INDEX BASED FLOOD INSURANCE (IBFI) IN BIHAR

.....The disaster affected people have the first right on the state's treasury.
- Shri. Nitish Kumar, Hon'ble Chief Minister, Bihar

Chapter 1: Present Scenario and Need for Index Based Flood Insurance in Bihar.

Bihar is a land of farmers and considered destination for second sunrise of Green Revolution in the country. Several reports including the National Farmers Commission have emphasized the need for accelerated development of agriculture in Bihar for securing food security of the country. Dr. A.P.J. Abdul Kalam, the then President of India has described Agriculture as Core Competence of Bihar. The Bihar government has successfully implemented two Agriculture Road Maps and is in the process of implementing the third Agriculture Roadmap (2018-22).These Agriculture Road Maps have been successful in facilitating food and nutritional security of state population, increase in farmer's income, gainful employment to agriculturist and check on migration, equitable agricultural growth with focus on gender and human aspects and sustainable use of natural resources for sustainability of production system.

Nevertheless, recurring disasters have often led to distress in the farming sector with indebtedness, crop failures, non-remunerative prices for crops and poor returns over cost of cultivation. Disaster Risks in Bihar emanate from the interplay of multiple contributing factors. The state is prone to natural hazards including flood, earthquakes, drought, cyclonic storms, fire, hail storms, lightning, heat wave and cold wave. Out of thirty eight districts of Bihar 15 districts are major flood prone and 13 districts are flood prone. In these twenty eight districts major flood events have occurred in year 2004, 2007,2008 (national calamity – Kosi Floods), 2011, 2013,2016,2017 along with many breach induced flooding. Areas typically not experiencing floods hitherto in the state have also started experiencing occasional floods especially areas lying in south Bihar. A unique paradox is witnessed in Bihar where in flood and drought event occur in the same year (2013) and sometimes in the same district. Due to Al Nino effect since the year 2009, drought has even spread to North Bihar as evidenced from drought being declared in 26 districts in the year 2009, the all 38 districts in the year 2010 and 33 districts in 2013. Bihar has witnessed irregular and erratic rain fall during these years and in March 2015, extensive crop damage was caused due to unseasonal rain fall and hail storm. Besides 8 districts bordering the Shivalik Tarai of the Himalayas in Nepal, has hairs of short streams and rivers (Baghmati – Adhwara is referred as watery Jata of Lord Shiva in local folk songs due to numerous streams) which causes flash floods due to unseasonal rainfall in Nepal again leading to crop loss. Agriculture and allied sector contributes 18.9 percent of the Bihar GSDP. The rate of growth of Agriculture and allied sector has been 5.4 percent during 2005-10 and 3.7 percent during 2010-14.Farm holdings are small and scattered. There are about 1.61 crore farm holdings of which 91 percent is marginal.The water area of Bihar constitutes about 3.9 percent of the total geographical area.

The above fact draws attention to an urgent need for financial safety nets for farmers to overcome vulnerabilities induced by floods and frequent weather anomalies in Bihar. A universal crop insurance mechanism, with various safeguards, was recommended as a key component of the safety net. Smallholders are particularly vulnerable to crop damage from extreme weather events, hence they stand to benefit greatly from affordable insurance products.

Though the government of Bihar, in recent years have successfully distributed the entitled relief compensation for crop loss under the Climatic Relief Norms (rupees eight thousand for un irrigated land and rupees thirteen thousand for irrigated land with maximum two acres of land coverage) amongst the farmers but it has been observed that it should be updated and modernized to make it timely and adequate help to affected farmers. Besides the huge amount spent on distribution in terms compensation payment can be more effectively be spent on subsidised premium payment, on behalf of farmers in post monsoon or harvest period by the state government.

Chapter 2: Previous Agriculture/Crop Insurance Schemes: An analysis (weaknesses in terms of implementation gaps)

An analysis of the past history shows that Crop insurance in general has not been so successful across the nation and in different states. Policy makers have unrolled various avatars of crop insurance in different times. Considering the unique nature of Indian agriculture and inequitable socio-economic status of Indian farmers, crop insurance has remained a abortive attempt in general.

