



Strategic Assessments and Development Pathways for Agriculture in the Semi-Arid Tropics

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How can rainfall insurance help dryland farmers?

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Introduction

About 65% of the cropped area in India is dependent on rains. Because most of the rains in India are received during the monsoon months, the crop growing seasons are quite short. Any aberrations in the amount of rainfall or in its distribution can adversely impact the crop yields. Yield and price uncertainties often reduce the incomes of the farm households and, consequently, their consumption levels and investments. Many of the farmers in the semi-arid tropics (SAT) of India live close to subsistence level, and shielding them from the weather-induced shocks in agricultural income is vital for their survival. The SAT accounts for 37% of the country's geographical area as well as population, 46% of the net cultivated area, 59% of the coarse cereals area, 53% of the pulses area and 60% of the oilseeds area. Even 60% of the commercial crops are grown in the SAT. If rainfed agriculture in the SAT is to remain as a means of livelihood, ex-ante risk management is a critical first step to ex-post risk coping.

Weather-related risks are co-variant as they typically impact all farm households in the affected region at the same time. Local risk sharing arrangements are largely ineffective in these situations. When the probability of weather-related risks is high, farmers diversify and adopt low risk and often low return production practices, which involve trading expected profits for lower risk. Like in many other developing countries, rural financial markets in India are fragmented and formal credit markets are, at best, emerging. Although credit is an important means of consumption smoothing, it tends to be complimented by an array of other ex-post risk coping strategies, such as asset sales, remittances from family members and other risk-sharing arrangements. When many farmers are in distress and seek to liquidate assets, their prices are likely to fall, making it hard for affected families to smooth consumption and to recover from the stress in the future.

Households can also reduce their exposure to weather risk ex-ante. This could occur through precautionary saving,

or by income smoothing strategies such as implementing more conservative agricultural production strategies. In fact, rainfed farmers were earlier focusing on low risk food crops to keep down risks although it meant sacrificing high expected returns from cash crops such as cotton, castor, vegetables, among others. But over the years, the returns from food crops such as millet and sorghum declined rapidly due to declining demand and falling prices. Farmers increasingly shifted to cash crops as their incomes from non-farm sources and seasonal migration enabled them to accept higher risks. However, in the absence of effective income-smoothing measures during drought, farmers often fall short of their consumption needs, leading to chronic indebtedness and, in some cases, even to desperation and suicide. In the absence of risk insurance, traditional ex-ante risk management strategies and ineffective ex-post risk coping systems lock the SAT farmers in poverty and subsistence production. Insurance is one of the important ex-post risk reduction strategies (Figure 1).

Impact of government policies on rainfed farmers

Several policies pursued by union and state governments over the last four decades have inadvertently favored irrigated agriculture and impacted rainfed agriculture adversely (Table 1).

The impact of the Green Revolution was far stronger on those with access to irrigation. The productivity growth for irrigated crops was matched by growth in consumption demand stimulated by the public distribution system. The farmers with irrigation facilities also benefited from a far higher level of input subsidies relative to those who did not have them (Figure 2). Thus, the march to self-sufficiency entailed huge subsidies on food and agricultural inputs and benefited the farmers with access to irrigation but rendered the farmers without access to irrigation non-competitive. Farmers whose production was largely insulated from weather aberrations benefited heavily from the input

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Table 1. Adverse effects of policies on rainfed agriculture and suggestions for correcting the policy bias.

Policy	Intended impact	Adverse consequence	How to correct the policy bias
1. Minimum support prices backed up by selective procurement (of only rice and wheat)	Encourage farmers produce more without the fear of price risk	Prices of rainfed crops fell relative to those of rice and wheat	Extending procurement support to rainfed crops
2. Supply of wheat and rice at a subsidy in the PDS	Improve the economic access of resources for poor consumers food grains	Distortion of price ratios and hastening of substitution of coarse grains by rice and wheat	Food stamps in place of PDS
3. Providing subsidies to key inputs such as fertilizers, irrigation water and power	Encourage farmers to adopt improved technologies and to produce more	Rendered rainfed farming non-competitive due to higher subsidies for irrigated farms	Targeting more investments and subsidies to rainfed areas and crops
4. Crop loan insurance schemes	Protect farmers from shortfalls in income	Coverage only for irrigated farms due to higher intake of credit	Introduction of subsidized rainfall insurance schemes for rainfed areas

subsidies and remained in the vanguard of Green Revolution. Those who were exposed to all the vagaries of weather hardly benefited from the input and food subsidies, and were largely bypassed by the Green Revolution. Certainly the distribution of income between the farmers with irrigation facilities and those without irrigation has become more unequal and adverse. The net impact of all the well-meaning policies for the agricultural sector has resulted in the non-viability of rainfed agriculture. Evidence from the ICRISAT village level studies (VLS) suggests that the farmers from Mahabubnagar, Akola and Solapur districts in India failed to recover even the variable costs from their rainfed crops while they were able to recover all the costs from the irrigated crops (Table 2).

