The Role of Social Capital in Early Childhood Development :

Evidence from Rural India

January 2004

Wendy Janssens
Jacques van de Gaag
Jan Willem Gunning

AIID
AMSTERDAM INSTITUTE FOR INTERNATIONAL DEVELOPMENT

Acknowledgements

The authors are very grateful to the Bihar State Director of Mahila Samakhya, Sr. Sabeena, for her support to the research project. We would also like to thank State Officer Ms. Pushpa and District Program Officers Ms. Poonam, Ms. Sangeeta and Ms. Aneeta, of Muzaffarpur, Sitamarhi and Darbhanga districts respectively, for their support and cooperation. Special thanks go to the District Core Teams for their help and enthusiasm. Moreover, the research group very much appreciated the hospitality of the Mahila Samakhya programme and the BEP programme in Muzaffarpur. We appreciate the support of Mr. S.K. Negi, State Director of the Bihar Education Project (BEP), and of the BEP District Officers, in particular Officers on Special Duty Mr. Sunil Kumar and Mr. Bhola Prasad. We would also like to thank the Early Child Development (ECD) team of the World Bank, with special reference to knowledge coordinator Ms. Mary Young, for financially enabling the research. Last but not least, our most sincere gratitude goes to Dr. Shantwana Bharti, legal trainer of Mahila Samakhya and member of the Muzaffarpur District Core Team, for her continuing support and most valuable contributions.

EXECUTIVE SUMMARY

The literature on social capital clearly shows the significant relationship between social capital and individual outcomes such as educational attainment. However, there is little evidence so far on outcomes of very young children. This report studies the role of social capital in enhancing child outcomes.

It investigates two potential sources of social capital. At the individual level, the authors consider social capital as the resources and information residing in the social networks of a child's parents. At the community level, we analyze social capital as the willingness of a community to cooperate and engage in collective action.

We study the Mahila Samakhya programme in rural Bihar (India), a women's empowerment programme that emphasizes female education. The findings strongly suggest that the programme is successful in increasing parental awareness on the value of preschool and primary education. In other words, the programme seems to increase the informational resources of parents on education, a social capital effect. Moreover, the results indicate that programme members are significantly more likely than non-participants in their village to participate in school management and school activities, and to contribute to the construction of schools and preschools. That is, the results are highly suggestive of increased collective action as well.

A second main finding is that these results do not remain limited to programme participants. We find that non-participating women in programme villages are significantly more aware of the importance of (preschool) education than women in control villages. In addition, non-participating households in programme villages are also significantly more likely to participate in school management and activities, and to contribute to school construction. These results suggest that the programme not only increases social capital among its members, but has potentially strong spillover effects to other community members as well. The programme seems to increase individual and community social capital throughout the wider community.

Next, we study the relationship between the Mahila Samakhya programme and preschool and primary school enrolment. Controlling for child, household and community characteristics, we find that children in programme villages are significantly more likely to be enrolled in preschool. The number of preschools, itself strongly correlated with the presence of the programme, is highly predictive of enrolment. We also find a significant and additional relationship between individual participation in the programme and preschool enrolment. Finally, the evidence suggests that children living in programme villages, whose mothers do *not* participate themselves, are significantly more likely to be enrolled as well. In short, the programme seems to have a direct relationship with preschool enrolment

For primary school the findings are approximately similar. The main difference is that the spillovers of the programme are much less visible. Only girls and children from the lowest castes seem to benefit of the presence of the programme regardless of whether their mother participates herself.

A similar analysis of immunization coverage again shows the large spillovers of the programme: children in programme villages are significantly more likely to be

immunized against tuberculosis, diphtheria and measles, *regardless* of the active participation in the programme. Surprisingly, this result is stronger than for individual membership. The differences in immunization coverage between the member households and non-member households are insignificant (except for measles). Note that the programme does not have any correlation with the immunization against polio. The impact of the recent mass polio campaigns organized by the government may obscure any programme effects.

Finally, the report analyses the relationship of the programme with health indicators. In particular, it studies the partial correlations of programme village and programme membership on the prevalence of diarrhea. However, the logistic estimation does not confirm any significant relationship. In contrast, participants in the programme do have better knowledge on how to treat diarrhea once it occurs than control households. Again, this relationship is also significant for non-participants although its size is smaller.

In summary, the evidence is strongly suggestive of the positive relationship between the Mahila Samakhya programme and increased individual and community social capital. In addition, the findings strongly suggest a positive relationship with pre- and primary school enrolment. Not only on members, but on non-members as well. We find similar results for immunization and the treatment of diarrhea, a proxy for health practices.

List of abbreviations

BEP = Bihar Education Project
Dpt = Diphtheria
ECD = Early Childhood Development
MS = Mahila Samakhya
NGO = Non-Governmental Organization
OBC = Other Backward Castes
ORT = Oral Rehydration Therapy
PTA = Parent Teacher Association
SC/ST = Scheduled Castes / Scheduled Tribes
Tbc = Tuberculosis
VEC = Village Education Committee

Tables and figures

1. Introduction

The social environment in which a child grows up is one of the most important determinants of its development, well being and outcomes later in life. Not only the family plays an important role, but also the social relations of a child's parents. Moreover, as the social capital literature suggests, the characteristics of the community shape a child's wider surroundings and strongly influence its opportunities.

Social capital at the individual level refers to the resources residing in one's social relations and networks that can improve individual outcomes. These resources can consist of information (on child rearing practices, job opportunities). They can be financial or material (informal loans, sharing cattle or equipment). They might concern help (such as childcare, or in building a house) or more intangible forms of social capital like emotional support and friendship. At the community level, social capital encompasses values, norms of behavior such as fairness and reciprocity and trust in others. Community social capital facilitates cooperation and increases the willingness of the community to engage in collective action.

There is increasing evidence on the relationship between social capital and child outcomes. Children's well being depends on several sources of social capital. The within family social capital concerns the relationship between parents and children and among siblings. Important factors in this respect are for example the presence of both parents in the household, parental interaction with the children, a stimulating home environment and the number of siblings with whom to share attention. A second source of child well being is based on the social capital of its parents, in particular the information and support that parents have access to through their own networks. Third, the community social capital shapes interpersonal relationships, directly influences behavior in the village, and affects the propensity of community members to engage in community projects to improve village life.

In spite of the increasing attention for social factors, research on social capital and the very young ones is still scarce. This report proposes to investigate the role of social capital in early childhood development. It will give some first insights in the relationship between parents' social networks, community social capital and early childhood outcomes. In particular, the report will focus on the following questions:

- What is the relationship between social capital, parental attitudes and parental participation in education?
- What is the role of social capital in increasing preschool and primary/middle school enrolment?
- What is the role of social capital in improving child health and immunization coverage?

To answer these questions, the report analyses the Mahila Samakhya (MS) programme in rural Bihar, a northern Indian state. The MS programme is a women's empowerment programme aimed at women from the economically and socially most disadvantaged groups. The programme initially aimed at empowering women through increased literacy and to improve education enrolment, especially of girls. Since its start in 1992 it has proven to be a successful community mobilizing force. Over time, the women's groups have addressed an increasingly broad range of issues (Mahila

Samakhya, 2002). Through the increased literacy and empowerment of the women and the strengthening of their position within and outside the household, the programme indirectly improves child well being. In addition, it also directly increases outcomes of young children. Examples are the construction preschools, increased awareness of the importance of girls' education, parental participation in school activities, and increased knowledge of health issues.

The analysis is based on a large-scale quantitative survey of the programme. In each of 75 villages where the programme is active twenty women were interviewed, both participants and non-participants in the programme. Moreover, the analysis uses a control group in 30 additional villages where the programme is not active. The quantitative data are used in both descriptive and econometric analyses. This approach enables us to distinguish between the outcomes of programme participants and of non-participants. More interestingly, it allows the comparison of non-participants and the control group. To the extent that the programme villages are similar to control villages, any differences between the latter two groups can be attributed to the presence of the programme *even though non-participants are not actively involved in the programme themselves.* In other words, we are interested in finding spillover effects of the programme on the rest of the community.

The remainder of the report starts with an overview of theories and current knowledge on the relationship between social capital, education and community engagement. The third section gives a more detailed description of the Mahila Samakhya programme and a comparison of participants versus non-participants. In section four, the report investigates parental attitudes towards education as well as parental involvement in school management and activities. Next, it performs a descriptive and econometric analysis of enrolment in preschool and primary/middle school. Finally, the sixth section looks deeper into immunization coverage and health practices among the three groups: participants and non-participants in programme villages, and households in control villages. The last section summarizes the findings and concludes.

2. Social capital and Child Development

2.1 The origins of social capital

The concept of social capital was closely linked to educational opportunities and outcomes from its early onset. Only in relatively recent years has it been expanded to other areas of development such as job opportunities, agricultural outcomes and economic development. Social capital can facilitate a number of issues such as risk sharing and contract enforcement. However, we will focus in this paragraph on the transmission of information with respect to education.

One of the founders of the concept, Bourdieu, introduced social capital and cultural capital to complement economic capital, which consists of financial, physical and natural capital (Bourdieu, 1986). He describes social capital as the actual or potential resources residing in one's social network and the ability of the individual to mobilize these resources. Social capital is a result of the investment in social relations over the years, both conscious and unintended, of the individual and its family. Cultural capital on the other hand would encompass human capital and education, culture as well as early socialization. Both the social and cultural capital of a child's family are important, albeit often disguised, determinants of the returns of investment in education. They shape a young child's cognitive and social development, and will influence the decisions of a child's parents regarding length and quality of its education.

Loury was one of the first principal authors to introduce social capital into the economics of education (Loury, 1977; 1981). He shows how differences in socioeconomic background (through social stratification, racial segregation in neighborhoods, differences in parental education and income) determine the eventual education that an individual will receive. Individuals with otherwise equal initial abilities but living in different social contexts can end up choosing entirely different educational careers.

