# Poverty, Access to Credit and Absorption of Income Shocks: Evidence from SHGs in India

# TIMOTHEE DEMONT

Studying the role of SHGs in helping the poor cope with climatic shocks, this article analyses the strength of informal microfinance groups in absorbing adverse shocks

#### INTRODUCTION

It is well documented that poor households in rural areas of developing countries often experience extremely variable incomes because of the combined effect of a large exposure to climatic, economic and policy shocks and a lack of appropriate insurance devices. Coping with climatic shocks, in particular, is becoming ever more crucial, given that climate change is expected to result in warmer temperatures as well as increasingly irregular and extreme precipitation patterns, with severe consequences for rain-fed agriculture in developing countries. In India, agriculture, which employs more than 60 per cent of the population, is extremely dependent on erratic monsoon precipitation, especially given that only a small fraction of land used for agriculture is irrigated. For instance, around 90 per cent of variation in Indian crop-production levels is due to rainfall volatility. Using macro data from 1951 to 2003, despite substantial decreases in the contribution of agriculture to the Indian GDP, severe droughts have resulted in decreases between 2 and 5 per cent of the GDP throughout the period. Rainfall shocks have been documented to affect agricultural profits, wages and ultimately the welfare of rural households significantly. Informal risk-sharing arrangements with neighbours, friends or family have often been shown to be largely imperfect in smoothing income shocks. This is especially true for rainfall variation, because a bad monsoon affects virtually every household in a local rural geographic area.

In this paper, long-term panel data measuring the evolution of living standards of SHG member households in rural India have been analysed to (i) quantify the impact of climatic shocks on different aspects of the welfare of households and (ii) measure the role of informal village microfinance groups to insure their members. The original panel household database about members of Self-Help Groups (SHGs) and meteorological data have been used to quantify and characterize the differential reaction of member and non-member households in the face of rainfall shocks. Given that most households in the sample depend principally on the cultivation of rain-fed rice, rainfall variation is expected to be an important determinant of the transitory swings in consumption and income. Although average rainfall is predictably different from place to place, the deviation of each year's rainfall from its local mean is unpredictable. On the other hand, SHGs present very interesting characteristics, combining savings, credit and linkages with formal banks, which open the possibility of helping members absorb adverse shocks, even when those are largely covariate. Farmers in Jharkhand, it is found, are extremely vulnerable to shocks in the monsoon intensity. Rice yields can decrease by more than 50 per cent following a monsoon that is one standard deviation below average. This is particularly dramatic because the farmers in the sample as more than 50 million households in India rely on rain-fed rice as the principal source of caloric intake and income. Microfinance members are no different from other households as far as the vulnerability of rice production is concerned. Further, given that the traditional sources of credit are relatives, bigger farmers or small

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business persons from the same community, credit access virtually dries up for non-members after a bad shock. By contrast, SHG members enjoy a steady access to credit, and are even able to borrow more than average during the bottleneck period one year after a bad monsoon. This is made possible thanks to the large pool of savings of SHGs, which collect 'regular' weekly savings from their members, and to their linkage with formal banks.

Although any direct consumption smoothing because of a timing issue could not be measured, this counter-cyclical borrowing helps SHG members absorb rain shocks over the year. However, the design of the SHG system does not allow much of inter-year smoothing, which is likely to limit the insurance power of SHGs. Finally, some evidence that SHG credit allows some investment towards the diversification of the crop mix is presented. In particular, the study shows that SHG members progressively decrease their reliance on rice and increase the relative share of vegetables, which are shown to help to smooth agricultural income. The study analyzes long-term household data to quantify the direct impact of objectively measured, exogenous shocks.

# SHOCKS, 'CONSUMPTION SMOOTHING' AND THE ROLE OF MICROFINANCE

In the face of transitory income shocks,

households are expected to (try to) smooth con-sumption for different reasons. First, individuals have relatively stable preferences over time and, therefore, prefer to maintain consistent levels of consumption if they can. Second, most households are risk averse, especially if they are poor (because they are close to the survival point).

Third, relatively wide variations in expenditure can be extremely harmful, especially if one lives close to the subsistence level. Within a village, though part of the risk is common to all families, another important part is specific to the circumstances of specific households (someone's cattle may die; people have more or less land with different characteristics, etc.).