Even after repeated revision of the schemes and huge support in the form of premium subsidies for the farmers, crop insurance has struggled to produce the desired results. After more than decades of existence of crop insurance in some form or the other, it has only reached just a small percentage of the farmers.

Previous crop insurance schemes (NAIS, MNAIS and WBCIS), failed to include sharecropper and tenant farmers in the scheme. The primary reason is that to avail of insurance, farmers needs papers or certification to prove that they are farming as tenants or sharecroppers. Conventional insurance schemes based payments to farmers on estimates of an individual farmers' loss in yield.

Time gap in payment of crop loss compensation extended from to average of 16 months.

In contrast, weather index-based insurance schemes base payments on a weather index which is developed from rainfall data that is in turn linked to farmer yields.The advantage is the reduced cost and time needed to monitor individual farms and hence lower insurance premiums. Innovative use of technology, such as remote sensing, can improve the accuracy and efficiency of index based insurance schemes by estimating flooded areas and crop losses through digital mapping.

A Chronology of crop insurance schemes in India can be summed up as following:

- Comprehensive Crop Insurance Scheme (CCIS): 1985 to summer 1999
- National Agricultural Insurance Scheme (NAIS): Winter 1999–2000 to 2015–16
- Modified National Agriculture Insurance Scheme (MNAIS): 2010 - 2013
- Weather Based Crop Insurance Scheme (WBCIS): Summer 2007 to summer 2013

⇨ Comprehensive Crop Insurance Scheme (CCIS): 1985 to summer 1999

A crop insurance scheme linking institutional credit(crop loan based on area approach) was suggested by Prof.Dandekar in 1976 & this scheme called as Comprehensive Crop Insurance Scheme (CCIS), was implemented from kharif 1985 to 1999,on all-India level.

The objectives of the scheme were:

* Financial support to farmers in the event of crop failure- as a result of drought, floods.
* Credit eligibility of farmers after a crop failure for the next crop season.

All natural risks were covered excluding nuclear and war risks. Premium as well as the indemnity rate for notified crop was uniform for all insured farmers irrespective of their actual yield. Indemnities were paid to all insured farmers when average output of a given area fell below the normal output. The CCIS was in operation until Rabi 1999.

⇨ National Agricultural Insurance Scheme (NAIS): Winter 1999–2000 to 2015–16

This Scheme was introduced during Rabi 1999-2000 season replacing Comprehensive Crop Insurance Scheme (CCIS). The Scheme was implemented by Agriculture Insurance Company of India limited, on behalf of Ministry of Agriculture. The main objective of the Scheme was to protect the farmers against the losses suffered by them due to crop failure on account of natural calamities, such as drought, flood, hailstorm, cyclone, fire, pest/ diseases, etc., so as to indemnify the losses and restore their credit worthiness for the ensuing season. The Scheme was available to all the farmers both, loanee and non loanee irrespective of the size of their holding. The Scheme envisages coverage of all crops including cereals, millets, pulses, oilseeds and annual commercial and horticultural crops in respect of which past yield data is available.

⇨ Modified National Agriculture Insurance Scheme (MNAIS): 2010 to Kharif 2013

The Scheme before incorporation in NCIP was piloted from Rabi 2010- 11 to Kharif 2013. The modified version had many improvements viz., Insurance Unit for major crops were village Panchayat or other equivalent unit; in case of prevented / failed sowing claims up to 25% of the sum insured was payable, post-harvest losses caused by cyclonic rains were assessed at farm level for the crop harvested and left in 'cut & spread' condition up to a period of 2 weeks in coastal areas; individual farm level assessment of losses in case of localized calamities, like hailstorm and landslide; on-account payment up to 25% of likely claim as advance, for providing immediate relief to farmers in case of severe calamities; minimum indemnity level of 80% was available (instead of 60% in NAIS);

⇨ Weather Based Crop Insurance Scheme (WBCIS): 2007 to summer 2013

Weather based Crop Insurance Scheme (WBCIS) is a unique Weather based Insurance Product designed to provide insurance protection against losses in crop yield resulting from adverse weather incidences. It provides payout against adverse rainfall incidence (both deficit & excess) during Kharif and adverse incidence in weather parameters like frost, heat, relative humidity, un-seasonal rainfall etc. during Rabi. It is not Yield guarantee insurance.

