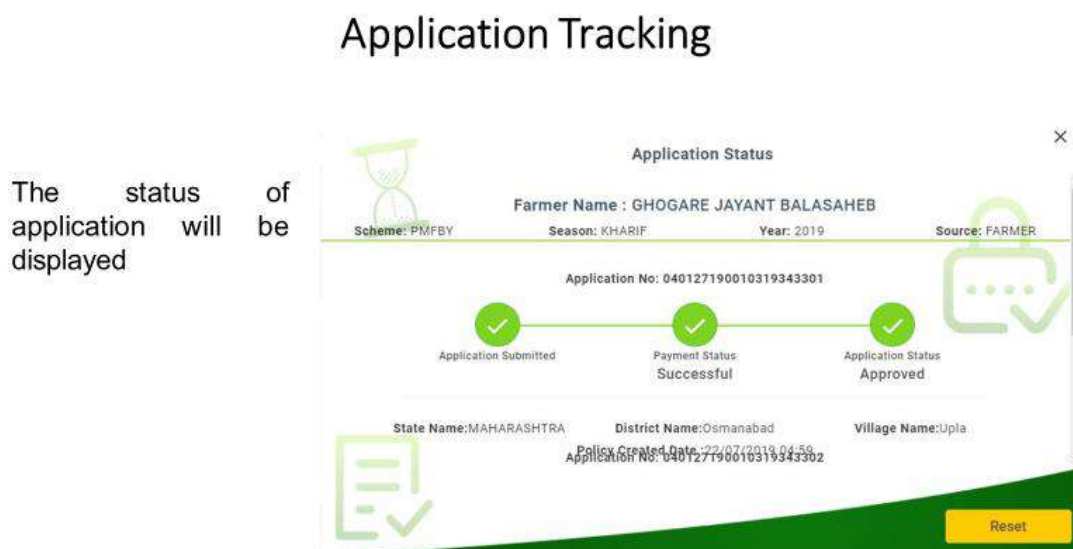
3.4.1 Benefits of IT Platform- NCIP

Benefits of IT platform- NCIP can be summarized as:

- Single platform facility for processes engaging multi-stakeholder.
- Speedy services to beneficiary farmers.
- Transparency in execution of all processes.
- Ease in administrative control.
- Accessible 24x7 from anywhere.
- View / edit information by registered & authorized users only.
- Adherence to seasonality calendar with respect to digitization of State notification, remittance of farmer premium by banks to insurers and real time enrolment by VLEs and farmers coming directly for self-enrolment.
- Verification of Aadhaar directly through UIDAI.
- All relevant information required for enrolment such as name of insurer, notified crop, sum insured and premium rate per unit to be paid by farmers etc. is readily available.

- Assistance in premium amount reconciliation for Banks and Insurance Companies.

- Facility for self-registration of farmers for crop insurance on NCIP

- Option for tracking of status of farmer application

- CCE yield details uploaded instantly from field itself using CCE Agri App

3.4.2 Feedback from various stakeholders

1. Farmers

- Farmers are unaware of rejection of his/her application till claim is lodged and processed by Insurance Company. It is not reflected in application status while tracking on NCIP.

- Portal does not allow enrolment of farmers whose Aadhaar details are still not updated in their respective Bank records.

- Unable to enroll if village mapping is wrongly done in Notification.

- Farmers complain about not having a utility on claim computation in NCIP so that they can understand their claims.

- Wheresoever CBS has been integrated with NCIP, the portal does not allow defaulting farmers to get covered under crop insurance. That's why such farmers need to approach CSC/VLE for crop insurance as a non-loanee farmer.

- Sometimes, a farmer is insured for the wrong crop because of wrong data entry done by banks and/or CSC while enrolling on portal. This makes the farmer disqualified for eligible claim.

- Farmers also complain about wrong selection of blocks and/or revenue circles which sometimes deprives them of otherwise eligible claims.

2. Banks

- Any change in Girdawari of loanee farmer after the creation of KCC is not updated in Bank records of loanee farmer until renewal of KCCs which happens now after every 5 years. This sometimes leads to rejection of farmer applications due to mismatch in land details.

- Village Master correction on portal usually takes longer time at the end of State government. This sometimes deprives the farmers from enrolment under scheme.

- Validating land area in absence of Land Records integration is a challenge for banks.

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- Delay in notification by the State Governments is impacts enrolment and uploading of farmers details on NCIP

- Many cases of excess/short farmer premium paid to insurance company is due to manual error.

- Issues in network speed at rural bank branches and excessive load on NCIP close to cut off dates results into errors and delay in submission.

3. CSC / VLE

- CSE/VLEs are not authorized to edit the application for correction of minor mistakes on portal.

- VLEs face huge rush during last week of enrolment. Heavy load at the time close to the cut-off date of enrolment sometimes leads to slowdown of the portal.

- Any check for farmers' duplicate application from multiple enrolment source is missing on NCIP.

- Non-availability of login to district/State managers of CSC results into difficulty in monitoring of reverted applications for getting them corrected by reaching out to the concerned VLE.

4. Insurance Company

- Only 3 days (including Sunday/holiday) are available to ICs for raising objection to digitized notification by the State government; otherwise it gets auto approved.

- Correction of erroneous Village Master entry sometimes takes long time, and several eligible farmers get deprived of insurance due to wrong village master.

- Many a times claims remitted to farmers account bounced due to discrepancies in bank account details of enrolled farmers uploaded on NCIP.

- Some banks remit farmer premium centrally without providing details of branch wise amount. This creates issues in reconciliation of farmer premium and other details with that of data uploaded on portal.

5. State Government

- It takes longer time for agriculture department to co-ordinate with revenue department for correcting any mistake in Village master digitized on NCIP.

- Issues in timely and satisfactory redressal of grievances in the absence of availability of competent technical human resources at State level.

- 24X7 technical support for operational issues in NCIP is required as State Governments do not have requisite skilled manpower.

- Non availability of separate module for loss assessment, claim computation and disbursement on NCIP makes it difficult for the State officials to monitor and answer constituency specific queries raised during assembly sessions.

6. Central Government (GoI)

- Integration of Core Banking System of major banks with NCIP is still under progress. The number of banks requesting for integration of CBS are very few.

- Only Maharashtra and Odisha came forward for Land Record Integration with NCIP. Other States are yet to take up.

- Integration of Weather data, Grievances Redressal, MNCFC data with NCIP is necessitated for having an effective tech system.

- Integration of internal platforms of insurance companies with NCIP is required to be taken up to have an end-to-end solution for calculation and settlement of claims.

Suggestions

- A separate tech support team is required to deal with operational issues/problems faced by various stakeholders while operating on NCIP.

- A pop-up menu for the bank branches to enter details of the problems faced while uploading the data on NCIP, which needs to reach to relevant technical support team of NCIP for immediate rectification.

- There should be some provision (Other than Aadhaar validation) to check for duplicate applications getting registered on Portal.

- Editing authority to CSC for minor mistakes on reverted applications may be considered.

- All payments made by Banks / PACS / CSC/other intermediaries to Insurance Companies should be done on NCIP. Pay-Gov is currently feasible for Farmers only, other stakeholders should also start using it. This will help in reducing errors and time lag in reconciliation process.

- NCIP should support raising of Invoices for service charges to be charged by Banks / PACS / CSC to ICs.

- NCIP should support Insurance Companies raising demand for release of Central and State Government subsidies.

- Claim calculation and settlement modules may be activated on NCIP.

- Integration of NCIP with following systems and agencies is needed on priority basis:
  - o Banks – Core Banking System
  - o Insurance Companies – Insurance Claim Computation & Amount Disbursal
  - o State – Land Records System (for states other than Maharashtra and Odisha)
  - o State – Automatic Weather Stations (Recording System)
- Centre – Mahalanobis National Crop Forecasting Centre
  Customized MIS options should be available for different level of hierarchy on portal. For example: Parameters (ticked by User) based report generation.
- The data of previous season should be auto populated for bank branches and banks should have option to edit it or submit it as it is. This will reduce a lot of load on bank branches especially near to the enrolment cut-off date.
- A system can be visualized, where Banker does not need to enter any data on NCIP. At the time of loan sanctioning/disbursement, the amount equivalent to farmer share of premium should be deducted automatically (except for those farmers who have given opt out application). The same premium should reflect in NCIP automatically. There should not be any need to do a separate data entry in NCIP.
- The enrolment process under crop insurance schemes is required to be linked to the digitized system of land records of the States which will help in eliminating the cases of over insurance which has been occurring in States due to farmers obtaining insurance more than once on same parcel of land. This will further remove a deep-rooted problem of issuance of higher number of KCCs on one parcel of land. Gujarat tried this model in terms of I-Khedut portal which may be studied further.
- Portal should have a provision to accept insured area in local unit of measurement and then convert from input unit to Hectare.

e. State Government

- Central Government should investigate the matter of non-participation of insurance companies in bidding process in few States because of that State Government has to go for retendering multiple times. Central government should persuade Public Sector Insurance companies to come forward in such areas, where participation of Private insurance companies is an issue.

- It is recommended to go for multi-year tendering (2-3 years) to ensure accountability of insurance companies in allotted clusters.

- Insurance company should compulsorily open functional offices and deploy adequate manpower for coordination with relevant Government Authorities and effectively carry out field activities like IEC activities, training and handholding support to various stakeholders, Co observance of CCEs and addressing grievances.

- States suggested that they will not allow insurance companies to object on yield data if their representative was not available at the time of CCE.

- States also demanded that insurance companies should settle the claims for the crops they have received the yield data instead of waiting for the data for all the crops.

- States also strongly suggested that insurance companies should settle the localized claims within the prescribed time limits without disputing the committee decision.

- A striking feature is that the roles of various IRDA approved intermediaries such as insurance agents, Brokers, IMFs etc. have not been very prominent in most of the States. This deserves greater attention as the take-up of insurance especially in the non-loanee category very much depends on insurance intermediaries and their activities.

3.5 Claim Settlement Process

One of the most important aspect of crop insurance is the claim computation and settlement process. It needs to be simple, transparent and within time. PMFBY perhaps is one of the most comprehensive crop insurance programmes in the world which covers a variety of risks spread across the complete crop cycle starting from sowing/germination failure to standing crop to production losses as well as post-harvest losses. Each category of losses is associated with defined perils and protocols for claim calculation and claim settlement. The entire process has been detailed in the operational guidelines issued by Government of India on time-to-time basis.

Localized claims and post-harvest claims are settled at individual farm basis in which farmer needs to intimate the insurance company within a stipulated time. Prevented sowing, Mid-season adversities and final Yield based claims are settled on area-based approach with no requirement of farmers to intimate any losses to insurance companies. The losses in mid-season adversity are assessed using proxy indicators

and yield losses are assessed using CCEs. For each process, clear guidelines pointing responsibility of each stakeholder is predefined by Government of India in its Operational Guidelines.

Prevented / Failed Sowing and Prevented Planting / Germination claims arise when there is a deficiency of rain fall or season/weather conditions are averse to sowing. This is a widespread calamity, and its provision is invoked by State Government not later than 15 days from cut-off date of enrolment.

Localized calamities and post-harvest losses must be reported by farmer within 72 hours of happening. DAC&FW has deployed an Android based Mobile App (Crop Insurance App) where such localized calamity or post-harvest loss can be reported. A joint survey is conducted by a team of State Agriculture Department and Insurance Company for assessing the extent of loss in the affected fields.

The most important and critical phase of the insurance cycle occurs in the culminating months of the cropping season when the produce is ready for harvest. The crop cutting experiments (CCEs) are performed to estimate the actual yield of the crop. Wide-spread calamity losses are assessed by using CCE data. The reported actual yield arrived from the CCE data is compared with the threshold yield which is generally notified by the State government beforehand and the shortfall in the yield level is compensated as claim measured in percentage of per unit sum insured. As per Direct Benefit Transfer (DBT) Policy of Government of India, the claim settlement is done directly into farmer's savings account of non-loanee farmers and loan account of loanee farmer.

a) **All India Claim Trend**

The table below gives a clear picture of claims and various indicators such as claim ratios calculated against farmer share of premium as well as on gross premium and percentage farmers benefitted etc. Claim Statistics on PAN India basis for three seasons studied are given below:

Table 3.7 All India Claim Statistics

	PMFBY & RWBCIS - All India Business Statistics Since Implementation								
Year	**Total Number of Farmers Insured in lakhs**	**Farmers Share in Premium in Cr**	**Gross Premium (in Rs Cr.)**	**Reported Claims (in Rs Cr.)**	**Claim Paid (in Rs Cr.)**	**No. of Farmers against paid Claims (in Rs Lakhs,)**	**% of farmers getting benefitted**	**Claim ratio calculated on farmer premium**	**Claim ratio calculated on gross premium**
Kharif 2016	407.5	2,930	16,031	10,576	10,573	109.8	27%	361%	66%
Rabi 2016-17	177.7	1,338	5,905	6,205	6,204	40.2	23%	464%	105%
2016-17 Total	**585.2**	**4,267**	**21,937**	**16,782**	**16,777**	**150**	**26%**	**393%**	**77%**
Kharif 2017	356.7	2,916	18,812	18,079	18,073	147.8	41%	620%	96%
Rabi 2017-18	174.8	1,482	6,535	3,885	3,869	29.7	17%	262%	59%
2017-18 Total	**531.5**	**4,398**	**25,347**	**21,964**	**21,942**	**177.5**	**33%**	**499%**	**87%**
Kharif 2018	343.9	3,179	20,732	19,238	15,800	123.2	36%	605%	93%
Rabi 2018-19	220.2	1,735	8,108	8,680	6,195	54.5	25%	500%	107%
2018-19 Total	**564.1**	**4,914**	**28,840**	**27,918**	**21,996**	**177.7**	**32%**	**568%**	**97%**

(Note: *Kharif 2018 and Rabi 2018-19 claims are not yet fully reported)

Overall claim ratio shows a progressive increase from 77% in FY 2016-17 to 97% in FY 2018-19 indicating significant benefits to the affected farmers by adequately supporting them financially in the event of crop loss. More so, it also substantiates that PMFBY as a direct financial assistant tool/mechanism is getting tested in bad years and is worth in supporting farmers at the right time.

It is important to see that claim ratio; when calculated on farmer share of premium show that farmers are receiving substantial benefits in terms of claims against minimal payment of premium. The table above shows that claim ratio is in the range starting from 262% to as high as 620% in Kharif 2017 when compared against farmer share of premium.

Similarly, the percentage of farmers getting benefitted when compare to total number of insured farmers also increased from 26% in FY 2016-17 to 32% in FY 2018-19 (figures for FY 2018-19 are provisional at the time when study is conducted).

Table below shows State wise highest claim ratios in various seasons during last three years.

Table 3.8 State-wise Season-wise Claim ratio

Kharif 2016	Claim Ratio	Rabi 2016-17	Claim Ratio
Kerala	209%	Tamil Nadu	315%
Karnataka	138%	Andhra Pradesh	175%
Tamil Nadu	103%	Kerala	108%
Kharif 2017	**Claim Ratio**	**Rabi 2017-18**	**Claim Ratio**
Chhattisgarh	453%	Odisha	226%
Haryana	270%	Tamil Nadu	149%
Odisha	216%	Andhra Pradesh	145%
Madhya Pradesh	166%	Chhattisgarh	109 %
Tamil Nadu	135%		

Kharif 2018	Claim Ratio	Rabi 2018-19	Claim Ratio
Tamil Nadu	145%	Odisha	360%
Andhra Pradesh	158%	Karnataka	250%
Haryana	141%	Andhra Pradesh	203%
Karnataka	133%	Tamil Nadu	140%
Chhattisgarh	124%	Maharashtra	126%
Jharkhand	148%	Telangana	108%
Kerala	119%		
Uttarakhand	114%		
Rajasthan	108%		

Season-wise highest claim ratios, more than 200%, are observed in the States of Tamil Nadu, Kerala, Chhattisgarh, Odisha, Haryana, and Karnataka. There are many other states, as described in the table above, where claim ratio is more than 100%.

The following tables show the trend of claim ratio in 12 surveyed States / UTs. Across the States, number of times the claim ratio that exceeded 100 and above per cent has been worked out with respect to six crop seasons under reference.

Figure 3.20 Claim Ratio in 12 Sample States
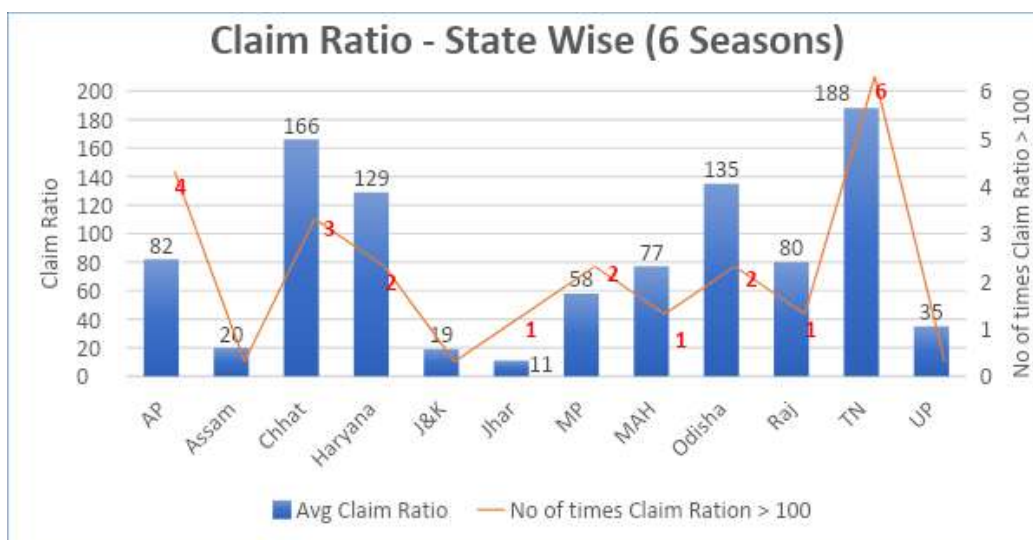
It is found that the phenomenon of claim ratio exceeding 100 per cent obtained in as many as nine States out of the total of 12. In the State of Tamil Nadu claim ratio exceeding 100% for all the six seasons created the highest record among all States. Similarly, the States of Chhattisgarh, Andhra Pradesh, Orissa, and Haryana also fall into the category of higher claim ratio.

b) Average Claim (Rs)

Figure 3.21 Average Claim Paid per benefitted farmer
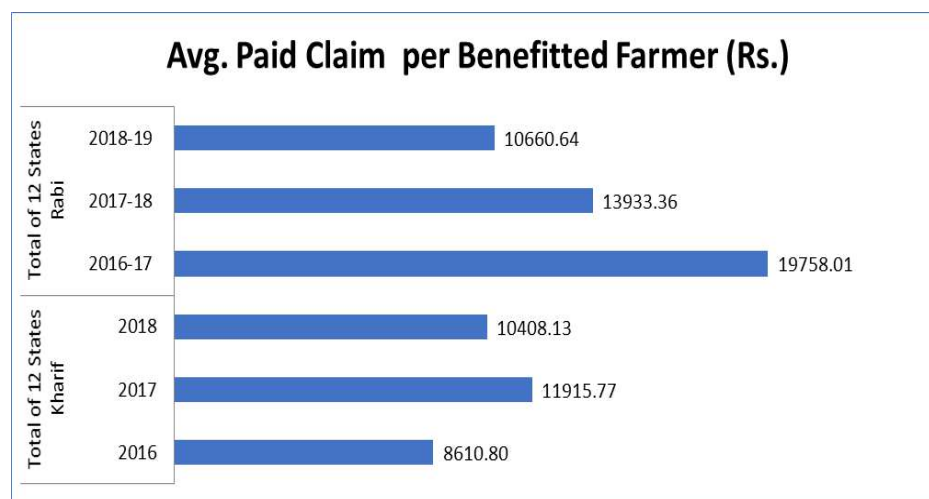
An average is worked out in terms of claim in Rupees per farmer by crop seasons and over three corresponding reference seasons. It is observed that the claim per farmer realized had a varied range with equilibrium shifted in favor of claims in Rabi season. **The claim amount (per farmer) in Kharif seasons varies from Rs. 8,611 to**

Rs.11,916 and the same for Rabi seasons comes out to be between Rs.10,661 to Rs.19,758.