Whether households are actually able to smooth consumption or not depends on the context (institutional, informational, social, economic or personal). The empirical literature on the effects on income shocks on household in developing countries provides relatively mixed results. Nevertheless, the consensus from the existing empirical literature seems to be that most households succeed in protecting their consumption from the full effects of the income shocks to which they are subject.

To understand why consumption smoothing may be incomplete and why variation is observed in the ability to smooth consumption, it is important to understand the mechanisms used towards this end. First is income diversification (that is, for agricultural households, diversification of crops and cattle, as well as seasonal wage work) or making conservative employment choices. After the onset of adverse shocks such as a bad monsoon, households can rely on different mechanisms, including engaging in inter-temporal transfers (borrowing/lending, selling/accumulating assets), participating in inter-household transfers or risk-pooling arrangements (formal insurance, informal state-contingent transfers, 'disguised' insurance in labour or credit contracts), trying to generate a quick alternative income (migration, wage work, including of children, early sowing of the next harvest), etc.

Not all those methods are equally efficient, and their relative availability will determine the optimal strategy and welfare cost for stricken households. A large amount of literature provides evidence that each of these channels is used in developing countries to smoothen income to some extent.

In particular, several academic papers have used rainfall shocks as proxy or instrument to variation in transitory income and have shown at least some smoothing. However, literature studying the effect of monsoon quality on consumption, health, savings, labour supply and so on is still limited. Much more needs to be understood about how rural households respond to an event like a severe drought, how large the welfare impact is and how the costs are distributed among households. Further careful, systematic research on these questions would be very valuable, especially given the potential for climate change to amplify weather variation in future years and decades. This paper aims at contributing to the issue, thanks to a particularly interesting panel database providing detailed household-level data.

Given that the above-mentioned, risk-sharing mechanisms are largely imperfect, microfinance is expected to be potentially beneficial for the welfare of member households, in the face of income shocks. In existing studies, the ability of households to insure against such shocks has often been shown to crucially depend on their wealth and access to financial markets. In the presence of credit constraints, microfinance can help beneficiaries to invest in profitable enterprises as well as cope with the negative shocks in their lives more effectively, allowing households to borrow to smooth consumption over shocks rather than liquidate assets, for instance. Hence, it is reasonable to believe that microfinance could provide an efficient means to consumption smoothing and positively affect long-term livelihoods. This is especially true for microfinance institutions (MFIs) such as Indian SHGs that are readily accessible and which form the subject of the current study.

# THE PROGRAM AND THE ENVIRONMENT UNDER STUDY

# The Context

Data for the study comes from a very large microfinance programme in central India initiated by a development NGO called Professional Assistance for Development Action (PRADAN). The main objective of the organization is to promote and strengthen the livelihoods of socioeconomically disadvantaged communities, such as indigenous people, women, scheduled castes, landless, and the marginal and small cultivators. Central to this broad agenda is microfinance, which is considered a means for the rural poor to make strategic investments in improving their livelihoods over time. Yet, unlike other microfinance models in which the NGO develops itself as the alternative credit provider. PRADAN organizes women in SHGs that become MFIs themselves. These SHGs are small informal village associations, which are engaged in a variety of collective activities, of which savings and credit are the most important. As on March 2012, PRADAN is active in eight states in India and has around 16,555 functioning SHGs.

This study focuses on the state of Jharkhand. It is among the poorest of all 27 Indian states, with 46 per cent of its rural population below the national poverty line and a female literacy rate of 38.9 per cent, 15 percentage points below the national average. Jharkhand is mostly rural (78 per cent of its 30 million inhabitants). Its population comprises 28 per cent tribals and 12 per cent Scheduled Castes (SCs), who are known to be the most vulnerable groups of Indian society. The

present study focusses on villages only, which are extremely isolated, on an average. Here, the main source of livelihood is subsistence agriculture and seasonal labour work. Rain-fed paddy is the predominant crop in the state, followed by pulses, maize, wheat and oilseeds. The backwardness of agriculture in the state is contributed by poor water control strategy, largely characterized by erratic rainfall, coupled with low irrigation coverage. These characteristics imply that the food security needs of households can be met through own cultivation for at most six months of the year.

