

The dynamics of trust, reciprocity and cooperation

An empirical investigation

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ABSTRACT

Community-based development (CBD) projects are often argued to set in motion a virtuous cycle of increasing trust, norms and cooperation. However, empirical evidence on the existence of such a cycle is scarce. This paper investigates the impact of a women's empowerment programme in India on the dynamics of trust, reciprocity and cooperation. It uses a unique dataset based on almost two thousand households in one hundred villages. The findings show that past experiences with community cooperation translate into higher trust. However, we do not find evidence that trust in turn increases future collective action, although it does increase assistance among households. Thus, our results do not support the existence of a virtuous cycle between trust and collective action. Nonetheless, the programme increases cooperation for public goods directly, potentially through awareness-raising, additional resources or increased self-confidence. The findings are also strongly suggestive of spillovers on the cooperative behavior of other households in programme villages who do not participate in the programme themselves. Strong norms of reciprocity in the village, reflecting a threat of social sanctions, positively affect the likelihood of cooperation. Individual norms of reciprocity are conducive to cooperation only at high average levels of contribution.

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1. Introduction

Two central features of many developing economies are the malfunctioning or absence of markets such as the credit market, and the low capacity of governments to provide social services and other public goods. Both issues have in common that households will have to cooperate with each other if they want to overcome the market failure and improve their well being. Indeed, many communities undertake collective activities to repair roads or to reconstruct the primary school after the monsoon. Similarly, households all over the world engage in intricate informal arrangements to exchange resources, share risk and help each other in difficult times. Nonetheless, the examples of communities that fail to undertake collective action are innumerable as well. And the extent of assistance among households shows considerable variation across and within communities. Free-riding problems, often described in terms of a Prisoner's Dilemma, lie at the core of many theories that explain the absence of collective action. Similarly, an act of help today is usually not instantly followed by a similar act in return. Most households will only help others if they trust that the receiver of assistance will reciprocate the act in the future, would the need arise.

Social capital is increasingly recognized as an essential concept in explaining why cooperation arises in some situations, but fails to materialize in others. Social capital in this context refers to the trust and shared norms of behavior that arise within informal social networks and that generate externalities for the members of a group (2004).¹ It influences the resources that an individual can mobilize through his or her social network (Woolcock and Narayan, 2000), and the propensity of community members to engage in collective action (Ostrom and Ahn, 2002). Trust, the prevalence of norms of reciprocity and the threat of social sanctions are central in explaining how households can overcome the prisoner's dilemma that hampers cooperation. Positive past experiences in turn strengthen trust in others, thereby enhancing cooperation further.

This expected virtuous cycle of increasing social capital and increasing cooperation is one of the rationales underlying many community-based development (CBD) projects that aim to build social capital (Dongier *et al.*, 2002; Mansuri and Rao, 2004). Community-based development is increasingly recognized as a valuable alternative to the more traditional, top-down mechanisms of development. In 2004, the World Bank alone was spending 7 billion dollars on its CBD portfolio (Mansuri and Rao, 2004). The common element in CBD projects is their involvement of community members either in project design, in project management or both. This involvement is thought to generate a wide range of benefits, from improved targeting, increased effectiveness and efficiency, to greater ownership and sustainability. If in addition CBD projects increase levels of social capital, this would further enable them to improve their living circumstances (World Bank, 2000; Grootaert and van Bastelaer, 2002). Although this benefit is less

¹ There is a general tendency to think of these externalities in positive terms. However, social capital does not necessarily yield 'good' outcomes (Portes, 1998). For example, strong bonds and trust within a social network often imply that others are excluded. Similarly, strong norms may be beneficial to the majority of the group, but put serious restrictions on the freedom of other individuals.

easily measurable, its long-term effect might be at least as important as the immediate impact of a programme.²

Abundant field evidence shows that cooperation and social capital in terms of trust and norms are positively *correlated* (for references see for example Ostrom (1990), Platteau (2000), Dasgupta and Serageldin (2000) or Bandiera *et al.* (2004)). However, few quantitative studies try to disentangle the direction of causality between trust and cooperation. Studies that do so yield ambiguous results. For example, Brehm and Rahn (1997) find a stronger causal direction from civic engagement to trust than from trust to civic engagement in the United States. On the other hand, Parqal *et al.*'s (1999) study in Bangladesh does not find a significant relation from collective action in waste management on trust or reciprocity nor from trust on collective action, although their reciprocity index is a significant determinant of cooperation. Miguel and Gugerty (2005) also find a significant relationship from social sanction to public good provision, but they do not analyze the reversed link.

Even more limited are studies that examine whether CBD projects can indeed create social capital spin offs and set in motion the expected upward spiral (see Mansuri and Rao (2004) for an extensive overview of impact evaluations of CBD projects). An interesting exception is Rao and Ibanez (2005) who combine qualitative and quantitative methods in their impact evaluation of Social Funds in Jamaica. Their results suggest a causal and positive impact of the Social Funds on trust as well as on collective action, especially for the elites. They do not provide an explicit analysis of the hypothesized dynamic cycle. On the other hand, Tripp *et al.* (2005) find no evidence from their case study that Farmer Field Schools in Sri Lanka produce the expected social capital spillovers in the community. Given the increasingly large budgets devoted to CBD projects, it is of great importance to further gain insights in their impact. If such projects are indeed able to generate social capital and collective action, their impact might multiply over time as communities become increasingly empowered to take matters in their own hands.

This paper will examine the dynamics of social capital and cooperation. It evaluates the impact of a particular CBD project –the Mahila Samakhya programme– on the expected cycle between trust, reciprocity and cooperation. It pays explicit attention to spillover effects of the programme on the wider community. The research is based on a unique, large-scale quantitative data set that contains 1991 households in 102 rural Indian communities. In two-thirds of the villages, a women's empowerment programme has been introduced that strongly emphasizes the building of trust and the importance of solidarity and joint action to improve life outcomes.

Using a two-stage instrumental variables approach, we find that past cooperation among households and past village levels of collective action increases current levels of trust in community members. However, this effect is found only in programme villages. In control villages, overall levels of collective action appear to be too low for individuals to develop more optimistic expectations regarding their fellow villagers. In turn, more trusting individuals are significantly more likely to assist other households. However, increased trust does not translate into more collective action with respect to school

² On the other hand, a number of drawbacks are attached to community-based development, such as elite capture (Platteau and Abraham, 2002; Platteau and Gaspart, 2003), or the reinforcement of exclusionary social mechanisms (Bardhan, 2002; Conning and Kevane, 2002).

construction and infrastructure maintenance. Thus, once endogeneity is controlled for, we do *not* find evidence of a virtuous cycle between trust and collective action, only between trust and assistance among households.

Nonetheless, levels of collective action are substantially higher in programme than in control villages. The women's empowerment programme seems to foster collective action through other mechanisms, most likely through its impact on perceived benefits, access to resources, empowerment and confidence-building. These changes in cooperative behavior do not remain confined to programme participants but extend to other households living in programme villages. That is, we find evidence of substantial programme externalities.

Conform the hypothesis, strong norms of reciprocity in the community that capture the threat of social sanctions significantly increase the levels of cooperation attained, especially in small communities. We find an ambiguous impact of an individual's reciprocal attitudes, dependent on the average cooperation levels in the village. In line with expectations, reciprocal individuals are more likely to contribute when average cooperation levels are high. When cooperation in the community is limited, individuals adhering to strong norms of reciprocity are substantially less likely to cooperate themselves.

The next section will give an overview of the theoretical models that explain the absence or emergence of cooperation, with a focus on the role of trust and reciprocity. Section three describes the women's empowerment programme and the data collection. The subsequent section outlines the econometric model. It also explains how cooperation, trust and norms of reciprocity are measured in this paper. Section five presents the main results. It investigates the exogenous determinants of social capital and cooperation. It shows the evidence regarding the impact of past cooperation on trust, and the effect of trust on cooperation. Next, we will look in more detail at the norms of reciprocity. Section seven in turn discusses the role of the Mahila Samakhya programme. The final section gives suggestions for further research and concludes.

2. The theoretical link between social capital and cooperation

In his seminal work *The Logic of Collective Action*, Olson (1965) convincingly described the social dilemma inherent to collective action. If individuals cannot be excluded from the consumption of a collective good, and if the marginal benefits to an individual of his own contributions are small, then individuals will rationally choose *not* to contribute although everyone would have been better off if all had cooperated. In game-theoretic terms, this dilemma has been translated in the famous Prisoner's Dilemma, in which universal defection is the only subgame-perfect Nash equilibrium (Hardin, 1971; Heckathorn, 1996). However, once interactions between individuals are infinitely repeated over time, such as in small communities characterized by low mobility, the option of strategic behavior influences the levels of cooperation that can be reached. Especially reciprocal strategies such as tit-for-tat strategies³ are effective in sustaining continuous cooperation.

³ "If you are good to me, then I will be good to you. But if you are bad, I will be bad as well."

In a similar vein, acts of assistance from one household to another often entail the implicit expectation that today's receiver will reciprocate the act in the future when needed.⁴ Since households living in small communities are likely to continue their interaction in the future, the decision whether or not to assist others closely resembles the structure of a sequential prisoner's dilemma. The denial of assistance today will save the current costs of providing help. But it is likely to yield less cooperation from others in the future. Thus, if the benefits of continued future cooperation are large enough to outweigh the temptation of a one-time defection, the threat of a breakdown in cooperative behavior may be enough to prevent households from betraying others' trust.

In fact, in infinitely repeated games an infinitely large number of Nash equilibria exist, as postulated in the Folk Theorem. In other words, any amount of cooperation can be sustained in equilibrium. This shows that rational self-interested individuals can indeed cooperate forever, refuting Olson's pessimistic stance. But it offers little help in explaining why we would find a certain outcome in one group but not in another, nor how these different levels of cooperation come about.

A number of systematic findings from experimental economics provide more insights in this issue.⁵ Behavior often deviates from the assumptions of strong rationality and self-interested utility-maximization (Ostrom, 1998). Cooperation in one-shot public good games is much more prevalent than theory predicts. This is found in communities from Papua-New Guinea to Zimbabwe to Belarus (Barr, 2001; Henrich *et al.*, 2001; Gaechter *et al.*, 2004), as well as in many industrialized countries (Fehr and Schmidt, 1999). The opportunity to withdraw cooperation or to punish defectors with social sanctions is widely used, even if it comes at a cost to oneself, and substantially increases cooperation (Ostrom *et al.*, 1992; Fehr and Gaechter, 2000; Barr, 2001; Cardenas, 2003; Seinen and Schram, 2006). Communication on intentions and past actions plays a similar role, even if it is only 'cheap talk' and not backed by enforcement mechanisms.⁶ In addition, experimental trust games reveal that people generally show substantial levels of trust towards others, and that this trust is often rewarded (Castillo and Carter, 2003; Cardenas and Carpenter, 2004). However, people are not all the same (Ostrom, 2000). Some individuals are unconditional cooperators, whereas so-called conditional cooperators only cooperate if others do. And in most experiment there are also chronic free-riders.

As we will argue, such recent explanations of cooperative behavior are closely related to the determinants of social capital. First of all, norms of reciprocity and fairness are often advanced to explain behavior that rewards other individuals for good acts, but punishes them for selfish acts. Social norms are understood as behavioral strategies or codes of conduct for given settings, which are shared within a group of people and sustained by social approval and disapproval (Elster, 1989). The widespread use of sanctions in experiments is a reflection of norms of reciprocity, as are tit-for-tat strategies in Prisoner's Dilemmas. In real life, norms of reciprocity translate into social approval,

⁴ Or, in case of 'network-generalized exchange', all receiving members in a social network are expected to give benefits at some point in time to another actor who belongs to the network, but who need not necessarily be involved in the original exchange (Yamagishi and Cook, 1993).

⁵ See Cardenas and Carpenter (2004) for an excellent overview of experimental studies on cooperation in developing countries.

⁶ See Sally (1995) for a meta-analysis of over one hundred experimental studies on communication in the Prisoner's Dilemma.

increased social esteem or returned help after an act of cooperation. Social sanctions take the form of gossip, disapproval or even outright ostracizing when cooperation is refused.

How norms evolve and what their consequences are for cooperation is usually analyzed in evolutionary models (Bardhan, 1993; Macy and Flache, 1995; Sethi and Somanathan, 1996; Bendor and Swistak, 2001; Sethi and Somanathan, 2003). Such models are based on the idea that individuals do not calculate the consequences of all their potential actions at each decision moment, but instead follow behavioral rules or norms.⁷ Dependent on how much the payoff of an individual's strategy is below (above) the population average, there is an increasing (decreasing) probability that the strategy is abandoned and replaced with a better performing strategy.⁸ The norms in a population slowly evolve over time until an evolutionary stable equilibrium is reached. However, multiple equilibria may exist. A population can be 'trapped' in a sub-optimal equilibrium of low cooperation even if many individuals are conditional cooperators, i.e. willing to cooperate if enough others would (Bardhan, 1993).

