

# Change of Resource Use and Livelihood Empowerment through Integrated Risk Management in Agriculture: Instances from Three Indian States

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## Abstract

*Integrated Risk Management in agriculture (IRM-A) has gained new ground amidst rising concerns about food security, sustainable livelihood and climate change nationally as well as internationally. For a country like India, where the majority of its population depends on agriculture, it becomes more important than any other nation. The declining agricultural productivity, climate change and rising resource intensity in Indian agriculture posed a serious threat to future food production. Therefore, a real paradigm shift is necessary in order to manage these threats and risks. In this context, this paper discusses and analyzes the issues around IRM-A taking evidences from three Indian states (Telangana/Gujarat/Maharashtra). The results of the study reveal that implementation of IRM-A has empowered farmers in these three regions by improving their technical and business knowledge in agriculture. It has also helped farmers to change their farming method (from a traditional resource intensive farming method to an eco-friendly method). The changed method/strategy has significantly reduced resource use, which has increased profit. An overall analysis of data suggests that the implementation of IRM-A creates an opportunity for farmers in these three states to make agriculture economically viable in a comprehensive term.*

## 1. Introduction

In India, agriculture and economy is intricately intertwined. It is a major source of income of more than 58 per cent of the country's population. Although its contribution to the Gross Domestic Product is slowly declining but still the contribution to the Indian economy is quite significant (Arjun, 2013; Das, 2005; Lall et al., 2011; Price et al., 2016; Dev, 2012). However, rising resource intensity in Indian agriculture sector is a matter of great concern. It also has serious implications for agricultural sustainability, productivity and future food production of the country (Lele et al., 2013; Sekhar and Bhatt, 2012; Lal, 2013; Price et al., 2016). As the population grows in the coming decades, more and more crop production will be needed for consumption. This will escalate the pressure on land and water. It will further be affected by rapid industrialization and climate change

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(Das, 2016; Das and Swain, 2016; IARI, 2015; Dev, 2012). Although India has made some progress in food production during the green revolution, recently that dynamic growth has been lost (MOA, 2007; Price et al., 2016). In addition to the declining agricultural productivity, degradation of the resource like increasing soil salinity, land quality, depleting water resources as well as expanding biotic and a-biotic stresses will add more to the problem (IARI, 2015; MOA, 2007).

In this context, the government as well as the private sector has planned and applied various measures to mitigate the adversities associated with agriculture.<sup>2</sup> Despite that, farmers in countries like India stay vulnerable to various risks (Demeke et al., 2016).<sup>3</sup> Without the presence of effective risk management strategies, it is difficult for the most of the small and marginal farmers<sup>4</sup> to manage their finances in the disastrous situations (Demeke et al., 2016; Miller, 2008; Price et al., 2016). A real paradigm shift is necessary in order to manage risks efficiently and to eliminate hunger, reduce poverty and achieve food security. In this backdrop, this paper would like to focus on the prospects and possibilities of Integrated Risk Management in Agriculture (IRM-A) taking instances from three Indian states. The paper would also analyze the importance of the IRM-A in the context of agricultural resource use and livelihood security.

## 2. Data and Approach

The study was conducted to assess the impact of risk management practices and economic participation of agricultural/horticultural households in the selected districts of Telangana, Gujarat and Maharashtra. For the primary data collection, a mix-method strategy (both quantitative and qualitative) was used to measure the impact and sustainability of the initiative. During the study, the entire ecosystems around IRM-A in the study areas were investigated to have a holistic picture. The quantitative data were collected from the farmer/beneficiaries through a structure questionnaire and qualitative data through key respondent interviews from implementing organizations. The evaluative study has collected both quantitative and qualitative information from the stakeholders in the post intervention period. The information was obtained through a recall<sup>5</sup> and real-time survey. Farmers or beneficiaries were asked to answer structured closed ended questions and the responses were recorded on paper instantly.

The study has employed a purposive sampling method for selection of samples. From each intervention states 40 farmers/producers were selected for the study. All the sample farmers have already availed the IRM-A training and practicing IRM in their agricultural farms. In Maharashtra, the samples were chosen from the Nasik district.