WBCIS operates on the concept of "Area Approach" i.e., for the purposes of compensation, a 'Reference Unit Area (RUA)' is deemed to be a homogeneous unit of Insurance. This RUA shall be notified before the commencement of the season by the State Government and all the insured cultivators of a particular insured crop in that Area will be deemed to be on par in the assessment of claims. Each RUA is linked to a Reference Weather Station (RWS), on the basis of which current weather data and the claims would be processed. Adverse Weather Incidences, if any during the current season would entitle the insured a payout. The "Area Approach" is as opposed to "Individual Approach", where claim assessment is made for every individual insured farmer who has suffered a loss. WBCIS provides protection to the insured cultivators in the event of loss in crops yields resulting from the adverse weather incidences, like un-seasonal/excess rainfall, heat (temperature), frost, relative humidity etc.

Previous Flood Insurance Schemes

S.No	Time Frame	Initiative/Scheme
1	1971-1978	First individual Approach Scheme
2	1979-1984	Pilot Crop Insurance Scheme
3	1985-1999	Comprehensive Crop Insurance Scheme (CCIS)
4	2000 to 2013	National Agricultural Insurance Scheme (NAIS)
5	2010-11	Modified National Agricultural Insurance Scheme (MNAIS)
6	2007-08	Weather Based Crop Insurance Scheme (WBCIS)
8	2016	Pradhan Mantri Fasal Bima Yojana (present)

Chapter 3: Pradhan Mantri Fasal Bima Yojna (PMFBY): A Pro Farmer Scientific Approach.

Pradhan Mantri Fasal Bima Yojana (PMFBY)-2016 has been the most recent version of crop insurance in the country. It replaced the earlier two schemes National Agricultural Insurance Scheme as well as Modified NAIS which had some inherent drawbacks. Thus pooling in the important learning from all the earlier schemes and taking into consideration of access to technology in the recent days, Pradhan Mantri Fasal Bima Yojana promises to take care of the loopholes of earlier schemes. Under this scheme the Nodal Banks act as intermediaries who collect the list of individual insured farmers (both loanee and non-loanee) with requisite details like name, fathers' name, Bank Account number, village, categories - Small and Marginal group, Women, insured holding, insured crops, sum insured, premium collected, Government subsidy etc., from concerned branch in soft copy for further reconciliation. This is done online once the E platform is put in the place. This ensures quick and on time payment of premium and compensation amount through RTGS. It reduced time gap in payment of crop loss compensation from current average of 16 months to 10 months.

It includes innovative and attractive provisions such as low premiums, rapid payout for replacement seeds if required, and includes payouts covering post-harvest losses. It also explicitly aims at expanding coverage to poor, rain-fed areas and to farmers who are unable to obtain bank loans to cover inputs because they don't have clear land records, as well as sharecroppers and tenant farmers.