Further, the Rabi season exhibited another concerning trend. The average claim amount paid per farmer (Rs.19758) during 2016-17 came down almost to half (Rs.10661) during 2018-19. This is because, number of farmers getting benefitted in Rabi 2018-19 increased by 36% without much increase in claims actually paid to farmers. However, total claims in rabi 2018-19 are yet to be settled. Higher Claim experience of Tami Nadu in Rabi 2016-17 as compare to Rabi 2018-19 also resulted into this variation in per farmer claim Settlement in Rupees.

c) State Wise Season Wise detailed analysis of Insurance Claim Received

An analysis is shown below on claims received by farmers for 6 seasons – 2016/17, 2017/18 and 2018/19 for Kharif as well as Rabi seasons for 12 States separately. This aimed to study the extent of claims received by insured farmers. The parameters identified for each season are as mentioned.

- Overall claim ratio
- No of farmers who had received claims
- No of farmers as % of total.

State-wise key analysis based on secondary data is described below. 4 States out of 12, have shown higher no of beneficiary farmers as well as higher % of total insured farmers namely, Tamil Nadu, Maharashtra, Chhattisgarh, and Rajasthan. These are for combined 3 years (6 seasons) which is also above or around the national averages.

Table 3.9 Farmers benefitted in sample States

States	Beneficiary Farmers (Lakhs)	% of beneficiary farmers against the total Insured Farmers
Tamil Nadu	35.9	72.08
Maharashtra	159.4	43.13
Maharashtra	24.2	40.12
Chhattisgarh	14.6	31.86
Rajasthan	77.9	30.97

Average claim amount is 4.7 times of premium paid by farmers. Examples of season-wise higher number of Beneficiary Farmers and claim amount are shown below:

Table 3.10 States with higher number of beneficiary farmers and Claim Amount

States	Season	No of Beneficiary Farmers (L)	Claim Amt per farmer (Rs)
AP	Kh 2018	8.4	12,990
Chhattisgarh	Kh 2017	5.9	22,300
Haryana	Kh 2017	2.4	33,318
MP	Kh 2017	21	26,582
MP	Rb 2018/19	1.1	16,036
Maharashtra	Kh 2018	50.2	8120
Maharashtra	Rb 2016/17	1.1	21,666
Odisha	Kh 2017	7.4	23,484
Odisha	Kh 2018	14.3	17,460
TN	Kh 2016	0.02	53,848
TN	Rb 2016/17	12.3	29,506

It is evident from the table 3.10 that **highest claim amount per farmer- Rs 53,848 was received in Tamil Nadu in Kharif 2016. In Maharashtra, number of farmers benefiting were highest i.e., 50.2 lakhs in Kharif 2018 with claim amount of Rs 8120 per beneficiary farmer.**

Key findings of primary survey conducted in the field are as follows:

Table 3.11 Representation of Loanee and Non-Loanee Farmers Receiving claim amount

State	Grand Total	Loanee Total	Loanee Yes	No	% of Loanee Farmers who received claims	Non Loanee Total	Non Loanee Yes	No	% of Non-Loanee Farmers who received claims
Andhra Pradesh	304	295	194	101	66%	9	5	4	56%
Assam	103	58	0	58	0%	45	0	45	0%
Chhattisgarh	205	3	2	1	67%	202	65	137	32%
Haryana	200	135	113	22	84%	65	25	40	38%
Jammu & Kashmir	101	49	0	49	0%	52	0	52	0%
Jharkhand	200	22	0	22	0%	178	0	178	0%
Madhya Pradesh	1007	477	112	365	23%	530	22	508	4%
Maharashtra	1600	512	31	481	6%	1088	211	877	19%
Odisha	75	66	57	9	86%	9	7	2	78%
Rajasthan	497	185	16	169	9%	312	22	290	7%
Tamil Nadu	256	128	111	17	87%	128	121	7	95%
Uttar Pradesh	1061	666	16	650	2%	395		395	0%
Grand Total	**5609**	**2596**	**652**	**1944**	**25%**	**3013**	**478**	**2535**	**16%**

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As described in the Table 3.23, **Total 41% of the farmers surveyed received the claim amount under PMFBY/RWBCIS. This includes, 25% of the loanee farmers and 16% of non-loanee farmers. Maximum loanee farmers in receipt of claims are from the states of Andhra Pradesh, Chhattisgarh, Haryana, Odisha, and Tamil Nadu. While non-loanee farmers from the States of Tamil Nadu, Odisha and Andhra Pradesh have reported to receive the claim amount under PMFBY/RWBCIS**.

Table 3.12 Response of farmers about claim settlement

Claim Process Steps And Satisfaction Level	AP L	AP NL	AS L	AS NL	CH L	CH NL	HR L	HR NL	J&K L	J&K NL	JH L	JH NL	MP L	MP NL	MH L	MH NL	OD L	OD NL	RJ L	RJ NL	TN L	TN NL	UP L	UP NL	Total L	Total NL
Did you receive any claim amount?	66	56	0	0	67	33	84	38	0	0	0	0	23	4	6	19	86	78	9	6	87	95	2	0	26	18
Claim received on the basis of CCE	50	80	0	0	100	83	88	48	0	0	0	0	75	50	42	31	40	0	20	33	81	84	88	0	67	51
Claim received on the basis of risk — Localized calamity	6	0	0	0	100	25	96	88	0	0	0	0	0	0	19	10	9	0	80	67	0	0	81	0	30	12
Claim received on the basis of risk — Mid-season	0	0	0	0	0	58	4	12	0	0	0	0	100	50	42	53	0	0	20	33	10	17	19	0	22	37
Claim received on the basis of risk — Post-harvest losses	94	100	0	0	0	8	0	0	0	0	0	0	0	25	13	11	91	100	0	0	90	83	100	0	47	36
Claim received on the basis of risk — Prevented sowing	0	0	0	0	0	8	0	0	0	0	0	0	0	25	26	26	0	0	0	0	0	0	0	0	1	15
Are you satisfied claim amount received?	79	40	0	0	100	92	91	84	0	0	0	0	87	75	97	85	95	86	43	20	78	77	44	0	83	81
Have you given intimation in case of localized calamity or post-harvest loses?	63	78	0	0	33	57	100	98	73	65	27	11	12	15	5	31	41	100	12	9	40	65	5	9	21	28
After intimation was any field survey conducted?	100	100	0	0	100	35	99	98	83	82	17	15	7	4	21	67	100	100	9	17	100	97	0	53	73	69
Was there any prior intimation of the surveyor coming for assessment?	77	71	0	0	0	53	98	85	28	26	33	15	9	9	8	16	93	100	14	17	74	60	0	3	51	32
Have you provided any copy of the assessment done by the surveyor?	68	57	0	0	100	94	100	93	83	71	17	20	5	9	79	3	96	100	49	0	36	40	40	47	66	30

a) Overall satisfaction among farmers

- The responses on **overall satisfaction of farmers are evident in States where claim ratio has been high (in States of Tamil Nadu, Odisha, Haryana, and Chhattisgarh) and the reverse in States where claims ratio was lower (UP, Jharkhand, J&K, Assam).**

- **A total of 83% of loanee farmers and 81% of non-loanee farmers are found to be satisfied with the claim amount they have received.**

- Overall, much higher satisfaction level is found in the States of Andhra Pradesh, Haryana, Orissa, Madhya Pradesh, and Maharashtra among loanee farmers and non-loanee farmers while Chhattisgarh, Haryana, Maharashtra, and Tamil Nadu shows higher satisfaction levels among non-loanee farmers.

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b) Types of risks covered, and claims settled

One of the distinctive features of PMFBY is inclusion of multiple risks in the scheme. While crop insurance claims due to post-harvest losses are major, there are other losses including localized calamities. State wise risks claims received by the farmers surveyed are as described.

- More CCE based claims are received in the States of Andhra Pradesh, Chhattisgarh, Haryana, Madhya Pradesh, Tamil Nadu and UP.

- Farmers reported to receive more localized claims in the States of Chhattisgarh, Haryana, Rajasthan and UP.

- Claims related to Post-Harvest losses are settled more in the States of AP, Odisha, TN and UP.

- Claims related to prevented sowing are settled in the State of Maharashtra.

c) Claim Settlement process for localized calamities and Post-Harvest Losses

- 49% loanee and non-loanee farmers from 12 surveyed states have reported that they have given crop loss intimations within 72 hours for localized calamities and post-harvest losses. The States, where maximum intimations given are- Haryana, J&K, Odisha, and Tamil Nadu.

- Farmers in the States of AP, CG, Haryana, J&K, Maharashtra, Odisha, and Tamil Nadu have confirmed that the field surveys are conducted by the State Government and Insurance Companies for assessing crop loss in the damaged fields.

- Majority of the farmers in the States of AP, Haryana, Chhattisgarh, J&K Odisha, and Tamil Nadu have reported that, they intimated prior to crop loss assessment surveys and are also provided with the copy of assessment survey conducted.

d) Delay in disbursement of claim (in months)

Delayed claim receipt remains a major concern area. **Majority of States have indicated delay of more than 2/3 months mounting up to 6 months in many instances. This is the main reason of dissatisfaction among the farmers.** The claim amount for a particular season can only be useful if the farmers get them before onset of next season.

Figure 3.22 Time taken for receipt of claims by farmers
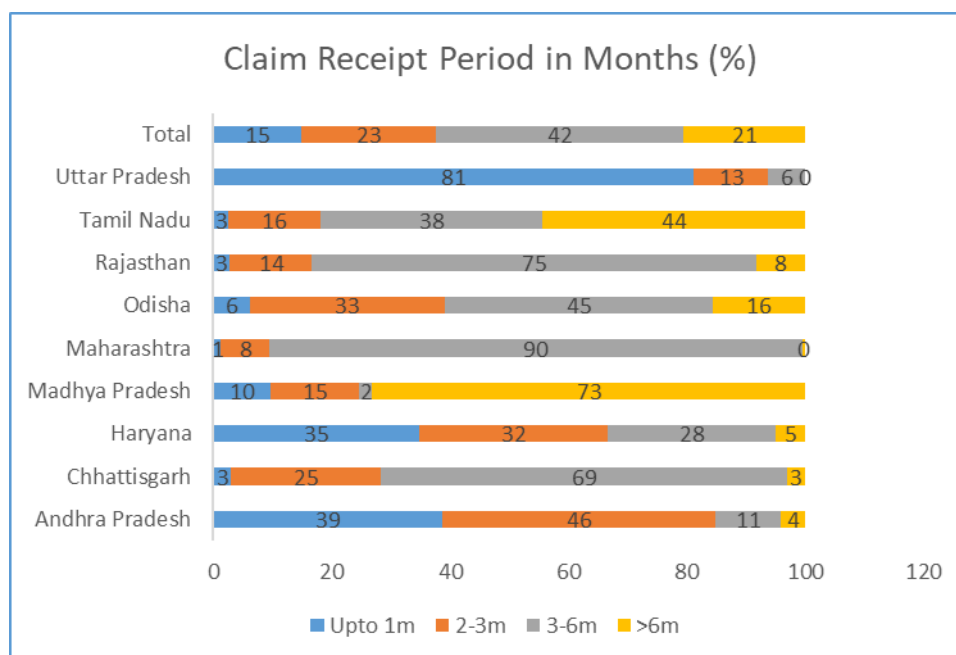
It is cumulative data for six seasons studied. **At All India level, 42% of the claims were disbursed for 3-6 months, 23% claims were disbursed between 2-3 months and 21% claims took more than 6 months to get settled. State-wise analysis shows that Uttar Pradesh is the best performing State where 81% claims were settled within 1 month of prescribed date. Significant claims are settled between 3-6 months in the states of Maharashtra, Rajasthan, Tamil Nadu, Chhattisgarh, and Odisha.** This time lag for claim settlement needs to be improved for effective scheme implementation.

Detail claim computation methods, time frame for payment of claim is all available in Operational Guidelines but farmers have strong complaints that the claim amount is getting delayed to the extent of 2 to 6 months.

There are several reasons for delayed payment by Insurance Companies:
- Delay in uploading of CCE data
- Delayed receipt of subsidy from State Government
- Dispute between Insurance Company and State Government on Actual Yield (CCE co-observation)
- Issues in matching of premium with the portal data entry by the insurers

DBT / Use of Aadhar - DBT for claim payment to farmers and use of Aadhar card for verification have a direct impact on transparency ensuring complete removal of various malpractices prevalent. **Direct transfer of claim to farmers bank account under DBT Policy of GoI has eliminated delay to a large extent.** DBT with Aadhaar

introduced in 2017 to deliver claims directly into bank accounts has helped in eliminating ghost beneficiaries. This had some adverse impact on the count of loanee farmers though voluntary coverage was unaffected.

The major challenge in execution of crop insurance is found to be lack of trust among various stake holders especially between insurance companies and farmers. Major reasons of this trust deficit have already been discussed viz. no or less claims when there is actual damage to crops, late claim settlement and most importantly the process of calculation of claims is not transparent enough to build that trust.

There are number of incidences in past where the trust deficit in seen between insurance companies and government officials also. This is evident from the regular objections on CCE data raised by insurance companies. Similarly, State Governments also accuse insurance companies of not sincerely co-observing the CCEs in the field.

Suggestions
- States need to pro-actively use technology for more accurate crop yield estimation.
- States should develop mechanism to resolve disputes at State level by technical support from State level organizations, such as Agricultural Universities, State Remote Sensing Centers, ICAR Centers located in the State, local IMD office, etc.
- The Insurance Companies should proactively, get involved with the States for supervision of CCEs.
- The Insurance Companies should invest more in use of technology to support the loss assessment. There should be better coordination between the State and the Insurance Companies.
- Insurance companies should deploy adequate manpower in the field for carrying out loss assessment surveys in timely manner.
- For addressing the problem of reliable yield data, video/image should be captured of crop growth at various stages. Transmission of CCE data on a real time basis utilizing mobile communication technology with GPS time stamping, can improve data quality and support timely claim processing and payments. States and insurance companies can make use of this technology for the purpose.
- For addressing the issue of reliability of CCEs in terms of their accuracy, representativeness and timeliness, innovative technologies such as satellite remote sensing, drone, modeling, AWS/ARG (Automatic weather station/Automatic rain gauge), real time transmission of data etc. should be utilized.

- State Government officials suggested the need for improvements in CCE Agri App which can show the exact location of the Khasra number of the village where CCE is to be conducted by the government officials as well as to insurance company representatives. This will be a simple improvement in terms of navigation of the field. However, for this, the State Government need to have correct hierarchy of village mapping, which remains fixed for a season.

3.6 Use of Technology

Considering the complexities associated with Indian agriculture such as small and scattered land holdings, very high eco-geographical variability, yield variability and weather aberrations, it is imperative that technologies are effectively used to increase the efficacy and effectiveness of crop insurance sector. PMFBY recognizes the need for technological interventions in crop insurance to make the insurance mechanism more efficient, transparent and farmer friendly.

During its implementation in the last few seasons, several challenges relating to enrolment, yield estimation, loss assessment, and claim settlement were reported by farmers, insurance companies as well as the State governments. It was also noted that several technological opportunities existed for possibly leveraging support to the Indian crop insurance program for enhanced efficiency and effectiveness.

For effective implementation of the PMFBY several technological options have been proposed such as

- Remote Sensing tools such as images taken from Satellite & Unmanned Aerial vehicle (UAVs) and their subsequent analysis
- Smart-phones, digital photography
- Decision Support Systems, Crop Modelling & Integrated Approaches
- IT/ICT in Insurance for enrolment and other operational issues

3.6.1 Pilot Study – Smart Sampling

PMFBY is a crop yield-based insurance and has many unique features. Promoting the use of technology for better implementation of the crop insurance is regarded as a major initiative. The Vegetation Index, which is derived from SRS (Spectral Reflectance Sensor) and is representative of crop condition, can be used for designing better sampling plan for CCEs, which is also known as Smart Sampling. The studies carried out under KISAN project has shown that a combination of two Vegetation Indices (Normalized Difference Vegetation Index and Normalized Difference Wetness Index) have significantly improved the efficiency of CCE planning.

The Government of India has rolled out nine pilot studies on optimization of CCE using modern technologies aiming to resolve various challenges faced by the Scheme. The nine pilot studies were conducted in 23 districts spread across 11 States.

The pilots are being conducted by the National Remote Sensing Centre (NRSC), CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), SatSure, Space Application Centre (SAC), Skymet, CropIn, Niruthi, Indian Agricultural Statistics Research Institute (IASRI) and Weather Risk.

Benefits and Impact on Crop Insurance

- Use of modern technologies to get the crop yield figures faster and accurately for payment of crop insurance claims.
- Checking area discrepancy, especially for major crops of the country. Crop Classification Accuracy is found to be 78-84%.
- Possible reduction of 49-54% in CCE numbers during Kharif study and reduction of 35-47% in CCEs is found possible during Rabi study. CCE can be reduced significantly with less than 10% standard error at GP level.
- Mapping of Spatial distribution of major cropland is possible.
- Can identify areas which are not suitable for prevented sowing cover available under PMFBY.
- It is possible to assess the severity of impact of drought, hailstorm and flood using satellite data.
- Microwave remote sensing data are useful to assess the flood and inundation situation.

Although CCEs are central to the insurance scheme, however, there are limitations in providing good estimates of yield loss over insurance units in a timely manner. It was noted that a combination of remote sensing, digital photography, statistical methods, and integrated crop modeling etc. can provide an objective and unbiased assessment of crop yield losses well in-time with lesser costs.

Results of detailed pilot study using smart sampling is extremely encouraging. Details of Smart Sampling Pilot Studies carried out by the Eight organizations in Kharif 2018, and Rabi 2018-19 is as follows:

Table 3.13 Details of Smart Sampling Pilot Studies carried out in Kharif 2018 season.