Social networks are of particular importance in sustaining cooperation. Communication in networks transmits information on past behavior, thereby reinforcing the importance of reputation and the strength of social sanctions and rewards (Raub and Weesie, 1990; Gould, 1993). The smaller the group (and the stronger the norms of reciprocity in the group), the more likely it is that the threat of sanctions is effective in enhancing cooperation. In addition, communication on intentions yields information about the types and preferences of others (Chwe, 2000). Especially in the case of S-shaped production functions of a public good, when a critical mass of early initiators is necessary to provide the good at all, this is of great importance (Granovetter, 1978; Marwell and Oliver, 1993). In large groups, it is more likely that such a critical mass of particularly interested (or resourceful) persons is available.⁹

One element has been left out of the discussion so far: the role of trust. Throughout the social capital literature, trust has been advanced as one of the crucial elements in explaining cooperation and collective action, albeit not always within a clear theoretical framework (see for example Coleman (1990), Putnam (1993) or Dasgupta and Stiglitz (2000)). Trust reflects the expectation that others will not betray you or cheat on you for their own benefit (Ostrom, 1998; Ostrom and Ahn, 2002). When information on intentions and preferences is asymmetric, the uncertainty regarding others' behavior can induce otherwise cooperative individuals not to participate in order to avoid the risk of betrayal. Trusting individuals expect this risk to be lower. Hence, they are more likely to cooperate. In other words, trust essentially captures the beliefs regarding the different types of people in a network. Individuals regularly adopt their beliefs, based on prior experiences. If the members of a community have successfully joined in collective action many times before, it is most likely that they will trust each other to do so again at the next opportunity. Strong social networks enhance trust both because people will have more knowledge on each others' past behavior, and because they increase the

⁷ Another approach incorporates norms of reciprocity, fairness or inequality aversion directly into preferences, e.g. Rabin (1993), Guth and Kliemt (1998) or Fehr and Schmidt (1999).

⁸ Strategies in this context are not interpreted as potential actions, but instead reflect the type of a player.

⁹ Recent advances in the literature focus on the endogenous formation of social networks where individuals can install or destroy links to others dependent on their action, e.g. Jackson and Watts (2002) or Goyal and Vega-Redondo (2005).

effectiveness of social approval and disapproval and as a consequence the likelihood that others will cooperate.

To summarize, we expect that individuals who trust their community members more are more likely to cooperate with others and to participate in collective action. Cooperation is also dependent on an individual's norms of reciprocity. More reciprocal individuals are more likely to match others' contributions and to withdraw cooperation when others defect, all things equal. Village level norms of reciprocity capture the threat of social sanctions and the promise of social rewards, thereby directly affecting the pay-off function of cooperation. Such norms are strongest in small communities, although large communities are more likely to contain a critical mass of early initiators to create a snowball effect.

Trust in turn is to a large extent shaped by past experiences with respect to the cooperative behavior of others in the community. Village level norms of reciprocity reinforce the expectations that others will join in collective action. We assume norms of reciprocity, both at the individual and the village level, to be relatively stable over time. In our analysis, this issue is discussed further.

These hypotheses yield the following dynamic model:

$$Coop_{ig,t=1} = f(X_{ig}, W_g, R_{ig}, R_g^*, Trust_{ig,t=1})$$

$$Trust_{ig,t=1} = f(X_{ig}, W_g, R_g^*, Coop_{g,t=0}^*)$$

In this model, the cooperation decision of individual i in village g at time $t=1$ depends on the expected benefits and costs of the good. This is captured by the exogenous household and community characteristics (X_{ig} and W_g) that affect preferences and resources. The decision also depends on the individual's norms of reciprocity R_{ig} , the village level norms of reciprocity R_g^* , and the individual's trust in her community members at time $t=1$. An individual's trust at time $t=1$ is a function of her exogenous household and community characteristics, the village level norms of reciprocity and average past levels of cooperation in the village at time $t=0$, $Coop_{g,t=0}^*$.

A community-based development project may provide additional resources or increase awareness on the benefits of cooperation. Then it will be included in the first equation. On the other hand, when such a project mainly emphasizes the building of community trust, it will enter the second equation. If the empirical evidence supports the hypotheses and the causality runs in both directions, CBD projects could set in motion a positive cycle of increasing trust and cooperation either way. On the other hand, if the causality runs only in one direction (either from trust to cooperation, or from cooperation to trust), this has implications for project design. In order to increase collective action, the programme should particularly focus on the 'engine' of cooperation.

3. The dataset

3.1 Description of the Mahila Samakhya programme

To analyze the relationship between trust, norms and cooperation, we use a unique quantitative data set collected in 2003 in the North-Indian state Bihar. Bihar is the poorest state of the country. Two-thirds of its population, 64 percent, lives below the poverty line of US\$ 1 per day (World Bank, 1997). Literacy rates in Bihar are consistently low at 48 percent for the total population compared to a national literacy rate of 65 percent. It is even lower for Bihari women at 34 percent only (Census Office, 2001). The state is plagued by electricity failures, banditry, damaged roads and inadequate social services. Corruption is widespread and there are frequent outbursts of violence. The former feudal system of bonded labor is officially abandoned but the landlords still have a large voice in politics and the innumerable landless laborers often live under very harsh circumstances. Society is very traditional and the lower castes are strongly disadvantaged. The persistently strong gender-bias keeps women in a subordinate and often secluded position out of the public domain (Government of Bihar, 1996).

Since 1992, the Mahila Samakhya programme is implemented in Bihar. Mahila Samakhya is a nation-wide women's empowerment programme that aims to mobilize women from the most disadvantaged segments in rural communities to set up women's groups in their village (Government of India, 2002). In Bihar, the programme has traditionally been financed through government education projects, although it is implemented by an autonomous non-governmental organization.

The programme stimulates women to improve their own living circumstances through joint action (Mahila Samakhya, 1995; Mahila Samakhya, 2002). Despite the initial focus on education, over time the women's groups have addressed a broad range of issues that range from income-generating activities or abolishing child marriage to village clean-up campaigns. Mahila Samakhya does not provide services itself to communities. Instead, it offers trainings on demand to the women's groups in areas such as literacy, health or women's rights. In addition, the programme supports the groups in accessing government schemes and subsidies. Some activities may receive limited financial support from the programme directly. For example, Mahila Samakhya pays the honorarium of teachers when a community group decides to set up an informal preschool or primary school.

However, it is very difficult to mobilize rural Bihari women to set up a group in their community (Mahila Samakhya, 1995). Most women are not used to reflect on their situation, let alone to discuss public issues. Initially, the distrust of the women towards the facilitator is large.¹⁰ By helping the women to solve small issues such as treating diarrhea in a child, the facilitator slowly gains their trust. As a result of the regular discussions with the facilitator in their homes and in the field, their self-confidence slowly increases. On average, a facilitator needs to pay weekly visits to a community for half a year to a year before a women's group is sufficiently operational to set its own meetings and its own agenda.¹¹

After the initial start-up period, we would expect the Mahila Samakhya programme to have a substantial impact on the levels of trust and cooperation in programme villages. Some of the defining characteristics of the programme are its initial

¹⁰ Levels of trust in strangers are extremely low in the study area in general. Of the 1991 respondents, 76 percent agrees that you cannot be too careful in dealing with a new person from outside the village.

¹¹ Based on own data collection.

focus on trust-building and its continuous emphasis on the importance of solidarity and joint action. That is, the programme explicitly stresses the building of social capital (determined by trust) to generate collective action. The first arrival of the facilitator to the community can be considered as an outside shock to the programme villages, potentially moving a village out of a low level of cooperation.

The programme also offers additional resources, either directly for certain specific activities such as informal schools, or indirectly through its support in accessing government schemes. Moreover, it increases awareness on issues such as education and on the benefits of collective action. Cooperation among households may result from increased feelings of solidarity and trust within programme villages. Finally, a strong component of the programme is the empowerment of disadvantaged women, coupled to increased self-confidence. Thus, beyond its impact on trust, the programme may have an additional effect on cooperation through greater awareness, increased availability of resources, empowerment and confidence building.

3.2 Sample selection

The Mahila Samakhya programme in Bihar is active in seven out of the thirty seven districts in the state. Selection criteria for districts into the programme are threefold: a) a high percentage of the population living below the poverty line, b) a high percentage of the population belonging to the Scheduled Castes, and c) a low level of female literacy rates. The study took place in three northern districts of Bihar: Sitamarhi, Muzaffarpur and Darbhanga. In these districts, Mahila Samakhya has started in 1992, 1993 and 1998 respectively.

Due to the slow process of group mobilization, the programme starts in a few blocks per district only. The selection of the initial blocks is also based on the three Mahila Samakhya selection criteria. This general selection rule of programme blocks is followed in most districts. In Darbhanga however, the programme started in the two blocks closest to the district capital because of travel considerations. Sitamarhi is another exception, as the programme is implemented in all blocks at the same time, but active in a relatively limited number of villages per block.

Only after all villages are being visited by a facilitator, the programme expands to additional blocks. Within programme blocks all rural villages are eligible for the programme. Which villages will be included first depends on the residence of the facilitators.¹² A facilitator starts her work in her own village and five neighboring villages. After one year she extends her working area with five additional villages that score high on the three Mahila Samakhya criteria, except in Darbhanga where all ten villages lay close the facilitator's home. Eventually, all villages in a block will be covered.

The last level of selection into the programme is at the level of the women's groups within programme villages. Although participation in a group is voluntary and open to all women, the facilitators aim to mobilize especially the most disadvantaged

¹² Women from the entire block are encouraged to apply to facilitator vacancies. After training, they need to pass several tests in order to be hired.

women. As a result, groups consist mostly of women who belong to the lower castes or the Muslim population, and who live in poor families with little education compared to the non-participants in their village (Janssens, 2005). On average, 5 percent of the adult women in a community are member of the Mahila Samakhya women's group, ranging from a low of 1 percent in one village to a high of 26 percent in another.

The data were collected in spring 2003, based on a stratified, clustered sample methodology. We used the slow scaling up of the programme over blocks to construct a quasi-experimental survey design. In each district, the programme blocks were matched with blocks not yet included in the programme that were as similar as possible on the programme block selection criteria. In Muzaffarpur, the two control blocks are relatively similar in the key Mahila Samakhya selection indicators to the programme blocks. In Darbhanga, the control blocks consist of the two next closest blocks to the district capital. For Sitamarhi, the three blocks where no or only a few groups have been started so far serve as a control group.

Within each district we then randomly selected 25 villages from the programme blocks and 10 villages from the control blocks. This yields a list of 75 programme villages and 30 control villages. The sampled women's groups existed on average for 4.7 years at the time of the survey. Their length of existence is spread out relatively evenly over durations from less than one year to ten years.¹³

Next, we randomly selected 20 households in each village. In programme villages these households consisted of 10 random households participating in the Mahila Samakhya group and 10 non-participating households. The final sample consists of 74 programme villages and 28 control villages. These include 718 participants, 714 non-participants in programme villages and 559 control households.¹⁴

3.3 Comparison of the programme and control group

To what extent do the control villages represent a good counterfactual for the programme villages? Table 1 gives a comparison of the programme and the control group. As the descriptive statistics show, the matching procedure over blocks has resulted in a control group that is highly comparable to the programme group. Table 1, panel A compares the population characteristics of households living in programme villages with households living in control villages. As the table indicates, the two groups do not significantly differ on any of the measured household characteristics, such as their caste or religion, their wealth and education, and their household composition. All differences are statistically insignificant, both individually and jointly.

The recruitment method for facilitators could potentially have favored the villages with a higher female literacy rate, since those villages might be more likely to provide suitable applicants for the job. However, we do not find a systematic difference in female

¹³ The number (percentage) of groups in the sample that existed for zero, one, two, ..., ten years at the time of the survey is 2 (3%), 7 (9%), 11 (15%), 13 (18%), 6 (8%), 8 (11%), 3 (4%), 9 (12%), 8 (11%), 1 (1%), 6 (8%) respectively. Seven missing values are replaced with the years of membership of the 'oldest' interviewed member in the community.

¹⁴ Three villages and an additional 49 interviews were dropped from sample because of incomplete or unreliable data.

education between programme and control villages at 2.0 and 1.8 respectively (p-value .339, see Table 1). Also the pre-programme 1991 village level female literacy rates are virtually identical among the programme and control villages at 14.4 percent and 14.2 percent respectively (Census Office, 2001).¹⁵

Alternatively, facilitators may be more widely available in villages that are more active and engaged in voluntary organizations from the onset. We do not have baseline data to rule out this possibility. However, the data suggest that this effect is limited. The average number of community organizations that are active in programme and control villages (excluding Mahila Samakhya-related groups) is similar at 1.6 groups per community (p-value .926).¹⁶

Likewise, pre-programme membership levels do not significantly differ between programme and control households. While we have no baseline data on associational membership, we can construct a retrospective panel using the variation in membership duration and in years of programme start in the village. For example, we can compare the percentage of households that were member of an organization for at least two years in control villages with such households in programme villages where the group had been active for at most one year. This comparison shows –very low– programme and control participation rates of 3 and 4 percent respectively (p-value .754). Similarly, the percentages of households with membership durations of at least three years are 4 and 2 percent in the respective groups (p-value .548), etcetera.¹⁷

In sum, the findings suggest that programme and control households do not significantly differ from each other with respect to their household characteristics, individually or jointly. In addition, pre-programme female literacy rates are virtually identical as are the number of other community organizations in the villages. Similarly, the data also suggest that the two groups do not differ significantly with respect to associational activity prior to the arrival of the programme.

