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IFMR LEAD | LEVERAGING EVIDENCE FOR ACCESS AND DEVELOPMENT

Landscape of Crop and Livestock Insurance in India

June 2018

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BACKGROUND AND CONTEXT

The Swiss Agency for Development and Cooperation (SDC) has been supporting the implementation of the Climate Resilience through Risk Transfer (RES-RISK) project (January 2012 – September 2018). The project is a unique experiment of bundling health, crop and livestock insurance to mitigate livelihood risks faced by rural poor. The project's mutual approach offers communities an opportunity to cover out of pocket health expenses (for medicine, diagnostics, travel, wage loss). It also provides them access to crop and livestock insurance without being linked to a credit or owning the land they till, unlike the government insurance schemes.

Following the initial success of the RES-RISK project, the SDC is now in the process of developing the next phase of the project, where SDC is considering linking up with the government supported insurance schemes like Pradhan Mantri Fasal Bima Yojana (PMFBY) for crops, for longer term sustainability and global leverage of the project approach. In this context, the SDC wants to conduct a study to map the existing landscape of crop and livestock insurance in India, especially targeted at rural poor communities. To this end, IFMR LEAD has been engaged to conduct a detailed landscape assessment of the crop and livestock insurance segments in India.

The main objectives of the study are:

a) To map the evolution of micro-insurance sector and assessment of the existing crop, and livestock insurance schemes of the Government

b) Conduct an analysis of the existing crop, and livestock insurance companies offering products for the rural poor

c) Analysis of insurance distribution channels / models

d) Analysis of resilience building activities of the insurers in India

e) Analysis at the level of the key supply-side, and demand-side stakeholders in the agricultural insurance space to assess perceptions and attitudes regarding the agricultural insurance space, and the potential way forward.

METHODOLOGY

The study utilizes a framework[1] that defines four categories of actors or stakeholders in the insurance space. This study relies on primary interviews with three of these stakeholder categories – facilitators/influencers, regulators, & providers/implementers. Additionally, the study utilizes an extensive literature review, supplemented with secondary data analysis where necessary. The study does not directly interview with demand side stakeholders; however, the research team relies on an established body of literature, from across the world that captures a spectrum of insights on the demand side.

The primary interviews were either telephonic, or in-person, following a loosely structured interview questionnaire specific to each category of stakeholder. Wherever permission was secured, interviews were recorded; all interviews were transcribed and further analysed by the research team. While a thorough and detailed list of stakeholders was prepared for the purpose of primary interviews, the research team was unable to interact with all identified individuals/ companies/ groups due to time and scheduling constraints. However, the team has ensured that a sufficient number of stakeholders were covered under each of the categories, in order to ensure that a diverse set of opinions and perspectives were captured.

Note: All data used is as of April 2018.

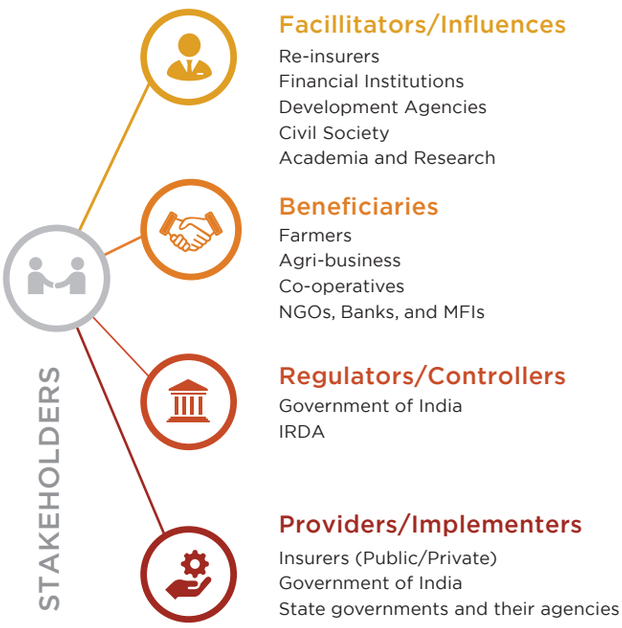

Figure 1. Key Stakeholders in Crop and Livestock Insurance Market in India

Source: Agricultural Livelihoods and Crop Insurance in India Situation Analysis & Assessment Report

1. Originally created by GIZ, in 2014

01 AGRICULTURE IN INDIA
Risks, and the Role of Insurance

Agriculture in India today is at a crossroads, like never before. Consumer demand is only increasing, bringing with it expectations for the agricultural sector to constantly increase its production year on year. At the same time, the number of cultivators is on the decline, and a large number of the rural youth do not view agriculture as their occupation of choice. To add to the situation, while technological advances are rapidly changing the nature of agriculture across the globe, Indian landholdings are increasingly fragmented. Thus utilizing the latest technology to improve cost-efficiency and productivity on Indian farms – the majority owned by small or marginal landholders[2] - is not only expensive, but also infeasible in most cases. Thus, it may be said that the agrarian sector as a whole is under more pressure than ever before, and in addition to the various issues outlined above, has to contend with the fast changing climatic and weather patterns, and the resultant natural calamities.

Farmers in India suffer high variability in yields, as a result of uncertainty in numerous natural factors such as rainfall (drought or excess), temperature, hail, pest infestation, livestock diseases etc. Available data suggests that India is among the most disaster prone countries in the world – 68 percent of India's cultivable land is prone to drought, 60 percent to earthquakes, 12 percent to floods and 8 percent to cyclones. Overall, 85 percent of Indian land and more than 50 million people are at risk from natural disasters.

The Economic Survey (2018) highlights in its chapter on agriculture and climate change that Kharif rainfall has declined by 26 millimeters, and Rabi rainfall by 33 millimeters (on average), over the last 30-odd years. Overall, the annual rainfall received has decreased by around 86 millimeters (on average), as compared to 30 years ago. These changes in precipitation, combined with other factors have resulted in manifold increase in drought in last two decades. Available data paints a grim picture – as per one assessment, about 100 districts of the country have witnessed a drought like-situation in 9 years, during the time period 2000-2015[3]. Accounting for the changes in temperature, along with the overall decrease in precipitation, the Economic Survey (2018) estimates farm income losses to be in the 15 percent to 25 percent range, the losses being highest for un-irrigated areas.

Ultimately, the risks inherent in agriculture not only endanger the livelihood and income of farmers but also undermine the viability of the agriculture sector and its potential to become a part of the solution to the problem of endemic poverty of farmers. Table 1 presents a detailed set of risks faced by farmers in India today.

2. Holding under 2 hectares of land. It is estimated that close to 70% of cultivable land is held by farmers with a landholding size of under 1 hectare
3. Data for 2011-17 can be found here: http://agricoop.nic.in/sites/default/files/CMP%202017.pdf

Table 1. Types of Agricultural Risk
Source: Adapted from Mahul and Stutley, 2010, and Holzmann and Jorgensen 2000

NATURAL DISASTERS	Hail	Flood	Drought
DISEASES & PESTS	Death of Livestock/ Crop Disease or Pest Infestation		Contagious Animal Disease
ENVIRONMENTAL		Pollution/ Deforestation	
PRODUCTION		Input Risks	
PROPERTY	Fire/ Theft		Earthquake/ Floods/ Cyclones
HEALTH	Illness/ Injury/ Disability	Epidemic diseases	
PRICE			Commodity/ Inputs/ Exchange Rates
	IDIOSYNCRATIC ← ---------- →		SYSTEMIC

Particularly for small and marginal farmers, it has been well established that the capacity to bear risk is very limited (Binswanger, 1980). The median monthly income of farming household in India is under INR 7000[4] - this offers extremely thin margins on average, while also providing very little room for investment in formal risk mitigating technologies or mechanisms. Informal risk management approaches like crop diversification, and reliance on family/ social networks to tide over adverse events may be possible strategies used by farmers, given an inability to adopt formal risk mitigating strategies (Cole et al, 2013). However, such approaches are likely to fail in the face of severe shocks or particularly extreme events (Rao 2008, Mullen 2016). Weather shocks are likely to impact all households in a given area, severely limiting the risk absorbing capacity of informal risk-sharing networks (Gine, Vickery and Townsend, 2007) – effectively rendering this an ineffective coping strategy. In the Indian context, Raju and Chand (2008) further substantiate the point, by arguing that informal strategies adopted by farmers to mitigate risk are also costly and relatively ineffective.

Furthermore, these strategies are often perceived as being 'low-risk/low-yield production' (Jensen and Barrett, 2017) – thus likely to have 'negative livelihood consequences' over a longer term - (Rosenzweig and Binswanger 1993; Carter 1997; Morduch 1999) as they effectively ensure that farmers cannot invest in productivity

4. NSSO data (2013)

enhancing technology/ other inputs (Rosenzweig and Wolpin, 2003), and may also potentially be locked out of credit markets as a result (Hazell and Skees, 2006). In fact, it has been observed that in the face of adverse shocks, coping strategies in the absence of formal risk management include reduced consumption (reduction in number of meals), and sale of productive capital (like cattle, other assets) (Jensen and Barrett, 2017). In this context, insurance appears to be a particularly effective means to reduce the losses individuals and communities suffer due to natural calamities such as floods, droughts, and outbreaks of pests and diseases that affect crop output, or livestock. It also enables farmers to obtain credit and financing for investment in new technologies and better inputs to enhance/sustain their productive capacity.

The various strategies to manage risk may be summarized under four broad approaches - Avoidance, Mitigation, Transfer, and Coping. Figure 2 presents some of the common formal and informal risk management tools under each approach that are used by farmers and other actors in the agriculture sector in India. Public and private insurers in India are currently involved only in risk transfer, and do not undertake any activity in risk mitigation or coping. Most of the latter are provided to the farmers by community based organizations or the central and state government.

