Addressing agricultural income risks in India: efficacy of risk management options in hazard-prone regions

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The present study discusses how formal risk management options (RMOs) have evolved in reducing agricultural income loss. It also considers the dependency of farm households on informal RMOs. Based on our analysis of a representative sample of 180 rural households, we conclude that the formal RMOs such as insurance and commercial credit markets need to improve. Addressing the complexity of claim assessment and the problem of information lop-sidedness in the insurance market should be a top priority for reducing inefficiency. Ascertaining the adequacy of claim amount in comparison to the loss is also important. The absence or underdevelopment of the formal market leads to efficient utilization of informal RMOs to reduce income risk. In this regard, informal ex-ante RMOs may be advantageous to the stable rise of farmers' income and development of the rural financial system in the long run.

Keywords: Addressing risk, finance markets, finance service, income risk.

AGRICULTURE in India is predominantly dependent on the monsoon, due to which it regularly faces production risks and income losses[1]. The erratic behaviour of the monsoon often leads to natural hazards that hinder farm development. The literature indicates that agricultural losses are increasing manifold lately. For instance, global financial losses in the agriculture sector alone from 1992 to 2002 are reportedly seven times higher than those in the 1960s (ref. 2). We assume climate change may further augment the frequency and intensity of natural hazards and the corresponding losses[3–5].

Climate-induced natural hazards (CINHs) have severely impacted the agriculture and allied sectors across the world, which is commonly underestimated[6–8]. Total losses reported in agricultural production (including crop and livestock) in the past decade (2005–14) in developing countries were 93 billion USD. Of this, more than 80% of cumulative production losses were due to CINHs. Among the CINHs, flood alone is responsible for notable losses (37%), followed by drought (19%) and other natural hazards (23%)[9].

To address the problems of CINHs, recourse to formal and informal risk management options (RMOs) is a prerequisite[10–12]. Formal RMOs include prescribed system arrangements, particularly modern social security nets, commercial insurance and rural credit facilities. In developed countries, a wide range of exclusive agricultural insurance products is available, which makes these countries less vulnerable and more resilient to CINHs. On the other hand, formal crop insurance in developing countries is still in its inception stage. In these countries, particularly India, it has lesser penetration and is yet to be fully accepted[13,14]. Poor implementation of formal RMOs compels farmers to adopt informal RMOs to avoid pre- or post-hazard risk[15,16]. The informal RMOs are cataleptic preparations towards risk mitigation or coping, and include an extensive range of options[17,18].

In this context, it is relevant to identify which RMOs the farmers are opting given the limited resources and several alternatives. It is also essential to know how efficient these mechanisms are in reducing income losses. Within this framework, the present study aims to examine what formal and informal RMOs do farmers resort to minimize income losses. Also, whether formal RMOs are helpful in efficiently reducing income losses and, if not, what is the possible way forward.

We chose the climatically vulnerable and largest state in India, viz. Rajasthan (Figure 1). The northwestern tract of this state is arid and infertile, and becomes fertile and habitable toward the east. The southern part of Rajasthan is flooded with rivers such as Chambal, Luni and Banas and their tributaries.

Empirical framework: data and sampling

We sought primary data using a multi-stage random sampling technique. From western Rajasthan, we chose Bikaner district for a detailed study as this is recognized for alternate drought years, poor irrigation and declining returns from cultivation[19]. Bikaner is so categorized as a 'very high vulnerability district' in the vulnerability atlas of