Table 1 panel B compares the village characteristics of the two treatment groups. Again, the programme and the control group are very similar to each other. The only exception is the distance to the nearest town, which is considerably larger for the control villages. However, their location further away from a town does not seem to affect the availability of facilities that are usually considered to be good indicators of village level development. The programme and control group show similar percentages of villages with a market, post office, telephone, bus stop, bank or health center within their boundaries. In addition, if we compare the distance to the nearest facility when not present in the village, again we do not find statistically significant differences

¹⁵ The Census is based on *revenue villages* that encompass one or more villages. Hence, the 1991 literacy rates reflect female literacy in the surrounding area of our sample villages. Not all sample villages could be matched to a 1991 Census village because administrative boundaries have changed in the last decade. In the estimations missing values are replaced with average literacy rates in the block.

¹⁶ Community organizations include religious, funeral, women's, credit, cultural, sports, youth, and common resource groups as well as agricultural and non-agricultural production groups, self-help groups, labor unions, political parties and other groups.

¹⁷ Going further back in time, 5 percent of non-participant households have been member of a group for at least four or five years compared to 2 percent in the control group. Again, the differences are not significant with p-values of .140 and .144 for four and five year durations respectively. Longer membership durations are rare with percentages below 3 and 1, and p-values significant at the 10 but not the 5 percent level. Remember that even the programme participants were initially very difficult to mobilize with an average of nine months of facilitator visits before a group emerges that is strong enough to set its own agenda.

(individually nor jointly). Nonetheless, we will control for distance to town throughout the analysis.

Given these results, we conclude that the control villages represent a good counterfactual for the programme villages. In other words, we assume that in the absence of the Mahila Samakhya programme, the population living in the current programme villages would not have differed substantially from the population in the control villages.

4 Econometric model

4.1 Measurement of social capital and cooperation

Before proceeding with an outline of the econometric model, this section will describe the main variables. Cooperation is measured using three outcome variables: assistance among households, cooperation in community school projects and cooperation to improve community infrastructure. Social capital is measured as trust in community members and as norms of reciprocity at the individual and at the village level.

The measurement of assistance among households is based on the following questions: “In the past year, did any member of your household give assistance to any other household without getting paid: a) look after children; b) share food; c) work without getting paid; d) build a house; and e) give financial assistance.” Each item was coded as 1 if the household had given that type of assistance and 0 otherwise. The average number of items on which a household has given assistance is 2.4 (see table 2).¹⁸ Only 9 percent of the households in the study region have not given assistance to other households on any of the measured items in the past year. Unfortunately, the dataset contains no further information on the frequencies of cooperation, nor on the amount of resources (time, food, money) shared. Therefore, we construct an assistance index based on a factor analysis of the five items that reflects a household’s underlying propensity to give assistance to others.

The other two measures of cooperation reflect collective action in terms of participation in community projects. The lack of adequate government services and the poor quality of infrastructure in Bihar suggest that the scope for joint action is large. Nonetheless, only few households engage in a joint effort to improve facilities.¹⁹ The two most common types of joint action refer to school projects and to infrastructural projects. We measure the participation in collective action with two dummy variables that equal 1 if, in the past year, any member of the household contributed to, respectively, the construction/maintenance of a school and to the construction/maintenance of a road or

¹⁸ Of the households in the study area, 76% have helped others with looking after children, 73% have shared food with other households, 19% have helped building a house, 37% have worked for other households without getting paid and 33% have assisted another household financially. The statistics are weighted for the stratified, clustered sample design.

¹⁹ For example, only 5% of all households have contributed to the delivery of community water services in the past year, 4% have cooperated to build a fence or a wall, 3% have worked together with others to construct a cattle dip, 2% of households have engage in tree-planting or managing a wood plot and only 1% has contributed to a community fish pond. Statistics are weighted for the stratified, clustered sample design.

bridge. On average, 21 percent of the households in the survey area have contributed to the improvement of a school (or a non-weighted 28 percent of the respondents in the sample).²⁰ At 11 percent (or a non-weighted 19 percent of respondents), the percentage of contributors to infrastructural projects is substantially lower.²¹ Table 2 gives more details.

Again, this outcome variable does not measure the intensity and frequency of participation, nor does it imply that the collective effort has been successful or sustainable. The majority (85 percent) of the contributors to school maintenance and to bridge renovation rated the cooperation as very successful. Cooperation with respect to roads was rated as very successful by 76 percent of the contributors. However, households tend to evaluate the state of a community facility to be of better quality once they have contributed to its improvement. For example, in communities that have worked together to maintain infrastructure, 29 percent of the contributors evaluate the roads to be in a good state in contrast to only 17 percent of the non-contributors.

Overall, people that are more likely to contribute to school projects are also more likely to participate in a community infrastructural project (Table 3 panel A). The correlation between the two collective action variables is .499 with p-value of .000. The correlations between the assistance index on the one hand and contributions to schools and to infrastructure on the other hand are much smaller but nonetheless statistically significant at .108 (p-value .000) and .111 (p-value .000) respectively. The correlation matrix clearly shows that on average people are significantly more likely to cooperate in a certain activity when the average level of cooperation in the village (excluding one self) is high.

The determinants of social capital are measured as trust in community members and norms of reciprocity. Trust in community members is based on an index constructed from a factor analysis of four trust statements²²:

- “People here look out mainly for the welfare of their own families and they are not much concerned with community welfare.”
- “Most people in this community are basically honest and can be trusted.”
- “In this village one has to be alert or someone is likely to betray you.”
- “Whenever it is to their advantage, people will not tell the truth.”

The descriptive statistics are shown in Table 2 panel B. As discussed in the theoretical section, this trust index captures expectations regarding the behavior of others, based on past experience.

In contrast to trust that reflects past experiences regarding how others *did* behave in situations of cooperation, norms of reciprocity capture attitudes regarding how one *should* behave in given situations. They usually include an appropriate response if someone does or does not behave accordingly. That is, norms are behavioral rules that contain an (implicit) notion of sanctions for non-conformance to the norm (Bendor and

²⁰ When households participate in a school improvement project, they mostly do so through labor (82 percent). 15 percent of contributions were in cash and 3 percent in kind.

²¹ 86 percent of contributions to infrastructural project were in labor, 10 percent in cash and 4 percent in kind.

²² Respondents could agree, be neutral, disagree or not know. Not knowing was translated to a missing variable. The index was rescaled to have a value of 0 for the least trusting and a value of 1 for the most trusting respondents in the sample.

Swistak, 2001). We measure norms of reciprocity as the index constructed from a factor analysis of three reciprocity statements²³:

- “If you help someone, then whenever you need help in the future that person should return a favor to you.”
- “Even if someone is not polite to me, I will still be polite to him or her.”
- “Whenever I treat someone badly, I can expect the other to treat me bad as well.”

Table 2 panel B gives more details. Note the low eigenvalue of the first rotated factor that is used to construct the reciprocity index. This reflects that the three statements each have a large unique component. To test the sensitivity of the results to the reciprocity measure, we also constructed an index as the sum of the statements (with one point for each reciprocity attitude). The results are robust to this change in specification.²⁴

There is a clear difference between individual norms of reciprocity and the average norms of reciprocity in the village (without one self). Individual reciprocity implies that you will cooperate if others did, but you will not cooperate if others did not do so. Thus, it relates an *individual’s* reaction to *others’* behavior. Village level reciprocity on the other hand reflects how others will treat you if you do or do not cooperate. Hence, it captures *others’* (potential) reaction to the *individual’s* behavior. In villages where such norms are strong and broadly shared, households know that they can expect retaliation once they refuse to cooperate themselves (either in the form of social sanctions or denial of future cooperation).

Both levels of trust and norms of reciprocity show large correlations with the village averages, excluding one self (see Table 3 panel C). The correlation of an individual’s trust index with the average index in the village is .525 (p-value .000). Similarly, an individual’s norms of reciprocity are highly correlated with the average norms in the village without self at .402 (p-value .000).

The descriptive statistics show a large and *negative* correlation between trust and reciprocity with a coefficient of -.317 and a p-value of .000. This result is in stark contrast with the hypotheses derived from most theoretical models and with the evidence from laboratory experiments. Apparently, people that are more focused on a tit-for-tat strategy are less confident in the trustworthiness of others. Perhaps the causality runs in the other direction: if you think that others will betray you, it is more likely that you will base your behavior on a tit-for-tat strategy. Section 6 will provide a more detailed discussion of the role of reciprocity in cooperation.

4.2 The econometric model

To test the full model as outlined in section 2, we would need a panel data set, whereas the data collection is based on a cross-section. Trust (T_{ig}) and norms of reciprocity (R_{ig}) of individual i living in village g are measured at the time of the survey.

²³ The reciprocity index is constructed following the same procedure as used for the trust index (see previous footnote). Disagreement with the second statement reflects a stronger norm of reciprocity.

²⁴ Replacing the index with the three individual statements repeats the results in all estimations. Whenever the index is significant, at least one of the statements is as well, with the same sign. The results are mainly driven by the politeness question and the help question, i.e. the positive statements.

The cooperation variables (Y_{ig}) refer to the year *preceding* the survey. The dataset does not contain baseline information on past levels of social capital. This effectively rules out a dynamic econometric estimation. We can measure the influence of past levels of cooperation on current levels of trust, but to measure the relation from trust to cooperation we will use a two stage instrumental variables (2SIV) approach.

To measure the first direction of causality, from past levels of cooperation on trust, we estimate the following ordinary least squares (OLS) model:

$$T_{ig} = \alpha^0 + \lambda^0 Y_g^* + \beta^0 X_{ig} + \gamma^0 W_g + \phi^0 R_g^* + \pi^0 MS_g + \eta_{ig}$$

where

- T_{ig} : The trust index of respondent i in village g
- Y_g^* : The average level of assistance, participation in school projects or participation in infrastructure in village g in the past year (excluding the individual herself)
- X_{ig} : Household characteristics of household i in village g : Age of respondent (squared), caste, religion, land ownership (squared), household and female education levels (squared), household size (squared), child dependency ratio (squared), gender of head of household
- W_g : Community characteristics of village g : Village development index, availability of a primary school, prevalence of floods, prevalence of droughts, road quality, village population (squared), distance to town (squared), Census 1991 village female literacy rates, Census 1991 block female literacy rates and percentage Scheduled Castes, district dummies
- R_g^* : Average reciprocity index in village g (excluding the reciprocity index of the individual herself)
- MS_g : Dummy variable equal to 1 if the Mahila Samakhya programme is implemented in village g ; and 0 otherwise.
- η_{ig} : Unobserved component of trust for individual i in village g

This specification reflects that, controlling for household and community characteristics, trust in the cooperative behavior of community members is a function of past cooperation levels in the village as well as village norms of reciprocity that capture the threat of social sanctions for non-cooperation.

Trust may also increase because of the presence of the Mahila Samakhya programme in the village, which could influence trust levels independently from its potential impact on cooperation. Section 3 argued that the control villages represent a good counterfactual for the programme villages. In other words, if the programme has no impact on trust, we would expect to find similar levels of trust in both treatment groups, and hence a small and statistically insignificant coefficient on the village dummy variable. Since past levels of cooperation and the presence of the Mahila Samakhya programme are likely to be correlated, we will also include an interaction term between the two variables in one of the specifications. In addition, we will estimate the model for control villages separately.

Note that the econometric model assumes that past village level cooperation Y_g^* is independent of past individual cooperation Y_{ig} . That is, we assume that the decision of one individual is of negligible influence on the average levels of cooperation reached. We will also test whether the results are robust to this assumption.

A number of additional econometric issues should be taken into account when measuring the effect of group behavior on individual behavior (Manski, 1993, 2000; Durlauf, 2002). This is also known as the reflection problem. A significant correlation between village level cooperation and individual trust could indicate three distinct mechanisms (Manski, 2000). First, individual trust may be affected directly by the aggregate group *behavior* with respect to cooperation. Second, the individual trust levels may be related to exogenous group *characteristics* that also influence aggregate group behavior. Finally, both an individual's trust and the cooperative behavior of community members may be correlated because they share similar exogenous characteristics or face similar institutional settings. When such third factors are not taken into account, a significant coefficient reflects merely a spurious relation caused by omitted variable bias. Only in the first case, changes in levels of cooperation of community members will directly affect an individual's trust in community members.²⁵ This measurement issue will be further taken up in the empirical section 5.

