AERC REPORT 171

Performance of Pradhan Mantri Fasal Bima Yojana (PMFBY) in Gujarat: Uptake, Adoption and Willingness to Pay

M. Swain, S. S. Kalamkar and K. Kapadia

All India Study Coordinated by
Centre for Management in Agriculture,
Indian Institute of Management, Ahmedabad (Gujarat)

Agro-Economic Research Centre
For the states of Gujarat and Rajasthan
(Ministry of Agriculture and Farmers Welfare, Govt. of India)
Sardar Patel University,
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Foreword

India is an agrarian economy and agriculture is primarily a gamble of monsoon. As a result, farmers are exposed to a variety of climatic and economic risks. Millions tonnes of agricultural produce is damaged by these risk factors each year across the country. On account of failure of crops, indebtedness in field, illness, frustration, family dispute, etc. are also increasing among the farmers. In fact failure of crops and indebtedness are major cause of farmers' suicide across the country. Since, agriculture is highly susceptible to natural calamities such as floods, droughts, heavy rains, hail-storm, pests/insects, diseases etc., it is necessary to protect the farmers from the adversities which occur frequently across the country. Agricultural insurance is considered as an important mechanism to address the risk of output and income resulting from various natural and manmade events. A number of crop insurance schemes like Pilot Crop Insurance Scheme (PCIS), Comprehensive Crop Insurance Scheme (CCIS), Experimental Crop Insurance Scheme (ECIS), Pilot Scheme on Seed Crop Insurance (PSSCI), Farm Income Insurance Scheme (FIIS), Sookha Suraksha Kavach (SSK), National Agricultural Insurance Scheme (NAIS), Weather Based Crop Insurance Scheme (WBCIS), etc. have been implemented in the country over a period of time. Looking at changing needs of the farmers, Pradhan Mantri Fasal Bima Yojana (PMFBY) is launched and implemented since Kharif 2016, replacing NAIS and modified NAIS. Almost all crops of Kharif and Rabi seasons are notified under PMFBY. The rate of premium is also very nominal which could be paid by even small and marginal farmers. To assess the performance of PMFBY, the Centre for Management in Agriculture (CMA), Indian Institute of Management, (IIM) Ahmedabad had submitted a study proposal on Performance, Evaluation of Pradhan Mantri Fasal Bima Yojana (PMFBY) to the Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, Govt. of India. It had been accepted in Directors Meeting which was held on 25th August, 2017 at Agro-Economic Research Unit (AERU), Institute of Economic Growth (IEG), Delhi. On the advice of the Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, Govt. of India, the cited study has been conducted in Gujarat in 2016-17 by this Centre.

This study has been conducted under the coordination and guidance of Prof. Ranjan Kumar Ghosh, Assistant Professor, Centre for Management in Agriculture (CMA), Indian Institute of Management (IIM), Ahmedabad. Being

the coordinator, the team worked hard and provided research design of the study and necessary guidance for the study.

I am thankful to authors and the research team for putting in a lot of efforts to complete this excellent piece of work. I also thank the Ministry of Agriculture and Farmers Welfare, Government of India for the unstinted cooperation and support. I hope this report will be useful for those who are interested in policies and implementation issues related to crop insurance in the State.

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We have benefited immensely from various scholars and officials from different government departments while carrying out this study. At the outset, we would like to thank **Dr. Shirish Kulkarni**, Vice Chancellor of our University and Chairman, AERC Governing Body as well as **Dr. Mahesh Pathak**, Honorary Advisor of our Centre for their constant encouragement and support for undertaking such research activity at the Centre. We thank **Shri P.C. Bodh**, Advisor and **Mr. Rakesh Kumar**, Assistant Director, AER Division, Ministry of Agriculture and Farmers Welfare, Government of India for their support and guidance.

The study would not have reached to this stage without the active co-operation of the sample households and respondents, who provided all the required data for the study without any hesitation and expectation. We thank each one of them for their invaluable support.

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List of Abbreviations

AERU	-	Agro-Economic Research Unit
AIC	-	Agricultural Insurance Company Ltd
APR	-	Actuarial Premium Rate
CAG	-	Comptroller and Auditor General of India
CCE	-	Crop Cutting Experiments
CCIS	-	Comprehensive Crop Insurance Scheme
DBT	-	Direct Benefit Transfer
DCEs	-	Discrete Choice Experiments
DLTC	-	District Level Technical Committee
ECIS	-	Experimental Crop Insurance Scheme
FGDs	-	Focus Group Discussions
FIIS	-	Farm Income Insurance Scheme
GCA	-	Gross Cropped Area
GMNL	-	Generalized Multi-Nominal Logit
GOG	-	Government of Gujarat
GOI	-	Government of India
HDFC ERGO	-	Housing Development Finance Corporation & ERGO
IA	-	Implementing Agency
LPC	-	Land Possession Certificate
MF	-	Marginal Farmers
MNAIS	-	Modified National Agricultural Insurance Scheme
MOA & FW	-	Ministry of Agriculture and Farmers Welfare
NAIS	-	National Agricultural Insurance Scheme
OBC	-	Other Backward Caste
OLS	-	Ordinary Least Square
PCIS	-	Pilot Crop Insurance Scheme
PMFBY	-	Pradhan Mantri Fasal Bima Yojana

PNB		Punjab National Bank
PRIs	-	Panchayati Raj Institutions
PSSCI	-	Pilot Scheme on Seed Crop Insurance
R&D		Research & Development
ROR	-	Records of Right
RUA	-	Reference Unit Area
RWS	-	Reference Weather Station
SAO	-	Seasonal Agricultural Operations
SBI		State Bank of India
SC	-	Schedule Caste
SF	-	Small Farmers
SI	-	Sum Insured
SLCCI	-	State Level Coordination Committee on Crop Insurance
ST	-	Schedule Tribe
TY	-	Threshold Yield
UIIC	-	United India Insurance Company Ltd.
WBCIS	-	Weather Based Crop Insurance Scheme
WTP	-	Willingness to Pay

Executive Summary

Backdrop:

India is an agrarian economy and agriculture is primarily a gamble of monsoon. As a result, farmers are exposed to a variety of climatic and economic risks. Millions tonnes of agricultural produce are damaged by these risk factors each year across the country. On account of failure of crops, indebtedness, illness, frustration, family dispute, etc. are also increasing among the farmers. The failure of crops and indebtedness are major cause of farmers' suicide across the country. Since, agriculture is highly susceptible to natural calamities such as floods, droughts, heavy rains, hail-storm, pests/insects, diseases etc., it is necessary to protect the farmers from the adversities which occur frequently across the country. Agricultural insurance is considered as an important mechanism to address the risk of output and income resulting from various natural and manmade events. A number of crop insurance schemes like Pilot Crop Insurance Scheme (PCIS), Comprehensive Crop Insurance Scheme (CCIS), Experimental Crop Insurance Scheme (ECIS), Pilot Scheme on Seed Crop Insurance (PSSCI), Farm Income Insurance Scheme (FIIS), Sookha Suraksha Kavach (SSK), National Agricultural Insurance Scheme (NAIS), Weather Based Crop Insurance Scheme (WBCIS), etc. have been implemented in the country over a period of time. Looking at changing needs of the farmers, Pradhan Mantri Fasal Bima Yojana (PMFBY) is launched and implemented since Kharif 2016, replacing NAIS and modified NAIS.

The new scheme compulsorily covers the farmers that avail the seasonal crops loan (loanee farmers), whereas it was optional for non-loanee farmers. All major Kharif and Rabi crops are notified under PMFBY. The premium rate of Kharif crops is fixed @ 2% of sum insured to be paid by farmers, while it is @ 1.50% of the value of sum insured for Rabi crops. In case of commercial and horticultural crops, 5% of the sum is insured to be paid by the farmers. From sowing to threshing of crops, everything is covered under PMFBY. It is a new scheme which had been uniformly started throughout the country. A number

of agencies are involved in the process of PMFBY. In Gujarat, for season kharif-2016, two insurance companies namely Agricultural Insurance Company (AIC) and HDFC Ergo were involved for implementation of the scheme and for season Rabi 2016-17, United India Insurance Company (UIIC) was involved for implementation of the scheme.

Objectives and Methodology:

The present study was undertaken (i) to assess the performance and functioning of the PMFBY scheme in Gujarat; (ii) to examine the role of different stakeholders such as insurance companies (known as the implementing agencies), the financial institutions (nodal and lending banks), insurance agents and farmers/cultivators for efficient functioning of the scheme in the state; (iii) to assess the extent of adoption of PMFBY by the farmers, the benefits realised and the constraints faced by the farmers; and (iv) to assess the willingness to pay by the farmers and necessary modifications required in the scheme so as to make it more effective for the farmers.

The study was conducted in two phases. In the 1st phase, the process of implementation at the state level was comprehensively mapped. In the exercise, nine AERCs were involved including AERC, Vallabh Vidyanagar. The study was involved mixed methods of data collection involving both secondary and primary sources of data.

The phase I study was intended to focus mainly on performance of PMFBY and implementation issues in the state. As per the stated distribution, a total of 150 households were covered under the detailed survey. Out of 150 households, 110 households were loanee farmers (beneficiary farmers), 10 households were non-loanee farmers and another 30 households were control farmers.

In the phase II, two districts (Anand and Vadodara) were selected for the survey. From each of the district, 72 households were selected from two blocks and 6 villages. From each block, three villages were selected. In total, 144

households were selected from 12 villages covering 4 blocks of two selected districts.

The data were analysed with the help of simple statistical tools. However, during the second Phase, Generalised Multi-Nomial Logit (GMNL) model was used for making a parametric estimation of the likelihood of a farmer opting for a crop insurance scheme such as PMFBY. The dependent variable was a *categorical* - representing farmers with and without crop insurance. Explanatory variables included some utility parameters such as coverage period of crop insurance, loss determination method, certainty of payment and sum insured. The Ordinary Least Square (OLS) Method was also used to assess the strength of factors affecting the willingness to pay.

Progress in Implementation of PMFBY in Gujarat

PMFBY is a flagship scheme of crop insurance implemented since Kharif 2016 with an ambition of covering 50 percent of the farmers in India within 5 years. The majority of the farmers insured under PMFBY belong to four states namely Maharashtra, Rajasthan, Madhya Pradesh and West Bengal constituting about more than 72 percent of the total farmers covered in India. Uttar Pradesh, Bihar, Karnataka, Gujarat contributes 10 to 15 percent each in the total number of farmers insured under PMFBY in India, while the coverage is very low in all the other states. As far as area insured under PMFBY is concerned, Rajasthan occupies the major share followed by Madhya Pradesh, Maharashtra and Uttar Pradesh. Chattishgarh, Odisha, Gujarat, West Bengal constitutes about 6-8 percent share each in the total area insured under PMFBY in India.

In Gujarat, around 4 lakh of farmers were insured with 6.8 lakh hectares area under PMFBY in the year 2016-17. Among the implementing agencies, Agricultural Insurance Company Limited (AIC) cluster has covered major share of the farmers. There was a common complaint about the earlier schemes that they provided cover to crop loans rather than to crop losses, as the

participation rate of non-loanee farmers was very low. Hence, more emphasis was given on the coverage of non-loanee farmers under PMFBY. In Gujarat, among the total farmers covered during Kharif 2016 season, around 0.02 lakh farmers were non-loanee farmers.

Around 10 percent share in premium was paid by farmers for Kharif season whereas during Rabi season, around 45 percent share in premium was borne by the farmers during 2016-17. About 90 percent of total premium for Kharif season and 55 percent in Rabi season were paid by the State and Central Government jointly.

During Kharif 2016 season, the applications for claims in the State were mostly made by the farmers from the districts of Junagadh, Rajkot, Surendranagar and Jamnagar. The farmers of Rajkot, Junagadh, Amreli, Jamnagar and Devbhumi Dwarka received the maximum claims. A total of 44335 farmers got benefit with claim settlements in the Kharif season. For Rabi season, the applications for claims were mostly made by the farmers of Junagadh, Jamnagar and Rajkot district. Of these, highest benefits of claim settlement was realized by farmers from Junagadh district, i.e. total 39564 farmers got benefited for claim in Rabi season of 2016-17. Thus a total of 482899 farmers were benefited with receipt of claims under the PMFBY in 2016-17.

Though the coverage under new scheme has increased, several factors have contributed to the scheme slowing down. Some of them are insufficient time for enrolment, disputes between the states and insurance companies on yield data and compensation resulting in delay in settlement and more focus on impractical targets/goals without much stress on quality of implementation. The central government has been citing reason of poor implementation by the states for the lackadaisical response to the scheme. State officials say that the bid of private insurance companies for more profit and delay in settlement of claims are crucial factors for the decline.

Insurance Behaviour of Sample Farmers

Since the premium rates and insurance details varies from crop to crop, two major Kharif crops, viz. cotton and groundnut and one major Rabi crop, i.e. wheat were considered for understanding the insurance behavior of sample farmers. About 54.2 percent and 27.7 percent of loanee insured farmers had taken crop loan with crop insurance from Cooperative bank or society and Bank of Baroda respectively. Remaining farmers had taken crop loan with insurance from Central Bank, Cooperation Bank, Dena Bank, PNB, SBI and Union Bank of India; whereas all non-loanee insured farmers had taken crop insurance from Agricultural Insurance Company Ltd (AIC).

Among different kinds of events of losses in cotton crop, the highest of 53.0 percent of event of losses were due to drought, dry spells, flood, pest attacks and diseases etc.; while 20.5 percent of event of losses were because of prevented sowing/planting due to deficit rainfall or adverse weather and remaining events of losses were due to post harvest losses, localised calamities (cyclone, landslide).

As far as compensation received from insurance companies is concerned, on an average of Rs. 13523.4 and Rs. 15480.0 were paid to the cotton grower farmers against the crop loss for loanee insured farmers and non-loanee insured farmers respectively. Thus, the compensation for crop losses was more to the non-loanee farmers compared to the loanee farmers.

Average premium paid by loanee and non-loanee groundnut farmers was Rs. 1323.3 and Rs. 1470.7 per household respectively. In case of loanee farmers, about 90.0 percent events of losses were because of drought, dry spells, flood, pest attacks and diseases etc and remaining events of losses were due to prevented sowing/planting due to deficit rainfall or adverse weather. In case of entire non-loanee insured farmers, the crop yield loss was due to drought, dry spells, flood, pest attacks and diseases etc.

As far as compensation received from insurance companies is concerned, an average of Rs. 34039.7 and Rs. 23220.0 were paid to the groundnut grower farmers against the crop loss for loanee insured farmers and non-loanee insured farmers respectively. Thus, the compensation for crop losses was much higher in case of loanee farmers compared to non-loanee farmers.

As regards to Rabi crops, in case of wheat, average amount of premium paid by the loanee and non loanee farmers was estimated to be Rs. 4800.0 and Rs. 3525.0 respectively. It is worth-mentioning that, during Rabi season (wheat crop) both categories of sample farmers had no claim against any event of crop losses, thus did not receive any compensation.

Assessment of the overall experience of sample farmers with PMFBY reveals that about 36.4 percent loanee insured farmers reported that they were never insured under earlier crop insurance scheme, 45.5 percent of them mentioned that PMFBY is better than earlier schemes whereas 70 percent non-loanee insured farmers opinioned that it is better than earlier schemes.

About 70 percent loanee insured farmers informed that they have informed the authorities about the event of losses. Among them, 37.3 percent and 24.5 percent loanee insured farmers had informed about the event of losses directly to local government officials and others (Gram Sevak and Agriculture Officer), respectively. In case of non-loanee farmers, all of them had informed about the event of losses directly to local government officials.

Of the total loanee insured farmers, 27.3 percent said that their farm was visited during Crop Cutting Experiment (CCE) while 40.9 percent said that their farm was not visited for CCE. Among non-loanee insured farmers, 20 percent said that their farm was visited during CCE while 80 percent said that their farm was not visited for CCE. Of the total loanee insured farmers, 26.4 percent said that they were aware about yield assessment of CCE while 41.8 percent were not aware about yield assessment of CCE.

Among the loanee insured farmers, about 31.8 percent farmers suggested to provide timely compensation, 22.73 percent suggested for more accurate assessment due to crop losses, 18.1 percent expressed the need of more awareness about the crop insurance scheme. About 8.1 percent suggested to reduce official complexity and emphasized on less time requirement and less paper work for enrolment and claim disbursement.

Regarding extent of awareness about PMFBY and the non-uptake of the same by the control farmers, it is revealed that, about 73.3 percent of the control farmers had heard about PMFBY and 26.6 percent control farmers of them had no idea about PMFBY. As regards the sources of awareness, about 43.3 percent, 16.6 percent, 10 percent and 3.3 percent of control farmers got the information about PMFBY from cooperative society, media, farmer's friend and gram sevak respectively. About 33.3 percent of control farmers expressed that they are not interested in this scheme, while 20 percent of them believed that the claim settlement process is tedious. About 13.3 percent of them believed that they may not get compensation due to crop losses, whereas only 6.7 percent farmers expressed that no sufficient time was there for getting enrolled for the crop insurance, even if they were interested to get enrolled for the same.

Willingness to Pay for Crop Insurance by Sample Farmers

The extent of willingness to pay for crop insurance products and services was assessed by the use of discrete choice experiments (DCEs), which DCE is an attribute-based survey method for measuring benefits (utility). Since it was entirely different kind of experiment where the name of PMFBY scheme was not disclosed, entirely new set of sample households were surveyed from the sample districts of Gujarat. However, all farmers were asked to share their experiences of enrolling for PMFBY after the end of the experiments. In total, 144 farmers were chosen for the experiment from 12 villages of 4 talukas of 2 districts (Anand and Vadodara) of the state.

The results from estimating the utility function (a generalized multinomial logit function) reveal that all the estimated coefficients of variables such as sum insured, certainty of payment, insurance coverage, loss determination are statistically significant at 1 percent level of significance. Thus, all these factors significantly influence the willingness to pay for the crop insurance. It is found that a farmer would be willing to pay Rs. 889 on an average for increase in the certainty of payment made to him as against the base category.

The analysis on the willingness to pay for an attribute on several household characteristics like age, farming experience, caste, gender, etc. with Ordinary least square regression revealed some interesting results. The study finds that, for 'Coverage: Pre-Planting', if the area cultivated in Kharif 2017 rises by 1 acre then the willingness to pay rises by Rs. 621 on an average. Likewise, if age of the farmer rises by 1 year, then he would be willing to pay Rs. 617 on average extra for 'Coverage period: Sowing to harvesting'.

Policy Implications

The study reveals some interesting results on uptake, adoption and performance of PMFBY in Gujarat. It was observed that this scheme was better than NAIS because lesser premium was paid by farmers and claim settlement process was more scientific which was decided through CCEs data. For main crops, CCEs were conducted at Gram Panchayat level and for other secondary crops, CCEs were conducted at block level. However, there are a number of areas where the present scheme can be further improved. There is a need to address issues such as delay in claim settlements; generating sufficient awareness in farmers about formulation and implementation of risk reduction strategies, developing suitable crop insurance product and effective implementation strategies and infrastructure, investing in R&D on insurance product design in collaboration with private insurance service providers, substituting relief payments with crop insurance system, covering the price risk along with weather risk and substituting relief payments with crop insurance

system.

Based on findings of the study and interaction with various stakeholders, following suggestions are made for improving the adoption and performance of the PMFBY in Gujarat.

- At present, the enrolment of loanee farmers under PMFBY is compulsory and that of non-loanee farmers is optional. Several farmers and farmer organizations, leaders etc. have suggested to make the scheme voluntary for the loanee farmers also.
- At present, the scheme covers major food crops (cereals, millets and pulses), oilseeds and annual commercial/ horticultural crops. It is suggested that the perennial horticulture crops should also be included under the scheme.
- Pests and diseases come under preventable risks and insurance companies do not consider for claims where losses occur due to pests and disease. Thus, it is necessary to clearly define the non-preventable risks or disease and pest should be considered as non-preventable risks. The unseasonal rain should be defined clearly in Operational Guidelines of PMFBY.
- Localized calamities are required to be clearly defined because insurance companies categorically deny the claims under local risks. Some of the risk factor like crop losses through wild animals should be incorporated in the guidelines. The operational guidelines should be in local languages for better understanding of the farmers.
- Majority of farmers do not have proper knowledge about crop insurance. Even the farmers do not know that they have been insured under the scheme. The farmers are unaware that the amount of crop insurance premium is automatically deducted from their account. Thus necessary awareness programmes should be organized periodically.
- In case of loanee farmers, the premium amount deducted is stated in their Saving Bank Passbook. In some other cases, the same has not been

stated in Bank Passbook (i.e., Bank of Baroda, Dena Bank). Thus, some farmers suggested that the premium deduction receipt should be provided to them for their record. There should be a document provided to the farmers like premium deducted receipt, insurance document, crop loss coverage criterion, guidelines, contact list of company etc., which will help them at the time of loss assessment and claim settlement.

- Because of less number of banks available in the nearly areas, farmers fail to get insured their crops. Thus, it is suggested to increase the number of bank branches. There should be at least one nationalized bank branch for every five villages.
- Some farmers complained that they were not given compensation even if they had incurred heavy crop losses due to no loss assessment or delayed loss assessment. In that case, farmers demanded that the amount deducted as a premium should at least be given back to them since the claim was not settled by the respective company. In the case delay in claim settlement, the additional interest amount should also be paid to the farmers.
- The control farmers expressed that they couldn't avail crop insurance since the land settlement was in process. Some of them came for enrolment after the due date. They suggested that timely information should be passed on to them. They further suggested that the paper work and official procedure should be reduced or simplified for successful implementation the crop insurance scheme.
- It is also clear from the discussion that PMFBY would not be sufficient to cover all the pure risks arising from agricultural activities. To protect farmers against various kinds of climatic risks, a comprehensive risk mitigation strategy needs to be planned rather than just focusing on crop insurance.

Chapter I

Introduction

1.1 Introduction

In India, more than half of the farming is practiced as rainfed agriculture and it's at the mercy of weather. The technological advance and institutional support have made little impact on risk factor in farm production and done little with the risk bearing capacity of the farmers. Agriculture is an important sector in India and it not only contributes to the national income but also provides livelihood to two third of its population and workforce in the country. The fortune of the majority of the population depends on the agricultural output. However, agricultural production and farm incomes in India are frequently affected by natural disasters such as droughts, floods, cyclones, storms, landslides and earthquakes (Raju and Chand, 2008). Susceptibility of agriculture to these disaster risks is compounded by the outbreak of epidemics and man-made disasters such as fire, sale of spurious seeds, fertilizers and pesticides, price flections etc. All these events severely affect farmers through loss in production and farm income and these are out of control of the farmers.

With growing commercialization of agriculture, the magnitude of loss due to unfavourable eventualities is increasing. In dry land farming, drought[1] is severely affecting farmers' income through loss in production. Agricultural insurance is considered as an important mechanism to address the risk of output and income resulting from various natural and manmade events. Agricultural insurance means protecting the farmers against financial losses

[1] Drought is a situation of lower than normal rainfall and it is as much a management issue as a technical one. Drought management and mitigation is important for the future sustainability of agriculture production, productivity and livelihoods.

due to uncertainties that may lead to agricultural losses from all unforeseen perils beyond their control (AIC, 2015).

Dominance of small and medium sized holdings coupled with inherent lacunae like apathy of farming community towards newer technologies, unscientific post harvest management, un-organized and chaotic marketing system makes agriculture a perilous endeavour. Apart from these, it is also affected by numerous socio-economic and market risks. Farmers are affected by various social risks such as civil disturbances and malicious damage. In addition, farmers continue to be haunted by the economic risks in the form of price fluctuations in input and output markets. These risks are eating into the profitability of agriculture and also causing several welfare implications through forward and backward linkages of agriculture sector with other sectors of the economy. Risks in production of crops also affect the credit worthiness of the farmers (Singh, 2010). Unfortunately, agricultural insurance in the country has not made much headway even though the need to protect farmers from agriculture variability has been a continuing concern of agriculture policy.

Crop insurance is one of the methods by which farmers can stabilize farm income and investment and guard against disastrous effect of losses due to natural hazards or low market prices. It not only stabilizes the farm income but also helps the farmers to initiate production activity after a bad agricultural year. It cushions the shock of crop losses by providing farmers with a minimum amount of protection. It spreads the crop losses over space and time and encourages farmers make more investments in agriculture. However, one need to keep in mind that crop insurance should be part of overall risk management strategy. Insurance comes towards the end of risk management process. Insurance is redistribution of cost of losses of few among many, and cannot prevent economic loss.

1.2 History of Crop Insurance in India

Crop insurance as a concept for risk management in agriculture has emerged in India since the turn of the twentieth century. From concept to implementation, it has evolved sporadically but continuously through the century and is still evolving in terms of scope, methodologies and practices. India is an agrarian country, where the majority of the population depends on agriculture for their livelihood. Yet, crop production in India is dependent largely on the weather and is severely impacted by its vagaries as also by attack of pests and diseases. These unpredictable and uncontrollable extraneous perils render Indian agricultural and extremely risky enterprise. It is here that crop insurance plays a pivotal role in anchoring a stable growth of the sector.

The question of introducing an agriculture insurance scheme was examined soon after the Independence in 1947 and different crop insurance schemes like Pilot Crop Insurance Scheme (PCIS), Comprehensive Crop Insurance Scheme (CCIS), Experimental Crop Insurance Scheme (ECIS), Pilot Scheme on Seed Crop Insurance (PSSCI), Farm Income Insurance Scheme (FIIS), Sookha Suraksha Kavach, National Agricultural Insurance Scheme (NAIS), Weather Based Crop Insurance Scheme (WBCIS), etc. were implemented in the country over a period of time. In India, the first crop insurance program was introduced in 1972-73 by the 'General Insurance' Department of Life Insurance Corporation of India on H-4 cotton in Gujarat. Later, the newly set up General Insurance Corporation of India took over the experimental scheme and subsequently included Groundnut, Wheat and Potato and implemented in the states of Gujarat, Maharashtra, Tamil Nadu, Andhra Pradesh, Karnataka and West Bengal.

Professor V. M. Dandekar, often referred to as the "Father of Crop Insurance in India", suggested an alternate "Homogeneous Area approach" for crop insurance in the mid-seventies. Based on this Area approach, the General Insurance Corporation of India (GIC) introduced a Pilot Crop Insurance Scheme (PCIS) from 1979. Participation by the State Governments was voluntary. The scheme covered cereals, millets, oilseeds, cotton, potato, gram and barley. Thereafter in the year 1985 when seventh five year plan was announced, a scheme called Comprehensive Crop Insurance Scheme (CCIS) was introduced which covered all the major crop production. In the year 1999, this scheme was replaced by National Agricultural Insurance Scheme (NAIS). In the year 2003, other private players also entered into the market. One of them is Royal Sundaram which runs many pilot schemes to provide benefits to the farmers. The features of various crop insurance schemes implemented in India so far have been summarised in Table 1.1.

Table 1.1: Various Crops Insurance Schemes Implemented in India

Name of schemes	*Features*	*Crops covered*	*Farmers covered, premium paid and claims disbursed*
Crop insurance by GIC (1972-1979)	Individual basis (6 states)	Cotton, Groundnut, Wheat, Potato	Farmers: 3110 Premium: Rs 4.5 lakh Claim: Rs 37.9 lakh
Pilot Crop Insurance Scheme (PCIS) (1979-1985)	Area basis (13 states) Loanee only Voluntary 50% premium subsidy for SF/MF Optional for States	Cereals, Millets, Oilseeds, Cotton, Potato and Gram	Farmers: 6.27 lakh Premium: Rs 1.97 lakh Claim: Rs 1.57 lakh

Table 1.1 continues.....