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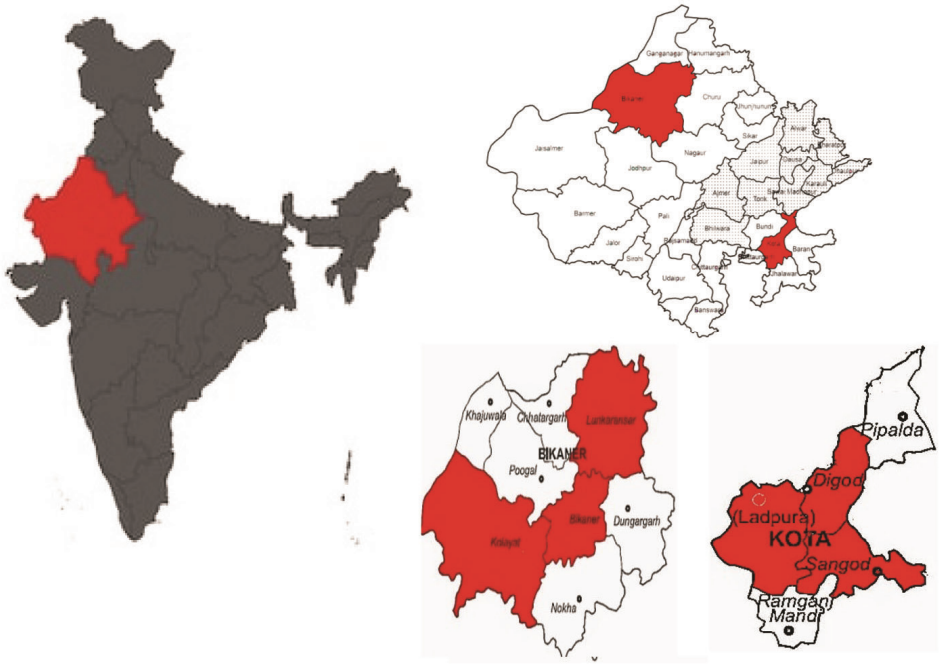

Figure 1. Map showing the location of the study region in India.

India[20]. We also chose Kota district from southern Rajasthan as it has experienced frequent floods (including severe and moderate) since the last 30 years (Figure 1)[21–23].

We carried out complete enumeration in 18 villages (9 from each district). At this stage, we contacted 4774 households (3159 in Bikaner and 1615 in Kota) and gathered information on landholding, dairy herd size and access to crop insurance.

Among these, we chose 180 crop-insured households with probability proportionate to the land and herd size categories (note 1). Prerequisite conditions for this were having agriculture as the major source of income and farmer household having access to crop insurance as an RMO. Interestingly, all these households were using at least one of the informal RMOs apart from formal RMOs.

From the sample, we sought household-specific information for the agriculture year 2018–19 on a pilot-tested and coherent schedule through personal interviews.

Statistical technique to measure the efficacy of RMOs: binomial logit

We used a binomial logistic regression model to study the usefulness of RMOs. We analysed the effect of various RMOs in reducing income losses. The model is

$$\ln\left(\frac{p_i}{1-p_i}\right) = Y_i = \pi_o + \pi_1 U_i + \pi_2 V_i + \pi_3 W_i + \pi_4 X_i + \pi_5 Z_i + \varepsilon_i,$$

where p_i is the probability that a household will have a stable income, $1 - p_i$ symbolizes that on facing a risk the household's income is likely to be significantly lower than its average annual income, and $p_i/1 - p_i$ signifies the odds ratio of considerably lower income.

The explanatory variables include continuous, dummy and ordered categorical variables (note 2). U_i is the set of socio-economic attributes. V_i and W_i are variables of formal RMOs. X_i and Z_i are variables of informal RMOs. π_0 is a constant, and π_1, π_2, π_3, π_4 and π_5 are the corresponding coefficients. ε_i is the random error term.

Variables and descriptive statistics

Explained variable

Our explained variable is 'the degree of income fluctuation' due to climate risk (drought or flood). According to the available literature, to measure income fluctuations ideally for the long term, one should study year on year change in income (or season on season change). However, in India, this information on farmers' income is available at the decadal interval (National Sample Survey Office's, Situational Assessment Surveys). This makes it difficult to capture annual fluctuations[24]. Therefore, to measure the annual income fluctuation (during drought or flood), we obtained first-hand information of income risk from the farmers, and designed the survey accordingly.

First, we asked the respondents about details of all the crops cultivated in major growing seasons of Rajasthan, i.e. *kharif*, *rabi* and *zaid*. We deducted the cost incurred in