Crop insurance

Crop insurance is a major public policy designed to get to the source of the problem of yield variability. It is a contingency contract where participant farmers pay premium and collect indemnities when yields fall below an insured level. In India, crop insurance was introduced in the mid-1980s as crop loan

insurance, where the insurer covers a percentage of the loan for annual cultivation expenses of the participant farmer. The yields are assessed by conducting a few crop-cutting experiments randomly. With

many small farmers subscribing to insurance through institutional sources of credit, it would be a very costly process to implement the crop loan insurance with village or individual farmers as the unit of insurance. So, the unit of insurance was taken as a tehsil (about 50 villages) or mandal (about 20 villages) and indemnities were paid if the average yields in the specified area fell below the assured yield levels. This scheme, in recent years, threw open the participation to non-borrowers and extended it to several non-food crops and horticultural plantations. However, the

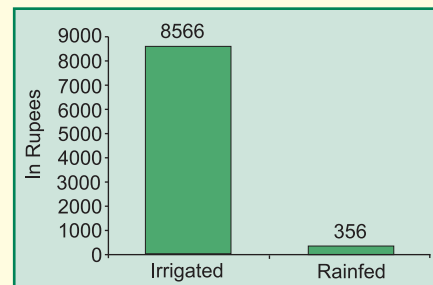


Figure 2. Subsidies per hectare in AP agriculture, 2002-03.

insurance premiums are closer to actuarial rates in case of the cash crops while they are still far below the actuarial rates in case of food grain crops and oilseeds.

As the crop loan insurance is largely tied to the institutional loans, it benefited the farmers with irrigation to a large extent. The financial institutions consider lending to rainfed farmers as a non-viable proposition. Ulrich Hess (2003) conceptualized a diagram depicting the decision criterion of the bankers (Figure 3).

Over the period of implementation of the Comprehensive Crop Insurance Scheme, the indemnities paid out were about five times the premiums collected. Between 1985/86 and 1999, the premiums collected totaled up to Rs 4028

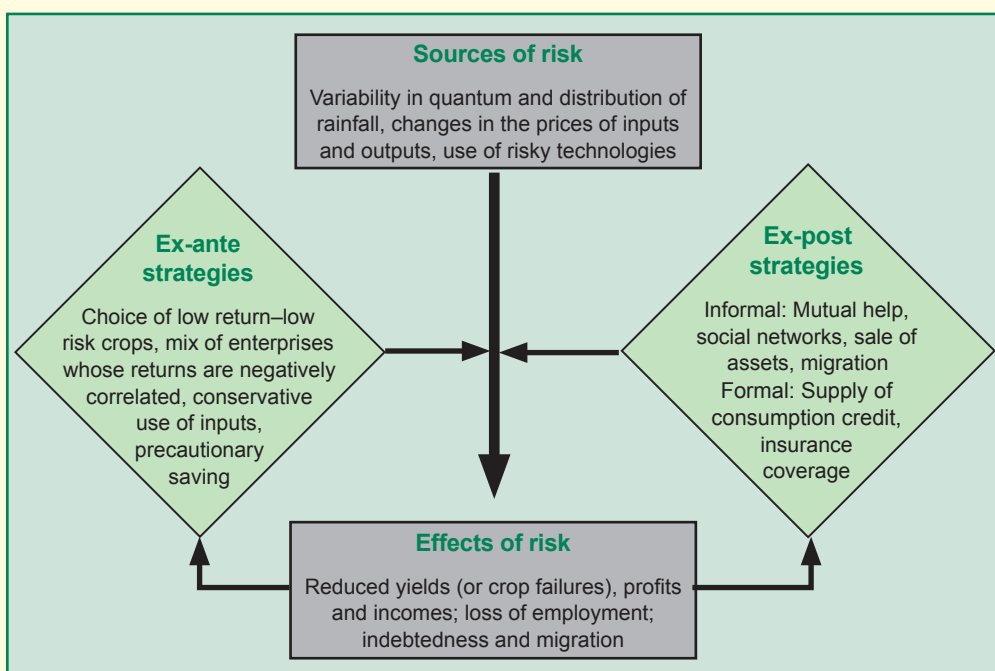


Figure 1. Sources of risk, effects and strategies of farmers.