# SHGS AND PRADAN'S INTERVENTION

This study looked at PRADAN's SHG programme in 2004. PRADAN chooses to work with relatively disadvantaged communities and poor villages, within geographical clusters around its local offices, where no other NGO has worked before. A study by CGAP (an independent policy and research centres dedicated to advancing financial access for the world's poor) found that PRADAN had indeed deeper-than-average outreach (CGAP, "Sustainability of Self-Help Groups in India: Two Analyses," Occasional Paper 12,

Central to this broad agenda is microfinance, which is considered a means for the rural poor to make strategic investments in improving their livelihoods over time. Yet, unlike other microfinance models in which the NGO develops itself as the alternative credit provider, PRADAN organizes women in SHGs that become MFIs themselves Consultative Group to Assist the Poor, August 2007). Almost all SHG members are tribal people or SCs, 85 per cent have no homestead land or only marginal non-agricultural landholdings and almost 90 per cent live in thatched huts or are squatters. To determine how effectively the SHG model reaches these populations, the CGAP study analyzed the locations of the 150 SHGs in a sample, and the economic and demographic profiles of their members. Most of the SHG members lived far

from paved roads, bank branches, and health centres.

Establishing a group usually begins with a PRADAN representative holding a meeting at some public place in a village, such as the panchayat office or the primary school, where the details of the program are explained. After a few such meetings, a group of between 10 and 20 motivated women is formed. One important rule imposed by PRADAN is that there may be only one member per household as part of an SHG. If a village is large, or interest in the programme is widespread, multiple groups may be created. After some initial training and capacity building from the NGO, the group chooses a name for itself, agrees on a weekly meeting time and determines other group rules. The rules such as the minimum contribution per member at each meeting (usually Rs 5 or 10 per month), the interest rate charged on loans that are given to group members, and fines for non-attendance or late payments, etc., are also decided by consensus.

The group then elects three members to take on the permanent positions of president, secretary and cashier, who are also the group's representatives to the bank. An accountant is chosen; she/he attends every group meeting and is responsible for recording all transactions and maintaining the books of the group. After a few months of smooth functioning, a savings account is opened at a commercial bank near the village to deposit the group savings. Usually, after about a year, the groups showing mature financial behaviour are enabled to take bank loans for a variety of income generating activities (the group is then said to be *linked*). At this point, the intervention of the NGO is only required to solve occasional problems (though PRADAN keeps track of the financial records of all SHGs through regular reports of the accountants). The bank-linked SHG model is a very decentralized, cheap and potentially sustainable way of providing access to reliable savings and credit services in rural areas and other potential benefits from the group structure, such as peer support and other social services.

# INSURANCE AGAINST INCOME SHOCKS THROUGH SHGS

Primarily, SHGs allow members to borrow (and save) money in the face of income shocks. Several features of SHGs are important in this respect. First, SHGs meet weekly (or even more often if needed) and there is no fixed order in loan taking. That is, members can ask any amount at any time-with the important restrictions that (i) the group needs to agree and (ii) the money needs to be available. Second, repayment is somewhat flexible. Third, SHGs lend out from accumulated savings and external bank loans. As a consequence, even though SHGs are essentially village institutions, several members can take loans together and are potentially able to insure against even covariate shocks (like rainfall shocks), at least partly. Yet, SHGs certainly go beyond mere credit and savings activities. They constitute strong groups of peers meeting regularly, which

gives individuals information on what others are doing as well as a strong reason to stay together. Consequently, SHGs can potentially help members to smooth income, through selfinsurance in the form of borrowing. Finally, it must be emphasized that even large rainfall shocks are certainly not fully covariate because there exists important heterogeneity among members regarding land ownership (from no land to relatively big plots), main occupation, assets, family structure, etc.