Table 1. Variables used and descriptive statistics

Category	Variables	Explanation
	Explained variable	
	Income	Stable – 36.1% (Bikaner – 42.2%, Kota – 30.0%) Distinctly lowered – 63.9% (Bikaner – 57.7%, Kota – 70.0%)
	Explanatory variables	
	Socio-economic attributes	
Social	Age	52 years
	Education	Illiterate – 37.2%, literate (up to primary schooling) – 62.8%
	Family size	6.23
Economic	Asset value	INR 695,000
	Land size	3.15 ha
	Cattle number	2.47
	Formal RMOs	
Ex-ante	Compensation amount	INR 10,112
	Adequacy	Not adequate – 88.9%, adequate – 11.1%
	Hardship	No access – 42.8%, moderately hard – 53.3%, easy – 3.9%
Ex-post	Formal credit-amount	INR 265,072
	Scale	None – 5%, 1 or 2 – 47.8%, 2–4 – 46.6%, more than 4 – 0.6%
	Hardship	No access – 5%, moderately hard – 10%, easy – 85%
	Informal RMOs	
Ex-ante	Area irrigated	63.1%
	Diversification	No – 43.4%, yes – 56.6%
	Mixed farming	No – 16.1%, yes – 83.9%
	Membership	No – 61.7%, yes – 38.3%
	Adoption of latest technology	No – 74.4%, yes – 25.6%
Ex-post	Informal credit amount	INR 96,427
	Scale	None – 41.1%,1 or 2 – 41.7%, 2–4 – 16.7%, more than 4 – 0.5%
	Hardship	No access – 41.1%, moderately hard – 5%, easy – 53.9%

Source: Field survey, 2018–19.

inputs (seeds, fertilizers, farmyard manure (FYM), labour, etc.), storage, marketing and other farming operations from the income obtained by selling products and by-products. Then, we enquired about the recent years in which that particular farmer faced income loss due to CINHs and the per cent yield losses incurred during those years. Using this information, we estimated the variation in the farm income of the households for an average year and the year they faced a risk of CINHs (drought or flood).

Accruing to major dependence on weather or climate, we considered crop cultivation as a risky venture. Hence, we counted a deviation of 15% (or less) as no loss, i.e. stable income (0) (Table 1). This deviation has been taken from the income in a regular or normal year when the effect of drought or flood was negligible. Also, we considered the loss of more than 15% as distinctly lowered income (taken as 1).

Explanatory variables

We studied explanatory variables under three classes – socio-economic attributes, formal RMOs and informal RMOs. Formal and informal RMOs include ex-ante and ex-post options based on the time of their applicability. Ex-ante options are used by farmers in anticipation of a risk (drought and flood). Thus they are undertaken before any kind of loss occurs. On the other hand, ex-post options are usually undertaken after the occurrence of losses. Figure 2 provides a detailed outline of the RMOs.

Socio-economic attributes: This category includes the age of household heads, years of schooling, family size, land (hectares), asset value (INR) and in-milk cattle. Additionally, we incorporated a location variable (a dummy) to examine the differences in drought and flood-prone regions, if any.

An average household has six members, and its head is 52 years old. Nearly two-thirds of the household heads are formally educated (at least primary schooling). The ordinary farm household owns 3.15 ha land, maintains assets worth INR 6.9 lakhs and has two in-milk cattle.

Formal RMOs: We studied formal RMOs under two categories, namely ex-ante and ex-post. Formal ex-ante RMOs are institutional arrangements (particularly Central, State or local Government) ahead of probable losses from sudden risks. Under this category, we studied commercial insurance markets in detail. We captured the level of development of these markets, penetration and acceptability among the cultivators. Under the category of formal

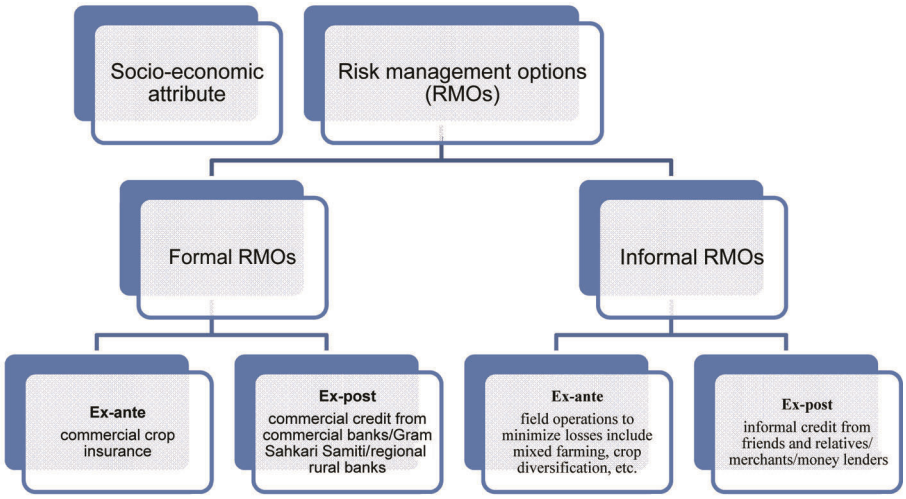

Figure 2. Detailed outline of the explanatory variables.