Available evidence from across the world highlights the benefit of crop/ livestock insurance as an effective means to cope with agricultural risk, and safeguard farmers from being adversely affected by various extremities or shocks (Nicola 2015, Cai et al. 2015, Karlan et al. 2014). In contrast, long-term evidence from Gujarat, India, suggests that weather index crop insurance may have only moderately positive effects, and might not be transformative at all. While households that were insured did receive larger pay-outs that offset the costs, it is observed that the insurance was purchased in the first place because the product was subsidized. (Tobacman et al, 2017).

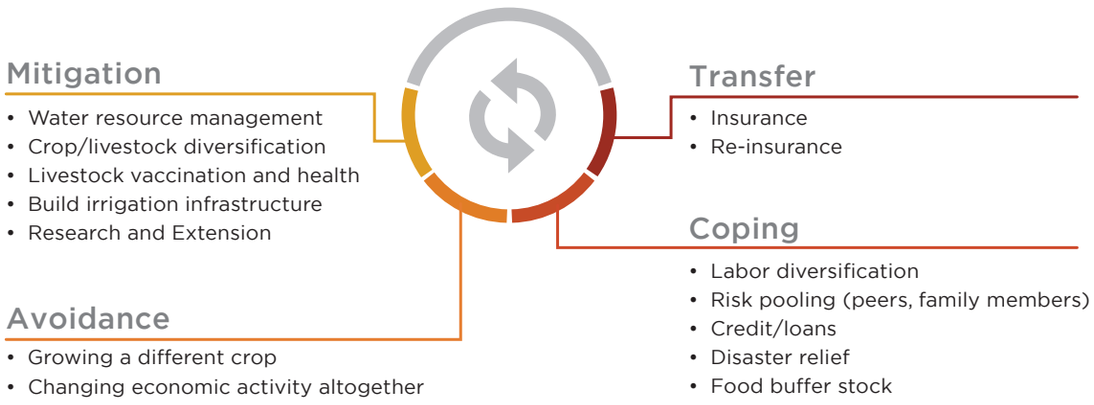

Figure 2. Risk Management Strategies in India
Source: Agriculture Risk Management Team, World Bank, 2011

02 THE CURRENT LANDSCAPE OF CROP & LIVESTOCK INSURANCE IN INDIA

Crop insurance as a concept for risk management first emerged in India at the turn of the twentieth century when a rainfall insurance scheme was proposed for the erstwhile state of Mysore. The sector has continually evolved since then - in terms of products, scope of coverage, and practices. Government intervention remains extremely high – both in terms of the provision of subsidy[5], and in terms of involvement in implementation. Particularly in the last two decades, new schemes have been continually rolled out, with substantial expenditure from the government being allocated towards the same.

Most recently in 2013-14 the "National Crop Insurance Programme (NCIP)" was formulated by combining three crop insurance schemes - Modified National Agriculture Insurance Scheme (MNAIS), Weather Based Crop Insurance Scheme (WBCIS) and Coconut Palm Insurance Scheme (CPIS) - with some improvements. The Prime Minister's Fasal Bima Yojana (PMFBY) – launched in 2016 - with an ambitious target of covering around 50 percent of the cropped area (approximately about 195 million hectares) in five years - is the most comprehensive crop insurance scheme seen in India so far in terms of scope and coverage. It covers all food & oilseeds crops and annual commercial/horticultural crops and aims to provide insurance cover on both pre-harvest and post-harvest risks.

The developments in the crop insurance segment are indeed much-needed, and a good sign that agricultural insurance in general could be seeing more purchase in the industry. Indeed, despite all the expenditure in crop insurance, some key issues persist, including – a) minimizing basis risk and moral hazard, and b) extending crop insurance coverage to non-loanee farmers. In addition, several challenges and issues continue to persist on both the supply and demand sides, which are discussed later in the report. Overall, despite the increase in area covered, and an overall increase in the take-up of crop insurance in the last few years, only about 14% to 15% of the output[6] from crops is actually insured.

While there have been several developments in the crop insurance sector, livestock insurance still accounts for an almost negligible share of the non-life/ general insurance business. Although the first large-scale livestock insurance initiative of the Government of India was launched back in 1971 and significant efforts had been made for the development of livestock sector since, these were mainly concentrated on milch animals and poultry. It is only recently that a need for a national framework for improving the productivity for the entire livestock sector in a sustainable manner was recognized. Following this, the 'National Livestock Mission' was launched by subsuming

5. In 2016-17, the share of the premium borne by the Central government amount to around one-third of the Department of Agriculture and Farmers' Welfare's budget for FY 2016-17.
6. Authors' calculations, based on data from MOSPI and Ministry of Agriculture.

1971	Cattle Insurance Scheme by Small Farmer's Development Agency (SFDA) for loanee farmers
1972	Experiments on crop insurance on a limited, ad-hoc and scattered scale based on individual
1979	Pilot Crop Insurance Scheme (PCIS) on an area approach for loanee farmers
1983	Cattle Insurance Policy by Intergrated RUral Development Program (IRDP) LIvestock Insurance under Market Agreement by GIC
1985	Comprehensive Crop Insurance Scheme (CCIS) on area approach compulsory for farmers availing crop loans`
1997	Experimental Crop Insurance Scheme (ECIS) introduced in 14 districts of 5 States
1999	ECIS replaced by improved and expanded "National Agriculture Insurance Scheme" (NAIS)
2000	Pilot Scheme on Seed Corp Insurance (PSSCI) introduced in Kharif Season in 11 States
2003	Pilot project, viz. Farm Income Insurance Scheme (FIIS)
2006	Livestock Insurance Scheme by State Livestock Development Boards (SLDB) and State Animal Husbandry Departments (SAHD)
2007	Pilot of Weather Based Crop Insurance Scheme
2010	Modified National Agriculture Insurance Scheme (MNAIS) on a pilot basis in 50 districts
2013	National Crop Insurance Programme (NCIP) formulated by merging the MNAIS, WBCIS & CPIS with improvements
2014	Risk Management and Insurance component of the National Livestock Mission
2016	Launch of Prime Minister's Fasal Bima Yojana (PMFBY)

Figure 3. Timeline of Crop and Livestock Insurance Schemes in India
Source: Illustration created by the authors using information from various sources

and modifying 7 centrally sponsored and 7 central sector schemes, including livestock insurance, of the Government of India. Despite the efforts of the central and state governments, the penetration of livestock insurance in India remains poor with less than 10 percent of all livestock heads insured, as of 2017. Several challenges in the design and implementation of livestock insurance hinder improvements in the sector. Key issues include persistently high cost of implementation, despite advances in technology, and continual challenges in preventing adverse selection. Also, given the highly idiosyncratic nature of risk in the livestock sector in India, index-based products remain infeasible for most part, at present. These challenges and issues are further discussed in the report in section 6.

Over the last few years, crop insurance has come to the fore as one of the largest business earners, post the thrust given by the central government to the PMFBY – this is indeed noteworthy, as the commercial interest in crop insurance has increased dramatically in the last two years. In 2016-17, crop insurance accounted for 15.69 percent of the non-life/ general insurance business in India compared to 5 in 2013-14 (Figure 4). The crop insurance business, driven by the PMFBY, saw a 288% growth in premiums for FY 2017 to INR 22,176 Crore - it must be noted that the performance in terms of claims settlement, and ensuring timely payouts to farmers remains highly criticized. At the same time, the market for livestock insurance has seen close to no growth.

The developments in the agricultural insurance sector are reflective of the many changes that have taken place,

particularly in the last few years. Various innovations in technology, including increased smartphone penetration, the use of satellite imagery and other big data sources, and the many-fold increase in accessibility to app based platforms have altered the way various other financial services are being delivered. Furthermore, the emphasis given to ensuring a well-functioning network of micro-insurance agents has only been increasing.

Nevertheless, key questions remain – for example, how can the current distribution networks be made more efficient, and scaled up in a cost-effective and feasible manner? Additionally, from a product design perspective, the sector has not seen a lot of innovation. Many products available in countries abroad (herd insurance etc.) are not available in the Indian market today.

An important area of debate that must thus seriously be considered pertains to the role of the regulator in this regard, and how convergence between the needs of the farmers, and resources and capabilities of the insurers can be encouraged in a sustainable and feasible manner. Overall, developing a strategic perspective towards agricultural insurance that relies on an assessment of the various innovations in technology, and client demand, supplemented with details pertaining to the attitudes and preferences of the key stakeholders involved, holds the key to the sector's evolution in the years to come.

At present, we do not see much of diversity in the landscape of products offered for crop or livestock insurance in India. A critical look at the developments of the last few years suggests that

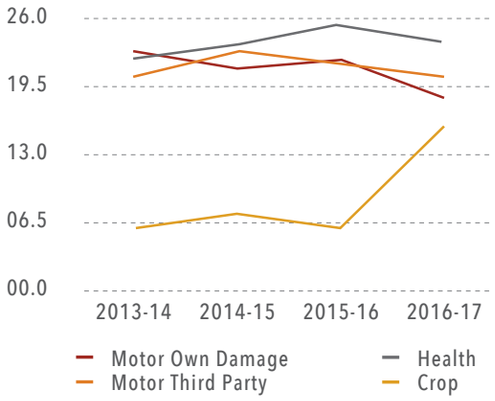

Figure 4. Rapid Growth In Crop Insurance Sales Source: IRDAI

amidst the focus on improving coverage, and scaling up the outreach of the programs, innovation in the sector has been underwhelming - as mentioned above. The market in India also continues to see a high level of government intervention – mainly in the form of premium subsidies, and most prominently for crop insurance. This is an important point to consider, when discussing the landscape of these products in India. On the one hand, premium subsidies may definitely be viewed as a stimulant for the take up of agricultural insurance, as premium rates are known to be on the higher side.[7] In China, government intervention in the form of premium subsidies led to rapid growth in the agricultural insurance market, becoming the world's second largest by 2008 (Mahul and Stutley, 2010).

The World Bank's survey regarding agricultural insurance (2008) found that close to 66% of the surveyed countries (at all levels of development) provided premium subsidies. In India, Dey and Maitra (2017) find that a 1% increase in the premium paid sees a 0.49% fall in the number of farmers insured. The

7. Especially in developing country insurance markets, where the transaction costs for insurers are on the higher side.

weather based crop insurance scheme (RWBCIS) is observed to be the most elastic to a subsidy payment.