Comprehensive Crop Insurance Scheme (CCIS) (1985-1999)	Area basis (17 states) Loanees compulsory 50% premium subsidy for SF/MF Optional for States	Cereals, pulses, oilseeds	Farmers: 7.6 crore Premium: Rs 403.6 cr Claim: Rs 2303.4 cr
Experimental Crop Insurance Scheme (1997-98)	Area basis (5 states, 14 dists) Only for SF/MF 100% premium subsidy	Same as CCIS	Farmers: 4.5 lakh Premium: Rs 2.84 cr Claim: Rs 168 cr
National Agricultural Insurance Scheme (NAIS) (1999-2016)	Area Approach (23 states and Uts)	Food crops, Oilseeds, and Selected Commercial Crops	Farmers: 22.9 cr Premium: 10.59000 cr Claim: 33.33000 cr
Modified National Agricultural Insurance Scheme (MNAIS)(2010 - 2016)	Area Approach (16 states)	Food crops (Cereals, Pulses, Millets), Oilseeds, Annual Commercial crops/Horticulture crops	Farmers: 11.05 lakh Premium: 2603.73 cr Claim: 2291.47 cr
Weather-Based Crop Insurance Scheme (WBCIS)	Area Approach (19 states)	Food crops, Oilseeds, and Annual Commercial Crops/Horticulture crops	Farmers: 3.4 cr Premium: 59550.3 cr Claim: 4078.84 cr
Pradhan Mantri Fasal Bima Yojana (PMFBY)	Area Approach (22 states and Uts) Loanees compulsory	Food crops, Oilseeds, and Annual Commercial Crops/ Horticulture crops	Farmers: 2. 4 cr Premium: 7768 cr Claim: 4701 cr

Source: Singh (2016); http://niapune.org.in,

1.2.1 First Individual Approach Scheme 1972-1978

Different forms of experiments on agricultural insurance on a limited, ad-hoc and scattered scale started from 1972-73 when the General Insurance Corporation (GIC) of India introduced a Crop Insurance Scheme on H-4 cotton. In the same year, general insurance business was nationalized and, General Insurance Corporation of India was set up by an Act of Parliament. The new corporation took over the experimental scheme in respect of H-4 cotton. This scheme was based on "*Individual Approach*" and later included groundnut, wheat and potato. The scheme was implemented in the states of Andhra Pradesh, Gujarat, Karnataka, Maharashtra, Tamil Nadu and West Bengal. It continued up to 1978-79 and covered only 3110 farmers for a premium of Rs.4.54 lakhs against claims of Rs.37.88 lakhs.

1.2.2 Pilot Crop Insurance Scheme (PCIS) 1979-1984

In the background and experience of the aforesaid experimental scheme, a study was commissioned by the General Insurance Corporation of India and entrusted to Prof. V.M. Dandekar to suggest a suitable approach to be followed in the scheme (Dandekar, 1976). The recommendations of the study by Prof. V.M. Dandekar were accepted and a Pilot Crop Insurance Scheme was launched by the GIC in 1979, which was based on "Area Approach" for providing insurance cover against a decline in crop yield below the threshold level. The scheme covered cereals, millets, oilseeds, cotton, potato and chickpea and it was confined to loanee farmers of institutional sources on a voluntary basis. The premium paid was shared between the General Insurance Corporation of India and State Governments in the ratio of 2:1. The maximum sum insured was 100 per cent of the crop loan, which was later increased to 150 per cent. The insurance premium ranged from 5 to 10

per cent of the sum insured. Premium charges payable by small / marginal farmers were subsidized by 50 per cent shared equally between the State and Central governments. Pilot Crop Insurance Scheme–1979 was implemented in 12 states till 1984-85 and covered 6.27 lakh farmers for a premium of Rs.1.97 crore against claims of Rs.1.57 crore in the entire period.

1.2.3 Comprehensive Crop Insurance Scheme (CCIS) 1985-99

This scheme was linked to short term credit and implemented based on the "homogenous area approach". Till Kharif 1999, the scheme was adopted in 15 States and 2 Union Territories. Both PCIS and CCIS were confined only to farmers who borrowed seasonal agricultural loan from financial institutions. The main distinguishing feature of these two schemes was that PCIS was on voluntary basis whereas CCIS was compulsory for loanee farmers in the participating states/UTs.

It covered farmers availing crop loans from financial institutions, for growing food crops and oilseeds, on compulsory basis. The coverage was restricted to 100 per cent of the crop loan subject to a maximum of Rs. 10000/- per farmer. The premium rates were 2 per cent for cereals and millets and 1 per cent for pulses and oilseeds. Farmers' share of premium was collected at the time of disbursement of loan. Half of the premium payable by small and marginal farmers was subsidized equally by the Central and State Governments (Tripathi, 1987). Burden of Premium and Claims was shared by Central and State Governments in a ratio of 2:1. The scheme was a multi agency effort, involving GOI, State Governments, Banking Institutions and GIC.

1.2.4 Experimental Crop Insurance Scheme (ECIS) - 1997

While the CCIS was being implemented, attempt was made to modify the existing CCIS from time to time as demanded by the states. During the Rabi 1997-98 season, a new scheme viz. Experimental Crop Insurance Scheme (ECIS) was introduced in 14 districts of five states. The scheme was similar to ECIS, except that it was meant only for all small /marginal farmers with 100 per cent subsidy on premium. The premium subsidy and claims were shared by the Central and respective State Government in the ratio of 4:1.The scheme was discontinued after one session due to its many administrative and financial difficulties. During its one session, the exercise covered 4,54,555 farmers for a sum assured of Rs. 168.11 crore at a premium of Rs. 2.84 crore against which the claim paid was of Rs. 37.80 crore.

1.2.5 Pilot Scheme on Seed Crop Insurance (PSSCI) - 2000

A Pilot Scheme on Seed Crop Insurance (PSSCI) was introduced in Kharif 2000 season in 11 states to provide financial security and income stability to the seed growers in the event of failure of a seed crop. It was also executed with an objective to provide stability to the infrastructure established by the State owned Seed Corporation and State Farm, and to give a boost to the modern seed industry by bargaining it udder scientific principles.

1.2.6 Farm Income Insurance Scheme (FIIS) - 2003

NAIS protect the farmers only against the yield fluctuation. The price fluctuations are outside the purview of the scheme. Farmer's income is cumulative function of yield and market price. In other words, a bumper harvest tends to bring down the market prices of greens and vice versa.

The objective of the scheme was to protect not only the income of farmer, but also to reduce the government expenditure on procurement at Minimum Support Price (MSP) under Price Support Scheme (PSS). The fluctuation in the price of the commodity has affected the income of the farmers significantly. Insurance of crop production provides a relief to the farmers when the crop is damaged by attack of pests, flood, drought or any other means. To avail the benefits of the crop insurance scheme, the interested farmers have to register themselves with the insurance provider company. The registration of marketing surplus at the sowing of crop is essential for crop insurance. The insurance company offer the appropriate coverage scheme which includes minimum support price guarantee or market price from past. Farmers are required to pay the premium for any type of price insurance. In the initial stages, government shares the burden of premium payment. During harvest, if the notified market price falls below guaranteed price, then the insurance company pays the compensation.

1.2.7 National Agricultural Insurance Scheme (NAIS) 1999

The National Agricultural Insurance Scheme (NAIS) was introduced in the country from the Rabi season of 1999 - 2000. Agricultural Insurance Company of India Ltd (AIC) which was incorporated in December, 2002, and started operating from April, 2003, took over the implementation of NAIS. This scheme was available to both loanees and non-loanees with nominal premium rates (see premium rates presented in Table 1.2). The Scheme covered all food grains, oilseeds and annual horticultural/ commercial crops. Among the annual commercial and horticultural crops, sugarcane, potato, cotton, ginger, onion, turmeric, chillies, coriander, cumin, jute, tapioca, banana and pineapple were covered under the

scheme. The scheme was operating on the basis of both area approach for widespread calamities and individual approach for localized calamities such as hailstorm, landslide, cyclone and floods. Agriculture insurance in India till recently concentrated only on crop sector and confined to compensate yield loss. Recently some other insurance schemes have also come into operation in the country which goes beyond yield loss and also cover the non-crop sector. These include Farm Income Insurance Scheme, Rainfall Insurance Scheme and Livestock Insurance Scheme. Main objectives of the scheme are:

a. To provide insurance coverage and financial support to the farmers in the event of failure of any of the notified crop as a result of natural calamities, pests and diseases.
b. To encourage the farmers to adopt progressive farming practices, high value inputs and higher technology in Agriculture.
c. To help stabilize farm incomes, particularly in disaster years

Table 1.2: Premium rates in NAIS

Season	Crops	Premium Rates
Kharif	Bajra & Oilseeds	3.5% of sum insured or actuarial rate whichever is less
	Other Kharif crops	2.5% of sum insured or actuarial rate whichever is less
Rabi	Wheat	1.5% of sum insured or actuarial rate whichever is less
	Other Rabi crops	2% of sum insured or actuarial rate whichever is less
Kharif + Rabi	Annual commercial/ Horticultural crops	Actuarial rate

Source: Office of the Directorate of Agriculture, Government of Gujarat, Gandhinagar.

1.2.8 Modified National Agricultural Insurance Scheme (MNAIS)

MNAIS was initiated during the 11th Five Year Plan from the season *Rabi* 2010–11 on pilot basis on the recommendation of the Government of India, Joint Group, in 50 districts. The salient features of MNAIS are as under:

(i) Actual premium, with subsidy in premium ranging up to 75 per cent to all farmers.

(ii) Only upfront premium subsidy is shared by the Central and State government on 50:50 basis; all claims liability is on the insurance company.

(iii) Unit area of insurance is reduced to village/village panchayat level for major crops.

(iv) Indemnity for prevented sowing/planting risk and for post-harvest losses due to cyclone (in coastal areas), etc.

(v) On-account payment up to 25 per cent of likely claims as immediate relief to farmers.

(vi) More realistic basis for TY (Threshold Yield) calculation; and minimum indemnity level increased to 70 per cent, from 60 per cent in NAIS. Like NAIS, MNAIS is compulsory for loanee farmers and voluntary for non-loanee farmers.

(vii) Private-sector participation to create a competitive crop insurance environment.

(viii) Setting up a catastrophe-relief fund at the national level, with 50:50 contributions from the Central and State governments, to provide protection to the insurance companies in the event of premium to claim ratio exceeding 1:5 at the national level and failure to procure appropriate reinsurance cover at competitive rates. NAIS was withdrawn from those area(s)/crop(s) where MNAIS was implemented.

1.2.9 Weather Based Crop Insurance Scheme (WBCIS)

The basic approach of 'weather index' insurance is to estimate the percentage deviation in crop output due to adverse deviations in weather conditions. There are crop models and statistical techniques available to work out the correlation between crop output and weather parameters. These techniques attempt to indicate the linkage between the financial losses suffered due to adverse weather variations and also estimate payouts. WBCIS envisages such weather index-based insurance products designed to offer insurance protection against losses to crop resulting from adverse weather conditions. Piloted in the Kharif 2007 season, WBCIS also operates on the concept of area approach. For loss estimation, a Reference Unit Area (RUA) is deemed to be a homogenous area unit of insurance. Each RUA is linked to a Reference Weather Station (RWS); claims are determined on the basis of weather data recorded by the RWS. Adverse weather events during the season entitle the insured to a pay-out, subject to the weather triggers defined in the "Payout Structure" and the terms and conditions of the scheme. The claim settlement is an automatic process, based on the weather readings at the RWS. In a given RUA, the payout given per unit area is the same for all cultivators under the same RWS. Claims are normally settled within 45 days from the end of the insurance period. Insurance companies declare a per-unit Sum Insured at the beginning of each crop season in consultation with experts. This may vary from crop to crop in each RUA. The sum insured for the loanee farmer is calculated by multiplying per unit area value of inputs with crop specific acreage declared by the farmer in the loan application form submitted to the lending bank. For a non-loanee farmer, the acreage figure is expected area sown/planted under the particular crop as declared in the insurance proposal form.

1.2.10 Pradhan Mantri Fasal Bima Yojana (PMFBY)

India is emerging as one of the largest crop insurance industries globally with constant efforts from the government in offering an effective insurance cover to the farmers through improving and trying various crop insurance products since 1972. The three major insurance products available in India till 2016 were NAIS, MNAIS and WBCIS. To help farmers cope with crop losses, the Government of India launched its flagship scheme Pradhan Mantri Fasal Bima Yojana (PMFBY) from the Kharif season of 2016. PMFBY replaced the National Agricultural Insurance Scheme (NAIS) and Modified National Agricultural Insurance Scheme (MNAIS). The Weather-Based Crop Insurance Scheme (WBCIS) remains in place, though its premium rates have been made the same as in PMFBY. State governments have the authority to decide whether they want PMFBY or WBCIS or both in their respective states.

PMFBY is an improvement over NAIS and MNAIS and is designed to reduce the burden of crop insurance on farmers. The scheme came into operation from 1st of April 2016 with a Central government budget allocation of Rs 5,500 crore for the year 2016–17 (see, CSE 2017) . Further, the central government had planned to bring 40 per cent of agricultural area under PMFBY in 2017–18 and, accordingly, a provision of Rs 9,000 crore was made in the budget for the year 2017–18.

The main objective of the Pradhan Mantri Fasal Bima Yojana (PMFBY) is to support sustainable production in agriculture sector by way of (a) providing financial support to farmers suffering crop loss/damage arising out of unforeseen events; (b) stabilizing the income of farmers to ensure their continuance in farming; (c) encouraging farmers to adopt innovative and modern agricultural practices; (d) ensuring flow of credit to the agriculture sector. All these measures were intended to contribute to food security, crop

diversification and enhancing growth and competitiveness of agriculture sector besides protecting farmers from production risks.

1.2.10.1 Coverage of Farmers and Crops:

All farmers including sharecroppers and tenant farmers growing the notified crops in the notified areas are eligible for coverage. However, farmers should have insurable interest for the notified/ insured crops. The non-loanee farmers are required to submit necessary documentary evidence of land records prevailing in the State, i.e., Records of Right (RoR), Land possession Certificate (LPC) etc.) and/ or applicable contract/ agreement details/ other documents notified/ permitted by concerned State Government (in case of sharecroppers/ tenant farmers). There are a compulsory and a voluntary component of the scheme.

(a) *Compulsory Component*: All farmers availing Seasonal Agricultural Operations (SAO) loans from Financial Institutions (i.e. loanee farmers) for the notified crop(s) would be covered compulsorily.
(b) *Voluntary Component*: The Scheme would be optional for the non-loanee farmers.

Special efforts were also made to ensure maximum coverage of SC/ ST/ Women farmers under the scheme. Budget allocation and utilization under these segments were made in proportion of land holding of SC/ ST/ General along with Women in the respective state/cluster. The Panchayati Raj Institutions (PRIs) may be involved at various stages of implementation of crop insurance schemes particularly in the identification of the crops and beneficiaries, extension and awareness creation amongst farmers, obtaining feed-back of the farmers while assessing the claim for prevented sowing/

planting risk, localized perils, post-harvest losses and advance payment of claims etc. As far as coverage of crops is concerned, major food crops (Cereals, Millets and Pulses), Oilseeds and annual commercial / annual horticultural crops have been covered.

1.2.10.2 Coverage of Risks and Exclusions

Following stages of the crop and risks leading to crop loss are covered under the scheme.

a) *Prevented Sowing/ Planting Risk*: Insured area is prevented from sowing/planting due to deficit rainfall or adverse seasonal conditions

b) *Standing Crop (Sowing to Harvesting)*: Comprehensive risk insurance is provided to cover yield losses due to non- preventable risks, viz. drought, dry spells, flood, inundation, pests and diseases, landslides, natural fire and lightening, storm, hailstorm, cyclone, typhoon, tempest, hurricane and tornado.

c) *Post-Harvest Losses:* coverage is available only up to a maximum period of two weeks from harvesting for those crops which are allowed to dry in cut and spread condition in the field after harvesting against specific perils of cyclone and cyclonic rains and unseasonal rains.

d) Localized Calamities: Loss/ damage resulting from occurrence of identified localized risks of hailstorm, landslide, and inundation affecting isolated farms in the notified area.

However, the losses arising out of war and nuclear risks, malicious damage and other preventable risks are excluded. The Actuarial Premium Rate (APR) charged under PMFBY by implementing agency (IA) payable by the farmer has been presented in Table 1.3.

Table 1.3: Actuarial Premium Rate (APR) charged under PMFBY

Sr. No.	Season	Crops	Maximum Insurance charges payable by farmers (% of sum insured)
1	Kharif 2016	All foodgrains and oilseeds crops (all cereals, millets, pulses and oilseeds crops)	2.0 % of SI or actuarial rate, whichever is less
2	Rabi 2016-17	All foodgrains and oilseeds crops (all cereals, millets, pulses and oilseeds crops)	1.5 % of SI or actuarial rate, whichever is less
3	Kharif and Rabi (2016-17)	Annual commercial and annual horticulture crops	5 % of SI or actuarial rate, whichever is less

Source: https://ikhedut.gujarat.gov.in.

The features of newly launched PMFBY have been compared with that of earlier ones, i.e., NAIS and MNAIS in presented in Table 1.4. It may be seen that the newly launched PMFBY enjoy many advantages such as lower premium rates, wider coverage of risks and coverage of more number of crops, use of technology in assessment of crop loss and inclusion of post harvest losses etc.

The new insurance scheme has already been implemented from 2016 Kharif season. Thus, it is necessary to assess its functioning, adoption by the farmers, the benefits realised by the farmers and constraints faced by the farmers and necessary modifications in the schemes so as to make it more effective for the farmers.

Table 1.4: Comparisons between NAIS, MNAIS and PMFBY

No	Feature	NAIS [1999]	MNAIS [2010]	PMFBY
1	Premium rate	Low	High	Lower than NAIS (Govt to contribute 5 times that of farmer)
2	One Season – One Premium	Yes	No	Yes
3	Insurance Amount cover	Full	Capped	Full
4	On Account Payment	No	Yes	Yes
5	Localised Risk coverage	No	Hail storm Land slide	Hail storm, Land slide Inundation
6	Post Harvest Losses coverage	No	Coastal areas - for cyclonic rain	All India – for cyclonic + unseasonal rain
7	Prevented Sowing coverage	No	Yes	Yes
8	Use of Technology (for quicker settlement of claims)	No	Intended	Mandatory
9	Awareness	No	No	Yes (target to double coverage to 50%)

Source: Press Information Bureau, Government of India, Ministry of Agriculture and Farmers Welfare, www.pib.nic.in, accessed on 10th April 2018.

1.3 Major Objectives of the Study

The major objectives of the study were:

(1) To assess the performance and functioning of the PMFBY scheme in Gujarat;

(2) To examine the role of different primary stakeholders such as insurance companies (known as the implementing agencies), the financial institutions (nodal and lending banks), insurance agents and farmers/cultivators for efficient functioning of the scheme in the state;

(3) To assess the extent of adoption of PMFBY by the farmers, the benefits realised and the constraints faced by the farmers; and

(4) To assess the willingness to pay by the farmers and necessary modifications required in the scheme so as to make it more effective for the farmers.

1.4 Data and Methodology

The present study is a part of an all-India level coordinated study, coordinated by Centre for Management in Agriculture, Indian Institute of Management, Ahmedabad. The study was conducted in two phases. In addition to survey of beneficiary and non-beneficiary households in two phases (as discussed below), Focus Group Discussions (FGDs) with farmers were instrumental in collecting information regarding gaps in the PMFBY and recommendations of the farmers to bridge these gaps. Most questions in FGD were open ended and led to multiple secondary questions depending on the course of the discussion. Moreover, other stakeholders such as insurance companies (AIC, HDFC Ergo and UIIC), banks, and state government officials were interviewed for gathering more insights on the implementation of the scheme.

1.4.1: Phase I:

In the 1st phase, the process of implementation at the state level was comprehensively mapped. The study was involved mixed methods of data collection involving both secondary and primary sources of data. The state level nodal agencies/authorities responsible for PMFBY including the State Department of Agriculture, State Statistics Department, State Level Coordination Committee on Crop Insurance (SLCCI), District Level Technical Committee (DLTC) and insurance companies (AIC, HDFC Ergo and UIIC) were contacted for collecting relevant secondary data on various aspects of progress in implementation of PMFBY in study districts including details of banks and insurance companies involved in the concerned districts.

1.4.1.1 Selection of Sample Districts and Households

For selection of the study districts, all the districts of Gujarat state were categorised into three groups on the basis of number of farmers enrolled for PMFBY. The categories of districts were as follows:

- Low uptake: A district which has lowest number of loanee and non-loanee farmers
- Medium Uptake: A middle district in terms of the number of famers
- High Uptake: A district in the state which has the highest number of farmers enrolled

Accordingly, three districts, one district from each of the groups, were selected for the survey. They were Rajkot (high uptake), Sabarkantha (medium uptake) and Vadodara (low uptake), which were selected for the survey of households and collection of primary data. Furthermore, from each of the district, three categories of farmers were selected for the study on PMFBY, which were loanee farmers, non-loanee farmers and control farmers.

Category 1: Loanee farmers

This category includes all farmers who availed agri-credit i.e. seasonal operational loans, are by default enrolled for PMFBY and the premium amount was deducted from their loan amounts at source by the banks. It was noted that many farmers were not even aware that they have been enrolled for PMFBY and have the premiums deducted. However, care was taken to make sure by meticulous investigation (through verification of their bank accounts) that all such farmers are included under the survey.

Category 2: Non-loanee farmers

This included the farmers who had not taken agri-credit and hence did not automatically qualify for insurance under PMFBY. But they had voluntarily enrolled for PMFBY by paying premiums.

Category 3: Control farmers

These were the non-Insured farmers who were aware of the insurance scheme and have not opted for insurance under PMFBY for some reason – either they did not trust it, or did not think it is important enough or have other means of risk management. This third category was also called the control group.

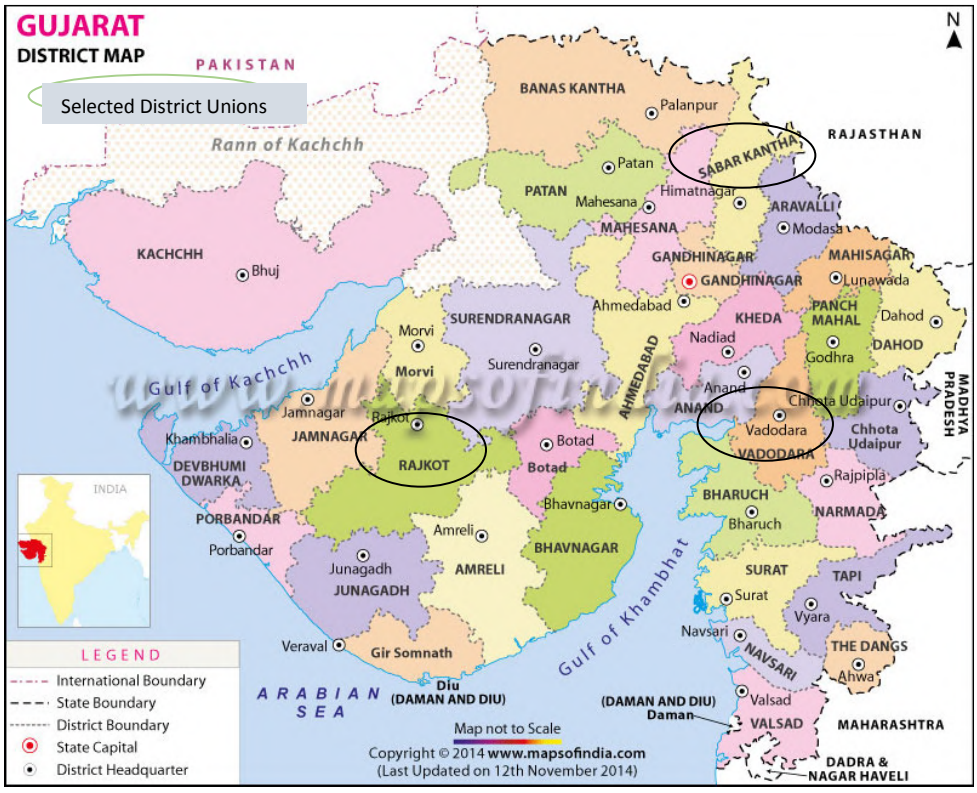
The phase I study was intended to focus mainly on performance of PMFBY and implementation issues in the state. As per the stated distribution, a total of 150 households were covered under the detailed survey (Table 1.5). Out of 150 households, 110 households were loanee farmers (beneficiary farmers), 10 households were non-loanee farmers and another 30 households were control farmers. It was planned to survey 30 loanee farmers and 10 non-loanee farmers from each of the study districts totalling to 40 beneficiary households from each of the district. However, due to unavailability of non-

loanee farmers in sample study blocks randomly selected for the study, only 10 non-loanee farmers could be surveyed from Rajkot district only.

Table 1.5: Sample Size Distribution for PMFBY Study in Gujarat (Phase I)

Districts selected	Beneficiary (Loanee)	Beneficiary (Non-loanee)	Non-beneficiary (Control farmers)	Total
Rajkot	30	10	10	50
Sabarkantha	40	0	10	50
Vadodara	40	0	10	50
Total	110	10	30	150

Map 1.1: Location Map of Study Area (Phase I) in Gujarat, India

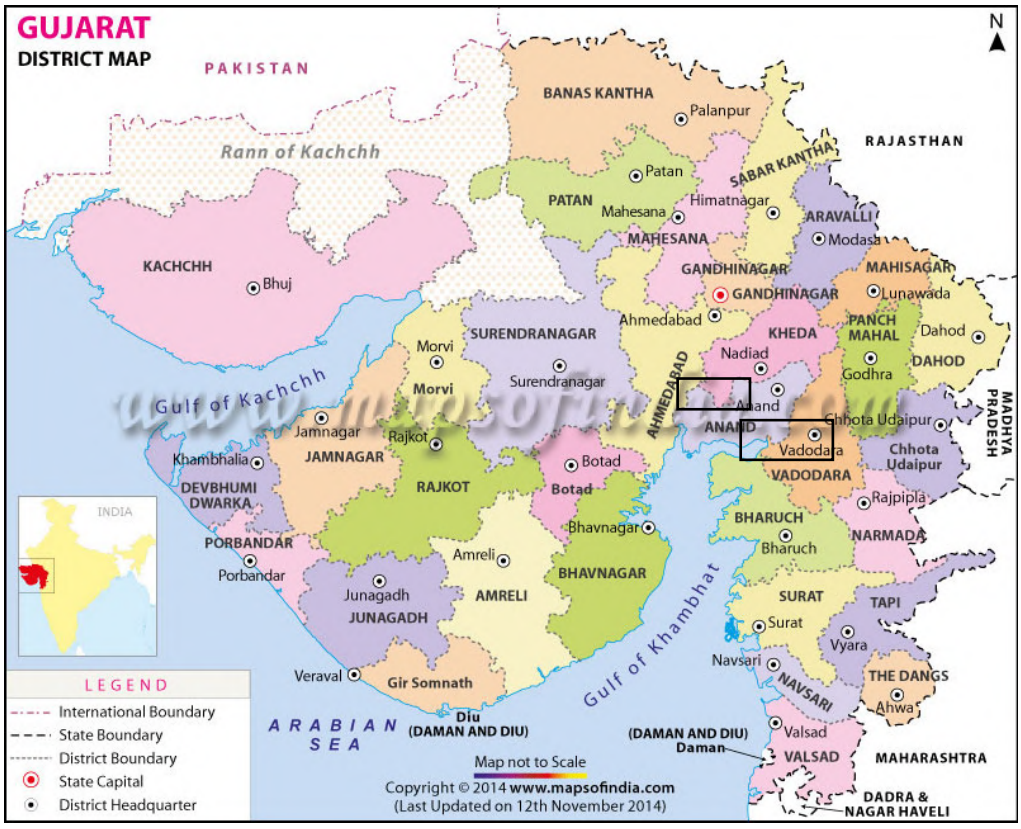


1.4.2 : Phase II:

Any new product or service needs to be tested so as to assess the possible extent of its adoption and the extent of willingness to pay for getting the same product or for availing the same service by the consumers. The

research in the area of benefits valuation has seen an increased interest in the use of discrete choice experiments (DCEs). The DCE is an attribute-based survey method for measuring benefits (utility). DCEs present respondents with samples of hypothetical scenarios (choice sets) drawn a priori from all possible choice sets according to statistical design principles. The choice sets comprise two or more alternatives, which vary along several characteristics or attributes of interest, and individuals are asked to choose one alternative. Most commonly, each respondent faces several choice questions within a single survey.