To estimate the second part of the dynamic model, i.e. the impact of trust on cooperation, we instrument for trust and estimate the following 2SIV model (based on ordinary least squares (OLS) or linear probability (LP) in both stages)²⁶:

$$\text{First stage: } T_{ig} = \alpha^1 + \lambda^1 Z_{ig} + \beta^1 X_{ig} + \gamma^1 W_g + \phi^1 R_g^* + \pi^1 MS_g + \mu^1_{ig}$$

$$\text{Second stage: } Y_{ig} = \alpha^2 + \rho \hat{T}_{ig} + \beta^2 X_{ig} + \gamma^2 W_g + \delta^2 R_{ig} + \phi^2 R_g^* + \pi^2 MS_g + \mu^2_{ig}$$

where:

Z_{ig} : Instrumental variables

\hat{T}_{ig} : Predicted trust variable from the first stage

R_{ig} : Reciprocity index of individual i living in village g

μ^1_{ig}, μ^2_{ig} : Unobserved component of trust and cooperation respectively for individual i in village g

That is, the decision to cooperate Y_{ig} depends on the benefits and costs of cooperation (proxied by the household and community characteristics X_{ig} and W_g), the individual's reciprocal attitudes R_{ig} , village norms of reciprocity R_g^* , the presence of Mahila Samakhya MS_g and the trust of the individual regarding the cooperative behavior of others in the community T_{ig} .

Norms, interpreted either as behavioral strategies or preferences, change slowly over time. We make the explicit assumption that norms of reciprocity at the time of the survey were similar to individuals' norms one year before the survey (i.e. prior to last

²⁵ Castillo and Carter (2003) provide an interesting and effective experimental set up to isolate social effects such as mimicry from other reasons for correlated cooperative behavior within groups.

²⁶ Using a probit estimation instead of a linear probability estimation in the second stage for contributions to school projects and infrastructure yields similar results.

year's cooperation decisions). A Hausman test does not reject exogeneity of the reciprocity index at the 10% level. In addition, we do not find that the Mahila Samakhya programme has influenced the norms of reciprocity in programme villages. This yields additional support for the assumption of (relatively) stable norms.

All estimations weigh the observations to correct for the outcome-based sampling in programme villages. Standard errors throughout the paper are robust and corrected for clustering at the village level. In addition, the results from the 2SIV estimations are bootstrapped with 200 replications.

4.3 Identification of the instruments

The instrumental variables for trust in community members should be non-trivially correlated with the trust index. A second requirement is that they are not directly correlated with assistance to other households (or contributions to schools or infrastructure), but only indirectly through their relationship with trust. In our model, cooperation is determined by the trade-off of benefits and costs for a given level of participation in the community on the one hand, and by trust, i.e. the expectations regarding the number of others that will participate, on the other hand. Thus, the instruments should not affect the benefits and costs of participation directly, but only through their effect on trust.

Our first set of instruments is an inequality measure and its squared value to capture non-linear effects. A large literature argues that heterogeneity decreases trust (see for example Alesina and La Ferrara (2005) for references). Land inequality in Bihar reflects the polarization in society between the rich, often high caste land owners, and the poor, often low caste landless laborers. Many disputes in Bihari society concern land issues. Thus we would expect that more heterogeneity with respect to land is associated with decreased trust. This may affect the number of initial contributors and hence expectations regarding the number of others that will participate. But it does not directly affect the benefits and costs of a certain community facility for a given individual. Inequality in land ownership is measured as the Gini coefficient of land ownership.²⁷

The other instrumental variable used is the village average of donations to the construction or maintenance of religious facilities, such as the temple, mosque or church (excluding one self). Again, we find a strong correlation with trust in community members. That is, in villages where others contribute relatively more to religious facilities, individuals are more likely to agree that their community members do not only think of their own welfare, will not take advantage of you, etc.

Since religious donations are decision variables (although not from the individual herself), we should be more careful to use it as an instrument. If other community members' donations to religious facilities increase the likelihood that an individual will contribute as well (perhaps through social pressure), this could increase the marginal

²⁷ An advantage of using land inequality over income inequality is its relative stability over time, which makes the index less vulnerable to endogeneity problems as compared to income measures. We do not have exact data on household income or expenditures. Our income variable in the estimations is derived from a factor analysis of assets and housing quality. The correlation between land ownership and income quintile at the household level is 31 percent (p-value = .000).

costs of contributing to other projects such as school construction or road maintenance. However, this effect, which would bias the results for trust downwards, is likely to be negligible. Most donations to religious facilities are in the form of money, whereas collective action and cooperation is usually in the form of labor. In addition, it seems unlikely that the average village level religious donations directly influence the expected benefits for a household of joining in a community effort to repair the school or roads. For example, others' religious outings do not affect the benefit that one will derive from filled potholes in the main road. However, religious donations could decrease the marginal costs of contribution if the temple or mosque uses the money to initiate community projects, such as an informal school. But in regressions of each of the three cooperation variables on this instrument as well as the other explanatory variables, the coefficients on village level religious donations are not statistically significant. This provides strong support for the assumption that the instrument does not affect cooperation directly, and hence, satisfies the second requirement.²⁸

Table 4 shows a regression of trust in community members on the instruments. They satisfy the first requirement of non-trivial correlation. A test of overidentifying restrictions for each of the cooperation variables does not reject the null hypothesis, hence providing support for the second requirement. The Chi-squared values (with p-values for two degrees of freedom) are 3.331 (.189), 1.518 (.468) and 3.326 (.190) for the assistance index, for contributions to school construction/maintenance, and for contributions to infrastructure respectively.

5 Results

5.1 Benefits and costs of cooperation: the role of exogenous factors

Before starting with the analysis of the relationship between cooperation, trust and reciprocity, we briefly examine the relationship between cooperation and the exogenous household and community characteristics. These characteristics proxy in part for the benefits and costs of cooperation (for a given level of other contributors) that are the main factors driving cooperative behavior. To avoid a confounding effect of the programme, this analysis is done in control villages only.

It seems likely that especially the poorest households in Bihar would assist each other to deal with the rampant poverty situation and the difficulties in accessing the formal financial market. As Table 5 shows, assistance between households is indeed most common among the lower castes and the Muslim population. This finding emphasizes the importance of bonding social capital for the most disadvantaged groups (Narayan, 1999). Larger households give more assistance to others, but this is attenuated by the number of children per adult. Both results reflect the importance of the availability of resources (e.g. time, labor) for giving assistance. Households with higher female levels of education assist others more as well.

²⁸ The impact of the Mahila Samakhyā programme on religious donations is not significant either. Results are available upon request.

In small villages assistance among households is most common, perhaps because of stronger feelings of group identity and solidarity. Cooperation is also most likely in villages with many facilities. It is unclear why the presence of a primary school in a community has a negative coefficient in the estimation.

In contrast to assistance among households, collective action for a public good is independent of most household characteristics, except for the characteristics that capture household resources. Household size and household size squared, reflecting available labor, are jointly significant both for school projects and for infrastructure. The same result is found for wealth in terms of land ownership. However, the latter may also capture the relatively large benefits that land owners expect to gain from improved infrastructure.

The findings suggest that the benefits of joint community action are determined mostly by community circumstances. Contributions to school projects are largest in communities that are least developed, have no formal primary school yet, with low literacy levels, that are further away from a town and that do not have paved roads. These characteristics reflect the lack of alternative options for school enrolment. Contributions to infrastructure are also most common in communities that need such projects most. When a village has experienced a flood (with the subsequent damage to roads and bridges), its inhabitants are substantially more likely to have joined forces to repair local infrastructure. Similarly communities that are further away from town invest in their roads and bridges more. Collective action with respect to both types of projects is most likely to emerge in larger communities. In both estimations, the coefficients for village population and population squared are jointly significant at the 1 percent level. Given the theoretical discussion on group size, this finding supports the hypothesis that larger groups are more likely to contain a few highly motivated individuals that initiate collective action. However, later estimations that include the threat of social sanctions will shed a different light on this issue (section 6).

Finally, the fourth and fifth columns in Table 5 show the results of the regressions of trust and reciprocity on the exogenous characteristics. Trust in community members is largest among the better off, i.e. the households with more land and higher education levels. This may reflect the more advantaged position, and accompanying privileges and respect that the elite enjoy in rural villages. The coefficients for the distance to the nearest town and its squared value are jointly highly significant. This suggests that in remote areas, where people are highly dependent on each other and know each other well, social control is larger and more effective. Vice versa, it would imply that integration with the outside world and increased mobility may have a negative impact on trust.

Reciprocity is largely independent from household characteristics. Note that the signs of the coefficients for community characteristics are opposite those in the trust estimation. This pattern is in line with the negative correlation coefficient between trust and norms of reciprocity found in section 4.1.

In sum, exogenous household characteristics such as caste, religion and education explain assistance among households to a large extent. In contrast, participation in collective action is determined mostly by (a lack of) household resources and by village characteristics. Whereas trust is largest in the richest and better educated households, reciprocity seems to be independent from most characteristics. The exogenous variables

are included in all following estimations, although their estimates are not shown in the tables with the results.

5.2 The impact of past cooperation on trust

We start our analysis with an estimation of the relationship between trust as the dependent variable and past levels of cooperation as the explanatory variables. In addition, we include as regressors the exogenous household and community characteristics, the programme dummy and village average norms of reciprocity (without one self). The results are given in column (i) of Tables 6a, 6b and 6c for each type of cooperation. The level of trust in community members that a respondent expressed at the time of the survey is positively related to the average levels of assistance and average contributions to school projects in the community over the last year. It is not significantly related to last year's participation levels in infrastructure projects. These results suggest that indeed experience with cooperative behavior of other individuals increases trust, but that not all cooperation is as effective in producing this effect.²⁹

However, the previous section discussed a number of implicit assumptions underlying the econometric model that estimates the relationship between group cooperative behavior and individual trust. First of all, we assumed that the effect of an individual's cooperation decision on group behavior is negligible. If not, the relationship between group cooperation and individual trust may actually reflect the mobilizing influence of early initiators. Therefore, in columns (ii) we control for own past cooperative behavior. A second problem may arise if the relationship between individual trust and group cooperation is caused by exogenous group characteristics that influence both. To test this further, we control for additional group level household characteristics in columns (iii).³⁰ Third, omitted variable bias will arise if a third factor influences both group level cooperation and individual trust. It is always difficult to test for omitted variable bias due to data constraints and because it is literally impossible to include all potential influences in a regression. But likely candidates are the heterogeneity measures of land inequality (squared), fragmentation with respect to caste (squared) and with respect to religion (squared).³¹ Columns (iv) show the results of the estimation including heterogeneity. As columns (i) to (iv) show, these changes in the specification do not

²⁹ In line with the descriptive statistics, we find a consistently negative relationship between the reciprocity index and trust. The estimates for the village level cooperation variables are not sensitive to the exclusion of this variable.

³⁰ That is, we control for the percentage of Scheduled Castes, Other Backward Castes and Muslims, for the average area of land owned, for average household and female education levels, average household sizes and for average child dependency ratios in the community.

³¹ Fragmentation in the community is measured with the heterogeneity index as used in Alesina and La Ferrara (2000): $Fragmentation_g = 1 - \sum_k S_{kg}^2$

where g represents a given village g , and k represents the two religions (i) Hindu and (ii) Muslim (or the four 'caste'-groups: (i) Scheduled Castes, (ii) Other Backward Castes, (iii) General Castes, and (iv) others, mainly Muslims). S_{kg} is the share of religion (caste) k in village g .

produce substantially different results although the levels of significance for village level assistance decrease slightly.

Finally, as noted before, the Mahila Samakhya programme may affect both individual trust and cooperation in the community directly. In columns (v) we introduce an interaction term between the programme dummy variable and village level cooperation. This changes the findings dramatically. Although we still find a positive impact of past cooperation on trust, this result is found *only* in the programme villages. In other words, the observation that others cooperate is in itself not sufficient to increase trust. It appears that the presence and activities of the Mahila Samakhya programme are essential in adjusting expectations regarding others' trustworthiness as a response to cooperation in the community. Which mechanisms lie at the basis of this finding is further discussed in section 7 on the impact of Mahila Samakhya.

In fact, if we estimate the impact of past village level cooperation on trust in control villages only, we find negative coefficients for all the past cooperation variables, that are statistically significant in the case of collective action (columns (vi)). This is in stark contrast to theoretical predictions. A potential explanation may be found in the low absolute levels of cooperation in control villages. Households that participate in collective action are consistently in the minority, often a small minority. On average, only 12 and 9 percent of households in control villages participate in school and infrastructure projects respectively (with a median of 0 percent and a maximum of 45 and 40 percent respectively).³² In such situations, it appears sensible to expect that most others do *not* care about the common good but about their own welfare only. Such a perception may be more salient in communities with some levels of collective action where a large majority refuses to cooperate than in communities where contributions are virtually absent overall.

5.3 The impact of trust on cooperation

To understand the relationship from trust and reciprocity to cooperation, we start with an OLS (or linear probability) estimation of the partial correlations. The results are shown in the first five columns of Tables 7a, 7b and 7c for assistance, school projects and infrastructure projects respectively. We find a strong and positive correlation between an individual's cooperative behavior and her trust in community members.³³ However, these estimates are biased since the trust variable is endogenous in these estimations. Therefore, we instrument for trust using a 2SIV approach. If the coefficient of the instrumented trust variable remains significant, this will provide evidence of a positive influence from trust on cooperation. However, if the coefficient becomes insignificant in the 2SIV estimation, the direction of causality must run mainly from cooperation to trust.