At the same time, premium subsidies can also have negative consequences. A common criticism of public intervention in the insurance market is that it results in privately sold insurance products being crowded out. Other worries include high-fiscal costs for the government, leading to long term unsustainability. In 2016-17, the central government reported an actual expenditure of around INR 11,051.55 crores[8], while the total estimated expenditure by state governments was INR 9,056 crores on subsidizing crop insurance. The central government is expected to have spent a similar amount on crop insurance in 2017-18, and has earmarked INR 13,000 crores towards the same in 2018-19.

Below, we briefly summarize the current schemes available in the market. We do not delve into the the finer details of the schemes – these may be accessed at the respective websites. The aim is to rather locate this discussion within the context of levels of government intervention, and observe the manner in which public and private sector players interact in the provision of these products.

2.1. Crop Insurance

The Department of Agriculture cooperation and Farmer Welfare (DAC & FW) under the Ministry of Agriculture and Farmers Welfare is the implementing agency for any crop insurance scheme in India. Presently, the Department manages three schemes: the Pradhan Mantri Fasal Bima Yojana (PMFBY), the Coconut Palm Insurance Scheme (CPIS), and the Restructured Weather Based Crop Insurance Scheme (RWBCIS). The Ministry has empanelled the Agriculture Insurance Company of India Ltd (AIC) and 17 other insurance companies since 2016 to participate in these Government sponsored crop insurance schemes. The states have control over which insurer from the empanelled list it wants to delegate the responsibility to. Currently, 6 public insurers and 12 private insurers are providing crop insurance under the PMFBY scheme. In addition to this, 3 public insurers and 7 private insurers are providing insurance cover to farmers under RWBCIS scheme[9]. Meanwhile, the CPIS is implemented by the AIC.

Prime Minister's Fasal Bima Yojana (PMFBY)

The PMFBY remains the most comprehensive crop insurance scheme that has been launched in India till date - in terms of scope, coverage, and broader vision. Like its predecessor, the Modified National Agricultural Scheme (MNAIS) – it covers a number of losses, including prevented sowing, and also post-harvest damage. It also offers the lowest premium rates to farmers yet. Lastly, the PMFBY also for the first time highlights several potential improvements in crop loss assessment processes that leverage technological solutions - aiming to improve transparency, and reducing delays.

8. Expenditure Statement on Central Sector Schemes: http://www.indiabudget.gov.in/ub2018-19/eb/stat4b.pdf
9. In addition to this, Kotak Mahindra General Insurance Company also provides crop insurance as an add-on under its "Kotak Industrial All Risk Insurance" policy. Retrieved from:[https://www.irdai.gov.in/Defaulthome.aspx?page=H1] Retrieved on 9th February, 2018.

Table 2. PMFBY Statistics (number of farmers covered in millions) (MoA).

	Kharif 2016	Kharif 2017	Rabi 2016-17	Rabi 2017-18
Total Farmers Covered	40.6	32.7	16.8	15.2
Non-Loanee Farmers	10.3	10.1	3.5	2.9
Loanee Farmers	30.3	22.6	13.3	12.3

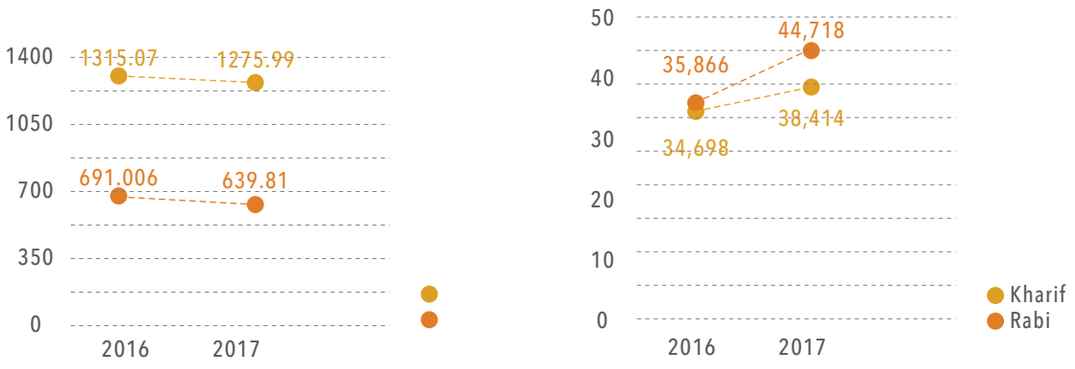

Figure 5 (left): Sum Insured (in billions of rupees) Under PMFBY
Figure 6 (right): Sum Insured (in thousands of rupees) Per Hectare of Land Under PMFBY
Source: MoA

While there has been a tremendous push to improve coverage of especially non-loanee farmers under the PMFBY, it has underperformed in terms of settlement of farmers' claims, with just 45 percent of claims being paid in the last three crop season (5 percent in the nine months after Kharif 2017)[10]. Recent research (CSE, 2017)11 reveals that in most of the states covered under PMFBY, claim settlement or timely compensation to farmers is a key issue affecting the efficacy of this new crop insurance scheme. Another issue faced with PMFBY is non-notification[12] of important crops, which has led to widespread dissatisfaction on the farmers' side. Lastly, the widespread usage of the various technological solutions that are meant to ease the loss assessment process, is yet to be seen. Concerns regarding the quality of the crop cutting experiments have been brought to the fore repeatedly. Given that the unit of insurance has reduced to a village level, the number of CCEs required has increased substantially[13], placing tremendous strain on the available resources to meet these requirements.

10. Financial express "Fasal Bima Yojana is failing, fix it", Dated 21st May, 2018. Retrieved from: https://www.financialexpress.com/opinion/fasal-bima-yojana-is-failing-fix-it/1174879/

11. CSE report: http://www.cseindia.org/userfiles/Pradhan-Mantri-Fasal-Bima-Yojana-Report.pdf

12. Many states do not notify important or high-value crops - tobacco or sugarcane, for example. It has been reported this is done in order to maintain limit the subsidy burden.

13. Estimated to total around 40 lakh experiments for the country. Crop cutting experiments are conducted under the General Crop Estimation Survey (GCES).

Figure 5 shows the performance of PMFBY in terms of farmers covered. One year after implementation of the scheme in 23 states in Kharif 2016, the total farmers insured decreased by 19 percent. This is led by a fall in the coverage among loanee farmers, which decreased by 25 percent. There has been a simultaneous decline in the farmers covered in the Rabi season (10%) between 2016 and 2017 (based on available data). The sum insured also witnessed a slight decline during this period for both Kharif and Rabi (see Figure 2). Also, on an average, during Kharif 2016, the sum insured per hectare of land was about INR 34,698 which increased to INR 38, 414 during Kharif 2017 i.e. a 11 percent increase. On the other hand, it registered a 25 % increase for Rabi during the same period (see Figure 6).

Restructured Weather Based Crop Insurance (RWBCIS)

Under the Restructured Weather Based Crop Insurance Scheme, pay-outs to farmers are calculated as an explicit function of various weather parameters such as rainfall, temperature and humidity. The scheme compensates farmers for deemed crop losses. The RWBCIS too operates on the principle of "Area Approach" in the selected notified areas. The RWBCIS explicitly aims to cover only highly adverse weather incidences that can result in major crop losses – thus placing a high emphasis on the identification of robust and adequate triggers. If the trigger identification is not rightly done, it could lead to frequent (but smaller) payouts. At the same time, several questions remain regarding the ability of the to minimize basis risk efficiently, given that the entire loss assessment is dependent on readings at local weather/rainfall stations rather than consumers' actual losses. Unlike the PMFBY, the RWBCIS covers only crop loss, from the period of sowing to the maturity of crop. A more detailed comparison between the PMFBY and the RWBCIS is presented in Table 3.

Coconut Palm Insurance Scheme (CPIS)

The CPIS covers individual farmers having at least 5 healthy nut-bearing palms, in a contiguous area/plot. The scheme provides coverage against the total loss of palm on account of insured perils leading to death of the insured palm or its becoming unproductive. Unlike the PMFBY and the RWBCIS, the CPIS is implemented by the AIC alone, and sees no involvement from private players. Additionally, it is available only in selected states where coconut palm is grown as a commercial/ plantation crop[14].

Table 3 summarizes some of the key differences between the PMFBY, and the RWBCIS, while comparing it to the earlier schemes such us the NAIS, and the Modified NAIS.

14. CPIS is implemented in Gujarat, Maharashtra, West Bengal, Karnataka, Goa, Tamil Nadu, Kerala, Andhra Pradesh, Orissa.