#	Agency Name	State	District	Crop
1	CCAFS	Bihar	Samastipur	Paddy and Maize
		Madhya Pradesh	Narsinghpur	Soybean
		Madhya Pradesh	Jabalpur	Paddy
2	Cropin	Karnataka	Koppal	Paddy and Maize
		Karnataka	Bellary	Maize
3	IASRI	Maharashtra	Buldhana	Cotton
4	Niruthi	Telangana	Jagityal	Paddy
		Odisha	Keonjhar	Paddy
		Uttar Pradesh	Ferozabad	Bajra
5	SAC (ISRO)	Madhya Pradesh	Seoni	Paddy
		Madhya Pradesh	Khargone	Cotton
		Gujarat	Ahmedabad	Paddy
		Gujarat	Rajkot	Cotton
6	Satsure	Chhattisgarh	Mahasamund	Paddy
		Andhra Pradesh	West Godavari	Paddy
7	Skymet	Maharashtra	Beed	Soybean and Cotton
		Madhya Pradesh	Hoshangabad	Soybean
		Haryana	Hisar	Paddy
8	Weather Risk	Tamilnadu	Triuvallur	Paddy
		Tamilnadu	Ramanathapuram	Paddy (Not done)
		Odisha	Bolangir	Paddy
		Uttar Pradesh	Varanasi	Paddy

Table 3.14 Pilot Studies carried out by the Eight organizations in Rabi 2018-19

#	Agency	State	District	Crop
1	Niruthi	Uttar Pradesh	Kaushambi	Chickpea
			Hapur	Wheat
		Telangana	Krishna	Paddy
2	CropIn	Madhya Pradesh	Sehore	Wheat
		Karnataka	Raichur	Paddy
			Belgaum	Chickpea
		Bihar	Madhubani	Wheat
		Kerala	Wayanad	Paddy
3	Satsure	Madhya Pradesh	Indore, Ujjain	Wheat

#	Agency	State	District	Crop
4	Skymet	Rajasthan	Alwar	Mustard
		Andhra Pradesh	East Godavari	Paddy
		West Bengal	Maldah, N 24 Parganas	Paddy
		Haryana	Hisar	Wheat
		Madhya Pradesh	Umariya	Wheat
		Odisha	Kalahandi	Paddy
5	Weather Risk	Uttar Pradesh	Varanasi	Wheat
		West Bengal	Bankura Paschim Medinipur	Potato Paddy
		Haryana	Karnal	Wheat
6	SAC (ISRO)	Haryana	Hisar	Wheat
		Madhya Pradesh	Indore	Wheat
7	IASRI	Uttar Pradesh	Barabanki	Wheat
		Madhya Pradesh	Morena	Mustard
8	ICRISAT	Uttar Pradesh	Jhansi and Chitrakoot	Chickpea, Wheat
		Madhya Pradesh	Panna	

Table 3.15 Approach and Key findings of the Studies carried out by the nine organizations for Kharif 2018 and Rabi 2018-19

Organization	Approach	Key Findings
CCAFS	Multi-model approach (Conditional Access Module- including weather indices, crop models, Remote Sensing, statistical models).	Crop Classification Accuracy 78-84%; Different crops had different accuracies for yield estimation; Model based clustering had high accuracy with CCE based clusters
CropIn	Weather + Remote Sensing Data; Artificial Intelligence (AI) & Neural Network, Sowing Pattern (Proprietary), Soil Moisture Index, Evapotranspiration	49-54% possible reduction in CCE numbers during Kharif study and 35-47% possible reduction during Rabi study
IASRI	Post stratification based on auxiliary variables, NDVI/RVI, Weather parameters	CCE can be reduced significantly (around 30% or even lesser) with less than 10% standard error at GP level.
ICRISAT	Multi-date remote sensing data for crop mapping, Satellite, Climate and Soil data for CCE planning. (Multi Date image means satellite image/aerial photographs captured by sensor on different dates but belong to same location or area covered by that sensor.	Spatial distribution of major cropland mapped; methodology was developed for CCEs optimisation and accordingly CCEs were conducted. Final analysis in process.
Niruthi Climate & Ecosystems Ltd.	Satellite, Weather & Productivity Model for Net Primary Productivity (NPP); CropSnap & Machine Learning for Harvest Index	Per cent saving in CCE 31-43% in Kharif and 35-45% in Rabi
Space Applications Centre (SAC), ISRO	Satellite index-based stratification; Monteith Model for Productivity	The optimized CCE numbers obtained was 24 at taluk level and 160 at district level.
SatSure	Relative yield Estimation (Simulation model) and Clustering for CCE point generation	30% reduction in number of points in West Godavari (Paddy); 25-30% in Alwar tehsil (Mustard); 65-75 % in Ramachandrapuram mandal (Paddy); 50-60 % in Depalpur tehsil (Wheat)
Skymet Weather Services Private Limited	Multi-source data (NDVI, Irrigations Class, LAI, Soil Moisture) and pixel level yield forecasting	With the help of NDVI, irrigation information and yield category 60%

Organization	Approach	Key Findings
		reduction in number of CCE's can be achieved effectively
Weather Risk	Formation of clusters based on past data analysis (Soil, LU, Groundwater, Weather, Satellite), Multi-level clustering	Results obtained from 2/3 CCEs would have been like to the error in yield estimated by doing 4 CCEs in each of the individual GPs

3.6.2 Futuristic Technology Model

A futuristic model for harnessing technologies and Big Data for Improved Crop Insurance is shown below –
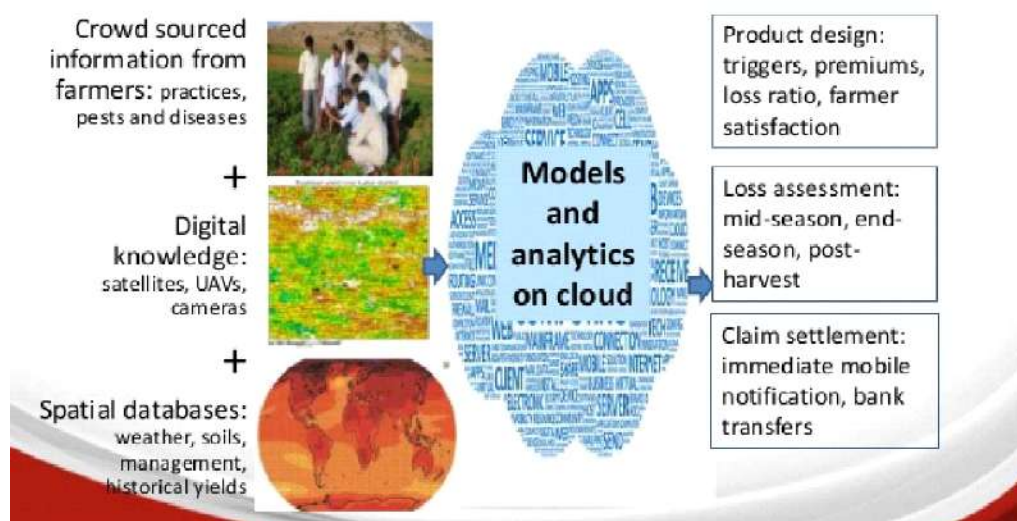
Long-term objective of technology-based interventions is to create a platform for agriculture insurance, serving the entire agro-ecosystem with farm-level insights that can be aggregated to meet various stakeholder needs for effective field implementation and informed policy decisions. Using an array of tools and algorithms for leveraging data from satellites, mobile phones, drones, automated weather stations, collaborative computing and modelling, technology can efficiently deal with the crop loss and yield estimation. It offers solutions for monitoring, modelling, and forecasting crop conditions, including location-specific weather, crop health, and crop yields by using technologies based on the terrestrial observation and prediction system.

3.6.3 Feedbacks on Status of Technology Use

Based on feedbacks obtained from relevant stakeholders; summary of primary survey followings findings is obtained.

1. All stakeholders believe that application of technology holds the key to eliminate major bottlenecks like delay in claim settlement, estimating correct yield, reduced manpower leading to faster and error free processing.

2. Different States are found at different levels of using technology. There is sustained focus from all the States to accelerate use of technology. Some of the areas where the States are using technical tools may be seen below –

   a. IT / ICT tools – All States (except Jammu &Kashmir)

   b. Centralized portal – All States (Gujarat & Karnataka are using their own portal)

   c. Remote sensing / drone/digital photography – Already being used in Maharashtra, Andhra Pradesh, Odisha, Tamil Nadu, and Rajasthan

   d. Mobile based application for additional services in agriculture sector including crop insurance– Andhra Pradesh, and Tamil Nadu

   e. Voice blasts, IVRS, SMS – All States (except J&K)

Suggestions:

1. The pilot studies carried out for reduction of CCEs should be scaled up in all implementing States and all major crops may be covered.

2. Application of technology in other areas like tracking of applications covering claim status, grievance redressal status, online payment of premium for intermediaries and issue of instant e-receipt to all farmers.

3. MNCFC in consultation with Government of India and State Governments take up widespread dissemination of results of various technology-based pilots among all stakeholders.

4. The States willing to carry out technological interventions in PMFBY, they should submit a technical and financial proposal to Government of India. The Central Government through its technical agency, MNCFC will evaluate the proposal and selected proposals will be provided with financial assistance.

5. Further discussions should be carried out with the implementing States to understand the level of digitization of land records and initiate its linking with NCIP.

6. Efficacy of technological interventions such as crop insurance app and CCE Agri App etc. should be evaluated frequently based on the field level implementation experience and changes as suggested from the concerned stakeholders should be incorporated.

7. Login for various IRDA approved insurance intermediaries on Crop Insurance App may be provided. This will help in increasing the enrolment using door to door approach.

3.7 Transparency and Accountability

While evaluating the major crop insurance schemes which have been implemented in India, the study comes across a major point related to public transparency and accountability of implementing stakeholders which resulted into discontent and trust deficit among farming community making the schemes unappealing to them. Therefore, while formulating PMFBY, one of the major thrust area has been grievance redressal mechanisms, having various crucial information in digitized form and easy accessibility of information to the beneficiaries and the Stakeholders. With the empanelment of more insurance companies, it was imperative to have performance evaluation of the companies on regular basis. Keeping this in mind, this chapter deals with following three major areas:

1. Grievance redressal mechanism
2. Performance Evaluation of insurance companies
3. Farmer perception on impact

3.7.1 Grievance Redressal Process

Under PMFBY the ultimate beneficiary is the farmer, the farmer seeks insurance for crop damages from the insurance companies for which the insurance companies seek premium and in case of damages claims are paid by an Insurance Companies. All other Stakeholders (Banks, PACS, CSC, VLE, Agriculture / Revenue Department etc.) are enabler/facilitator of the Scheme. Since multiple stakeholders are involved during various stages of implementation therefore it becomes important to have a strong mechanism to address the grievances of various stakeholders that arise during the implementation of the scheme.

Three-tiered structure has been given for grievance redressal under PMFBY. For any grievance, farmer may approach or contact District Agriculture Officer (DAO) and lodge his complaint. DAO is expected to resolve the grievance within 7 days, failing which or in case of dissatisfaction, the matter may be put up before District level Grievance Redressal Committee (DGRC).

a. District Level Grievance Redressal Committee (DGRC):

A district level monitoring Committee in some of the States acts as a grievance redressal Committee for redressal of grievances of Farmers, Banks, CSC, Insurance Company, implementing department at district level. The District Grievance Redressal Committee considers and is expected to resolve the matter within 15 days. The decision of the DGRC is binding to all the parties and in case of disagreement with the decision; the matter may be represented to the State Level Grievance Redressal Committee (SGRC) within 15 days from the decision of DGRC.

b. State Level Grievance Redressal Committee (SGRC):

A State level monitoring Committee acts as a grievance redressal Committee for matters which remained unresolved in DGRC. The SGRC examines the matter and is required to dispose the grievance within 15 days of receipt of the grievance. Matters pertaining to amount exceeding Rs. 25 Lakh in monetary terms can be directly raised before SGRC. The decision of the SGRC is binding to all the parties.

The table below shows number of Grievances (Season-wise) in select States and Districts which were registered, reviewed, monitored, and redressed amicably in time in the surveyed State. Only few farmers went to District Consumer Court for dispute settlement.

Table 3.16 Grievances registered/redressed in select states

| Season | Number of Grievances Registered / Redressed | | | | |
| | Haryana | Tamil Nadu | | Andhra Pradesh | |
	Faridabad	Tiruvallur	Thiruvarur	Visakhapatnam	Anantapur
Rabi 2016-17			30		
Kharif 2017	223	149			
Rabi 2017-18	29		18		
Kharif 2018	95			43	
Rabi 2018-19	33		14		64

Farmers interact Agriculture Department at local District/Block level for enrolment, any calamity, complaint, CCEs, Insurance claim etc. The representatives of the insurance companies are scantly placed and their whereabouts are not known to the farmers. Since the VAO / DAO are most easily accessible therefore most of the farmers' grievances are lodged in the Agriculture Department. It was observed that many farmers are not aware of these Committees (DGRC, SGRC).

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Table 3.17 Farmer's Response to Grievance Redressal Mechanism

GRIVENANCE REDRESSAL MECHANISM		STATES (% OF YES RESPONSE) - LOANEE (L) & NON LOANEE (NL)																								Total (%)	
		AP		AS		CH		HR		JK		JH		MP		MH		OD		RJ		TN		UP			
		L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL
Are you aware of any grievance redressal mechanism?		65	56	0	0	100	80	50	60	4	0	45	77	16	13	88	37	0	0	21	16	73	55	5	5	36	33
Whom do you approach in case of any grievance?	Agriculture Department	38	60	0	0	0	20	100	100	100	0	100	100	0	0	32	50	0	0	90	82	98	100	0	67	45	71
	Bank	0	0	0	0	0	40	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	1	2
	CSC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	0	0	0	0	0	0	0	0	1	3
	Fellow Farmer	0	0	0	0	0	20	0	0	0	0	0	0	43	0	5	10	0	0	0	0	0	0	0	0	3	6
	Gram Panchayat	0	0	0	0	0	9	0	0	0	0	0	0	57	0	10	13	0	0	10	9	0	0	0	0	7	7
Do you know about DGRC and SGRC functioning in your state?		37	33	0	0	33	30	27	49	0	0	23	13	20	7	21	14	0	0	25	45	7	17	0	1	18	13
Have you filled any complaint of grievance with DGRC/SGRC		12	33	0	0	33	33	2	14	0	0	9	8	12	8	11	16	6	0	26	47	4	9	0	0	11	12

- 69% of loanee and no-loanee farmers have reported to know about grievance redressal mechanism placed under PMFBY. Majority of the farmers from the States of AP, Chhattisgarh, Haryana, Jharkhand, Maharashtra, and Tamil Nadu are aware of the grievance redressal mechanism.

- 45% loanee and 71% non-loanee Farmers in all the States first, approach local agriculture department at district or block level for any of its complaints/grievances.

- 40% non-loanee farmers are approaching banks in Chhattisgarh State. 43% Loanee farmers in Madhya Pradesh and 20% non-loanee farmers in Chhattisgarh approach fellow farmers and 57% of the loanee farmers are also trying to approach Gram Panchayats for their grievances.

c. Feedbacks From Stakeholders

The type of grievances received are as listed below:

- Non availability of acknowledgement on premium deductions by banks was the major grievance raised by the loanee farmers.

- Key issues raised by farmers pertain to claim calculations and delay in claim settlement.

- Rejection of application due to Aadhaar mismatch.

- Non-cooperation from the Banks / Insurance Companies in sharing claim information and status of localized claim intimations.

- Notification related issues such as exclusion of crops / villages etc.

- Rejection of application not conveyed to Farmer. A farmer gets to know about the rejection of his application only at the time of claim intimation.

- Claim money more than Rs 50,000 are returned by Jan Dhan Account.
- With a view to ensure better transparency, accountability, and timely payment of claims to the farmers, Government has comprehensively revised the Operational Guidelines of the scheme (effective from 01.10.2018) which include among others the following.
- Provision of 12% interest rate per annum to be paid by the Insurance Company to the farmers for delay in settlement claims beyond 10 days of prescribed cut-off date for payment of claims.
- State Government to pay 12% interest rate for delay in release of State share of Subsidy beyond three months of prescribed cut- off date/submission of requisition by Insurance Companies

It was found that none of the above-mentioned penalty clauses were enforced in case of delayed claim payments beyond the prescribed timeline.

Suggestions

- Lot of correspondence takes place for each grievance making it difficult to recapture and Committee members are unable to utilize the time efficiently. The concerned Government department may provide a summary showing farmer identity, contact details, type of grievance, point of grievance, date filed, action taken by various Officers, current status and due date for redressal.
- For effective and efficient monitoring of grievances of farmers and other stakeholders, a system for registration of grievances is recommended to be developed immediately to be used by DGRC / SGRC and the same can be integrated subsequently with NCIP. This Application should assign a unique Ticket Number to each Complaint with Date/Time stamp and should have links to Document Management Systems to scan and maintain a vast Repository of Documents submitted by Farmers. Immediately after the meeting of the Committee, the notes, change in grievance status etc. can be updated in the Grievance Redressal System on computer and pending cases can be printed anytime for next Meeting. List of all resolved cases can also be displayed / printed.
- Insurance Company should appoint competent staff at District level to handle grievances.
- Responses from Toll free numbers of implementing Insurance Companies should be strengthened for effective usage in resolving issues/disputes.

- ICs need to build internal capacity of the staff engaged in crop insurance implementation, ICs to set up adequate infrastructure in districts, develop working relationship with all the stakeholders and work towards reducing the grievances specially from farmers.

- ICs to ensure deployment of adequate and skilled manpower for co observation of CCEs.

3.7.2 Performance of Insurance Companies

Feedback from Farmers' Survey shows that out of 12 State/UT surveyed in the study, 3 States namely, Tamil Nadu, Jharkhand and Chhattisgarh are found to be satisfied with IC's performance. Three States namely, Rajasthan, Maharashtra and MP are found to be in mid zone of acceptance. Six States namely, Odisha, J&K, Haryana, Assam, Andhra Pradesh, and Uttar Pradesh have expressed dissatisfaction on performance of ICs.

Figure 3.23 Farmer's Satisfaction levels about functioning of Insurance Companies
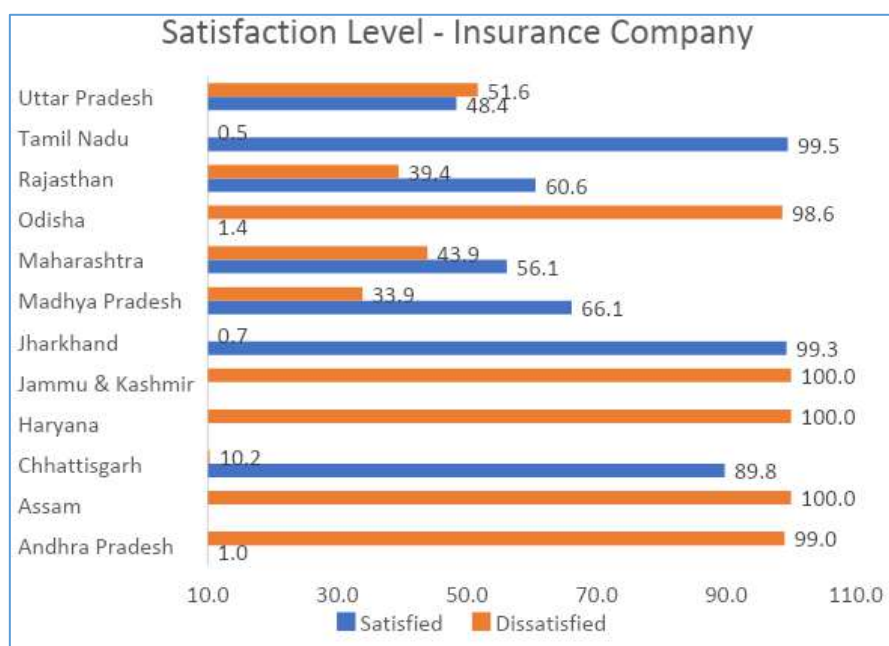
Performance of Insurance companies is not satisfactory especially during active participation during awareness creation is required. All of them have not utilized the allocated budgeted amount towards publicity. Their presence during CCE has been an area of discontentment. This is primarily due to deployment of inadequate and unskilled manpower. Lack of manpower at IC's end for co-witnessing CCEs at the time of harvest is a major issue raised by the State Government officials. Insurance companies raised the issue of delay in getting the yield data and State subsidy from

the State Governments. Some instances of fake enrolment / wrong crop name also create disputes during claim settlement.

The following table shows the combined gross margins of the insurance companies in 3 years.

Table 3.18 Loss Ratios in 3 years of PMFBY Implementation

Year	Gross Premium (CR)	Reported Claim (CR)	Loss Ratios (%)
2016/17	21,875	16,774	77
2017/18	25,350	21,925	86.5
2018/19	29,105	23,175	79.7

Almost all private insurance companies have much higher expense ratios and distribution costs, which are needed to take into consideration before calculating margins. Primary stakeholder interactions reveal that the administrative and marketing expenses (constituting of salary of employees, logistics costs and IEC activities) and distribution costs (Comprising of bank service charges, CSC charges and intermediary commission) at the insurance company's end can range from 10 to 15%. This leaves them with around 5-10% margins which are considered as quite moderate. However, in few States (for example Tamil Nadu), concerned ICs suffered losses continuously and insurance companies were found to be in net losses. However, AIC the Public sector company has been able to keep its administrative expenses (3-4%) very low when compare with private insurance companies. At the same time, claim ratios of AIC is found to be on higher side when compare to private insurance companies.

3.7.3 Ranking of Websites

To ensure that the websites of Insurance Companies are updated with information on PMFBY and easy navigation towards the content is facilitated through their websites, DAC&FW decided to rank their websites on a quarterly basis. The first of such an assessment was done for the quarter ended during September 2018.

The websites were evaluated based on six parameters - Visibility of the Scheme in the respective website, Information about the Scheme, Scale of information about the Scheme, Data, ease of navigation and provisions for grievance redressal. Based on the evaluation for the quarter ended during September 2018, following ranking was declared. Names of top 5 ICs out of 18 are shown below.

Table 3.19 Top 5 IC- website Ranking 2018

Insurance company	Marks	Rank
HDFC Ergo	28	1
AIC	21	2
Oriental	18.5	3
Universal Sompo	18	4
Shriram General	14.5	5

3.7.4 Action Against ICs

Some States such as Rajasthan, Karnataka and Gujarat have debarred various insurance companies at different times from participating in tender of the PMFBY in one or more seasons.

Suggestions

- ICs need to build internal capacity of the staff engaged in crop insurance implementation, ICs to set up adequate infrastructure in districts, develop working relationship with all the stakeholders and work towards reducing the grievances specially from farmers.
- ICs to ensure deployment of adequate and skilled manpower for co observation of CCEs.