The instrumented estimation results for assistance among households are presented in the final four columns of Table 7a. The coefficients on the trust variable

³² In contrast, the average participation level in programme villages is 33 percent for school projects and 22 percent for infrastructural projects, with maximums levels reaching 85 percent and 80 percent respectively.

³³ Marginal effects from a probit instead of a linear probability estimation are similar. For example, the marginal effects (standard errors) of the programme dummy and the trust variable on school contributions are .120 (.023) and .103 (.015) respectively; marginal effects on infrastructural contributions are .083 (.021) and .058 (.014) respectively. Compare column (ii) in Tables 7b and 7c.

remain positive and significant at the 10 % level. In other words, trust in community members significantly increases a household's propensity to assist other households. The results also show that strong norms of reciprocity are important in explaining a household's propensity to give assistance. The higher the average norms of reciprocity in a village (and hence the larger the threat of social sanctions or denial of future help), the larger the assistance index of a household living in that village. In addition, households that adhere to strong reciprocity norms themselves are more likely to assist others. This could result in part because this assistance was a favor in return for received help. The correlation between the sum of assistance given and the sum of assistance received is indeed very large at .790 (p-value .000). We do not find an indication of an impact of the programme. The positive signs in the OLS estimations are negative in the 2SIV estimations, but the programme dummy variable is not significant in any of the specifications.

Thus, the findings for the assistance index among households support the hypothesis that trust in community members enhances cooperation. In combination with the results from the previous section, this yields evidence for the existence of a dynamic cycle between trust and assistance among households. Similarly, norms of reciprocity within households enhance informal exchange. Village norms of reciprocity that capture social sanctions and rewards are equally conducive to cooperation.

The 2SIV findings for collective action in tables 7b and 7c yield a number of results that run contrary to the theoretical hypotheses.³⁴ Although the sign of the trust variable remains positive in the estimation for school projects, the variable is not significant any more once we instrument for it. Likewise, once instrumented the coefficient on trust is not significant in the estimation for infrastructural projects either.³⁵

A number of explanations could underlie these findings. A first possibility is related to the temptation to free-ride. Even if an individual trusts that her fellow community members will not betray her but join in the community project, she may still decide to free-ride herself. In fact, the more one trusts and expects others to join, the higher the temptation to defect may be. This suggests that the original hypothesis is based on a too optimistic view of behavior and should be reversed. Trust would have a negative coefficient in estimations of collective action, as we find for contributions to infrastructure.

Second, trust may not matter at all because highly interested individuals that value the public good greatly may decide to provide it regardless of whether others participate. Similarly, enthusiastic early initiators may decide to work for the common good even if they are not certain about the number of others that cooperate. For example, Oliver (1984) finds that very active participants are more pessimistic about the contributions of others ("If I don't do it, nobody will"). Some suggestive evidence supports these explanations. In programme villages, participants in the women's groups cooperate significantly more often in collective action than non-participants. The externalities of

³⁴ Using probit instead of linear probability in the second stage yields similar results. For example, the marginal effects of the programme dummy and trust variable are .128 and .072 on school contributions, and .129 and -.103 respectively on infrastructure contributions. The programme effects are significant at the 1% error level. The trust effects are not statistically significant. Compare column (vi) in Tables 7b and 7c.

³⁵ An alternative specification substitutes the individual trust index with the average trust index in the village (excluding one self) and the individual deviation from average trust. Again, the coefficients on the instrumented trust variables are insignificant.

their actions are well understood. Eighty-four percent of the participants think that non-participants benefit from the programme as well. However, their concern with free-riding appears very limited. Of them, 99 percent report that they do not mind others benefiting from the programme.³⁶

Third, trust may not matter for collective action because most instances of joint action consist of simultaneous decision-making processes in which the behavior of others can be observed directly and immediately. This would also explain why we *do* find a positive relationship for assistance among households, which is clearly based on a sequential decision-making model.

Alternatively, our examples of collective action (school and infrastructure construction/maintenance) may represent more closely a coordination failure than a prisoner's dilemma. In that case, not trust but a lack of communication would be the main obstacle to cooperation. Mahila Samakhya increases collective action because it brings people together and stimulates discussions on preference and intentions, creating focal points. The early cooperators subsequently set in motion a snow-ball effect.

Finally, our measurement of trust may not be adequate for our purposes. Some authors argue that survey measures of trust do in fact not measure trust but the *trustworthiness* of the respondent (Glaeser *et al.*, 2000) or a *propensity for gambling* (Karlan, 2005). However, in that case, we would expect an even stronger positive relationship from the trust variable to cooperation. It has also been argued that there is a low correlation between attitudes and behavior in general (Carter and Castillo, 2003; Karlan, 2005; Poppe, 2005). To actually measure trust, one should therefore ask questions about past trusting behavior (which in our case would capture the causal link from cooperation to trust) or use the results from experimental trust or dictator games as a proxy for trust. A considerable number of other authors however find a direct and positive relation between survey trust questions and trusting behavior in public good experiments (see Yamagishi and Cook (1993) or Gaechter *et al.* (2004) and references therein). Since we do not have experimental data, we cannot test these alternative options.

Whatever the underlying reason, we do not find a significant relationship from trust to collective action. That is, the results do not yield support for the existence of a positive and reinforcing cycle between this social capital variable and contributions to public goods.

Village level norms of reciprocity on the other hand are strongly significant for school projects. However, they have a *negative* sign instead of the positive sign that we found for assistance. Village level norms also have a negative sign in the infrastructure estimation, although the coefficient is not statistically significant. Individual reciprocity has a negative sign for both dependent variables as well, although the coefficient is only statistically significant in the estimation for infrastructure. These perhaps counterintuitive findings will be discussed further in the next section.

Finally, the Mahila Samakhya programme turns out to have a strong impact on both contributions to school projects and participation in road projects. The coefficient of the programme dummy variable remains strongly significant in all specifications. This

³⁶ When the non-participants were asked whether others benefit, 38 percent think they do and of those 38 percent, 98 percent think this is fair. When asked whether they would join the group if they were excluded from these benefits, 48 percent say they would join.

indicates that the programme substantially increases collective action, but not through its influence on trust.

6 Reciprocity reconsidered

Tables 7a, b and c have shown a mixed picture of the role of individual reciprocity and village level reciprocity. Whereas the variables are positive and significant as expected for the propensity to give assistance, their sign is negative in the estimation for collective action. This section will look at the role of reciprocity in more detail.

6.1 The strength of norms and social sanctions

Average norms of reciprocity in the village capture the threat of social sanctions for defection or the promise of social esteem for cooperation. However, a large body of literature emphasizes the importance of group size for social sanctions and rewards to be effective. In small networks, information about the actual behavior of individuals is passed on much more easily. This enhances the threat of sanctions and the effect on social status. In addition, the smaller the social network, the more likely people are to care about what others think of them since people are more dependent on each other and more likely to meet one another again. A straightforward extension therefore takes into account the size of the village. That is, we include an interaction terms between village level norms of reciprocity and village population totals. The results are given in table 8. They confirm the expectations.

Strong norms of reciprocity in the community are positively related to all three forms of cooperation. Their coefficients are statistically significant in the estimations for assistance and contributions to school projects. The interaction term with village population totals is consistently negative and (almost) statistically significant in the two collective action estimations. In other words, the threat of social sanctions is less effective in larger communities.

6.2 Individual norms of reciprocity as a tit-for-tat strategy

Similarly, a closer look at the individual reciprocity index indicates that the negative sign on its coefficient is perhaps not so counterintuitive after all. In general, reciprocity indicates that people will cooperate if others do so as well, but *will not cooperate if others do not either*. Figures 1 and 2 show the histograms of village levels of collective action with respect to school construction and infrastructure respectively. On average, the percentages of households in a community that join in a community project are extremely low. In such communities, one would indeed expect a correlation between reciprocal attitudes and low levels of cooperation. On the other hand, levels of assistance are much higher in most communities. Figure 3 gives the histogram of the average sum of

assistance items in communities. Not surprisingly, in such situations individuals will reciprocate received favors and assistance, hence the positive correlation between reciprocity and assistance.

These findings show that strong norms are not necessarily a ‘good’ thing. This is important to note, especially with respect to the discussion about social capital. In fact, whether or not norms of reciprocity are favorable to the emergence of collective action depends to a large extent on the point of departure. Communities may be trapped in a suboptimal level of low cooperation although every single community member could be a ‘conditional cooperator’ willing to participate if others do so as well.

In sum, strong norms of reciprocity in a community facilitate cooperation, especially in smaller villages. But such norms are not necessarily productive. Reciprocal individuals will decide whether to cooperate or not, dependent on the actual levels of cooperation of others.

7 The impact of the Mahila Samakhya programme

7.1 Do we find evidence of a virtuous cycle?

First of all, trust in community members is significantly higher in programme villages than in control villages. Norms of reciprocity on the other hand do not differ between the two treatment groups. Second, collective action in school projects and infrastructure are significantly more common in programme villages than in control villages. But we do not find such a difference for assistance among households. We will now discuss whether or not these effects are related to the programme’s initiation of a virtuous cycle between trust and cooperation.

The previous sections showed that positive past experiences with cooperative behavior of others in the community significantly increases current levels of trust, although not all types of cooperation are equally relevant. However, this effect was mainly found in villages where Mahila Samakhya is active. In control villages with very little collective action at all, this relationship is absent or even reversed. Thus, one direction of the virtuous cycle is partly confirmed.

The difference between programme and control villages may be due to the explicit and continuous attention for trust-building within Mahila Samakhya groups that translates positive past experiences into updated beliefs. It is also possible that a certain level of collective action should be reached before individuals start reconsidering their opinion about the trustworthiness of others. The maximum percentage of households that participates in collective action in any of the control communities is 45 percent. Hence, when asked whether “most people in this community can be trusted (...)”, people are right if they disagree. That is, the Mahila Samakhya programme may have lifted cooperation in the programme villages above a certain threshold necessary to increase trust.

Mahila Samakhya also has a direct positive impact on trust, beyond its effect through cooperation, which is significant in two of the three tables. Most likely, the programme directly increases trust among community members because it brings them

together, enhances social interactions within the community, and stimulates communication and discussion across caste and religious boundaries.

Next, the results showed that more trusting individuals in a community are significantly more likely to assist others. This confirms the other direction of the virtuous cycle for one-on-one cooperation among households. However, we do not find a direct effect of the programme itself on assistance, even in specifications that exclude trust. Our measure of assistance may be limited as it only captures whether or not households have assisted others in the past year, not how often they have done so. In sum, trust increases assistance and assistance increases trust, supporting the hypotheses. This positive cycle is found especially in programme villages, although programme impact is not statistically significant.

Finally, the results show that trust has no direct impact on subsequent participation in collective action. This indicates that a virtuous cycle between social capital and collective action is not as easily set in motion as often argued. It also emphasizes the importance of looking beyond positive correlations and dig into causality relationships to really understand underlying processes. Given that one link of the expected cycle is non-existent, the programme will not be able to set in motion the self-reinforcing mechanism of increased joint action, at least not through its effect on trust.

Nonetheless, we find a positive coefficient of the programme dummy variable in all specifications for collective action with respect to schools and infrastructure. This indicates that the programme has a direct effect on community action unrelated to trust-building. There are a number of pathways through which the programme could influence a community's propensity to engage in collective action directly.

First of all, the Mahila Samakhya programme stimulates women to reflect on the status quo and articulate their needs and demands. Before the arrival of the programme, most women accept their situation as just the way it is (Mahila Samakhya, 1995). Once common needs (and the potential for changes) become clear, this would increase awareness of the benefits of a joint effort such as the importance of setting up schools for girls. Such awareness is enhanced further through trainings and workshops that educate women with respect to health, human capital and women's rights.

Second, the programme provides additional resources, either directly (in paying the honorarium of primary school teachers for informal girls' schools) or indirectly through its support in accessing government schemes. In the year prior to the survey, 16 out of the 74 women's groups in the sample had received at least one government subsidy. It also facilitates communication with government officials. Mahila Samakhya facilitators initially accompany the women who want to address public issues. Thereafter they become more confident to approach government representatives themselves. Over time, these effects appear to be strengthened. The longer a group has been active, the more likely it is that it has tried to influence policy, or to change an existing or newly announced rule. The correlation coefficient between the number of years that a group has existed and their involvement in policy issues is .265 (p-value equal to .023).³⁷ The correlation between group years and whether such an effort was successful is .371 (p-value equal to .074). The correlation between group years and a supportive relationship with local government officials is also significantly positive at .286 (p-value equal to

³⁷ Note that the direction of causality could partly run in the other direction if facilitators were initially recruited from communities more actively involved in politics in the first place.