Table 2. Relative profitability of irrigated and rainfed crops in VLS villages, 2001-04.

Village	District (State)	Crop	Returns to land and management (Rs/Hectare)
Aurepalle	Mahabubnagar (AP)	Sorghum Paddy	-997.3 3188.1
Dokur	Mahabubnagar (AP)	Castor Paddy	-813.8 3105.2
Kalman	Solapur (Maharashtra)	Rabi Sorghum Sugarcane	-128.5 3189.4
Shirapur	Solapur (Maharashtra)	Rabi Sorghum Sugarcane	-1179.9 4187.4
Kinkheda	Akola (Maharashtra)	Cotton Wheat	-627.5 1254.0
Kanzara	Akola (Maharashtra)	Sorghum Wheat	116.1 774.7

million, while the indemnities paid amounted to Rs. 23050 million (Table 3). More than 55% of the indemnities were paid to farmers in Gujarat alone. The loss ratio was nearly 21 for Gujarat, while it was only about 6 at the all India level. Yet the farmers were not satisfied with it due to lack of transparency.

Rainfall insurance

Research carried out through the ICRISAT VLS suggested that rainfall lotteries are better than the crop insurance schemes (Table 4) to diminish rural household income variability in a cost-effective manner in rainfed areas of India (Walker and Ryan 1990). They would be a fair betting system and would be open to all households in the village. For instance, if landless labor households felt the demand for their labor was markedly reduced in low rainfall years, they could hedge their future labor income by purchasing tickets on the lowest or what they perceive to be the most adverse rainfall event. Rainfall may explain more of the variations in

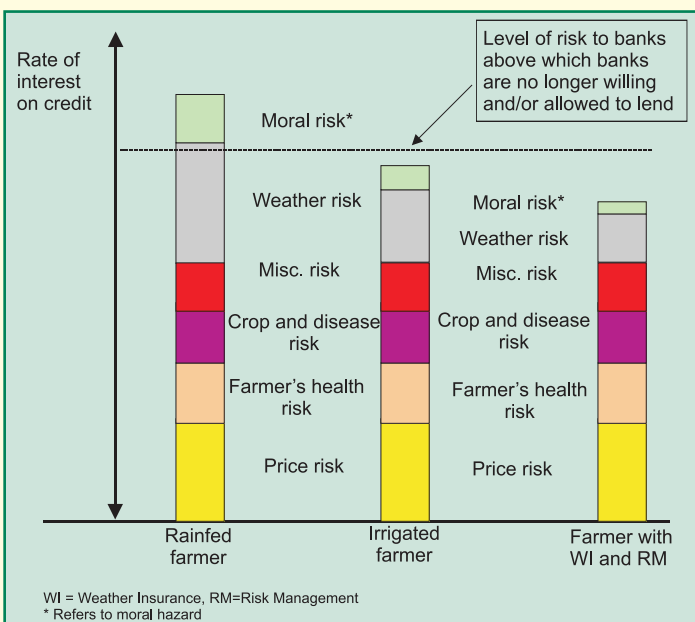


Figure 3. Bank perception of crop loan risk.

Table 3. State wise premium and claims: origin and destination (1985/6–1999).

State	Premium		Claims		Loss ratio
	Million rupees	Share (%)	Million rupees	Share (%)	
Gujarat	644.5	16	13369.3	58	20.74
Maharashtra	604.2	15	2533.3	11	4.19
Andhra Pradesh	1007.0	25	3227.0	14	3.20
Others*	1772.4	44	3918.6	17	2.21
All India	4028.1	100	23050.4	100	5.72

*Others include 22 states and UT's excluding Punjab, Haryana and North-Eastern states

crop revenue when compared with the pure impact of yield variability as it also influences the area sown.

The ICICI-Lombard General Insurance Company Limited is the pioneer in designing rainfall insurance products and marketing them through banking and non-banking financial institutions in India. They sold rainfall insurance products for the first time to 148 farmers in a few villages in Mahabubnagar district of Andhra Pradesh State during 2003–04 through Krishna Beema Samruddhi (KBS) local area bank. They refined the products in 2004–05 and sold them to 315 farmers in 43 villages of Mahabubnagar and Anantapur districts targeting them to castor and groundnut farmers. The trigger levels and indemnity payments were worked out on an actuarial basis. ICICI-Lombard could purchase reinsurance from international insurers for the products based on the rainfall distribution at India Meteorological Department (IMD) stations. ICICI-Lombard made some more changes to the products during the 2005–06 season, and introduced the concept of Policy Activation Rainfall, which is linked to the onset of the monsoon. The policy gets activated when the cumulative rainfall after 1 June reaches 50 mm, and the first phase commences. This process of refining the products may continue for some time before they are standardized. The Agricultural Insurance Company of India Limited also introduced the 'Varsha Bima' pilot scheme during *kharif* (rainy season) 2004. Farmers are slowly learning to deal with these constantly changing products. As can be expected, the demand for these rainfall insurance products is higher in the villages where farmers received payouts in the previous year.