# DATA

# Household Data

Three rounds of household panel data, from 2004 to 2009, were collected. The sample was selected using a stratified sampling strategy. Jharkhand was divided into four geographical clusters, based on historical differences in ecological and demographic characteristics: Northeastern (Santhal Parganas districts), Central (Hazaribagh and surrounding districts), Southwest (Ranchi-Lohardaga districts) and Southeast Jharkhand (Singhbhum districts). For each cluster, a simple random sample of six villages was chosen from the set of all villages with at least one SHG formed in 2002 (the first year of the programme). In each of those villages, 36 respondents were randomly selected-18 being SHG members and 18 being non-members from the same village. In addition, 12 control villages with no SHGs were randomly selected in the same districts, in which 18 households were randomly selected and interviewed. This constituted the final sample, which adds up to 1,080 households from 36 villages and 9 districts. The surveys were always carried in the same period of the year, namely, January-March, which corresponds to a rather slack, post-harvest period at the end of the monsoon season. The questionnaire included detailed information on many aspects of the living standards of households, including

demographics, recurrent durable and expenditure, consumption, credit and savings, labour market participation, selfemployment, migration, food vulnerability, landholdings and agriculture, dwelling conditions, health, education, female empowerment, participation in key activities in and out of the village. This threw up broad indicators that were either fixed or slow to change.

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# **Rainfall Data**

Data from 1998 to 2008 for these 9 districts were retrieved. Given that the survey took place between January and March, and that Indian rains are mostly concentrated between June and September (southwest monsoon), the main reference rainfall episode for each round was June–September of the previous year.

Statistically, Jharkhand is not a drought-prone area; it has an average annual rainfall of about 130 cm. Nevertheless, it suffers from the extreme concentration and volatility of rainfall: more than 80 per cent of the rainfall comes between June and September, which implies that some years can be extremely wet whereas others can be extremely dry. Substantial variation was detected in our sample, both across districts and over time. The Southeastern Plateau receives relatively more rain and has the highest cropping intensity; the Central and Northeastern Plateau is the biggest zone presenting a lower intensity, and the Western Plateau is the hilliest region, with an agricultural profile comparable to the previous region. Predominantly, rice and maize are cultivated in all three regions, pulses in the Central and Northeastern Plateau as well as the Western Plateau, and wheat in the Central and Northeastern Plateau.

Not only is rainfall variable, but also crucial. The study sample comprised small landholders, who largely practise subsistence agriculture with limited marketable surplus. Rice, in particular, often represents the main source of income. Indian food grain production, including rice production, is highly correlated with the amount of summer monsoon rainfall from June to September. This is partly due to the high poverty and low

agricultural investment rates in Jharkhand. Given the high levels of risk and low levels of production, the resources available for inputs such as fertilizers and pesticides are meagre and most households tend to avoid such costly investments. Scanty rainfall during the *kharif* season is, therefore, likely to depress both income and agricultural productivity during the next calendar year, possibly right until the next *kharif* harvest. Jharkhand's rural population faces a 'hungry season' from June to October.

Rain shocks strongly affect the agricultural production of all households in the sample. Rain over the entire monsoon (June–September) appears a strong predictor of yields and income. SHG members do not experience any significant difference with respect to other members. This was perhaps anticipated because there is not much that can be done against poor rainfall when cultivating rainfed rice (except, of course, investments such as irrigation, which are probably too costly for the size of SHG operations). Perhaps the role of SHGs is more about smoothing these unavoidable shocks.

#### **EMPIRICAL STRATEGY**

Rainfall shocks are plausibly exogenous

income shocks, given that they are essentially unan-ticipated at the start of the season. In theory, membership decisions could be influenced by the previous experience of shocks. Some limited movements into and out of membership occurred over time. which is why we also report estimates using contemporary membership because it is only if a household is actually a member at the date of the shock that it may derive any effect from membership. Reassuringly, results virtually do not change partly because movement in and out of membership is limited anyway. Because rainfall shocks are exogenous and spread over space, and we surveyed both members and non-members in each district, their incidence is by definition balanced between SHG members and comparison households. We can, therefore, examine the treatment effect of micro-credit on response to shocks, which is conditional on a shock having occurred. However, because of the self-selection into membership, SHG households may have decided to participate because they are more risk averse to start with. Rainfall is an exogenous and unanticipated shock to the transitory income of agricultural households, and the study estimates its differential impact on member and non-member households.