<sup>2</sup> Government has launched several schemes on agricultural insurance, credit and price support, input subsidy etc. Recently government has also launched several irrigation related schemes to with several other agencies like National Bank of Rural Development. PM-KUSUM schemes is a very recently launched as one of solar irrigation schemes to provide reliable and quality power supply to the famers.

<sup>3</sup>The risk is mainly two-fold i.e weather related risk as well as market related risk.

<sup>4</sup>More than 70% of production in our country coming from smallholders and half of agriculture rain-fed. Several studies states that in the disastrous situation small and marginal farmers fail to recover from the production losses as mostly, they do not have any other sources of income.

<sup>5</sup>The recall period was two years for the survey. Respondents were also asked to compare the before and after intervention situation to assess the post-intervention changes in different areas.

However, in Gujarat samples were chosen from Amreli and Gir Somnath district and in Telangana the samples were chosen from Medak and Karim Nagar districts. In addition, officials of local NGOs who are acting as resource persons were also interviewed to gather qualitative information regarding the intervention. The finding of the study is based on a combination of data, literature, and stakeholder perspectives of the three states.

### **3. Livelihood Security and Integrated Risk Management in Agriculture**

With rising concern at the national and international level for food security and climate change, Integrated Risk Management in agriculture (IRM-A) has gained new ground. Integrated Risk Management (IRM) refers to the establishment of organized and well plan mechanisms (both formal as well as informal mechanism) for handling the possibilities of an uncertain future. It is considered that effective agricultural risk management strategies would play a vital role in fostering productive and sustainable investment across the food and agricultural value chain in order to ensure food and livelihood security. In a country like India, agricultural risks are among the major reasons for poverty traps and unmanaged risks leads to a cycle of shock (both production and price shocks) which affect the livelihood and food security of the small and marginal farmers (Demeke et al., 2016). As far as food and agricultural market is concerned, it is very prone to macro-economic disturbances as well as adverse weather events.<sup>6</sup> These changes coupled with unexpected institutional and policy changes and personal risks strongly influence farmers decision pertaining to input use, investment and technology adoption in this sector (Demeke et al., 2016).

Indian agricultural sector has witnessed several policy reforms to strengthen the sector to eradicate poverty in last 70 years. The pre-green revolution period (1950) till the mid-60s, the sector has experienced several reforms such as institutional changes, development of irrigation projects, land reform and imposition of land ceiling acts, etc. During the Green Revolution, the reform took a back seat and more emphasis was given on credit, price support, marketing, input supply, research, extension, and technology support to attain the food security (Dhoot, 2006; Dev, 2012). However, in recent years specifically after the economic reform Indian agriculture have been susceptible to global market as transnational corporations try to dominate the seed market, which is seen in the case of BT cotton, and rice. Further, several policy changes like removal of input subsidy as well as unusual weather events due to climate changes created a worrying situation for the resource poor farmers (Das, 2005).

Therefore, the risk in the sector has multiplied and it seems that agricultural risk management is critical for national food security and livelihood in this point of time. Recognizing the importance of risk management in this sector National Agricultural Policy, Vision document 2020 and 12th Plan document has emphasized on integrated risk management in the sector. As part of the plan, the government has time and again

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<sup>6</sup>Adverse weather events are one of major risk to the Indian agriculture. In the time of filed work most of the sample famers reported that hailstorm, high wind and unseasonal rain are the major risks they face very frequently and highest number of respondents incurred financial losses due to these events in last one year.

come up with various schemes and policies including crop insurance schemes, with recent culmination in Pradhan Mantri FasalBima Yojana and irrigation schemes like Pradhan Mantri KisanUrja Suraksha EvamUtthanMahabhayan (PM-KUSUM). These schemes, and its predecessors, tends to focus on one aspect of the agricultural risks, i.e. crop failure due to bad weather. Further, these schemes were not applicable for all parts of the country given the local context of agriculture in India. Apart from that, this partial risk transfer does not help large proportion of the small and medium farmers who are not aware about the products and terms and conditions (NSS, 2005; Lall et al., 2011; Ghosh and Yadav, 2008).<sup>7</sup>