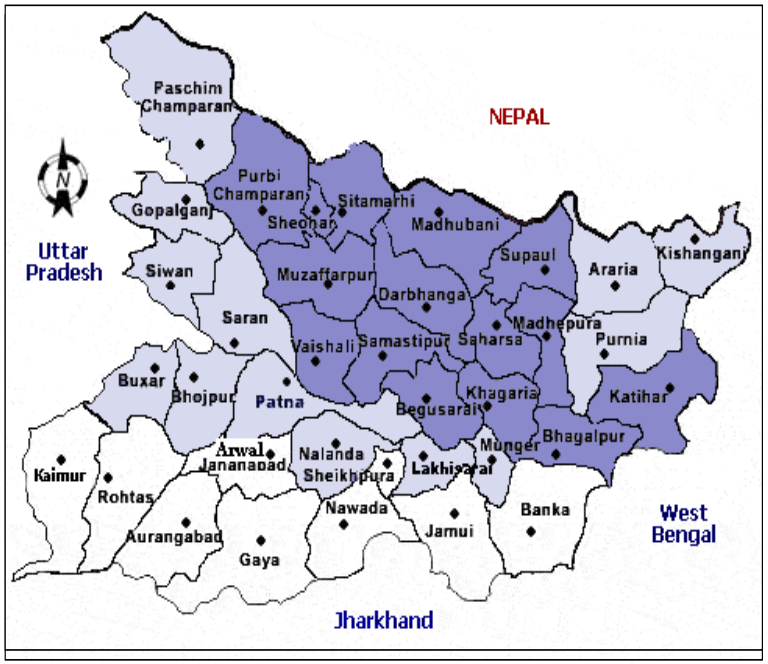
Chapter 4: Limitations of Pradhan Mantri Fasal Bima Yojna (PMFBY)

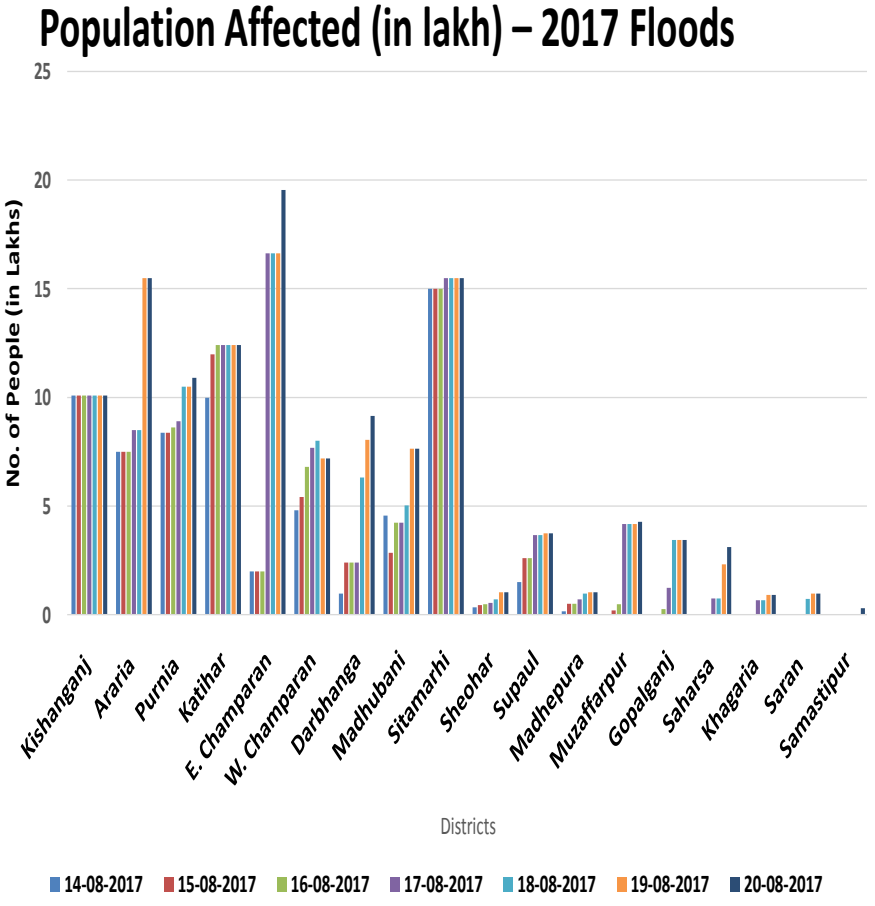
It has been analysed that the PMFBY has a homogeneous or area-based approach, rather than an individual approach, to assessing vulnerability or when assessing the impacts of a flood event. The pay-out is based on the effects of floods on a large area – if only part of the area is affected, there will be no pay-out. In contrast an individual approach uses farmer's fields as the unit considered. This means that PMFBY faces similar constraints to other insurance schemes on offer such as the National Agricultural Insurance Scheme (which offers area-based crop yield insurance)and the pilot Weather Based Crop Insurance Scheme (which offers area-based rainfall insurance).Studies note that although PMFBY has reduced the insurance coverage unit from the block (district sub-division) to the village, individual farmers suffering crop losses still cannot benefit from the scheme unless the disaster affects the entire village area. This limits the ability of this scheme to effectively reach the poorest and most marginalized groups who are often the ones living in the most flood prone areas. Although in principle the commitment of the PMFBY to reach sharecroppers and tenant farmers is progressive, in practice most farmers in these categories are in reality still excluded because they are unable to fulfill key submission requirements, such as providing an applicable contract or agreement permitted by the relevant state government. Current land sharing arrangements in rural India, such as those in Bihar, are usually based on mutual trust and verbal commitments.Limited documentation and/or a lack of written proof of land tenancy is a barrier that excludes tenant farmers, women and marginal farmers from insurance coverage. Hence there are challenges in terms of reaching out the last mile connectivity.