Coleman popularized the concept of social capital with his 1988 article on the role of social capital in the creation of human capital (Coleman, 1988). On the one hand, Coleman emphasizes the importance of relations between the parents and the child for child outcomes. A child's social capital gives it access to its parent's human capital such as knowledge, a home environment conducive to learning, and early socialization. This is dependent on parents' physical presence and the attention they give to the child. Second, a child benefits from social capital beyond the family: the relations of parents with other community members and the institutions in the community. He introduces the closure of social networks that would be especially conducive to the existence of norms. Intergenerational closure, with links among parents of the children in school, helps supervision and control of the children and is argued to improve school outcomes (Coleman, 1990). Coleman operationalizes the concept in his analysis of high school drop out. [1]

[1] However, as Portes (1998) notes, we should make an explicit distinction between positive and negative consequences of social capital or strong social networks. Negative consequences could stem from exclusion, excess claims on members, restriction on individual freedom because of demands for conformity and the dilemma between community solidarity and individual freedom, and down-levelling norms.

2.2 Social capital and child outcomes

Recent theoretical and empirical research on the impact of social capital on child outcomes support these early theories (Harpham, 2002; Winter 2000). The extent to which daily caregivers can draw on resources such as child care, temporary loans, advice about child rearing and emotional support, affect their ability to create a satisfying environment for themselves and their children.

In general, the research on social capital and education has focused mainly on the individual impact of social capital. In this respect, the analysis of Snijders (1999) is worth mentioning. Snijders distinguishes four elements of social capital, each of crucial importance to the individual. These are:

a) the number of relations one has, that is, the size of one's network (e.g. through family, work, school, voluntary organizations);
b) the resources that these social relations possess such as information, time, money, friendship;
c) the willingness of the relations to provide you with these resources (which in turn could based on trust within the group or norms of behavior); and
d) the structure of the network (closed versus open networks, strong versus weak ties).

Applying this perspective to for example the 'lack of a child's social capital' when parents do not offer sufficient learning stimuli to their child gives a more detailed investigation of what is lacking. It could be a lack of (the number of) social relations if one or both of the parents have left the family. It could be a lack in resources in the child's network if its parents do not have sufficient knowledge regarding cognitive development for example. Or else, it could be related to the structure of the network if the child has many siblings with whom to share its parents' attention.

Furstenberg and Hughes (1995) provide a longitudinal analysis of the role of social capital in the successful development among at-risk youth. Their social capital measure consists both of within family indicators (e.g. presence and attention of both parents, siblings, encouragement) and family-community links (e.g. religious involvement, school quality, number and attitudes of friends). The authors find substantial evidence for the relationship between social capital indicators and educational and socioeconomic outcomes. Using evidence from the United Kingdom, Jack and Jordan (1999) argue that child welfare and family functioning are crucially dependent upon the social support available within communities. According to them, in order to promote child welfare it would be more effective to build social capital in poor communities than to increase formal child protection, family support services, and parenting skills training.

Interesting in this respect is also Narayan's distinction between bonding and bridging social capital (Narayan, 1999). Whereas the former denotes the social relations among one's own social group, the latter refers to relationships that cross social lines and reach out to other segments of society. Even the most marginalized groups in society often have access to bonding social capital. This is important in that it helps people to get by in daily life, for example when they receive help in childcare. But the resources and information contained in bonding links might be limited. Without bridging links,

the most disadvantaged groups will find it very difficult to step out of their situation and substantially improve their well being.

If the role of social capital on educational outcomes is so important, we would expect social capital to play a significant role in early childhood development as well. Indeed, the little evidence that is available is promising. For example, Runyan et al. (1998) find that young and vulnerable children benefit from their parents' social capital just as they benefit from parents' financial or human capital. Factors such as church affiliation and support within the neighborhood were able to significantly discriminate between low and high levels of child well being among high-risk preschool children in the United States. So far however, quantitative research on the relation between social capital and young children's well being has been limited.

Hypotheses
In line with the above, we would expect that participation in the Mahila Samakhya programme enhances child outcomes because parents gain access to better knowledge about health and education. They enlarge their social networks to the extent that they get to know the other participants and the officers of the MS programme. The information residing in this network becomes available to them. Thus, the report will study the relation between participation in the Mahila Samakhya programme and education and health outcomes.

Moreover, since non-participants live in the same village as MS members and are likely to know some participants (or know people that know participants), the social capital literature suggests that this information might travel through their social networks and reach other community members as well. In other words, we will also look for a change in child outcomes among non-participant households living in programme villages.

2.3 Social capital and community engagement

At the community level, social capital resides in social relations and institutions. Values, norms of behavior such as fairness or reciprocity, and trust in both other community members and in strangers jointly determine the social and economic development of villages and societies.

The main outcome of social capital at the community level is enhanced cooperation and increased propensity to engage in collective action. Ostrom (1990, 2000) provides convincing evidence on the importance of community involvement in the delivery of projects for subsequent outcomes at the village level. Trust among the participants in a project, as well as sharing of certain norms, facilitate project delivery and sustainability. Moreover, strong social ties facilitate monitoring and sanctioning if people do not adequately contribute to the project. Likewise, Krishna and Uphoff study community cooperation in the management of watershed projects in north-west India (Uphoff, 2000; Krishna and Uphoff, 1999). They find that an index of social capital variables is positively and consistently related to superior development outcomes both in watershed conservation and in cooperative development activities more generally.

In a similar vein social capital can increase community participation in the delivery of preschool and primary school education. Parental involvement in school activities and school management is found to have substantial impact on both school performance and child outcomes. A multi-country study on Latin America (Willms and Somers, 2001) shows how children's achievement in the first three grades of primary school is significantly related to parental involvement in school activities. Moreover, the authors also find that all pupils do better if there is a high level of parental involvement in the school, even if their own parents do not actively participate. A World Bank study on the impact of community involvement in 23 large education projects provides additional evidence on the role of community participation in improving educational outcomes (Uemura, 1999).

In line with this, Braatz and Putnam (1998) focus on the educational consequences in the United States both of parents' involvement in education (direct participation in school governance as well as participation in school-community collaborative efforts) and of wider community networks of civic engagement. They find that an increase in social capital (measured as trust, associational activity, the number of NGOs, and voter turnout) is significantly related to the expected increase in educational performance.

Hypotheses

This report will also consider community social capital as a factor in child development. The Mahila Samakhya programme stimulates collective action of its members to set up community projects. A number of these projects affect young children, in particular the construction and management of preschools. Other activities are less tangible, such as the campaigns to increase immunization coverage or increase primary school enrolment.

Participants in the MS programme are expected to contribute more often to school activities and community projects. First of all, the report will investigate whether this hypothesis holds. If so, a related question concerns whether this effect also extends to non-participants. That is, does an increase in social capital within a specific group also increase the propensity to engage in collective action among other community members?

Ideally, we would have used indicators that directly measure developmental outcomes, such as cognitive and socio-emotional development. However, these indicators are not available. Therefore, we will use preschool enrolment as a proxy for cognitive early child development.

3. Description of the programme

3.1 History of the Mahila Samakhya programme

The Government of India launched the Mahila Samakhya programme in 1988 as a pilot in pursuance of its New Policy of Education. The main objective of Mahila Samakhya (literally 'women interacting as equals') is to educate and empower women in rural areas, especially women from socially and economically marginalized groups such as women belonging to Scheduled Castes. The programme is currently active in nine states. The national Department of Education organizes the Mahila Samakhya programme at the national level. At the state levels, the programme is implemented through autonomous Mahila Samakhya Societies.

The Mahila Samakhya programme was introduced in the state of Bihar in 1992 as a component of the Unicef-sponsored Bihar Education Project (BEP)[2]. It started in a few districts and was soon extended due to its success. In March 2002 the programme was active in 7 out of the 37 districts of Bihar. 1890 women's groups were active, covering 52,000 women.

Initially, the programme in Bihar aimed particularly at educational interventions: to enable greater access to education and to strengthen women's capacity to effectively participate in education processes at the village level. The participating women obtained literacy and numeracy skills and sought to ensure educational opportunities for their children, especially girls. They were stimulated to become active members of Village Education Committees (VECs) and Parent Teacher Associations (PTAs). Also, the programme supports women to set up educational centers for teenaged girls and preschool children. Over time the women groups have taken additional initiatives to address a wide range of issues, ranging from meeting daily minimum needs through savings and credit groups or income-generating activities, gaining control over their health, entering local politics, improving village level infrastructure, settlings conflicts in the village, to campaigning against child marriage (Mahila Samakhya, 2002).

3.2 Context: Mahila Samakhya in Bihar

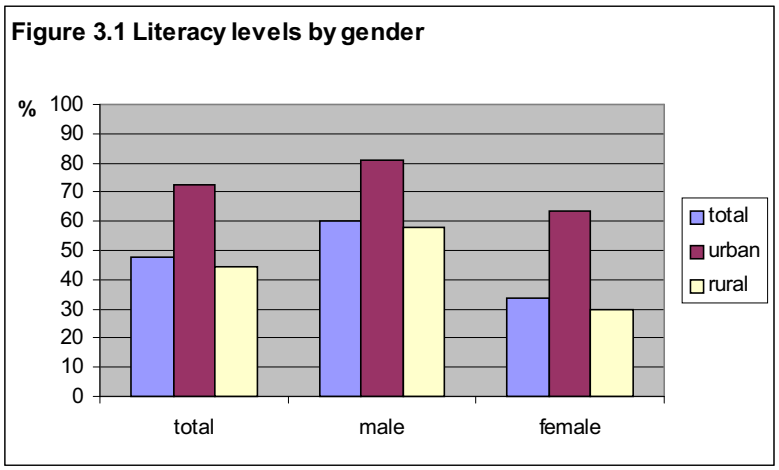
Bihar is situated in the northeastern part of India on the plains of the Ganga. It is one of the poorest states of India with the lowest socioeconomic indicators. Bihar is a predominantly rural state with a large and rapidly growing population of almost 83 million people. The percentage urban population is a mere 10.5% compared to the national average of 27.8%. Its population density is relatively high (880 people per square kilometer compared to an average density of 324) and its population continued to grow with 28% over the last decade. 20% of the population is in the age group of 0 to 6 years (India Census Office, 2001a; 2001b).