Nearly 80 per cent of farmers and 85 per cent of farm holdings in India are small and marginal but they contribute more than 60 per cent of the farm produce. Several studies in India and abroad revealed that small and marginal farmers are always unable to avail the schemes due to their small landholdings and high cost of insurance premiums (Giné et al., 2007; Giné et al., 2008; Sarris et al., 2006; McCarthy, 2003; Daninga and Qiao, 2014; Panda, 2013; Sundar and Ramakrishnan, 2015; Gaurav et al., 2011). Apart from that, they face several other challenges like lack of capital to invest to improve farm input, farm equipment and infrastructure. They are also seen as risky clients by the formal financial institutions as they do not have a lot to offer as collateral. Therefore, extra-formal mechanism is necessary to support these types of farmers.

#### **4. IRM in Agriculture: Instance from three Indian states**

As mentioned earlier, while providing employment and livelihood to a larger share of population, agriculture in India remains one of the most vulnerable economic activities. As the present government schemes fail to provide a holistic approach to agricultural risks, different non-government organizations and multilateral agencies are trying to fill the gap with a strategy for IRM-A. The recent pilot initiative of the German Development Corporation with several other local Non-governmental organizations in three Indian states (Telangana/Gujarat/Maharashtra) provides a new light to risk management in the agriculture sector. At the pilot stage, the initiative was implemented for selected horticulture produces like mango, pomegranate, vegetables and groundnuts, in these three states.

Recently, providing assistance and creating awareness about end-to-end management of agricultural risk has been one of the primary goals of different agricultural development agencies of the government. National agricultural policy also gives importance to spreading awareness among farmers about risk management in agriculture as it could have significant impact on the small and marginal farmers livelihood and food security.

The study reveals that the implementation of integrated risk management approaches in agriculture, in rural areas of Telengana, Maharashtra and Gujarat have empowered

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<sup>7</sup>In a recent study in Karnataka we have seen that agri-insurance largely beneficial for the big farmers. Small and marginal farmers are not willing to take the insurance because they think the present insurance scheme is not beneficial for them. Same as in the case of solar pump scheme under PM-KUSUM. Although the scheme has attached with a good amount of subsidy but due to high initial investment cost in the solar pump installation, marginal and small farmers are not able to access the scheme.

small and marginal farmers<sup>8</sup> by increasing their knowledge about agricultural risk management tools and strategies like insurance, financial services, market linkages, post-harvest management. The informants stated that due the training and awareness they have been able to take right decision in right time, which proves to be economically beneficial for them. It was also found that the productivity of different produces has increased because of the knowledge and awareness about risk management in the pre and post-harvest stage.<sup>9</sup> The producers showed confidence in their agricultural practices due to training and awareness about IRM by different resource/supporting organizations. These resource/supporting organizations become the 'one stop knowledge source' for all agricultural needs. Overall it has been found that the risk management knowledge has been proven extremely beneficial for the farmers in all the study areas.

Post intervention data analysis (Figure 1) reveals that, apart from the knowledge and awareness, the access to good quality agricultural inputs in a better price from the Agri-malls<sup>10</sup> has economically empowered famers in these regions. The participation of the farmers in the Farmers Producer Organizations (FPOs) has also created a network among the farmers, which help small and marginal famers sell their produces. The FPOs have helped farmers in marketing of their produces and creating a direct link to consumers. Different FPOs have also tried to brand and market local produces with a premium price. Data also shows that post-harvest management training (grading, sorting, packaging) and awareness has minimized production and transportation loss for several farmers. An overall analysis of post intervention data reveals that knowledge, advisory and access to better agricultural input has socio-economically empowered farmers of studied region.

With regard to the perception of the farmers on variables such as knowledge about risk management tools and other strategies to convert their produce into better income-generating pursuit (Figure 2). The study reveals that most of the farmers are aware and using various risk management strategies and tools at different stages of the agricultural process to minimize the production as well as market risks. Both quantitative and qualitative data analysis shows that farmers in all the studied regions has improved their agricultural practices due to the awareness. Most of the respondents/farmers also anticipate better livelihood in the future due to better market linkages as well as advance risk management plans. Due to training and awareness, producers are quite confident about their agricultural practices and there is a perception that livelihood condition of farming community of the region has improved because of the implementation of the IRM.