	Season	Crops	Maximum Insurance charges payable by farmer (% of Sum Insured)
1.	Kharif	All foodgrain and Oilseeds crops (all Cereals, Millets, Pulses and Oilseeds crops)	2.0% of SI or Actuarial rate, whichever is less
2.	Rabi	All foodgrain and Oilseeds crops (all Cereals Millets, Pulses and Oilseeds crops)	1.5% of SI or Actuarial rate, whichever is less
3.	Kharif and Rabi	Annual Commercial/ Annual Horticultural	5% of SI or Actuarial rate, whichever is less crops

Worst flood prone districts

Flood prone districts



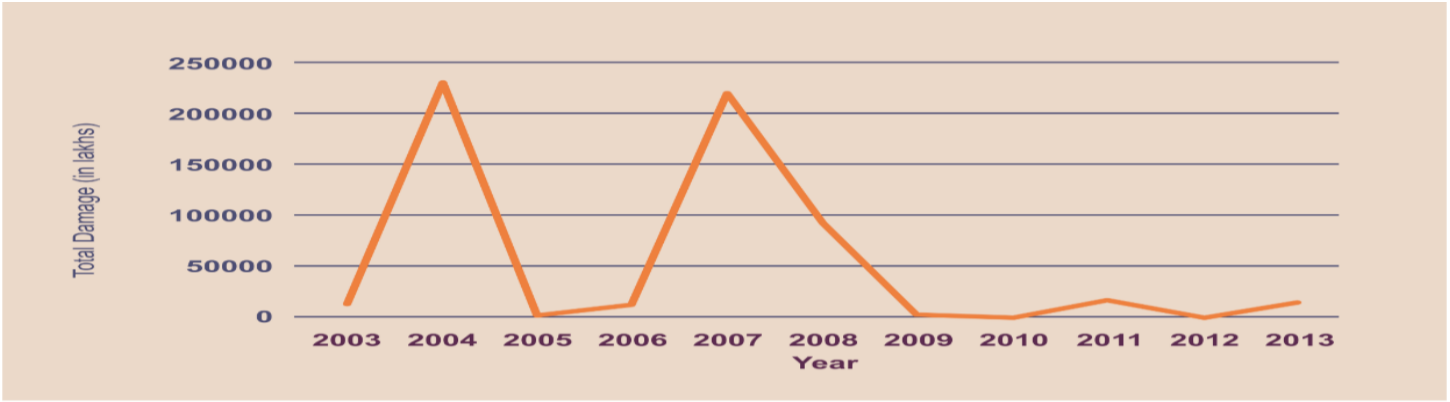


Land Utilization (Lakh Hectare) in Bihar

Item	Area*
Total geographical area	93.60
Forest	6.22
Land put to non agricultural uses	17.03
Barren & uncultivated land	4.31
Permanent pastures	0.16
Land under miscellaneous trees and groves	2.44
Culturable wasteland	0.45
Current fallow land	7.81
Other fallow land	1.21
Net sown area	53.95
Gross cropped Area	76.46