.016).³⁸ Similarly, the relationship with the local elite seems to improve over time (the correlation coefficient is .340 with a p-value of .003).³⁹

Third, a potentially important mechanism through which the programme increases collective action is through its impact on the confidence and empowerment of women. Table 9 shows the coefficients of a number of statements that were added in turn to the full 2SIV estimations of cooperation (column (ix) in Tables 7a, 7b and 7c). Even when controlling for programme impact, trust and reciprocity, the partial correlations between participation in collective action and most statements are highly significant. Individuals are significantly more likely to have participated in collective action when they believe that people like themselves can have a lot of influence in making their community a better place to live, or that members of their community are able to improve the quality of education and the quality of roads if they would jointly organize. This could partly result from reversed causality if participation subsequently increases confidence in oneself and other (disadvantaged) community members. But increased confidence in turn is likely to enhance future collective action. These findings corroborate the results from other studies that find a strong correlation between empowerment, self-confidence or framing and collective action (Hirsch, 1990; Finkel and Muller, 1998; Small, 2002). We do not find such a strong relationship between confidence and the assistance index.

In sum, these findings suggest that a community development project that focuses on the building of trust and empowerment may indeed increase collective action, as long as it offers additional incentives and support to undertake the community projects. However, expecting a self-reinforcing mechanism is probably too optimistic. Instead, the programme's impact on collective action appears to run through other mechanisms than trust. Increased, awareness, knowledge about government subsidies and confidence in one self and one's neighbors may strengthen the capacity and willingness of the women to continue their joint efforts over time.

One may question the sustainability of the changes in collective action in the long run. From discussions with Mahila Samakhya programme officers it appears that most of the women's groups are not strong enough yet to be independent of the programme, even after a considerable number of years. That is, programme support is still necessary to keep collective action going. This replicates the finding from studies of other CBD projects that continuous support from external agents remains necessary for collective action (Mansuri and Rao, 2004; Rao and Ibanez, 2005). However this is not necessarily a major drawback. If the women's groups accomplish certain objectives (such as increasing school enrolment) as well or better than the government at equal or lower costs, long-term investment in the programme could be a very sensible policy.

7.2 Spillover effects on non-participants in programme villages

³⁸ The question "How is the relationship between the group and local government officials" could be answered as: 0. Opposing, 1. Ignoring, 2. Accepting, 3. Consulting, and 4. Other. (The answers are recoded such that higher values indicate higher support. Code 4. is put to missing).

³⁹ The question: "What is the relationship of the more prosperous families toward the Mahila Samakhya group?" could be answered as: 1. Adversarial, 2. Interfering, 3. Indifferent, 4. Supportive/cooperative (The answers are recoded such that higher values indicate higher support).

The Mahila Samakhya programme positively affects the levels of trust and the levels of collective action in communities. However, to genuinely transform the social environment in programme villages, it should not only have an impact on participants in the women's groups but also on non-participants in programme villages. This section shows the results of the main estimations of cooperation, excluding participants from the sample. That is, we estimate the impact of the programme on assistance, on participation in school projects and participation in infrastructure projects for non-participants in programme villages as compared to the control population.

Note that the estimations suffer from a selection bias since we compare the entire population in control villages with the population in programme villages that voluntarily decided *not* to participate in Mahila Samakhya. Their decision is guided in part by unobservables that cannot be controlled for. However, it seems most likely that, if anything, non-participants would be inherently *less* likely to cooperate and participate in joint action for the benefit of the community, which would bias the estimates downwards.

The results are shown in Table 10. The levels of assistance among households do not significantly differ between non-participants in programme villages and households in control communities (column (i)). However, the findings provide evidence of strong spillover effects on the propensity of the broader community to engage in collective action (columns (ii) and (iii)). When a Mahila Samakhya women's group has been started in a village, households *who are not a member of Mahila Samakhya themselves* are 11.7 percentage points more likely to participate in a school project and 14.3 percentage points more likely to participate in infrastructure maintenance than households living in control villages. Box 4.1 provides examples and anecdotal evidence on the different mechanisms that may produce such externalities.

In addition, the results in column (vii) show that indeed non-participants in programme villages are significantly more likely to trust their fellow community members than control households. As a comparison, column (viii) shows the impact of Mahila Samakhya on norms of reciprocity. We do not find evidence that the programme has had an effect on the norms of non-participants.

8 Conclusion and discussion

An important trend in development aid is the shift from traditional, top-down programmes to community-based development (CBD) projects that actively involve communities in project design and implementation. Proponents of this approach advocate that, besides a number of other benefits, such projects will increase social capital in communities, thereby enhancing their capacity to further improve community life through collective action. However, empirical evidence of the impact of CBD projects on social capital is strikingly limited.

Box 1. Mechanisms of the spillover effects on participation in school projects

Focus group interviews with many women's groups that have set up an informal primary school for girls in the study region indicate that enrolment in the informal school is open to all. However, parents are required to help in cleaning the surroundings, finding a covered place to keep materials, etc. That is, in many communities selective incentives in terms of free school enrolment induce parents to contribute to school construction and maintenance.

In Bajitpur Majhauri village, mobilization for school maintenance occurs on a very different basis. Mahila Samakhya participants regularly worked for the school, repairing the roof, filling in potholes, etc. The members of the Village Education Committee (VEC) or parent-teacher association, very passive until then, suddenly realized that 'those low-caste women' were actually doing their job. Feeling too proud to let this happen, they subsequently started to organize activities themselves, involving other parents.

In Kachrachak village, the women's group organizes regular community meetings between the community, the VEC, the teacher and other government officials. Those meetings are meant to discuss the problems with the primary school in the village, and divide responsibilities for solutions. For example, the parents together with the teacher are responsible for building maintenance, the women's group together with the community work on enrolment rates and the VEC deals with teacher-related issues.

This paper presents an impact evaluation of Mahila Samakhya, a women's empowerment project in rural India that explicitly aims to increase trust and joint action among disadvantaged women. Based on a unique quantitative dataset of 1991 households in 74 programme villages and 28 control villages, we examine whether evidence from the field supports the theoretical dynamics between trust and cooperation, and whether the project can set in motion such a virtuous cycle.

The findings suggest the existence of such a cycle between trust and assistance that is unrelated to the presence of the programme. We do *not* find evidence of a reinforcing cycle between trust and collective action. Although positive past experiences with joint action translate into higher subsequent trust, especially in programme villages, we do not find a significant link from trust to subsequent collective action.

Assuming that our trust measure is adequate for our purposes, this finding has several important implications. First of all, it refutes the commonly advanced argument that CBD projects would be able to set in motion a virtuous cycle between trust and collective action. Even a programme with such a strong emphasis on trust-building, solidarity and joint action as Mahila Samakhya has not been able to initiate such reinforcing mechanisms. Second, from a methodological point of view, the results underscore the importance of looking beyond correlations and aim to disentangle causality.

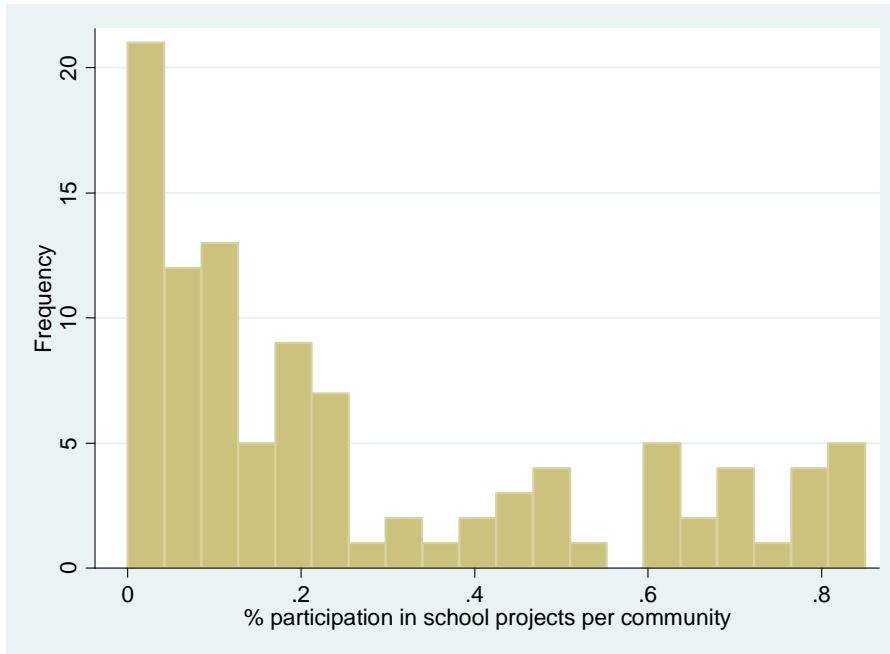
This is not to say that CBD projects do not affect a community's propensity to engage in collective action. In fact, Mahila Samakhya has had a strong positive impact that spills over even to non-participants in programme villages. What the findings show is that this impact does not run through trust. Potential mechanisms instead could be a greater awareness about the benefits of collective action, additional resources at the disposal of community members and increased empowerment and self-confidence among the (low-caste) women in programme villages. Especially the last pathway seems promising for further investigations. It is not a popular concept among (economic) collective action theorists, but it might prove very valuable in explaining the emergence or absence of collective action, particularly among minorities.

In line with theoretical predictions, social capital in terms of norms of reciprocity is strongly related to cooperative behavior. High village level norms of reciprocity that capture a threat of social sanctions significantly increase cooperation, mainly in the smaller communities. Individual level reciprocity plays a more ambiguous role. It positively affects cooperation and assistance among households, but has a negative impact on contributions to the common good. This is not surprising when we notice that levels of collective action are very low in the study area. Under such circumstances, reciprocating behavior implies that people will not participate because others do not contribute either. This finding points out to an important issue. It is often assumed that social capital, in terms of strong norms, is beneficial for a community. However, this depends crucially on the specific context and the type of norms under consideration.

The results also point out a number of limitations and suggestions for future research. For a more thorough understanding of the dynamics, a panel data set that includes a baseline survey of the social capital variables would greatly add to the analysis. In addition, including experimental evidence on the initial levels of trust would facilitate the interpretation of findings, in view of the ongoing discussion regarding the validity of trust questions in surveys. The inclusion of information on motivations, on the intensity and frequency of cooperation, as well as on social networks, will further shed light on decisions and behavior. A much more detailed focus on empowerment and confidence-building is likely to add substantially to our understanding of collective action among disadvantaged groups.

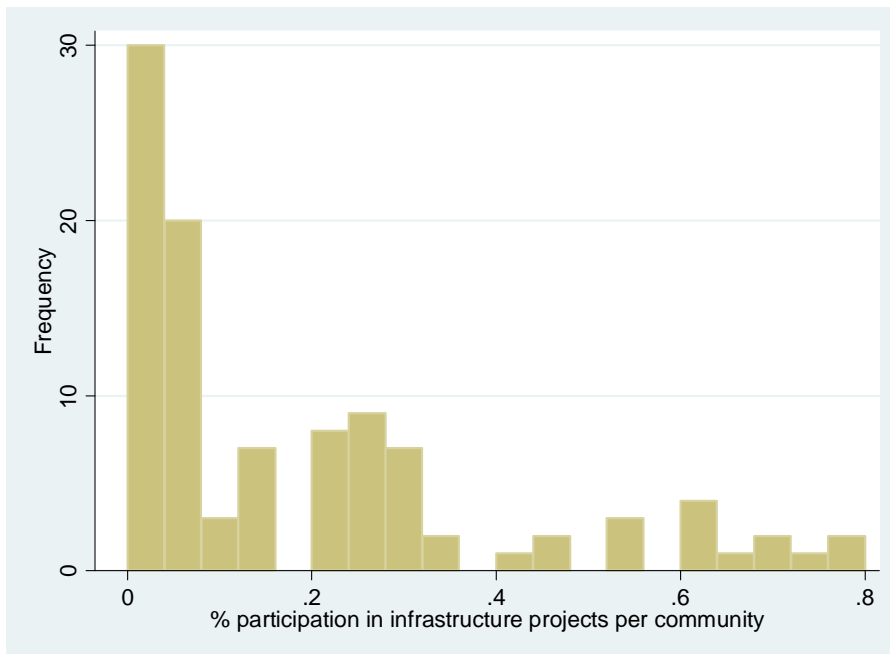
Finally, it is not straightforward to what extent the results on the impact of the Mahila Samakhya programme can be extended to other programmes. Mahila Samakhya is rather unique in its very careful but slow approach that puts a lot of effort in building trust and confidence among the women before it goes on to any other activity. Most other community-based development projects instead start with the mobilization of individuals to join in collective action, perhaps after one or two weeks of participatory meetings. Our results cannot predict whether such an approach is able to produce similar outcomes on the levels of joint action. Platteau and Abraham (2002) argue that such rapid disbursement procedures for CBD projects are likely to be unsuccessful, if not counterproductive. Building social capital, empowering minorities and breaking down existing social inequalities takes time and intensive facilitator efforts. Hence, a comparative study of the impact of different programme designs is necessary to further gain insights in the specific characteristics of projects that are successful in increasing a community's propensity to engage in collective action.