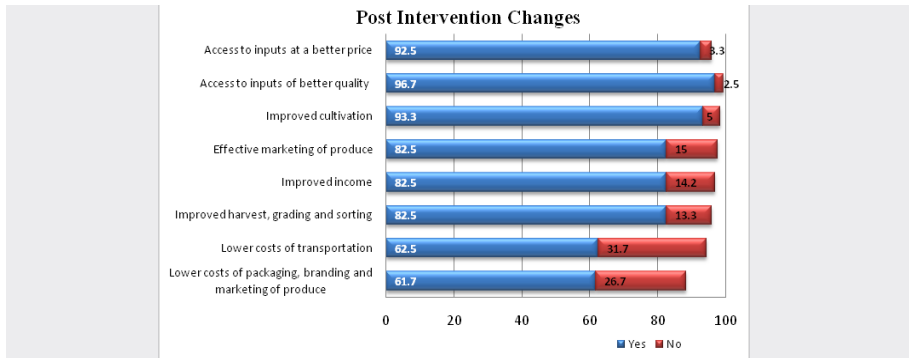
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<sup>8</sup>Around 77 percent of the sample famers are small and medium famers having 0-5 acres of land holding and for 97 percent famers agriculture is their primary source of income. The annual income of more than 80 percent of the sample farmers are below three lakhs.

<sup>9</sup>The productivity varies from produce to produce, which is discussed later part of the paper.

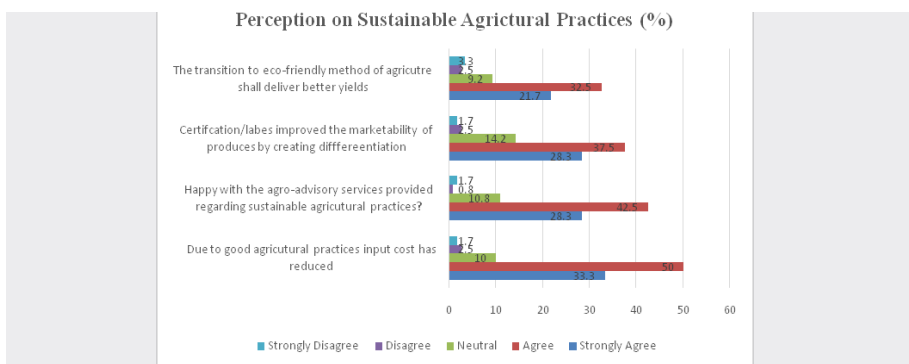
<sup>10</sup>Agri-Malls are small shopping centres for all agricultural inputs like seed, fertilizer, pesticide, agricultural equipments etc. These Agri-Malls are local initiatives of the 'Farmer Producer Organizations (FPOs) and financially supported by local NOGs and funding agencies like GIZ, TATA trust etc. The malls offer good quality agricultural inputs in a subsidies rate. These shopping centres also provide agro-advisory for eco-friendly farming methods.

**Figure 1:**



Source: Primary field data analysis

**Figure 2:**



Source: Primary field data analysis

**5. Eco-friendly Framing<sup>11</sup>: Decreasing input cost and resource use**

The study reveals that the farmers in these regions have significantly changed their farming methods and strategy for agriculture as well as horticulture produces (Figure-3). More than 60 percent of sample farmers in all the three states, mentioned that the eco-friendly method delivered better yield and pesticide free certification and labeling of their produces giving them more economic advantages over other products in the market. Apart from that, the new farming method (eco-friendly method) and strategy has lower their input cost which has increased the share in the profit. It was also found that input cost has decreased significantly because chemical pesticides and fertilizer use has also gone down. For instance, in Telangana and Gujarat 60-70 percent of the growers are not using any chemical fertilizer, which reduces their fertilizer cost by 70-80 percent and those who are practicing Non-Pesticide Management (NPM) they reduce their expenditure by 95 percent (using organic pesticide which they buy from

<sup>11</sup>Eco-friendly farming does not exactly mean organic farming. It starts with the crop selection in a certain area looking at the agro-climatic zone and using different method to minimize the input use, soil protection, minimizing water use through different micro-irrigation methods etc. there by reducing greenhouse gas emission.

farmers cooperatives). Due to proper agroadvisory the water use has also gone down in several areas, which also resulted lower electricity consumption (Table:1).

