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Popular Article

# Biotic and Abiotic Stress Management Through Crop Insurance: Enhancing Agricultural Resilience in India

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## Abstract

Crop insurance forms one of the most important tools providing agricultural risk mitigation and safeguarding the livelihood of farmers in India. Since agriculture forms the backbone of India's economy, the farmers face constant factors like irregular climatic conditions, infestation by pests, and fluctuating market conditions. Crop insurance provides farmers with financial security through adequate protection against loss because of such uncertainties and encourages a farmer to invest in modern technology and other sustainable practices. It may thus be said that with the Pradhan Mantri Fasal Bima Yojana, the level of insurance coverage is considerably increased, along with better prospects of protection in case a crop fails. The paper tries to conceptualize how crop insurance relates to reduced financial vulnerability and furthering a resilient agricultural sector.

**Keywords:** crop insurance, risk mitigation, financial stability, Pradhan Mantri Fasal Bima Yojana, sustainable farming

## Introduction

Farm suicides are common occurrences as well due to non-remunerative pricing of crops low returns for yields and crop failures that lead to financial stress. According to Rai (2019), suicides among farmers in 2015 were due to bankruptcy and debt, therefore, which has shown how severe the situation is. Any type of irregular monsoon pattern, along with extreme weather conditions, is indeed considered one of the major risks posing a threat to agricultural production. Pests and diseases, along with arable farming operations, increase crop vulnerability as well (Datta, and Behera (2022).

These factors of vagaries of economic uncertainty, volatility in market prices, and poor infrastructure are aggravating the woes of farmers and thus necessitate risk-reduction strategies in Indian agriculture (Cenacchi, 2014). A crop insurance program, therefore, stands to be one of the crucial tools for reducing risk proffering financial protection sometimes, leading to reduced aftershocks in



terms of income (Patitundi, 2008). These schemes, such as Pradhan Mantri Fasal Bima Yojana (PMFBY), help enhance the effectiveness and availability of crop insurance by making it more farmer-friendly.

**Crop insurance-** Pooling risks on account of unpredictable weather and volatile markets, will therefore be a step towards building resilience in India's agriculture sector. In doing so, it safeguards the livelihoods of farmers and contributes to the sustainability of rural economies and food safety simultaneously. Strengthening crop insurance systems and scaling up will be critical to safeguard the farmers and ensure long-term growth in agriculture (Falco, *et al.*, 2014).

#### **Risks and constraints farmers face**

**1. Risks related to the weather:** Unpredictable climatic patterns, such as irregular monsoons, wide temperature fluctuations, droughts, and floods, generally tend to threaten crop yields with a much greater degree of seriousness.

**2. Pests and Diseases:** Crop vulnerability to pests and diseases further complicates farming. The lack of timely access to advanced techniques in pest management often accompanies high crop loss, which directly affects the farmer's returns.

**3. Land Degradation and Fragmentation:** Continuous farming without proper soil conservation methods leads to land degradation like erosion of soil and loss of nutrient. Laws of Inheritance leading to fragmented holdings of

land reduce economies of scale in the management of resources.

**4. Market and Price Volatility:** Fluctuation in crop prices in the market, combined with inappropriate road networks and storage facilities, hastens post-harvest losses. It involves reduced profit margins for farmers and failure to attain fair prices.

**5. Policy and Infrastructure Gaps:** Because agricultural reforms were introduced late, the government support was weak, the road networks, irrigation canals, and storage facilities were poor which prevented them from accessing the market, and inefficiencies and wastages were being incurred.

There are several risks and disadvantages associated with traditional farming in India that prove to be a significant challenge to its farmers (Behera and France, 2016). The source of irrigation is mainly monsoon rain and dependency on it happens to be one of the major concerns (Guimberteau, *et al.*, 2012).

Crop production can be seriously affected by drought or flood due to irregular and unexpected rainfalls. Monoculture exposes farmers to crop infection and infestation if they have farmed only one crop. Additional financial disadvantages include limited ability to access insurance and loans. Needless to say, high input prices of machinery, seeds, and fertilizer add another burden to financial viability. The lack of diversified sources of income increases economic fluctuation that makes it hard for farmers to resource allocation toward modern technology or adapt changed



market demands. Land degradation is the most severe problem in Indian traditional farming.

### **Crop insurance and risk management**

Crop insurance is a pretty significant safety net of financial protection that farmers have for risks associated with agriculture. Originally, crop insurance was developed to offset the risk that farmers might face based on risks outside their control such as bad weather infestations of insects and changes in demand (Hazell, 1992).

### **Crop insurance is an essential component of risk management in agriculture today:**

**A. Risk Reduction:** Crop insurance also protects farmers against other factors that cannot be controlled, like weather and pests, that could be the cause of losing crops; hence thereby reducing the risks related to finance associated with farming activities.

**B. Financial Resilience:** Crop insurance has made financial resilience to the farmer by compensating losses. Due to crop insurance, they bounce back from failures rapidly, keep farming, and make a living.

**C. Prompts Investment:** If the farmers come to believe that there is a safety net, then there would likely be investment in the latest technologies, superior quality inputs, and high-tech farming methods that encourage higher production and greater efficiency from the agriculture sector.

**D. Creditworthiness:** Crop insurance purchased by farmers may also be seen as

creditworthy, so they can obtain loans more easily. In the case of insured farmers, the possibility of loan repayment would be better, as in any casualty arising from crop loss, the loans are paid back, and therefore financial institutions will be more than willing to provide loans.

### **Crop Insurance and Risk Mitigation Impact for Farmers**

**Crop insurance and financial security:** It provides financial protection to the farmers. Crop insurance shields the farmer from losses caused by biotic stress factors such as pests and diseases, which protects him from heavy monetary loss. If there is great crop damage through biotic factors, then this loss becomes a colossal loss in terms of income for the farmer. Crop insurance saves losses from crop failure and puts an end to the vicious circle of debt into which nearly all of the farmers found themselves after a crop failure.

**Crop insurance and biotic stress:** Amongst the biotic threats, crop insurance also covers abiotic stressors in the form of floods, droughts, and cyclones which are increasingly frequent with unstable climatic situations. Yield losses due to these could be compensated, thereby lessening crop damage impacts and giving farmers who needed stability to continue farming despite such setbacks. Crop insurance is far more than just an immediate relief from a financial loss; it enhances the capacity among farmers to use modern technology and engage in sustainable farming.



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