Table 3: Comparison of NAIS, MNAIS, and PMFBY

	NAIS	MNAIS	PMFBY	RWBCIS
States Covered	All states and UTs opting for the scheme.	Same as NAIS.	States have the choice of RWBCIS/PMFBY.	RWBCIS/PMFBY.
Farmers Covered	All farmers including sharecroppers and tenant farmers growing the notified crops in the notified areas were eligible for coverage. Scheme was compulsory for farmers availing crop loans and voluntary for others.	Same as NAIS.	Same as NAIS.	Same as NAIS.
Coverage	Comprehensive risk insurance will be provided to cover yield losses due to non-preventable risks, viz.: 1. Natural Fire and Lightning 2. Storm, Hailstorm, Cyclone, Typhoon, Tempest, Hurricane, Tornado etc. 3. Flood, Inundation and Landslide 4. Drought, Dry spells 5. Pests/ Diseases etc.	- Same as NAIS. - Additional cover of risks associated with prevented sowing/planting: 'Insured area is prevented from sowing/ planting due to deficit rainfall or adverse seasonal conditions	All risks covered in MNAIS.	1. Rainfall – deficit/ excess, unseasonal, rainy days, dry-spell, dry days 2. Temperature– High temperature (heat), low temperature, 3. Relative Humidity 4. Wind Speed 5. A combination of the above 6. Hailstorm, cloud-burst (Optional)
Unit	Unit area of insurance may be a gram panchayat, mandal, hobli, circle, phirka, block, taluka, etc.	Unit area to be reduced to village / village panchayat or other equivalent unit for all crops.	Unit to be village / village panchayat for major crops and higher than village/ village panchayat like block, taluka for other crops.	Smallest Possible Reference Unit Area to be notified as the insurance area
Threshold	Average yield of last three years for wheat and rice and five years for other crops multiply by indemnity level.	Average yield of last seven years excluding maximum two calamities years for all crops multiply by indemnity level	Same as MNAIS.	Notified trigger value
Sum Insured	- Loanee farmers – Equivalent to the amount of loan availed. - Non-loanee farmers –Upto value of 150 per cent of average yield.	- Loanee farmers - Equivalent to the 'cost of cultivation' and is predeclared by SLCCCI and notified. Sum insured will be at least equal to amount of crop loan sanctioned/advanced. - Non-loanee farmers -Equivalent to sum insured upto value of 150 per cent value of average yield.	Same as MNAIS.	The Sum Insured (SI) for each notified crop is pre-defined and will be same forloanee and non-loanee farmers, which will be based on the 'Scale of finance' asdecided by the District Level Technical Committee.
Premium Rate	Kharif season - 3.5 per cent - Oilseeds and Bajra. - 2.5 per cent - Cereals, millets & pulses Rabi season - 1.5 per cent - Wheat - 2 per cent - Other food and oilseeds crops. Actuarial premium for Annual commercial/ horticultural crops	Actuarial premium as well as net premium rates (premium rates actually payable by farmers after premium subsidy) for each notified crop through standard actuarial methodology in conformity with provisions of IRDA.	- Maximum premium of 2 per cent of sum insured for Kharif (food & oilseed) crops. - 1.5 per cent of sum insured for Rabi (food and oilseed) crops; and - 5 per cent of sum insured for Annual commercial/ horticultural crops.	Same as PMFBY.

Miscellaneous Crop Insurance Schemes

These schemes cover agri-related and agri-allied activities, which are not usually covered by mainstream crop insurance schemes. They cut across various segments and provide support to farmers in terms of protection from natural calamities and also in some instances come in the form of packages which includes other forms of protection (see Table 4).

Table 4: Miscellaneous Schemes

Unified Package Insurance Scheme (UPIS)	Set up in Kharif 2016 on a pilot basis, in 45 districts. Aims at financial protection & comprehensive risk coverage under seven sections i.e. crop Insurance (PMFBY/WBCIS), Loss of Life (PMJJBY), Accidental Death & Disability (PMSBY), Student Safety, Household, Agriculture implements & Tractor. Crop insurance is compulsory, with the option to choose at least two other schemes.
Floriculture Insurance	Floriculture insurance for instance, indemnifies the insured to the extent of input costs (cultivation costs) incurred up to the date of loss.
Plantation Insurance	Cover for loss of or damage to the insured tree/fruits such as pulpwood, rubber, eucalyptus, tea, coffee, tobacco, cardamom etc. Schemes that figure under this category are: Revenue Insurance scheme for Plantation Crops (RISPC), Bio-Fuel Tree Insurance, Rubber Plantation Insurance (RPI) and the Pulpwood Insurance Scheme (PIS).
Agro-Machinery Insurance	Providers cover for the machinery which are used in day to day agricultural activities like pump sets, tractors, carts, cycle etc. Losses covered include theft, accident, floods, mechanical/technical breakdown, fire, strike, malicious damage. Additionally, one company offers a barn insurance product.

2.2 Livestock Insurance

In India, we identify three different categories of livestock insurance: Indemnity based (products where payouts are based on the actual amount of loss at the insured unit level), community based (individual risk is mitigated through collective contribution to a corpus), and pro-conservation based (in ecologically sensitive areas, where the aim is to prevent human-wildlife conflict, and minimize losses arising from human-wildlife interactions). The insurance products within each of these categories have been listed in Table 5.

Table 5: Livestock insurance in India

INDEMNITY BASED

Concept

The most basic kind of livestock insurance product seen in India which covers (the persons owning) cows, bullocks or buffaloes, that have been certified as being in good health at the time of policy purchase, by a para-vet, or a veterinary doctor.

Examples

Livestock Insurance by Department of Animal Husbandry, Dairying & Fisheries (D0AHDF)

Design

A beneficiary may insure more than 5 animals or 10 in case of sheep, goat, pig or rabbit by paying the full premium without availing the benefit of subsidy. Moreover, for the first time there is also provision for group insurance for animals belonging to milk societies or unions.

Animals Covered

Animals that are covered include indigenous / crossbred milch animals, pack animals (Horses, Donkey, Mules, Camels, Ponies and Cattle/Buffalo Male) and other livestock (Goat, Sheep, Pigs, Rabbit, Yak)

Premium

Premium rates to be paid by farmers - 4 percent for annual policies and 10.5 percent for three-year policies

COMMUNITY/MUTUAL

Concept

Individual risk is mitigated through collective contribution to a corpus. The underlying assumption is that it is not possible to pre-determine loss, that any of the members in the collective or group is likely to incur.

Examples

Goat Insurance by The Goat Trust.
Community Livestock Insurance model in Andhra Pradesh by United India Insurance Company.

Design

The Goat Trust
-Healthy and active goats within the community are eligible to be insured.
-Based on the age and weight of the goat, an estimation of the animal's health is obtained.

Community Insurance-Andhra Pradesh
-Under this approach, the livestock insurance scheme leverages the capacities and the capabilities of the community to manage the scheme and any SHG members can get their cattle insured under this scheme.

Animals Covered

The Goat Trust - Goats
Community Insurance-Andhra Pradesh - Cattle

Premium

The Goat Trust
-An amount equal to 10% of sum assured is taken as premium, and the product covers a maximum of 50% of market value.

Community Insurance-Andhra Pradesh
-The premium rates are fixed at 4.5% of the costs incurred in maintaining the animal for 3 years.

PRO-CONSERVATION

Concept

Cater to very specific local contexts, and environmental pressures. These products have arisen out of need, mainly because of the increasingly fragile nature of several ecosystems – thus creating the need to adopt a conservation approach, while balancing out the need for people living in these ecosystems to maintain and sustain their livelihoods.

Examples

The Tiger Safe Insurance by the World Wildlife Fund (WWF) in collaboration with Oriental Insurance Company (OIC).
The Snow leopard Insurance by the Snow leopard Trust.

Design

Tiger Safe
Encourages communities to shift from "low value livestock to high-value stall-fed cattle."
Livestock owners of the village have to agree to not graze their animals in the core area of the Tiger Reserve.

Animals Covered

Tiger Safe
-Any livestock of households situated in the buffer area of the Jim Corbett Tiger Reserve that has been lost to predation.
Snow leopard trust
-Any livestock of households within the snow leopard habitat that has been lost to predation

Premium

Tiger Safe
-N/A

Snow leopard Trust
-N/A

03 RECENT INNOVATIONS IN CROP AND LIVESTOCK INSURANCE

In India, the insurance sector has seen many innovative products being introduced in the past. The successful scale up of weather based insurance, from scattered pilots to a fully developed product is a case in point. Nevertheless, a criticism often offered is that the pace of innovation in the insurance sector quite underwhelming, and improving this aspect in particular is the need of the hour, given the barriers and challenges at hand. Several opinions exist on the topic – while some attribute this to the regulator not being pro-active enough, others also highlight that meaningful and sustainable convergence between academia/ research organizations, and industry are yet to emerge in a continued manner.

In particular, this study identifies two key areas where the sector at present can immensely benefit from innovative approaches, given recent advances in the technology available: i) improving the coverage of various kinds of risks – particularly those excluded from current schemes - in a feasible and cost-effective manner, ii) identifying efficient, and highly effective delivery mechanisms that can significantly improve the outreach and penetration of insurance. To this end, some of the recent noteworthy innovations in the sector are summarized below.

Index Based Flood Insurance

The International Water Management Institute (IWMI) (supported by CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) and Water, Land and Ecosystems (WLE) and Ministry of Agriculture, Forestry and Fisheries (MAFF, Japan)) has developed a risk transfer solution called Index Based Flood Insurance (IBFI). This product is particularly developed for implementation in states like Bihar, which have a large number of smallholder farming communities, prone to high losses due to floods. The IBFI initiative aims to increase the short term coping capacity of smallholder, poor and marginalized farmers against flood risk with the use of the high quality remote sensing data, Geographical Information System (GIS) technology and computer modelling. The institute's scientists first examined past satellite images to identify historic floods and prepared a flood-risk map. A hydrological model was developed using 35 years of observed rainfall and discharge data from gauges. In other words, it can indicate where flooding is likely to occur.

RES-RISK

The RES-RISK project supports innovative micro-insurance solutions for climate risks through a variety of participatory and flexible approaches. It places strong emphasis on involving communities in the design and operation of insurance

schemes, including risk sharing within communities. The project boasts of innovative approaches like the multi-tier underwriting, group policies for crop and livestock, combining insurance with resilience building activities and community participation in awareness creation, selection of insurance package, and administration of the scheme, assessment, approval and payment of claims. This pilot provides an important example of how multiple solutions can be layered or bundled, thus potentially creating a more appealing product for customers.

App-Based Livestock Insurance

In this pilot, researchers from IFMR LEAD collaborated with a private insurance provider to pilot and assess its Android-based application that digitizes the marketing, enrolment and claim settlement process of a livestock product. The first phase of the project involved a formative evaluation of the process innovation. This will be followed by a longer term evaluation which evaluates the process intervention, on specific outcomes of interest such as take-up, retention rate which speaks of how livestock farmers perceive insurance as a product, life time value and so on. Roll out of the improved app based process will be preceded by a marketing and awareness campaign (regarding the need of livestock insurance and highlighting the benefits of the new-app based approach). The project is being implemented in Gujarat. The integration of technology into livestock insurance has long been considered as a means to improve loss assessments, and reduce fraud. However, this pilot also provided a glimpse at the role of technology in improving delivery mechanisms, and reducing overall product costs.