Table 2. Business statistics of insurance schemes (PMFBY and RWBCIS) in Rajasthan, India

Year	Farmers' applications insured (lakh)	Area insured (lakh ha)	Sum insured (INR, crores)	Applications received compensation out of total insured (%)
2016–17	93.5	104.8	17,908	31.0
2017–18	91.1	100.4	23,528	27.8
2018–19	71.8	77.6	29,340	28.7
2019–20	85.3	97.0	34,916	30.3

Source: Press Information Bureau[25].

ex-post RMOs, we studied the credit extended by formal institutions (commercial banks, sahkarisamite, etc.) in detail. This credit is usually extended for production or cultivation. The details of sub-categories have been provided later.

Ex-ante RMO: Since our sample comprises households that have taken loans from the Kisan Credit Card (KCC) scheme, they compulsorily have insurance (note 3). Out of the total cultivable land (220 lakh ha) of Rajasthan, a significant proportion is insured under crop insurance schemes (Table 2)[25]. A farmer pays just 2.1% of the premium amount. In the past four years, nearly one-third of the farmers who insured their crops got compensatory benefits, showing an effective and pro-farmer approach. Under this category, we included details of insurance claim payment versus crop loss incurred. We also enquired about the hardships faced by the farmers (note 4).

Referring Table 1, ascribed to either drought or flood, nearly two-thirds of households (63.9%) reported notable crop losses and distinctly reduced farm income. Despite bearing significant losses, about one-fourth of the farmers did not receive crop insurance compensation. Approximately one-third of them reported 'no losses', but a noteworthy number (26%) got compensation. Moreover, among the households that experienced high losses, a large section did not receive compensation. The pattern is prevalent because of the 'area approach method' undertaken by the Government of India (GoI) for compensation. As a result, many farmers who had experienced high personal losses did not receive compensation accruing to relatively fewer cumulative losses in their area[26].

A large number (88.9%) of households that received insurance compensation perks indicated an inadequacy in compensation compared to the loss incurred. Studies across India also indicate that Government-led crop insurance schemes are more beneficial to the insurer (company) than the insured[27]. Attributable to the insurance company's lack of transparency, a considerable section of farmers experienced hindrance (high to moderate level) in accessing insurance compensation. Farmers' low economic status, illiteracy, unawareness, inaccessibility to technology, etc. are other crucial factors that avert smooth settlements of compensatory claims[27,28]. Concerning the behaviour of insurance agency staff and documentation complexity, majority of the respondents reported cordial behaviour and a relatively easy documentation process.

Ex-post RMOs: Crop losses due to CINHs combined with the inefficacy of the insurance market push farmers to avail credit facilities from different sources to temporarily overcome the impact of financial losses. These sources could be formal/organized or informal/unorganized. This leads to a credit trap for the farmers and further deteriorates

their conditions. To mitigate this, on various occasions GoI/State Governments have launched various crop-related affordable credit and insurance schemes for marginal and small farmers[29–31].

We calculated the amount of credit obtained from organized/formal institutions, its scale (number of agencies involved) and hindrances faced in obtaining the credit (note 5).

Farmers depend upon more than one agency for formal credit. KCC and other term loans (medium and long) are the basic formal credit provided by commercial banks. Nearly 90% of farm households borrow credit from these commercial banks. Other agencies of formal credit are Gram Sahkari Samiti and regional rural banks on which around 40% and 18% of the households depend respectively.

Only a small section (5%) reported that they did not have any outstanding loans from formal agencies. The average credit that farmers borrow from formal agencies was INR 265,000 annually, indicating a greater dependence. This pattern is attributable to lowered interest rates and comparative ease in obtaining credit[30].