Society in Bihar is agrarian and still largely feudal. Although the Zamindari system of landlords and bonded labor does not officially exist anymore, most landless laborers live under extreme harsh circumstances. Society is very caste conscious with the lower castes facing innumerable social and economic deprivations. Gender discrimination is large (Mahila Samakhya, 2002).

[2] It is currently (also) part of the World Bank-sponsored Third District Primary Education Project in Bihar.

The extreme social stratification results in severe disadvantage in primary school access and learning for girls and children from the lowest castes. Enrolment is low, drop out and retention rates are high and learning achievement of those completing primary school is very low (World Bank, 1997). This leads to the lowest literacy levels of the entire country. The overall literacy rate in Bihar is only 47.5% compared to the national literacy rate of 65.4% (India Census Office, 2001a). Desegregation by gender shows that 60.3% of the male population in Bihar can read and write, but only 33.6% of the female population (see Figure 3.1). This is an alarmingly low percentage.

Figure 3.1 Literacy levels by gender



The poor social conditions in Bihar are accompanied by severe material poverty for a majority of the population. Almost two thirds of all people, 64%, lived below the poverty line of US$1 per day in 1993/1994. This is a very large proportion compared to the national average of 36%. This situation of extreme poverty forces many of the impoverished peasants to live from subsistence agriculture. Families migrate en masse for seasonal work at the brick kilns and in the fields. The yearly floods in the northern districts of the state increase these migration patterns. Social services and infrastructure for communication and transport are in similar need of improvement (Mahila Samakhya, 1995).

Needless to say, in an environment of such deprivation and social segregation, the position of the rural poor, in particular of women, is extremely difficult. This underscores the importance and potential scope of collective action to improve families' living conditions in Bihar. It also gives an impression of the many obstacles faced when trying to organize collective action at all.

3.3 Objectives and methods of Mahila Samakhya

The central component of the Mahila Samakhya programme is the 'mahila samooh', the women's collective. Usually a few times per month the women meet to discuss problems and issues that they encounter in their daily lives. For many of them, the initial discussions in the women's group are the first time that they reflect on their situation, ask questions, and feel confident enough to articulate their needs and think about solutions through initiating collective action. Most of the women have never come out of their house before to discuss public issues, let alone to address village leaders or local administrative bodies.

Of vital importance in the strategy of Mahila Samakhya are the facilitators, called the 'sahyogini's', who each support a cluster of ten villages. They are also the link

between the ten villages and the supporting institutions of the Mahila Samakhya programme at the district level. Each sahyogini is the initial mobilizing force in a village. The organization of women into a group is not an easy process, especially since the Mahila Samakhya programme does not offer clear-cut and immediate benefits. The women's collective has to produce these benefits itself. Regularly, the sahyogini has to overcome considerable mistrust on the side of the women or even overt hostility of the entire community. She gains trust among the women through regular visits to their homes, the fields and their work place. During these visits she talks and listens to the women, assists in solving small issues and helps them to articulate their problems and needs. Slowly, the women of the villages learn new things, gain information, become aware of the issues around them, and decide on the first activities of collective action to improve their lives. As the group gets stronger, it starts to set its own agenda and meeting times, and the sahyogini participates less and less in the meetings (Mahila Samakhya, 1995; 2002).

An important difference between the Mahila Samakhya programme and many other community development programs, is the emphasis on the *process* of empowerment, instead of on the fulfillment of targets. Mahila Samakhya seeks to bring about a change in women's perceptions about themselves and their own abilities, and the perceptions of society with respect to women's "traditional" roles. It is a bottom-up and demand driven program. Women themselves decide which issues deserve priority. The programme does not prescribe the kind of activities that a group has to engage in. As a result, the activities of the mahila samoohs differ from village to village and from state to state.

The Mahila Samakhya programme itself is not involved in the delivery of services or resources to communities. Instead, the programme assists the mahila samoohs in their own solutions for problems and enables the collectives to effectively access and utilize resources and government subsidies available at village, block and district levels. The Mahila Samakhya programme provides substantial training programmes. Part of the training programmes is aimed at project functionaries such as the facilitators, trainers or legal advisors. The other trainings aim specifically at the women themselves and focus on areas like literacy, health, legal issues, financial management, non-traditional skills or group leadership.

3.4 Selection in the programme and in the sample

In line with its objectives, the Mahila Samakhya programme focuses on districts and on blocks within districts[3] that are particularly disadvantaged. Selection criteria for the programme blocks are a low female literacy rate, a high percentage of SC/ST population, and a high percentage of population living below the poverty line (a census measure). Whereas blocks without the programme might not be much better off, MS blocks are generally considered to be especially backward.

Within programme villages, selection within the programme of individual women is voluntary. The facilitators gear their efforts towards women from the Scheduled or Other Backward castes, but in principal any woman who is interested can participate. This suggests a potential selection bias if we compare participating and non-

[3] The administrative structure divides States in districts, districts in blocks, and blocks in revenue villages.

participating women. The women already most interested in education would be most likely to participate. However, forming a group is a slow process. Given the limited awareness especially among the target group, and given the fact that it takes on average 10 months for the facilitators to convince women to organize, it seems likely that their interest increases mainly *after* the first contact with Mahila Samakhya officers. That is, it would not so much be the pre-programme attitudes of members that determine participation. Instead, the mobilizing efforts of the Mahila Samakhya officers and subsequent participation influence attitudes. Still, we need to keep in mind these potential individual differences in motivation.

The study is based on a clustered stratified sample in three districts of Bihar: Muzaffarpur, Sitamarhi and Darbhanga. In each of the districts we choose a few blocks that are covered by the MS programme and a few blocks where the programme is not (yet) active. The first stage of the sample selection consisted of a random sampling of 35 villages per district: 25 programme villages and 10 control villages. In the second stage, we randomly selected 20 households per village. In the programme villages, these households covered 10 participating households and 10 non-participating households. For a detailed description of the sample region, the sample selection method and the data collection process, see Annex 1.

3.5 Mahila Samakhya and preschool centers

On demand of the women of an MS group, the Mahila Samakhya programme can give support to set up a preschool, the so called *Bal jag jagi centers.* The centers aim to prepare young children aged 3 to 6 years old for entrance in primary school. Through games, stories and songs, the children get ready for enrolment in primary education. By March 2002, the women's groups in Muzaffarpur had set up 137 bal jag jagi centers, in Sitamarhi they were operating 110 centers and in Darbhanga, the youngest programme district, 23 centers had been opened (Mahila Samakhya, 2002).

The Mahila Samakhya programme provides initial and follow-up training for the preschool instructors and finances her honorarium. However, the operation of the bal jag jagi center is the responsibility of the women's group. The women need to make space available for the center and to maintain the center. They choose the instructor (usually a woman from their own village) and monitor her. Also, the group is responsible for the payments to the instructor.

The bal jag jagi centers are clear examples of community-based ECD centers (Young, 1997; 2002)[4]. They are initiated by community members. They share the common characteristic of a strong felt need on the part of parents. The daily caregivers are involved in the set up and the running of the programme. Parents contribute to the programme by assisting in the activities and construction works.

A drawback of many community ECD programmes is their lack of quality (Evans, Myers et al., 2000). Often a lack of appropriate materials, little training and support of the teacher and little attention for nutrition and the physical development of the children contribute to the low quality. In those cases, the programme will not result in all the expected benefits of ECD programmes. Unfortunately, the study does not

[4] For other examples of successful community-based ECD programmes, see for example Kirpal (2002).

provide data to test the quality of the bal jag jagi centers. We do not have enough information on the preschool characteristics, nor do we have sufficient data on the cognitive and physical development of the children. Therefore the study limits itself to enrolment in preschool as an indicator of child development.

3.6 Comparison of participants and non-participants

This section provides a comparison of women who participate in the MS programme with women living in the same villages but who decide not to participate. We find that slightly more MS members are widows as compared to non-members from the sample (8.1% versus 7.1%). More MS members have work outside the household than non-participants (25.1% versus 18.1%). Also, the proportion of skilled laborers among MS members is a bit larger. For MS members, skilled labor often relates to Mahila Samakhya work, e.g. in the childcare center. Finally, it seems that MS members are somewhat younger on average than non-participating respondents. The mean age of respondents is 38.0 and 40.6 years respectively.

However, part of these differences could be related to the sample selection procedure. MS members were selected in the sample as individuals. Interviewers would come back if members were not at home at the time of the first visit. In contrast, non-members were selected as households. Any female of the household that was at home at the time of the visit by the interviewer was eligible as a respondent. Hence, the proportion of domestic workers is likely to be larger among the non-members. Moreover, since older women often have more 'rights' within the family, their proportion among non-participant respondents is likely to be higher as well. Hence, it is not clear whether the above averages represent real differences between MS and non-members.

Differences in household characteristics on the other hand represent real differences between the participants' households and the non-participating population in their villages. As compared to non-members, the heads of households of MS members are less often skilled, student or farmer (see Table 3.1). The largest group works in unskilled labor. It seems that women from unskilled, landless households are more inclined to become a member of Mahila Samakhya. We also find a difference in skilled versus unskilled labor between non-participants in MS villages and the control group. The former group is substantially more likely to have a skilled laborer as head of the household.