3.7.5 Farmer's Perception

Overall farmers are seemed to be satisfied with the scheme structure in terms of premium amount, coverage of risks and sum insured. This is especially true for those areas which have experienced higher claim rations in last few seasons. Farmers want more localized risks to be incorporated such as bush fire, damage due to wild animal attack and inundation in paddy crop. However, there is a need to continuously educate farmers on various facets of the scheme which are aimed to benefit them.

The three stated impacts of PMFBY are stability of income of farmers, move towards modern agricultural practices and crop diversification. All three have direct linkage with PMFBY. However, these are all dependent on a variety of other factors like input quality, input cost, MSP, credit cost, export policy etc.

All three impacts of PMFBY are long term in nature and will be visible over a period. Financial support through claim settlement is helping farmers in continuing their agriculture operations. Once income stability is achieved with the help of crop insurance and other allied factors, productivity and quality will follow. With this, farmers will be encouraged to opt for mechanization and adoption of advanced farming

techniques. Further, to ensure flexibility and reduce risk, farmers will slowly move towards crop diversification.

Thus, the farmers responses indicate primarily their intent, understanding and willingness to continue with scheme. The process to achieve full impact will be gradual and steady.

Shown below are the responses of the farmers on these key aspects as also their willingness to continue with the PMFBY scheme. These are shown below using a scale of 1,2 and 3, which are defined below.

Table 3.20 Impact of PMFBY and Farmer's willingness to continue with scheme

STATES	LOANEE / NON LOANEE			
	IMPACT			Will continue next year
	Stabilized Income	Modern practices	Crop diversification	
Andhra Pradesh	2	2	2	3
Assam	1	1	1	3
Chhattisgarh	2	2	2	2
Haryana	1	1	1	3
Jammu & Kashmir	1	1	1	3
Jharkhand	2	2	2	3
Madhya Pradesh	1	2	1	2
Maharashtra	1	1	1	3
Odisha	2	2	3	3
Rajasthan	1	1	1	2
Tamil Nadu	2	3	3	3
Uttar Pradesh	1	1	1	2
Average	1.4	1.6	1.6	2.7
Scale	1: <=30%, 2:31to 70%, 3: >70%			

Despite, moderate responses in three indicators **more than 70% farmers wants to continue in the scheme in the next year which is very significant. This shows that slowly farmers are realizing the benefits of crop insurance.**

Stability of Income

Extended coverage, lower premium, higher sum assured, have resulted in higher claim amount benefitting large number of farmers.

5 States out of 12 surveyed States have shown higher numbers of benefitted farmers as well as higher % (benefitted farmers vs total insured farmers). These data are for combined 3 years and 6 seasons.

Table 3.21 Farmers Benefitted in Sample States

States	Beneficiary (Lakhs)	Beneficiaries as % of total insured farmers
Tamil Nadu	35.9	72.08
Maharashtra	159.4	43.13
Andhra Pradesh	24.2	40.12
Chhattisgarh	14.6	31.86
Rajasthan	77.9	30.97

The following table shows claims for few seasons in terms of benefitted farmers and average claim amount per farmer. Higher claim amount benefitting large number of farmers ensured stabilization of income.

Table 3.22 Farmers Benefitted and per farmer claim amount

States	Season	Beneficiary farmers (L)	Claim Amt per farmer (Rs)
AP	Kharif 2018	8.4	12,990
Chhattisgarh	Kharif 2017	5.9	22,300
Haryana	Kharif 2017	2.4	33,318
MP	Kharif 2017	21	26,582
MP	Rabi 2018/19	1.1	16,036
Maharashtra	Kharif 2018	50.22	8120
Maharashtra	Rabi 2016/17	1.1	21,666
Odisha	Kharif 2017	7.4	23,484
Odisha	Kharif 2018	14.3	17,460
TN	Kharif 2016	0.02	53,848
TN	Rabi 2016/17	12.3	29,506

Focused Group Discussions reveal that the timely claims are helpful in terms of providing cash in hand for following purposes:

- Purchase of quality inputs for next season

- Repayment of loan (interest and/or principle) for existing season and hence lesser financial burden in the time of distress

- Household consumptions use such as purchase of consumer goods and other household needs.

Mechanization & Modern Farming Practices

The overall level of mechanization in India is 40 to 45 % (tillage 40%, seeding and planting – 30%, plant protection - 35 to 45 %, harvesting threshing - 60 to 70% for rice and wheat, less than 15 % in other crops). Level of mechanization varies greatly from region to region. Northern States like Punjab, Haryana and Western UP have high level of mechanization (70 to 80 % overall and 80 to 90% for rice and wheat due to high productive land, declining number of agricultural workers and support of State

govt). The eastern and southern States have lower level of mechanization (35 to 45 %) due to smaller and scattered land holding.

Primary stakeholder interactions show that farmers tend to incline towards more modern agriculture practices when supported with various other interventions along with the crop insurance. The financial assistance through crop insurance claims is still very low when compare to cost of changing the agriculture practice. However, wheresoever Government is providing support in terms of various subsidies on inputs and assured buybacks etc., farmers tend to adopt newer technology along with mechanization. (Not clear)

Crop Diversification

Agricultural diversification is used as a strategy to reduce risks associated with traditional agriculture and improve returns to investment in subsistence turned commercial agriculture. Diversification with intensive use of inputs has the potential to increase profit with greater market orientation of products. Index of crop diversification of various States as mentioned in Economic Survey, 2015 is as mentioned. Punjab (.66), Maharashtra (.90), Odisha (.38), MP (.84), Tamil Nadu (.87), West Bengal (.065), Rajasthan (0.88), UP (0.78), HP (0.75), Jharkhand (0.58). It is to be noted that crop diversification is a rather slow process (Odisha is a special case) and depends on variety of factors.

It is further observed that there is a declining inter-temporal behavior in crop diversification for States like Chhattisgarh, Haryana, Madhya Pradesh, Punjab, and Uttar Pradesh apart from Odisha. On the other hand, Himachal Pradesh and Jharkhand displayed increasing value in crop diversification while for India as a whole, the value remained almost stable throughout the periods.

Similar response was obtained for crop diversification through interaction with farmers. Their understanding of the need and benefits were captured in their responses. There are some State Governments like Haryana which is providing free insurance up to certain extent when farmer shifts from Paddy to other crops. Farmers themselves may not shift the crops however when supported institutionally with assured buy backs and strong crop insurance support, they can move towards the diversification process. Assam and Jharkhand government initiative for small farmers (with land holding up to 1 ha) whereby they are charging only Rs.1 as farmer share of premium has also resulted into tremendous participation of non-loanee farmers. Some of the State

Governments such as Maharashtra and Rajasthan are struggling with higher premium rates in some of the crops in few districts which has resulted into heavy burden on States in terms of higher State share of subsidy. Such Governments are now thinking to devise an alternate mechanism of risk mitigation and crop diversification.

Focused Group Discussions also pointed out that farmers are willing to let go those crops which are giving consistently low yield or are getting damaged due to changing climatic factors.

Willingness to Continue with the Scheme
Despite certain areas of concern like delay in claim payment and differences over yield estimation, most of the insured farmers have expressed their willingness to continue with the scheme. Given the many positive inherent features of the scheme, it is believed that due to regular improved measures taken by various stakeholders involved in the scheme the farmers are quite positive about the future and more than 70% of the surveyed farmers want to continue with the crop insurance in the next year also.

3.8 Publicity and Awareness

This section primarily covers two broad areas, one, awareness and publicity activities carried out by implementing Insurance Companies, other stakeholders and second being awareness among farmers on various aspects of scheme captured through primary survey of farmer households.

3.8.1 Publicity and awareness by Insurance Companies and other stakeholders

This section attempts to analyze, various publicity modes adopted by the implementing Insurance Companies and its efficacy in reaching out to farmers and making them aware about basic features as well as responsibilities of farmers while participating in the scheme. It also examines the extent of spending against the allocated budget on awareness activities by the implementing Insurance Companies.

Once the tendering and bidding process is completed and Insurance Companies have been awarded work in the cluster of districts, it calls for a regular and continuous effort for conducting IEC activities for all stakeholders. As per the Seasonality Discipline, Insurance Companies are expected to initiate awareness programmes at least three months before the cut-off date of enrolment for respective seasons. Insurance Companies in close co-ordination with the State Government needs to chalk out various publicity campaigns/drives to ensure that farmers are adequately informed and

are made aware of crop insurance scheme provisions. Various means that were adopted in each Village/Block to spread awareness such as leaflets and pamphlets distribution to farmers, newspaper advertisements, FM Radio, Tom Tom, Auto, Van campaign, Bike Rallies with scheme banners, audio and audio-visual advertisement, public meetings, Kisan Mela, Mobile SMS, Individual Farmer contact, Kisan Sangoshthi awareness camps, TV scrolling messages etc. Officials from agriculture department at district and block level holds meetings at villages, Gram Panchayats as well as block level to explain the farmers about the scheme and its benefits.

Government of India, in its revised Operational Guidelines, 2018, has made it mandatory for Insurance Companies to spend 0.5% of total gross premium towards awareness creation, publicity and training and Capacity building activities at the field level. The unspent amount is collected back from Insurance Companies towards IEC Pool Fund of Government of India. Analysis of 0.5% budgeted vs actual spent indicates that awareness and publicity remain an area of concern as the gap has been substantial.

Van campaign, Village camp, Workshops, Hoardings, Wall wraps, Newspaper ads

Based on available data, a detailed validation analysis of actual spending on publicity by insurance companies' vis a vis total budgeted amount (0.5% of gross premium) has been carried out. The analysis covers spending by 18 empaneled ICs during Kharif 2018, Rabi 2018-19 and Kharif 2019 season. It is observed that the actual spending by ICs during 3 seasons is far less than what is mandated in the scheme mentioned above.

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Figure 3.24 Awareness Budget and Spending by ICs

SEASONS	BUDGET (Rs.Cr)	ACTUAL (Rs.Cr)	SHORTFALL (Rs.Cr)
Kharif 2018	105.7	43.5	62.2
Rabi 2018-19	45.5	27.0	18.5
Kharif 2019	114.7	54.5	60.2
TOTAL	265.8	124.9	140.9

a) All India analysis shows that average shortfall worked out to be more than 50% for three seasons. This is a major indication that awareness and publicity need more focused attention and adherence to laid down operational guidelines.

b) Most of the ICs have not been able to utilize the budgeted amount adequately to conduct various IEC activities in the field.

Following table summarizes, Insurance Company wise variance (% of shortfall) between target and actuals spending on IEC for 3 seasons.

Table 3.23 Insurance Company-wise actual spending on IEC activities

#	Insurance Companies	Kharif 2018	Rabi 2018/19	Kharif 2019
1	AIC	38	42	52
2	Bajaj Allianz		19	6
3	HDFC Ergo	9		8
4	ICICI Lombard	13		
5	IFFCO-Tokio	9		
6	New India		28	
7	Reliance General	11		11
8	SBI General			10
9	United India	5		

Among other Insurance Companies, Agriculture Insurance Company (AIC) has reported highest shortfall, close to 40 % and more in all three years and highest shortfall of 52% was reported in 2019. It is a serious concern as AIC is the largest public sector Insurance Company and holds maximum crop insurance business.

3.8.2 Awareness among farmers

Low awareness level of farmers about various facets of the schemes has been reported as a major concerned area on various platforms. Responses from loanee and non-loanee farmers were captured through structured interview covering as many as 13 aspects of the scheme. This includes knowledge about the scheme- crops covered, cut-off date of enrolment, enrolment channels, sources of information, premium rate

to be paid by farmer, sum insured, acknowledgement receipt, risk coverage, grievance redressal, implementing Insurance Companies, tracking on PMFBY portal etc.

1. **Awareness among loanee farmers**

Table 3.24 Awareness / Knowledge about Various Facets of the Schemes- Response from Loanee Farmers

Awareness / Knowledge About Various Facets of the Schemes	STATES (% OF YES RESPONSE) - LOANEE FARMERS																								Total (%)	
	AP		AS		CH		HR		JK		JH		MP		MH		OD		RJ		TN		UP			
	PM	RW	PM	RW	PM	RW	PM	RW	PM	RW	PM	RW	PM	RW	PM	RW	PM	RW	PM	RW	PM	RW	PM	RW	PM	RW
Coverage of crops	100	0	36	0	95	0	100	0	100	0	18	0	53	0	87	35	100	0	90	8	100	0	82	18	79	10
Various enrolment channels	100	0	0	0	100	0	100	0	55	0	27	0	53	0	64	36	100	0	8	8	91	0	18	18	52	10
Cut off dates for enrolment	53	0	26	0	100	0	84	0	2	0	36	0	53	0	85	36	0	0	8	7	100	0	18	18	48	10
Premium amount	100	0	36	0	100	0	99	10	0	0	36	0	15	0	85	9	73	0	1	1	100	0	1	0	46	2
Insured amount	100	0	28	0	100	0	46	0	0	0	41	0	32	0	87	9	65	0	0	0	88	0	1	0	45	2
Implementing Insurance companies	100	0	21	0	100	0	84	0	96	0	18	0	52	0	78	36	82	0	7	7	100	0	18	18	54	10
Acknowledge receipt	79	0	19	0	67	0	23	0	0	0	59	5	52	0	29	9	76	0	2	1	94	1	1	0	32	2
Risks covered	86	0	31	0	100	0	91	0	0	0	59	9	44	0	78	11	89	0	1	0	87	4	1	0	46	2
Claim process	89	0	19	0	67	0	71	0	0	0	36	23	24	0	82	7	85	0	79	1	79	13	83	0	72	2
Grievance redressal process	40	0	0	0	67	0	60	0	0	0	32	23	40	0	94	7	52	0	2	0	78	14	82	0	57	2
Insurance Co toll free no	77	0	0	0	100	0	43	0	0	0	41	0	48	0	94	8	58	0	2	0	71	0	62	0	58	1
Crop insurance App	7	0	0	0	33	0	24	0	4	4	59	23	59	0	32	10	8	0	2	0	91	11	0	0	21	3
Tracking application on portal	33	0	41	0	100	0	78	18	78	0	64	64	32	0	89	36	14	0	88	7	79	79	84	18	73	17

It is evident from the analysis of 13 parameters that loanee farmers are better aware about coverage of crops (79%) and tracking of farmer application on PMFBY portal (73%) and claim process (71%). Awareness level among them was comparatively good about various channels of enrolment, implementing Insurance Companies, Grievance redressal and Insurance Company's toll-free numbers and claim process. More than 50% of the surveyed farmers are aware about above information.

On other parameters awareness among farmers was little on the lower side, where less than 50% of the farmers are aware about enrolment cut-off dates, premium amount, Sum Insured, and risk covered. Only 32% of the loanee farmers are were about acknowledgement receipts send by Insurance Companies. Response on RWBCIS scheme was mainly confirmed to Maharashtra State.

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2. Awareness among Non-loanee farmers

Table 3.25 Awareness / Knowledge about Various Facets of the Schemes- Response from Non- Loanee Farmers

Awareness / Knowledge About Various Facets of The Schemes	States (% OF Yes Response) - Non Loanee Farmers)																								Total (%)	
	AP		AS		CH		HR		JK		JH		MP		MH		OD		RJ		TN		UP			
	PM	RW	PM	RW	PM	RW	PM	RW	PM	RW	PM	RW	PM	RW	PM	RW	PM	RW	PM	RW	PM	RW	PM	RW	PM	RW
Coverage of crops	100	0	22	0	93	0	100	0	100	0	8	0	7	0	84	26	100	0	88	12	100	0	82	17	75	17
Various enrolment channels	100	0	0	0	5	0	100	0	44	0	28	0	7	0	86	26	100	0	12	12	88	0	17	17	59	17
Cut off dates for enrolment	44	0	18	0	5	0	80	0	4	0	30	1	7	0	83	26	0	0	12	12	100	2	17	17	57	17
Premium amount	100	0	42	0	3	0	100	17	0	0	37	3	26	0	83	6	56	0	0	0	100	2	6	0	58	4
Insured amount	100	0	18	0	3	0	60	0	0	0	49	0	29	0	74	5	56	0	0	0	73	0	2	0	51	2
Insurance companies	100	0	16	0	5	0	85	0	100	0	24	0	7	0	76	26	78	0	12	12	100	0	17	17	55	17
Acknowledge receipt	56	0	16	0	3	0	20	0	0	0	21	0	14	0	19	3	100	0	3	0	95	0	5	0	20	2
Risks covered	78	0	13	0	3	0	82	0	0	0	29	1	1	0	82	6	100	0	2	0	77	0	6	0	54	3
Claim process	89	0	24	0	3	0	52	0	0	0	20	6	29	0	86	7	100	0	65	0	66	1	88	0	73	4
Grievance redressal process	44	0	0	0	3	0	35	0	0	0	27	15	14	0	53	3	100	0	1	0	64	16	84	0	51	4
Insurance Co toll free no	89	0	0	0	5	0	60	0	0	0	68	1	50	0	70	7	0	0	3	0	48	1	66	0	60	4
Crop insurance App	11	0	0	0	5	0	23	0	0	0	42	13	29	0	9	8	0	0	1	0	85	15	0	0	15	6
Tracking application on portal	56	0	44	0	40	0	77	8	0	0	24	94	0	0	50	50	100	0	39	12	72	72	53	17	48	42

Analysis of responses from non-loanee farmers from Table above, shows that non-loanee farmers are aware about coverage of crops (75%) and claim process (73%). More than 50% of the farmers are aware about toll-free numbers of Insurance Companies, various channels of enrolment, cut off dates for enrollment, premium amounts, sum Insured, implementing Insurance Companies, risk covered and grievance process.

c. State-wise responses on awareness among loanee and non-loanee farmers Responses of loanee and non-loanee farmers, vary greatly from State to State. Responses from Loanee and Non-loanee farmers in select 12 States is summarized in the following table.