Map 1.2: Location Map of Study Area (Phase II) in Gujarat, India



In the phase II, two districts (Anand and Vadodara) were selected for the survey. From each of the district, 72 households were selected from 6 villages and two blocks. From each block, three villages were selected. In total, 144 households were selected from 12 villages covering 4 blocks of two selected districts. (Table 1.6)

Table 1.6: Sample Size Distribution for Choice Experiments in Gujarat (Phase II)

Sr. No.	District name	Taluka name	No. of villages	No. of households/respondents interviewed
1	Vadodara	Vadodara	3	36
2	Vadodara	Savali	3	36
3	Anand	Anand	3	36
4	Anand	Khambat	3	36
Total	02	04	12	144

Source: Field survey data.

1.4.3 Data Analysis Tools

The data were analysed with the help of simple statistical tools. However, during the second Phase, Generalised Multi-Nomial Logit (GMNL) model was used for making a parametric estimation of the likelihood of a farmer opting for a crop insurance scheme such as PMFBY. The dependent variable was a *categorical* - representing farmers with and without crop insurance. Explanatory variables included some utility parameters such as coverage period of crop insurance, loss determination method, certainty of payment and sum insured.

The Ordinary Least Square (OLS) Method was also used to assess the strength of factors affecting the willingness to pay. Here, the willingness to pay for an attribute on several household characteristics like age, farming experience, caste, gender, etc. The coefficient corresponding to each characteristic shows the value by which the WTP for the attribute (such as coverage, loss determination and certainty of payment and sum insured) will rise or reduce if the household characteristic rises by 1 unit. However, all coefficients should be multiplied by a factor of 1000 for correct interpretation.

1.5 Limitations of the Study

The study is based on both primary and secondary level of data and hence the accuracy of results depends on the accuracy with which the data

were generated. Due to paucity of decentralized data, certain analyses have been limited to some extent level. As mentioned earlier, it was planned to survey 30 loanee farmers and 10 non-loanee farmers from each of the study districts totalling to 40 beneficiary households from each of the district. However, due to unavailability of non-loanee farmers in sample study blocks randomly selected for the study, only 10 non-loanee farmers could be surveyed in total which were from Rajkot district only.

1.6 Organization of the Report

The present study report is divided into seven chapters including this introductory chapter. The introductory chapter presents the introductory notes, history of crop insurance in India, main objectives of the study, data and methodology used along with limitations and organisation of report. Chapter two presents the progress and coverage of Pradhan Mantri Fasal Bima Yojana in India and Gujarat. The socio-economic characteristics of selected sample households are presented in Chapter III. Chapter IV presents farm level characteristics of sample households. Chapter V presents the insurance behavior of sample households, details of enrolment and awareness about PMFBY among selected households, insurance details of selected crops, overall experience with PMFBY and implementation related issues of PMFBY. Chapter VI presents the willingness to pay for crop insurance of selected sample households. Last chapter presents the conclusions and recommendations emerged from the study.

The next chapter present details about the Pradhan Mantri Fasal Bima Yojana (PMFBY) in Gujarat and India.

Chapter II

Progress and Status of Pradhan Mantri Fasal Bima Yojana (PMFBY) in India and Gujarat

2.1 Introduction

Pradhan Mantri Fasal Bima Yojana (PMFBY) has been introduced in 2016-17 by replacing NAIS and MNIAS. PMFBY is a multi-peril crop insurance programme, introduced in 2016-17 agricultural year. It is a head-way from the previous schemes in terms of cut in premium rates to 2 per cent of sum insured (SI) in Kharif and 1.5 per cent of SI in Rabi season for all food grains and oilseeds crops and flat 5 per cent of SI for commercial/horticultural crops in both seasons (GOI, 2017). The scheme is being implemented by AIC and some private insurance companies. The scheme insures farmers against a wide range of external risks - droughts, dry spells, floods, inundation, pests and diseases, landslides, natural fire and lightning, hailstorms, cyclones, typhoons, tempests, hurricanes and tornadoes. The scheme also covers post-harvest losses up to a period of 15 days.

The data on coverage under PMFBY during the least two years 2016-17 & 2017-18 indicate that despite of low premium and more benefits, number of farmers (or farm holdings) covered fell to 47.9 million in 2017-18, from a high of 57.5 million the year before, a sharp decline of 17% in just a year (Lok Sabha on 16th March 2018[1]). The data further shows that while coverage among loanee farmers fell to 35 million in 2017-18 from 44 million the year before, coverage of non-loanee farmers fell marginally from 14 million to 13 million during this period.

[1] http://www.businessfortnight.com/narendra-modis-crop-insurance-scheme-running-aground/

This chapter makes a comparative analysis of previous crop insurance scheme (i.e., NAIS) and present crop insurance scheme (i.e., PMFBY) in Gujarat. The purpose is to analyze the performance of PMFBY (introduced in year 2016-17) in terms of farmers' coverage, premium, sum insured and claim payout efficacy and analyse how it was different from earlier scheme. It is attempted to analyse the growth and performance of National Agricultural Insurance Scheme of 19 seasons from Rabi 1999-2000 to 2013-14 and PMFBY of 2016-17 and 2017-18.

2.2 Performance of Crop Insurance Schemes in India

Commercialization of agricultural products has increased in India. The insurance schemes for the farmers have been evolved to provide benefits to the farmers. Some of the policies cater to both the personal and property need of the farmers. The basic requirements of the farmers are covered in the farmer's insurance scheme.

1. Loss or damage caused due to fire or natural disaster such as flood, storm, tornado, cyclone, earthquake etc.
2. Loss or damage to the property of the insured farmer
3. Coverage for personal accident which includes the insurer and the family members
4. Cover for loss or damage of tractor
5. Cover for loss of pump set
6. Coverage for loss/ damage caused by power failure

The performance of the major crop insurance schemes in the recent past (after 1999) is summarized in Table 2.1. NAIS has covered around 22.9 crore farmers since its inception in 1999. The claim premium ratio is very high for

NAIS indicating that the claims were 300 percent more than the premium collected. On an average, Rs. 5649 was paid to a beneficiary under NAIS from a lowest average premium of Rs. 462 per farmer. Only 3.4 crore farmers are covered under WBCIS and is not popular due to lack of adequate number of weather stations and long term yield data. MNAIS has been adopted only by a few states and has covered about 11.05 crore farmers in spite of the premium rates being higher as compared to NAIS.

Table 2.1: Comparative statistics of the previous insurance schemes of India (cumulative since inception of the schemes till Kharif, 2014-15)

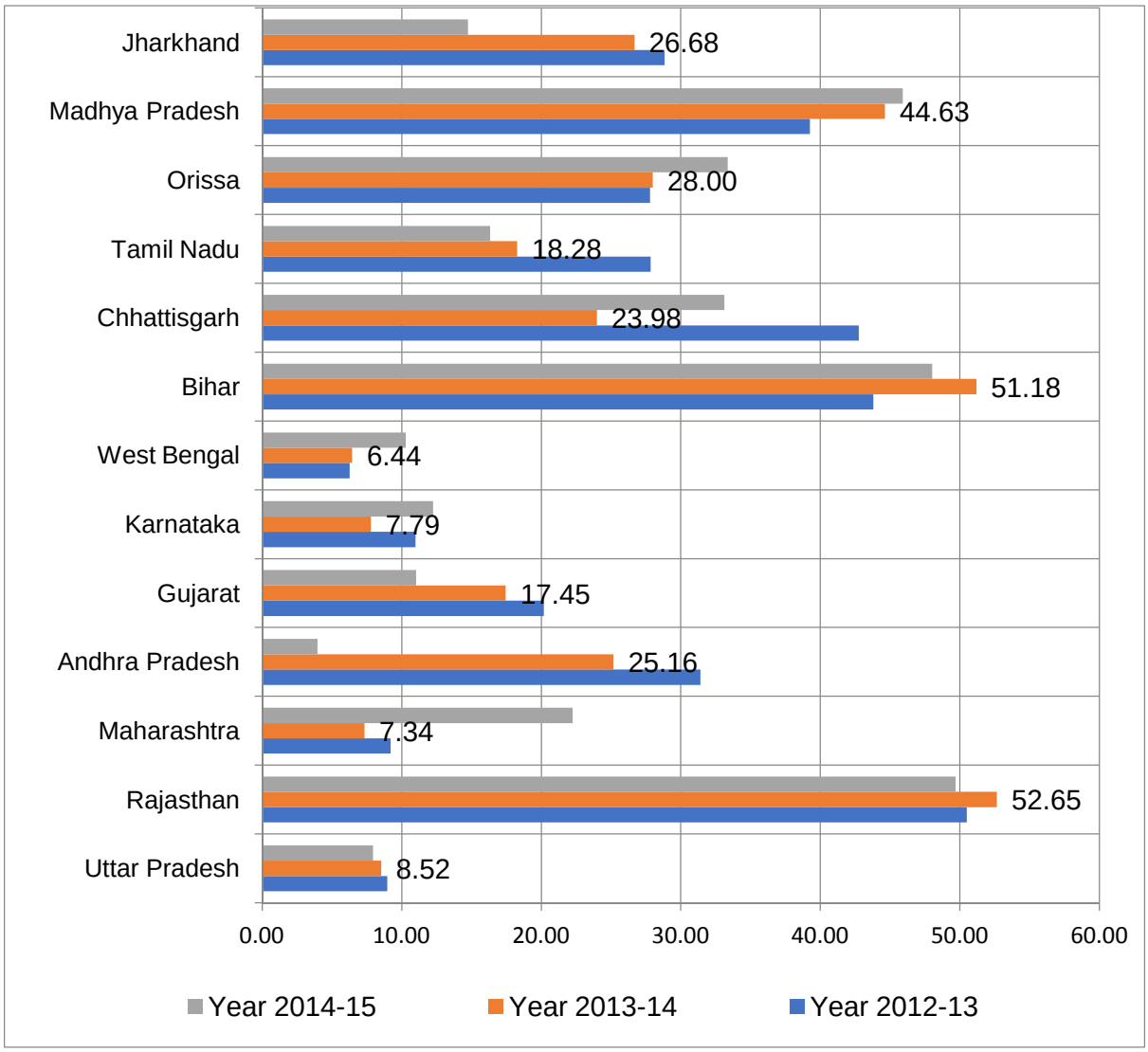
Scheme	Number of farmers covered (crores)	Area Insured (crore hectares)	Over-all claim Premium Ratio	Average premium per farmer	Average Claim amount / farmer
National Agricultural Insurance Scheme (NAIS) (From 1999)	22.90	33.97	3.06	Rs. 462	Rs. 5649
Weather-Based Crop Insurance Scheme (WBCIS) (From 2007)	3.4	4.6	0.69	Rs. 1743	Rs. 2146
Modified National Agricultural Insurance Scheme (MNAIS) (From 2010-11)	11.05	1.25	0.88	Rs. 2356	Rs. 7708

Source: Govindaraj (2016).

Figure 2.1 shows the trends of the percent of area insured under various crop insurances in India. In the year 2014-15, out of the gross cropped area of 194.40 million hectares in the country, only 45.34 million hectares was covered under crop insurance it means 23.32 percent area was covered under crop insurance. The coverage is very good in the states of Rajasthan, Bihar and MP with about 45-50 percent gross cropped area insured under different schemes

(Figure 2.1). Penetration of insurance schemes in terms of percentage of GCA insured is low in UP, West Bengal, Karnataka and Haryana. In few states such as MP, Odisha and Maharashtra, the coverage has increased in 2014-15, while in Gujarat, AP, and Tamil Nadu, the percent area insured has gone down as compared to 2012-13.

Figure 2.1: Percentage of GCA covered under all Crop Insurance Schemes

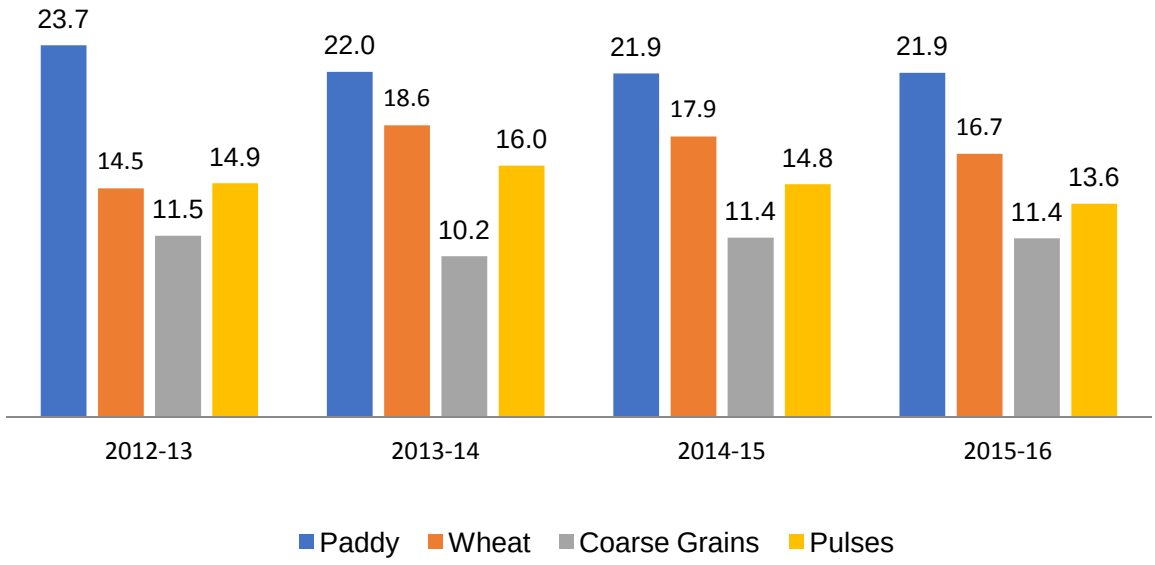


Source: GOI (2015).

The percent area of various crops insured under the crop insurances schemes is displayed in Figures 2.2 to 2.4. There is not much variation over the

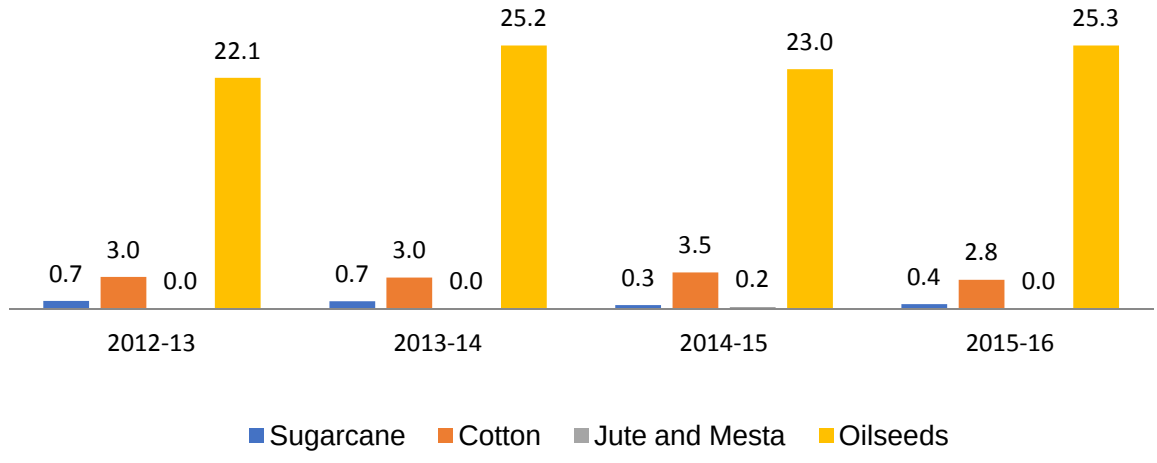
time period for the area under cereals, while insurance coverage of area under vegetables and fruits has increased three times in 2015-16 as compared to previous years.

Figure 2.2. Percentage of area insured Cereals and Pulses

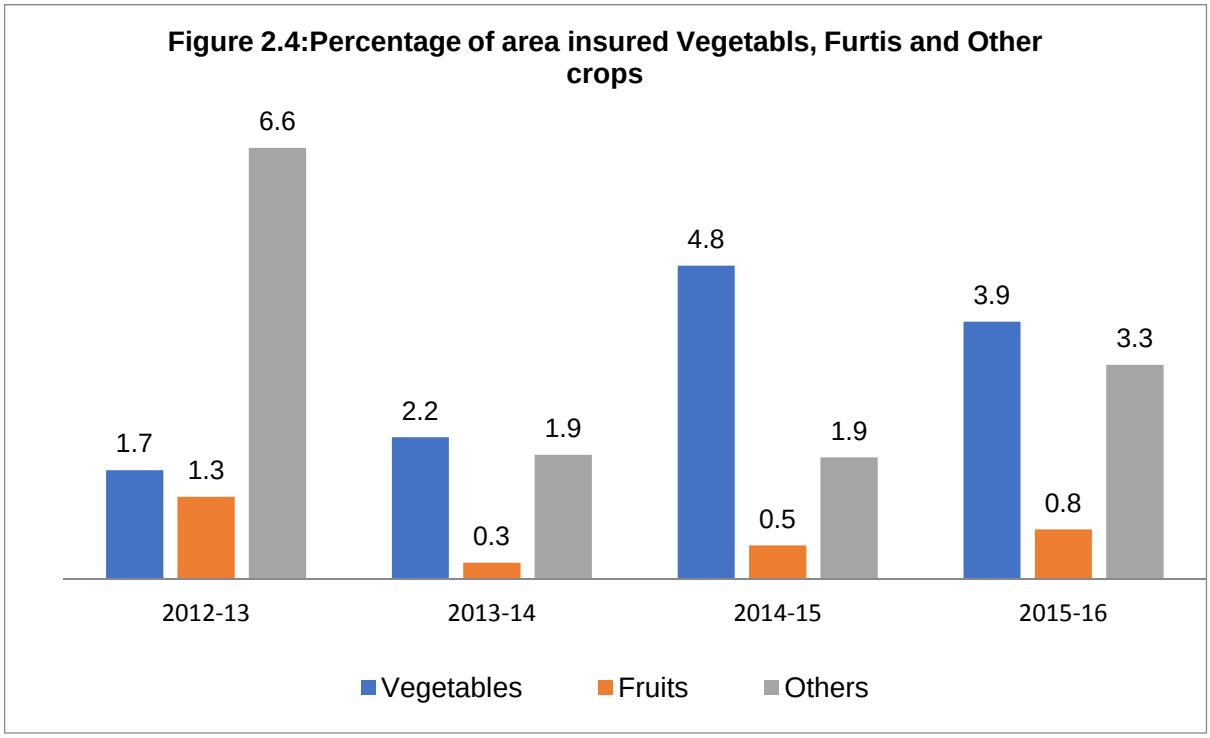


Source: GOI (2015).

Figure 2.3:Percentage of area insured Cash crops and Oilseeds



Source: GOI (2015).



Source: GOI (2015).

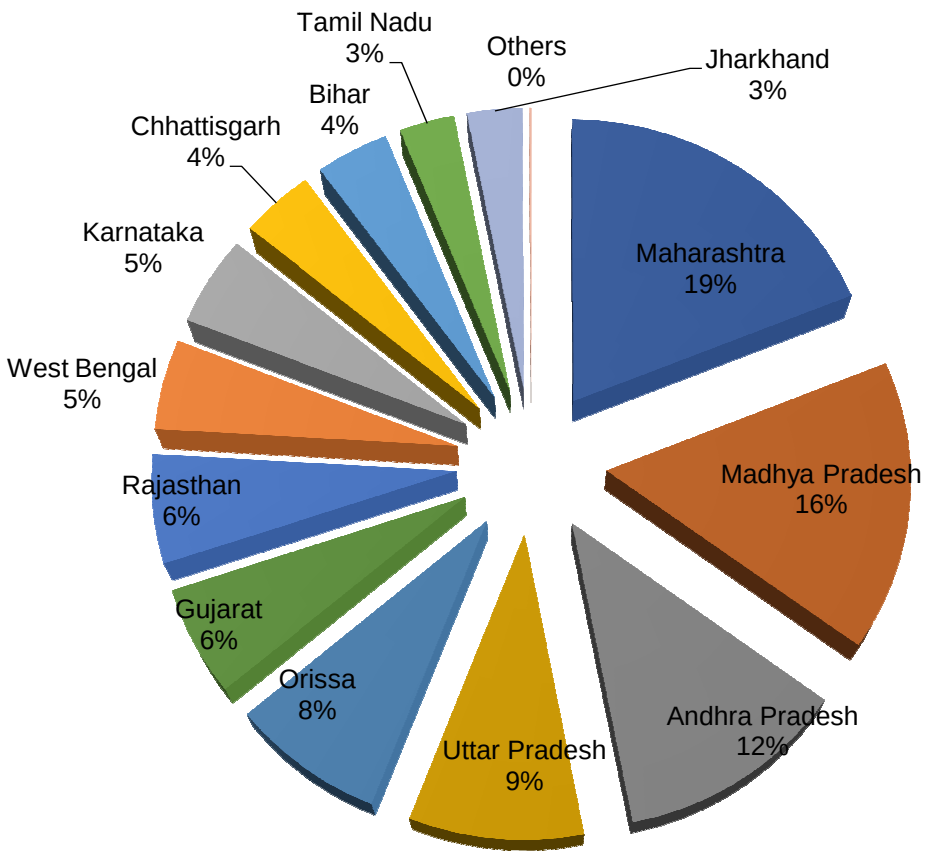
2.2.1 National Agricultural Insurance Scheme (NAIS)

The NAIS was implemented by 25 States and 2 Union Territories. Under NAIS, during the last thirty three crop seasons (i.e. from Rabi 1999-2000 to Rabi 2015-16) about 2691 lakh farmers have been covered over an area of 3887 lakh hectares insuring a sum amounting to Rs. 461238 crore. The claims to the tune of about Rs. 50610 crore have been paid as against the premium of Rs. 14009 crore benefiting about 779 lakh farmers. Scheme was demand driven and moreover, claims were based on the occurrence of natural calamities like drought, flood etc. The scheme was withdrawn after Rabi 2015-16.

Figures 2.5 and 2.6 have shown a skewed performance of NAIS across the states in terms of number of farmers covered and area insured. The majority of the farmers insured under NAIS belong to 3 states namely Maharashtra, Madhya Pradesh and Andhra Pradesh contributing to more than 35 percent of the total farmers covered in India. Uttar Pradesh, Odisha, Gujarat,

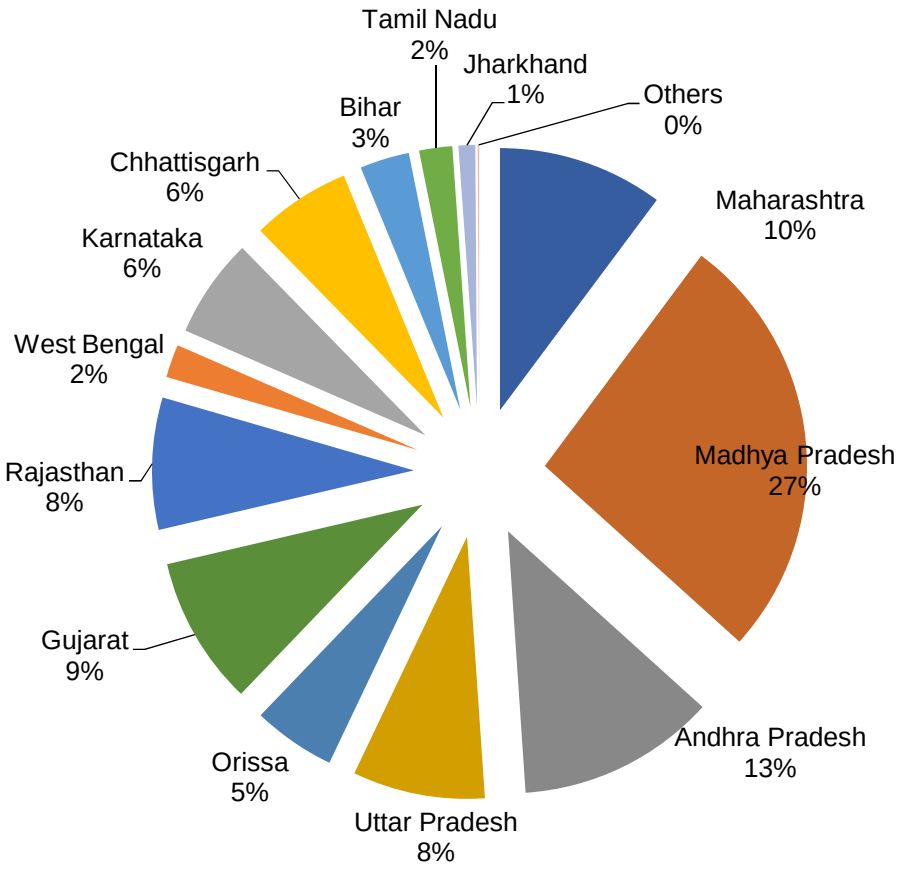
Rajasthan, West Bengal and Karnataka contributes 5-10 percent each in the total number of farmers insured under NAIS in India, while the coverage is very low in all the other states. As far as area insured is concerned, Madhya Pradesh occupies the major share followed by Andhra Pradesh and Maharashtra. Uttar Pradesh, Odisha, Gujarat, Rajasthan, Karnataka and Chhattisgarh contribute to 6-8 percent share each in the total area insured under NAIS in India. The performance in terms of number of cases insured and area insured under NAIS is very insignificant in the states such as Bihar, Tamil Nadu, Jharkhand and others.

Figure 2.5: Statewise share in number of farmers insured under NAIS (%)



Source: Govindaraj (2016).

Figure 2.6: Statewise share in total area insured under NAIS (%)



Source: Govindaraj (2016).

Sustainability and profitably of an insurance scheme can be assessed by its claim/premium ratio. Higher the ratio, higher will be the losses incurred by the insurance agencies and the government. In Table 2.2, claim to premium ratio is calculated based on the claims paid and premiums collected under NAIS since the inception of the scheme in 1999 till 2015. For India as a whole, the claim to premium ratio is 3.06, which shows that the amount of claims was three times higher than the premium amount collected. This indicates the loss in the operation of the scheme, even without including the administrative and operational expenses.

Claim to premium ratio varied between 4 to 6 in the states of Rajasthan, Gujarat, Bihar, Tamil Nadu and Jharkhand. The claim payment ratio under NAIS for the states of Madhya Pradesh and Maharashtra which have contributed to a major share of area insured is 2.5 and 2.9 respectively, indicating that the claims amounts were more than the premium collected by 2.5 and 2.9 times. The percentage of farmers who claimed as against the number of farmers covered was also high (34 to 39%) for Gujarat, Rajasthan, Bihar, Tamil Nadu and Karnataka as against the country average of 25.6 percent.