Table 3.1 Employment characteristics

	MS members	Non-members	Control group
Farmer	20.7	26.1	29.3
Domestic work	3.2	1.6	1.1
Unskilled labor	43.3	30.5	39.0
Skilled labor	15.2	20.0	10.5
Student	9.2	15.8	15.1
Other	7.8	4.9	4.2
Missing	0.6	1.1	0.7
Total	**100%**	**100.0%**	**100.0%**

We find significant differences for the caste that the households belong to (see Table 3.2). 35% of the programme participants come from the Scheduled Castes (the Scheduled Tribe population in the study area is very low). Overall, a relatively large percentage of women belonging to the Scheduled Castes (SC/ST) participate and a relatively small percentage of women from General Castes. This is not surprising, given the objective of the programme, although women from all castes are welcome to participate. It might also be related to the benefits that SC/ST women hope to get from participation as opposed to the other women. Finally, an explanation could be that General Caste women are not always socially allowed to mix with other castes.

Table 3.2 Caste and religion characteristics

	MS members	Non-members	Control group
Scheduled Caste/Scheduled Tribe	35.4	21.4	26.0
Other Backward Castes	53.0	54.8	46.9
General Castes	2.2	9.5	13.4
Minority (mainly Muslims)	8.5	11.7	13.2
Missing	1.0	2.6	0.5
Total	**100%**	**100.0%**	**100.0%**
Hindu	90.6	86.4	85.1
Muslim	9.2	12.8	14.8
Missing	0.2	0.8	0.2
Total	**100%**	**100.0%**	**100.0%**

Relatively few Muslim women participate as compared to the overall population in MS villages. Also, in comparison with control villages the Muslim population in programme villages is slightly lower. However, both findings are not significant.

We do not have information on household income. The data on household assets provide some insights in the wealth of the households. On average, MS members live in houses of lesser material than non-participants or the control group. In general, the entire sample has relatively little access to facilities such as electricity and sanitation. However, again the MS members seem to be worse off. They use more often biomass to cook on. They have less access to electricity. They more often use public instead of private water facilities. They have less quality sanitation facilities. Note however that the overall access to sanitation is alarmingly low. Only 15% of the population in the study area have access to sanitation facilities such as a pit toilet or a latrine.

4. Changing attitudes and community engagement

4.1 Parental attitudes towards education

In view of the very low primary education outcomes in Bihar, female literacy and primary education are focus points of the Mahila Samakhya programme. The programme provides literacy training to the women. It establishes education centers for women and teenaged girls who did not go to school. It raises awareness among the programme members with respect to the importance of education, for girls as well as for boys. Moreover, the members discuss the role of preschool education with the programme officers.

Since primary education is not compulsory in Bihar, schooling is primarily a family decision. The decision will depend both on the costs of education (tuition fees, transportation, costs of books and uniforms, as well as opportunity costs of child labor) and on the benefits. These benefits are long term and concern not only future income but also a better ability of mothers to take care of their family for example, when they are literate and gain better understanding of health or nutrition. In addition, education has a value in itself. Also, female empowerment crucially hinges on girls' schooling. Whereas the costs to the family are immediate, the potential benefits of education are not always apparent. For girls in rural Bihar moreover, these benefits will usually not accrue to her own family. Upon marriage, women are mostly expected to move and live with their parents-in-law.

Apart from factors such as parent's own education and income, attitudes of parents are likely to play a major role in enrolment and schooling outcomes. It is expected that the programme training and discussions change the attitudes of members towards their children's schooling. The questionnaire contained some statements regarding the importance and value of primary and preschool education. Table 4.1 shows the statements and the corresponding attitudes of the MS members, the non-members in programme villages, and the women in control villages.

Table 4.1 Parental attitudes towards education

% that agrees with the following statements:	MS members	Non-MS members	Control group
Decision to send your child to school			
a) It is each family's own decision whether to send their children to school or not. You should not interfere with that.	3.6	24.4	21.6
b) In our community, we do not discuss whether or not to send our children to school.	5.6	22.9	26.3
Perceived benefits of schooling			
c) If children study hard and do their best at school, they will do better later in life.	99.4	97.5	93.7
d) Sending girls to school is a waste of time and money because they will have to stay in the house anyway.	1.6	8.7	14.2
Early Childhood Development			
e) When children go to preschool at a young age, they will perform better in primary school.	99.1	96.1	91.4
f) Young children under 5 do not learn much by playing with each other. To acquire skills it is better that they help in the household.	8.7	22.8	35.4

The decision to send your child to school
21.6% of the control group feel that no one should interfere with a family's decision whether or not to send a child to school. This reflects the 'private' aspects of the education decision. Likewise, 24.4% of the non-participants in the programme villages share this opinion. In contrast, only 3.6% of the MS members agree that no one should interfere with the schooling decision. This strongly suggests that MS members are more aware of the importance of primary schooling. As a consequence they might see it more in the interest of the child to convince parents to enroll their child.

The second statement shows a similar picture. 26.3% of the control households do not discuss within the community whether to send a child to school. In the MS villages 22.9% of the non-members say they never discuss the issue. On the contrary, only 5.6% of the MS members feel their community does not discuss primary schooling. Again, programme members score significantly different from the other two groups. Although non-members agree slightly less often than the control group with the statement, the difference is not significant. This is surprising since we know that the women's collectives are active in raising awareness on primary enrollment. Maybe the MS members reach only non-participating women that are already more open to the issue.

Perceived benefits of schooling
With respect to the future benefits of schooling, the differences between the three groups are not significant. Only 0.6% of the MS members does not agree that primary education will make you perform better later in life, compared to 2.5% of the non-members and 6.3% of the control group.

The opinions on girl's education are more worrisome. 14.2% of the respondents in the control group states that girls going to school is a waste of time and money. This answer would suggest that these respondents consider female education as non-valuable regardless of the family's financial position. It strongly reflects the prevalent attitudes and bias against women. Among the non-members in programme villages, this percentage is 8.7%, significantly less than the control group at the 1% error level. The programme seems to be successful in reaching other community members and changing their attitudes towards female education. Note that 1.6% of the MS members agree with the statement that girls' schooling is a waste of time, despite the programme's explicit emphasis on the importance of female education.

Early childhood development
A large majority in all three groups acknowledges the importance of preschool education for performance in primary school. 91.4% of the control group agrees with this statement compared to 96.1% of the non-participants in MS villages and 99.1% of the participants. MS members score significantly different from non-members and the control group. The difference between non-participants and control respondents is not significant.

Regarding the process of early childhood development, differences are much more pronounced. Only 8.7% of the MS members agrees that young children do not learn much by playing with each other. In contrast 22.8% of the non-participants thinks so. For the control group this percentage is even higher, reaching 35.4%.

Conclusion

Overall we could say that members in the Mahila Samakhya programme are significantly more aware of the importance of preschool and primary education than non-members, who in turn are more aware than the control group. This latter difference is significant for half of the statements, in particular with respect to the decision to send a child to school, girls' education and play as stimulating activity for young children.

We cannot directly infer causality from participation to increased awareness because participation in the programme is based on self-selection. That is, it is possible that especially women who were already interested in primary education joined Mahila Samakhya. However, this seems unlikely. The programme focuses on the poorest, most disadvantaged and least educated groups. In the subsequent training courses women become gradually convinced of the importance of education. It seems plausible to assume that their increased awareness is a result of participation in the programme, not a cause.

Thus, the results suggest that social capital of children's parents have increased among the MS households. The MS programme has introduced additional informational resources into the members' social network, which in turn increases their awareness with respect to education.

Also, our results suggest that the programme might reach beyond its members to influence the attitudes of non-members in programme villages as well. Women living in a village of course do not limit their communication to the MS group members. Discussions about educational attitudes and information on the value of girls' education seem to reach other women, especially the already interested, as well. However, non-participating women who feel education is a private decision that no one should interfere with, are less likely to be influenced by the programme, as the answers to the first two statements indicate.

4.2 Participation in school activities

At the community level, social capital is related to the involvement and active engagement of community members in community projects. Cooperative norms within a community group and increased trust indicate the presence and extent of social capital. A higher social capital in turn translates into more collective action and cooperative behavior.

A first operationalization of this idea is related to the active participation of parents in the schooling of their children. The MS programme explicitly supports the increased participation of the members in school management (such as Village Education Committees and Parent Teacher Associations). Over time, the women gain self-esteem and confidence which might change perceptions of the women's own role in their children's education. Moreover, as the group grows stronger, the members would become more conscious about the importance and more confident about the results of cooperation. The set up of bal jag jagi (ECD) centers is one of the examples where cooperation of the group is translated into successful collective action. A number of statements related to parental participation in education can shed further

light on these assumptions. Table 4.2 shows the statements and the answers of the three respondent groups.

Table 4.2 Parental involvement in education

% that agrees with the following statements:	MS members	Non-members	Control
Parental involvement in school management			
a) Parents should participate in the management of primary school	99.3	96.3	94.7
b) Parents cannot change the quality of primary school	7.4	19.8	14.1
Parental participation in school activities			
c) One of more members of my household are member of a Parent Teacher Association/Village Education Committee	17.4	8.1	5.1
d) One or more members of my household have participated in school activities over the last year.	47.6	22.2	15.4
Household contribution to (pre-)school construction			
e) One of more members of my household have contributed to the construction/maintenance of a primary school	45.7	24.5	13.6
f) One of more members of my household have contributed to the construction/maintenance of a preschool	50.8	8.3	2.8

Parental involvement in school management
The results show that almost all respondents agree with the need for parental participation in the management of schools. MS members are even more convinced of this than non-participants and the control group. This is significant at the 1% level. Still, the statement could also be interpreted as reflecting the role of parents in general. That is, a large majority of the respondents is in favor of participation of parents in school management. But this does not necessarily refer to their own participation.

Despite this support for the role of parents in school management, not all respondents are convinced of the effectiveness of participation. Among the MS members 7% feels that parents cannot change primary school quality. Among the non-participants and the control group, this percentage reaches 19.8% and 14.1% respectively. These latter two percentages are not significantly different from each other.