Like the case of insurance companies, the respondents reported friendly behaviour of staff and smooth paperwork/documentation in the case of formal credit agencies as well. Our findings are strikingly different from those of Singh *et al.*[32]. Disbursement of credit and other facilities is faster with several options of formal agencies/offices that distribute credit.

Informal RMOs: Ex-ante RMOs are oblivious arrangements that are made before a risk occurs. Conversely, ex-post RMOs comprise compensation made for losses incurred.

Ex-ante RMOs: Under this category, we studied variables such as mixed farming, diversification, irrigation, membership of organizations (helping technology sensitization) and adoption of conservative production strategy.

Interestingly, nearly two-thirds of the drought-prone area is under irrigation (using canals, tubewells, pumps, etc.). More than half of the respondents had diversified their land towards paddy, soybean, urad bean, ginger, carrot, etc. A significant section also raised livestock along with crops.

Nearly 40% of the households either held administrative positions or were members of popular organizations promoting agriculture-related technologies. These organizations include Gram Panchayats (and Gram-Sabhas), farmers' organizations (agricultural, dairy, or credit cooperative societies), and target-based groups (rural youth club, Mahila Mandal, etc.). One-fourth of the households had used the latest technologies, on facing the risk of drought or flood. These include drip irrigation, using enhanced seeds and improved varieties, adjusting plantation schedule according to the monsoon, contract farming, etc.

Ex-post RMOs: When formal insurance and credit systems do not serve the farmers adequately, they resort to informal sources of credit[12]. The other reasons include easy and early access to cash, social structure, embedded illiteracy, fewer transaction costs and the option for less/no collateral[33].

Under this category, we included the credit amount and number of agencies contacted for informal credit (scale). We also examined the hardships faced by households in obtaining this credit from the concerned agency (note 6).

In this study, informal agencies delivering credit comprised 'friends and relatives', merchants and regional moneylenders. Among these informal sources, friends and relatives were the most popular. The average credit amount loaned from an informal credit agency was INR 96,000 annually. This is less than half the amount borrowed from formal agencies.

Results and discussion

We used STATA 15.0 software in the present study. For robust results, we included the variables of formal and informal RMOs under the constant restriction of socio-economic attributes (models I–IV). We chose the degree of income losses as the explained variable (Table 3). Finally, we included all the explanatory variables in model V. With the corresponding coefficient values, we report robust standard error (instead of the standard error) to avoid any unintended biases.

Implications of the models

An aged household from the disadvantaged categories (schedule caste or tribe) is most likely to manage income risk successfully. Small landowners manage risk more efficiently compared to large landholders. Large cultivators are more likely to suffer income losses. The odds ratio is 1.157 (coefficient = 0.146), implying that one unit increase in land size can raise income fluctuations by 115%.

Higher are the possessions of a household, lesser is the risk of income fluctuation faced by him. Contrarily, a relatively more educated household having membership of any social group is more likely to face risk of income fluctuation though the losses may turn out to be insignificant. In general, socio-economic attributes of the households have a restricted role in smoothing the income losses in the study area.

Effects of formal RMOs

Ex-ante RMOs: The extent of development of the insurance market insignificantly reduces income losses. Low