Table 3.26 Responses of loanee and non-loanee farmers on awareness indicators

#	Awareness indicator	Loanee Farmers	Non-Loanee Farmers
1	Coverage of crops	• Overall, 79% of farmers were aware of coverage of crops under PMFBY. • 100% Loanee farmers in the States of AP, Haryana, J&K, Odisha, and Tamil Nadu were aware of crops covered under PMFBY. • Awareness about crops covered was found high in Chhattisgarh, Maharashtra, Rajasthan and UP, where more than 80-90% farmers were aware of it. • However, lower awareness is observed in Assam, Jharkhand, and Madhya Pradesh.	• Overall, 75% of farmers non-loanee farmers were aware about the coverage of crops under PMFBY. • Majority of the non-loanee farmers in the States of AP, Chhattisgarh, Haryana, J&K, Maharashtra, Odisha, Tamil Nadu, Rajasthan and UP are well aware of crops covered under PMFBY. • Poor awareness is observed in Assam, Jharkhand, and MP
2	Various enrolment channels	• In all, 52% of the loanee farmers were aware of various enrolment channels • All loanee farmers interviewed in the States of AP, CG, Haryana, and Odisha are fully aware of various channels enrolment under PMFBY. Significant number of farmers in Tamil Nadu are also aware of enrolment channels. • More than 50% farmers are aware of enrolment channels in Maharashtra, MP, J&K. • Awareness among loanee farmers in Assam, Jharkhand, RJ and UP is very poor.	• Overall, 59% of the non- loanee farmers were aware of various enrolment channels • Non-loanee All farmers interviewed in the States of AP, Haryana, Maharashtra, Odisha, and Tamil Nadu are well informed about various channels enrolment under PMFBY. Significant number of non-loanee farmers in Tamil Nadu were also aware of enrolment channels. • Awareness among non-loanee farmers in Assam, Chhattisgarh, MP, RJ and UP in this regard is very poor.
3	Cut off dates for enrolment	• 48% of the loanee farmers were off cut off dates for enrolment • Farmers in CG and TN were fully aware (100%) • Significant number of farmers are found aware about cut of dates in the States of Haryana and Maharashtra. It is more than 50% in AP and MP. • Awareness level was very poor among farmers of J&K, Odisha, Rajasthan and UP.	• Overall, 57% of the non-loanee farmers were aware about the cut off dates for enrolment • Awareness among farmers in Haryana, Maharashtra and Tamil Nadu is excellent. To some extent it is ok in the States of AP and Jharkhand • Awareness among non-loanee farmers in Assam, Chhattisgarh, J&K, MP, RJ, and UP.
4	Premium amount	• Overall, 46% of the farmers were aware about premium rates. • Farmers in the States of AP, CG, Haryana, and Maharashtra and Tamil Nadu were found to be fully aware about premium rates, especially the premium to be paid by the farmers. It is fair in Odisha • Low level of awareness was observed in the States of Assam, Jharkhand, and MP. • Farmers in J&K, RJ, UP have no idea about premium rates	• 58% of the non-loanee farmers are aware about premium amount • Majority farmers in farmers in AP, Haryana, Maharashtra, and TN are almost aware • Medium level of awareness is observed among farmers from the States of Assam, Jharkhand, MP, and Odisha.
5	Insured amount (Sum Insured)	• Overall, 45% farmers are aware of Sum Insured.	• 51% of the non-loanee farmers are aware about the insured amount for enrolment

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#	Awareness indicator	Loanee Farmers	Non-Loanee Farmers
		• 100% farmers in AP and CG States only are found well aware about insured amount • Comparatively, awareness level about Insured amount among farmers Maharashtra, Odisha and TN was better • Awareness is low in Assam, Haryana, Jharkhand, and MP • Farmers in the State of J&K, Rajasthan and UP are found to be totally unaware.	• More than 70% farmers in AP, Maharashtra and Tamil Nadu are fully aware, followed by Haryana and Odisha • Awareness among non-loanee farmers in Assam, Chhattisgarh, J&K, MP, Rajasthan and UP in this regard is very poor.
6	Insurance companies	• 54% of the loanee farmers were aware of implementing Insurance Companies in their areas • State-wise analysis shows that majority of the loanee farmers are aware of implementing Insurance Companies, in States of AP, CG, Haryana, J&K, Maharashtra, Odisha and TN. • Awareness is low among farmers of Assam, Jharkhand, MP, Rajasthan and UP. •	• 55% of the non-loanee farmers were aware about the insured amount for enrolment • Farmers in AP, J&K and Tamil Nadu are fully aware (100%) • More than 75% non-loanee farmers are aware in the States of Haryana, Maharashtra, and Odisha. • Awareness among non-loanee farmers in Assam, Chhattisgarh, Jharkhand, MP, Rajasthan and UP in this regard is very poor.
7	Acknowledge receipt	• Only 32% of the loanee farmers have knowledge about acknowledgement receipts sent by Insurance Companies to loanee farmers • Farmers in the States of AP, Chhattisgarh, Jharkhand, MP, Odisha, and Tamil Nadu are well informed. • Awareness among the farmers from Assam, Haryana, J&K, Maharashtra, RJ and UP is • poor	• Non-loanee farmers are getting instant receipts from CSC at the time of enrolment
8	Risks covered	• Overall, 46% farmers know about various risks covered under PMFBY • Majority of the farmers from the States of AP, CG, Haryana, Maharashtra, Odisha, and TN are having good knowledge about risk covered under PMFBY. • Poor awareness is observed among farmers in the States of Assam, J&K, Jharkhand MP, Rajasthan and UP	• Overall, 54% of the non-loanee farmers are aware about the risks covered under PMFBY. • Farmers in Odisha are fully aware (100%) • Significant no. of farmers in the States of AP, Haryana, Maharashtra, and Tamil Nadu are aware about risks covered. • Awareness among non-loanee farmers in Assam, Chhattisgarh, J&K, Jharkhand, MP, Rajasthan and UP in this regard is poor ranging between 0-30% only.
9	Claim process	• Overall, 72% farmers are aware about claim process • Farmers in the State of AP, Chhattisgarh, Haryana, Maharashtra, Odisha, Rajasthan, Tamil Nadu and UP are found to be well informed about claim process • It is poor among farmers from Assam, J&K, Jharkhand, and MP	• 73% of the non-loanee farmers are aware about the claim process. • Significant no. of farmers is aware about the claim process in AP, Maharashtra, Odisha and UP. Followed by Haryana, Rajasthan, and Tamil Nadu. • Awareness among non-loanee farmers in the States of Assam, Chhattisgarh, J&K, Jharkhand, and MP is poor.
10	Grievance redressal mechanisms	• Overall, 57 % farmers know about grievance redressal mechanisms • Farmers in Maharashtra, Tamil Nadu and UP are best in knowing about grievance redressal mechanisms • Farmers in the States of AP, CG, Haryana Odisha, JH, and MP Odisha	• 51% of the non-loanee farmers were aware about the Grievance redressal process under PMFBY. • Farmers in Odisha are fully aware (100%) • Significant no. of farmers are aware about the grievance redressal in Maharashtra,

#	Awareness indicator	Loanee Farmers	Non-Loanee Farmers
		have little more knowledge about grievance redressal • However, farmers in Assam, J&K, and Rajasthan do not have any knowledge about grievance redressal	Tamil Nadu and UP. Followed by AP and Haryana
11	Insurance Co toll free no	• Overall response to knowledge about toll free numbers is found among 58% farmers • Farmers in AP, CG and Maharashtra are better aware about it • Medium response was given by farmers from Haryana, Odisha, Tamil Nadu and UP.	• 60% of the non-loanee farmers were aware about the toll-free numbers of ICs. • More than 60% non-loanee farmers are aware about Insurance Company toll free number. They are from the States of AP, Haryana, Jharkhand, Maharashtra, and UP
12	Crop insurance App	• Overall, only 21 % farmers know about Toll- Free Numbers of Insurance Companies • Only farmers in Tamil Nadu were best aware of Crop Insurance App (91%). There is possibility that farmers are mistaken by UZVAN App in the State with GoI's Crop Insurance App. • 59% farmers have reported to be aware in JH and MP • Low awareness is seen among farmers from Assam, AP, Haryana, Chhattisgarh, J&KR, Rajasthan and UP	• Awareness pertaining to Crop Insurance App is poor. Merely, 15% of the total non-loanee farmers are aware about it. • Only, 85% non-loanee farmers in Tamil Nadu are aware of it. There is possibility that farmers are mistaken by UZVAN App in the State with GoI's Crop Insurance App. • In other states, very low percentage of awareness is seen about Crop Insurance App.
13	Tracking application on portal	• Overall, close to three-fourth of the farmers knows about how to track a farmer's applications on PMFBY portal. • Farmers from CG, Haryana, J&K, Maharashtra, Rajasthan, Tamil Nadu and UP have good knowledge about tracking of farmer application on PMFBY portal	• Overall, 48 % of the total non-loanee farmers are aware about the application tracking on the portal. • Farmers in Odisha were fully aware (100%) • More than 50% non-loanee farmers in the States of AP, Haryana, Maharashtra and UP knows about how to track applications on portal. Followed by AP, Assam, Chhattisgarh, and Rajasthan

Loanee and Non-Loanee responses captured about RWBCIS scheme are very limited because, RWBCIS is implemented only in few States out of select 12- viz- CG, MP, MH, RJ and UP. (Assam- only in Kh 16). It is not implemented in AP, HR, J&K, JH, Odisha, and TN.

3.8.3 Sources of Awareness / Publicity

This section enquires about various sources of awareness, i.e., sources from where farmers get to know about information related to schemes- PMFBY/RWBCIS. State-wise responses from loanee and non-loanee farmers were also captured, and it varies significantly from State to State.

Table 3.27 Sources of Awareness about PMFBY/RWBCIS

	STATES (% OF YES RESPONSE) - LOANEE (L) & NON LOANEE (NL)																									Total (%)	
	AP		AS		CH		HR		JK		JH		MP		MH		OD		RJ		TN		UP			
	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL	L	NL
Banks/PACS	3	0	0	0	33	63	0	0	0	0	0	5	69	71	65	31	33	71	42	41	2	7	92	57	50	27
CSC/VLE	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	26	0	29	0	19	0	25	0	4	0	18
Fellow Farmer	0	0	100	100	0	0	37	0	0	0	0	0	0	0	1	5	0	0	0	5	0	0	0	0	4	5
Govt. officials-State/District/Block	97	100	0	0	67	0	63	100	0	0	100	95	31	18	20	37	67	0	58	24	98	68	8	39	43	48
Gram Panchayat/Gram Sabha	0	0	0	0	0	13	0	0	0	0	0	0	0	0	2	1	0	0	0	11	0	0	1	0	0	1
Input Dealers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Insurance company representative	0	0	0	0	0	13	0	0	0	0	0	0	0	0	10	1	0	0	0	0	0	0	0	0	2	1
Insurance Company toll free numbers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
NGOs	0	0	0	0	0	13	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0

Primary survey of farmers revealed that:

- Banks and PACS were the major source of information for 50% loanee farmers and Govt. officials- State/District/Block in 43% loanee farmers.

- Govt officials at State/district/block level played crucial role in making 48% non-loanee farmers aware about scheme provisioning. Other sources for non-loanee farmers are banks and CSC.

- Government officials at State/district/block level were found to be the most effective source of information for farmers in the States of AP, JH, Haryana and Tamandu, followed by Odisha, CG and Rajasthan.

- State-wise effectiveness of information sources shows that banks were leading in creating awareness among both loanee as well as non-loanee farmers, particularly in Chhattisgarh, MP, Maharashtra, Rajasthan & UP.

- CSC/VLEs' were found to have played to some extent in Maharashtra, Odisha, and Tamil Nadu.

- Fellow farmers / Progressive farmers were found to be influential in popularizing the scheme in Assam and Haryana.

- Role of Insurance Company representatives in the field and Toll-Free number of Insurance Companies in disseminating scheme information is found to be very negligible. This is a cause of concern considering prime responsibility of Insurance Companies in publicizing the scheme.

3.8.4 Mode of awareness

A wide variety of modes were used by different stakeholders for publicity, which varies from State to State. This includes TV, Radio, print media, outdoor media, awareness camps, street play, Social Media, Pamphlet/brochure/Audio Visual Vans/Kisan Mela and Others (as per questionnaire).

Figure 3.25 Modes of Awareness
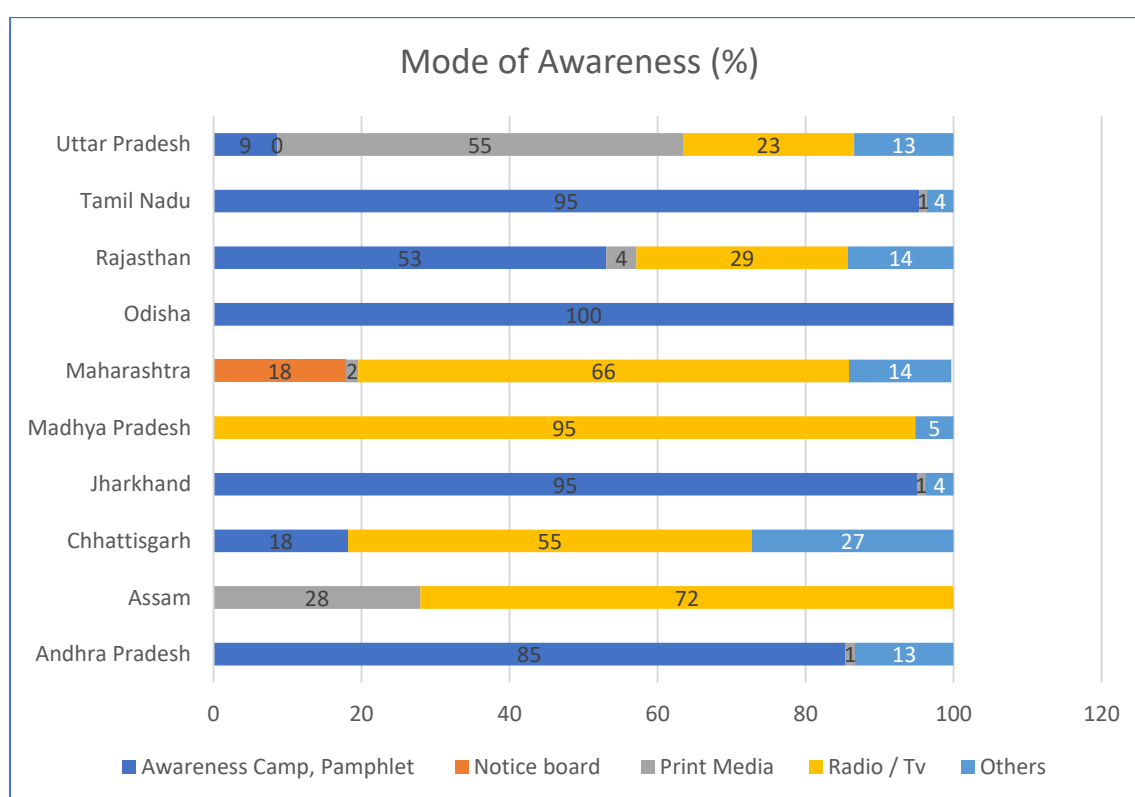
Awareness camps and pamphlets were widely used in Odisha, Tamil Nadu, Jharkhand, and Andhra Pradesh. TV/Radio were predominantly used in Madhya Pradesh, Maharashtra, Assam, and Chhattisgarh. Extensive use of print media is seen in Uttar Pradesh for awareness generation.

District Agriculture Officers (DAO) shared that awareness and publicity about Scheme is mainly done through Newspaper, FM, Local TV, Banners, Wall paintings, Leaflets, Mobile vans, Mobile SMS, Camps, Mela, Village campaigns, by contacting individual farmers.

Suggestions

1. It is recommended that the insurance companies should play a prominent role in IEC activities in States allotted to them. This deserves greater attention as the take-up of crop insurance especially in the non-loanee category very much depends on activeness of insurance companies at field level.

2. Though there is a clarity that insurance company is primarily responsible for carrying out IEC activities yet more coordinated efforts are required at the end of various stakeholders such as State and district Government officials, Banks, and CSC.

3. Additional efforts are required for creating awareness among tenant /sharecropper farmers and women farmers.

4. Insurance companies to ensure maximum utilization of allocated budget for awareness, publicity, and training activities.

5. More frequent awareness drives should be planned and executed at different levels.

6. It is to be ensured that the timelines laid down in the guidelines be strictly adhered. It is important that the State Government should finalize the tenders and selection of insurance companies well before the commencement of cropping season so that insurance companies and all other stake holders get enough time to plan and execute IEC activities.

7. The insurance companies should share expenditure details on IEC activities to the State Government and to the Government of India after every season and the shortfall may be deposited in the IEC pool of Government of India. The defaulting ICs may be asked to deposit the difference in Technology fund within 3 months of cutoff date for enrolment.

8. Government of India may plan an exclusive national campaign for awareness generation of PMFBY/RWBCIS. A popular celebrity can also be chosen as brand ambassador of the programme.

9. Banks can use its network of Banking Correspondents (BCs) to motivate farmers and to conduct awareness drive. Similarly, CSC can use its network of VLEs to reach out farmers and disseminate information about enrolment and claims to the farmers.

10. Insurance companies need to send timely acknowledgement receipt to all insured loanee farmers.

11. Insurance Companies can collaborate with local Farmers Producers Organization (FPO) and enabling NGOs to increase popularity of PMFBY among farming community.

12. To facilitate the universal and inclusive coverage of all farmers there is urgent need for an awareness and sensitization program on crop insurance literacy which can be planned and executed throughout the season. The districts/blocks with poor enrolment/farmer coverage may be specially targeted.

13. Insurance company should depute one person for limited time-period in Agriculture Development Branch of all PSU banks for further dissemination of information to farmers. The information can pertain to premium amount, coverage of perils, crop loss intimation, claim settlement etc.

14. Banks' agriculture field officers should be trained by insurance companies. They may also act as a point of sale (POS) for enrolment of non-loanee farmers.

15. Insurance Companies to share claim settlement information with banks so that banks will be able to share relevant information with concerned farmers visiting the branches.

Chapter 4: Triangulation of Data

Triangulation refers to use of multiple data sources in qualitative research to develop a comprehensive understanding of any phenomenon. It can also be viewed as a qualitative research strategy to test the validity through the convergence of information from different sources. Triangulation facilitates validation of data through cross verification from more than two sources. It tests the consistency of findings obtained through different instruments and increases the chance to control, or at least assess multiple causes influencing the results.

Triangulation is not just about validation but about deepening and widening one's understanding of the current situation. Salient points of feedback from all stakeholders including farmers and data related to States' performance was attempted to capture in this section. This part is intended to highlight the key areas for each state where focus is needed for further augmentation of the scheme and to avail the benefits it offers to farmers. We have considered 3 sources of data / information / views to organize the understanding of the status of individual States as regards to their implementation of the scheme over a period of three years in surveyed 12 States. These include:

a. Secondary data.
b. Responses from various stakeholders including farmers during household survey using formal questionnaires.
c. Interaction with related stakeholders of the scheme – Concerns and constraints observed by stakeholders in their own area as well as in others, their suggestions.
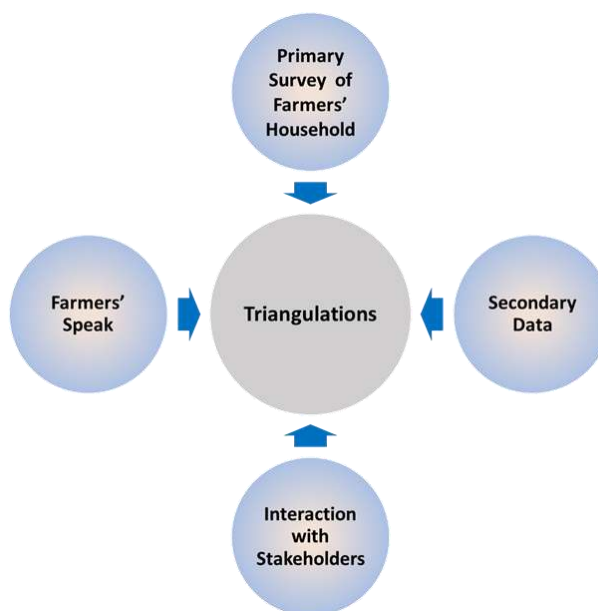
State – Andhra Pradesh

Secondary Data

- Enrolment of farmers / insured area marginally reduced vis a vis first year of PMFBY introduction
- The actual insured area as a % of gross crop area (GCA) is only 28.1
- Total claim (6 seasons) – 40% of insured farmers
- Delay in claim settlement and Pending claims

Primary Survey Feedback

- Overall satisfaction level high.
- Higher non loanee participation in Rabi 2018/19 (81%)
- Claim ratio is more than 100 in 4 seasons
- Active role of District Agri Dept.
- 11% of respondents charged by CSC

Farmers' Speak

- Need to create more awareness
- To include crop losses due to fire (some not aware of its inclusion)
- Enrolment and cut off dates to be extended

Stakeholders' Feedback

- Ragi, Korra, Millets crops proposed to be included in Kharif and Maize in Rabi season.
- Synchronization of bank CBS data with portal
- Use of technology for CCE to be expedited
- Lack of initiative towards farmer enrolment
- Pending payment claims, a perennial issue
- DES to expedite compilation of yield data
- Network connectivity issue in remote villages for CSC / VLEs: alternate arrangement.
- 12% penal charge for delay to be waived
- Acute shortage of State Govt fund for premium payment
- Excess area insured by few farmers vs actual area sown

Conclusions

a) Overall satisfaction is high with adequate awareness level though enrolment has not increased
b) State Govt. was in acute fund crunch to release premium payment for PMFBY
c) Excess area insured by farmers, a major concern area
d) Benefits of scheme is moderate but given state govt fund crunch, the outlook towards scheme is muted.

Unique Feature

In terms of land record digitization, AP has taken a lead among states.

State – Assam

Secondary Data

- No of Farmers enrolment remained unchanged in all seasons.
- The actual insured area as a % of gross crop area (GCA) is only 1.1
- Minimum insurance claim (13% of total insured farmers)

Primary Survey Feedback

- Farmers coverage is low
- Portal and Crop Insurance App was not available

Farmers' Speak

- Need to create more awareness
- To cover all localized risk factors – damage by elephants / other animals.