Participation in school activities
Whereas the previous statements reflect norms on parental participation, the next two statements concern actual behavior. Participation of parents in school activities can have the form of participation in the management of the school through a Parent Teacher Association. Also, parents can contribute to school activities ranging from

support in the classroom to the distribution of food. Note that the survey does not distinguish between pre- and primary school activities for the latter form of participation. Again, the findings show that overall MS members are most active. Moreover, non-members are significantly more active than the control group as well, both with respect to participation in PTAs/VECs and in school activities.

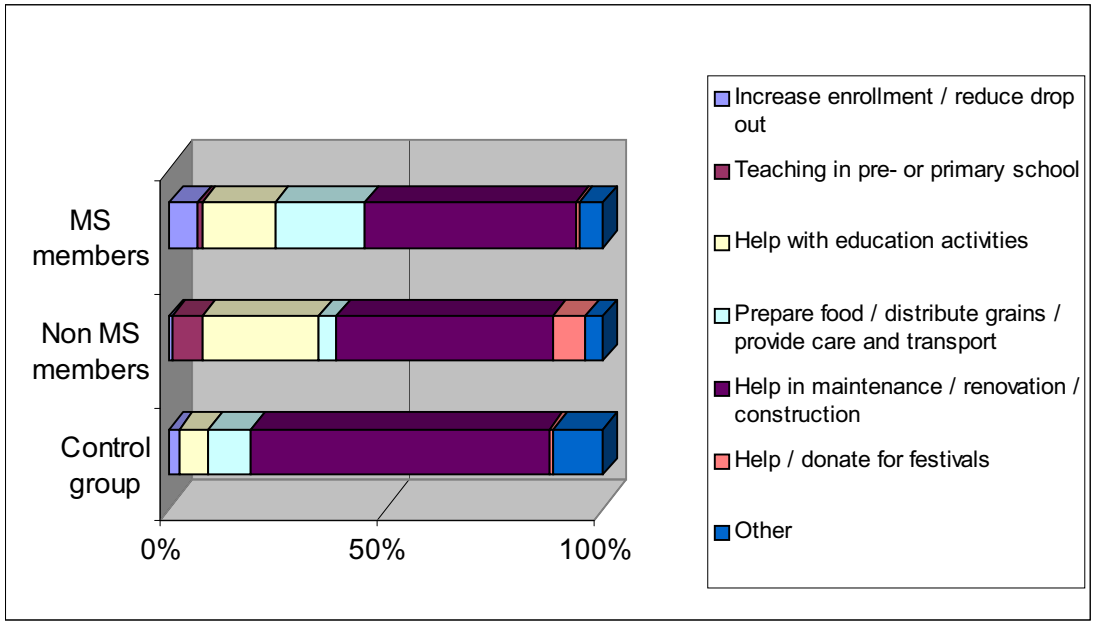
Especially this latter finding is promising. It suggests that the existence of the programme sets in motion a new motivation for participation in school activities within the village. Non-members seem to be affected as well by this increased propensity for cooperation. The mechanisms are not entirely clear. A potential explanation could be that good examples create followers. Second, the schools might get used to parental participation and promote this more actively. Or village members might see the beneficial effects of small individual efforts on the functioning of the school and realize they can make a contribution as well. Regardless of the exact processes, it seems very plausible that the presence of the programme has increased the cooperative behavior not only of programme members but also of non-members.

Type of activities

For those households who are participating in school activities (either in pre- or primary school), a majority (52.8%) helps in maintenance, repair or construction of the school building. A second major activity is helping with educational activities in the school program.

There is a small difference in type of activities between MS members and non-members in programme villages (see figure 4.1). The former group participates relatively more in increasing enrolment and in care/food activities. The latter group participates relatively more in education activities and construction activities. If households in control villages participate in school activities, they are most likely to help in maintenance and construction (e.g. construction of a fence or latrines, repairing the roof, refilling the holes in the schoolyard after a flood).

Figure 4.1 Parental participation in school: Type of activities



Contribution to (pre-)school construction
Finally, we asked respondents about the contribution of their household members to the construction of schools and preschools within the community. This contribution can be in terms of money or in kind (materials) but generally concerns labor efforts. MS members are substantially more likely to contribute to these community projects (see Table 4.2). About half of them have participated in the construction of a school (45.7%) or of a preschool (50.8%).

Non-members are more likely to participate than control households. Compared to the control group, non-members from programme villages are twice as likely to contribute to school construction (24.5% versus 13.5%). Note that their participation in the construction of preschools remains low, albeit significantly higher than for the control group.

The increased cooperation does not limit itself to school related activities. When asked about the contribution to other projects, such as the construction and repairing of roads, bridges, dikes, hand-pumps or temples, a similar pattern reveals itself. On average, the MS households have contributed to such construction projects 2.31 times over the last year. The non-member households in MS villages have contributed 1.24 times. The control group has contributed only 0.92 times to such community projects. The differences are significant at the 5% or 1% error level. Since these activities benefit the entire community, the spillover effects of the Mahila Samakhya programme on the rest of the community are potentially large.

Differences between the districts
A final remark concerns the differences between the districts. Within all districts, MS members are most oriented towards collective action and the control group is least likely to participate. However, overall Sitamarhi households are much more active. The Sitamarhi MS members, non-members and control households have participated to community (construction) projects on average 3.88, 2.58, and 1.44 times respectively. Muzaffarpur comes second with 1.53, 0.72 and 0.66 average contributions respectively. Darbhanga is least cooperative as a district with averages of 1.00, 0.70 and 0.38 for the three respective groups.

The Mahila Samakhya project in Darbhanga has been active since only a few years. This might explain the low propensity to contribute to collective action in this district. However, the low average for the control group indicates that part of it might be a district feature. Not clear is the reason for this low cooperative behavior. Nor do we have a clear explanation for the very high cooperation in Sitamarhi, although MS programme officers suggested that Sitamarhi might be positively influenced by neighboring Nepal, where the population would be more geared towards collective action than the population in Bihar.

Conclusion
The evidence on parental attitudes and behavior leads to three separate findings. First, the results suggest that the MS programme positively affects the social capital available to children from participating families. Two pathways were investigated: increased information and increased willingness to cooperate.

The evidence suggests that the programme introduces additional information on the value of education and thereby raises awareness among programme members. Women that are member of the programme disagree significantly more often that schooling is a private family issue as compared to non-members. They value (girls') education significantly more and they are more aware of the importance of appropriate, play-oriented child development than non-members.

The results also show that participation in the programme is related to increased parental participation in school management and school activities. Moreover, the higher willingness to contribute to school construction in MS villages increases the number of preschools substantially.

Second, the results strongly suggest a spillover effect of the programme on non-members. As compared to the control group, non-participants in programme villages are significantly more aware of the value of education on a number of issues. Also, non-participating households in programme villages contribute significantly more to school management, school activities and school construction. It seems that there is some untapped potential in the villages for collective action, which is stimulated by the MS programme.

A third finding concerns the differences between the districts, especially with respect to collective action. Overall Sitamarhi scores much higher and Darbhanga scores significantly lower than Muzaffarpur. However, the reasons for these differences are not clear.

5. Preschool and primary school enrolment

In the previous chapter we showed the potentially large correlation between the Mahila Samakhya programme and the attitudes and cooperative behavior of parents living in programme villages. First, the programme members are significantly more aware of the value of education than non-members in their villages, and are significantly more likely to participate in activities, school construction and school management. Second, similar patterns reveal themselves for non-members living in programme villages as compared with the control group. Although the difference in attitudes and behavior between non-members in MS villages and the control group is not as large as the difference between members and the control group, it is nonetheless substantial for a number of aspects.

In this chapter we will focus on the relationship between the programme and educational outcomes. We would expect the increased awareness and increased participation to translate into improved child outcomes. In particular, we would expect enrolment in both pre- and primary school to be larger in programme villages because parents value the benefits of education more. Within programme villages, we would expect enrolment to be larger among children from MS households than from non-participating households. Second, the presence of the programme increases the likelihood of preschool construction (the bal jag jagi centers), and the presence of a preschool is a necessary condition for enrolment (although parents could send their children to a preschool in a nearby village). Again, this suggests a positive correlation between the presence of the programme and preschool enrolment.

5.1 Methodology

This chapter looks first at the relationship between the programme and preschool enrolment. Second, it will analyze the relationship between the programme and primary/middle school enrolment. We will start both parts with a descriptive analysis of the enrolment differences between the MS members, non-members in programme villages and the control group. Also, we will look at the differences between districts.

Although descriptive tabulations can give us a first impression of correlations, they do not take into account other confounding factors. For example, the participants in the programme belong significantly more often to Scheduled Castes than non-participants. Since SC/ST children are generally less likely to go to school, this will influence the difference in enrollment between MS and non-MS children. To investigate the relationship between Mahila Samakhya and enrolment we will econometrically analyze the likelihood of pre- and primary enrolment based on a logistic maximum likelihood estimation. This allows us to control for characteristics unrelated to the programme.

The control variables concern three groups of variables: child characteristics, household characteristics and community characteristics. The child variables are sex, age and previous preschool enrolment in the estimation of school enrolment. The household characteristics are caste and religion of the household, the highest education level in the household, the highest female education level in the household (a proxy for mother's education), a poverty measure, sex of the head of household, household size and child dependency ratio. The community variables consist of

dummies for the Sitamarhi and Darbhanga districts (with Muzaffarpur as the reference district), and the number of preschools/primary schools in the community. A detailed description of the variables is given in Annex 2.