Table 3. Results of measurement test: binomial logit

Variables	Model I	Model II	Model III	Model IV	Model V	Coefficients
	Formal		Informal			
Socio-economic attributes	Ex-ante	Ex-post	Ex-ante	Ex-post	All variables included	
Age	0.972*	0.976	0.974	0.965**	0.974	–0.026
	(0.017)	(0.016)	(0.017)	(0.018)	(0.019)	
Education	1.361	1.567	1.429	1.400	1.839	0.609
	(0.543)	(0.658)	(0.637)	(0.601)	(.870)	
Disadvantaged section	0.436**	0.427**	0.452*	0.700	0.571	–0.560
	(0.181)	(0.179)	(0.223)	(0.315)	(0.300)	
Family size	1.054	1.023	1.077	1.112	1.068	0.066
	(0.090)	(0.091)	(0.096)	(0.107)	(0.106)	
Owned land	1.093*	1.151***	1.131**	1.062	1.157**	0.146**
	(0.058)	(0.066)	(0.062)	(0.060)	(0.083)	
Value of asset	1.000	1.000	1.000	1.000	1.000	–1.2E-07
	(3.21E-07)	(2.96E-07)	(2.92E-07)	(3.21E-07)	(3.15E-07)	
Number of cattle	0.949	0.971	0.970	0.973	1.019	0.019
	(0.058)	(0.070)	(0.067)	(0.081)	(0.098)	
Location	2.845**	2.517**	3.562***	3.003*	3.300	1.194
	(1.286)	(1.080)	(1.599)	(1.911)	(2.976)	
Constant	2.370	2.325	0.955	6.706	1.672	0.514
Formal RMOs						
Compensation amount	1.000				1.000	–6.1E-06
	(1.22E-05)				(1.38E-05)	
Compensation adequacy	2.080				1.267	0.236
	(1.329)				(0.973)	
Hardship in obtaining compensation	1.339				1.231	0.208
	(0.496)				(0.551)	
Formal credit amount (INR)		1.000***			1.000**	–2.7E-06**
		(9.34E-07)			(1.19E-06)	
Formal credit scale		1.060			0.981	–0.019
		(0.350)			(0.429)	
Hardship – formal credit		1.297			1.360	0.307
		(0.423)			(0.480)	
Informal RMOs			Ex-ante	Ex-post		
Mixed farming			0.588		0.525	–0.645
			(0.344)		(0.330)	
Area irrigated			0.984***		0.988*	–0.013*
			(0.006)		(0.007)	
Crop diversification			2.011**		1.833	–0.606
			(0.729)		(0.726)	
Adoption of latest technology			0.650		0.633	–0.457
			(0.294)		(0.314)	
Membership			3.170***		3.620**	1.286**
			(1.498)		(2.109)	
Informal credit amount (INR)				1.000***	1.000**	–6.1E-06**
				(2.33E-06)	(2.97E-06)	
Informal credit scale				2.181*	1.900	0.642
				(0.945)	(0.957)	
Hardship – informal credit				1.896**	1.746*	0.557*
				(0.527)	(0.591)	
Log pseudo-likelihood	–108.228	–105.120	–98.817	–97.237	–85.962	
Wald chi^2	19.120**	25.020***	30.360***	32.880***	40.270***	40.270***
Pseudo R^2	0.081	0.107	0.160	0.174	0.270	0.270

*,** and ***are levels of significance at 10%, 5% and 1% respectively. Parenthesis indicates robust standard errors.
Source: Field survey, 2018–19.

farm incomes and high premium costs restraint the affordability of insurance and hence call for a prominent driving force[34,35]. In the absence of this external drive, combined with huge losses incurred continuously in the farm sector, private insurance companies (that are profit-driven) reduce their farming business. It is pivotal to assess individual losses and distribute compensation in accordance with the losses that actually occur.

Ex-post RMOs: The amount of credit obtained from formal institutions significantly and proportionately (odds ratio of 1) smoothens the farm income losses. Also, the value of regression coefficients is low (6.1E-06). The easier the credit is obtained, less will be the income fluctuation. Similar is the case with the number of agencies contacted, though this effect is insignificant.

These findings indicate that at present, formal RMOs play a small part in reducing income losses. Likewise, past studies have shown that formal credit markets in rural India face many impediments in their operation. A few of these cover discriminatory access to credit (production/consumption) based on the land size of farmers, deflection of productive loans for consumptive use and credit rationing[36]. The findings indicate the importance of keeping checks and balances on credit diversion and use. Fully developed insurance and credit markets reduce financial/economic inefficiencies, and often become prototypical or near-perfect RMOs[24].

Effects of informal RMOs

Ex-ante RMOs: Area under irrigation, diversification, holding an office and opting for advanced farm technology reduce the probability of income losses. Taking this into consideration, the choice of climate-smart technologies is crucial.

Ex-post RMOs: Informal credit amount significantly reduces income fluctuations. Additionally, this reduction is proportionate to the credit amount, though the value of the coefficient is small (–6.1E-06). The opposite is observed for the scale of credit, as it significantly increases income variations. This implies that more the number of informal credit agencies contacted, less will be the income smoothening. The high interest charged by private sources and informal agencies (24–48%) is primarily responsible for this.

Interestingly, reduced hindrances in the informal credit market increase farmers' income fluctuation; the odds ratio is 1.896. To be precise, one unit decline in the hindrance of informal loans will double the probability of monetary losses. The overall result of this study reveals that easy access to informal credit relatively increases income loss.