Figure 1: Flood related financial losses (2003 to 2013)

Source: Disaster Management Department, GoB, Database



Chapter 5: Introducing Index Based Flood Insurance (IBFI)

International Water Management Institute (IWMI) with the support from 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), developed an innovative financial risk transfer solution called Index Based Flood Insurance (IBFI) particularly suitable for implementing in a state like Bihar with large small holding farming communities against flood losses. The Index Based Flood Insurance (IBFI) initiative aims to increase the short term coping capacity of small holding, poor and marginalized farmers against flood risk with the use of the latest remote sensing data, Geographical Information System (GIS) technology and computer modeling. The approach called as Ag RISE (Agricultural Remote sensing Insurance for Security and Equity) seeks to provide all farmers, no matter how small, with the security that insurance can provide. IWMI developed the IBFI for Bihar in collaboration with global reinsurer Swiss Re.

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. When contemporary rainfall data was input, the model was able to make predictions of where runoff will travel and collect. In other words, it can indicated where flooding is likely to occur.

Chapter 6: A brief of Pilot Project in Muzaffarpur

To authenticate it's findings on Index Based Flood Insurance, IWMI piloted this project in 200 villages of Muzaffarpur district of Bihar. Villages in three locations were selected for the pilot; one in an area at high risk of flooding, one in medium risk and one with a low risk of inundation. In a survey, farmers from a few selected villages were asked about their recollections of floods that occurred in 2007 and 2013. Information that was collected from these villages on the depth and duration of flooding helped in validating the model. Also, gathered data on the levels of payouts made in those years helped to determine premiums at different levels of risk.

Once the IBFI was finalized and authenticated at ground level, it was approved by the Insurance Regulatory Development Authority of India, IWMI partnered with the Agricultural Insurance Company of India (AICI) to enroll the farmers and implement the pilot. The scheme went live in July, with a total sum insured of around INR 5 million (approximately $78,000). Awaiting the rains IWMI monitored the monsoon very closely. If the water level exceeded in the model, the scientists of the institute used 10 m-resolution satellite images from the European Space Agency to verify the depth, duration and extent of the flooding, and this helped to identify those farmers who were eligible for payouts. The eligible farmers are likely to be paid their premium amounts by November , 2017.

Chapter 7 : Process of pay out to the farmers

Under the IBFI, any compensation payments will be made directly to the farmers' bank accounts. The insured period will extend until October 15, till which time harvest takes place in flood prone districts of Bihar. By this time IWMI would also have demonstrated the potential role that remote sensing data and modeling can play in supporting agricultural insurance schemes. This will drastically reduce time gap in payment of crop loss compensation from current average of 16 months to 10 months.

This will help in getting away with the traditional of the government system, wherein the crop damage data is collected manually by the field staff and cross verified from various sources. The compensation amount is then paid in cash or a/c bank check which delays the premium payment to the farmers in distress.

Slow pace of payment of premium amount leave large number of farmers dependant on high cost non institutional lending sources, chronic indebtness and seriously impeding use of modern agriculture technology. Besides, the monitoring of the depth, duration and extent of the flooding through satellite will help in devising alternate strategy to improve the reliability and timely submission of data of Crop Cutting Experiments (CCE) in state.

Chapter 8: Key features and Promises

IBFI is important as there is an increasing demand for this kind of product. Of $140 billion reported for damages in all economic sectors between 2003 and 2013, agriculture reports an estimated loss of $30 billion.

Innovative use of technology such as remote sensing, can improve the accuracy and efficiency of index based insurance schemes by estimating flooded areas and crop losses through digital mapping.

Around the world, governments and private sector can both benefit from successful large-scale public-private partnership insurance schemes.

By building farmers' resilience to climate shocks, private sector will gain from up-scaled agricultural insurance schemes, as they will have a much wider pool of potential clients to sell policies to. And the more people they insure, the lower premiums will be, so government subsidies can be reduced too. It's a win-win situation.