Table 2.2: State wise performance of NAIS (cumulative since 1999-2015)

States/UTs	% of farmers who Claimed	Average Amount of Claim Settled/ farmer (Rs)	Average Area Insured / farmer (in Ha)	Claim to Premium Ratio
All India	25.68	5934	1.45	3.06
Maharashtra	30.97	3163	0.79	2.90
MP	18.62	6983	2.37	2.50
Andhra Pradesh	22.62	7087	1.51	2.63
Uttar Pradesh	19.28	2588	1.33	1.71
Odisha	16.28	6477	0.97	2.33
Gujarat	36.10	15039	2.27	4.15
Rajasthan	34.54	5041	2.08	5.73
West Bengal	21.53	4505	0.50	1.62
Karnataka	37.27	3732	1.58	3.46
Chhattisgarh	14.60	2334	1.99	1.06
Bihar	35.35	9339	1.12	5.70
Tamil Nadu	38.65	10451	1.29	5.14
Jharkhand	31.81	2398	0.61	4.80
Haryana	20.36	3351	1.21	1.80

Source: Govindaraj (2016).

The average amount of claim settled per farmer is very high (Rs.15, 039) for Gujarat as against the country average of Rs.5934. The average amount of claim settled per farmer is on the higher side for Bihar and Tamil Nadu. In Madhya Pradesh, on an average Rs.6983 is paid to a farmer in the form of claims. The average area insured/farmers were above 2 ha in the states of MP,

Gujarat and Rajasthan. State wise analysis of the performance of the NAIS scheme indicates the skewed benefits attained by states such as Gujarat, Rajasthan, Tamil Nadu and Bihar while the performance in terms of number of farmers covered and area insured is better in Madhya Pradesh and Maharashtra. According to CAG report (year 2017), 14 per cent farmers opted for the weather-linked insurance scheme between 2014 and 2017. The percentage of farmers ranged between 1.71 and 1.72 per cent for Kharif season and 1.01 and 1.68 per cent for Rabi season were covered under the National Agricultural Insurance Scheme from 2014 to 2016, which indicated that the coverage was very low and there has not been significant progress in coverage under the scheme.

In Gujarat state, as can be seen from Table 2.3 that number of farmers insured and insured area has increased since 2012-13. About 4.57 and 5.37 lakh farmers were benefited under the scheme during 2009-10 and 2012-13 respectively. During 2012-13, the highest claim to premium ratio was realized (4.3%) in the state (Table 2.4).

Table 2.3: Performance of the National Agricultural Insurance Scheme in Gujarat State

Season	No. of Farmers Insured (in lakh)	Area Insured (lakh Ha)	Sum Insured (Rs. Crore)	Gross Premium (Rs. Crore)	Claims (Rs. Crore)	No. of farmers benefited (in lakh)
2009-10	8.98	19.37	22.27	0.84	5.88	4.57
2010-11	8.64	18.30	23.61	0.85	0.26	0.42
2011-12	8.46	18.66	24.76	0.85	4.70	2.89
2012-13	9.48	20.67	31.02	1.07	8.08	5.37
2013-14	9.54	20.52	34.86	1.19	0.68	0.70

Source: http://www.aicofindia.com

Table 2.4: Claims to Premium Ratio of NAIS in Gujarat

Year	Claims (Rs. Crore)	Premium (Rs. Crore)	Claim to Premium
2009-10	5.00	2.00	2.5
2010-11	3.00	3.00	1.0
2011-12	2.51	2.33	1.1
2012-13	11.72	2.75	4.3
2013-14	0.02	2.85	0.0

Source: http://www.aicofindia.com.

The basic statistics of the NAIS scheme during Kharif in Gujarat since 2010 till 2014 is summarized in the Table 2.5. The assessment of performance of NAIS in Gujarat state during last five years reveals that the coverage has increased from 2010 till 2012, thereafter, it has declined from 11.43 lakh farmers in 2012 to 5.38 lakh farmers in 2014. Similarly, the area insured has declined from around 25 lakh hectares in 2012 to about 11 lakh hectares in 2014. In the year 2012, highest percent of farmers (74.4%) were benefited under NAIS. On an average, the highest amount of claim paid per farmers was Rs. 25752.57, which was realized in 2012 since it was a drought year in Gujarat state.

Table 2.5: Details of NAIS in Gujarat (Kharif Season)

Year	Farmers covered (in lakh)	Area insured (in lakh ha.)	% of farmers benefited	Average amount of claim per farmer	Claim premium ratio
2010	9.27	19.90	7.55	9714.29	17.0
2011	9.76	20.83	26.61	12181.73	70.5
2012	11.43	24.72	74.37	25752.57	72.6
2013	10.05	21.36	4.23	8955.57	0.5
2014	5.38	11.12	0.00	0.00	0.00

Source: http://www.aicofindia.com.

The crop-wise claims reported and revised claims paid as per the area correction factor has been presented in Table 2.6. It may be noted that there was significant decline in the revised claims in case of many crops especially since Kharif 2008.

Table 2.6: Area Correction Factor applied under NAIS in different Crops in Gujarat

Season	Crop	Total Claim Reported (M. Rs)	Total Revised Claim (M. Rs)	% Decline in the Revised Claims
Kharif 2001	Paddy, Cotton	2194.74	1340.71	-63.70
Kharif 2002	Groundnut, Cotton, Castor	9004.34	7102.86	-26.77
Kharif 2004	Groundnut	3693.27	2791.64	-32.30
Kharif 2005	Bajra	31.89	24.92	-27.97
Kharif 2006	Groundnut, Bajra, Maize	789.16	751.53	-5.01
Kharif 2007	Bajra, Groundnut	207.38	196.84	-5.35
Kharif 2008	Paddy, Bajra, Groundnut	5995.02	669.78	-795.07
Kharif 2009	Paddy, Bajra, Groundnut, Castor	11106.81	8001.38	-38.81
Kharif 2010	Groundnut	1458.42	676.72	-115.51
Kharif 2011	Maize, Groundnut	6718.27	165.33	-3963.55
Kharif 2012	Paddy, Bajara, Maize, Groundnut	282.86	160.8	-75.91
Rabi 2009-10	Wheat Irrigated	46.96	46.37	-1.27

Source: (GOI, 2014), Report of the Committee to Review the Implementation of Crop Insurance Schemes in India.

2.2.2 Modified National Agricultural Insurance Scheme (MNAIS)

To improve further and make the scheme easier and farmer friendly, a Joint Group[2] was constituted by the Government of India to study the improvements required in the existing crop insurance schemes. Based on the recommendations of the Joint Group and views and comments of various

[2] http://agricoop.nic.in/sites/default/files/Modified%20National%20Agricultural%20Insurance%20Scheme.pdf

stakeholders, Modified NAIS (MNAIS) was approved for implementation on pilot basis in 50 districts during the remaining period of 11th Five Year Plan from Rabi 2010-11. The major improvements made in MNAIS were: actuarial premium with subsidy in premium ranging upto 75 percent to farmers; unit area of insurance reduced to village panchayat level; indemnity for prevented sowing/planting risk and for post harvest losses due to cyclone in coastal areas; on account payment up to 25 per cent of likely claims as immediate relief; more proficient basis for calculation of threshold yield; minimum indemnity level of 80 per cent and 90 per cent etc.

From Rabi 2013-14, it was launched as a full-fledged component scheme under the aegis of NCIP (National Crop Insurance Programme). Scheme which was being implemented on actuarial basis but subsidy in premium upto 75 per cent of sum insured was provided to farmers. From its inception to Kharif 2015 and Rabi 2015-16, 276 lakh farmers were covered with an area of 303 lakh hectares insuring a sum amounting to Rs. 62113 crore. The claims to the tune of about Rs. 4804 crore was payable (of which majority claims have already been settled) against the premium of about Rs. 5017 crore benefiting about 81 lakh farmers. However, only 0.17 lakh farmers were covered under MNAIS in year 2015 in Gujarat state.

2.2.3 Weather Based Crop Insurance Scheme (WBCIS)

With the objective to bring more farmers under the fold of Crop Insurance, a Pilot Weather Based Crop Insurance Scheme (WBCIS) was launched in 20 States since Kharif/Rabi 2007. WBCIS aimed to provide insurance protection to the farmers against adverse weather incidence, such as deficit and excess rainfall, high or low temperature, humidity etc. which are deemed to impact adversely the crop production. It has the advantage to settle

the claims within shortest possible time. The WBCIS was based on actuarial rates of premium. During pilot period, premium actually charged from farmers was restricted to at par with NAIS. The Scheme is being implemented on full-fledged basis as component scheme of NCIP since Rabi 2013-14 on actuarial premium however upto 50 per cent subsidy in premium (maximum premium for the farmers is restricted to 6 per cent) are being provided to farmers. From its inception till Kharif 2015 to Rabi 2015-16, about 724 lakh farmers have been covered over an area of 937 lakh hectares insuring a sum amounting to Rs. 124240 crore. Claims to the tune of about Rs. 9817 crore have become payable against the premium of about Rs. 12271 crore benefiting about 491 lakh farmers.

However, in Gujarat state, only 5 lakh farmers were covered under WBCIS and 1 lakh farmers were benefited under the scheme in 2015-16. Around 5 lakh hectares of area were covered in the scheme during the same period.

2.2.4 Pradhan Mantri Fasal Bima Yojana (PMFBY)

NCIP/NAIS was recently reviewed, and a new scheme namely, Pradhan Mantri Fasal Bima Yojana (PMFBY) was approved in place of MNAIS/NAIS for implementation from the Kharif 2016 season. The premium structure under restructured WBCIS has also been rationalized and made at par with PMFBY. CPIS component will also be continued. In addition, a Unified Package Insurance Scheme (UPIS) covering other risks of farmers including life, accident like house, tractor, pump set, student safety etc. besides crop insurance has also been approved for implementation on pilot basis in selected 45 districts. The PMFBY has been providing a comprehensive insurance cover against

failure of the crop thus helping in stabilizing the income of the farmers and encourages them for adoption of innovative, as per guidelines[3] given below:

- The Scheme covers all food and oilseeds crops and annual commercial/horticultural crops.
- The scheme is compulsory for loanee farmers obtaining Crop Loan /KCC account for notified crops. However, it is voluntary for others /non loanee farmers who have insurable interest in the insured crop(s).
- This scheme has a provision of low premium ratio and the maximum premium payable by the farmers was 2 per cent for all Kharif food and oilseeds crops, 1.5 per cent for Rabi food and oilseeds crops and 5 per cent for annual commercial/horticultural crops.
- The difference between premium and the rate of insurance charges payable by farmers was shared equally by the Centre and State.
- The scheme has been implemented by AIC and other empanelled private general insurance companies. Selection of Implementing Agency (IA) has been done by the concerned State Government through bidding on premium rates.
- The existing State Level Co-ordination Committee on Crop Insurance (SLCCCI), Sub-Committee to SLCCCI, District Level Monitoring Committee (DLMC) have been made responsible for proper management of the Scheme.
- The Scheme is being implemented on an 'Area Approach basis'. The unit of insurance is Village/Village Panchayat level for major crops and for other crops it may be a unit of size above the level of Village/Village Panchayat.

[3] https://pmfby.gov.in/

- In case majority of farmers in a notified area are prevented from sowing/planting the insured crops due to adverse weather conditions then insured farmers are eligible for indemnity claims upto maximum of 25 per cent of the sum-insured.
- Claims for wide spread calamities are being calculated on area approach. However losses due to localised perils (hailstorm, landslide and inundation) and Post-Harvest losses due to specified perils, (cyclone/cyclonic rain and unseasonal rains) are being assessed at the affected insured field of the individual insured farmer.
- Three levels of indemnity, viz., 70 per cent, 80 per cent and 90 per cent corresponding to crop risk in the areas are available for all crops.
- The Threshold Yield (TY) is the benchmark yield level at which Insurance protection shall be given to all the insured farmers in an Insurance Unit. The moving average of yield of last seven years excluding yield upto two notified calamity years multiplied by indemnity level has been estimated as as the threshold yield of the notified crop.
- In case of smaller States, the whole State has been assigned to one Implementing agency (IA) (2-3 or more for comparatively big States). Selection of IA may be made for 3 years.
- The designated / empanelled companies participating in bidding have to bid the premium rates for all the crops notified / to be notified by the State Govt.
- Crop Cutting Experiments (CCE) shall be undertaken per unit area /per crop, on a sliding scale, as prescribed under the scheme outline and operational guidelines. Improved Technology like Remote Sensing. Drone etc will be utilized for estimation of yield losses.

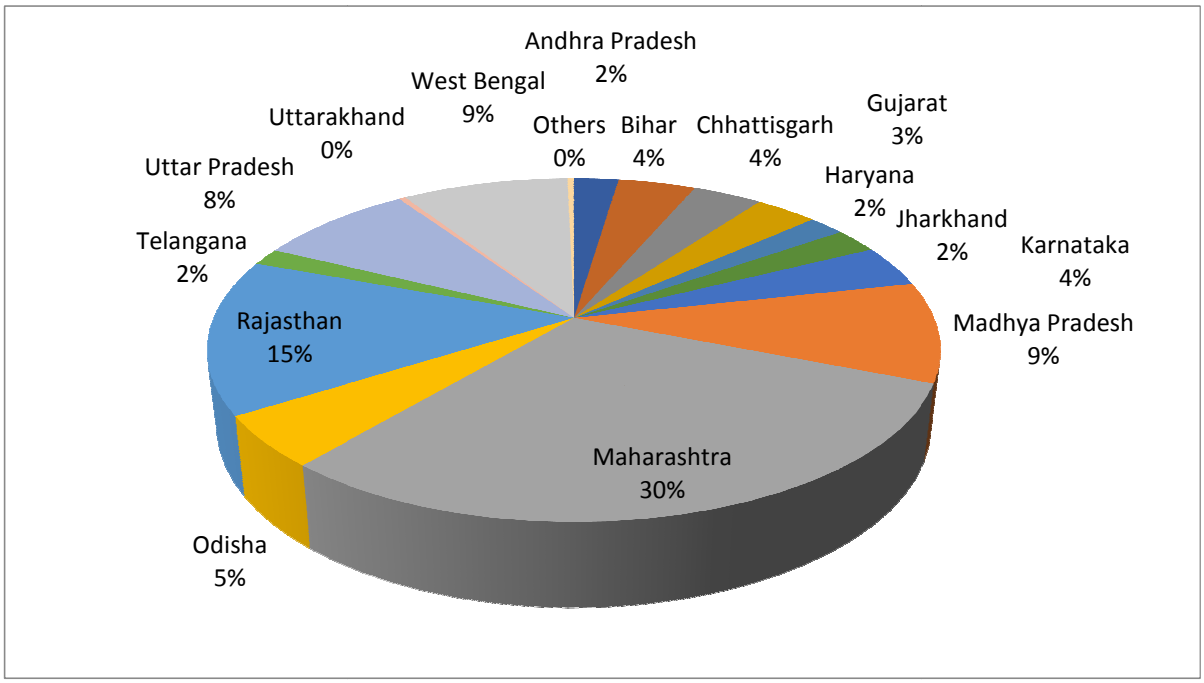
- State governments should use Smart phone apps for video/image capturing CCEs process and transmission thereof with CCE data on a real time basis for timely, reliable and transparent estimation of yield data
- There is a provision of on account claims in case of adverse seasonal conditions during crop season viz. floods, prolonged dry spells, severe drought, and unseasonal rains.
- On account payment upto 25 per cent of likely claims is being provided, if the expected yield during the season is likely to be less than 50 per cent of normal yield. The claim amount is being credited electronically to the bank account of individual Insured farmers. Adequate publicity and awareness has been created in all the villages of the notified districts or areas. The cost of using technology etc. for conduct of CCEs etc is being shared between Central Government and State/U.T. Governments on 50:50 basis.

Figure 2.7 has shown a skewed performance across the states in terms of number of farmers covered and area insured. The majority of the farmers insured under PMFBY belong to four states namely Maharashtra, Rajasthan, Madhya Pradesh and West Bengal constituting more than 72 percent of the total farmers covered in India. Uttar Pradesh, Bihar, Karnataka, Gujarat contributes 10 to 15 percent each in the total number of farmers insured under PMFBY in India, while the coverage is very low in all the other states.

As far as area insured under PMFBY is concerned, Rajasthan occupies the major share followed by Madhya Pradesh, Maharashtra and Uttar Pradesh (Figure 2.7). Chattishgarh, Odisha, Gujarat, West Bengal constitute about 6-8 percent share each in the total area insured under PMFBY in India. The

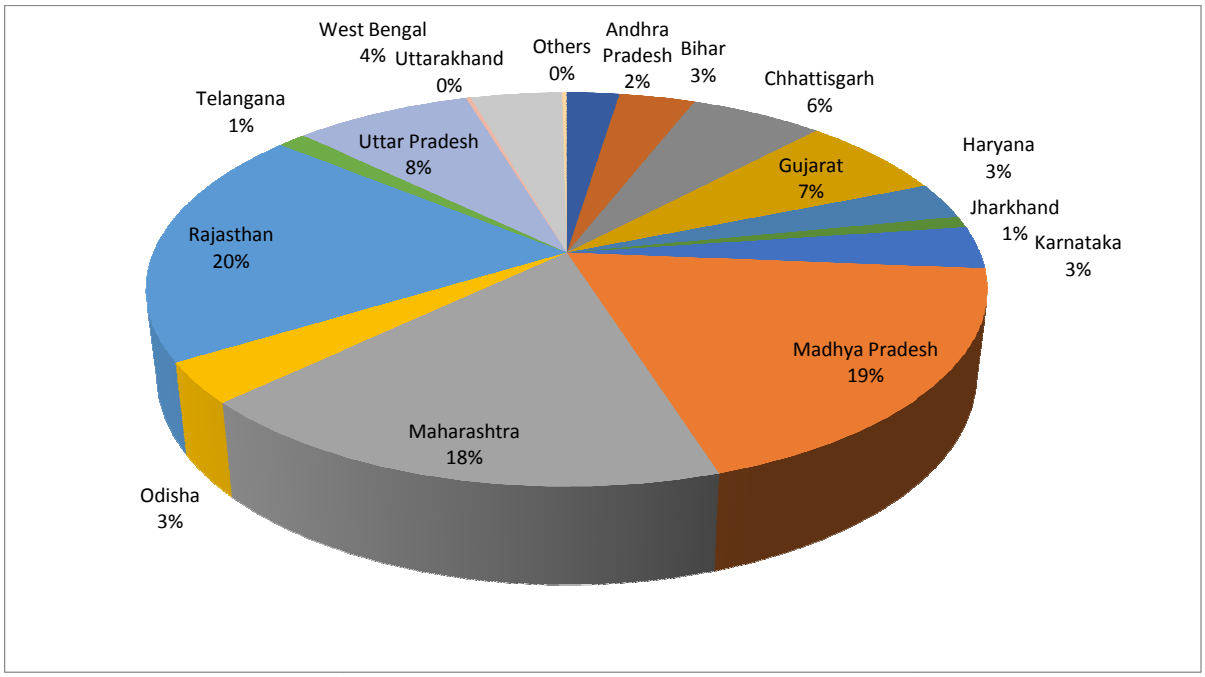
performance in terms of number of cases insured and area insured under PMFBY is very insignificant in the states such as AP, Telangana and others.

Figure 2.7: State-wise farmers insured under PMFBY (per cent) during 2016-17



Source: https://www.indiastat.com and Authors own calculation

Figure 2.8: State-wise area insured under PMFBY (per cent) during 2016-17



Source: https://www.indiastat.com and Authors own calculation

2.3 Progress in PMFBY in Gujarat

As discussed earlier, PMFBY is a flagship scheme of crop insurance implemented since Kharif 2016 with an ambition of covering 50 percent of the farmers in India within 5 years. The details on the coverage of farmers and the cropping area in Gujarat and India are presented in Table 2.7. In the state, it is stated that around 4 lakh farmers were insured with to 6.8 lakh hectares area under PMFBY during 2016-17. Among the implementing agencies, AIC cluster has covered major share of the farmers. There was a common complaint about the earlier schemes that they provided cover to crop loans rather than to crop losses, as the participation rate of non-loanee farmers was very low. Hence, more emphasis was given on the coverage of non-loanee farmers under PMFBY. In Gujarat, among the total farmers covered during Kharif 2016, around 0.02 lakh farmers were non-loanee farmers in kharif season.

Table 2.7: Performance of PMFBY

Schemes	No. of Farmers Insured (000')	Area Insured (000' Ha)	Amount in Rs.Crore				No. of Farmers benefitted (000')
			Sum Insured	Premium	Subsidy	Claims	
Gujarat	415	687	2986.1	814.1	755.0	456.4	179
India	24213	23889	76946.0	7768.0	6077.0	4701.0	4055

Source: GOI (2016).

The state wise number of farmers insured under PMFBY in India can be seen from Table 2.8. More proportions of loanee farmers were covered in Rajasthan, Madhya Pradesh, Uttar Pradesh and Maharashtra, whereas more proportions of non-loanee farmers were covered in Maharashtra, Karnataka, West Bengal and Tamil Nadu states during 2016-17. In 2017-18, more non-loanee farmers were covered under PMFBY in state Maharashtra, West Bengal, Karnataka and Tamil Nadu states. In case of Gujarat, the number of non-loanee farmers in compared to loanee farmers was very low in both years.

The details of premium paid by Gujarat government for PMFBY during 2016-17 have been shown in Table 2.9. Around 10 percent share in premium was paid by farmers for Kharif season whereas during Rabi season, around 45 percent share in premium was borne by the farmers. In Kharif season, state government's share was around 43 percent in premium whereas in Rabi season 28 percent share was borne by state government. In Kharif season, central government's share was around 43 percent in premium whole during Rabi season 28 percent share was borne by central government. Thus, about 90 percent of total premium for Kharif season and 55 percent in Rabi season were paid by the state and central government together.

Table 2.8: State wise tentative number of farmers insured under PMFBY in India

State	2016-17			2017-18		
	Loanee	Non-loanee	Total	Loanee	Non-loanee	Total
Andhra Pradesh	1637887	133670	1771557	167078	61594	228672
Bihar	2672627	40551	2713178	2239812	37408	2277220
Chhattisgarh	1352433	196731	1549164	1279785	218224	1498009
Gujarat	**1970507**	**4685**	**1975192**	**1231067**	**2547**	**1233614**
Haryana	1332922	3062	1335984	1348632	2987	1351619
Himachal Pradesh	318642	60411	379053	188931	1647	190578
Jharkhand	200681	677073	877754	158279	847592	1005871
Karnataka	1589762	1526672	3116434	653942	791593	1445535
Madhya Pradesh	6483990	509137	6993127	6618096	280540	6898636
Maharashtra	4089619	7916713	12006332	2113915	7698713	9812628
Odisha	1787620	32616	1820236	1745785	159835	1905620
Rajasthan	9242326	45610	9287936	8017230	359	8017589
Tamil Nadu	326698	1123438	1450136	385941	994725	1380666
Telangana	903544	72278	975822	980851	33559	1014410
Uttar Pradesh	6648660	21594	6670254	5356183	68875	5425058
Uttarakhand	228915	32656	261571	50934	15532	66466
West Bengal	2789072	1346117	4135189	1997916	546732	2544648
Others	123761	45084	168845	377074	1238119	1615193
India	43699666	13788098	57487764	34911451	13000581	47912032

Source: https://www.indiastat.com/

Table 2.9: Details of premium paid by Gujarat State Government (PMFBY) during 2016-17

Sr. No.	Particular	Kharif 2016 (Rs. In crore)	Percentage share (Kharif 2016)	Rabi-Summer 2016-17 (Rs. In crore)	Percentage share (Rabi 2016-17)
1	Sum Insured	11249.00		1075.00	
2	Share of farmer's premium	224.30	9.7	25.06	45.2
3 (a)	State Government's share	972.58	42.2	15.18	27.4
3 (b)	State Government's Additional Premium Subsidy	135.57	5.9	--	--
4 (3a+3b)	State Government's total share	1108.15	48.1	15.18	27.4
5	Share of Government of India	972.58	42.2	15.18	27.4
6 (4+5)	State and Central Government's share	2080.73	90.3	30.36	54.8
7 (2+6)	Total amount of premium	2305.03	100.0	55.42	100.0

Source: Office of the Department of Agriculture, Government of Gujarat, Gandhinagar

In Gujarat, in Kharif 2016, the applications for claims were mostly made by the farmers of Junagadh, Rajkot, Surendranagar and Jamnagar district, while farmers of Rajkot, Junagadh, Amreli, Jamnagar and Devbhumi Dwarka received the maximum claims. A total of 44335 farmers got benefit with claim settlements in the Kharif season. For Rabi season, claims were mostly made by the farmers of Junagadh, Jamnagar and Rajkot district. Of these, highest Junagadh district farmers got the benefits of claim settlement; total 39564 farmers got benefit for claim in Rabi season of 2016-17. Thus a total of 482899 farmers were benefited with receipt of claims under the PMFBY in 2016-17 (Table 2.10).

Table 2.10: Details of Claims Settlement under PMFBY 2016-17 in Gujarat

Cl. No.	District	No. of farmers application	No of claims payable farmers	Amount tobe paid (Rs. In lakh)	Paid no of farmers	Paid claims (Rs. in lakh)
			Kharif Season 2016			
1	Ahmedabad	141627	15062	2179.364	15062	2179.36
2	Amreli	231041	35911	4367.8	35911	4367.8
3	Anand	66	66	2.3	66	2.3
4	Arvalli	3560	3560	394.1	3,560	394.1
5	Banaskantha	64599	18918	873.9	18918	873.9
6	Bharuch	305	0	0.0	0	0.0
7	Bhavnagar	16652	16652	1398.0	16652	1398.0
8	Botad	60599	75	3.1	75	3.1
9	Chotaudepur	421	421	19.0	421	19.0
10	Dahod	40446	1506	38.3	1506	38.3
11	Dangs	10	0	0.0	0	0.0
12	Devbhumi Dwarka	216	67602	16668.4	67602	16668.4
13	GirSomnath	7706	0	0.0	0	0.0
14	Jamnagar	153951	29831	4426.5	29831	4426.5
15	Junagadh	144399861	78024	18181.6	78024.00	18181.6
16	Kheda	22667	700	17.4	700	17.4
17	Kutch	40069	74	1.0	74	1.0
18	Mahisagar	91	91	64.2	91	64.2
19	Mehsana	28685	3	0.1	3	0.1
20	Morbi	133337	18166	3812.0	18166	3812.0
21	Narmada	523	0	0.0	0	0.0
22	Panchmahals	503	503	57.6	503	57.6
23	Porbandar	65810	1251	40.7	1251	40.7
24	Rajkot	147156	147156	41079.1	147156	41079.1
25	Sabarkantha	10937	10937	2621.8	10937	2621.8
26	Surendranagar	136062	2440	154.8	2440	154.8
27	Tapi	105	11	0.5	11	0.5
28	Vadodara	5672	0	0.0	0	0.0
29	Valsad	74	0	0.0	0	0.0
	Total Kharif	14,57,43,809	448977	96402.99	4,48,977	96402.99

Table 2.10 Continued.....