Exorbitantly high rate of interest (at times 24%) combined with massive collateral requirements (land, jewelry, utensils, etc.) often makes informal RMOs less desirable for farmers (especially in the study area)[37,38].

Conclusion and policy suggestions

Farmers opt for risk management options (RMOs) to address risks (including production, yield, income risks, etc.) associated with agriculture and allied sectors. These options may be formal or informal based on the level of associated formalities; and ex-ante or ex-post-based on the time of their applicability.

Formal RMOs, particularly ex-post, have emerged as effective measures to minimize the associated agricultural income risk. It is a common observation that whenever a farmer faces the risk of crop failure, the amount of compensation paid by the insurance company is significantly less than the cost incurred by the farmer. This sets a chain reaction of exorbitant interest rates due to the inability of farmers to renew their credit facilities on time. This also excludes farm households from other credit-linked benefits like interest subvention offered by Government institutions other than scheduled commercial banks.

To address the hardships suffered by the farm households after crop loss, rightful assessment of compensation amount by the implementing/insurance agency is necessary. Additionally, ensuring the adequacy of the same by the losses must be top priority for improvizing the acceptability of formal RMOs.

Due to poor acceptability and the aforementioned problems with formal RMOs, farm households often resort to informal RMOs which leads them to the vicious cycle of the debt trap. Among informal ex-ante RMOs, irrigation facilities, on-field diversification and climate-smart agricultural technologies may be advantageous for a stable increase of farmers' income in the long run. Since informal ex-post RMOs are indispensable for risk reduction, it is important to have a check on exceptionally high rates of interest charged by informal credit institutions, particularly merchants and moneylenders.

An ideal macro-level policy should be one that considers the equity of households (tangible and intangible), unconventional savings and insurance-based schemes. In addition, focus should be on the development of formal credit market and social capital. Finally, social welfare schemes (of both Central and State Governments) should specifically cover farm households based on their socio-economic attributes, outstanding loan amount, adverse fluctuation in the market and minimum support price.

It is advisable to constantly increase the social capital to reduce the sensitivity of farmers to CINHs. This will be assisted by improving rural financial inclusion in the formal credit institutions, checking the excessive rise in interest rate in case of non-renewal of credit facilities or

when the dues are not paid on time, enhancing the ability of farmers to handle the income risk through ex-post measures, etc.

In addition, providing non-farm business opportunities, building more social security nets, enhancing farmers' literacy and subsidizing the enterprises engaged in rural insurance will help in improving the penetration of formal RMOs and thereby will increase their efficiency.

Notes

1. Land size categories include small (<2 ha), medium (2–4 ha) and large (>4 ha), and herd size categories are small (up to 6), medium (6–12) and large (>12).
2. To deal with ordered categorical variables, each option/category within the variables is assigned a definite value and is subsequently used as continuous variables. This method requires the assignment of values to be of equal size as much as possible to avoid any specific biases. This approach is relatively simple, easy to explain, and has been widely used in the literature. We designed the research survey and attentively spaced the categories of variables for proper assignment, to classify the ordered categorical variables in detail.
3. All KCC loans have insurance coverage under either Pradhan Mantri Fasal Bima Yojana (PMFBY) or Restructured Weather Based Crop Insurance Scheme (RWBCIS; https://pmfby.gov.in/faq).
4. The component hardship in obtaining compensation' is determined based on the cumulative scores of staff behaviour of insurance companies (in terms of associating and assisting farmers), average time to prepare the documents, average time in releasing the final compensation amount, and how many often the farmers had to go to the insurance companies for getting compensation.
5. The component 'hindrances in obtaining formal ex-post credit' is determined based on the cumulative score of the agency/bank personnel response, average time exerted in documentation, total time from application to release of the loan amount and recurrence of bank visits.
6. The component 'hardship in getting credit' under informal ex-post RMOs is determined based on the aggregate score of the behaviour of friends/relatives/merchants/moneylenders, average documentation time, time window from asking for the loan to getting it and the frequency of visit to informal agencies.

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ACKNOWLEDGEMENT. Funding support from the Indian Council of Social Science Research, New Delhi is highly appreciated.

Received 9 September 2021; revised accepted 18 November 2021

doi: 10.18520/cs/v122/i2/178-186