# AGRICULTURE

An obvious starting point for analysis of the impact of rainfall is the agricultural sector, allowing for quantifying the importance of the shocks at hand. Moreover, given that at least some effects may be expected, agricultural outcomes will help validate the definition of rain shocks. The focus is mainly on rice because it represents 80 per cent of the total agricultural production of households on average (50 per cent of agricultural income) and is cultivated by 95 per cent of agricultural households (76 per cent of all households). Moreover, only *kharif* (or winter) rice is cultivated in the region, which is highly dependent on monsoon rains and is harvested just before the survey. By contrast, *rabi* crop cultivation during the dry season is relatively limited and is unequally distributed geographically, mainly because of under-investment in irrigation facilities. *Rabi* production, therefore, has only limited capacity to mitigate shocks to the main *kharif* production in the region.

The most important rains come in June and especially July (start of the monsoon) when rice needs to be transplanted in flooded fields. Clearly, the rainfall variable captures important agricultural shocks. However, SHG members do not appear different from other households. Yields are more sensitive to monsoon and especially to the small land ownerships, probably because more land means more diversification possibilities and/ or more wealth to invest in agricultural inputs. This, perhaps, reflects the use of different technologies (for example, seeds or irrigation) between these two sets of farms. Yields are also more responsive to rainfall if the head of the household specializes in agriculture.

The analysis of rice sales delivers similar insights as for production, that is, a significantly positive relationship with rain. It indicates that the production effect dominates any potential price effect that could exist (for example, a relative abundance lowers market price). It also means that households sell a higher proportion of their production in case of good rain and less in case of bad rain. Market sales could theoretically be affected by the monsoon as well, to the extent that households would strategically store the rice to sell it in a period of scarcity. This does not seem to be the case in the sample study mainly because the survey asked about the land cultivated last year. In any case, considering the local environment,

small farmers do not resort to strategic storage because poor households lack the physical

and behavioural ability to store rice for a long period.

Seen through the lens of food security, the probability of being 'rice sufficient' increases with rain for all households.

A monsoon that is below average can lead to a loss of food security. Small-yields farmers are much more likely to be food insecure, on average and because of rain shocks. Agricultural expenses (including seeds and saplings, fertilizers, insecticides, renting in animals, labour and machinery, irrigation, fuel, transportation of production) follow the same trend as production, meaning that households do not seem to vary the (external) input intensity very much.

Rain shocks, to conclude therefore, strongly affect the agricultural production of all households in the sample. Rain over the entire monsoon appears a strong predictor of yields and income. SHG members do not experience any significant difference with respect to other members.

#### CREDIT

In this section, the hypothesis that SHGs bring easier access to credit, even in periods of bad rain is being studied. First, in order to finance agricultural expenditure, either the 'immediate' effects that might happen simultaneously to rain shocks or in anticipation of bad harvest will be analysed, followed by, second, an analysis of the crucial 'stock' period, one year after the rain shocks. It is expected that households may seek credit in order to make two ends meet before the new harvest. At the same time, it may be in a period of acute

Rain over the entire monsoon (June– September) appears a strong predictor of yields and income. SHG members do not experience any significant difference with respect to other members. shortage of credit if traditional lenders suffered bad harvests themselves. Third, the 'sales' period comes immediately after the harvest, in which credit may be taken to compensate lost revenue in case of bad harvest. Finally, the period two years after the rain shock is called 'reconstitution', in which households might need to reconstitute their net stock of

debt, either by repaying a debt incurred or by returning to optimal debt and living levels, after a period of credit contraction.

The first dependent variable is whether or not an individual borrowed during the period. On average, the probability of borrowing an amount over the year is 75.4 per cent for SHG members and 53.6 per cent for other households. The second dependent variable is the total amount borrowed over the period. Amounts are less different between member and non-member households, reflecting the fact that non-members take on average bigger loans but less often.

Moreover, all households take lower total amounts of credit following a bad shock, which means that SHG members reduce the average amount borrowed per loan. It was found that there is not much impact of the current rain ('immediate' effect), but that there is a big impact of last year's rain. By contrast, the estimate for SHG members is the opposite, yielding an average effect, which is slightly negative: members take less credit than average after a generous rainfall. When focusing on negative shocks, the effects go in the same direction but are much larger: a negative rainfall shock is associated with a reduction in the borrowing probability of nonmembers by 50 per cent and an *increase* by 16 per cent for member households. That is,

whereas non-members experience a strong pro-cyclicality in their access to credit, members enjoy a stable or even counter-cyclical access.