Cl. No.	District	No. of farmers application	No of claims payable farmers	Amount to be paid (Rs. In lakh)	Paid no of farmers	Paid claims (Rs. in lakh)
			Rabi Season 2016			
1	Ahmadabad	1255	379	79.5	379	79.5
2	Arvalli	6247	674	47.8	674	47.8
3	Banaskantha	8416	467	18.1	467	18.1
4	Bharuch	11	16	9.1	16	9.1
5	Bhavnagar	4673	1511	108.2	1511	108.2
6	Botad	4065	1832	83.3	1832	83.3
7	Dahod	25	30	1.2	30	1.2
8	Devbhumi Dwarka	3849	1552	236.7	1552	236.7
9	Gandhinagar	3348	487	15.8	487	15.8
10	Gir Somnath	3213	671	6.2	671	6.2
11	Jamnagar	10341	8367	311.6	8367	311.6
12	Junagadh	29231	11890	896.7	11890	896.7
13	Kachchh	3618	2176	610.3	2176	610.3
14	Kheda	1697	435	6.6	435	6.6
15	Mahisagar	3253	1010	20.3	1010	20.3
16	Morbi	2079	609	19.8	609	19.8
17	Panchmahals	15	31	3.9	31	3.9
18	Patan	3343	747	54.3	747	54.3
19	Porbandar	3950	613	34.3	613	34.3
20	Rajkot	8497	3295	391.3	3295	391.3
21	Sabarkantha	4851	1153	32.9	1153	32.9
22	Surat	2	3	0.1	3	0.1
23	Surendranagar	3483	1610	279.8	1610	279.8
24	Tapi	1	4	0.4	4	0.4
25	Vadodara	47	6	0.4	6	0.4
	Total Rabi	109509	39564	3268.2	39564	3268.2
	Grand Total (Kharif+Rabi)	145853318	488541	99671.24	488541	99671.24

Source: Office of the Department of Agriculture, Government of Gujarat, Gandhinagar

2.4 Implementation Bottlenecks

Looking at crucial role that crop insurance can play in reducing farmers' risks, the Government of India started crop insurance in 1985, with the Comprehensive Crop Insurance Scheme (CCIS). This CCIS was replaced by the National Agriculture Insurance Scheme (NAIS) and assumed to be an improvement over the CCIS, but it simply replaced one flawed scheme with another less flawed one. The main flaws were goal of financial viability, its mandatory nature, its failure to address adverse selection, arbitrary premiums, and the area approach. Also, price fluctuations greatly affect the farmers' income, thereby causing market risk to influence its future earnings. For increasing the coverage under the crop insurance and make it more effective, Government of India had introduced PMFBY in February 2016. According Comptroller and Auditor General of India (CAG) report (year 2017), close to 14 per cent farmers opted for the weather-linked insurance scheme between 2014 and 2017. Farmers ranging between 1.71 and 1.72 per cent for Kharif season and 1.01 and 1.68 per cent for Rabi season were covered under the NAIS from 2014 to 2016, which indicated that the coverage was very low. However, with the launch of the PMFBY, the coverage of farmers had increased to 11.61 and 12.24 per cent for Kharif and Rabi seasons, respectively.

However, later on, the growth in farmers covered and area covered slowed down. Several factors have contributed to the scheme slowing down. One, insurers face a delay in receiving data on crop yields from the States. A case in point is the Kharif 2017 season; while the cut-off date for submission of yield data to insurance companies for the season was January 31, 2018. Some states, including Chhattisgarh, Haryana, Rajasthan, Tamil Nadu and Telangana, delayed it by over a month. Andhra Pradesh and Madhya Pradesh took close to three months after the deadline, while Jharkhand and West Bengal had not

provided the yield data till the first week of May. Also, in many cases, insurance companies do not agree on the yield data provided by the States, which results in disputes and delays in claims settlement.

The other problem is that the States do not pay their share of the premium on time, which means insurers are unable to process the claims. For Kharif 2017, States had to pay their share by December 2017 but many failed to do so. Bihar, Madhya Pradesh, Telangana, West Bengal and Andhra Pradesh, among others, had not paid their premium for Kharif 2017 even till the first week of June, according to an official at a crop insurance company. The delay is also because the Centre has opted for direct benefit transfer (DBT) of claims payment. For this, details of farmers' bank accounts have to be provided to the insurers. This is often not done on time, which further delays the settlement.

The central government's flagship crop insurance scheme, launched with much fanfare two years ago, has witnessed negative growth this year as the coverage has reduced to 24 per cent of gross cropped area (GCA) in 2017-18 from 30 per cent in 2016-17. This is when the actual target for the current year was 40 per cent. Similarly, the number of farmers insured during both the Kharif and Rabi seasons has gone down by 14 per cent this year. In 2017-18, the area insured under the Pradhan Mantri Fasal BimaYojana (PMFBY) was 47.5 million hectares, as per the data accessed by NAIS, which translates into 24 per cent of the GCA of 198.4 million hectares. After the PMFBY was launched in February 2016, the area under coverage had gone up to 30 per cent in 2016-17 from 23 per cent under the old schemes a year ago. As per the government's targets, the coverage in 2017-18 should have increased to 40 per cent but has actually reduced to 24 per cent. Thus, the government's final target of bringing 50 per cent (98 million hectares) of the GCA under the PMFBY in 2018-19, which has been allocated Rs 13,000 crore in the budget, appears to

be an impractical goal. Under the scheme, farmers have to pay just two per cent of the total premium in case of the Kharif crop, 1.5 per cent for Rabi and 5 per cent for horticulture. The remaining premium is equally shared by the Centre and the states. The central government has been citing poor implementation by the states for the lackadaisical response to the scheme. State officials say that the bid of private insurance companies for more profit and delay in settlement of claims are crucial factors for the decline.

The next chapter presents socio-economic characteristics of selected sample households.

Chapter III

Socio-Economic Characteristics of Selected Sample Households

3.1 Introduction

Understanding the risk taking behaviour and adoption of risk reduction measures such as crop insurance would be easier if we examine the socio-economic background of the selected sample households. Relating the extent of adoption of PMFBY by farmers with their socio-economic characteristics would be useful for the insurance companies and the policy makers in designing the suitable crop insurance products.

3.2 Socio Economic Profile of Selected Households

The socio-economic profile of selected sample households has been presented in Table 3.1. The age group of sample farmers was divided into three categories such as minor, adult and senior. It may be seen that around 46.2 percent of total beneficiary farmers were adults, followed by 27.7 percent senior and remaining 26.1 per cent were minor (less than 16 years). In case of control farmers, 44.1 percent were adults, followed by 33.8 per cent senior farmers and 22.1 per cent minor (less than 16 years) farmers.

The analysis on education status of sample households reveals that, in case of insured farmers (loanee and non-loanee), around 12.5 percent were illiterate, 18.3 percent farmers had completed primary education, highest of 46.7 percent farmers had completed secondary education and 22.5 percent farmers had completed graduation. Around 16.7 percent of control farmers had primary education and another 16.7 per cent control farmers had completed graduation. About 66.7 percent of control farmers had completed secondary education and 16.7 percent of them had completed the graduation.

There was not even a single farmer from control farmers, who had not studied or was illiterate.

Around 86 percent of the farmers from the loanne insured farmers belonged to general caste and other remaining belonged to SC/ST/OBC caste. In non-loanee insured farmers, 80 percent belonged to OBC and 20 percent belonged to general caste. While 93 percent control farmers were belong to general caste, only around 7 per cent control farmers belonged to OBC.

Table 3.1: Socio-economic Profile of Sample Households

Farmer category	Particulars									
	Age group of family member (% to sample)			Educational Status (% to sample)				Caste (% to sample)		
	Minor		Senior							
	< 16 years	Adults 16-59	> 60 years	Illiterate	Primary	Secondary	Graduate and above	SC/ST	OBC	General
Loanee insured farmers (n=110)	26.1	46.2	27.7	11.8	17.3	47.3	23.6	7.3	7.3	85.5
Non-loanee insured farmers (n=10)	11.1	74.1	14.8	20.0	30.0	40.0	10.0	0.0	80.0	20.0
Total insured farmers (n=120)	25.5	47.1	27.5	12.5	18.3	46.7	22.5	6.7	13.3	80.0
Farmers (Control) (n=30)	22.1	44.1	33.8	0.0	16.7	66.7	16.7	0.0	6.7	93.3
Grand Total (n=150)	24.8	46.4	28.8	10.0	18.0	50.7	21.3	5.3	12.0	82.7

Source: Field Survey data.

The details on occupation, members engaged in farming and income of the selected households are presented in Table 3.2. It can be seen from the

table that agriculture and allied activities, self employed and others have been included in the primary occupation and other such a agriculture labour, service and others have been included in secondary occupation. Almost all the loanee insured farmers were engaged in farming that means main occupation was agriculture and allied activities, where about 43 percent were involved in agriculture labour, 38 percent were engaged other occupation. Similarly 90 percent of the non-loanee insured farmers were engaged agriculture and allied activities, with about 80 percent were engaged in service sector and 20 percent were involved in other sector. Around 97 percent control farmers were engaged in agriculture and allied activities with about 100 percent control farmers were involved in other secondary occupation. About 3 percent of family members of sample of loanee insured farmers, non-insured farmers and control farmers were engaged in agriculture. Average annual income of insured farmers was Rs. 2.2 lakh, whereas the same for control farmers was Rs. 2.0 lakh.

Table 3.2: Occupations, Members engaged in Farming & Household Income

Farmer category	Occupations of sample H.H. (% to Sample)								Av. number of family members engaged in farming (%)	Per HH annual income (in lakh Rs.)
	Primary				Secondary					
	Agriculture & Allied activities	Self employed	Others	Total	Agri. Labour	Service	Others	Total		
Loanee Insured farmers	98.2	0.9	0.9	100.0	42.9	19.0	38.1	100	2.909	2.310
Non-Loanee Insured Farmers	90.0	0.0	10.0	100.0	0.0	80.0	20.0	100	3.500	1.204
Total Insured Farmers	97.5	0.8	1.7	100.0	34.6	30.8	34.6	100	2.958	2.218
Farmers (Control)	96.7	0.0	3.3	100.0	0.0	0.0	100.0	100	3.333	2.007

Source: Field Survey data.

The details of per household annual income from non-agricultural sources have been presented in Table 3.3. In case of loanee farmers, about Rs. 0.4 lakh of annual income was generated from milk sale. Similarly, average Rs. 0.6 lakh income was generated from farm labour. A total income of Rs. 0.69 lakh was generated from various non agriculture sources in case of loanee insured farmers. In case of non-loanee farmers, average annual income generated was Rs 0.64 lakh. In comparison to insured farmers, the control farmers received more annual income (Rs 1.47 lakh) from various non agricultural assets.

Table 3.3: Per HH Annual Income from Non-agricultural Sources

(in Rs. Lakh)

Farmer category	Milk Sale	Other livestock product sale	Income from non-agricultural sources								
			Salary from employment	Farm labor	MGNREGA	Remittances	Pension	Rents house/land	Business / trade	Others	Total
Loanee insured farmers	0.41	0.28	0.01	0.56	0.02	0.00	0.04	0.00	0.03	0.02	0.69
Non-loanee insured farmers	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
Total insured farmers	0.38	0.26	0.01	0.52	0.02	0.00	0.04	0.00	0.03	0.02	0.64
Farmers (Control)	0.39	0.00	0.20	0.01	0.01	0.00	0.17	0.00	0.08	1.00	1.47

Source: Field Survey data.

The values of asset possessed by loanee, non-loanee and control farmers are presented in Table 3.4. It can be seen from the table that loanee farmers, non-loanee and control farmers had the highest value of land owned in comparison to other assets. The per household average value of owned land of loanee farmers, non-loanee farmers and control farmers was found to be Rs. 28.89 lakh, Rs. 9.56 lakh, Rs. 32.48 lakh, respectively. The average value of assets of control farmers was also more compared to that of insured farmers. The average value of total assets of loanee farmers, non-loanee and control farmers was found to be Rs. 40.1 lakh, Rs. 14.7 lakh, Rs. 45.3 lakh per household, respectively.

Table 3.4: Asset Value of Sample Households

(in Lakh Rs.)

Farmer category	Per HH asset type					
	Value of Land owned	Value of machinery	Value of building	Value of livestock	Others	Total
Loanee Insured	28.89	3.24	6.34	1.20	0.44	40.10
Non-Loanee Insured	9.56	0.28	4.65	0.19	0.00	14.68
Total Insured	27.28	2.99	6.20	1.12	0.40	37.98
Non-insured (Control)	32.48	3.04	8.20	1.56	0.00	45.28

Source: Field Survey data.

It may be noted from Table 3.5 that, the major sources of institutional credit were co-operative bank and commercial banks for loanee insured farmers. However, cooperative banks provided more loans compared to commercial banks. The main purpose of taking loans from both commercial and co-operative banks was for agriculture activities. About 93.9 percent

loanee insured farmers had taken loan for crop cultivation and agriculture purpose and the same from commercial bank was 71.1 percent. About 28.9 percent farmers had taken loan from co-operative banks for non-agricultural activities. About 97.3 percent of all farmers took loan for a period one year. It is interesting to note that the amount of loan outstanding was much higher in case of cooperative banks (Rs.96 lakh per HH) compared to commercial banks.

Table 3.5: Access to Credit per HH for Loanee Insured Farmers

Source of borrowing	Amount (Lakh Rs.)	Purpose of loan (%)		Duration (%)				Amount paid with interest (Lakh Rs.)	Outstanding loan from-2016 present (Lakh Rs.)
		Agri.	Non-agri.	6 month	1 year	2 year	2-5 years		
Commercial Bank	2.10	93.88	6.12	2.17	97.83	0.00	0.00	2.14	0.04
Co-operative Bank	2.38	71.11	28.89	0.00	96.88	0.00	3.13	1.47	0.96
Total	2.27	79.14	20.86	0.91	97.27	0.00	1.82	1.75	0.57

Source: Field Survey data.

It may be noted from Table 3.6 that, non loanee insured farmers had taken loan only from friends and relatives. The main purpose of the loan was only non-agriculture activities. 50 percent, 20 percent and 30 percent of the non-loanee insured farmers took loans for a period of 1 year, 2 years and 2 to 5 years, respectively. Nearly Rs 0.15 lakh was loan outstanding in such cases of informal borrowings.

Table 3.6: Access to Credit per HH for Non-loanee Insured Farmers

Source of borrowing name	Amount (Rs.)	Purpose of loan (%)		Duration (%)				Amount paid with interest (Rs.)7	Outstanding loan from-2016 present (Rs.)
		Agri.	Non-agri.	6 month	1 year	2 year	2-5 years		
Friends and relatives	0.68	0.0	100.0	0.0	50.0	20.0	30.0	0.55	0.15

Source: Field Survey data.

Table 3.7: Access to Credit per HH for Non-insured Farmers (control)

Source of borrowing name	Amount (Lakh Rs.)	Purpose of loan (%)		Duration (%)				Amount paid with interest (Lakh Rs.)	Outstanding loan from-2016 present (Lakh Rs.)
		Agri.	Non-agri.	6 month	1 year	2 year	2-5 years		
Cooperative Bank/ Societies	2.99	68.18	31.82	0.00	100.0	0.00	0.00	1.82	1.26
Friends and relatives	0.67	0.00	100.0	40.00	60.00	0.00	0.00	0.51	0.16

Source: Field Survey

It can be seen from the Table 3.7 that about 68.18 percent of loans was taken by the control farmers for agriculture purpose from co-operative banks/societies and 31.82 percent of loan was taken for non-agriculture activities from the same sources. The control farmers had taken some loans (Rs 0.67 lakh per HH) from friends and relatives which were mainly for non-agricultural activities. The entire loan taken from co-operative banks/societies

was for one year, while 60 percent of loans taken from informal sources was for one year and rest amount was for 6 months. Around Rs.1.3 lakh and Rs. 0.2 lakh of loans were outstanding amount in case of cooperative banks and friends and relatives, respectively.

The next chapter presented the details on farm and crop cultivation.

Chapter IV

Farm Level Characteristics of Sample Households

4.1 Land Holding Pattern

The details of land holding pattern of the sample households have been presented in Table 4.1. The average size of land holding was found to be 7.9 ha., 8.2 ha., and 6.3 ha for loanee insured, non-loanee insured and control farmers respectively. Out of total, on an average 91 percent, 72 percent and 93 percent land was under irrigation of loanee insured, non-loanee insured and control farmers respectively. The gross cropped area for loanee insured farmers, non-loanee insured farmers and control farmers was estimated to be 9.20 ha, 8.67 ha and 8.27 ha respectively. The loanee insured farmers had a gross cropped area higher than non-loanee insured and control farmers. The cropping intensity for loanee insured farmers, non-loanee insured farmers and control farmers were estimated to 116.9 percent, 105.2 percent and 130.5 percent respectively. Thus, cropping intensity of control farmers groups was higher than loanee insured farmers and non-loanee insured farmers, which may be due to higher coverage of irrigation.

4.2 Sources of Irrigation

The sources of irrigation for selected samples households may be noted from Table 4.2. For loanee insured farmers, dug well, bore well and canal were found to be the major sources contributing about 47.3 percent, 47.3 percent and 25.5 percent of total irrigated area respectively. Similarly, in case of non loanee insured farmers, dug well, bore well were found to be the major sources contributing about 60.0 percent and 20.0 percent of total irrigated area respectively. While in the case of control farmers, around 53.3 percent and 46.7

percent of total irrigated area were irrigated by dug well and bore well respectively. Thus, the groundwater was the major source of irrigation for the selected sample households. The canal, tank and other water sources accounted for meagre share in irrigated crops of sample farmers.

Table 4.1: Characteristics of operational holdings per household

(Area in Ha.)

	Loanee insured (n=110)	Non-loanee insured (n=10)	Non-insured (control) (n=30)
Own land			
Irrigated	6.19	5.96	5.75
Un-irrigated	0.56	2.28	0.46
Total	6.75	8.24	6.21
Uncultivated land			
Irrigated	0.01	0.30	0.00
Un-irrigated	0.00	0.00	0.00
Total	0.01	0.30	0.00
Cultivated land			
Irrigated	6.18	5.66	5.75
Un-irrigated	0.56	2.28	0.46
Total	6.74	7.94	6.21
Leased-in land			
Irrigated	0.96	0.00	0.13
Un-irrigated	0.15	0.00	0.00
Total	1.11	0.00	0.13
Leased-out land			
Irrigated	0.00	0.00	0.00
Un-irrigated	0.00	0.00	0.00
Total	0.00	0.00	0.00
Net operated land			
Irrigated	7.16 (91.0)	5.96 (72.3)	5.88 (92.7)
Un-irrigated	0.71 (9.0)	2.28 (27.7)	0.46 (7.3)
Total	7.87 (100.0)	8.24 (100.0)	6.34 (100.0)
Gross cropped area (GCA)	9.20	8.67	8.27
Cropping Intensity (%)	116.91	105.24	130.47

Note: Figures in parenthesis are percentage to total.

Source: Field Survey data.

Table 4.2: Sources of irrigation

(% to sample)

Farmer category	Sources of irrigation (% to sample)					
	Dug well	Bore well	Canal	Tank	Others	Total
Loanee Insured	47.3	47.3	25.5	0.0	17.3	100.0
Non-loanee Insured	60.0	20.0	10.0	0.0	20.0	100.0
Total Insured	48.3	45.0	24.2	0.0	17.5	100.0
Non-insured (Control)	53.3	46.7	13.3	0.0	20.0	100.0

Source: Field Survey

4.3 Cropping Pattern

The cropping pattern of sample households is presented in Tables 4.3, 4.4 and 4.5. It can be seen from the tables that the proportion of total area under Kharif crops was 74.9 percent, 79.2 percent and 73.1 percent respectively in case of loanee insured, non-loanee insured and control farmers. Among the kharif crops grown by sample farmers, cotton and groundnut were the major crops. The area under groundnut and cotton was about 17.1 percent and 31.2 percent of GCA respectively in case of loanee insured farmers. In case of non-loanee insured farmers, kharif area under groundnut and cotton crops was 42.4 percent and 25.7 percent respectively. For control farmers, kharif area under groundnut and cotton crops was 18.5 percent and 44.3 percent respectively (Table 4.3).

Total Rabi crops contributed about 25.0 percent, 20.8 percent and 24.5 percent of GCA of the loanee insured, non-loanee insured and control farmers respectively. Among the Rabi crops grown by sample farmers wheat was major crop. Besides small portion of lands were devoted to cultivation of potato and cumin during Rabi season. The share of area under wheat to total area under Rabi crops was 21.8 percent, 18.5 percent and 22.9 percent in case of loanee insured, non-loanee insured and control farmers respectively. The share of area

under potato to total area under Rabi crops was 1.1 percent in case of loanee insured farmers. Similarly the share of cumin crop to total area under Rabi crops were 0.4 percent, 2.3 percent and 0.8 percent of loanee insured, non-loanee insured and control farmers respectively (Table 4.4).

Table 4.3: Cropping Pattern per farm during Kharif season

(in Percentage)

Farmer category	Kharif													
	Ground nut	Cotton	Castor	Maize	Paddy	Tobacco	Urad	Tur	Vegetables	Fodder	Sesamum	Jowar	Others	Total
Loanee Insured	17.1	31.2	5.7	1.6	6.2	1.7	0.3	5.8	3.8	0.3	0.0	0.0	1.0	74.9
Non-loanee Insured	42.4	25.7	0.0	0.0	0.0	0.0	0.0	9.2	0.0	0.0	1.8	0.0	0.0	79.2
Total Insured	19.1	30.8	5.3	1.5	5.7	1.6	0.3	6.0	3.5	0.3	0.1	0.0	1.0	75.2
Non-insured (Control)	18.5	44.3	3.1	1.4	0.0	0.0	0.8	0.8	2.8	0.3	0.0	1.2	0.0	73.1

Source: Field Survey

Table 4.4: Cropping Pattern per farm during Rabi season

(in Percentage)

Farmer category	Rabi									
	Coriander	Wheat	Potato	Fodder	Cumin	Fennel	Garlic	Maize	Total	GCA
Loanee Insured	0.8	21.8	1.1	0.5	0.4	0.1	0.2	0.1	25.0	100.0
Non-loanee Insured	0.0	18.5	0.0	0.0	2.3	0.0	0.0	0.0	20.8	100.0
Total Insured	0.7	21.6	1.0	0.4	0.5	0.1	0.2	0.1	24.7	100.0
Non-insured (Control)	0.0	22.9	0.0	0.8	0.8	0.0	0.0	0.0	24.5	100.0

Source: Field Survey

Total summer crops contributed about 0.1 percent and 2.4 percent of GCA of loanee insured farmers and non-insured (control) farmers respectively. The cropping intensity for loanee insured farmers, non-loanee insured farmers and control farmers was estimated to be 116.9 percent, 105.9 percent and 130.5 percent respectively (Table 4.5).

Table 4.5: Cropping pattern per farm during Summer season

(in Percentage)

Farmer category	Summer				
	Fodder	Bajra	Total	GCA	Cropping Intensity
Loanee Insured	0.1	0.0	0.1	100.0	116.9
Non-loanee Insured	0.0	0.0	0.0	100.0	105.2
Total Insured	0.1	0.0	0.0	100.0	115.9
Non-insured (Control)	0.0	2.4	2.4	100.0	130.5

Source: Field Survey

4.4 Crop Production by Sample Households

The details of crop production during Kharif season in quintal per household and quintal per hectare is presented in Tables 4.6 and 4.7. Among Kharif crops grown by sample farmers, cotton, groundnut castor and vegetables were the major crops. Per hectare production of groundnut and cotton crops for loanee insured farmers was estimated to be 4.0 quintal and 3.9 quintal respectively. For non-loanee insured farmers, the productivity of groundnut and cotton was 4.8 quintal per hectare and 3.3 quintal per hectare respectively, which was 4.1 quintal per hectare and 3.8 quintal per hectare respectively in case control group. In case of loanee insured, non-loanee insured and control farmers the productivity of cotton was observed to be 6.3 qt/ha, 17.7 quintal per hectare and 8.5 quintal per hectare respectively.

Similarly, the productivity of groundnut was 11.1 qt/ha, 7.4 quintal per hectare and 19.7 quintal per hectare respectively.

On the other hand, the per-household (HH) production of groundnut and cotton in case of loanee insured farmers was 6.3 quintals and 11.1 quintals, respectively (Table 4.7). The per-HH production of castor and vegetables of loanee insured farmers was 3.0 quintals and 5.6 quintals, respectively. The production of groundnut and cotton in case of non-loanee insured farmers was 17.7 quintals and 7.4 quintal per household. The production of groundnut and cotton crops in case of control farmers was 8.5 quintals and 19.7 quintal per households, which was much higher as compare to total insured farmers. The per-HH production of castor and vegetables was 2.3 quintal and 5.1 quintals respectively for control farmers.

Table 4.6: Crop Productivity during Kharif Season

(Quantity in Qtls/Ha)

Particulars	Groundnut	Cotton	Castor	Maize	Paddy	Tobacco	Urd	Tur	Vegetables	Fodder	Seasmum	Jowar	Others
Loanee Insured	4.0	3.9	5.7	9.5	4.9	9.4	3.4	3.8	16.1	8.4	NA	NA	0.9
Non-loanee Insured	4.8	3.3	NA	NA	NA	NA	NA	2.5	NA	NA	0.5	NA	NA
Total Insured	4.1	3.8	5.7	9.5	4.9	9.4	3.4	3.7	16.1	8.4	0.5	NA	0.9
Non-insured (Control)	5.6	5.4	9.0	8.9	0.0	NA	3.5	7.5	24.7	37.5	NA	11.9	NA

Source: Field Survey

Table 4.7: Crop Production during Kharif Season

(Quantity in Qtls./HH)

Farmer category	Kharif													
	Groundnut		Cotton		Castor		Maize		Paddy		Tobacco		Urd	
	Main product	By-product	Main product	By-product	Main product	By-product	Main product	By-product	Main product	By-product	Main product	By-product	Main product	By-product
Loanee Insured	6.3	0.5	11.1	0.0	3.0	0.0	1.4	0.1	2.8	0.0	1.5	0.0	0.1	0.0
Non-loanee Insured	17.7	0.0	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Insured	7.3	0.4	10.8	0.0	2.8	0.0	1.3	0.1	2.6	0.0	1.4	0.0	0.1	0.0
Non-insured (Control)	8.5	0.0	19.7	0.1	2.3	0.0	1.0	1.6	0.0	0.0	0.0	0.0	0.2	0.0

Table 4.7(Cont.): Crop Production during Kharif Season

(Quantity in Qtls./HH)

Farmer category	Kharif											
	Tur		Vegetables		Fodder		Sesamum		Jowar		Others	
	Main product	By-product	Main product	By-product	Main product	By-product	Main product	By-product	Main product	By-product	Main product	By-product
Loanee Insured	2.0	0.2	5.6	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Non-loanee Insured	2.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Total Insured	2.0	0.2	5.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Non-insured (Control)	0.5	0.0	5.7	0.0	1.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0

Source: Field Survey

The details of crop productivity per hectare and production per household during Rabi season have been presented in Tables 4.8 and 4.9. Among the Rabi crops grown by sample farmers, wheat was the major crop,

followed by small area proportion under potato and cumin. The productivity of wheat in case of loanee insured farmers was 9.9 quintal per hectare. The productivity of potato, cumin and garlic crops of loanee insured farmers was 53.1 quintal per hectare, 10 quintal per hectare, 5.8 quintal per hectare. For non-loanee insured farmers, the productivity of wheat was 7.5 quintal per hectare. Where control farmers, same was 9.1 quintal per hectare comparatively higher.

The per-household (HH) production of wheat in case of loanee insured farmers was 19.9 quintals (Table 4.9). The per-HH production of potato and cumin was 5.5 quintals and 0.1 quintals in case of loanee insured farmers. The production of wheat crop in non-loanee insured farmers was comparatively higher (12.0 quintals per household). The per-HH production of cumin was 0.8 quintals per HH in case of non-loanee insured farmers. The per households production of wheat crop in control farmers was much higher (17.7 quintals) compared to both loanee insured and non-loanee insured farmers.