5.2 Preschool enrollment

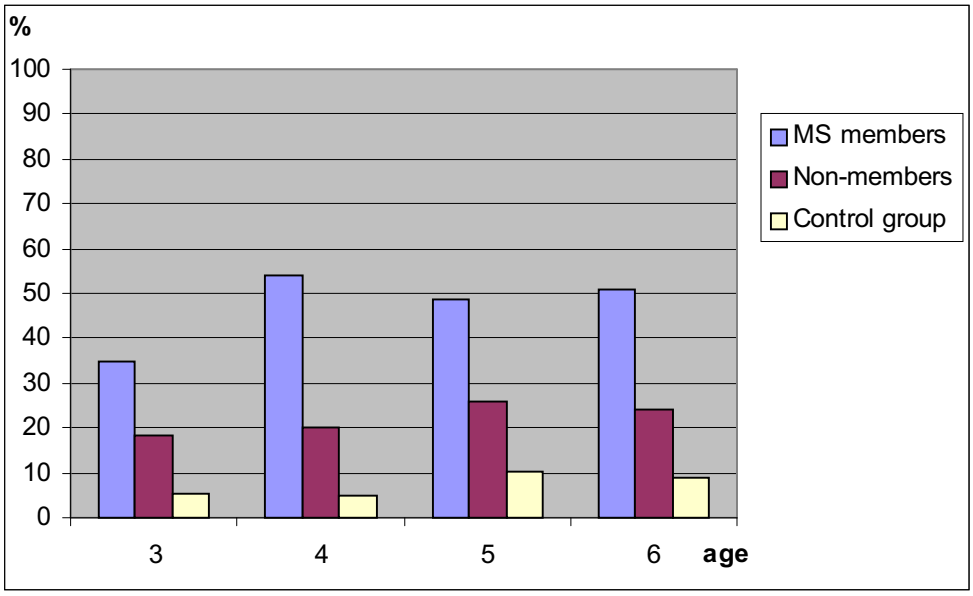
Descriptive analysis of preschool enrolment

In the study area, several institutions and organizations run preschools. A number of preschools are Early Childhood Education centers operated by the Bihar Education Project). The ICDS (Integrated Child Development Services) scheme of the Ministry of Women and Child Development operates a number of so-called Anganwadi centers. Finally, in a considerable number of villages the women's groups have organized to set up a preschool, the bal jag jagi center. The availability of a preschool in the community is positively correlated with the presence of the programme. Overall there are substantially more preschools in MS villages than in the control villages.

Figure 5.1 gives us a first impression of preschool enrolment by age. It represents the percentage of children aged 3 to 6 years old that do or did go to preschool. Part of the six year-olds is probably enrolled in primary school already. For each age group, we see that MS members send their children to preschool considerably more often than non-participants from the programme villages. Also, non-participants from MS villages send their children significantly more often to preschool than parents from control villages. These differences are significant at the 1% error level.

At the age of 3, about one third (34.8%) of MS children is enrolled in preschool compared to less than one fifth (18.4%) of children from non-members and one twentieth (5.2%) of children in the control villages. At the age of 5, almost half (48.7%) of all MS children is enrolled in preschool versus one quarter (25.9%) of children from non-members and one tenth (10.3%) of children in the control group.

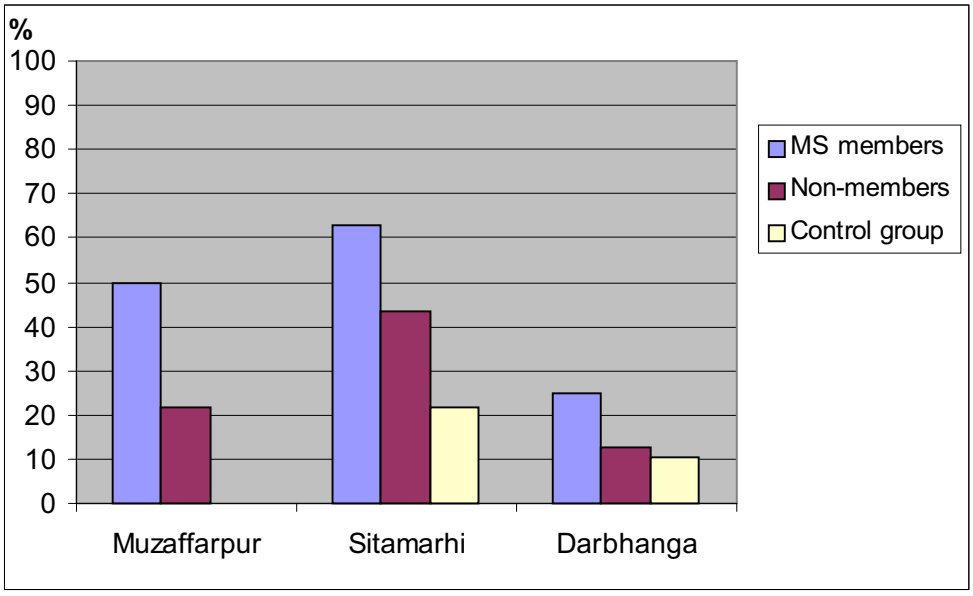
Figure 5.1 Preschool enrolment by age



Another noticeable difference reveals itself between the districts (see Figure 5.2). The general pattern of members, non-members and control households is repeated within each district. However, preschool enrolment in Sitamarhi is much larger overall than in Muzaffarpur, which in turn is much larger than in Darbhanga. The differences between districts are highly significant for MS members and for non-members. In the age 5 group, Sitamarhi shows a preschool enrolment among MS households of 62.7%, versus 49.7% in Muzaffarpur MS families and 24.9% in Darbhanga MS families. In that same age group but focusing on non-participating families in MS villages, we find a preschool enrolment of 43.6% in Sitamarhi, 21.6% in Muzaffarpur and 12.8% in Darbhanga. For the control group on the other hand, the difference between the districts, although present, is not significant.

The fact that control villages have access to considerably less preschool facilities than programme villages is likely to play an important role with respect to the low enrolment in Darbhanga. In Darbhanga, the programme has been active since a few years only, and the number of bal jag jagi centers in MS villages is still limited with only 23 centers in March 2002 (Mahila-Samakhya 2002). It is likely that over time, when the number of bal jag jagi centers increases, preschool enrolment in Darbhanga will increase as well. However, both in Muzaffarpur and Sitamarhi the MS groups have constructed more than 100 bal jag jagi centers. It is not clear why Muzaffarpur children in MS villages are enrolled less often than Sitamarhi children. This might be a difference in other variables such as child or household characteristics.

Figure 5.2 Preschool enrolment at age 5 by district



Econometric analysis of preschool enrolment

To disentangle the various factors, we introduce a logistic estimation of the likelihood of enrolment in preschool and include control variables for child, household and community characteristics as listed in the methodology paragraph. The results of the estimation are presented in Annex 3. We first use all control variables in the complete estimation of preschool enrolment. Surprisingly, none of the household characteristics is significant at the 10% error level.

The preferred estimation is found after dropping all (individually and jointly) insignificant variables (see the fourth column of the table in Annex 3). Let us first consider the basic child characteristics. Although the sign of the coefficient for sex suggests that girls are somewhat less likely to be enrolled, the coefficient is not significant. Within the 3 to 6 year old age group, the older children are significantly more likely to be (or have been) enrolled. This is not surprising since enrolment at the age of 3 is generally less likely than at an older age.

The household characteristics are mostly insignificant and thus dropped. This refers the caste dummies, education in the family, household poverty and household size/structure. The only exception is the religion of the household. Muslim children are significantly less likely to be enrolled in preschool than their Hindu counterparts. This might capture a cultural difference with Muslim families generally less likely to send their child to preschool.

The number of preschools in a community is strongly and significantly related to the likelihood of enrolment. In particular, an additional preschool almost doubles the likelihood of enrolment in preschool of the average child in the village[5]. If we include the number of preschools in the estimation, the coefficient for the Darbhanga dummy becomes insignificant. As we suspected in the descriptive analysis, this suggests that the difference between the reference district Muzaffarpur and Darbhanga can be explained entirely by the other variables in the estimation, especially the preschool variable. However, the Sitamarhi dummy is still highly significant. Holding all other variables constant, a child in Sitamarhi is still substantially more likely to go to preschool than children living in the other two districts under study. The reason for this difference is not clear.

Finally, the two programme dummies are both highly significant. That is, even if we take into account differences in the child, household and community variables, children living in Mahila Samakhya villages are significantly and substantially more likely to be enrolled than children in control villages. On top of that and taking into account the village effect, children from participating families are significantly more likely to be enrolled in preschool than children from non-participating families. With respect to this latter finding, we remark that the analysis does not take into account potential differences in motivation prior to the programme. These differences might explain part of the differences in enrolment between MS and non-MS families. However, as argued before, given the efforts necessary to motivate women to participate, this effect is likely to be limited.

Conclusion

It seems very plausible to conclude that the Mahila Samakhya programme can have a significant effect on preschool enrolment. First of all, the programme enhances collective action in the community and cooperation to construct preschool centers.

[5] The odds ratio for the number of preschools equals 1.9. The "odds ratio" is an intuitive interpretation of the coefficients "B" in logistic estimations: exp(B) is the effect of the independent variable on the "odds ratio", which is the probability of the event divided by the probability of the non-event, evaluated at the mean of the independent variables. For example, if exp(B1)=2, then a one unit change in X1 would make the event twice as likely (.67/.33) to occur. See Whitehead, J. (2004), "An Introduction to Logistic Regression", http://personal.ecu.edu/whiteheadj/data/logit/intro.htm

That is, presence of the programme increases the availability of preschools. In turn the availability of preschool centers is positively and significantly related to enrolment.

Second, the programme seems to work through other channels as well: controlling for a substantial number of factors the MS members send their children significantly more often to preschool than non-members, and non-members enroll their children significantly more often than households in the control group. It is likely that the increased awareness and changes in attitudes of the parents, as discussed in chapter 4., are related to this increased preschool enrolment.