Finally, there is some evidence of a reconstitution effect. Non-member households that have credit rationed after a bad shock try to bounce back the following year, and try to reduce their debt stock in two years. These effects do not apply to member households. The analysis of loan amounts delivers very similar results to the previous ones. Given that the need for credit is theoretically inversely related to the previous year's rainfall, most loans to non-members comes from moneylenders and relatives, who are almost always larger farmers living in the same village or its neighbourhood. By contrast, member households take most of their loans from SHGs, and their borrowing ability stays virtually unaffected by rain shocks. This is remarkable, in particular during the critical stock period, given that the basic concept underlying SHGs is the pooling of local resources, which could have been expected to dry up in case of adverse rainfall shocks. In conclusion, SHGs do not seem to break down in critical periods. To the contrary, there is some evidence that member households are able to borrow a bit more than average in case of negative shocks.

The second aspect of SHG resilience that was checked is the evolution of repayment performances (though the previous discussion implies that groups break even only with savings, at least for the modal member). Whereas outright defaults are extremely rare in the data, delays in repayment are frequent. It was observed that a bad monsoon affects the promptitude of repayment negatively, of SHG as well as other loans. However, the actual duration of SHG loans does not increase, mainly because the contractual duration stays stable (whereas it strongly increases for other loans). Consequently, whereas the extension of the repayment period might imply some cash shortage for normal lenders, the availability of savings implies that bad rainfall shocks have no major consequence on the sustainability of SHGs.

A last way of checking the availability of funds for lending in SHGs is to look at the passbook balance of members in 2009, which states the accumulated savings since joining the group. Given that each survey asked about all loans taken in the last two years, virtually the entire credit history of each member can be reconstructed from 2002 to 2009 (though with a gap in 2006). By comparing the total credit taken from the SHG since 2002 with the passbook balance in 2009, the long-term net position of each member can be gauged. The conclusion of such computation is clear: about 80 per cent of the sample is long-term net debtors, confirming that SHGs are powerful credit instruments over the long run. Indeed, if the general rule is to balance personal credit and savings, the only smoothing allowed is seasonal smoothing, which is clearly limited given that there is only one main harvest per year (though, of course, farming income can always be complemented by casual work off season). SHG members would probably benefit from more flexibility in the system of compulsory savings; at least once the groups have built up a reasonable pool of savings and become bank-linked.

Some additional insights as to why SHGs are able to keep lending in case of important and largely covariate shocks are that primarily SHG members do not lend to each other out of their *current* money but out of a pool of savings that is growing over time. Moreover, that pool is reinforced by external loans from commercial banks. That is, whereas the pooling is finite due to the limited scale of operation, SHGs work as micro financial intermediaries, which can usually meet credit needs thanks to the collection of regular deposits and borrowing from commercial banks.

#### CONSUMPTION

It was found that prices do respond to local rain shocks,

reflecting the low integration of food markets in Jharkhand. As anticipated, the prices of rice and arhar (kharif pulses) are negatively associated with the intensity of the previous monsoon, that is, the prices respond to relative scarcity. By contrast, masoor, being a rabi pulse, is harvested in March-April and is, therefore, less dependent on rainfall. In any case, the previous monsoon could not affect their relative scarcity. It was found that they do not react to the last monsoon's intensity, but do react to the monsoon. Finally, vegetables have a short cycle, being harvested from November to April, and are consumed fresh. Therefore, vegetable consumption data in January-March will be affected by the previous monsoon (if anything). Vegetables might be less sensitive to rainfall because these are mostly grown on small, irrigated plots close to the house (though the possibility to irrigate usually depends on the quantity of rainfall). The overall consumption levels are rather stable with respect to monsoon intensity. Across different subcomponents it was observed that whereas grain consumption remains largely unaffected (being necessity goods), the consumption of vegetables correlates negatively with rainfall, and that the consumption of animal proteins (meat/fish/eggs) displays a strong positive correlation. Vegetables thus react to price increases whereas meat and fish may be considered superior goods that respond strongly to income. Because the monetary value of consumption was computed, the

SHGs do not seem to break down in critical periods. To the contrary, there is some evidence that member households are able to borrow a bit more than average in case of negative shocks variations observed can result from variation in both quantities consumed and through median prices.