Table 4.8: Crop Productivity during Rabi Season

(Quantity in Qtls/Ha)

	Rabi (Quantity in Qtls.)							
	Coriander	Wheat	Potato	Fodder	Cumin	Fennel	Gralic	Maize
Loanee Insured	5.8	9.9	53.1	12.5	2.8	3.7	10.0	19.5
Non-loanee Insured	NA	7.5	NA	NA	3.8	NA	NA	NA
Total Insured	5.8	9.7	53.1	12.5	3.1	3.7	10.0	19.5
Non-insured (Control)	NA	9.4	NA	20.0	0.6	NA	NA	NA

Source: Field Survey

Table 4.9: Crop Production during Rabi Season

(Quantity in Qtls./HH)

Farmer category	Rabi															
	Coriander		Wheat		Potato		Fodder		Cumin		Fennel		Gralic		Maize	
	Main product	By-product	Main product	By-product	Main product	By-product	Main product	By-product	Main product	By-product	Main product	By-product	Main product	By-product	Main product	By-product
Loanee Insured	0.4	0	19.9	2.0	5.5	0	0.5	0	0.1	0	0	0.0	0.2	0	0.1	0
Non-loanee Insured	0.0	0	12.0	0.0	0.0	0	0.0	0	0.8	0	0	0.0	0.0	0	0.0	0
Total Insured	0.4	0	19.2	1.8	5.1	0	0.5	0	0.2	0	0	0.0	0.2	0	0.1	0
Non-insured (Control)	0.0	0	17.7	0.1	0.0	0	1.3	0	0.0	0	0	0.0	0.0	0	0.0	0

Source: Field Survey

The crop production during summer in quintal per hectare and quintal per household has been presented in Tables 4.10 and 4.11. Among the summer crops, the major crops cultivated by the sample households were bajra and fodder. The productivity of summer bajra was 10.8 quintal per hectare, which was cultivated by only sample control farmers. On the other hand, the fodder productivity was 41.8 quintals/ha for loanee insured farmers (Table 4.10). The per household crop production of summer bajra was 2.17 quintal per household and that of fodder was 0.45 quintals for loanee insured farmers and 0.42 quintals for control farmers (Table 4.11).

Table 4.10: Crop Productivity during Summer Season

(Quantity in Qtls/Ha)

	Summer	
	Fodder	Bajra
Loanee Insured	41.8	NA
Non-loanee Insured	NA	NA
Total Insured	41.8	NA
Non-insured (Control)	NA	10.8

Source: Field Survey

Table 4.11: Crop Production during Summer Season

(Quantity in Qtls./HH)

Farmer category	Zaid/Summer			
	Bajra		Fodder	
	Main product	By-product	Main product	By-product
Loanee Insured	0.00	0.00	0.45	0.00
Non-loanee Insured	0.00	0.00	0.00	0.00
Total Insured	0.00	0.00	0.42	0.00
Non-insured (Control)	2.17	0.00	0.00	0.00

Source: Field Survey

4.5 Marketing of Crop Output by Sample Households

The details of quantity sold of crop output by the sample households is presented in Table 4.12. It can be seen that, the major crop output sold by selected sample farmers during Kharif were groundnut, cotton, castor and paddy. In case of groundnut, the quantity sold was 6.31, 17.7 and 8.49 quintals by loanee insured, non-loanee insured and control farmers respectively, against the production of 6.32, 17.7 and 8.53 quintals per household, respectively. In case of cotton, production quantity was 11.8, 7.42 and 19.74 quintals per household and sold volume was 11.5, 7.4 and19.7 quintals per household by loanee insured, non-loanee insured and control farmers,

respectively. Among the castor growers, the crop production was 3.0, 2.2 quintals per household and quantity sold was 2.5 and 2.2 quintals per household by loanee insured and control farmer respectively. Thus, the major proportion of crop output realised was sold by the sample farmers.

Table 4.12: Quantity of Crop Output Sold by Sample Households during Kharif season

(Quantity in Qtls/HH)

Farmer category	Groundnut			Cotton			Castor			Maize			Paddy			Tobacco		
	Production	Sold	Retained	Production	Sold	Retained	Production	Sold	Retained	Production	Sold	Retained	Production	Sold	Retained	Production	Sold	Retained
Loanee Insured	6.3	6.3	0.0	11.1	11.0	0.0	3.0	2.5	0.5	1.4	1.1	0.3	2.8	2.7	0.1	1.5	1.5	0.0
Non-loanee Insured	17.7	17.7	0.0	7.4	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Insured	7.3	7.3	0.0	10.8	10.7	0.0	2.8	2.3	0.4	1.3	1.0	0.3	2.6	2.5	0.1	1.4	1.4	0.0
Non-insured (control)	8.5	8.5	0.0	19.7	19.7	0.0	2.3	2.3	0.0	1.0	0.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0

Table 4.9 Contd...

Farmer category	Urad			Tur			Vegetables			Fodder		
	Production	Sold	Retained	Production	Sold	Retained	Production	Sold	Retained	Production	Sold	Retained
Loanee Insured	0.1	0.1	0.0	2.0	2.0	0.1	5.6	5.6	0.0	0.2	0.0	0.2
Non-loanee Insured	0.0	0.0	0.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Insured	0.1	0.1	0.0	2.0	0.2	1.8	5.1	5.1	0.0	0.2	0.0	0.2
Non-insured (Control)	0.2	0.2	0.0	0.5	0.5	0.0	5.7	5.7	0.0	1.0	0.0	1.0

Source: Field Survey

The details of quantity of output of Rabi crops sold by the sample households have been presented in Table 4.13. It may be seen that, during Rabi season, wheat and potato were the major crops sold by the selected sample farmers. In case of wheat crop, the production was 19.8, 12.0, 8.7 quintals per household and the quantity sold was 19.8, 12.0 and 8.7 quintal by loanee insured, non-loanee insured and control farmers respectively. Among the potato crop production were 5.5 quintals per household to against sold this production were 5.5 quintals by loanee insured. Thus, entire production of Rabi crops was sold by the sample farmers. The same pattern was observed in case of summer crops also (Table 4.14).

Table 4.13: Quantity of crop output sold by sample households during Rabi season

(Quantity in Qtls/HH)

Farmer Category	Coriander			Wheat			Potato			Fodder			Cumin		
	Production	Sold	Retained	Production	Sold	Retained	Production	Sold	Retained	Production	Sold	Retained	Production	Sold	Retained
Loanee Insured	0.4	0.4	0.0	19.9	19.9	0.0	5.5	5.5	0.0	0.5	0.0	0.5	0.1	0.1	0.0
Non-loanee Insured	0.0	0.0	0.0	12.0	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8	0.0
Total Insured	0.4	0.4	0.0	19.2	19.2	0.0	5.1	5.1	0.0	0.5	0.0	0.5	0.2	0.2	0.0
Non-insured (Control)	0.0	0.0	0.0	17.7	8.7	9.0	0.0	0.0	0.0	1.3	1.3	0.0	0.0	0.0	0.0

Table 4.13 Contd..

Farmer category	Fennel			Gralic			Maize		
	Production	Sold	Retained	Production	Sold	Retained	Production	Sold	Retained
Loanee Insured	0.04	0.04	0.00	0.18	0.18	0.00	0.13	0.13	0.00
Non-loanee Insured	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Insured	0.04	0.04	0.00	0.17	0.17	0.00	0.12	0.12	0.00
Non-insured (Control)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Field Survey

Table 4.14: Quantity of crop output sold by sample households during Zaid/Summer season

(Quantity in Qtls./HH)

Farmer category	Bajra			Fodder		
	Production	Sold	Retained	Production	Sold	Retained
Loanee Insured	0.00	0.00	0.00	0.45	0.00	0.45
Non-loanee Insured	0.00	0.00	0.00	0.00	0.00	0.00
Total Insured	0.00	0.00	0.00	0.42	0.00	0.42
Non-insured (Control)	2.17	2.17	0.00	0.00	0.00	0.00

Source: Field Survey

4.6 Gross Value of Crop Output and Returns to Farmers

It was surprising to note that the control farmers growing various Kharif crops like cotton, groundnut crops had received higher returns per hectare and per household compared to that by total insured farmers (Tables 4.15 and

4.16). The value of output per hectare for groundnut was Rs. 15615.8, Rs. 18131.8 and Rs. 20240.8 for loanee insured farmers, non-loanne insured farmers and control farmers respectively. The value of output per hectare for cotton crop was Rs. 17045.4, Rs. 15236.6 and Rs. 23742.6 for loanee insured farmers, non-loanne insured farmers and control farmers respectively. While the value of output per hectare for vegetables crop was Rs. 9580.8 and Rs. 13888.4 for loanee insured farmers and control farmers respectively.

Table 4.15: Per hectare Value of Crop Production during Kharif season

Particulars	Per hectare Value of crop production -Kharif (Rs/Ha.)						
	Groundnut	Cotton	Castor	Maize	Paddy	Tobacco	Urad
Loanee Insured	15615.8	17045.4	22535.0	20074.3	10858.7	43534.7	21500.9
Non-loanee Insured	18131.8	15236.6	NA	NA	NA	NA	NA
Total Insured	16056.1	16926.0	22535.0	20161.2	11113.0	43534.7	21500.9
Non-insured (Control)	20240.8	23742.6	42722.2	11631.6	NA	NA	17500.0

Table 4.15 continues

Particulars	Per hectare Value of crop production -Kharif (Rs/Ha.)						
	Tur	Vegetables	Fodder	Seasmum	Jowar	Others	Total
Loanee Insured	13965.3	9580.8	10535.6	NA	NA	2088.6	1266.6
Non-loanee Insured	9375.0	NA	NA	3000.0	NA	NA	1216.9
Total Insured	13412.7	9580.8	10535.6	3000.0	NA	2088.6	1264.1
Non-insured (Control)	31100.0	13888.4	0.0	NA	5950.0	NA	1889.9

Note: N.A. Not Available.
Source: Field survey data.

The analysis of per household value of crop output yielded similar pattern of results (Table 4.16). The higher value of crop output received by the control farmers may be because of relatively better price realized enjoyed by them. However, during Rabi season, the trend was somewhat different. For majority of crops, the value of crop output received by the insured farmers was more compared to control farmers (Tables 4.17 and 4.18).

Table 4.16: Per Household Value of Crop Production during Kharif season

Particulars	Per hh Value of crop production -Kharif (Rs/HH)						
	Groundnut	Cotton	Castor	Maize	Paddy	Tobacco	Urad
Loanee Insured	24624.55	48971.64	11913.64	2940.91	6211.82	6890.00	624.55
Non-loanee Insured	66725.00	34008.00	0.00	0.00	0.00	0.00	0.00
Total Insured	28132.92	47724.67	10920.83	2707.50	5827.50	6315.83	572.50
Non-insured (Control)	31035.00	86954.0	10817.83	1300.00	0.00	0.00	1166.67

Table 4.16 continues

Particulars	Per hh Value of crop production -Kharif (Rs/HH)						
	Tur	Vegetables	Fodder	Seasmum	Jowar	Others	Total
Loanee Insured	7420.91	3346.77	286.36	0.00	0.00	201.27	8725.57
Non-loanee Insured	7500.00	0.00	0.00	480.00	0.00	0.00	8362.54
Total Insured	7427.50	3067.88	262.50	40.00	0.00	184.50	8706.47
Non-insured (Control)	2073.33	14665.0	0.00	0.00	583.33	0.00	11430.4

Source: Field Survey

Table 4.17: Per hectare Value of Crop Production during Rabi season

Particulars	Per hectare Value of crop production - Rabi (Rs/Ha.)				
	Coriander	Wheat	Potato	Fodder	Cumin
Loanee Insured	6746.3	15755.1	23950.5	0.0	27500.0
Non-loanee Insured	NA	11375.0	NA	NA	39375.0
Total Insured	6746.3	15559.8	23950.5	0.0	31458.3
Non-insured (Control)	NA	10780.9	NA	8000.0	5625.0

Table 4.17 continues

Particulars	Per hectare Value of crop production - Rabi (Rs/Ha.)			
	Fennel	Garlic	Maize	Total
Loanee Insured	22044.0	40000.0	24402.9	1996.0
Non-loanee Insured	NA	NA	NA	1810.8
Total Insured	22044.0	40000.0	24402.9	1994.7
Non-insured (Control)	NA	NA	NA	1314.9

Source: Field Survey

Table 4.18: Per Household Value of Crop Production during Rabi season

Particulars	Per hectare Value of crop production - Rabi (Rs/HH)				
	Coriander	Wheat	Potato	Fodder	Cumin
Loanee Insured	502.91	31643.09	2500.00	0.00	1000.00
Non-loanee Insured	0.00	18200.00	0.00	0.00	7875.00
Total Insured	461.00	30721.17	2291.67	0.00	1572.92
Non-insured (Control)	0.00	20391.67	0.00	533.33	375.00

Table 4.18 continues

Particulars	Per hectare Value of crop production - Rabi (Rs/HH)			
	Fennel	Garlic	Maize	Total
Loanee Insured	240.00	727.27	159.09	4596.55
Non-loanee Insured	0.00	0.00	0.00	3259.38
Total Insured	220.00	666.67	145.83	4509.91
Non-insured (Control)	0.00	0.00	0.00	2662.50

Source: Field Survey

The next chapter discuss the insurer behaviour.

Chapter V

Insurance Behavior of Sample Households

5.1. Introduction:

Pradhan Mantri Fasal Bima Yojana (PMFBY) being a newer one, providing necessary information about various aspects of the same including eligibility, benefits and enrolment procedure is essential for better adoption of the scheme. The details of enrolment and awareness of selected sample farmers about PMFBY is discussed in this chapter.

5.2 Details of Enrolment and Awareness about PMFBY

It can be was observed from Table 5.1 that about 71.8 percent of the total loanee insured farmers were aware about PMFBY, all non-loanee insured farmers were aware about PMFBY. Among the PMFBY loanee-insured farmers, about 70.0 percent of them had also availed other crop insurance services. On the other hand, all non-loanee insured farmers could avail the services under other insurance schemes. All of the loanee farmers were insured their crop because they had taken crop loans from the bank and about 54 percent of them were voluntarily enrolled for the same. In case of non-loanee insured farmers, all had enrolled for crop insurance voluntarily through insurance agencies.

The major source of information about the scheme for was government awareness programs (both loanee and non-loanee farmers) (Table 5.1). The insurance companies and agents played insignificant role in generating awareness about the PMFBY scheme.

Table 5.1: Enrolment and Awareness (% to sample)

Type of sample Farmers	Heard of PMFBY		Availed any other insurance scheme		Insured in PMFBY		Insured because you had applied for loan		Voluntary enrollment under PMFBY	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Loanee	71.8	28.2	70.0	30.0	100.0	0.0	100.0	0.0	53.6	46.4
Non-loanee	100.0	0.0	100.0	0.0	100.0	0.0	0.0	100.0	100.0	0.0

Table 5.1 continues...

Type of sample Farmers	How did you know about PMFBY Scheme*				
	1	2	3	4	5
Loanee	32.7	7.3	15.5	18.2	47.3
Non-loanee	90.0	0.0	0.0	20.0	10.0

Notes: Field Survey Notes:*Government awareness programs-1, Insurance Company/Agent -2, Panchayat-3, other villagers-4, others-5.
Source: Field survey data.

5.3 Insurance Details of Selected Crops

Since the premium rates and insurance details varies from crop to crop, this section provides the insurance details for two major Kharif crops (cotton and groundnut) and one major Rabi crop (wheat). The insurance details for cotton have been shown in Table 5.2. It may be seen that about 54.2 percent and 27.7 percent of loanee insured farmers had taken crop loan with crop insurance from Cooperative bank society and Bank of Baroda respectively. While remaining farmers had taken crop loan with insurance from Central Bank, Cooperation Bank, Dena Bank, PNB, SBI and Union Bank of India; whereas all non-loanee insured farmers had taken crop insurance from Agricultural Insurance Company Ltd (AIC).

Average amount of premium paid by the loanee cotton farmers and non-loanee cotton farmers was about Rs. 3003 and Rs. 3970 per household respectively. Among different kinds of events of losses, the highest of 53.0 percent of event of losses were accounted due to drought, dry spells, flood, pest attacks and diseases etc.; while 20.5 percent of event of losses were accounted because of prevented sowing/planting due to deficit rainfall or adverse weather and remaining events of losses were due to post harvest losses, localised calamities (cyclone, landslide). In case of entire non-loanee insured farmers, the crop yield loss was due to drought, dry spells, flood, pest attacks and diseases etc.

As far as compensation received from insurance companies is concerned, on an average of Rs. 13523.4 and Rs 15480.0 per household compensation were paid to the cotton farmers against the crop loss for loanee insured farmers and non-loanee insured farmers respectively. Thus, the compensation for crop losses was more to the non-loanee cotton farmers compared to the loanee farmers.

In case of groundnut growers, only 0.8 percent and 0.2 percent loanee insured farmers had taken crop loan with crop insurance from Cooperative bank or society and SBI respectively (Table 5.3). All non-loanee insured groundnut farmers had taken crop insurance from AIC. Average amount of premium paid by loanee and non-loanee groundnut farmers was estimated to be Rs. 1323.3 and Rs. 1470.7 per household respectively. In case of loanee farmers, about 90.0 percent events of losses were mainly because of drought, dry spells, flood, pest attacks and diseases etc and remaining events of losses were due to prevented sowing/planting due to deficit rainfall or adverse weather. In case of entire non-loanee insured farmers, the crop yield loss was due to drought, dry spells, flood, pest attacks and diseases etc.

As far as compensation received from insurance companies is concerned, an average of Rs. 34039.7 and Rs. 23220.0 as compensation were paid to the groundnut farmers against the crop loss for loanee and non-loanee respectively. Thus, the compensation for crop losses was much higher in case of loanee farmers compared to non-loanee farmers.

Table 5.2: Insurance details for Cotton Growers (per household)

Cotton	Name of implementing agency								
	Bank of Baroda	Central Bank	Cooperative Bank/ Societies	Corporation Bank	Dena Bank	PNB	SBI	Union Bank	AIC
Loanee	27.7	2.4	54.2	1.2	3.6	1.2	7.2	2.4	0.0
Non-loanee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100

Table 5.2 continues...

Cotton	Premium in Rs.	Event of Losses (code)*				Compensation Secured (Rs.)
		1	2	3	4	
Loanee	3003.2	20.5	53.0	6.0	9.6	13523.4
Non-loanee	3969.6	0.0	100.0	0.0	0.0	15480.0

Notes: Codes*: 1-prevented sowing/planting due to deficit rainfall or adverse weather, 2- yield loss (due to drought, dry spells, flood, pests and diseases etc.) 3- post harvest losses (spoilage during storage), 4- localized calamities such as cyclones, landslides etc.
Source: Field survey data.

Table 5.3: Insurance details of Groundnut Growers (per household)

Groundnut	Name of implementing agency								
	Bank of Baroda	Central Bank	Cooperative Bank/Societies	Corporation Bank	Dena Bank	PNB	SBI	Union Bank	AIC
Loanee	0.0	0.0	0.8	0.0	0.0	0.0	0.2	0.0	0.0
Non-loanee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

Table 5.3 continues...

Groundnut	Premiums in Rs.	Event of Losses (code)				Compensation Secured (Rs.)
		1	2	3	4	
Loanee	1323.3	10.0	90.0	0.0	0.0	34039.7
Non-loanee	1470.7	0.0	100.0	0.0	0.0	23220.0

Notes and Source: Same as Table 5.2

Table 5.4: Insurance details of Wheat growers (per household)

Wheat	Name of implementing agency								
	Bank of Baroda	Central Bank	Cooperative Bank/Societies	Corporation Bank	Dena Bank	PNB	SBI	Union Bank	AIC
Loanee	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-loanee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

Table 5.4 continues...

Wheat	Premiums in Rs.	Event of Losses (code)				Compensation Secured (Rs.)
		1	2	3	4	
Loanee	4800.0	0.0	0.0	0.0	0.0	0.0
Non-loanee	3525.0	0.0	0.0	0.0	0.0	0.0

Notes and Source: Same as Table 5.2.

The insurance details of wheat farmers have been shown in Table 5.4. It may be seen that entire loanee insured wheat farmers had taken crop loan with crop insurance from of Co-operative bank/societies; whereas entire non-loanee insured wheat farmers had taken crop insurance from AIC. Average amount of premium paid by the loanee and non loanee farmers was Rs. 4800.0 and Rs. 3525.0 respectively. It is worth-mentioning that, during rabi season (wheat crop) both categories of sample farmers had no claim against any event of crop losses, thus did not receive any compensation.

5.4 Overall experience with PMFBY

Overall experience with PMFBY has been presented in Table 5.5. About 36.4 percent loanee insured farmers said that they were never insured under earlier crop insurance scheme, 45.5 percent of them said that PMFBY is better than earlier schemes whereas 70 percent non-loanee insured farmers said that

it is better than earlier schemes and 20 percent of them said it is worse than earlier schemes.

Table 5.5: Farmers' Experiences with PMFBY

Sr. No.	Details of experience	Type of sample Farmers (%)	
		Loanee	Non-loanee
1	Experience with PMFBY:		
	Better than earlier schemes	45.45	70.00
	Worse than earlier scheme	6.36	20.00
	Same any other scheme	9.09	0.00
	Never insured earlier	36.36	0.00
	Cannot say	2.73	10.00
2	Event of loss did you inform to any authority :		
	Yes	70.00	100.00
	No	30.00	0.00
3	Whom did you inform?		
	Insurance company	2.73	0.00
	Bank	5.45	0.00
	Local Govt. Official	37.27	100.00
	Toll free number	0.00	0.00
	KVK officer	0.00	0.00
	Others	24.55	0.00

Source: Field Survey data.

About 70 percent loanee insured farmers informed that they have informed the authorities about the event of losses. Among them, 37.3 percent and 24.5 percent loanee insured farmers had informed about the event of losses directly to local government officials and others (Gram Sevak and Agriculture Officer), respectively. In case of non-loanee farmers, all of them had informed about the event of losses directly to local government officials.

5.5 PMFBY Implementation related Issues

The details of PMFBY implementation related issues faced by the selected sample farmers have been shown in Table 5.6. It may be seen that, about 30.0 percent loanee insured farmers had informed the authority within

15 days of the crop loss whereas about 13.6 percent loanee insured farmers had informed within 48 hours and remaining said that they had informed within one month. Also about 90 percent non-loanee insured farmers have expressed that they had informed about the crop loss within 15 days and remaining farmers of them said that they had informed within one month. Of the total loanee insured farmers, 27.3 percent said that their farm was visited during Crop Cutting Experiment (CCE) while 40.9 percent said that their farm was not visited for CCE. Among non-loanee insured farmers, 20 percent said that their farm was visited during CCE while 80 percent said that their farm was not visited for CCE.

Of the total loanee insured farmers, 26.4 percent mentioned that they were aware about yield assessment of CCE while 41.8 percent were not aware about yield assessment of CCE. In case of non-loanee insured farmers, 70.0 percent were aware about yield assessment of CCE while 30.0 percent were not aware about yield assessment of CCE. Of the total loanee insured farmers, 23.6 percent were aware about role of panchayat in process of claims while 44.5 percent were not aware about role of panchayat in process of claims. In case of non-loanee insured farmers, 70.0 percent were aware about role of panchayat in process of claims while 30.0 percent that they were not aware about role of panchayat in process of claims. Of the total loanee insured farmers, 43.6 percent were a satisfied with the implementation PMFBY while 24.5 percent were not satisfied with the implementation PMFBY. In case of non-loanee insured farmers, 70.0 percent are satisfied with the implementation of PMFBY while 30.0 percent said that they are not satisfied with the implementation of PMFBY.

Table 5.6: PMFBY Implementation Related Issues

(% in sample)

Type of sample farmers	Event of loss did you inform how many days				Did anyone visit your farm during CCE		Are you aware of any yield assessment of CCE taking place in village		Role of panchayat in process of claims		Are you satisfied with the implementation PMFBY	
	Within 48 hours	Within 15 days	Within one month	Within 3 months	Yes	No	Yes	No	Yes	No	Yes	No
Loanee	13.6	30.0	1.8	0.0	27.3	40.9	26.4	41.8	23.6	44.5	43.6	24.5
Non-loanee	0.0	90.0	10.0	0.0	20.0	80.0	70.0	30.0	70.0	30.0	70.0	30.0

Source: Field Survey

As discussed above, loanee and non-loanee insured farmers faced some issues in implementation of PMFBY. So as to resolve these issues and to improve the adoption rate of the scheme, they have made some suggestions which are shown in Table 5.7. Among the loanee insured farmers, about 31.8 percent farmers suggested to provide timely compensation, 22.73 percent suggested to provide more accurate assessment due to crop losses, 18.1 percent expressed the need of more awareness about the crop insurance scheme. About 8.1 percent respondents suggested to reduce official complexity and emphasized on less time requirement and less paper work for enrolment and claim disbursement. About 7.2 percent suggested to reduce the premium rate, while 6.4 percent desired that the compensation amount should be high and premium should not be deducted automatically. About 5.4 percent suggested to provide higher compensation due to yield loss.

In case of non loanee insured farmers, about 60.0 percent farmers suggested to adopt more accurate method of assessment during crop loss and 20 percent wanted lower premium rate. About 10 percent of them wanted to get higher compensation due to crop loss and 10 percent wanted to get timely

compensation. It is worth noticing that, the majority of loanee insured farmers wanted to get timely compensation and more accurate assessment due to crop losses; whereas the majority of non- loanee insured farmers desired more accurate assessment of crop losses.

Table 5.7: Suggestions for further Improvement of PMFBY (in %)

Type of sample Farmers	Premium should be lower	Less time to finish paperwork	Higher compensation	Timely compensation	More accurate assessment of losses	Need more awareness about the scheme	Premium should not be deducted automatically
Loanee	7.27	8.18	5.45	31.82	22.73	18.18	6.36
Non-loanee	20.00	0.00	10.00	10.00	60.00	0.00	0.00

Source: Field Survey

The details regarding extent of awareness about PMFBY and the non-uptake of the same by the control farmers has been presented in Table 5.8. It may be seen that, about 73.3 percent of the control farmers had heard about PMFBY and 26.6 percent control farmers of them had no idea about PMFBY. As regards the sources of awareness, about 43.3 percent, 16.6 percent, 10 percent and 3.3 percent of control farmers got the information about PMFBY from cooperative society, media, farmer's friend and gram sevak respectively. About 33.3 percent of control farmers expressed that they are not interested in this scheme, while 20 percent of them believed that the claim settlement process is tedious. About 13.3 percent of them believed that they may not get compensation due to crop losses, whereas only 6.7 percent farmers expressed that no sufficient time was there for getting enrolled for the crop insurance, even if they were interested to get enrolled for the same.

Table 5.8: Awareness and Non-uptake of PMFBY by the Control Farmers (in %)

Heard of PMFBY		If yes, who informed you				Why did you not enrollment for PMFBY (up to 3 reason)			
Yes	No	Co-operative Society	Farmer's friend	Gram Sevak	Media	Tedious claim settlement process	No compensation	Not interested	No sufficient time for enrolling of the crop insurance
73.33	26.67	43.33	10.00	3.33	16.67	20.00	13.33	33.33	6.67

Source: Field Survey

The next chapter present the details on willingness to pay for crop insurance by the selected households.

Chapter VI

Willingness to Pay for Crop Insurance

6.1. Introduction

The details of choice experiments have been explained in the methodology section of introductory chapter earlier. Based on DCEs, the willingness to pay for crop insurance has been assessed in this Chapter. It is worth-mentioning that the name of PMFBY was not disclosed to the sample farmers so as to avoid biases. However, all the attributes exist in the scheme was presented in the choice sets so as to assess the willingness to pay for the same scheme and all farmers were asked to share their experiences of enrolling for PMFBY after the end of the experiments. Since it was entirely different kind of experiment where the name of PMFBY scheme was not disclosed, entirely new set of sample households were surveyed from the sample districts of Gujarat. In total, 144 farmers were chosen for the experiment from 12 villages of 4 talukas of 2 districts (i.e., Anand and Vadodara) of Gujarat state.