Figure 1. Histogram of average village participation levels in school projects



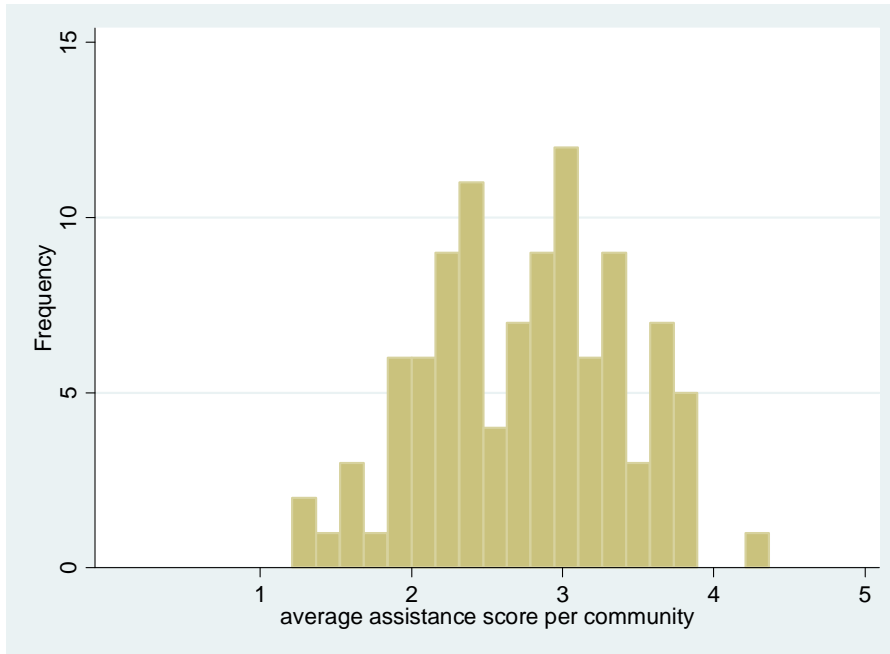
The x-axis represents the percentage of households in a village that contributed to school projects in the past year. Number of observations (communities): 103

Figure 2. Histogram of average village participation levels in infrastructure projects



The x-axis represents the percentage of households in a village that contributed to infrastructure projects in the past year. Number of observations (communities): 103

Figure 3. Histogram of average village level assistance among households



NB: The histogram is not based on the index constructed from factor analysis, but as a simple sum of the underlying items. This sum has a minimum value of 0 and a maximum value of 5. The x-axis represents the average sum over the households per community. Number of observations (communities): 103

Table 1. Comparison of programme and control villages

	Control villages	Programme villages	P-value of the difference
PANEL A.			
Population characteristics	(n=559)	(n=1432)	
% Scheduled Castes / Scheduled Tribes	23.4	23.3	0.980
% Other Backward Castes	45.6	53.2	0.210
% General Castes	13.8	10.1	0.426
% Muslim	18.7	11.5	0.216
Mean income quintile ⁴⁰	3.1	3.3	0.266
Average land ownership (in acres)	0.4	0.4	0.786
Highest education level in household ⁴¹	3.1	3.3	0.473
Highest female education level in household	1.8	2.0	0.339
Average household size	6.7	6.9	0.606
Average # children < 14 years of age	2.2	2.4	0.158
Average child dependency ratio ⁴²	0.6	0.7	0.191
% households with female head	5.7	5.1	0.683
<i>Test of joint significance</i>			0.222
PANEL B.			
Village characteristics	(n=28)	(n=74)	
% with flood in last three years	90.9	78.1	0.066*
% with drought during last three years	46.5	45.8	0.944
Average road quality	1.5	1.5	0.972
Availability of public transport	48.8	56.4	0.531
Average child wage	29.0	25.0	0.152
Average distance to nearest town (km)	24.8	12.8	0.000***
<i>Test of joint significance (excluding distance to town)</i>			0.220
% of villages with facility available			
Market	44.2	40.5	0.743
Post office	45.5	25.6	0.071*
Telephone	71.1	62.2	0.299
Bus stop	27.2	31.2	0.723
Bank	17.8	12.7	0.582
Health center	36.4	41.6	0.659
<i>Test of joint significance</i>			0.644
Distance to nearest facility if not available within community boundaries (km)			
Market	2.1	2.6	0.133
Post office	2.1	2.2	0.717
Telephone	4.6	2.9	0.313

⁴⁰ The income quintile is derived from a principal component analysis based on 18 household assets and facilities. The poverty index, with mean zero, is calculated using the factor loadings of the first factor. Based on the poverty index, quintiles were constructed where the first quintile represents the poorest 20% of the households. For a motivation of using a score to proxy Indian household wealth based on weightings for household assets, see Filmer and Pritchett (2001).

⁴¹ Highest education level of adult household members: 1 = no schooling; 2 = primary school incomplete; 3 = primary school completed; 4 = middle school completed; 5 = high school completed or higher education.

⁴² The children who are less than fourteen years of age as a fraction of the total number of adults in the household.

Bus stop	2.7	2.9	0.681
Bank	3.2	3.4	0.703
Health center	3.3	2.9	0.516
<i>Test of joint significance</i>			0.253
Average number of villages that have at least one school of the type specified:			
Primary school	88.1	85.5	0.760
Middle school	24.3	23.0	0.905
High school	3.3	6.4	0.526
<i>Test of joint significance</i>			0.879
<i>Test of joint significance (all village characteristics excluding distance to town)</i>			0.640

Estimates are weighted for the stratified clustered sample design, with standard errors corrected accordingly. *: p<0.10, **: p<0.05, ***: p<0.01

Table 2. Descriptive statistics of cooperation, trust and reciprocity

	# obs.	Mean	Standard error	Standard deviation	Min	Max	Rotated factor loadings
PANEL A. COOPERATION VARIABLES^Δ							
Assistance index	1989	.740	.018	.306	0	1	<i>Eigenvalue: 1.203</i>
- children	1988	.759	.019	.331	0	1	.749
- food	1989	.726	.023	.361	0	1	.746
- work	1987	.372	.034	.498	0	1	.145
- build house	1988	.187	.021	.454	0	1	.211
- financial assistance	1988	.332	.030	.465	0	1	.139
Contribution to school construction/maintenance	1980	.211	.030	.447	0	1	
Contribution to infrastructure construction/maintenance	1991	.111	.017	.390	0	1	
PANEL B. SOCIAL CAPITAL VARIABLES[†]							
Trust in community members	1985	.422	.026	.409	0	1	<i>Eigenvalue: 2.253</i>
- People here look out mainly for the welfare of their own families, and they are not much concerned with community welfare	1978	1.819	.054	.989	1	3	.755
- Most people in this community are basically honest and can be trusted‡	1975	2.012	.045	.963	1	3	.746
- In this village one has to be alert or someone is likely to betray you	1978	1.704	.073	.989	1	3	.798
- Whenever it is to their advantage, people will not tell the truth	1976	1.905	.038	.977	1	3	.699
Reciprocity	1985	.688	.011	.240	0	1	<i>Eigenvalue: .180</i>
- If you help someone, then whenever you need help in the future, that person should return a favor to you‡	1974	2.785	.051	.676	1	3	.199
- Even if someone is not polite to me, I will still be polite to him or her	1942	1.782	.108	.925	1	3	.298
- Whenever I treat someone badly, I can expect the other to treat me bad as well‡	1922	2.583	.058	.693	1	3	.226

Missing variables were imputed for the indices constructed with factor analysis. This is 1.31% of all observations for the trust index, 4.12% for the reciprocity index and 0.25% of observations for the assistance index. Estimates are weighted for the stratified clustered sample design, with standard errors corrected accordingly.

^Δ: Cooperation variables equal 1 if any of the household members has cooperated on the specific item in the past year, and 0 otherwise.

[†]: Social capital statements receive the following value: agree=1, neutral=2, disagree=3, don't know = missing.

[‡]: Answers for these statements are recoded to reflect increasing trust or reciprocity: disagree=1, neutral=2, agree=3, don't know = missing.

Table 3. Correlation matrix of cooperation, trust and reciprocity

	Assistance	Schools	Infra-structure	Village assistance (without self)	Village schools (without self)	Village infra. (without self)	Trust	Reciprocity	Village trust (without self)	Village reciprocity (without self)
PANEL A										
Assistance	1.000									
Schools	0.108 (.000)***	1.000								
Infrastructure	0.111 (.000)***	0.499 (.000)***	1.000							
Village assistance (without self)	0.292 (.000)***	0.129 (.000)***	0.123 (.000)***	1.000						
Village schools (without self)	0.085 (.000)***	0.560 (.000)***	0.417 (.000)***	0.220 (.000)***	1.000					
Village infra. (without self)	0.090 (.000)***	0.463 (.000)***	0.485 (.000)***	0.235 (.000)***	0.788 (.000)***	1.000				
PANEL B							PANEL C			
Trust	0.157 (.000)***	0.414 (.000)***	0.279 (.000)***	.0128 (.000)***	0.466 (.000)***	0.337 (.000)***	1.000			
Reciprocity	0.041 (.067)*	-0.198 (.000)***	-0.111 (.000)***	0.088 (.000)***	-0.187 (.000)***	-0.124 (.000)***	-0.317 (.000)***	1.000		
Village trust (without self)	0.088 (.000)***	0.488 (.000)***	0.317 (.000)***	0.239 (.000)***	0.809 (.000)***	0.586 (.000)***	0.525 (.000)***	-0.223 (.000)***	1.000	
Village reciprocity (without self)	0.074 (.001)***	-0.235 (.000)***	-0.140 (.000)***	0.180 (.000)***	-0.394 (.000)***	-0.260 (.000)***	-0.268 (.000)***	0.402 (.000)***	-0.490 (.000)***	1.000

P-values are given in brackets below the correlation coefficients. *: p<0.10, **: p<0.05, ***: p<0.01

Table 4. Correlation of trust with the instrumental variables

Dependent variable:	Trust in community members	
	coefficient	s.e.
<i>Programme village dummy</i>	.249	.080***
<i>Instruments</i>		
Village average of religious contributions (without self)	.496	.156***
Land inequality	1.790	.685**
Land inequality squared	-1.672	.588***
<i>Individual characteristics</i>		
Age	.001	.010
Age squared	-.000	.000
SC/ST	.006	.101
OBC	.016	.087
Muslim	.028	.113
Land ownership	.001	.001*
Land ownership squared	-.000	.000**
Household education	.218	.090**
Household education squared	-.034	.015**
Female education	-.127	.108
Female education squared	.021	.019
Female household head	-.003	.089
Dependency ratio	-.040	.099
Dependency ratio squared	.014	.040
Household size	.008	.029
Household size squared	-.000	.002
<i>Community characteristics</i>		
Village development	.016	.023
Primary school	-.142	.089
Village population total (x100)	-.026	.027
Village population squared	.000	.001
Flood	.074	.096
Drought	.120	.098
Paved roads	.028	.065
Distance to town	.014	.012
Distance to town squared	-.000	.000*
1991 village female literacy	-.008	.004*
<i>Block var./district dummies</i>	Yes	
R-squared	.229	
# observations	1879	

Estimates are weighted for the outcome-based sampling in programme villages. The robust standard errors are corrected for clustering at the village level. *: p<0.10, **: p<0.05, ***: p<0.01

Table 5. Relationship between cooperation/trust/reciprocity and exogenous characteristics (control villages only)

Dependent variable:	Assistance (OLS)		Schools (probit)		Infrastructure (probit)		Trust (OLS)		Reciprocity (OLS)	
	coefficient	s.e.	coefficient	s.e.	coefficient	s.e.	coefficient	s.e.	coefficient	s.e.
<i>Individual characteristics</i>										
Age	-.012	.014	.062	.028**	.042	.041	.003	.016	-.005	.008
Age squared	.000	.000	-.001	.000*	-.000	.000	-.000	.000	.000	.000
SC/ST	.512	.183**	-.200	.413	-.009	.547	-.047	.175	-.047	.091
OBC	.299	.158*	-.053	.349	.052	.489	-.139	.150	-.059	.072
Muslim	.375	.160**	-.171	.397	.136	.513	-.325	.214	-.019	.075
Land ownership	.001	.001	.004	.002**	.004	.002**	.002	.001*	.000	.000
Land ownership squared	-.000	.000	-.000	.000**	-.000	.000***	-.000	.000**	-.000	.000*
Household education	.091	.167	.337	.322	-.497	.363	.265	.141*	-.007	.070
Household education squared	-.019	.026	-.062	.059	.076	.058	-.045	.026*	.002	.011
Female education	.405	.167**	.580	.465	-.275	.450	-.202	.194	-.052	.115
Female education squared	-.065	.027**	-.095	.077	.068	.084	.040	.035	.009	.021
Female household head	-.001	.148	-.570	.474	.074	.359	.073	.191	.027	.064
Dependency ratio	-.380	.162**	-.044	.594	-.169	.444	-.021	.221	.048	.072
Dependency ratio squared	.177	.082**	-.153	.280	.022	.213	-.024	.098	.001	.032
Household size	.136	.045***	.209	.169	.220	.115*	.032	.055	.002	.018
Household size squared	-.008	.003**	-.010	.009	-.010	.007	-.000	.003	-.001	.001
<i>Community characteristics</i>										
Village development	.071	.034**	-.120	.049**	-.067	.049	-.035	.030	.044	.010***
Primary school	-.303	.102***	-1.451	.249***	.360	.411	-.459	.148***	.136	.031***
Village population (x100)	-.266	.110**	.809	.199***	.331	.220	.055	.115	-.053	.043
Village population squared	.027	.010**	-.076	.020***	-.027	.025	-.003	.011	.005	.004
Flood	.151	.211	-.197	.142	1.683	.255***	-.046	.188	.150	.075*
Drought	-.048	.168	1.106	.439**257	.233	-.073	.058
Paved roads	-.016	.038	-.237	.072***	-.010	.088	-.242	.055***	.076	.019***
Distance to town	-.006	.020	.062	.019***	.257	.047***	.016	.016	.002	.007
Distance to town squared	.000	.000	-.001	.000***	-.004	.001***	-.000	.000	-.000	.000
1991 village female literacy	.001	.004	-.020	.010**	.001	.015	-.002	.005	.001	.001
<i>Block var. / district dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	.768						.134		.314	
# observations	513		511		534		512		511	

*: p<0.10, **: p<0.05, ***: p<0.01. Robust standard errors are corrected for clustering at the village level.