**Table 1: Input cost Pre and Post intervention**

Items	Pre-intervention	Post-intervention	Remarks
Seed	Buying seed from the market	Reduced by 10-20 %	Some of seeds buying from FPO and Agri. malls in lower cost.
Labor	Hire labour during sowing and harvesting	No change	In fact, in some areas labour cost has increased.
Fertilizer	100%	Reduced by 70-80%	Because of NPM and organic farming the fertilizer use has reduced significantly. (More farmers using NPM than organic)
Pesticide	100%	Reduced by 90-95 %	Due to NPM method. 5% cost is still there because they buy natural pesticides like Nim oil etc.
Electricity/water	100%	Reduced by 60-75%	Due to different types of technical advisory/ agro advisory

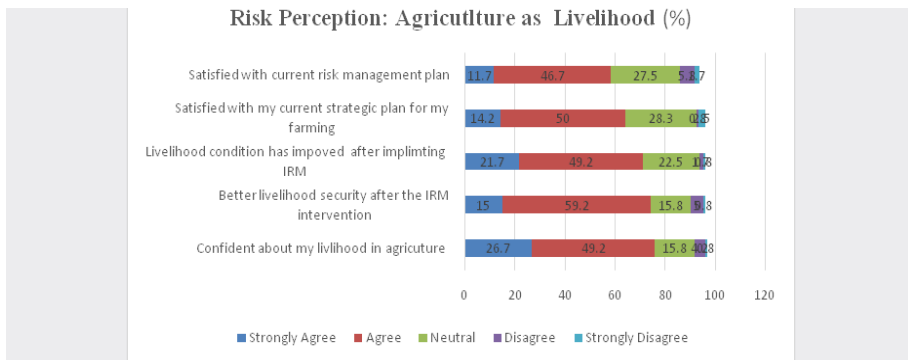
Source: Collaboration of field data

However, it is also noted during the fieldwork that the drip irrigation system, which was generally suggested in the agro advisory is not used by several farmers because of cost factor. Very few farmers in Gujarat have used drip irrigation, which showed spectacular result in terms of the water use in vegetable and peanut farming. Most of the studied farmers have strong perceptions regarding eco-friendly agricultural practices and they are confident that certification/labels of their produces will improve their profit in the long run. It seems that technical and business knowledge has strengthened livelihood of the sample farmers in the study regions.

**6. Strengthening Income by Increasing Profit**

The knowledge and support of resource/supporting organizations also helped growers to develop a network of producer-consumer, which has extended their relevant geographical market without middleman. The ‘producer-consumer’ network and knowledge in post-harvest management has helped farmers to increase their profit in the market. The profit varies based on produces, values ranging upwards of 25 percent to as low as 10 percent. In addition, several farmers/producers also get premium price for their produces due to good agricultural practice like NPM and organic farming, which further increases their profit as well confidence in the eco-friendly farming methods. The study found that profit is twofold for the grower. The first part of profit comes from the lower input cost and the second part of the profit is due to the premium price that they get because of the new branding, grading and marketing practices (producer to consumer marketing method). Apart from that, it is also evident from the fieldwork that when growers sell their produce to the farmers’ cooperatives they get better price. In addition, they do not have to bear certain costs like transportation, commission to the agent, cost of weight loss etc. It is evident from the collaborative facts that there is a significant gain in the farmers’ income due to their participation in the risk management interventions in these three states.