Stakeholders' Feedback

- Farmers to open bank account in advance (NL)
- More frequent awareness programs
- Timeline particularly for non-loanee applications submission to be extended
- Insurance cover should be increased to more crops
- Delayed Acknowledgement Receipt for premium
- Lack of IC Manpower for CCEs co-observation
- Delayed submission of CCEs yield data
- Technology to capture crop condition is required

Conclusions

a. Awareness regarding RWBCIS scheme is poor for both loanee and non- loanee farmers.
b. DAO - Trained and developed progressive farmers for creating awareness.
c. Improper documents and Bank account in Farmer's name only are major concerns
d. Delay of more than 1 year to receive acknowledgement receipt for enrolment.
e. State govt encouragement with subsidized premium is likely to boost enrolment.

Unique Feature

State Govt. has introduced subsidized premium for paddy at Re 1/= for farmers with less than 1.0 Ha of land for 2019,

State – Chhattisgarh

Secondary Data

- Enrolment of farmers / insured area remained unchanged in all 3 years
- The actual insured area as a % of gross crop area (GCA) as high as 38.9
- Benefitted farmers – average 32% for 6 seasons

Primary Survey Feedback

- Need for efficient Officers for PMFBY in field (including IC).
- Impact – Stable income, keenness for innovative agricultural practices
- Irrigation through Borewell for most of farmers
- Claim receipt satisfaction is high among farmers

Farmers' Speak

- Need to create more awareness
- Wish to have lower insurance premium rates

Stakeholders' Feedback

- Conduct more awareness programs
- Wishes to have IC representative at dist. level
- IC to take active role in spreading awareness about Schemes
- Majority of enrolment is routed through Banks
- 2 to 4 months delay in claim processing
- Aadhaar Number mismatch is a major issue (Enrolment)
- Portal should be redesigned for user friendly features and fast response

Conclusions

a. Feedback for continuation with Scheme is moderate
b. However, overall experience in terms of satisfaction with Scheme is high

Unique Feature

State having maximum % of farmers as tenant/Share cropper

State – Haryana

Secondary Data

- Enrolment of farmers / insured area reduced.
- The actual insured area as a % of gross crop area (GCA) is as high as 29.6
- Benefitted farmers, average for 6 seasons - 23% of total

Primary Survey Feedback

- Insurance Companies should settle claims without delay
- Crop insurance impact is yet to be experienced by Farmers
- Awareness about RWBCIS scheme is very low

Farmers' Speak

- Timely payment of claims needed by farmers from ICs

Stakeholders' Feedback

- Mostly notified crops remain same in a season
- Response from Portal should be fast
- Provision of online real time assistance for Portal problems
- Lack of farmer enrolment
- Emails to ICs about Pending payment claims are not replied back by ICs
- Develop web application for grievance on Claims registration, settlement and pending status display.
- Network connectivity issue in remote villages
- State has no authority to rectify Village Code

Conclusions

a. Satisfactory overall experience varies: 50% loanee and 89% for non- Loanees
b. Crop insurance impact yet to be fully felt / experienced by farmers
c. However, willingness to continue with the crop insurance is high.

Unique Feature

Almost 100% land has irrigation facility available

State – Jammu & Kashmir

Secondary Data

- Enrolment of farmers / insured area reduced over 3 years.
- The actual insured area as a % of gross crop area (GCA) is only 13.0
- Minimum benefitted farmers through claim – 12% of total in 6 seasons

Primary Survey Feedback

- Awareness about RWBCIS, use of Portal & App, cut-off dates is needed
- No impact on income stability, crop diversity and innovative technology is experienced
- Farmers are well versed with enrolment process and required documents
- No extra fee is charged by any VLE / CSC

Farmers' Speak

- All farmers should be insured for crops
- Farmers feel premium paid is high

Stakeholders' Feedback

- More risks should be covered
- Reporting time for crop loss is less
- Enrolment processing is time consuming
- Signing Opt In/Opt Out by KCC beneficiaries now is going to be a difficult task
- Insurance coverage should be wider including all crops and losses of animals
- In overall terms, knowledge about grievance redressal is very poor
- All Insurance companies should participate
- Assessment committee should be constituted at village level consisting of Agriculture Extension Officer, Insurance Agencies and Farmer

Conclusions

a. Overall experience with PMFBY / RWBCIS scheme was expressed as good
b. Farmers to be kept informed about premium debited
c. Farmers to be informed about approval / rejection of their insurance application

Unique Feature

Internet based Services face frequent outage

State – Jharkhand

Secondary Data

- Enrolment of farmers / insured area increased over time
- The actual insured area as a % of gross crop area (GCA) is only 19.4
- Delay in claim payment
- Minimum number of benefitted farmers: 8% of total in 6 seasons

Primary Survey Feedback

- Overall satisfaction level is good
- Good response on impact on stabilized income, willingness to move to modern agriculture practices and crop diversification is good.
- Most farmers find enrolment process easy
- High non loanee participation (88% in K2018)

Farmers' Speak

- Need to create more awareness about Schemes for smallest farmer
- Insurance Companies should set up Camps at Panchayat level to enroll farmers

Stakeholders' Feedback

- Insurance Company should be made more accountable
- Banks not very effective in Enrolment of farmers
- Majority of Farmers enroll through PACS
- Farmers surveyed did not experience any calamity, hence no claim.
- Three-Fourth of farmers are aware of grievance redressal system but only 15% are aware of presence of DGRC / SGRC.
- Farmers approach Agriculture Department for any type of problem / grievance.
- Delay in receiving error free AY Data
- Non availability of historical data of 7 years for inclusion of more crops
- Delay in data uploading on portal
- CCE Agri App should function smoothly

Conclusions

a. Overall satisfaction is high for both loanee and non-loanee farmers
b. Little more than half of farmers vouch for income stability, crop diversification and move to modern technology use
c. Majority of farmers would like to continue enrolling with PMFBY regularly.

Unique Feature

Borewell water suffices for irrigation of farmland

848567/2022/Credit-II

State – Madhya Pradesh

Secondary Data

- Enrolment of farmers / insured area went up in last 3 years
- The Actual Insured area as a % of gross crop area (GCA) is as high as 52.7
- Pending claim high
- Only 19% of farmers benefitted through claims in last 6 seasons

Primary Survey Feedback

- Overall satisfaction for loanee farmers was good at 71%, but low for non-loanee (37%)
- Impact on stable income, getting into modern agricultural practices and crop diversification was only moderate.
- Awareness about RWBCIS is almost missing
- Enrolment process was certified as easy by almost all farmers

Farmers' Speak

- Timely payment required from Insurance Companies for claim settlement
- Need to create more awareness about Schemes
- Premium to be reduced further and claim should be maximum

Stakeholders' Feedback

- Crops sown differs from crop insured in many farmers cases
- No Helpline number (toll free) is available at District level to satisfy queries by farmers in relation to PMFBY
- Cut-off date for payment of premium to Insurance Company should be extended.
- Many discrepancies reported by IC from Bank Branches
- A pop-up menu to be provided in NCIP for the Branches to enter discrepancies / irregularities faced / observed by them and they should be rectified at earliest.

- Insurance Company should appoint one Officer at District level to resolve claim disputes

Conclusions

a. Very few farmers satisfied with claim settlement, 5% of them even went for appeal. Being the largest state in terms of farmers enrolment, focus to be directed to speed up claim settlement and resolve grievances.
b. Both loanee and non-loanee farmers are ignorant about RWBCIS.

Unique Feature

This state is the leader in terms of maximum insured areas as % of GSA.

848567/2022/Credit-II

State – Maharashtra

Secondary Data

- Farmers' enrolment / insured area remained unchanged.
- The actual insured area as a % of gross crop area (GCA) is 25.0
- Higher number of benefitted farmers (average 43% of total in 6 seasons)

Primary Survey Feedback

- Integration of Land Records with Insurance Portal helps in reducing Enrolment errors
- One of the few states where awareness about RWBCIS is observed
- Overall satisfaction in claim process is very high at > 95%
- 9% farmers reported that CSC charges at some villages

Farmers' Speak

- Need for timely and full payment of claim amount to farmers
- Enrolment should be done at Farmer's home only
- Need for efficient & transparent system with accountable Govt. Officers at ground level

Stakeholders' Feedback

During awareness program, farmers should be encouraged to use Technology / Mechanization in farming

- Agriculture equipment & implements should be organized for time-share basis of use
- Seasonal Calendar should be enforced for implementation
- Almost half number of farmers awareness about Schemes through Banks
- Insurance Companies need to create more awareness about Schemes
- IC Representative should visit CCEs site and be present during CCEs
- Knowledge of grievance redressal system is mixed for loanee and non-loanee: 88% vs 37%
- Grievance redressal mainly through Govt Departments
- Knowledge about grievance committee (DGRC/SGRC) is low (only few have filed complaint)
- Land Records integration is completed
- All historical data about weather, yield etc. should be ported to Portal for Repository of information

Conclusions

a. Overall satisfaction level is high for loanee and muted for non-loanee farmers
b. Impact of crop insurance in terms of income stabilization is low, as also willingness for farm modernization and crop diversification.
c. Almost 90% of loanee and 70% of non-loanee farmers would like to continue
d. Land record digitization completed
e. Leveraged use of CSC for registration.
f. Given the regular problems faced by state and steps taken by state government, it is likely the state will significantly increase the farmers enrolment in near future.

Unique Feature

a) High non loanee participation
b) Taken lead role in land record digitization – active site.

State – Odisha

Secondary Data

- Enrolment of farmers / insured area remained unchanged in 3 years.
- The actual insured area as a % of gross crop area (GCA) is 27.4
- Benefitted farmers: 27% in 6 seasons

Primary Survey Feedback

- Overall awareness level is good for PMFBY but knowledge about RWBCIS is lacking
- Enrolment process is easily understood by all farmers and mostly accomplished by Banks
- Insurance claim due to post harvest losses were 100% settled to entire satisfaction of farmers
- CSC / VLE do not charge any fee additionally

Farmers' Speak

- Timely payment required from Insurance Companies for claim settlement
- To include crop losses due to Fire Accidents

Stakeholders' Feedback

- Advertisement and Camp on village level for awareness creation.
- Insurance Companies need to engage more professional man-power for meeting the queries of the farmers & Bankers.
- Yield dispute between IC and Govt. should be amicably resolved
- Faster claims settlement should be attempted sincerely
- Timely receipt of Govt. subsidy is expected for faster disbursal of claim money
- Claim settlement does not happen in time due to multiplicity of factors.
- VLEs for enrolment of Non-Loanee farmers, hardly get trained and possess very little knowledge about the PMFBY scheme.
- Functional autonomy of ICs at State & District level to be ensured.
- More perils to be added to the risk scenarios.
- The premium sharing pattern should be 60:40 between Centre & State like all other Centrally Sponsored program.

Conclusions

a. Overall satisfaction level about Schemes is high.
b. Impact of insurance on longer term benefit (income stabilization and willingness to move towards crop diversification.) is clearly evident.
c. 100% Farmers would like to continue with scheme
d. Land record digitization completed

Unique Feature

- Calamity hit state – farmers benefitted with CR > 200 in 3 seasons.
- Land Records integration with NCIP effective Kharif 2020

State – Rajasthan

Secondary Data

- Farmers' enrolment / area insured remained unchanged.
- The actual insured area as a % of gross crop area (GCA) is as high as 38.0
- Benefitted farmers for 6 seasons – 31% of total

Primary Survey Feedback

- Overall awareness about both the Schemes (PMFBY / RWBCIS) is poor
- Overall application process for enrolment was found to be easy
- Satisfaction level about Claim process is mixed: loanee are just ok, but non-loanee are not very happy.
- Awareness about Grievance Redressal System is confined to less than 20% whereas 35% farmers know about DGRC/SGRC (incidence of lodging complaint is low)

Farmers' Speak

- Door to door awareness campaign is needed
- Insurance Company should not change every year

Stakeholders' Feedback

- Names of farmers are wrongly entered
- Extra-long time to determine claim of farmers
- Many a times farmers do not receive claims
- Presence of IC Representative in DAO office for handling farmers' complaints
- Common & solid data Portal is need of the hour
- Insufficient digital platform knowledge
- Rate of reinsurance is too high
- Agriculture department is the main route for grievance redressal
- Crop insured in Bank records is different from crop sown, at times.
- Village mapping edit function to be made available to State Govt.
- Portal should check issue of duplicate policy generation
- Portal need to be technically sound.

Conclusions

a. Overall satisfaction is very high.
b. Impact due to crop insurance on income stability, willingness to move towards modernization and crop diversification is low (less than 15%)
c. Willingness to continue with crop insurance is mixed and on the lower side: loanee (48%) and non-loanee (25%).
d. Although enrolment is high, but effort should be focused to maintain the level and explore further increase. Areas to be looked into are aggressive awareness drive and speeding up claim settlement process.

Unique Feature

State taken active steps to digitize land records

State – Tamil Nadu

Secondary Data

- Farmers enrolment / insured area reduced marginally
- The actual insured area as a % of gross crop area (GCA) is only 21.1
- Large number of farmers benefitted in claim payment (72% in 6 seasons)
- Delay in claim settlement (delay of state govt premium payment)

Primary Survey Feedback

- Scheme awareness seems to be high for most of aspects of insurance scheme
- Overall feedback: 'easy' to enroll / application process predominantly through PACS
- Satisfaction level about claim process is quite high, majority (90%) have received claim due to post-harvest losses
- Farmers are not aware of DGRC / SGRC, though majorly farmer know about Grievance Redressal System
- 24% of respondents charged by CSC

Farmers' Speak

- All Insurance Companies should put up Camps at Panchayat Office for enrolment
- Even the smallest/poorest farmer should be somehow insured for his crops

Stakeholders' Feedback

- CEE data uploading in remote village difficult due to connectivity issues
- ICs delay claim settlements and disputes resolution
- ICs should appoint field level staff for resolving disputes
- All survey numbers cultivated by one farmer should be entered in one application only.
- Portal should take care if residence and farm are in different villages
- Inadequate data from CCE and delay in Govt. announced Yield Data delay claim settlement
- Debar willful defaulting farmers from this Scheme for next 3 years
- Village mismatch on Portal due to change in Village Code or missing village in Master at time of enrolment
- Farmer is not informed about Rejection of his application registration. While claim is filed, he is told that his application is rejected
- VLEs are not professional, commit errors in data entry which result into mismatch at the time of claim processing
- Portal and CCE Agri App should be made user friendly and custom specific.
- Notification process may be simplified.

Conclusions

a. Overall satisfactory response for the scheme experience
b. Almost all farmers will opt for crop insurance next year
c. Impact on steady income, keenness for investment on modern practices and crop diversification seen as high among farmers.
d. It is expected given high claim ratio and proactive steps taken by state, enrolment of farmers will significantly increase from current level.
e. Viability of ICs is a major concern. State Govt to ensure higher enrolment.

Unique Feature

a) Implemented effective awareness programs and hassle free registration
b) High level of non loanee participation (Rabi)
c) CR have been more than 100% in all 6 seasons

State – Uttar Pradesh

Secondary Data

- Farmers enrolment / insured area remained unchanged in 3 years
- The actual insured area as a % of gross crop area (GCA) is only 14.9
- Only 13% farmers benefitted through claims.

Primary Survey Feedback

- Awareness about Schemes is poor
- Process of enrolment in PMFBY / RWBCIS is simple & easy
- CSC / VLE does not charge any additional fee from farmers

Farmers' Speak

- Timely payment of claims by IC's directly in Farmers' account
- Need for more village-wise campaigns/seminars for awareness & explanation of Schemes
- Transparency & involvement of farmers needed in CCE

Stakeholders' Feedback

- More awareness programs should be conducted
- Insurance policy should be more simplified for farmers
- Enrolment of 64% farmers was done by Banks and remaining was accomplished by CSC
- Infrastructure should be developed for implementation of PMFBY Scheme particularly ICs.

Conclusions

a. Overall satisfaction level high
b. However, willingness to opt for insurance scheme next year is low (benefits from scheme till now is very low)
c. Minimum impact of crop insurance scheme on farmers' income stabilization, low willingness for opting for modern practices and moving for crop diversification.
d. Being a big state, all the concerns expressed through feedbacks to be considered and action taken in order to increase farmers enrolment from current level.

Unique Feature

State has maximum average Family size of farmers

Chapter 5: Impact Assessment: Key Findings & Recommendations

The report has covered various achievements and challenges under PMFBY in detail in chapter 3 and detailed observations have been outlined. The study has been carried out based on eight 'Performance Parameters' and overall suggestions relating to the respective sections have also been included. In this part of the report emphasis has been placed on major achievements and concerns which have not been elaborated in other chapters and based on these long-term recommendations have been included.

Examination of the designs, application, performance, and overall impact of the various insurance schemes, it can be inferred that salient features of a good crop insurance system would include the following:

- Easy access to insurance products and hassle- free registration/enrolment.
- Reasonable premiums with adequate financial coverage.
- Robust databases of farmers, risks, and crop details.
- Reliable, balanced, timely, accurate and rapid methodology for crop damage estimation.
- Timely claim settlement and payouts.
- Responsive grievance redressal system.
- Effective implementation and infrastructure development.
- Covering the price risk along with weather risk.

Let's analyze PMFBY in some of the criteria as mentioned above

5.1 Major Achievements of the Scheme

➢ PMFBY is the third largest crop insurance scheme in the world in terms of premium.

➢ The farmer pays only nominal premium while State and Central Government bears rest of the premium on 50:50 sharing basis.

➢ Significant increase in number of farmers getting enrolled in the scheme. A positive trend has been seen in enrolment of non-loanee farmers across various States with Maharashtra, Tamil Nadu, Jharkhand, Orissa, Karnataka etc. leading in non-loanee enrolment.

➢ The scheme has leveraged the strength of CSC channel quite effectively and major enrolment under non-loanee category has been drawn from this channel.

- ➢ Significant increase in sum insured as it is now made equal to scale of finance. Hence, practically all cost of cultivation has been covered under crop insurance.

- ➢ Number of crops notified under the scheme has also been increased from 80 in 2016 to around 200 in 2019.

- ➢ Scheme now comprehensively covers risks associated with entire span of the crop growth cycle. Along with yield losses, various add on covers such prevented sowing/sowing or germination failure, mid-season calamities, Localized claims and post-harvest losses are also available for the local as well as wide area level calamities.

- ➢ Overall claim ratios have also seen a positive trend during 2016 to 2019. It has increased from 77% (2016-17) to 97% (2018-19) with number of farmers getting benefitted have increased from 150 Lakh (2016-17) to 178 Lakh (2018-19).

- ➢ A significant achievement of the scheme is to bring all the stakeholders at one digital platform (National Crop Insurance Portal) which has resulted into improvements in real time data capturing during enrolment and processing of farmer's applications for claim settlement.

- ➢ Various other technology-based interventions such CCE Agri app, Crop Insurance App, Pilot studies carried out from smart sampling and rationalization of CCEs has also made the scheme further efficient.

- ➢ Calamity-hit areas saw high Claim settlements. Farmers of various States such as Tamil Nadu, Chhattisgarh, Haryana, Orissa, Madhya Pradesh etc. have received claims ranging between 100-400% of the gross premium. The claim settled are even higher when compare to premium paid by the farmer.

- ➢ Mandatory capture of Aadhaar for enrolment accounts erased ghost beneficiaries.

- ➢ Direct Benefit Transfer (DBT) to deliver claims directly in bank accounts has resulted into reduction of time lag for claims to get settled to eligible beneficiaries.

5.2 Various Gaps identified in Scheme implementation

- Failure to reach the targeted Insured area coverage to 50% by 2020. Only 25-27% area is covered under the scheme in various years.

- Delay in claim settlement (2-6 months) mainly due to delay in State share of premium subsidy, delay in yield estimation through CCEs and yield related disputes between State government and insurance companies.

- Impact of technology for yield estimation and loss assessment is yet to result in speeding up of critical processes.

- The roles of insurance companies have not been very prominent with regards to creating awareness and skill development in most of the States.

- Farmers are not getting informed about rejection of their applications until admissible claims are settled.

- The scheme fails to adequately cover sharecroppers/tenant farmers due to process and documentation related obstructions.

- Not many details are captured to understand the uptake of the scheme by SC/ST/Women and very poor farmers.

- Some States such as Bihar and West Bengal have opted out of the scheme which has resulted in reduction in enrolment and area covered.

- Negative publicity in the media about insurance companies making huge profits has created wrong impression among the farming community.