Table 6a. Trust in community members as a function of past village levels of assistance

Dependent variable:	Trust					
As a function of past village level:	Assistance					
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Programme dummy	.220 (.074)***	.230 (.073)***	.262 (.082)***	.186 (.076)**	.216 (.071)***	
Interaction term (programme dummy)*(past village assistance)					.515 (.189)***	
Village average assistance (without self)	.231 (.124)*	.191 (.123)	.195 (.126)	.191 (.109)*	-.097 (.173)	-.212 (.285)
Own past assistance		.095 (.025)***				
Village average household characteristics			Yes			
Heterogeneity variables				Yes		
Village average norms of reciprocity (without self)	-.798 (.178)***	-.827 (.176)***	-.679 (.181)***	-.807 (.178)***	-.702 (.168)***	.185 (.783)
<i>Individual characteristics</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Community characteristics</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Block var. / district dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes
# obs.	1879	1877	1879	1879	1879	512
R-squared	.230	.240	.239	.237	.237	.135

Estimates are weighted for the outcome-based sampling in programme villages. The robust standard errors are corrected for clustering at the village level. *: p<0.10, **: p<0.05, ***: p<0.01.

Table 6b. Trust in community members as a function of past village level participation in school projects

Dependent variable:	Trust					
As a function of past village level:	Participation in school projects					
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Programme dummy	.073 (.080)	.077 (.080)	.106 (.083)	.039 (.083)	-.030 (.095)	
Interaction term (programme dummy)*(village average participation in school projects)					.981 (.374)**	
Village average participation in school projects (without self)	.846 (.228)***	.606 (.223)***	.877 (.207)***	.811 (.234)***	-.231 (.479)	-2.924 (.666)***
Own past participation in school projects		.410 (.063)***				
Village average household characteristics			Yes			
Heterogeneity variables				Yes		
Village average norms of reciprocity (without self)	-.440 (.166)***	-.436 (.165)**	-.295 (.176)*	-.463 (.167)***	-.411 (.174)**	-.630 (.598)
<i>Individual characteristics</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Community characteristics</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Block var. / district dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes
# obs.	1879	1869	1879	1879	1879	512
R-squared	.239	.272	.249	.245	.242	.153

Estimates are weighted for the outcome-based sampling in programme villages. The robust standard errors are corrected for clustering at the village level. *: p<0.10, **: p<0.05, ***: p<0.01

Table 6c. Trust in community members as a function of past village level participation in infrastructure projects

Dependent variable:	Trust					
As a function of past village level:	Participation in infrastructure projects					
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Programme dummy	.258 (.081)***	.245 (.082)***	.305 (.098)***	.226 (.086)**	.193 (.089)**	
Interaction term (programme dummy)*(village average participation in infrastructure projects)					.862 (.788)	
Village average participation in infrastructure projects (without self)	.032 (.260)	-.145 (.253)	-.000 (.279)	-.029 (.253)	-.785 (.883)	-1.618 (.790)*
Own past participation in infrastructure projects		.352 (.074)***				
Village average household characteristics			Yes			
Heterogeneity variables				Yes		
Village average norms of reciprocity (without self)	-.687 (.173)***	-.677 (.172)***	-.581 (.178)***	-.727 (.176)***	-.641 (.173)***	.324 (.803)
<i>Individual characteristics</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Community characteristics</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Block var. / district dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes
# obs.	1879	1879	1879	1879	1879	512
R-squared	.226	.243	.236	.234	.228	.142

Estimates are weighted for the outcome-based sampling in programme villages. The robust standard errors are corrected for clustering at the village level. *: p<0.10, **: p<0.05, ***: p<0.01

Table 7a. OLS and 2SIV estimations of assistance

Dependent variable:	Giving assistance to other households									
	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)	(2SIV)	(2SIV)	(2SIV)	(2SIV)	
Programme dummy	.034 (.068)	.006 (.072)	.001 (.068)	.033 (.068)	.027 (.068)	-.111 (.102)	-.110 (.097)	-.052 (.088)	-.061 (.089)	
Trust in community members (instrumented)		.099 (.031)***	.119 (.032)***	.115 (.029)***	.127 (.031)***	.484 (.294)*	.483 (.272)*	.429 (.255)*	.435 (.252)*	
Reciprocity			.171 (.064)***		.111 (.065)*		.356 (.166)**		.255 (.151)*	
Village level reciprocity, without self				.672 (.192)***	.608 (.195)***			.886 (.245)***	.719 (.195)***	
<i>Household characteristics</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
<i>Community characteristics</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
<i>Block var. / district dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
# observations ⁴³	1883	1877	1875	1877	1875	1877	1875	1877	1875	
R-squared	.121	.130	.135	.143	.145	.013	.037	.067	.075	

Estimates are weighted for the outcome-based sampling in programme villages. The robust standard errors in brackets are corrected for clustering at the village level. *: p<0.10, **: p<0.05, ***: p<0.01. 2SIV results are bootstrapped with 200 replications.

⁴³ The number of observations may change from one specification to another due to missing values.

Table 7b. Linear probability (LP) and 2SIV estimations of participation in school projects

Dependent variable:	Participation in school projects								
	(LP)	(LP)	(LP)	(LP)	(LP)	(2SIV)	(2SIV)	(2SIV)	(2SIV)
Programme dummy	.154 (.031)***	.123 (.028)***	.125 (.028)***	.118 (.026)***	.120 (.027)***	.139 (.041)***	.139 (.040)***	.128 (.036)***	.130 (.037)***
Trust in community members (instrumented)		.100 (.016)***	.095 (.016)***	.097 (.016)***	.093 (.016)***	.049 (.100)	.049 (.093)	.059 (.088)	.058 (.088)
Reciprocity			-.045 (.027)		-.033 (.027)		-.069 (.051)		-.050 (.047)
Village level reciprocity, without self				-.140 (.077)*	-.119 (.076)			-.166 (.076)**	-.132 (.067)**
<i>Household characteristics</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Community characteristics</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Block var. / district dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	1874	1869	1867	1869	1867	1869	1867	1869	1867
R-squared	.259	.293	.294	.295	.296	.287	.291	.293	.294

Estimates are weighted for the outcome-based sampling in programme villages. The robust standard errors in brackets are corrected for clustering at the village level. *: p<0.10, **: p<0.05, ***: p<0.01. 2SIV results are bootstrapped with 200 replications.

Table 7c. Linear probability (LP) and 2SIV estimations of participation in infrastructure projects

Dependent variable:	Participation in infrastructure projects									
	(LP)	(LP)	(LP)	(LP)	(LP)	(2SIV)	(2SIV)	(2SIV)	(2SIV)	
Programme dummy	.113 (.028)***	.094 (.028)***	.096 (.028)***	.093 (.028)***	.096 (.029)***	.144 (.039)***	.139 (.037)***	.131 (.034)***	.134 (.035)***	
Trust in community members (instrumented)		.064 (.015)***	.058 (.015)***	.063 (.015)***	.058 (.016)***	-.106 (.107)	-.087 (.096)	-.082 (.093)	-.077 (.091)	
Reciprocity			-.051 (.027)*		-.052 (.027)*		-.125 (.055)**		-.116 (.051)**	
Village level reciprocity, without self				-.020 (.068)	.012 (.069)			-.120 (.073)	-.038 (.060)	
<i>Household characteristics</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
<i>Community characteristics</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
<i>Block var. / district dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
# observations	1885	1879	1877	1879	1877	1879	1877	1879	1877	
R-squared	.203	.220	.222	.220	.222	.093	.136	.130	.148	

Estimates are weighted for the outcome-based sampling in programme villages. The robust standard errors in brackets are corrected for clustering at the village level. *: p<0.10, **: p<0.05, ***: p<0.01. 2SIV results are bootstrapped with 200 replications.

Table 8. The importance of village size

Dependent variable:	Assistance	Schools	infrastructure
Programme dummy	-.064 (.088)	.126 (.037)***	.133 (.035)***
Trust in community members (instrumented)	.452 (.239)*	.083 (.084)	-.066 (.087)
Reciprocity	.257 (.149)*	-.047 (.047)	-.115 (.050)**
Village level reciprocity, without self	.952 (.368)***	.227 (.126)*	.146 (.122)
Interaction of village level reciprocity with village population	-.065 (.111)	-.100 (.035)***	-.052 (.031)*
Village population	-.040 (.025)	-.012 (.010)	-.021 (.009)**
<i>Household characteristics</i>	Yes	Yes	Yes
<i>Community characteristics</i>	Yes	Yes	Yes
<i>Block var. / district dummies</i>	Yes	Yes	Yes
Joint significance of village level reciprocity, village population and interaction term (p-value)	.039**	.379	.417
# observations	1875	1867	1877
R-squared	.067	.301	.162

Estimates are weighted for the outcome-based sampling in programme villages. The robust standard errors in brackets are corrected for clustering at the village level. *: p<0.10, **: p<0.05, ***: p<0.01. Results are bootstrapped with 200 replications.

Table 9. Empowerment and confidence (2SIV)

	Dependent variable:	Assistance	Schools	infrastructure
Specification:				
A.	How much influence do you think people like yourself can have in making this community a better place to live? (1. none, 2. some, 3. a lot) ⁴⁴	.077 (.111)	.187 (.039)***	.161 (.043)***
B.	Parents cannot change the quality of the primary school. (1. agree, 2. neutral, 3. disagree)	.100 (.043)**	.054 (.016)***	.051 (.017)***
C.	Do you think that the members of this community would be able to improve the quality of education if they would jointly organize? (0. no, 1. yes)	-.171 (.098)*	.126 (.034)***	.102 (.039)**
D.	Do you think that the members of this community would be able to improve the quality of the roads if they would jointly organize? (0. no, 1. yes)	-.065 (.095)	.129 (.033)***	.127 (.038)***
Additional variables in all specifications:				
	<i>Programme dummy</i>	Yes	Yes	Yes
	<i>Trust in community members (instrumented)</i>	Yes	Yes	Yes
	<i>Reciprocity</i>	Yes	Yes	Yes
	<i>Village level reciprocity, without self</i>	Yes	Yes	Yes
	<i>Household characteristics</i>	Yes	Yes	Yes
	<i>Community characteristics</i>	Yes	Yes	Yes
	<i>Block var. / district dummies</i>	Yes	Yes	Yes

Estimates are weighted for the outcome-based sampling in programme villages. The robust standard errors in brackets are corrected for clustering at the village level. *: p<0.10, **: p<0.05, ***: p<0.01. Results are bootstrapped with 200 replications

⁴⁴ The original codes are reversed to indicate increasing influence with an increasing code.

Table 10. Spillover effects on non-participants in programme villages (2SIV and OLS)

Dependent variable:	Assistance (2SIV)	Schools (2SIV)	Infrastructure (2SIV)	Trust in community members (OLS)	Reciprocity index (OLS)
Programme dummy	-.057 (.086)	.117 (.035)***	.143 (.035)***	.251 (.077)***	.022 (.050)
Trust in community members (instrumented)	.382 (.254)	.076 (.092)	-.096 (.100)		
Reciprocity	.273 (.141)*	-.039 (.048)	-.133 (.054)**		
Village level reciprocity, without self	.686 (.202)***	-.112 (.069)	-.054 (.063)		
<i>Household characteristics</i>	Yes	Yes	Yes	Yes	Yes
<i>Community characteristics</i>	Yes	Yes	Yes	Yes	Yes
<i>Block var. / district dummies</i>	Yes	Yes	Yes	Yes	Yes
# observations	1189	1184	1191	1193	1193
R-squared	.108	.269	.101	.192	.099

Participants in programme villages are excluded from the estimations. The robust standard errors in brackets are corrected for clustering at the village level. *: p<0.10, **: p<0.05, ***: p<0.01. 2SIV results are bootstrapped with 200 replications.

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