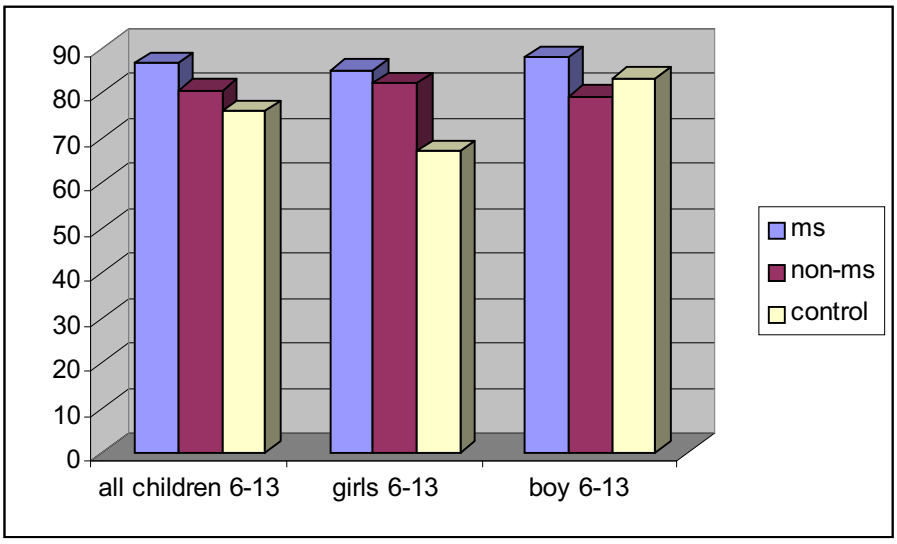
5.3 Primary/middle school enrolment

Descriptive analysis of primary/middle school enrolment

Both the descriptive and econometric analyses of school enrolment look at total gross enrolment in school for the group of children aged 6 to 13 years old. *Gross* enrolment indicates that we do not look at whether children are enrolled in the appropriate grade. Generally, enrolment for a part of the children is late so that they enter primary school at the age of 7 or 8. Moreover, the enrolment does not restrict itself to primary school only but includes middle school as well. Including children up to the age of 13 means that the older ones can be enrolled either in primary or in middle school. We exclude children older than 13 who are still enrolled in middle school.

If we look at total gross enrolment in school for the age group of 6 to 13 years old, MS children perform better than non-member children, who in turn are more likely to be enrolled than children from the control group (see Figure 5.3). However, only the high MS enrolment is significantly different from the other two. Non-MS and control children do not significantly differ in the likelihood of enrolment.

Figure 5.3 Primary/middle school enrolment by gender

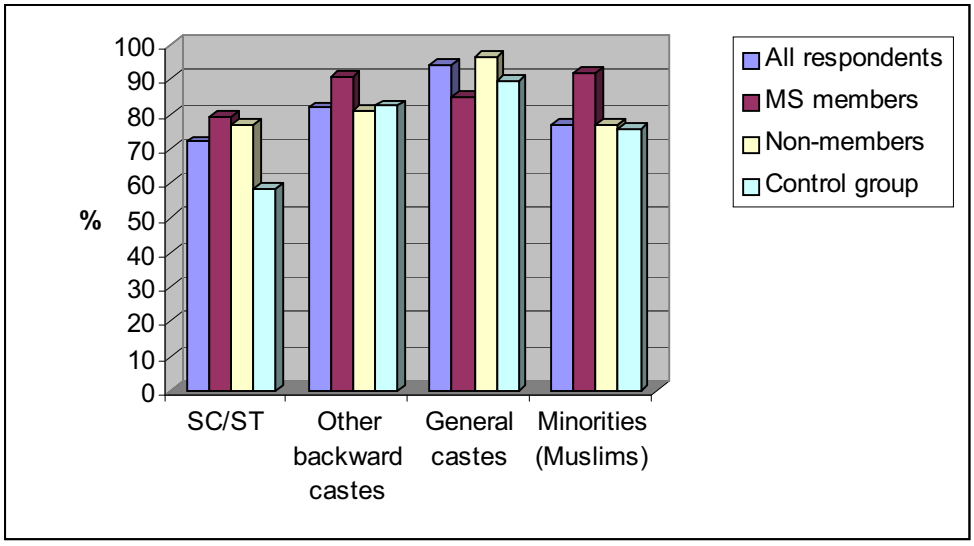


The picture changes when we look at enrolment for girls and boys separately. Girls from MS and non-MS families in programme villages are almost equally likely to be enrolled. The difference between them is not significant. However, girls from control villages are substantially and significantly less likely to be enrolled than girls from MS villages.

Looking at the boys, we find that the difference between the members and non-members is now highly significant. Boys from families participating in MS are more likely to be enrolled than from non-participating families in MS villages. The difference between non-participating and control families is not significant. The figure suggests that boys in non-participating households perform worse than girls. However, this difference is not significant either.

In other words, it seems that the Mahila Samakhya project has a different effect on boys and girls. Whereas the effect on boys seems limited to male children of MS members, the effect on girls seems to have reached beyond the participating group. Not only girls from member families but also from non-member families living in MS villages are significantly more often enrolled in primary school than girls in control villages.

Figure 5.4 Primary/middle school enrolment by caste



The Mahila Samakhya programme focuses especially on SC/ST women. Their children are least likely to be enrolled, as Figure 5.4 shows. Overall, enrolment of SC/ST children is 72.0%. Overall enrolment of children from Other Backward Castes is 81.8%. Among general castes children enrolment is 94.4%. 79.8% of Muslim children are enrolled in school. The focus of the programme would suggest that Mahila Samakhya is mostly related to school enrolment of children from the SC/ST population.

The caste data desegregated by membership support this hypothesis. The differences in enrolment between MS children and control children is most pronounced for the SC/ST children with 21.0 percentage points: only 58.3% of control children are enrolled versus 79.3% of the MS children. Note that an equally high percentage of SC/ST children of non-members living in MS villages is enrolled (76.7%).

The Muslim population shows the second largest difference in enrolment between the MS children and the control group: 75.6% of the control children are enrolled compared to 92.1% of the MS children, a difference of 16.5 percentage points.

However, the spillover to the non-participant Muslim households seems virtually absent (76.8% of children enrolled).

We find a similar pattern for children from Other Backward Castes, where children from MS children are more likely to be enrolled (90.6%) than the control group (82.4%), but other children in MS villages are not (81.0%). The difference between the first two groups is 8.2 percentage points.

Finally, the programme seems to have little relation to the school enrolment of General Caste children. We even find a lower enrolment among MS children than among non-participating children and the control group (84.8%, 96.6% and 89.4% respectively). However, this difference is not significant.

In short, it seems that the Mahila Samakhya programme is particularly related to improvements in enrolment among SC/ST families, followed by Muslim families and OBC families. Moreover, we find suggestive evidence for a spillover within the village on non-participating families from the SC/ST castes, which is absent for the Muslim and OBC population.

Estimation of primary/middle school enrolment

As for the logistic estimation of preschool enrolment, we start our econometric analysis of primary/middle school enrolment with an estimation that consists of the complete list of independent variables. We then eliminate the variables that are individually and jointly insignificant and that do not add to the explanatory power of the model. See Annex 3. for both the complete and the preferred estimation.

The preferred estimation includes three child characteristics that are all significant at the 10% to 1% level. Girls are significantly less likely to be enrolled in school than boys. Children are more likely to be enrolled the older they are. The third variable, previous preschool enrolment, has a large coefficient and is highly significant at the 1% level as well. It is substantially and positively related to the likelihood of being enrolled in primary/middle school.

As for preschool, the caste of the household is not significantly related to school enrolment. Moreover, religion is insignificant as well. This seems to be in contrast to the descriptive analysis. However, we do find a positive and significant relationship between the highest level of education in the household as well as the highest female education level in the household, and school enrolment. Also, the wealth of family is significantly related to the likelihood of enrolment. The poorer the household, the less likely it is that a child goes to school. In turn, both household education and household wealth are highly correlated with caste. Apparently after controlling for a number of other household characteristics, it is not caste as such that is related to low school enrolment, but the associated low education and high poverty of most SC/ST households.

In contrast to preschool enrolment, children in Muzaffarpur district are significantly more often enrolled than children living in Sitamarhi and Darbhanga districts, after controlling for the other variables. This is surprising especially for Sitamarhi, given the high performance on preschool enrolment. Surprising as well is the significant and *negative* relation between the number of primary schools in a community and school

enrolment. We cannot find an explanation for this negative partial correlation. It seems likely that the variable captures some other factor that we did not take into account[6].

Again we find a significant and positive relation between participation in the programme and enrolment. But as opposed to preschool enrolment, this relation is generally not carried over to programme villages. That is, non-participating members are not more likely to send their child to school as compared to the control group. This is in line with the preliminary findings from the descriptive analysis. There we found indications of spillover effects only for girls and children from the lowest castes.

Conclusion
As was the case with preschool enrolment, participation in the Mahila Samakhya programme significantly increases the likelihood of parents to send their children to school. This effect is especially large for children from the Scheduled Castes and somewhat less pronounced for Muslim children and children from the OBC population.

After controlling for participation in the programme, the caste dummies become insignificant. Enrolment is more likely for boys and older children, as well as children that went to preschool. Moreover, children from better-educated and wealthier families are more likely to be enrolled, as are children living in Muzaffarpur.

The evidence strongly suggests that the MS programme is related to increased child enrolment, especially of the children of its primary beneficiaries. Again, because of the self-selection into the programme, some caution is warranted with respect to conclusions regarding direct causal effects. However, the explicit awareness-building activities are likely to play a major role in the improved child outcomes.

In spite of the highly significant coefficient on prior preschool enrolment, we cannot directly infer that previous enrolment in preschool increases subsequent school enrolment. The positive partial correlation in the estimation between preschool and primary/middle school enrolment could also be caused by other factors positively related to both pre- and primary school enrolment (such as parental awareness). Note that the programme coefficient remains significant even when we introduce preschool enrolment. This indicates a separate and additional relationship.