**Figure 3:**



Source: Primary field data analysis

As far as livelihood security is concerned, overall data analysis suggests that the IRM initiative has strengthened the livelihood of the small and marginal farmers in the study area. As data reveals the farmers income has increased due to proper management of all kinds of risks and adoption of eco-friendly farming method. The pre and post-harvest knowledge like sorting, grading, marketing links provided by the supporting organizations has empowered farmers and strengthened their livelihood by creating awareness about formal risk management mechanisms. It has also reduced farmers financial burden in a significant manner due to easy access to agricultural credit as crop insurance. However, access to financial resources is still marginal as compared to other factors. Therefore, it shows that more intervention and advocacy is required to create a good investment climate in the agricultural sector.

**7. Prospects and Possibilities**

Integrated risk management in agriculture confronts several challenges related to scalability, efficiency and sustainability in addition to public and private investment. However, these challenges can be seen as opportunities in order to ensure food and livelihood security, reduce resource use in agriculture and achieve the target of sustainable development. As we have witnessed from the findings of the study, risk management could pull producers from out of the poverty trap by insulating farming communities from income shocks and by ensuring that a fair share of the price goes to the producers. The challenge for the present risk management strategies, which are focused primarily on micro-credit, crop insurance and other price risk management instruments do not work due to high geographical dispersion, limited awareness and poor collective organization.

The study results reveal that, absence of formal risk management mechanisms discourage most of the small and medium farmers to invest less because they are worried about the loss. They generally show less willingness to adopt modern eco-friendly cultivation techniques and chose to go for the same method/strategies to avoid production risks. Therefore, agricultural transformation requires substantial governmental and financial sector interventions. However, the challenge is public investment in the sector has



been declining and private investment is very slow. Thus, there is a strong need to encourage both private as well as public investment in this sector. Apart from that there is also a need for institutional and credit support especially for small and poor farmers. Improved institutional support can create opportunity for several young people looking for employment in the agro-processing and agro-industry. There is a great opportunity to create an agriculture based rural agro-industry, which will help producers as well as consumers. The study in three states shows that creating a producer-consumer linkage proved to be economical and beneficial for both. It is evident from the study that small agro businesses are very much willing to carry out their agro business as they could see lot of market potential.

However, without external support it is not possible for them to scale up their business because most of them are struggling for the working capital and other resources. They need at least 3-5 years of constant support from government as well as non-government agencies. The challenge to create the effective agro market is lack of investment, access to information and infrastructure. The sustenance and scalability of the IRM in agriculture depends on the public and private investment as well as building new intermediary institutions and regulatory mechanisms. It is also revealed in the study that participation of the farmers in the IRM-A training programme is not very encouraging due to low level of encouragement and support. In this context, voluntary organizations can play a vital role to minimize that challenge and bridge the gap between awareness and implementation. Therefore, it is necessary to strengthen those organizations by providing them financial support as well as capacity building training to their employees. The participation of these organizations will be helpful to change the attitude and perceptions of the farming community regarding new farming method and resource use. In other words, these organizations help implement the IRM practice in the ground. In the long run it would help farmers, consumers and environment.

This not only ensures livelihood and food security of the farming community but also generates savings and investments in this grossly underfunded sector. In addition, if we look at the inter-sectoral linkages, IRM-A creates an opportunity for water and energy security point of view. It could have a significantly positive impact on resources used in agriculture. Therefore, IRM-A creates a great opportunity for both economy and environment by improving food security as well as assuring sustainability in the use of natural resources.

## **8. Conclusion**

It is well evident from the instance of the three states that IRM in agriculture has a potential to transform agriculture by reducing the vulnerability in the sector. It could also improve farm income by addressing the issues related to institutional and market failure. IRM-A creates an opportunity to strengthen rural economy as well as environment. It would also have a significant impact on livelihood security as well as sustainability in the use of natural resources. As risk in agriculture has been multiplied due to emergent climate change, IRM-A as an approach could be used to empower farming community of the country.

However, the full-scale implementation all over the country and sustainability of programme needs more of public as well as private spending in the sector. There is a strong need to include and encourage civil society organization to create awareness among the farmers. In addition, there should be some emphasis on building of new intermediary institutions, which would provide support to farmers to enhance their technical as well as business knowledge. For an all-round development and economic viability of the agriculture, policies need to focus on the holistic risk management combined with greater awareness and information.

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