Subsidizing rainfall insurance

Both the Government of India as well as some state governments have shown considerable interest in the rainfall insurance scheme and are discussing possibilities of a national or state coverage with ICICI-Lombard. During 2004–05, the rainfall insurance products were also marketed through VELUGU (a semi-government agency in Andhra Pradesh working for eradication of poverty), besides BASIX, in Hindupur area of Anantapur district. VELUGU could sell the products by extending the period of sale. Rainfall insurance policies are also being sold under the 'Varsha Bima Yojana' scheme of Agricultural Insurance Corporation. With the involvement of government agencies, it is a matter of time that the premiums of the rainfall insurance products

Table 4. Crop loan insurance vis-à-vis rainfall insurance: a comparison of merits and demerits.

Crop loan Insurance	Rainfall Insurance
Merits	Demerits
Farmers can obtain cover against yield loss as the payments of indemnities are based on insured yield levels	There is no one to one correspondence between the quantum of rainfall and yield of the crop
	When the distance of the rainfall recording station from their farms is farther, the chance of getting a meaningful insurance cover is less
Demerits	Merits
Coverage mostly available for irrigated farms due to higher absorption of credit by them	Good scope for covering the rainfed areas
Practically limited to borrowers from financial institutions	It can be purchased by any one (both non-borrowers and borrowers)
Yield loss is estimated based on a few crop cutting experiments	It is based on rainfall received at the IMD/mandal rain gauges
It is not transparent	It is transparent and easily verifiable
Farmers benefit indirectly from the indemnities paid	The purchaser gets the benefit of indemnities directly
Premium rates are actuarial for commercial crops while they are much lower than the actuarial rates for food crops	Premium rates are actuarial based on the quantum and distribution of rainfall
The problem of moral hazard is quite serious	The problem of moral hazard is eliminated due to transparency and easy access to rainfall data
High social costs involved in assessing the yields as some of the costs are absorbed by government departments	The cost of recording and publishing the rainfall data is quite moderate and affordable
Problem of adverse selection as the farmers tend to take insurance cover more for the crops with low premiums and in areas with higher risk	These problems of adverse selection are non-existent as the premiums are based on the rainfall data at the nearest rain gauge
The time taken for settling the indemnities is more than one year	It takes only two months to settle the indemnities
Cannot be extended to non-farmers	Can be extended to non-farmers such as shopkeepers, agri-processing units, agricultural labor, among others

insurance to rainfall insurance might be desirable as it is transparent and cost effective (Table 4).

Policy implications

How can rainfall insurance help rainfed farmers? The facts presented in this Brief imply viable policy initiatives to help rainfed farmers face risks inherent in rainfed agriculture. Rainfed farmers have very little access to institutional credit as they are subjected to credit rationing by the institutions due to perceived high risks. Hence they do not get much cover from the National Agricultural Insurance Scheme (NAIS), which focuses primarily on crop loan insurance. Well-designed rainfall insurance products can attract rainfed farmers to buy the policies and get adequate insurance coverage. At the moment, while the NAIS charges lower premium than the actuarial levels (particularly in the case of food crops and oilseeds), the rainfall insurance premiums charged by the ICICI Lombard or Agricultural Insurance Company of India are actuarial. The difference creates a disincentive to rainfed farmers, resulting in slow uptake rates. There is a compelling justification for subsidizing the premium for rainfall insurance products so that they get a level playing field in matters of insurance. To introduce the rainfall insurance concept to a wider clientele of smallholders, institutional arrangements facilitated by pilot programs can show how best insurance schemes benefit them. It can also feature the benefits to a wide range of beneficiaries including landless households and small producers in the rainfed regions. Ultimately, a well designed and appropriately subsidized rainfall insurance scheme will enhance the uptake rates and will improve the safety net against weather-induced risks, especially among the marginalized population who are dependent on rains for their livelihoods.

will be subsidized either based on income criterion or size group criterion. Just as the insurance premiums were subsidized directly to small and marginal farmers or indirectly by fixing low premium (much lower than the actuarial rates) to food grain and oilseed crops in the National Agricultural Insurance Scheme, the premiums of rainfall insurance products may also be subsidized to an extent of 50 to 80% in the schemes administered through the government organizations. The shift from crop loan

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