Picture Based-Crop Insurance

This project encompasses a pilot experiment[15] by IFPRI, along-with a private insurance provider, aiming to understand and evaluate a new, innovative way of delivering cheap and easy-to-understand crop insurance. By using visible crop characteristics derived from farmers' own smartphone pictures, the project aims to minimize the costs of loss verification and make crop insurance more affordable and accessible. A formative evaluation was conducted in the Rabi (winter) season during 2016 and 2017 in six districts of Haryana and Punjab, India. A few features of this insurance are:

- Farmers download the insurance app onto their smartphones.
- They enroll within the app with as many sites as they prefer.
- Every few days from sowing to harvest, farmers upload new pictures for the same sites.
- Every few days from sowing to harvest, farmers upload new pictures for the same sites.
- After cultivation, local agronomists analyse the pictures to verify losses. The aim is to train an algorithm to automate the image processing..
- Farmers who suffered crop damage receive insurance pay-outs.

15. See: https://www.ifpri.org/project/PBInsurance for further details.

04 AGRICULTURAL INSURANCE IN INDIA Delivery Channels and Distribution Networks

Distribution is a key part of every insurer's strategy, particularly in the larger aim of improving coverage among the target population, and increasing product take-up. In India, insurers rely upon a combination of distribution channels in order to cover the population across the length and breadth of this country.

Traditionally, it can be said that three broad types of channels for insurance delivery are seen in the Indian market:

- Partner-Agent
- Direct Sales
- Community Based

However, in the recent years, a fourth type of channel has emerged – that of the insurance "intermediaries."

Figure 7: Delivery Channels for Crop and Livestock Insurance Products
Figures in brackets represent the number of channel/intermediary available in India (IRDA, 2017)

Partner-Agent Model:

In this model of insurance distribution and delivery, all sales are done through Banks, MFIs/ NBFCs etc. who then receive a commission on the same. Various kinds of partner agent models exist:

Individual Agents:

> Has undergone training as required by IRDA regulations, passed an examination and been licensed by IRDA to sell insurance polices to the public and provide after-sales service including assisting at the time of a claim.

Corporate Agents:

> Banks that provide loans for dairying activities (Scheduled Commercial banks, Regional Rural Banks and Co-operative Banks), MFIs, Dairy Cooperatives and NGOs all fall under the category of corporate agents. All entities that are registered as corporate agents. When a bank becomes the corporate agent of an insurance company it is referred to as a bancassurance arrangement or partnership.

Micro-insurance Agents:

> The active distribution channels for micro-insurance in India are NGOs, MFIs, and SHGs (self-help groups), Micro agents, Cooperative Banks and RRBs (regional rural banks), and Post Offices[16].

Point of Sales:

> This is a channel that has been recently created, in order to facilitate the growth and penetration of insurance. A PoS person can represent an insurance company or an insurance intermediary, and can sell only a certain set of pre-specified insurance products, that are pre-underwritten products.

Direct Sales:

Insurers appoint their own staff for marketing as well as sales.

16. In rural areas, it must also be noted that most of the general insurance products are distributed through specific distribution channels (e.g. agriculture input suppliers, tractor dealers etc.) and individual agents. These distributors do not qualify to be Micro-Insurance Agents, but these channels contribute at least 20-25% of the business. Therefore, none of the general insurers have MIAs.

Community-based:

Risk is borne by the community, through pooling of premiums. In regulatory terms, community/ mutual insurers are completely excluded under the IRDAI regulations. A few examples of community based agricultural insurance in India are highlighted later. In 2010, it was estimated that under 1% of the agricultural insurance was distributed in this fashion. It is likely that this number has since gone up; however, there is very little data to make an estimation of the same.

Intermediaries:

Brokers:

Insurance brokers represent the customer, and are licensed to give out policies from any insurance company. Their role is to provide advice on the insurance policies that are relevant/ suitable, and are paid a brokerage fee by the companies based on the policies sold.

Web Aggregators:

Online access to insurance plans are now available through aggregators who are essentially insurance brokers having an online presence. The websites of these aggregators serve as a fast growing- means of comparison, as they showcase plans of various insurers. In the context of agricultural insurance, not very relevant currently.

Insurance Marketing Firms:

A relatively new distribution channel to solicit or procure insurance products, by employing individuals who may be licensed to do the same.

Customer Service Centers:

Based on IRDA guidelines, licence was granted to CSC e-Gov ernance Services India Limited (CSC SPV) to work as an authorised intermediary to market specifically approved insurance products and services through the Rural Author- ised Village Level Entrepreneurs (VLE) under the CSC Scheme of National e-Governance Plan. PMFBY sales through CSCs officially began in July 2017.

Gross Direct Premium Income Through Various Channels

In 2016-17, the available data for crop insurance shows that Direct Business was the largest channel of distribution. The role of Common Service Centers, and India Post is likely to increase drastically in the future, given their ability to reach the grassroots. In 2016-17, CSCs sold 22,170 crop insurance policies.

State-Wise Outreach, and Presence of insurers

As per latest available data for 2016-17, offices of general insurers (private or public) are present in at least 95% of the country's 640 districts. Of these, Public insurers have the larger network in terms of direct office presence in different districts of the country – there is at least one office that belongs to a public insurer, in 95% of the districts (609/640). Private insurers on the other hand, have an office only in 46% of the districts (209/640). In terms of state-wise variation, one observation to be highlighted is that most of districts which do not have an office of either a private/ public insurer, are found in the North East of the country.

Figure 8: Channel-wise share: Crop Insurance.
Source: IRDAI

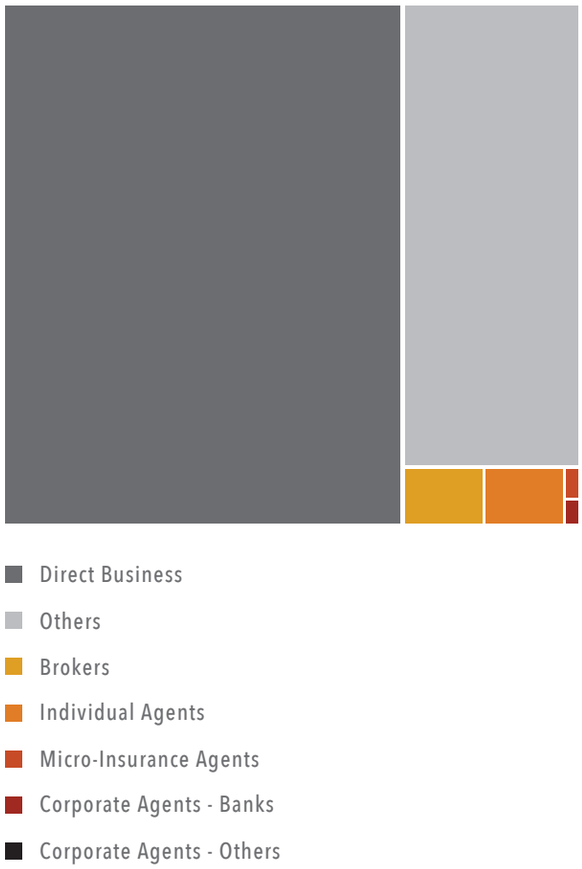

Table 6: Delivery Network for Agricultural Insurance in India.
Source: IRDAI

CHANNEL	2016-17
Corporate Agents	527
Brokers	429
Micro-Insurance Agents	
Web-aggregators	26
CSC	19698
IMF	114
PoS	
-Non-life insurer	7261
-Insurance Brokers	2614

05 AGRI-INSURANCE IN INDIA Challenges, and Barriers

Evidence from various country contexts show that factors like high premium rates, and low levels of trust (Cole et al., 2013; Gine, Townsend & Vickery, 2007; Karlan, et al2014), low product knowledge & lack of awareness (Cai & Song, 2013; Gaurav, Cole & Tobacman, 2011) about insurance have resulted in limited access, and take-up of agricultural insurance products for low income farmers. In India, Chand et al (2016) also find very low rates of renewal for crop insurance. Additionally, it is increasingly likely that product features are not as much as a concern for the rural poor, as are issues such as the actual cost of the policy, and other factors such as the time taken for policy disbursal, and claims settlement. Indeed, researchers have found previously that low quality/ poorly designed insurance products often find low take-up (Clarke 2016, Elabed et al. 2013) Through discussions and interviews with key stakeholders, and an analysis of existing literature and research, some of the key supply, and demand-side perspectives and insights obtained regarding the challenges involved in crop and livestock insurance are further detailed below.

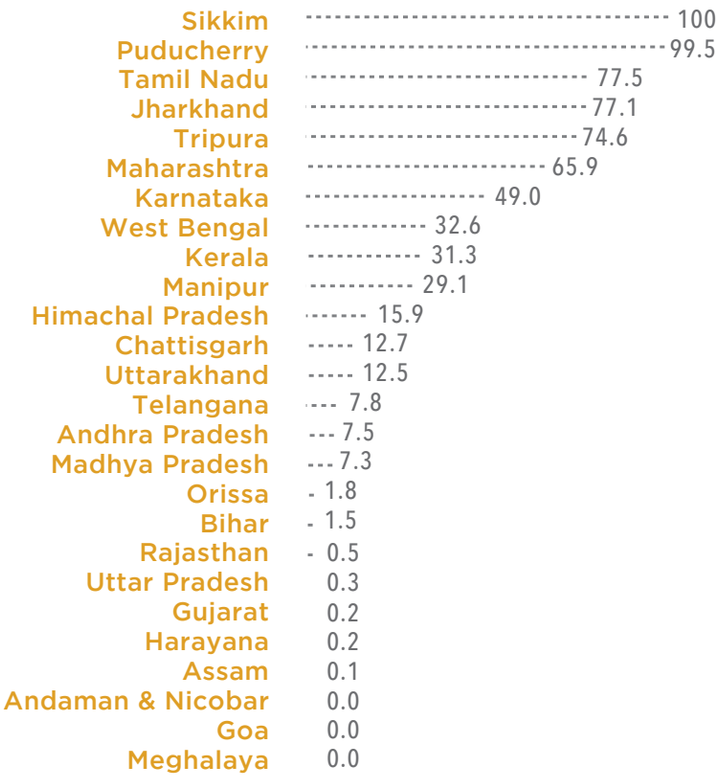

Figure 9: Share of Non-Loanee Farmers in Total Number of Farmers Covered - PMFBY and RWBCIS 2016-17 Source: IRDAI

5.1. Supply-side Perspectives

Coverage of non-loanee farmers:

Covering non-loanee farmers remains a huge challenge – historically, crop insurance has been distributed as a credit-linked product. Indeed, even at present, only 24% of the 5.7 Crore farmers insured under the PMFBY in 2016-17 across the country are non-loanee farmers. High variation in terms of state-wise coverage of non-loanee farmers is also seen. Tamil Nadu (77%), Jharkhand (77%), and Maharashtra (66%) are the best performing in this regard – i.e, over half the farmers covered under the PMFBY in these states are non-loanee farmers[17]. The situation far worse in the livestock insurance sector, and must be addressed immediately.