6.2. Demographic Profile of Sample Respondents of Choice Experiments

The demographic profile of the sample farmers is presented in Table 6.1. It can be seen that the majority of the sample farmers chosen for the experiments were experienced farmers with average years of farming experience of 26 years. Around 53 percent of them were aged between 46 and 65. All of them were male. Majority of them had completed matriculation (38.2%) and majority of them were of general caste (69.4%). The average size of land holding was 2.6 ha. The major crops cultivated by the sample farmers were paddy, bajra, banana, tur and vegetables.

Table 6.1 Demographic description of sample respondents

Particulars	Number	Percent
Age (years):		
25 to 45	47	32.6
46 to 65	76	52.8
66 to above	21	14.6
Gender :		
Male	144	100.0
Female	0	0.0
Education:		
CHSE (class 11-12) Completed	27	18.8
Graduation (Bachelors) Completed	16	11.1
High school (class 9-10) Completed	55	38.2
Middle (class 6-8) Completed	31	21.5
No schooling/ primary incomplete	3	2.1
Postgraduate (Masters) or higher Completed	5	3.5
Primary (class 1-5) Completed	6	4.2
Vocational training	1	0.7
Caste Category/Group:		
General Caste	100	69.4
OBC	30	20.8
SC	12	8.3
ST	2	1.4
Religion:		
Hindu	128	88.9
Muslim	16	11.1
Average years of experience of farming	26	26
Average land cultivation during Kharif season (Ha)	3.80	3.80
Average land ownership (Ha)	2.60	2.60
Major crops	Paddy, bajra, banana, tur, vegetables etc.	

Source: Field survey

6.3. Asset Ownership by Respondents

The asset ownership pattern by the sample farmers has been stated in Table 6.2. It may be seen that among cattle, buffalo was major one possessed by 43 percent of sample farmers. About 34.7 percent of them had tractors and

27.8 percent of them had tractor trolley. Thus, the extent of farm mechanisation was good among the sample farmers. Major essential household assets were present in the majority of households.

Table 6.2: Asset ownership by respondents

Particulars	Number of respondents	Percentage
Dairy cow	47	32.64
Bull	3	2.08
Buffalo	62	43.06
Goat	6	4.17
Sheep	2	1.39
Bore well	16	11.11
Tube well	5	3.47
Power tiller	4	2.78
Tractor	50	34.72
Thresher	5	3.47
combined harvester	2	1.39
tractor trolley	40	27.78
Rotavator	2	1.39
small equipment	89	61.81
spraying machine	4	2.78
Atta chakki	5	3.47
sewing machine	8	5.56
chaff cutter	9	6.25
Sprayer	65	45.14
Rice miller	1	0.69
Refrigerator	120	83.33
Radio	1	0.69
TV	136	94.44
Fan	141	97.92
Bed	142	98.61
Chair	139	96.53
mobile phone	141	97.92
cycle rickshaw	37	25.69
Auto rickshaw	2	1.39
Motorcycle	128	88.89
Car	36	25.00
Others	4	2.78

Source: Field survey

6.4. Source-Wise Average Annual Income

Table 6.3 presents the source-wise average annual income per household of the sample farmers. Since both Anand and Vadodara were developed districts with diversified livelihood options, the farmers were found

to generate substantial amount of household income from other sources besides agriculture. Some of the family members of the sample farmers were also NRIs that brings substantial amount of remittances. As a result, the transfers and others including money from abroad was the major component of their family income constituting about 49 percent of total family income of sample farmers. Agricultural income constituted about 8.4 per cent and other wages and salaries constituted about 22.9 per cent of total household income.

Table 6.3: Source-wise Average Annual Income per household

Particulars	Average Income (In Rs.)	% Share
Agricultural income	10493.3	8.4
Livestock and milk	5659.0	4.5
Agricultural Wages	1340.3	1.1
Other Wages/Salaries	28738.6	22.9
Self-employed business (trade and crafts)	17666.7	14.1
Transfers and others including money from abroad	61579.9	49.1
Total	125477.7	100.0

Source: Field survey

6.5. Access to Credit by the Sample Farmers

It may be seen from Table 6.4 that the 93.8 percentage of respondents having taken a loan from any source which shows that almost all farmers could avail to some sorts of external financing for their farming activities. Majority of them (63.9%) had taken loans from formal source whereas 24.3 per cent of them had taken loans from friends and relatives.

Table 6.4: Access to Credit

Assets	Number	Percent
Percentage of respondents having taken a loan from any source	135	93.75
% having take loan from formal source	92	63.89
% having take loan from friends and relatives	35	24.31
% having take loan from Group based society	8	5.56
% of respondents who still have outstanding debt from all sources	23	15.97

Source: Field survey

6.6. Respondents' Experience of Implementation of PMFBY

The details of respondents' experience of implementation of PMFBY have been stated in Table 6.5. It may be noted that the 71.5 percentage respondents had heard of PMFBY however, the percentage of who were insured under PMFBY in Kharif 2017 was only 11.1 per cent. None of them were found to have enrolled for PMFBY during Rabi season. About 10.4 per cent of them were loanee farmers.

Table 6.5: Respondents' Experience of Implementation of PMFBY

Particulars	Number	Percent
% respondents who have heard of PMFBY	103	71.53
% respondents who were insured under PMFBY in kharif 2017	16	11.11
% respondents who were insured under PMFBY in rabi 2017-18	0	0.00
% loanee farmers	15	10.42
% respondents who received compensation, if insured	0	0.00
% cases where respondents aware of crop-cutting experiments done on their field/in their Panchayat	0	0.00

Source: Field survey

6.7. Transaction Costs Associated with Purchase of Insurance

The transaction costs associated with purchase of insurance is presented in Table 6.6. About 88.2 per cent of the farmers expressed that they are likely to purchase an insurance policy even if they have to travel to the nearest office of the financial institutions to buy the policy. About 93.1 per cent of them said that they are likely to purchase an insurance policy even if they have to personally inform the insurance agency of losses on your field. About 87.5 per cent of them said that they are likely to purchase an insurance policy even if they have to submit copy of land records. There were no hesitation to provide bank account details and Adhaar cards for purchasing crop insurance. Thus, it

was clear that the farmers were very much interested in crop insurance products if those products fulfil their choices and preferences.

Table 6.6: Transaction Costs associated with Purchase of Insurance

Sr. No.	Particulars	Number of farmers	% who said yes
1	How likely are you to purchase an insurance policy if you have to travel to the nearest office of the financial institutions to buy the policy?	127	88.19
2	How likely are you to purchase an insurance policy if you have to submit copy of Adhaar card?	133	92.36
3	How likely are you to purchase an insurance policy if you have to submit details of your bank account?	131	90.97
4	How likely are you to purchase an insurance policy if you have to submit copy of land records?	126	87.50
5	How likely are you to purchase an insurance policy if you have to personally inform the insurance agency of losses on your field?	134	93.06

Source: Field survey

6.8. Estimating Willingness to Pay for Policy Attributes

Table 6.7 shows the results from estimating the utility function directly in WTP space. This is done by estimating a generalized multinomial logit function. The upper panel reports the estimates of the mean willingness to pay for the corresponding attribute and the lower panel reports the corresponding standard errors. All the estimated coefficients are statistically significant at 1 percent level of significance. Positive value of a coefficient in the upper panel indicates the monetary value a farmer is willing to pay if the attribute changes from base category to category corresponding to the coefficient. A negative coefficient indicates the discount a farmer expects and must be given to the farmer for a change in the attribute from base category to the category corresponding to the coefficient.

Table 6.7: Regression Results from GMNL

Variable name	GMNL
Utility Parameters:	
Coverage: Sowing to harvesting	-1.554***
	(0.164)
Coverage: Pre-planting	-5.23***
	(0.39)
Coverage: Post-harvest	-4.825***
	(0.343)
Loss determination: Remote sensing	-0.463**
	(0.22)
Loss determination: Rainfall index	-1.14***
	(0.201)
Certainty of payment	0.889***
	(0.154)
Sum insured	0.09***
	(0.008)
het. (Intercept)	1.315**
	(0.588)
Distribution Of Utility Parameters:	
SD (Coverage-Sowing to harvesting)	1.525***
	(0.17)
SD (Coverage- Pre-planting)	3.466***
	(0.288)
SD (Coverage-Post-harvest)	2.779***
	(0.258)
SD (Loss determination -Remote sensing)	2.559***
	(0.221)
SD (Loss determination -Rainfall index)	2.481***
	(0.195)
SD (Certainty of payment)	0.908***
	(0.17)
SD (Sum insured)	0.078***
	(0.008)
Tau	2.122
SD (Tau)	(0.432)
Log likelihood function value	-746.717
Number of Halton draws used	1000
Number of choice observations	852
Number of individuals	142

Note: Standard error in parenthesis; ***Significant at 1 percent; **Significant at 5 percent; *Significant at 10 percent
Source: Estimated from field survey data.

All coefficients should be multiplied by a factor of 1000 for correct interpretation. For example, the coefficient corresponding to 'Coverage: Sowing to harvest' is -1.554. This implies that if there is a change in the coverage period of an insurance policy from full coverage (pre-planting to post-harvest), which is our base category to only 'Sowing to harvesting', then the farmer expects to be paid Rs. 1.554*1000 or Rs.1554 on an average. Similarly, if we consider the coefficient of "Certainty of Payment", it can be understood that a farmer would be willing to pay Rs. 889 on an average for increase in the certainty of payment made to him as against the base category. The lower panel gives the estimates of the distribution of the attribute and a measure of the heterogeneity in that attribute.

6.9 Factors affecting Willingness to Pay Measures

Table 6.8 reports the results from the regression of the willingness to pay for an attribute on several household characteristics like age, farming experience, caste, gender, etc. This is a simple Ordinary least square regression. The coefficient corresponding to each characteristic shows the value by which the WTP for the attribute will rise or reduce if the household characteristic rises by 1 unit. Again, all coefficients should be multiplied by a factor of 1000 for correct interpretation. For ex-ample, for 'Coverage: Pre-Planting', in second column, if the area cultivated in Kharif 2017 rises by 1 acre then the willingness to pay rises by Rs. 621 on an average. Likewise, in the first column, if age of the farmer rises by 1 year, then he would be willing to pay Rs. 617 on average extra for 'Coverage period: Sowing to harvesting'.

Table 6.8: Regression Results from OLS regression of Policy attributes on Household Characteristics

Variable name	Coverage: Sowing to Harvesting	Coverage: Pre-Planting	Coverage: Post-harvest	Loss determination: Remote sensing
Intercept	-20.78112	-40.88022	-45.50796	13.96298
	(16.2761)	(41.50272)	(35.58189)	(23.8877)
Age (in years)	0.61799	0.29207	0.64773	-0.4418
	(0.69302)	(1.76714)	(1.51504)	(1.01711)
Age squared	-0.00539	-0.00079	-0.00513	0.00523
	(0.00667)	(0.01701)	(0.01459)	(0.00979)
Farming experience (in years)	0.0319	0.25621	0.6452	-0.20718
	(0.31248)	(0.7968)	(0.68313)	(0.45862)
Farming experience squared	-0.00203	-0.00869	-0.01387	0.00094
	(0.00538)	(0.01373)	(0.01177)	(0.0079)
Area cultivated in Kharif 2017	0.09435	0.62101	0.69147	-0.21597
	(0.32122)	(0.81909)	(0.70224)	(0.47145)
Area cultivated squared	-0.00372	-0.01586	-0.01583	0.00437
	(0.00927)	(0.02363)	(0.02026)	(0.0136)
Duration of primary crop (months)	0.27525	1.1127	-0.00176	0.86144
	(1.12514)	(2.86902)	(2.45972)	(1.65132)
Insured during Kharif 2017=1	1.96586	12.01243*	4.66	-2.9065
	(2.68332)	(6.84223)	(5.86611)	(3.93818)
General caste=1	-4.11445	-2.92998	-5.44337	-6.55577
	(2.84771)	(7.26143)	(6.22551)	(4.17946)
Other Backward Class=1	-0.77815	8.57718	7.60914	-4.51678
	(3.20593)	(8.17486)	(7.00862)	(4.7052)
Adjusted R-squared	-0.0085	0.0056	0.028	-0.0107
No. of observations	142	142	142	142

Table 6.9 continues.....

Variable name	Loss determination: Rainfall index	Certainty Of payment	Sum-insured
Intercept	1.30949	1.69002	-0.07809
	(26.20811)	(9.21431)	(0.84302)
Age (in years)	0.29607	0.357	0.03722
	(1.11591)	(0.39233)	(0.03589)
Age squared	-0.00285	-0.00352	-0.00042
	(0.01074)	(0.00378)	(0.00035)
Farming experience (in years)	-0.21353	-0.12615	-0.01987
	(0.50316)	(0.1769)	(0.01618)
Farming experience squared	0.00124	0.00197	0.00039
	(0.00867)	(0.00305)	(0.00028)
Area cultivated in Kharif 2017	-0.36441	-0.00538	-0.01321
	(0.51724)	(0.18185)	(0.01664)
Area cultivated squared	0.01089	-0.00064	0.00036
	(0.01492)	(0.00525)	(0.00048)
Duration of primary crop (months)	-1.61676	-0.839	-0.04787
	(1.81173)	(0.63697)	(0.05828)
Insured during Kharif 2017=1	2.1204	-0.8023	0.06182
	(4.32073)	(1.51909)	(0.13898)
General caste=1	-2.43808	-1.47396	0.17331
	(4.58544)	(1.61216)	(0.1475)
Other Backward Class=1	2.37507	-1.42412	-0.02258
	(5.16225)	(1.81496)	(0.16605)
Adjusted R-squared	-0.021	-0.0403	-0.0128
No. of observations	142	142	142

Note and Source: Sam as Table 6.

The next chapter presents summary and conclusions.

Chapter VII

Summary and Policy Implications

7.1 Backdrop

India is an agrarian economy and agriculture is primarily a gamble of monsoon. As a result, farmers are exposed to a variety of climatic and economic risks. Millions of tonnes of agricultural produce are damaged by these risk factors each year across the country. On account of failure of crops, indebtedness, illness, frustration, family dispute etc. are also increasing among the farmers. The failure of crops and indebtedness are major causes of farmers' suicide across the country. Since, agriculture is highly susceptible to natural calamities such as floods, droughts, heavy rains, hail-storm, pests/insects, diseases etc., it is necessary to protect the farmers from the adversities which occur frequently across the country. Agricultural insurance is considered as an important mechanism to address the risk of output and income resulting from various natural and manmade events. A number of crop insurance schemes like Pilot Crop Insurance Scheme (PCIS), Comprehensive Crop Insurance Scheme (CCIS), Experimental Crop Insurance Scheme (ECIS), Pilot Scheme on Seed Crop Insurance (PSSCI), Farm Income Insurance Scheme (FIIS), Sookha Suraksha Kavach, National Agricultural Insurance Scheme (NAIS), Weather Based Crop Insurance Scheme (WBCIS), etc. have been implemented in the country over a period of time. Looking at changing needs of the farmers, Pradhan Mantri Fasal Bima Yojana (PMFBY) was implemented since Kharif 2016, replacing NAIS and modified NAIS.

The new scheme compulsorily covers the farmers that avail the seasonal crops loan (loanee farmers). The non-loanee farmers can also be covered under PMFBY, if they are interested to come under PMFBY. All major Kharif and Rabi crops are notified under PMFBY. The premium rate of Kharif crops is fixed i.e. 2% of sum insured to be paid by farmers, while it is 1.50% of the value of sum insured for Rabi crops. In case of commercial and horticultural crops, 5% of the sum is insured to be paid by the farmers. From sowing to threshing of crops, everything is covered under PMFBY. It is a new scheme which had been uniformly started throughout the country. A number of agencies are involved in the process of PMFBY. In Gujarat, for season kharif- 2016, two insurance companies namely Agricultural Insurance Company (AIC) and HDFC Ergo were involved for implementation of the scheme and for season Rabi 2016-17, United India Insurance Company (UIIC) was involved for implementation of the scheme. Being a new scheme implemented on a large scale, a number of bottlenecks such as lack of awareness among the farmers about PMFBY and lack of willingness to pay a very marginal amount of premium, lack of understanding of insurance process, non-access to insurance providers, delay in receipt of insurance claims have cropped up in the process of implementation.

In this context, the present study was undertaken (i) to assess the performance and functioning of the PMFBY scheme in Gujarat; (ii) to examine the role of different stakeholders such as insurance companies (known as the implementing agencies), the financial institutions (nodal and lending banks), insurance agents and farmers/cultivators for efficient functioning of the scheme in the state; (iii) to assess the extent of adoption of PMFBY by the farmers, the benefits realised and the constraints faced by the farmers; and (iv)

to assess the willingness to pay by the farmers and necessary modifications required in the scheme so as to make it more effective for the farmers.

The present study is a part of an all-India level coordinated study, coordinated by Centre for Management in Agriculture, Indian Institute of Management, Ahmedabad. The study was conducted in two phases. In the 1st phase, the process of implementation at the state level was comprehensively mapped. In the exercise, 9 AERCs were involved. The study involved mixed methods of data collection involving both secondary and primary sources of data.

The phase I study was intended to focus mainly on performance of PMFBY and implementation issues in the state. As per the stated distribution, a total of 150 households were covered under the detailed survey (Table 1.4). Out of 150 households, 110 households were loanee farmers (beneficiary farmers), 10 households were non-loanee farmers and another 30 households were control farmers.

In the phase II, two districts (Anand and Vadodara) were selected for the survey. From each of the district, 72 households were selected from two blocks and 6 villages. From each block, three villages were selected. In total, 144 households were selected from 12 villages covering 4 blocks of two selected districts.

The data were analysed with the help of simple statistical tools. However, during the second phase, Generalised Multi-Nomial Logit (GMNL) model was used for making a parametric estimation of the likelihood of a

farmer opting for a crop insurance scheme such as PMFBY. The dependent variable was a *categorical* - representing farmers with and without crop insurance. Explanatory variables included some utility parameters such as coverage period of crop insurance, loss determination method, certainty of payment and sum insured. The Ordinary Least Square (OLS) Method was also used to assess the strength of factors affecting the willingness to pay.

7.2 Summary of Findings:

7.2.1. Progress in Implementation of PMFBY in Gujarat

PMFBY is a flagship scheme of crop insurance implemented since Kharif 2016 with an ambition of covering 50 percent of the farmers in India within 5 years. The majority of the farmers insured under PMFBY belong to four states namely Maharashtra, Rajasthan, Madhya Pradesh and West Bengal constituting about more than 72 percent of the total farmers covered in India. Uttar Pradesh, Bihar, Karnataka, Gujarat contributes 10 to 15 percent each in the total number of farmers insured under PMFBY in India, while the coverage is very low in all the other states. As far as area insured under PMFBY is concerned, Rajasthan occupies the major share followed by Madhya Pradesh, Maharashtra and Uttar Pradesh. Chhattisgarh, Odisha, Gujarat, West Bengal constitutes about 6-8 percent share each in the total area insured under PMFBY in India.

In Gujarat, around 4 lakh of farmers were insured with to 6.8 lakh hectares area under PMFBY in year 2016-17. Among the implementing agencies, AIC cluster has covered major share of the farmers. There was a common complaint about the earlier schemes that they provided cover to crop

loans rather than to crop losses, as the participation rate of non-loanee farmers was very low. Hence, more emphasis was given on the coverage of non-loanee farmers under PMFBY. In Gujarat, among the total farmers covered during Kharif 2016, around 0.02 lakh farmers were non-loanee farmers in Kharif season.

Around 10 percent share in premium was paid by farmers for Kharif season whereas during Rabi season, around 45 percent share in premium was borne by the farmers during 2016-17. In Kharif season, state government's share was around 43 percent in premium whereas in Rabi season 28 percent share was borne by state government. In Kharif season, central government's share was around 43 percent in premium when during Rabi season 28 percent share was borne by central government. Thus, about 90 percent of total premium for Kharif season and 55 percent in Rabi season were paid by the state and central government jointly.

During Kharif 2016, the applications for claims in the state were mostly made by the farmers of Junagadh, Rajkot, Surendranagar and Jamnagar district. Of these, the farmers of Rajkot, Junagadh, Amreli, Jamnagar and Devbhumi Dwarka received the maximum claims. A total of 44335 farmers got benefit with claim settlements in the Kharif season. For Rabi season, the applications for claims were mostly made by the farmers of Junagadh, Jamnagar and Rajkot district. Of these, highest Junagadh district farmers got the benefits of claim settlement; total 39564 farmers got benefit for claim in Rabi season of 2016-17. Thus a total of 482899 farmers were benefited with receipt of claims under the PMFBY in 2016-17.

Though the coverage under new scheme has increased, several factors have contributed to the scheme slowing down. Some of them are insufficient time for enrolment, disputes between the states and insurance companies on yield data and compensation resulting in delay in settlement and more focus on impractical targets/goals without much stress on quality of implementation. The central government has been citing poor implementation by the states for the lackadaisical response to the scheme. State officials say that the bid of private insurance companies for more profit and delay in settlement of claims are crucial factors for the decline.

7.2.2 Socio-Economic Profile of Sample Households

Overall socio-economic profile of sample farmers was good. The analysis on education status of sample households reveals that, in case of insured farmers (loanee and non-loanee), around 12.5 percent were illiterate, 18.3 percent farmers had completed primary education, highest 46.7 percent farmers had completed secondary education and 22.5 percent farmers had completed graduation. Around 86 percent of the farmers from the loanee insured farmers belonged to general caste and other remaining belonged to SC/ST/OBC caste category.

Almost all the loanee insured farmers were engaged in farming that means main occupation was agriculture and allied activities, with about 43 percent were involved in agriculture labour, 38 percent were engaged in other occupations. In case of loanee farmers, about Rs. 0.4 lakh of annual income was generated from milk sale. Similarly, average Rs. 0.6 lakh income was generated from farm labour. A total income of Rs. 0.69 lakh was generated from various non agriculture sources in case of loanee insured farmers. In case

of non-loanee farmers, average annual income generated was Rs 0.64 lakh. In comparison to insured farmers, the control farmers received more annual income (Rs 1.47 lakh) from various non agricultural assets. The average value of total assets of loanee farmers, non-loanee and control farmers was found to be Rs. 40.1 lakh, Rs. 14.7 lakh, Rs. 45.3 lakh per household, respectively.

As far as credit provisions are concerned, the major sources of institutional credit were co-operative banks and commercial banks for loanee insured farmers. About 93.9 percent loanee insured farmers had taken loan for crop cultivation and agriculture purpose and the same from commercial bank was 71.1 percent. About 28.9 percent farmers had taken loan from co-operative banks for non-agricultural activities. It is interesting to note that the amount of loan outstanding was much higher in case of cooperative banks (Rs.96 lakh per household) compared to commercial banks.

7.2.3 Farm Level Characteristics

The average size of land holding was 7.9 ha, 8.2ha, and 6.3 ha, for loanee insured, non-loanee insured and control farmers respectively, out of average 7.2 ha, 5.9 ha, and 5.9 ha, land was under irrigation. The gross cropped area for loanee insured farmers, non-loanee insured farmers and control farmers were 9.20 ha, 8.67 ha, and 8.27 ha, respectively. The loanee insured farmers had a gross cropped area higher than non-loanee insured and control farmers. The cropping intensity for loanee insured farmers, non-loanee insured farmers and control farmers were estimated to 116.9 percent, 105.2 percent and 130.5 percent respectively. Thus, cropping for control farmers groups was higher than loanee insured farmers and non-loanee insured farmers.

For loanee insured farmers, dug well, bore well and canal were found to be the major sources contributing about 47.3 percent, 47.3 percent and 25.5 percent of total irrigated area respectively. Thus the groundwater was the major source of irrigation for the selected sample households. The canal, tank and other water sources accounted for meagre share in irrigated crops of sample farmers.

The proportion of total area under Kharif crops were 74.9 percent, 79.2 percent and 73.1 percent in case of loanee insured, non-loanee insured and control farmers respectively. Among the Kharif crops grown by sample farmers, cotton and groundnut were the major crops. The area under groundnut and cotton was about 17.1 percent and 31.2 percent of GCA respectively in case of loanee insured farmers. In case of non-loanee insured farmers, Kharif area under groundnut and cotton crops was 42.4 percent and 25.7 percent respectively. For control farmers, Kharif area under groundnut and cotton crops was 18.5 percent and 44.3 percent respectively. Total Rabi crops contributed about 25.0 percent, 20.8 percent and 24.5 percent of GCA of the loanee insured, non-loanee insured and control farmers respectively. Among the rabi crops grown by sample farmers wheat was the major crop. Total summer crops contributed about 0.1 percent and 2.4 percent of GCA of loanee insured farmers and non-insured (control) farmers respectively.

Among Kharif crops grown by sample farmers, cotton, groundnut castor and vegetables were the major crops. As far as crop production is concerned, the per-hectare production of groundnut and cotton crops for loanee insured farmers was 4.0 quintal per hectare and 3.9 quintal respectively. For non-loanee insured farmers, the productivity of groundnut and cotton was 4.8

quintals per hectare and 3.3 quintals per hectare respectively. For control farmers, productivity of groundnut and cotton crops was 4.1 quintals per hectare and 3.8 quintals per hectare respectively.

Among the Rabi crops grown by sample farmers, wheat was the major crop, followed by small proportion of potato and cumin. The productivity of wheat in case of loanee insured farmers was 9.9 quintals per hectare. The productivity of potato, cumin and garlic crops of loanee insured farmers was 53.1 quintal per hectare, 10 quintals per hectare, 5.8 quintals per hectare. For non-loanee insured farmers, the productivity of wheat was 7.5 quintal per hectare. For control farmers, the productivity for wheat crop per hectare was comparatively higher (9.1 quintals per hectare). Among the summer crops, the major crops cultivated by the sample households were bajra and fodder. The productivity of summer bajra was 10.8 quintal per hectare, which was cultivated by only sample control farmers. On the other hand, the fodder productivity was 41.8 quintals per ha for both loanee insured farmers and control farmers.

The major crop outputs sold by selected sample farmers during Kharif were groundnut, cotton, castor and paddy. In case of groundnut, the amount sold were 6.31, 17.7 and 8.49 quintals by loanee insured, non-loanee insured and control farmers respectively, against the production of 6.32, 17.7 and 8.53 quintals per household, respectively. In case of cotton, production amount was 11.8, 7.42 and 19.74 quintals per household and selling volume was 11.5, 7.4 and 19.7 quintals per household by loanee insured, non-loanee insured and control farmers, respectively. Thus, the major proportion of crop output was sold by the sample farmers.

The value of output per hectare for groundnut was Rs. 15615.8, Rs. 18131.8 and Rs. 20240.8 of loanee insured farmers, non-loanne insured farmers and control farmers respectively. The higher value of crop output received by the control farmers may be because of relatively better price realized enjoyed by them. However, during Rabi season, the trend was somewhat different. For majority of crops, the value of crop output received by the insured farmers was more compared to control farmers.

7.2.4 Insurance Behaviour of Sample Farmers

Since the premium rates and insurance details varies from crop to crop, this section provides the insurance details for two major Kharif crops cotton and groundnut and one major Rabi crop wheat. About 54.2 percent and 27.7 percent of loanee insured farmers had taken crop loan with crop insurance from Cooperative bank or society and Bank of Baroda respectively. Remaining farmers had taken crop loan with insurance from Central Bank, Cooperation Bank, Dena Bank, PNB, SBI and Union Bank of India; whereas all non-loanee insured farmers had taken crop insurance from Agricultural Insurance Company Ltd (AIC).