- Announcement of farm loan waiver schemes by various States has resulted into defaulting of farmers on repayment of their agriculture loans which further results into making them in-eligible for coverage under loanee farmer category of crop insurance. During 2017-18, there was a drop in total farmers insured to Rs.4.99 crore from 5.72 crore in 2016-17. This drop was in the compulsory loanee category. Two largest States, Maharashtra, and Uttar Pradesh, announced loan waivers, making more than 69 lakh farmers ineligible.

- The actuarial premium rate which was charged by the insurance entities was 12.55% which is higher than the average of previous schemes. This has been because of various reasons such as change in methodology of calculating Threshold Yield, higher sum insured, higher natural calamities in 2017 and 2018, historic higher losses, high distribution costs etc. This is testimonial to the fact that even though the load on a farmer is low, but the burden on government exchequer has increased.

- Due to continuous loss faced in 2 to 3 years, Insurance companies are opting out of the scheme as the business of crop insurance is becoming unviable for them. Four private insurance companies viz. ICICI Lombard, Tata AIG, Cholamandalam MS, and Shriram General Insurance have stopped participating in PMFBY – for both the Kharif and Rabi seasons of the 2019-20 crop year.

- Some States had to invite tender again due to higher premium quoted by participating insurance companies as well as lack of participation by number of insurance companies.

- North Eastern States are yet to realize full benefit of the scheme.

5.3 Recommendation

Agriculture has been one of the major contributors to India's growth story. As high as 65 crore people or 58 per cent of Indian households are directly or indirectly reliant on agriculture. In recent years, crop failures, indebtedness, non-remunerative prices, and very low returns have resulted in agrarian distress in some parts of the country. Government has initiated numerous reforms in the sector. However, challenges continue to exist. Government of India has tried to provide various risk hedging mechanisms first through National and State Disaster Relief Funds and later through various provisions of crop insurance schemes. Over last 30 years, the country has seen major improvements in the crop insurance schemes and the same has become more comprehensive and more transparent. The study has found various areas where immediate and long-term work is required. Some of them are mentioned below:

5.3.1. Land Record Digitization and integration with NCIP

Integration of digitized State land records is critical for reducing moral hazards in crop insurance. Such moral hazards include higher insured area than sown area, multiple uptake of credit and hence multiple insurances for the same parcel of land etc. Digitization of land records has reached an advanced stage in more than 90% of the States however, their integration with NCIP is yet to be started (except for Maharashtra and Orissa).

5.3.2. Coverages of Crop / Risks

- All-important crops should be covered under crop insurance. Farmers should be educated to diversify the crops which are not giving economic returns over last many years or so. Those crops whose cultivation is getting impacted due to weather changes, should give way to other suitable crops.

- For those crops, where the historical yield data is not available and conducting crop cutting experiments is also not feasible may be shifted to RWBCIS. State and Central Governments should analyze such cases once in 2-3 years and then decided upon their inclusion / exclusion under PMFBY / RWBCIS. Further, adequate efforts are required to strengthen RWBCIS implementation.

- Damage caused by wild animals, fire, cold waves, and frost to crops should also be considered at the individual level.

- The crops for which, MSP is not declared, farm gate price established by the marketing department / board should be adopted.

- The insurance unit (IU) must be reduced over a period. In any case, it should not be more than village level.

- Incentivize groups of SC/ST farmers or women farmers and promote group insurance.

- Robust assessment of crop loss should be done by building capacities of State governments, involvement of PRIs and farmers, in loss assessment. Auditing and multi-level checking to ensure credibility of data and testing incorporating technology such as remote sensing, drones, and online transmission of data.

5.3.3. Structural Changes

- Developing innovative, unique insurance products as well as superior use of technology in implementing and monitoring crop insurance would need budget. It is recommended that a dedicated fund should be made available for such purpose.

- PMFBY being only a yield-protection insurance, is not holistic and fails to consider price fluctuations. Without revenue protection, farmers do not benefit from the insurance scheme since, irrespective of the harvest at the end of the season, a negative Wholesale Price Index (WPI) for primary food articles leaves farmers under-compensated.

- States may revisit clusters for equitable distribution of risk. Re-clustering has been seen in Maharashtra, Madhya Pradesh, Uttar Pradesh, and Rajasthan and has resulted into better spread of risk for insurance companies also.

- Alternate channels for non-loanee enrolment may be identified. All intermediaries approved by IRDA should be allowed to participate in the scheme.

- A hybrid scheme which covers both production risks as well as weather related risks can be envisaged and if farmers are able to save their crops in adverse

weather conditions, they can still be compensated for change in weather conditions.

- Various models of implementation such as trust model, Pool based model, inclusion of price in insurance, making insurance free for marginal/Women farmers etc. can be explored.

- Promoting Group Insurance – Few States like TN, AP and Telangana have taken initiative to promote / encourage group insurance to include landless farmers in scheme. It is recommended that more States should incorporate the same.

5.3.4. Alternate Financial Model

For Insurance Companies as well as for State and Central government, crop insurance should be economically viable and sustainable to ensure long term continuity of the scheme. Government of India and the State Governments need to examine this aspect on a regular basis and take suitable steps.

Insurance companies had made nearly net operating margin of 5-10% in the last 3 years. The companies think this is not a sustainable margin as in a bad drought year, the losses and indemnity payments could go up to very high wiping out the gains of 2 to 3 years. Conversely the fact that insurance companies make profit generates negative perception and spread bad message that the profits are being made on perceived 'agrarian distress'.

To counter the above dilemma, "Model for higher acceptability and sustainability" may be studied which is mentioned below.

Extracts from: Performance Evaluation of Pradhan Mantri Fasal Bima Yojana (PMFBY), PART II - "Uptake and Willingness-To-Pay", Centre for Management in Agriculture (CMA) Indian Institute of Management Ahmedabad (IIMA)

"A new model of financial administration can be thought of which ensures companies make sustainable profits. ….. this is akin to a 'cap-and-cup' approach. Insurance companies can carry the risk with a cap of, say, 120% and a cup of, say, 80%. Which means pure losses (claim ratio i.e., claim/premium) on the insurer's book beyond 120% falls on Centre and State at a pre-agreed ratio of 50:50 or 60:40, whereas surplus arising out of pure losses below 80% is ploughed back to the Centre and State in the same pre-agreed ratio. The Centre and State need to create a separate crop insurance fund (as there was during CCIS regime) which will be used only for crop

insurance. The participating insurance company will be given parameterized target to perform and receive performance-linked-incentive or be penalized for below-par performance. Essentially, this means that in a profit year, insurance companies will plough back all the money beyond its normal capped profit to the PMFBY managed special fund. In a loss year, this fund can be used to compensate the company's losses. This will reduce the cost of re-insurance and ensure companies keep participating while farmers get assured claims when under losses."

5.4 Special Efforts for Social Inclusion

Special Efforts under the scheme resulted in considerable participation of women farmers in Crop Insurance. Some of the following important and fruitful steps taken up under PMFBY especially in the States of Assam, Odisha, AP, Tamil Nadu, MH, UP, Chhattisgarh motivated the women farmers to join crop insurance scheme. Following could be some of the ways for social inclusion under PMFBY.

- Door to door campaign in the villages with special focus on women farmers and SC/ST farmers.
- On the spot enrolment in the villages can be done if Government of India come up with an enrolment app with payment gateways linked with different insurers.
- Shandy (market hats) campaigns, generally where presence of female and SC/ST farmers is high during weekly hats.
- Awareness creation through Road transport buses, folk arts, short films, distribution of pamphlets.
- Gram Panchayat meetings also contributed a lot as women constitute 1/3 of Panchayat members as per compliance under 73rd and 74th constitutional amendment. Also, villages having considerable SC/ST population, GPs posts are reserved for SC/ST.
- More number of insurance intermediaries should be encouraged. Brokers, Agents, IMF, and Web Aggregators along with a greater number of CSCs can facilitate a supply chain for enrolment of more non-loanee farmers- especially women and SC/ST farmers.
- Finally, effective coordination among stakeholders and multidisciplinary approach under the scheme resulted increased participation of women and SC/ST farmers.

## Chapter 6: Socio- Economic Status of Surveyed Farmers

This chapter mainly highlights the socio-economic status of farmers covered in sample household survey, a perspective on gender and social inclusion under PMFBY and few case studies showcasing key implementation aspects.

6.1 Socio Economic Status of Farmers Surveyed

a. Sample Size

More than 65% of the samples were drawn from bigger States in terms of higher Gross Sown Area like MP, UP and Maharashtra. Against a target of 6000 farmers' household, the actual was above 91%. Because of COVID 19 outbreak target of sample households was not met fully, especially in Rajasthan and Odisha.

Figure 6.1 Sample Size: Districts and number of farmers covered
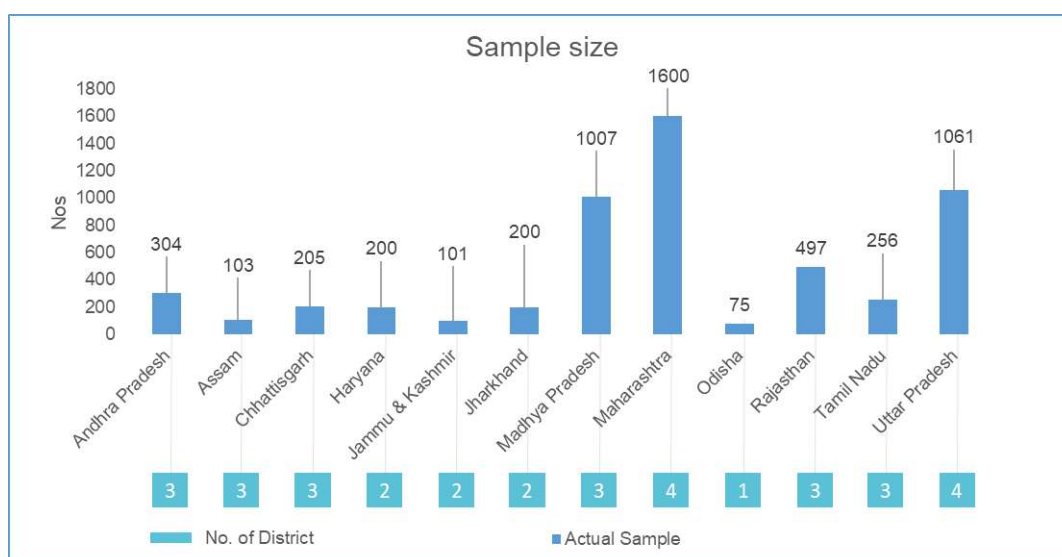
b. Family Size

Family size is significant for agricultural families since a significant proportion of the members are involved in various agricultural activities making 'farming is a family enterprise'. Average family size is 5.4, with UP being the highest family size of 7.2 and average farm working members was 2.2. Women members share in family membership is 33% with MP being the leader with 40%. It is observed that 2-3 persons per family are engaged in farming across the country.

Figure 6.2 Average family size of sample farmer household
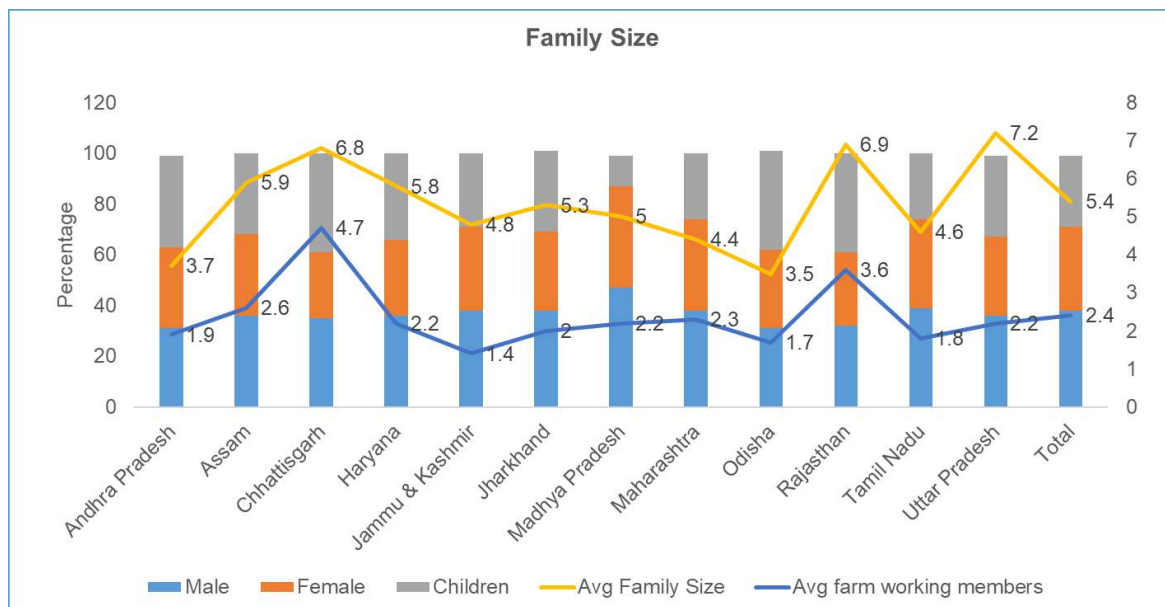
c. Caste Distribution

Adequate representation of socially, economically backward sections of society like SC/ST is essential for overall growth. The idea is to reach out to the under- served sections of population. Rural development must benefit the poor, women, scheduled castes, and tribes. In total sample 25% farmers represent both SC/ST together, which is at par with all India average. Jharkhand with 72% and Chhattisgarh with 55% have much higher proportion of SC/ST farmers.

Figure 6.3 Caste Distribution of sample farmers
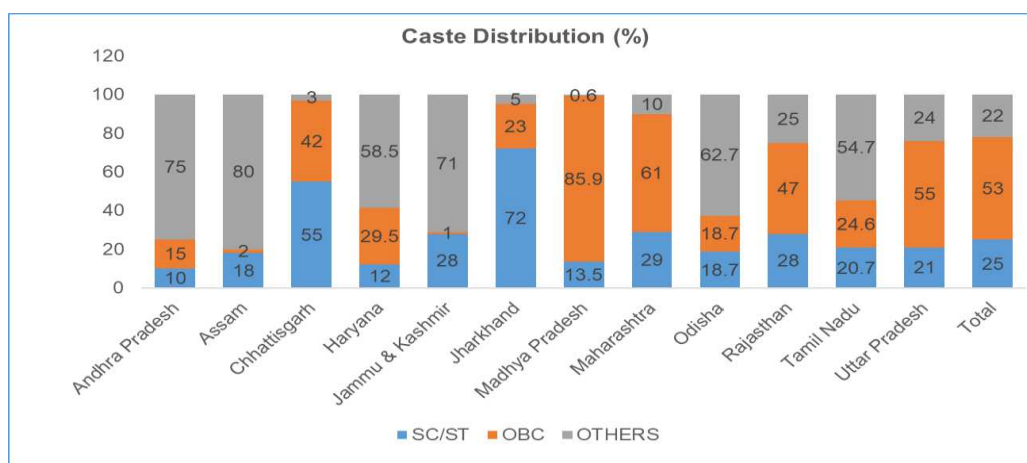
d. Education Status

Universal basic education is a critical part of rural development. Educated farmers are better capable of taking informed decisions. This is an important parameter for a crop insurance scheme where education will have a direct positive impact of creating

adequate awareness level - understanding the insurance features, use of modern technology, yield calculation, use of portal.

Figure 6.4 Education Status of Sample Farmers
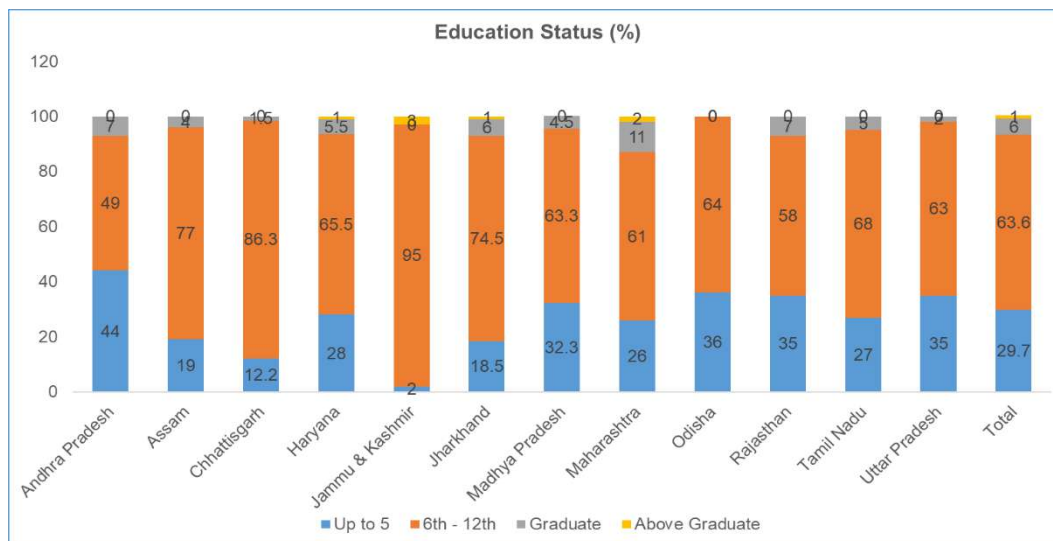
In terms of education status of farmers, all States, to some extent are similar. Maharashtra with 11% and AP with 7% graduates are ahead of others.

e. Farmers' Category

Till recently crop insurance was compulsory for loanee farmers and not mandatory for non- loanees (the scheme was revamped in Feb 2020 and made voluntary for all farmers). Hence the focus for the scheme's success was aimed to increase share on non-loanee farmers in overall farmers' participation.

In overall terms the share of loanee versus non loanee in the final sample was 46: 54. The total non- loanee farmers outnumbered the loanee farmers in States like Jharkhand, Maharashtra, Rajasthan, and Chhattisgarh in sample farmers studied.

Figure 6.5 Farmer Category- Loanee and Non-Loanee
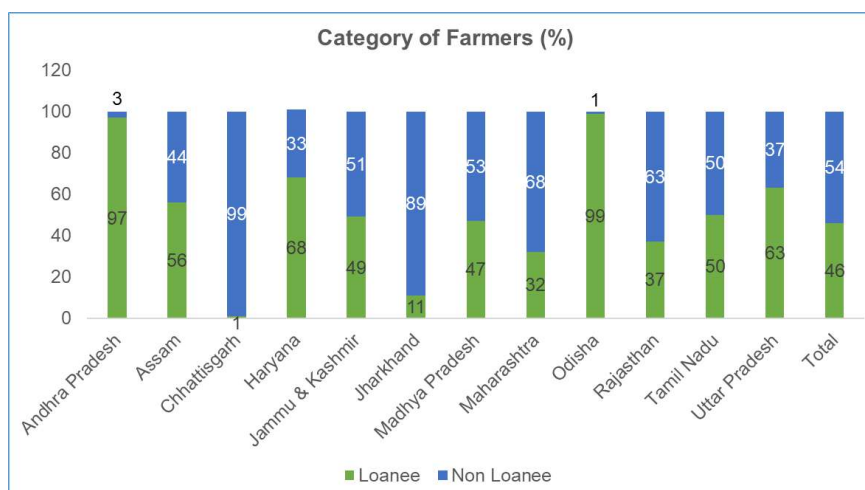
6.2 Perspective on Gender and Social Inclusion

Since women make up 33% of cultivators and their dependence in agriculture for livelihood is as high as 84%, it is relevant to include them in all Government programs that aimed to alleviate farmers' distress. However, there is no special provision in the scheme for women farmers except for making special effort during enrolment in some States.

This section briefly emphasizes the need to enhance role of women in agriculture. Given the challenges they face in the form of gender inequality (limited property ownership rights, decision making power, bank credit).

Critical resources such as land are generally unevenly distributed once it comes to gender. Women seldom enjoy property ownership rights directly in their names. They have little control over decisions made in reference to land. Even with land in their names, they may not have actual decision-making power in terms of cropping patterns, sale, mortgage, and the purchase of land. In India only 14.9% of households are female headed.

In rural India, the percentage of women who depend on agriculture for their livelihood is as high as 84%. Women make up about 33% of cultivators and about 47% percent of agricultural laborers, as per Census 2011.

Agriculture is directly tied to issues such as economic independence, decision-making abilities and access to education and health services and in this manner has created externalities such as poverty and marginalization, and compounded issues of gender inequality.