Need for Product Alternatives:

Stakeholders are in agreement that the current agri-insurance market is dominated by "push-type products". The launch of the PMFBY and RWBCIS, and the high amount of subsidy attached to these makes it impractical for insurers to develop/ sell stand-alone crop insurance products. There is also agreement that very little has been achieved in terms of solutions and innovations that can improve the current livestock insurance product substantially, so as to improve take-up, and cost effectiveness.

- In highly advanced states like Punjab, where irrigation networks are good, the role of insurance needs to be considered, and re-thought. Punjab currently participates in neither the PMFBY, or in the RWBCIS. For small and marginal farmers, it needs to be seen if risk transfer is the best strategy, or if investments should be in other forms of risk management.

- Designing new products: The high amount of premium subsidy paid by the government, coupled with lack of solutions to improve take-up makes it difficult for private insurers to develop/sell stand-alone crop/livestock insurance products. The need is to package the insurance product better, and potentially bundle it with other services so as to make the value proposition more tangible, realizable, and explicit. For example: The value proposition for farmers, of schemes like the Unified Package Insurance Scheme (UPIS) is higher as compared to standalone agri-insurance products

Poor Data Quality:

There is universal acceptance of the fact that the existing data regarding agricultural insurance is highly unreliable. The variability in data availability, from region to region, and from crop to crop/ for different animals does not help the task of the actuary any easier. The urgent need of the hour is for the development of an ecosystem where

17. After adjusting for the high-performing states, the actual coverage of non-loanee farmers remains low overall.

high-quality and highly reliable data is collected and shared among the stakeholders in the ecosystem, akin to the manner in which credit histories are stored, protected, and shared by credit bureaus with the stakeholders in that ecosystem.

- In the specific context of crop insurance, the need of the hour is to leverage technology at the earliest, in order to reduce the number of required crop cutting experiments (CCEs). This will allow for better loss assessment. Ensuring better quality and reliability of this data, and making it available over a time-series is crucial for all stakeholders in the sector.

- The creation of single warehouse or repository, where all stakeholders can easily access weather and crop data (including historical data) might go a long way towards addressing the data issues as well.

Insurance - Stand-alone product, or bundled?:

In general, there is agreement that the future viability of agri-insurance as a 'stand-alone' product is certainly in doubt – particularly if more complete penetration and coverage are the goals. The current structure and design of the PMFBY can ensure that take-up improves to a certain extent only. At present, the need is innovation and creative thinking, that can package the insurance product better, and potentially bundle it with other services so as to make the value proposition more tangible, realizable, and explicit. Finding attractive, and relevant complementarities on the demand side is hard - there is some evidence to suggest that linking of insurance to other financial products might not necessasarily increase demand or take-up, for instance. Giné and Yang (2009) find that linking loans with weather-linked insurance reduced demand for credit, and Stein and Tobacman (2015) found poor success for weather insurance bundled with savings. Thus, a lot of work needs to be done, in order to evaluate and assess what product bundles are best suited to different needs, of the various farmers across the country.

Concentration of Risk:

Over 70% of the take-up of the PMFBY (2016-17) is in the 9 states that were drought hit in 2016-17. These states also account for 65% of the total number of cultivators reported in India (Census 2011), and the PMFBY mean coverage for these 9 states together is around 53% of the total number of reported cultivators. There is a very high concentration of risk transfer activities in a very limited number of states, and this is detrimental to the insurers. Across these states, the average claims ratio for 2016-17 has been 88%, with claims ratios in Andhra Pradesh and Tamil Nadu being 114%, and 225% respectively. The role of the 2016 drought – the worst in 140 years in Tamil Nadu – is thus clearly reflected.

The situation is more troubling when considering the nature of the re-insurance market for crop insurance. The major reinsurer is the GIC, while the foreign re-insurers remain

reluctant to engage on a larger scale due to the volatility of Indian agriculture. Thus, this results in a situation where the risk is concentrated even on the supply side.

Delivery:

The role of customer service centers, and other channels that are meant to influence and impact last-mile delivery and take-up need to be carefully considered and reviewed, and strong action needs to be taken in order to ensure that distribution through such channels can drive growth in take-up and coverage of agricultural insurance. Ideally, the aim should be to ensure that this highly-granular delivery infrastructure is inter-operable – thus keeping pace with changes in terms of empanelled agencies etc., highly cost-effective, and have the ability to provide context specific advice and recommendations.

Co-ordination between stakeholders (PMFBY) :

As there are multiple stakeholders involved in the PMFBY implementation process, numerous delays have been reported – mainly due to inefficiency arising from the difficulties in coordination across institutions. A frequently reported bottleneck is the delay in release of premium subsidy to the insurance companies. A recent review of the PMFBY[18] shows that claim was delayed in even states where subsidy was already given. As of April 2017, only 32 per cent of the claim reported was paid by insurance companies. Another area where better coordination can lead to improved results is with regards to crop cutting experiments. Currently, states are required to complete the CCEs, and submit the data to the insurance companies within one month of harvest. From the government's perspective, having the insurance company participate in the process can potentially lead to a better quality of outcomes, and also better manage the increased man-power and logistical requirements.

High transaction costs:

Agricultural insurance continues to remain expensive for the insurer to implement. In livestock insurance in particular, the identification of the animals, assessment of livestock value, claim settlement process (fraud) are all manually driven, and require a para-vet at the site. Furthermore, existing operational processes related to enrolment and claims settlement are labour-intensive and expensive. The heavy claim ratio (above 80%) in case of livestock makes the cost of transaction and service very high for the insurance industry and also acts as deterrent factor in extending the coverage of the schemes. Digital delivery is likely to be the next big game changer- with the increase in mobile phone and smartphone penetration being the game changers, and is likely to significantly influence this aspect. A pilot by IFMR LEAD (2017) showed that using a digital process for the enrolment, and claim settlements aspect of a livestock insurance product had the potential to translate into a 1 to 1.5 percent

18. http://www.cseindia.org/userfiles/Pradhan-Mantri-Fasal-Bima-Yojana-Report.pdf

reduction in premiums charged, thus further highlighting the importance of digital delivery mechanisms.

Building awareness regarding insurance products, and their working:

There has not been much effort on the part of the states to build awareness, as described within the operational guidelines of PMFBY. Insurance companies engage usually only in broad marketing campaigns/ strategies, that aim to cover masses of people. Door-to-door marketing, or personalized efforts are not common in rural areas due to high transaction costs. In livestock insurance, very little importance is given to marketing, as mainly the coverage is often only extended to loanee farmers. While digital delivery is likely to potentially improve take-up, there are several factors that will influence the success of these channels in rural India – including the ICT literacy, financial literacy and numeracy, and overall comfort levels of people to trust digital interfaces and applications. Given the poor experience of the sector with regards to earning people's trust, a lot of work needs to be done in this regard as well.

- Overall, assessing key supply-side stakeholders provides the overwhelming sense that there is a willingness to innovate, and address various issues in agricultural insurance if two main barriers can be addressed:
    - Regulatory Support: A common observation across multiple interviews was the fact that there are many gaps in current regulation. Additionally, given the rapid progress in technology – there is a serious pressure on the regulator as well to ensure that the regulatory support and protection afforded to the sector evolves as rapidly.
    - Fostering Innovation: While stakeholders are excited about the role of new technology in changing the insurance landscape, there is a sense that enough is not being done, that can leverage latest advances to design, implement, and deliver better products. With regards to crop insurance, the issue is that remote sensing, and other such tools that can replace the CCEs improve data quality, and substantially improve crop loss estimation techniques are being adopted rather slowly.
    - With regards to livestock, the advances in technology have not resulted in fundamental changes to product design – the para- vet is still required to certify the animal in person at the time of enrollment, and at the time of death/ claims. No technology has been developed to do away with this operation, which is the time-consuming, and expensive. RFID chips, or mobile applications are unfortunately not yet the best tools to gather robust data on animal health.

- With specific regards to crop insurance, there still is no solution to monitor tubers, or other such crops that do not have an explicit presence above the ground, per se. Satellite imagery is not perhaps the right solution here, and alternatives will need to be looked into.

5.2. Demand Side Perspectives

The most frequently cited factors for low levels of crop and livestock insurance take-up in India (apart from cost) are:

Non-coverage of important risks, and common agricultural practices:

- In the sphere of livestock insurance, death of cattle is not the only loss the farmer incurs. Even morbidity, and declining productivity result in financial losses for the farmer. No solution exists that addresses these issues- the main barrier is the really high transaction costs in covering productivity loss for instance, which discourages insurers from providing coverage for the same. Morbidity, and declines in productivity due to disease/ age are thus covered by only a few insurers and that too at a higher premium.