Among different kinds of events of losses in cotton crop, the highest of 53.0 percent of event of losses were due to drought, dry spells, flood, pest attacks and diseases etc., while 20.5 percent of event of losses were because of prevented sowing/planting due to deficit rainfall or adverse weather and remaining events of losses were due to post harvest losses, localised calamities (cyclone, landslide).

As far as compensation received from insurance companies is concerned, an average of Rs. 13523.4 and Rs. 15480.0 were paid to the cotton farmers against the crop loss for loanee insured farmers and non-loanee insured farmers respectively. Thus, the compensation for crop losses was more to the non-loanee farmers compared to the loanee farmers.

In case of groundnut growers, only 0.8 percent and 0.2 percent loanee insured farmers had taken crop loan with crop insurance from Cooperative bank or society and SBI respectively. All non-loanee insured farmers had taken crop insurance from AIC.

Average premium paid by loanee and non-loanee groundnut farmers was Rs. 1323.3 and Rs. 1470.7 per household respectively. In case of loanee farmers, about 90.0 percent events of losses were because of drought, dry spells, flood, pest attacks and diseases etc and remaining events of losses were due to prevented sowing/planting due to deficit rainfall or adverse weather. In case of entire non-loanee insured farmers, the crop yield loss was due to drought, dry spells, flood, pest attacks and diseases etc.

As far as compensation received from insurance companies is concerned, an average of Rs. 34039.7 and Rs. 23220.0 were paid to the groundnut farmers against the crop loss for loanee insured farmers and non-loanee insured farmers respectively. Thus, the compensation for crop losses was much higher in case of loanee farmers compared to non-loanee farmers.

As regards Rabi crop wheat, average amount of premium paid by the loanee and non loanee farmers was Rs. 4800.0 and Rs. 3525.0 respectively. It is

worth-mentioning that, during Rabi season (wheat crop) both categories of sample farmers had no claim against any event of crop losses, thus did not receive any compensation.

Assessment of the overall experience of sample farmers with PMFBY reveals that, about 36.4 percent loanee insured farmers said that they were never insured under earlier crop insurance scheme, 45.5 percent of them said that PMFBY is better than earlier schemes whereas 70 percent non-loanee insured farmers said that it is better than earlier schemes.

About 70 percent loanee insured farmers informed that they have informed the authorities about the event of losses. Among them, 37.3 percent and 24.5 percent loanee insured farmers had informed about the event of losses directly to local government officials and others (Gram Sevak and Agriculture Officer), respectively. In case of non-loanee farmers, all of them had informed about the event of losses directly to local government officials.

Of the total loanee insured farmers, 27.3 percent said that their farm was visited during Crop Cutting Experiment (CCE) while 40.9 percent said that their farm was not visited for CCE. Among non-loanee insured farmers, 20 percent said that their farm was visited during CCE while 80 percent said that their farm was not visited for CCE. Of the total loanee insured farmers, 26.4 percent said that they were aware about yield assessment of CCE while 41.8 percent that they were not aware about yield assessment of CCE.

Of the total loanee insured farmers, 43.6 percent said that they were a satisfied with the implementation PMFBY while 24.5 percent that they were not

satisfied with the implementation of PMFBY. In case of non-loanee insured farmers, 70.0 percent said that they are satisfied with the implementation of PMFBY while 30.0 percent said that they are not satisfied with the implementation of PMFBY.

So as to resolve these issues and to improve the adoption rate of the scheme, they have made some suggestions. Among the loanee insured farmers, about 31.8 percent farmers suggested providing timely compensation, 22.73 percent suggested providing more accurate assessment due to crop losses, and 18.1 percent expressed the need of more awareness about the crop insurance scheme. About 8.1 percent suggested to reduce official complexity and emphasized on less time requirement and less paper work for enrolment and claim disbursement.

Regarding extent of awareness about PMFBY and the non-uptake of the same by the control farmers, it is revealed that, about 73.3 percent of the control farmers had heard about PMFBY and 26.6 percent control farmers of them had no idea about PMFBY. As regards the sources of awareness, about 43.3 percent, 16.6 percent, 10 percent and 3.3 percent of control farmers got the information about PMFBY from cooperative society, media, farmer's friend and gram sevak respectively. About 33.3 percent of control farmers expressed that they are not interested in this scheme, while 20 percent of them believed that the claim settlement process is tedious. About 13.3 percent of them believed that they may not get compensation due to crop losses, whereas only 6.7 percent farmers expressed that no sufficient time was there for getting enrolled for the crop insurance, even if they were interested to get enrolled for the same.

7.2.5 Willingness to Pay for Crop Insurance by Sample Farmers

The extent of willingness to pay for crop insurance products and services was assessed by the use of discrete choice experiments (DCEs), which DCE is an attribute-based survey method for measuring benefits (utility). Since it was entirely different kind of experiment where the name of PMFBY scheme was not disclosed, entirely new set of sample households were surveyed from the sample districts of Gujarat. However, all farmers were asked to share their experiences of enrolling for PMFBY after the end of the experiments. In total, 144 farmers were chosen for the experiment from 12 villages of 4 talukas of 2 districts (Anand and Vadodara) of the state.

The majority of the sample farmers chosen for the experiments were experienced farmers with average years of farming experience of 26 years. Around 53 percent of them were aged between 46 and 65. About 34.7 percent of them had tractors and 27.8 percent of them had tractor trolley. Thus, the extent of farm mechanisation was good among the sample farmers.

Regarding the respondents' experience of implementation of PMFBY, it was noted that the percentage of respondents who had heard of PMFBY was about 71.5; however, the percentage of who were insured under PMFBY in Kharif 2017 was only 11.1 per cent. None of them were found to have enrolled for PMFBY during Rabi season. About 10.4 per cent of them were loanee farmers. The farmers were very much interested in crop insurance products if those products fulfil their choices and preferences.

The results from estimating the utility function (a generalized multinomial logit function) reveal that all the estimated coefficients of variables

such as sum insured, certainty of payment, insurance coverage, loss determination are statistically significant at 1 percent level of significance. Thus, all these factors significantly influence the willingness to pay for the crop insurance. It is found that a farmer would be willing to pay Rs. 889 on an average for increase in the certainty of payment made to him as against the base category.

The analysis on the willingness to pay for an attribute on several household characteristics like age, farming experience, caste, gender, etc. with Ordinary least square regression reveal some interesting results. The coefficient corresponding to each characteristic shows the value by which the WTP for the attribute will rise or reduce if the household characteristic rises by 1 unit. Again, all coefficients should be multiplied by a factor of 1000 for correct interpretation. For ex-ample, for 'Coverage: Pre-Planting', in second column, if the area cultivated in Kharif 2017 rises by 1 acre then the willingness to pay rises by Rs. 621 on an average. Likewise, in the first column, if age of the farmer rises by 1 year, then he would be willing to pay Rs. 617 on average extra for 'Coverage period: Sowing to harvesting'.

7.3. Policy Implications

The study reveals some interesting results on uptake, adoption and performance of PMFBY in Gujarat. This scheme was better than NAIS because lesser premium was paid by farmers and claim settlement process was more scientific which was decided through CCEs data. For main crops, CCEs were conducted at Gram Panchayat level and the CCEs were conducted at block level for other secondary crops. However, there are a number of areas where the present scheme can be further improved. There is a need to address issues

such as delay in claim settlements; generating sufficient awareness in farmers about formulation and implementation of risk reduction strategies, developing suitable crop insurance product and effective implementation strategies and infrastructure, investing in R&D on insurance product design in collaboration with private insurance service providers, substituting relief payments with crop insurance system, covering the price risk along with weather risk and substituting relief payments with crop insurance system.

Based on findings of the study and interaction with various stakeholders, following suggestions are made for improving the adoption and performance of the PMFBY in Gujarat.

- At present, the enrolment of loanee farmers under PMFBY is compulsory and that of non-loanee farmers is optional. Several farmers and farmer organizations, leaders etc. have suggested to make the scheme voluntary for the loanee farmers also.

- At present, the scheme covers major food crops(cereals, millets and pulses), oilseeds and annual commercial/ horticultural crops. It is suggested that the perennial horticulture crops should also be included under the scheme.

- Pests and diseases come under preventable risks and insurance companies do not consider for claims where losses occur due to pests and disease. Thus, it is necessary to clearly define the non-preventable risks or disease and pest should be considered as non-preventable risks. The unseasonal rain should be defined clearly in Operational Guidelines of PMFBY.

- Definition of localized calamities highly required because insurance companies categorically deny the claims under local risks. Some of the risk factor like crop losses through wild animals should be incorporated in the guidelines. The operational guidelines should be in local languages for better understanding of the farmers.

- Some of the farmers are not aware about the PMFBY, some of them aware about the scheme but don't known about the sum assured, premium amount deducted, claim process etc. Majority of farmers do not have proper knowledge about crop insurance. Even the farmers do not know that they have been insured under the scheme. The farmers are unaware that the amount of crop insurance premium is automatically deducted from their account. Thus necessary awareness programmes should be organized periodically.

- In case of loanee farmers, the premium amount deducted is stated in their Saving Bank Passbook. In some other cases, the same has not been stated in Bank Passbook (i.e., Bank of Baroda, Dena Bank). Thus, some farmers suggested that the premium deduction receipt should be provided to them for their record. There should be a document provided to the farmers like premium deducted receipt, insurance document, crop loss coverage criterion, guidelines, contact list of company etc., which will help them at the time of loss assessment and claim settlement.

- Because of less number of banks available in the nearly areas, farmers fail to get insured. Thus, it is suggested to increase the number of bank branches. There should be atleast one nationalized bank branch for every five villages.

- Further, the bank employees should be of the local language or bank employees should be knowledgeable in local language so that farmers can easily communicate about their issues without any difficulty.

- Some farmers complained that they were not given compensation even if they had incurred heavy crop losses due to no loss assessment or delayed loss assessment[1]. In that case, farmers demanded that the amount deducted as a premium should atleast be given back to them since the claim was not settled by the respective company. In the case delay in claim settlement, the additional interest amount should also be paid to the farmers.

- The control farmers expressed that they couldn't avail crop insurance since the land settlement was in process. Some of them came for enrolment after the due date. They suggested that timely information should be passed on to them. They further suggested that the paper work and official procedure should be reduced or simplified for successful implementation the crop insurance scheme.

- It is also clear from the discussion that PMFBY would not be sufficient to cover all the pure risks arising from agricultural activities. To protect farmers against various kinds of climatic risks, a comprehensive risk mitigation strategy needs to be planned rather than just focusing on crop insurance.

[1] Particularly in the case of non- loanee farmers those who did not avail the loan but paid the premium for the crop insurance, but all of them did not get the claim and they have filed a case in court on the issue in Rajkot.

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Office of the

- Directorate of Agriculture, Government of Gujarat, Gandhinagar
- Agricultural Insurance Company Ltd, Ahmedabad
- United India Insurance Company Ltd., , Ahmedabad
- Housing Development Finance Corporation & ERGO, Ahmedabad

Annexure Tables

Annexure -A1
District-wise Coverage under PMFBY and Subsidy Sharing during Kharif 2016

(Area in Ha and Rupees in Crore)

Sr.No.	District	Insurance Company	Farmers Insured	Area Insured	Sum Insured	Gross Premium	Farmers Premium	Subsidy Share (GOI)	Subsidy Share (state)
1	Amreli	HDFC ERGO	231041	340538	1347.59	396.64	26.95	176.42	193.27
2	Rajkot	AIC	226748	412598	1719.45	636.47	0.78	291.56	310.52
3	Junagadh	HDFC ERGO	171955	224690	1132.24	329.09	22.64	152.39	154.06
4	Jamnagar	HDFC ERGO	153951	226892	1024.70	176.15	20.49	69.68	85.98
5	Ahmedabad	HDFC ERGO	141627	123002	685.97	45.62	13.72	13.03	18.87
6	Surendranagar	HDFC ERGO	136062	217256	1058.62	77.30	21.17	13.89	42.24
7	Morbi	HDFC ERGO	133337	180188	667.05	158.13	13.34	66.79	78.00
8	Banaskantha	HDFC ERGO	95657	130946	237.73	17.20	4.75	5.77	6.67
9	Devbhumi Dwarka	HDFC ERGO	91052	144338	582.25	141.98	11.65	64.82	65.51
10	Porbandar	HDFC ERGO	65810	76488	382.94	90.02	7.66	41.13	41.23
11	Botad	HDFC ERGO	60599	88665	487.25	38.97	9.75	7.32	21.91
12	Bhavnagar	AIC	57351	114236	575.76	106.04	2.26	41.79	52.73
13	Dahod	HDFC ERGO	40446	19914	69.13	2.85	1.38	0.73	0.73
14	Kachchh	HDFC ERGO	40069	64370	315.32	10.65	6.31	2.17	2.17
15	Sabarkantha	AIC	38554	41528	226.33	40.10	3.19	15.79	19.79
16	Mehsana	HDFC ERGO	28685	15676	100.43	2.26	2.01	0.00	0.25
17	Kheda	HDFC ERGO	22667	14584	96.37	1.94	1.93	0.00	0.00
18	Panchmahals	AIC	20866	14665	59.78	2.87	25.23	0.69	1.15
19	Patan	AIC	20506	48406	94.75	14.95	1.74	6.17	6.89
20	Arvalli	AIC	20324	21398	113.36	7.83	4.18	1.78	3.79
21	Mahisagar	AIC	16808	12643	43.73	1.16	14.34	0.17	0.30
22	Gir Somnath	HDFC ERGO	7706	7008	37.62	1.50	0.75	0.32	0.42
23	Anand	AIC	6216	9250	68.87	1.37	0.59	0.13	0.13
24	Vadodara	HDFC ERGO	5672	4463	30.20	0.78	0.60	0.02	0.15
25	Gandhinagar	AIC	4429	6455	41.13	1.64	2.25	0.01	0.81
26	Chotaudepur	AIC	3173	5510	41.98	1.37	65.12	0.00	0.58
27	Narmada	HDFC ERGO	523	546	4.87	0.10	0.10	0.00	0.00
28	Bharuch	HDFC ERGO	305	294	2.23	0.07	0.04	0.00	0.02
29	Tapi	HDFC ERGO	105	168	1.21	0.02	0.02	0.00	0.00
30	Valsad	HDFC ERGO	74	43	0.12	0.00	0.00	0.00	0.00
31	Dangs	HDFC ERGO	10	4	0.01	0.00	0.00	0.00	0.00
32	Navsari	HDFC ERGO	5	2	0.01	0.00	0.00	0.00	0.00
33	Surat	AIC	4	11	0.05	0.00	0.09	0.00	0.00
Gujarat Total			1842337	2566775	11249.03	2305.08	285.03	972.59	1108.17

Source: Department of Agriculture, Government of Gujarat

Annexure - A2

Statistics of National Agriculture Insurance Scheme in Gujarat (up to 14/01/2015)

SL. No.	Season	No. of Farmers Insured (000')	Area Insured (000' Ha)	Sum Insured	Gross Premium	Premium Subsidy	Claims	No. of Farmers benefitted (000')
				Amount in (Rs. Crore)				
1	Rabi 1999-2000	15	26	20	0.431	0.067	2	8
2	Kharif 2000	1118	2756	1615	62	9	770	977
3	Rabi 2000-01	32	63	34	0.781	0.106	3	8
4	Kharif 2001	1254	2469	1978	74	8	149	262
5	Rabi 2001-02	26	44	30	0.626	0.064	0.515	11
6	Kharif 2002	1169	2280	2028	88	8	726	671
7	Rabi 2002-03	27	43	35	0.844	0.077	2	8
8	Kharif 2003	1016	2183	1910	99	6	6	30
9	Rabi 2003-04	22	37	37	0.846	0.047	0.021	0.078
10	Kharif 2004	1068	3775	1987	108	3	289	347
11	Rabi 2004-05	0	0.054	0.054	0.001	0	0	0
12	Kharif 2005	880	2526	1993	85	3	8	14
13	Rabi 2005-06	11	20	27	0.424	0.011	0.024	0.5
14	Kharif 2006	864	1870	2116	82	3	583	450
15	Rabi 2006-07	14	26	40	0.702	0.021	0.527	4
16	Kharif 2007	825	1749	2216	82	3	23	35
17	Rabi 2007-08	14	26	35	0.674	0.019	1	2
18	Kharif 2008	813	1794	2324	83	2	467	283
19	Rabi 2008-09	28	56	76	1	0.045	11	22
20	Kharif 2009	915	1996	2944	104	3	796	521
21	Rabi 2009-10	34	67	111	2	0.06	5	7
22	Kharif 2010	927	1990	3323	116	4	68	70
23	Rabi 2010-11	39	81	145	3	0.09	3	7
24	Kharif 2011	976.49	2083.84	4127.49	143.79	4.49	316.53	259.84
25	Rabi 2011-12	33.28	72.2	152.2	2.33	0.07	2.51	5.81
26	Kharif 2012	1143.77	2472.76	6065.11	233.48	30.18	2190.57	850.622
27	Rabi 2012-13	32.77	71.2	158.18	2.75	0.09	11.72	16.035
28	kharif 2013	1005.1	2136.48	5778.12	264.42	71.28	38.08	42.521
29	Rabi 2013-14	27.11	61.76	162.67	2.85	0.1	0.02	0.304
30	Kharif 2014	538.88	1112.03	3485.38	146.7	3.1	0	0
	Kharif Seasons Total	13975.05	32080.66	40405.61	1622.61	156.54	6460.66	4846.906
	Rabi Seasons Total	356.1	693.9	1062.82	19.28	0.86	42.78	99.15
	Grand Total	14331.16	32774.55	41468.43	1641.9	157.4	6503.44	4946.056

Sources: http://www.aicofindia.com/AICEng/Pages/Gujrat_NAISDetail.aspx

Annexure - A3:
State wise crop area insured under all Insurance Scheme

States/UTs	2012-13			2013-14			2014-15		
	Gross Area Sown	Area Insured	% of Area Insured	Gross Area Sown	Area Insured	% of Area Insured	Gross Area Sown	Area Insured	% of Area Insured
Andhra Pradesh	136.50	42.87	31.41	136.50	34.35	25.16	136.50	5.40	3.96
Andaman & Nicobar	0.25	0.01	4.45	0.25	0.02	6.88	0.25	0.01	4.92
Arunachal Pradesh	2.85	0.00	0.00	2.85	0.00	0.00	2.85	0.00	0.00
Assam	41.97	0.43	1.03	41.97	0.39	0.92	41.97	0.30	0.72
Bihar	77.78	34.06	43.79	77.78	39.81	51.18	77.78	37.35	48.02
Chandigarh	0.02	0.00	0.00	0.02	0.00	0.00	0.02	0.00	0.00
Chhattisgarh	56.91	24.33	42.75	56.91	13.65	23.98	56.91	18.85	33.12
Dadar & Nagar Haveli	0.24	0.00	0.00	0.24	0.00	0.00	0.24	0.00	0.00
Daman & Diu	0.03	0.00	0.00	0.03	0.00	0.00	0.03	0.00	0.00
Delhi	0.49	0.00	0.00	0.49	0.00	0.00	0.49	0.00	0.00
Goa	1.63	0.00	0.19	1.63	0.00	0.29	1.63	0.00	0.11
Gujarat	126.00	25.44	20.19	126.00	21.98	17.45	126.00	13.89	11.02
Haryana	63.76	3.38	5.30	63.76	4.84	7.60	63.76	0.00	0.00
Himachal Pradesh	9.47	4.11	43.36	9.47	0.25	2.65	9.47	0.53	5.62
Jammu & Kashmir	11.62	0.16	1.36	11.62	0.06	0.50	11.62	0.00	0.03
Jharkhand	16.57	4.78	28.83	16.57	4.42	26.68	16.57	2.44	14.75
Karnataka	117.68	12.91	10.99	117.48	9.15	7.79	117.48	14.39	12.25
Kerala	25.92	0.51	1.98	25.92	0.48	1.85	25.92	0.44	1.70
Lakshdweep	0.03	0.00	0.00	0.03	0.00	0.00	0.03	0.00	0.00
Madhya Pradesh	23.13	90.81	39.26	231.30	103.23	44.63	231.30	106.20	45.91
Maharashtra	218.74	20.15	9.21	218.74	16.05	7.34	218.74	48.69	22.26
Manipur	3.09	0.10	3.08	3.09	0.10	3.17	3.09	0.06	2.10
Meghalaya	3.40	0.02	0.68	3.40	0.03	0.86	3.40	0.01	0.41
Mizoram	1.16	0.00	0.05	1.16	0.00	0.00	1.16	0.00	0.00
Nagaland	4.89	0.00	0.00	4.89	0.00	0.00	4.89	0.00	0.00
Orissa	50.69	14.09	27.80	50.69	14.19	28.00	50.69	16.90	33.35
Puducherry	0.26	0.04	16.52	0.26	0.02	9.17	0.26	0.02	6.67
Punjab	78.70	0.00	0.00	78.70	0.00	0.00	78.70	0.00	0.00
Rajasthan	239.54	120.93	50.49	239.54	126.13	52.65	239.54	119.05	49.70
Sikkim	1.44	0.00	0.01	1.44	0.00	0.00	1.44	0.00	0.01
Tamil Nadu	51.40	14.30	27.83	51.40	9.40	18.28	51.40	8.40	16.33
Telengana	-	-	-	-	-	-	-	13.58	-
Tripura	3.68	0.01	0.28	3.68	0.00	0.00	3.68	0.00	0.11
Uttar Pradesh	258.21	23.16	8.97	258.21	21.99	8.52	258.21	20.53	7.95
Uttarakhand	11.24	1.35	12.01	11.24	0.48	4.25	11.24	0.51	4.56
West Bengal	96.78	6.07	6.27	96.78	6.23	6.44	96.78	9.97	10.30
India	1943.99	444.03	22.84	1943.99	427.23	21.98	1943.99	437.56	22.51

Source: Agricultural Statistics at a Glance 2015, GoI

Annexure - A4:
PMFBY - All India Business Statistics from Kharif 2016 to Rabi 2016-17 i.e. for 2 Seasons (AS on 29/1/2018)

Sl. No.	State / UT	No. of Farmers Insured (000')	Area Insured (000' Ha)	Amount in Rs. Crore				No. of Farmers benefitted (000')
				Sum Insured	Premium	Subsidy	Claims	
1	Andhra P	488	383	2767.9	264.6	204.9	84.3	33
2	Andaman Nicobar	0	0.00	0.0	0.0	0.0	0.0	0
3	Arunachal P	0	0.00	0	0.0	0.0	0	0
4	Assam	0	0	0.0	0.0	0.0	0.0	0
5	Bihar	536	482	2286.80	301.74	256.0	63.2	35
6	Chhatisgarh	77	104	264.3	21.1	17.1	9.4	20
7	DadraNagar H	0	0.00	0.0	0.0	0.0	0.0	0
8	Daman & Diu	0	0.00	0.0	0	0.0	0.0	0
9	Goa	0	0.00	0	0.0	0.0	0.0	0
10	Gujarat	415	687	2986.1	814.08	755.0	456.4	179
11	Haryana	0	0	0.0	0.0	0.0	0.0	0
12	Himachal Pradesh	156	53	260.4	7.3	4.4	2.6	9
13	Jammu & Kashmir	0	0.00	0.0	0.0	0.0	0	0
14	Jharkhand	828	353	1891.3	265.3	227.5	24.6	32
15	Karnataka	798	2441	2425.9	348.9	312.1	0.0	0
16	Kerala	18	13	128.3	4.9	2.2	3.4	2
17	Lakshadweep	0	0.00	0.0	0.0	0.0	0.0	0
18	Madhya P	3771	6279	18132.58	1794.1	1452.53	743.3	404
19	Maharashtra	4832	2578	7812.66	1470.6	1256.3	1055.3	1180
20	Manipur	8	9	36.9	3.59	2.9	1.96	8
21	Meghalaya	0	0.00	0.2	0.0	0.0	0	0
22	Mizoram	0	0.00	0	0.0	0.0	0.0	0
23	Nagaland	0	0.00	0.0	0.0	0	0.0	0
24	Orissa	0	0	0.0	0	0.0	0.0	0
25	Puducherry	4	4	16.77	1.6	1.6	7.3	4
26	Punjab	0	0	0.0	0	0	0.0	0
27	Rajasthan	4077	3920	7628.5	847.5	697.14	433.4	791
28	Sikkim	1	0.00	0.46	0.01	0	0	0
29	Tamil Nadu	443	415	2289.31	507.76	289.7	1271.1	325
30	Telengana	385	300	1898.61	59.3	21.64	50.15	40
31	Tripura	11	4	25.99	0.34	0.10	0.01	0
32	Uttar Pradesh	5868	5159	22584.9	892.2	478.3	452.8	870
33	Uttarakhand	208	107	697.2	12.1	3.7	3.8	18
34	West Bengal	1290	598	2810.8	150.8	93.9	38.2	104
TOTAL		24213	23889	76946	7768.0	6077.0	4701	4055

Source: http://www.aicofindia.com/AICEng/Pages/BusinessProfilePMFBY.aspx

Coordinator's Comments on the Draft Report

The comments received on draft report from the **Centre for Management in Agriculture, Indian Institute of Management, Ahmedabad (Gujarat)**

The draft report submitted by The Agro-Economic Research Centre (AERC) at Sardar Patel University, Vallabh Vidyanagar, titled 'Performance of Pradhan Mantri Fasal Bima Yojana (PMFBY) in Gujarat: Uptake, Adoption and Willingness to Pay' I s very comprehensive district wise assessment of PMFBY for the important state of Gujarat for the year 2016-17. The first chapter presents an excellent overview and history of crop insurance in India till up to the latest available period. Chapter brings us to the state of the current central scheme called the Pradhan Mantri Fasal Bima Yojana (PMFBY) and compares its key features with previous multi-peril insurance schemes such as the NAIS and existing index-based schemes such as WBCIS. It analyses crucial parameters, district-wise, such as the number of farmers enrolled, the sum insured, area insured, premiums collected and pay-outs. It also provides a comprehensive view of how the whole scheme is implemented and governed by different stakeholders. The methodology includes secondary departmental and company data, interviews and field observations. The second part tries to analyse the factors that help in a greater uptake of crop insurance. This is based on a primary survey of sampled farmers across three districts and splitting the sample into insured and non-insured farmers to provide a better comparison of variances in farmer's choices. In the final part, results from a unique choice experiment are presented that assesses the willingness-to-pay (WTP) of farmers for crop insurance. This is based on an experimental methodology conducted using advanced CAPI methods. Overall the report is a very valuable contribution to the understanding of crop insurance and we highly recommend its publication. There are some minor suggestions that can help improve the report:

Minor Suggestions

- The report could be reviewed once again and spelling mistakes could be addressed along with a few basic grammatical mistakes.
- Please ensure uniformity in font size and font style of the data in the table and the rest of the text of the document. Please consider doing so for all the tables.

- Uniformity in some of the words should be maintained. (For example, Kharif and kharif).
- Consistency in the usage of units. For example, 4.0 quintal per hectare or 4.8 qt/ha.
- Kindly consider highlighting the headings of the tables.
- Chapter VII, Summary and Policy Implications, the heading would be Backdrop and not backdrops. Kindly check the other headings as well.
- The overall report is good and includes many parts which are highly appreciable.

Annexure A6

Action taken by the authors based on the comments received from the Coordinator of the study.

- All the comments made by the Coordinator of the study have been addressed at the appropriate places in this final report.

S. S. Kalamkar

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