Self-help groups, village-based financial organizations, which are often comprised solely of women are playing a crucial role in promoting a shared agenda around health, education, and agriculture. It is not an exaggeration to say that these groups are changing the lives of women at the grassroots level. Equally, self-help groups can act as a catalyst in the efforts towards closing this agricultural gender gap. For the women farmers, it is also easy to come out of their household as the member of a self-help group in which they share their group identity.

Government's Approach on Women Farmer

Government's approach on women farmers mentioned in Economic Survey 2018, is briefly reproduced in the following paragraphs:

"A gender-specific intervention to raise productivity of small farm holdings is required, as is engagement of men and women in extension services with gender expertise.

The entitlements of women farmers will be the key to improve agriculture productivity, even as it noted that there is an increasing number of women in multiple roles in agriculture sector, as cultivators, entrepreneurs, and laborer.

Rural women are responsible for the integrated management and use of diverse natural resources to meet the daily household needs. This requires that women farmers should have enhanced access to resources like land, water, credit, technology, and training which warrants critical analysis in the context of India.

The government has already started taking measures to ensure mainstreaming of women in agriculture sector. It has earmarked 30% of the budget allocation for women beneficiaries in all ongoing schemes and programs, and development activities.

Alongside, it is focusing on women self-help groups to connect them to micro credit through capacity building activities and to provide information and ensure their representation in decision-making bodies."

All farmers including woman farmers are eligible to enroll under the scheme. There are no specific extra benefits/provisions for women farmers under the scheme. However, the Government is bound to pay its share in premium subsidy for all the farmers including women who take up crop insurance.

The coverage of women farmers under PMFBY has remained consistent since inception of the scheme. In past three seasons mainly, Rabi 18-19, Kharif 18 and Kharif 19, out of the total coverage under the scheme approximately 15%-16% women farmers were enrolled under the scheme every year. The State of Maharashtra has achieved maximum enrolment of women farmers, constituting almost 18%-19% of the State's total farmer coverage. Insured area owned by women farmers in the State of Maharashtra is the highest among all participating States since Kharif 18. Union Territories and North East States have recorded poor enrolment of women over the years.

There has been 0.7% increase in the enrolment of loanee women farmers and a significant increase in the enrolment of Non-Loanee women farmers amounting to

approximately 56% increase from Kharif 18 to Kharif 19 demonstrating favourable attitude among women farmers towards PMFBY.

To widen the coverage of women farmers under PMFBY, DAC&FW in partnership with the World Bank Group has commissioned a qualitative study to capture the barriers impacting access to crop insurance of women farmers. The findings of the study will help in the overall design of crop insurance to make it more accessible and beneficial for women farmers.

The graph below shows female farmers as head of family based on sampling plan for household survey. It was as low as 3% in Haryana and Rajasthan and as high as >15% in Assam, Odisha, AP, and TN.

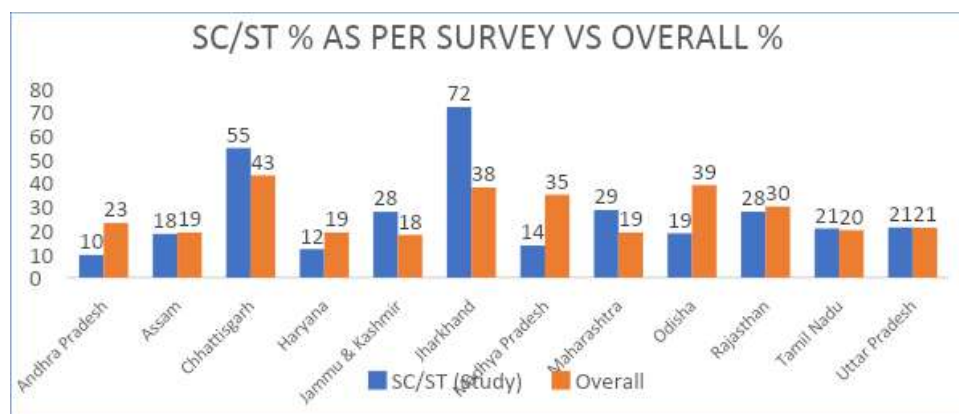**Figure 6.6% of Women Farmers in Sample Farmers**
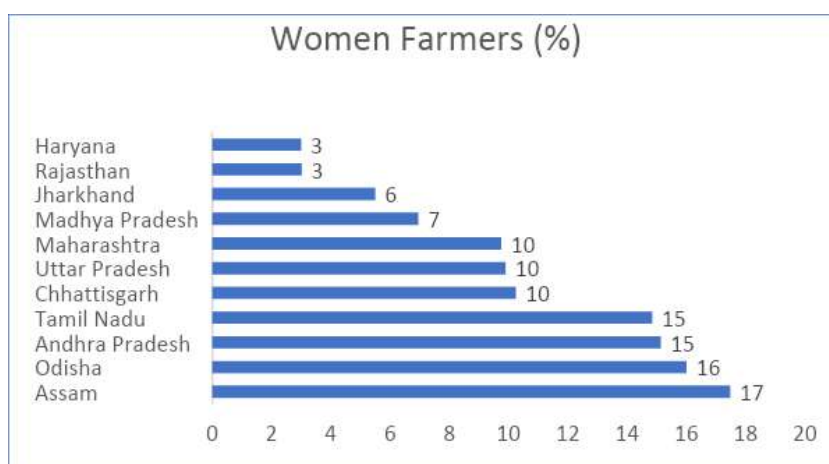
Based on sampling plan, the above graph shows approx. 30 to 40% of the household members work in farming including women.

SC/ST Farmers Coverage

The following graph captures % share of SC/ST farmers in sampling plan. While, for some States % of SC/ST farmers surveyed was more than the States' average (like Chhattisgarh, Jharkhand, J&K, Maharashtra), for few it was same (UP, TN, Rajasthan) and for balance it was lower.

Figure 6.7 % SC/ST farmer Coverage in sample

Special Efforts for Social Inclusion

Special Efforts under the scheme resulted in considerable participation of women farmers in Crop Insurance. Some of the following important and fruitful steps taken up under PMFBY especially in the States of Assam, Odisha, AP, Tamil Nadu, MH, UP, Chhattisgarh motivated the women farmers to join crop insurance scheme. Following could be some of the ways for social inclusion under PMFBY.

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- Awareness creation through Road transport buses, folk arts, short films, distribution of pamphlets.
- Gram Panchayat meetings also contributed a lot as women constitute 1/3 of Panchayat members as per compliance under 73rd and 74th constitutional amendment. Also, villages having considerable SC/ST population, GPs posts are reserved for SC/ST.
- More number of insurance intermediaries should be encouraged. Brokers, Agents, IMF, and Web Aggregators along with a greater number of CSCs can facilitate a supply chain for enrolment of more non-loanee farmers- especially women and SC/ST farmers.
- Finally, effective coordination among stakeholders and multidisciplinary approach under the scheme resulted increased participation of women and SC/ST farmers.

Chapter 7: Case Studies

A case study is a method that involves an in-depth and detailed investigation of a subject and its related contextual position. A case study helps in bringing the understanding of an issue or object. Their appropriate analysis revolves around a limited number of events or conditions and how they relate.

A few case studies have been selected based on primary survey at various locations. While successful case studies help us to develop sets of best practices, unsuccessful ones prevent us to circumvent such situations in future.

3 case studies based on primary survey have been included

    A. A PMFBY Success Story - Tiruvallur District, Tamil Nadu

    B. PMFBY Implementation – Few Learnings from Assam

    C. Impactful Awareness Campaign - Tamil Nadu Experience

1. A PMFBY Success Story - Tiruvallur District, Tamil Nadu

The District has a total cultivable area of 1,51,590 ha with a net area sown of 99,325 ha. Tanks and tube wells are the major sources of irrigation. Groundnut, green gram, black gram, sugarcane, fruits, and vegetables are the major crops grown in the District.

PMFBY has been implemented in the District from 2016 onwards, with the active participation of District Collector and agriculture department officials and all the other stakeholders of the Scheme. Impact observed and lessons learned so far are described in the following paragraphs.

Overall Impact

More than Rs. 138.00 crores were disbursed as claim to 88,157 farmers in this District during the past three years by ICICI Lombard General Insurance Company Limited and Cholamandalam MS General Co. Ltd as detailed below:

Table 7.1 PMFBY Statistics for Tiruvallur District, Tamil Nadu

Sr No	Year	Enrolment Details		Claim Disbursed Details		Beneficiary Farmers as % of total insured farmers
		Area Insured (ha)	No. of farmers	Amount (Crores)	No. of farmers	
1	2016-17	30,074.4	31,493	65.2	31,625	100
2	2017-18	39,306.0	37,259	37.7	21,659	58
3	2018-19	33,761.1	39,431	35.4	34,873	88
	Total	**1,03,141.5**	**1,08,183**	**138.3**	**88,157**	**85**

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Benefits to farmers

- Financial support from PMFBY resulted in an increase in cropping intensity in many of the holdings to 200%. Farmers are fully occupied for two crop seasons now. Consequently, the Net Area Sown in many of the villages in the District has gone up significantly by 20 - 30% in the recent years.

- Returns from agriculture has also gone up significantly to an extent of Rs.30000 to Rs. 50000 per hectare per annum in many of the agricultural holdings.

- Farmers are now involved in the adoption of good agriculture practices by investing money in the application of fertilizers in time, which help them in improving agricultural productivity.

- Women farmers have taken up vegetable cultivation on a large scale. The returns obtained from vegetable cultivation helps them in spending money to meet the day-to-day household expenses.

Role of State Government in PMFBY implementation

- The State Government is taking keen interest in ensuring the successful implementation of PMFBY. The State Level Coordination Committee on Crop Insurance (SLCCCI) is quite active in holding discussions with various stakeholders for inclusion of various crops, risks, and areas under the scheme.

- Agricultural Production Commissioner & Principal Secretary, Government of Tamil Nadu personally review the progress made in the implementation of PMFBY in the State through weekly video conferences with all the stakeholders. The APC office appreciated the higher benefits accrued to the farmers despite the concern of higher budget burden on the State Government. The State Government has reduced the unit of insurance from firka to village which has led to better assessment of loss compensation.

- As a part of Human Resources Development program of the Government, the staff of Agriculture department attended various training programs on PMFBY in State Agricultural Management and Extension Training Institute (SAMETI).

- Indian Council for Research on International Economic Relations (ICRIER) praised Tamil Nadu Government for its effective implementation of PMFBY during the

worst drought year 2016-17[6]. Most of the farmers in Tamil Nadu received claims for their crop damage caused by drought in that season. It was further mentioned that "*Tamil Nadu stands as an outstanding example that should be emulated by other States to provide yield data and premium subsidy on time to the ICs*".

- A Special Cell for PMFBY has been formed at the office of the Joint Director of Agriculture to ensure effective implementation of the Scheme. An Officer has been posted for the PMFBY Cell exclusively to coordinate with all the stakeholders.

Awareness Drive–

Some of the specific initiatives are indicated below -

- Awareness Programs were conducted in all villages of this District through block level officials.

- Conducted program in PACS, CSCs and Banks to create awareness among farmers.

- Leaflets and Pamphlets were issued to all farmers during the campaigns and through block officials and through AAOs of concerned villages.

- Local newspaper advertisements are given for creating awareness about the scheme among the farmers. FM radio was used for advertisement.

- Separate Van (Ratham) campaign was organized in every village with scheme banners, audio, and video visuals for advertisement. Publicity was done in villages through SHG's, FPG's and FIG's.

- Publicity through banks, through Insurance Companies by auto campaign, television scrolling in local channels and distribution of leaflets to the farmers.

- Public meetings were organized on PMFBY and series of Kisan Mela were organized with PMFBY as the Focal Theme

CCE Accuracy and Process Streamlining-

- The Department is having the checks and balances in ensuring accuracy by adopting measures like geo tagging of the plot, accurate measurement of plot to be harvested according to crops, weighing of the harvested produce at field level using calibrated digital weighing balance etc. All data regarding plot selection, CCE

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[6] Crop Insurance in India: Key Issues and Way Forward, Working Paper no 352, INDIAN COUNCIL FOR RESEARCH ON INTERNATIONAL ECONOMIC RELATIONS, February 2018.

yield etc. is being updated in portal from the field itself, CCE plot selection is acknowledged by VAO with his signature in each season.

- Preparation and consolidation of CCE results by Statistics Department to is completed within one month of harvesting of crops.

- After Receipt of CCE Yield data, the Insurance Company to process the claim calculation and claim settlement within 30 days.

Concern Areas

Implementation of the Scheme during the last three years have resulted in huge losses to all the insurance companies bided for the six clusters in the State. Consequently, some of these insurance companies have withdrawn from the Scheme. Many of the re-insurance companies are hesitant to offer re-insurance cover.

2. PMFBY Implementation – Few Learnings from Assam

While carrying out the field study with various stakeholders of PMFBY, few aspects attracted attention which is highlighted below.

Waiving of farmers' premium by Government of Assam

The Government of Assam introduced premium waiver during 2019 for farmers owning land one hectares or below for increased participation of farmers in crop security measures under PMFBY. The crop loss of farmers during Kharif particularly paddy by and large happens to be a regular phenomenon in Assam due to the onslaught of natural calamities like floods. The habit of adopting crop security practice like crop insurance on the other hand, is a rare phenomenon among the farmers. This measure is encouraging farmers' interest towards adoption of crop security practice thus is a need felt by the State. The State Government, therefore, introduced this scheme to create interest and participation of farmers in crop insurance. The small and marginal farmers to pay a nominal amount of just Rs.1.00 having land holding of less than 1 ha.

The sample farmers and members of FGDs responded their high appreciation to such act (Premium Waiver Scheme for Farmer, 2019) of the Government. it was observed during the interaction with sample farmers that majority of them did crop insurance for the first time. Farmers have therefore in general shown appreciation towards the scheme.

Progressive Farmer for Awareness Generation, Mobilization and Hand Holding

The Agriculture Department with its district and block level network took up the initiative of using Progressive Farmers to- i) make farmers of their localities aware about PMFBY and ii) extend support to willing farmers in filling up of the crop insurance forms and iii) submit the filled in application to BTM or DPD, ATMA in the State.

Shri. Khirod Sarma of Bosuchuba village, Lokrai GP is a certified progressive farmer (PF) of Darang district (by District Agricultural Office and District Administration, Darang). Mr. Sarma and four other progressive farmers were trained by Block Technology Manager (BTM) under ATMA on PMFBY. In the training, they were given orientation about the PMFBY; its importance, objectives, need for crop security at the event crop failure, insurance premium, how to fill up the form related to crop insurance, the documents required for the purpose and the role expected to be played by them.

Shri. Sarma, informed that he did took up the task of popularizing the PMFBY among the fellow farmers in the neighbouring villages through personal contact, helped them in filling the Crop Insurance Forms and motivated around 100 farmers to enroll under crop insurance. No fee was charged by these progressive farmers for this task, it was all voluntary help.

Farmers Enrolment Process and Delay of Enrolment Confirmation

Shri. Khirod Sarma of Bosachuba village, Lokrai Gram Panchayat is a Progressive Farmer who enrolled under crop insurance by paying the premium amount of INR 1.00 for the crop of Sali paddy (Kharif) for an area measuring 0.26 hectare only. On query to the district office after about a month, the DPD informed him that the whole bunch of crop insurance applications (including his) received from the Block Technology Managers (BTM) and Progressive Farmers (PF) of the district have been handed over to the Field Supervisor of the insurance company (Agriculture Insurance Company) for further needful at their end. However, he did not receive any acknowledgement of his enrolment which somewhat disheartened him.

But to his utter surprise, he received an SMS from the insurance company confirming his crop insurance application after a long gap of more than nine months on 10th May 2020. The SMS reads that "application under the PMFBY for Paddy -Summer crop has been filled in 02 season of year 2019. Sum insured for your 0.26000-hectare area is 15626 for which, you have paid a premium of 1 INR to the AIC and subsidy given by the Government is 389.65 INR". The other details of the like farmer ID, Application

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ID are also made available in the SMS. Similar was the experience of Shri Mahendra Sarma, a farmer from same Bosachuba village, Lokrai Gram Panchayat of Darang District, Assam.

Both farmers felt disheartened at the abnormal delay of SMS from insurance company. The farmer ID number as well as application ID number which were required for lodging crop loss intimation was not available in time, which deprived them from lodging crop loss intimation in the event of damage. They expected that all the information related to farmer enrolment should be available to all farmers on real time basis.

Acknowledgment receipt are being sent to loanee farmers by ICs on premium received from Kharif 2018 onwards. This has been facilitated through a collaborative effort of GoI and Post Office.

Further, it is also important to State that farmers have not been paid any yield-based claim as State government has not paid their share of premium subsidy yet from kharif 2019 onwards. The delay on part of State government has started negating the positive effect of State bearing the farmer share of premium.

3. Impactful Awareness Campaign - Tamil Nadu Experience

The Tamil Nadu State launched a massive campaign for the enhancement of awareness about PMFBY, primarily among the non-loanee farmers. Consequently, it could be observed that, in most of the Districts in Tamil Nadu, number of non-loanee farmers is higher than loanee farmers.

The foundation for these awareness campaigns in all the Districts of Tamil Nadu is laid with a strong HRD support to the officers of the State Department of Agriculture. All the Joint Directors of Agriculture, taking charge as Head of the Department in each District are to undergo training on PMFBY at State Training Centre at Kudimianmalai. The Training program includes imparting knowledge on Operational Guidelines on PMFBY with case studies of success stories on successful implementation. Similarly, Officers taking charge of PMFBY Cells in different Districts are also undergoing training at Chennai.

Details of the steps taken by the Department in creating awareness amongst the farmers and increasing enrolment of non- loanee farmers in Tamil Nadu State are furnished below:

Robust Extension Network

- Establishment of exclusive PMFBY Cell at State level - functioning from 2016-17.

- PMFBY cell established in all districts during 2018-2019.

- Ensured dedicated staff positioned in the PACs / Nationalized Banks/ CSCs in all the districts to facilitate the enrolment of farmers with the necessary documents.

- Exclusive contact number at State level to redress farmers' grievances.

- Sensitization program involving all the stakeholders organized at State/ District / Block levels.

Facilitation Centres Opened at District & Block Level.

- Manned by experienced extension officers

- One Stop Information Centre for the farmers

- Act as Help Desk for the farmers enrolment.

Publicity Campaigns

Large number of Campaigns are organized at Village, Firka and Block level; Multidisciplinary Participation; Mini Exhibition; Press Briefing / Press Release Production and Release of Short films were undertaken for ensuring wide publicity.

Other efforts

- Input dealers are sensitized on the benefits of PMFBY to encourage enrolment.

- All major crops are notified – if a crop is available in minimum of 20 ha area, it is notified. Enrolment of Non-loanee farmers have been taken up on a mission mode.

- Specific targets are fixed for each district for enrolment of non-loanee farmers.

- The field level functionaries and the CSC-VLE act as master trainers and sensitized the progressive farmers regarding the availability of the centres, location of the centres and documents required for enrolment.

- Department officials conduct publicity and awareness campaigns to showcase the role of CSC.

- District heads of Common Service Centres participate in the Farmers Grievance Day and other public forums to educate the farmers about the role of Common Service Centres.

- Exclusive bilingual Mobile app viz., "UZHAVAN APP" launched on 05.04.2018 for the benefit of farmers so that they can have a tab on the premium amount to be paid, when and where to pay, insurance details and status of registration.

- District Collectors, Zonal Officers of the Department and District Heads of the Department frequently visit the PACs / Nationalized banks / CSCs to ensure the smooth functioning in enrolment of farmers.

Capacity Building Programs

Sensitization programmes are conducted at State / District / Block level for all the stakeholders before the commencement of the season regarding enrolment and conduct of CCEs. Training programme are conducted to SLBC representatives, State Heads of Nationalized Banks, DCCBs, CSCs, District Co-coordinators of ICs and CSCs, District Joint Directors of Agriculture, Lead Bank Managers, District Bank Branch heads, Block Assistant Directors of Agriculture, CSC- VLEs, Field functionaries of Agriculture Department and the outsourced CCE staff. Exclusive training programmes are conducted on the notification of crops / IUs during every season. Appropriate skill-mix training is provided for different levels of extension personnel in conduct of CCEs.