- In the sphere of crop insurance, there are many cases where human-wildlife conflicts are not covered. In many parts of the country for instance, herds of elephants, and other wild animals are known to destroy crops, or field infrastructure. No pro-conservation type product exists that might cover these losses.

- The PMFBY does not cover sharecropping, tenancy farming and is compulsory only for loanee famers' which is a cause of immense concern for farmers' especially sharecroppers and non-loanee farmers. The notification of crops under PMFBY overlooks the fact that many farmers practice mixed cropping to enable food sustenance; the product can be made more relevant to farmers by diversifying the number of crops covered, and allowing insurance for mixed cropping[19].

- Each state notifies the crops that are to be covered in each season;interviews with key stakeholders reveal that on there have been instances where major crops are excluded from the list of notified crops. While this may reduce the premium subsidy burden on the state, it also translates into lower insurance sales.

19. Chandra Bhushan and Vineet Kumar, 2017, Pradhan Mantri Fasal Bima Yojana: An Assessment, Centre for Science and Environment, New Delhi. Retrieved from http://www.cseindia.org/userfiles/Pradhan-Mantri-Fasal-Bima-Yojana-Report.pdf

Awareness:

There is a general lack of understanding of insurance as a concept among most of the target populations. Low awareness regarding the need and benefits of a crop or livestock insurance policy remain a significant deterrent to take-up. Apart from low literacy and education levels, one of the prime causes of lack of awareness is a lack of outreach at the ground level.

- Additionally, it was found that the insurance companies (for the districts considered safe) engaged very heavily in marketing and lobbying with the local bank officials to increase insurance coverage. However, in the districts where crop loss probability was high, insurance companies rarely made any efforts to increase insurance coverage. Farmers had no direct connection with insurance companies and insured farmers received no insurance policy document or receipt. They usually were not even aware if their premiums had been deducted and crops insured.

Documentation:

For non-loanee farmers a significant challenge arises from the amount of documentation that is required from them, which they often lack. The non-loanee farmers are required to submit proof of land records prevailing in the State Records of Right (RoR), Land possession Certificate (LPC) etc. Moreover, applicable contract, agreement details, other documents notified by concerned State Government are required to be submitted. Since they do not have an intermediary such as a bank, they are required to submit insurance proposals personally or through post to insurance company with requisite premium.

Lack of trust:

There are multiple factors that result in farmer's lack of trust in insurance products as well as the companies offering these products:

- Firstly, a lack of proper understanding of insurance terms and concepts, resulting partly from the manner in which most agents or bank employees explain these to the farmers.

- Second, the often reported erroneous denial of claims or delays in claim payments (whether due to delays in crop cutting experiments (CCEs), or delays from the government in releasing subsidies, or the time-consuming administrative processes).

- Third, farmers might be present biased; insurance has traditionally required a payment upfront, for losses that might never occur. In the situation where a farmer does not receive a payour, the premium paid is perceived as a loss.

Fragmented set of risk management solutions:

There are various other activities for risk management that farmers can potentially undertake, apart from insurance. Some of these are discussed in the next section. Farmers usually get most of the knowledge and resources to undertake different risk management activities from different organizations, and often at different times. The result of receiving information and risk management products in such a fragmented way further reduces the value of any single product for the farmers. Moreover, the risk management strategies are usually non-standardized, in that different farmers might be receiving different information regarding dealing with a particular risk/event. There is a need to bundle insurance, or align it with other risk management (mitigation, coping) strategies. Even if different entities are covering different risk management strategies, it is important that the farmers themselves receive it as a single product.

Timing of Premium Payments

It has been well established that the cost of crop/ livestock insurance premiums is a potential deterrent to take-up. However, recent evidence also suggests that the timing of premium payments could be a crucial aspect of determining demand - particularly for crop insurance. Casaburi and Willis (2017) find that offering pay at harvest insurance - where the insurer offers the insurance product, and deducts the premium (plus interest) at the time of harvest results in a very high take-up (72%), in an expermental setting. Such products are yet to be tested in an Indian scenario.

Ongoing pilot work by IFMR LEAD finds some anecdotal (and mainly qualitative) evidence, based on focus groups and interviews, that similar constraints might exist even in the field of livestock insurance. Linking the premium payments to the local dairy cooperative, and deducting payments from the farmer's income (from dairy sales) might potentially ease challenges faced, and improve the take-up of livestock insurance as well.

06 THE WAY FORWARD?
Insurers, Insurance, and Resilience Building

The substantial amounts of risks inherent to agriculture in India not only endangers the livelihood and income of farmers but also undermines the viability of the agriculture sector. Protecting farmers from these risks require considerable effort in terms of developing capacity to manage such risks. While insurance is an important tool in this regard, it must be remembered that insurance as a product can only transfer risk away from vulnerable individuals, groups etc. Insurance products on their own cannot be expected to solve larger systemic issues that are prevalent in the agricultural sector. In this context, it is important to place the conversation on insurance in the larger context of an increasingly common discussion, and debate centred around the concept of resilience, and resilience building.

By many accounts, it is hard to arrive at a single definition for resilience, and 'resilience-building'. Resilience may be viewed in general as a system's ability to withstand (absorb) shocks and stresses but also its ability to adapt to dynamic conditions and put in place mechanisms that enable longer-term, systemic responses to the underlying causes of vulnerability (Barrett and Constas, 2013). The backdrop to this broader conversation has largely been the result of recognition that the agricultural sector in India is extremely vulnerable to climate and weather risks - It has been estimated that for every two-degree rise in temperature, the agriculture GDP of India will reduce by at least five percent. It is therefore an urgent need to ensure that sufficient mechanisms are put in place to ensure that these risks can be managed in a sustainable and cost-effective manner. Furthermore, a majority of those affected are likely to be small/ marginal farmers, who also have the least resources to adapt to such drastic environmental changes or shocks in a manner that substantially reduces the risks associated.

Recent literature has tended to focus on 'resilience' as a process (Norris et al, 2008) that brings together various elements and strategies, such as learning, adaptation, improved anticipation and risk management, and better structure and institutions, that ultimately allow the goal of resilient systems to be created. Needless to say, managing risk is in inherent to achieving resilience, and the various strategies to manage risk include reducing risk, transferring and sharing risk, being adequately prepared for various uncertainties/ shocks, and developing the capacity and ability to respond and recover efficiently. In this context, it is important to critically assess the role of some of the key stakeholders involved in risk management activities, in the context of developing linkages, and cooperative strategies that can bring the focus of policymakers, practitioners, and the other key stakeholders towards one that aims to build resilience.

INSURANCE COMPANIES

In addition to the various crop and livestock insurance products under mainstream government schemes such as PMFBY, RWBCIS and National Livestock Mission, there are a few other insurance products available to farmers, that have been discussed above. Products include honey bee insurance, and barn insurance. In addition, there are products which do not directly provide cover for crop or livestock, but instead cover the materials used by farmers. There are schemes that protect farmers from losses arising due to failure of their machinery which are used in their day to day agricultural activities like pump sets, tractors, carts, cycle etc. Such schemes cover losses that may arise due to theft, accident, floods, mechanical/technical breakdown, fire, strike, malicious damage. By transferring the risk associated with various parts of the agricultural value chain, insurers play a key role in mitigating production risk in particular, thus ensuring that the insured farmers are able to cope with various shocks that are livelihood threatening. Other than such products, there is only a limited set of activities such as marketing, outreach and other forms of customer engagement and education insurers commonly engage in.

COOPERATIVES, NGOS AND OTHER COMMUNITY BASED ORGANIZATIONS

Most of the risk mitigation and coping tools for farmers are usually provided by community based organizations in India. These include organizations such as The Goat Trust, Anthra, Global Alliance for Livestock Veterinary Medicines (Galvmed), DHAN foundation, ISAP India as well as thousands of smaller cooperatives across India. These organizations undertake a variety of activities aimed at building community resilience through capacity building of small and marginal farmers' agricultural practices, provision of feed and veterinary services, encouraging savings, and marketing activities.

Some of these organizations (referred to as "mutuals") also offer insurance services in addition to capacity building activities.

GOVERNMENT SCHEMES AND PROGRAMMES

In addition to crop and livestock insurance schemes, the central and state governments have undertaken various measures for development of rural infrastructure across blocks through co-ordination of activities related to agriculture, animal husbandry, infrastructure and extension.

However, most of these schemes suffer from low awareness among the farmers, and inefficient or limited implementation. For example, Aditya et al (2017)[20] find that only 23.72 and 20.04 percent of farmers in the rural agricultural households in India were aware of MSP of crops grown by them in Kharif and Rabi season, respectively. They also show that farmers' knowledge of MSP does not lead to specialization. The efficacy of any government risk resilience scheme depends on the farmer's awareness about

20. Aditya, K. S., Subash, S. P., Praveen, K. V., Nithyashree, M. L., Bhuvana, N., and Sharma, A. (2017) Awareness about Minimum Support Price and Its Impact on Diversification Decision of Farmers in India. Asia & the Pacific Policy Studies, 4: 514–526. doi: 10.1002/app5.197. Retrieved from:[http://

these schemes, as well as the quality of implementation. Considerable efforts still need to be put in training farmers on their rights and entitlements.

By thus placing the insurer, and insurance within a framework focused on risk management and amidst broader conversation on resilience building, the study seeks to highlight those aspects of risk management that insurance as a product can effectively address. The broad landscape of product/s services highlighted above demonstrate that there are several aspects of the risk management process insurance cannot address, and neither should we expect it to.

It is easy to see from the landscape of products/ services highlighted above that risk management and resilience building activities in India remain very fragmented even today, and much needs to be done to ensure that the efforts of various stakeholders converge in a manner that is beneficial to the farmer. Small/ marginal landholders in particular will gain immensely from this convergence between government, market and community. For this convergence to happen, there is a need for a thorough assessment of the various risks faced by the farmer, and the agricultural value chain today, and a clear enunciation of adequate strategies by the various stakeholders involved, to extend risk management strategies to one and all. Such an approach is likely to also ensure gains for insurers and the insurance sector as a whole as well.