Therefore, the study also reports the evolution of quantities, for reasonably homogenous categories (rice and vegetables).

When studying quantities, it was found that the consumption of rice does increase slightly with rain-reflecting the fact that households spread the consumption of the stock of home production over the year. Members do not have a different consumption profile from non-members. Hence, the extra credit they enjoy with respect to non-members in bad years does not seem to be used for this purpose. Yet, an important caveat lies in the timing of the survey, which was carried out in period of relative abundance right after the harvest. That is why we observe that even non-members enjoy a stable consumption; clearly, we do not expect SHG members to be any different in these circumstances (there is no reason why they should increase their consumption after a shock). However, this tells nothing about the potential use of credit for short-term consumption smoothing before the harvest, that is, when households are most hit.

In fact, given the large credit effect detected in that period, it is quite likely that SHG households do smooth consumption when there is the highest need to do so. The proportion of food that is purchased in order to reach a relatively stable consumption profile, households increase their external acquisition of food in case of low home production. As expected, rice consumption cannot vary much and home production traditionally represents an important share of total consumption. Here again, SHG members do not appear to behave differently than other households. The biggest consumption shocks occur between the two winter harvests, towards the end of the year. The impact of monsoon intensity on total food purchases, using data from the pilot survey of 2002, suggests that food purchases are strongly affected by the rainfall of the previous year.

#### CONCLUSION

In developing countries, most poor households experience extremely variable income

because of the combined effect of a large exposure to climatic, economic and policy shocks and a lack of appropriate insurance devices. Extreme weather events, in particular, are projected to become more frequent in a warming climate, leaving rain-fed agriculture and large populations in developing countries at great risk. In this context, reliable access to finance, in general, and credit, in particular, potentially bring welfare-improving can consumption-smoothing opportunities. This paper studied the extent and the nature of the reactions to rainfall shocks that are linked with microfinance participation for rural households in Jharkhand, India.

The study analyzed first-hand panel data about members of SHGs and control households, coupled with meteorological data at the district-level. It was found that agricultural production and income, consumption patterns and access to credit are all very dependent on the monsoon quality. On the other hand, member households enjoy a stable use of credit, opening the possibility of short-term consumption smoothing thanks to higher borrowing, following a bad rain shock. Moreover, SHG membership also allows some ex-ante risk mitigation, notably by diversifying

The biggest consumption shocks occur between the two winter harvests, towards the end of the year. The impact of monsoon intensity on total food purchases, using data from the pilot survey of 2002, suggests that food purchases are strongly affected by the rainfall of the previous year. the crop mix towards vegetables. Nevertheless, we suggest that the specific savings policy of the Indian SHG system, whereas ensuring its strong resilience in the face of adverse climatic shocks, might hinder its insurance power. Extreme weather events are projected to become more frequent in a warming climate.

Policy needs a better understanding of the magnitude of the impacts on rural households, the distribution across income

groups and the coping strategies adopted. Climatic shocks are expected to increase in frequency and magnitude in the future, leaving rain-fed agriculture and populations in developing countries at great risk. It is wellestablished in the literature that recurring income shocks, as well as traditional riskmitigating strategies and coping mechanisms, can be very costly for poor households. Indian SHGs are useful and effective credit instruments for rural households, which appear extremely resilient to weather shocks. However, their policy of forced savings might be too rigid in order to play an effective insurance role in case of important adverse shocks. Indeed, the most frequent behaviour at the member level is to fully collateralize credit with one's own regular savings over the year, this even after bad rain shocks. Though the seasonal smoothing it still offers is likely to bring substantial benefits to members, it might not be enough to absorb the consequences of a bad rice harvest. Therefore, either SHGs are able to relax the constraint for members to save regularly during periods of economic hardships, or they could be advantageously complemented by proper insurance devices, given the widely recognized difficulty of selling weather-based insurance products.