However, the real beneficiaries will be the small-scale farmers, like those in enrolled in IWMI's IBFI. For the first time, they will have peace of mind that their families will be protected, come rain or shine. If the harvest is good, they will be well fed and might make some money selling their surplus crops too. But even if they have a disastrous harvest, they will be able to pick themselves up and use their compensation to get by until the next cropping season comes round.

The state government will have a greater chance of reducing risk from disasters and promoting economic growth. This can help them meet global Krishi Roadmap targets and such as those laid out in the Sendai Framework for Disaster Risk Reduction 2015–2030 and the United Nations Sustainable Development Goals.

Chapter 9: Way Forward for IBFI in Third Agriculture Roadmap (2018-22), Bihar.

Bihar Agriculture Road Map envisages Rainbow Revolution through use of sustainable technologies and the country should also surrogate it.The first agricultural road map concluded with a Krishi Karman Award to the state for ever highest rice production at 81 lakh MT in 2011-12. This also led to commendable progress in seed sector and agriculture extension. The second agricultural roadmap(2012-2017) has been successfully implemented in the state. It included programmes of zero tillage, SRI vidhi, oganaic farming, horticulture which further energised the agricultural sector's performance in Bihar and empowered the farming community. The President of India, Shri Ram Nath Kovind, launched the third Bihar Krishi Road Map (2018-2022) in Patna on 9th November, 2017.It provides comprehensive and coordinated plans for the development of agriculture. All concerned Departments have been directed to design their policies keeping the welfare of farmers in mind. The guidelines on implemtataion of Crop Insurance under the third Krishi Road Map have been given to the Cooperative Department.

In Bihar each of the 8463 Panchayats has a democratically elected Primary Agriculture Cooperative Societies (PACS). 531 Blocks have Vyapar Mandals Sahyog Samiti (VMSS). They are the main institutions given the responsibility to ensure input supply and also for marketing of agricultural produce. There are 22 District Central Cooperative Banks (DCCBs) and an Apex level State Cooperative Bank (SCB) with wide network of Branches (Both SCB and DCCBs) for catering

the needs of short term credit , loan and insurance requirements. Presently, short term agriculture credit of Rs. 441.73 crore among 2.43 lakh farmer members has been disbursed through Cooperative Credit Structure.

PACS and VMSS would be sensitized and capacitated to provide services to farmer members regarding Index Based Flood Insurance (IBFI) and marketing of the package. It would be ensured that all farmers engaged in agricultural activities would have at least one IBFI policy.

PACS would be properly strengthened to create IBFI resource centre at Panchayat Level in the flood identified districts. It would also maintain a strong database for all farms, input requirements, nature of crops produce likely to be insured so that it proper insurance solution can be facilitated.

Role of State Cooperative Bank and District Cooperative Bank would be further enhanced to meet the premium ammount disbursal.

There is a need to develop state level IBFI Resource Centre to support and guide VMSS and PACS.

The COMFED Dairy Cooperative Society (DCS) is a success story in the sate with huge production of Milk and allied products. The existing co-operative network is covering about 45.5% of the inhabited villages of Bihar. By 2021-22 this number will grow to 30500 covering 80% of the villages in all districts. The thrust will be on organisation of all women dairy co-operative societies. The number of new DCS will be 12500 and of member in these DCS will be 19.15 lakh at the end of 2021-22. This can be an important souce of marketing the packages of IBFI.

There are two agricultural universities, five agricultural colleges, one horticulture college, one agriculture engineering college, one dairy technology college and one veterinary college in the state. All the 38 districts have a functional Krishi Vigyan Kendra (KVK).ICAR has also a presence with eastern states regional headquarter at Patna. Besides, National Research Centre for Litchi and Makhana are established in state. However, state productivity remains low because of the slow adoption of modern technologies by the farmers and under use of crop insurance policies.

The above mentioned institutions can be used for capacity building, sensitization and upsacling the crop insurance activities across the state and ensure its last mile connectivity.