Thus, in conclusion, the key takeaways from the discussion thus far as follows:

1. There are a number of key issues, both on the supply and demand side, that hinder the growth of crop and livestock insurance in India. While some evidence to the efficacy of such insurance products is available, major barriers such as the high costs, and challenges in implementation continue to persist. Additionally crop and livestock insurance have been presented and sold independent of other products and services - a strategy that needs to be given considerable thought, going forward.

2. The future of the sector depends on the ability of insurers to locate their products in a manner that is far more appealing, impactful, and relevant to the daily struggles of the farmers. Viewing insurance in the larger context of resilience building, and risk management activities is one strategy that may be adopted.

3. However, insurance companies themselves are per-se are not currently well-placed to undertake any other risk management activities. The aim for the next generation of insurance products should be to ensure the creation of meaningful and high-value partnerships between community organizations that function a grassroots level, and insurers. These partnerships must ideally lead to the creation of ‘packages’, or a ‘bundled’ products that encompass risk transfer and other risk mitigation strategies. This will go a long way in addressing commonly cited issues of ‘value proposition’, and ‘product tangibility’, and will also be beneficial for the insurers.

4. Currently, a disproportionate amount of importance is given to crop insurance vis-à-vis livestock insurance by both the government, and insurance companies in India. No risk management, or resilience building strategy in agriculture can succeed in the long term without adequately safeguarding livestock, given the high-value potential of livestock assets. There is an urgent need for improvement here.

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APPENDIX

Table 7: Damage Due to Natural Disasters 2001-2015
Source: NDMA

Year	Cattle Lost (in Nos.)	Lives Lost (in Nos.)	House Damaged (in Nos.)	Cropped Areas Affected (in lakh ha)
2001-02	834	21269	346878	18.72
2002-03	898	3729	462700	21
2003-04	1992	25393	682209	31.98
2004-05	1995	12389	1603300	32.53
2005-06	2698	110997	2120012	35.52
2006-07	2402	455619	1934680	70.87
2007-08	3764	119218	3527041	85.13
2008-09	3405	53833	1646905	35.56
2009-10	1677	128452	1359726	47.13
2010-11	2310	48778	1338619	46.25
2011-12	1600	9126	876168	18.87
2012-13	948	24360	671761	15.34
Total	24523	1013163	16569999	458.9

Table 8: Providers of PMFBY and Coverage – (2016-17)

Source: IRDAI

Insurer	No. of Farmers Covered	Gross Premium (INR Lakh)	Claims		Share of Total Farmers Covered	Share of Total Gross Premium
			No. of Beneficiaries	Amount (INR Lakh)		
AIC	2,38,82,055	6,63,203.5	61,29,300	2,72,471.5	46.85%	38.43%
United India	51,30,706	1,41,720.7	203	36.2	10.06%	8.21%
IFFCO Tokio	36,46,915	1,10,561.9	6,50,122	61,665.2	7.15%	6.41%
HDFC ERGO	34,10,353	2,02,488.7	5,63,369	26,073.6	6.69%	11.73%
Reliance General	25,81,660	91,944.2	1,18,409	16,490	5.06%	5.33%
ICICI Lombard	25,01,534	1,40,354	3,00,650	26,025.9	4.91%	8.13%
National	18,88,707	23,729.6	59,394	3,792.3	3.70%	1.38%
Chola MS	17,82,012	27,378.94	1,01,926	7,009.9	3.50%	1.59%
Future Generali	16,02,767	21,297.2	1,00,000	6,944.4	3.14%	1.23%
Bajaj Allianz	12,21,595	65,204.4	2,20,365	1,80,846	2.40%	3.78%
Universal Sompo	9,49,252	43,897.2	3,45,468	35,134.8	1.86%	2.54%
TATA AIG	8,08,407	41,941.1	96,939	155,08.5	1.59%	2.43%
New India	6,33,616	1,04,642			1.24%	6.06%
SBI General	5,78,429	36,525.6	26,054	5,353.4	1.13%	2.12%
Shriram	2,90,953	10,239.3			0.57%	0.59%
Oriental	70,402	395.8	197	14	0.14%	0.02%
Total	5,09,79,363	17,25,524	87,12,396	6,57,366	100.00%	100.00%

Table 9: State-Wise Details - PMFBY + RWBCIS (2016-17)

Source: MoA

Year 2016-17		No. of Farmers Insured			Area Insured (Ha)	Sum Insured	Farmers Premium	GOI Premium (share)	State Govt Premium	Gross Premium	Claims reported	Claims Paid	No. Of Farmers Benefitted	Claims Ratio
SL no.	State/UT	Loanee	Non Loanee	TOTAL		Rs.Lakh								%
1	Andhra Pradesh	1637886	133670	1771557	1552472	860883	19896	29687	29687	72270	90691	81524	880128	114%
2	Andaman & Nicobar Island	324	0	324	253	47	0	0	1	2	15	15	295	892%
3	Arunachal Pradesh													
4	Assam	60229	36	60265	41005	23559	497	184	184	865	502	502	23370	58%
5	Bihar	2672627	40551	2713178	2465249	1172428	20392	60851	60851	142093	32718	0	149698	23%
6	Chhattisgarh	1352433	196731	1549164	2416925	723141	13649	9464	9464	32578	15473	15330	135221	47%
7	Dadra & Nagar Haveli													
8	Daman & Du													
9	Goa	757	0	757	548	580	7	0	0	7	3	3	111	36%
10	Gujarat	1970507	4785	1975192	2841630	1232376	24940	98793	112345	236078	100248	100248	500219	42%
11	Haryana	1332922	3062	1335984	2084576	1178294	19653	6486	10202	36341	29488	28319	223417	81%
12	Himachal Pradesh	318642	60411	379053	128554	89766	3104	2024	2024	7152	4420	3138	105721	62%
13	Jammu & Kashmir													
14	Jharkhand	200855	677204	878059	375726	201050	3979	11609	11609	27196	2635	2028	36783	10%
15	Karnataka	1589762	1526672	3116434	4548284	1129739	26793	67912	67912	162623	118333	101334	756617	73%
16	Kerala	63711	24194	77405	53105	33248	722	1298	1298	3317	2135	1704	24895	61%
17	Lakshadweep													
18	Madhya Pradesh	6394844	502879	6897723	11571175	3522827	71191	150767	150767	372725	194113	182560	1264454	92%
19	Maharashtra	4089276	7916713	12005989	7442226	2447175	69104	201888	201888	472879	231225	229556	2901571	49%
20	Manipur	5928	2438	8366	9121	3694	74	143	143	359	196	127	8358	55%
21	Meghalaya	89	0	89	38	47	1	1	1	4	3	0	48	65%
22	Mizoram													
23	Nagaland													
24	Orissa	1787620	32616	1820236	1318712	726235	14263	19823	19823	53908	43038	42978	167929	80%
25	Puducherry	44	8493	8537	7979	3399	26	129	154	310	734	734	4254	237%
26	Punjab													
27	Rajasthan	9242326	45610	9287936	10203046	1718985	36660	107737	107737	252134	157696	42978	167929	80%
28	Sikkim	0	574	574	131	46	1	0	0	1	1	1	31	136%
29	Tamil Nadu	326693	1123439	1450132	1323985	626394	29659	47045	47045	123249	278997	264796	857592	225%
30	Telangana	903544	72278	925022	865560	548942	12201	9571	9571	31342	18383	15855	257542	59%
31	Tripura	3179	9349	12528	4917	2958	29	5	5	39	11	11	542	29%
32	Uttar Pradesh	6639117	21468	6660585	5744498	2508245	45936	29727	29727	105390	53221	53198	1110824	51%
33	Uttarakhand	228915	32656	261571	132363	92139	1956	1101	1101	4159	2747	2247	61679	66%
34	West Bengal	2789072	1346112	4135189	2034681	1234548	23425	24067	25601	73093	32334	3176	484072	51%
	Total	**43600803**	**13781846**	**57382649**	**57166758**	**20080745**	**418160**	**880313**	**899141**	**2217624**	**1414450**	**1283427**	**12385134**	**64%**

Table 10: Premium Rates and Other Details - Goat Trust Partners in Rajasthan

Source: The Goat Trust

Particulars	GSVS (Ajmer)	GMVS (Ajmer)	IBTADA (Alwar)	SSD (Dausa)	RMKM (Ajmer)	GDS (Jawaja)	Total
Launching of SSY	Jun.'13	Jul.'13	Apr.'13	Sep.'13	Jul.'13	Aug.'13	
1. Total No. of Goats Inducted	307	445	335	226	156	319	1788
2. Insurance of Inducted Goats	307	445	335	226	156	319	1788
3. Insurance of Existing Goats	64	87	568	14	90	105	928
4. No. of HH	126	196	301	84	98	163	968
5. Total Goat Insured	371	532	903	240	246	424	2716
6. Total Premium Collected	62325	130400	469100	40005	52400	89760	843990
7. Total No. of Claims	12	16	32	6	7	4	77
8. Total Claim Amount Disbursed	28000	37700	105500	9500	14000	7000	201700
Analysis							
9. Avg. Premium Amount	167.99	245.11	519.49	166.69	213.01	211.7	
10. Mortality Rate	3.13	2.92	3.42	2.44	2.77	0.93	

Table 11: Community Livestock Micro-insurance in Andhra Pradesh (2012-15)
Source: AABP website

District Name	No. Of Polices	Premium	Service Charge
Srikakulam	2095	2200569.21	50045
Vizianagaram	273	31339	4095
Visakhapatnam	1596	1339726.5	32380
East Godavari	479	135976.5	7985
West Godavari	814	1030701	16840
Krishna	3677	844289.31	57875
Guntur	1515	1307636.93	31930
Prakasam	2929	3338904.77	63895
S.P.S Nellore	691	411529.72	13920
Chittoor	19487	12843291.54	354725
Y.S.R(Kadapa)	1123	638445	19775
Anantapur	4692	3051648.05	85340
Kurnool	2135	1448401.95	40595
Total	41506	28622459.48	779400

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