In contrast to preschool enrolment we find little evidence of general spillover effects to the rest of the community. The logistic estimation does not provide a significant coefficient for the dummy on programme villages. Tabulations of several subpopulations give a more detailed view. Figure 5.4 indicates that daughters of non-participating women are more likely to be enrolled than are girls in control villages. But this external effect is not found for boys. Likewise, SC/ST children from non-participating women are more likely to be enrolled than SC/ST children in control villages. Again, the percentages for OBC and Muslim children do not reflect this external effect.

[6] Controlling for village population size (with potentially more schools in larger villages, and less enrolment in larger villages) does not alter this finding.

6. Immunization and health practices

In chapter 4 and 5 of the report, we discussed parental attitudes towards education and preschool and primary/middle school enrolment. Another important aspect of child development is the health of the child. In this chapter we will focus on two indicators of healthy physical child development: immunization coverage and hygiene. We measure the first indicator with immunization data on four types of vaccines. The second indicator is translated into the prevalence of diarrhea in the household and treatment thereof. Both are discussed along the same lines as enrolment. We start with some descriptive statistics. Next, we use logistic maximum likelihood estimation to distinguish the relation of the indicators with the programme dummies from a number of controlling variables.

6.1 Immunization

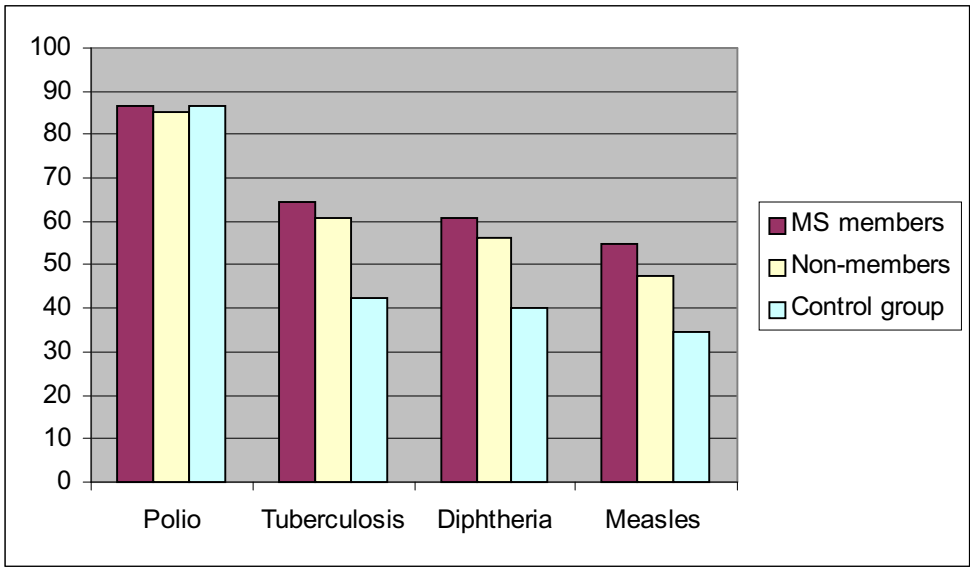
An important aspect of early childhood development is the immunization against diseases such as polio, tuberculosis, diphtheria and measles. Although the Mahila Samakhya programme does not provide the immunizations itself, it does offer health and hygiene training. It raises awareness among the participants regarding the importance of vaccines. It is likely that the women in their private spheres discuss the issue with other community members, thereby disseminating the information through their personal social networks. Moreover, once the participants of the programme are aware of the health issues, part of them volunteer to participate in immunization campaigns of the government, such as the recent mass polio campaigns.

Thus, as with parental attitudes towards education we expect the same mechanisms at work for immunization. The Mahila Samakhya programme is expected to increase knowledge and awareness among its members. Second, we expect that this information will be discussed with others and travel through the social networks within the community to reach other community members as well. This process would result in improved child outcomes with respect to immunization coverage for both programme participants and non-participants in programme villages.

Descriptive analysis of immunization coverage
To measure immunization coverage, we use data on all children in the sample between 0 and 13 years of age. The results confirm the hypotheses mentioned above, as Figure 6.1 clearly shows. The children that live in villages where the Mahila Samakhya programme is active are significantly more often immunized than children living in control villages. The only exception is immunization against polio. Apparently the regular mass immunization campaigns organized by the government are equally effective in all villages.

Despite the mass campaigns, about 15% of all children are not reached. The coverage for the other three types of immunization is more worrisome. In control villages, only 34-42% of all children in the age group is covered.

Figure 6.1 Immunization coverage by type of disease



Again, we cannot infer any direct causality between the programme and child outcomes because of the self-selection into the programme. However, as discussed before, the hypothesis that the programme increases awareness seems not unlikely in view of the household characteristics of the participants.

More interesting is the fact that women who are *not* member of MS but who live in a village where the Mahila Samakhya programme is active, are significantly more likely to immunize their children as compared to women in control villages. This can hardly be a result of self-selection. It clearly suggests a strong spillover effect of the programme on non-participants. Differences in immunization coverage as compared to the control group range from 12.8% for measles, 15.9% for diphtheria to 18.1% for tuberculosis. Note that differences between the three groups (MS members, non-members and control group) are not significant for polio.

The mechanisms, through which this spillover effect operates, are not entire clear. It seems most likely that we are capturing a network effect. The information about the importance of vaccination for children would be communicated to the other village members. In addition, it is possible that the increased willingness of MS members to engage in collective action and participate in immunization awareness campaigns explains part of the increase in immunization in programme villages.

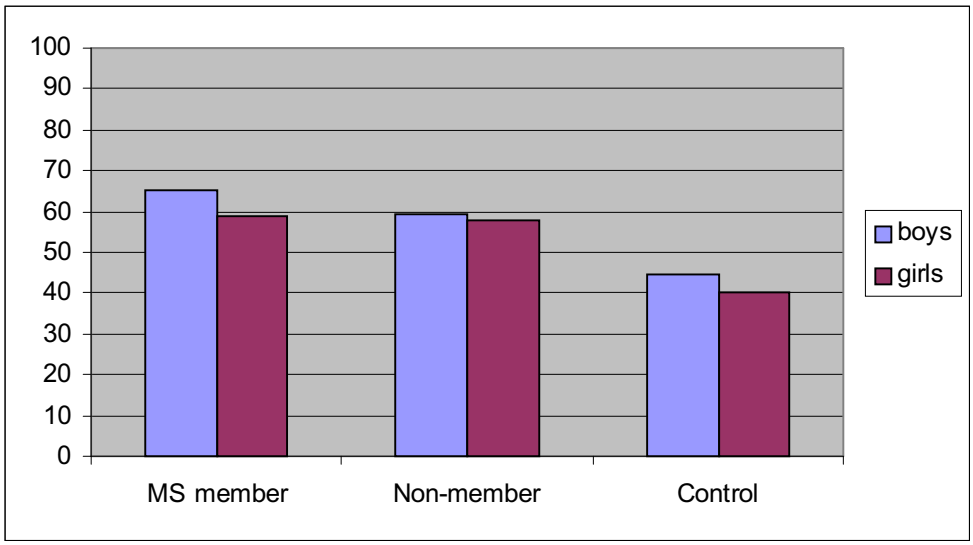
Girls' immunization coverage

A large number of studies[7] show how girls are often disadvantaged within the family in comparison with their male siblings. A look at the immunization percentages of Diphtheria in control villages, desegregated by gender, confirms this gender bias (see Figure 6.2). The other types of immunization show a similar pattern. On average girls are worse off than boys are in terms of coverage. This is insignificant however for the non-participating households and the control group. It is highly significant for the MS participators. Before we can draw any conclusion regarding the relationship between the programme and the gender bias in immunization, we should control for other

[7] See for example Drèze and Sen (2002).

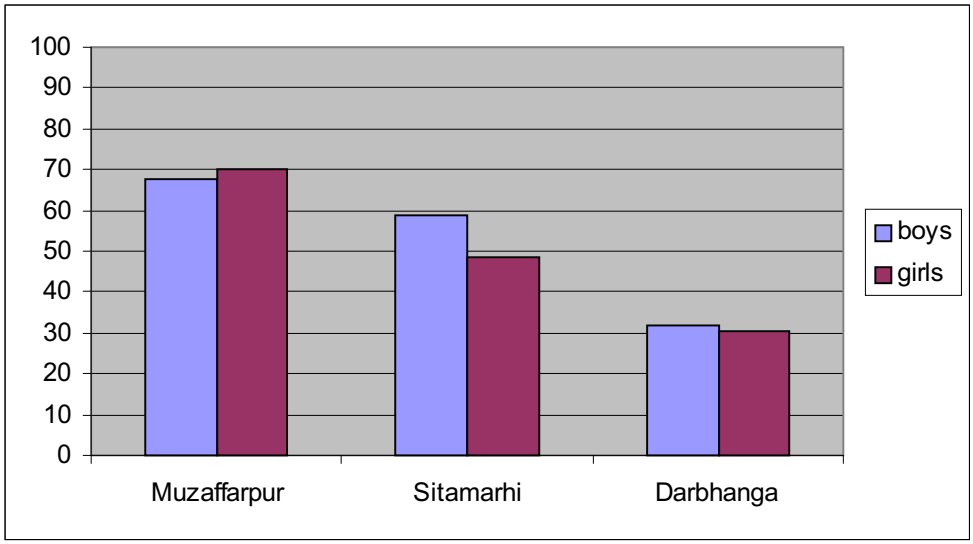
variables. Remember that programme members come from the most marginalized groups, where the discrimination of girls is still widespread.

Figure 6.2 Diphtheria immunization coverage by gender



With the only exception of polio immunization, we find that immunization coverage is much lower in Darbhanga than in the other two districts (see Figure 6.3). The differences between boys' and girls' immunization are significant only in the district of Sitamarhi. Surprisingly, in all districts the differences between participants and non-participants in programme villages are insignificant. In contrast, MS villages in all districts differ significantly in immunization coverage from control villages. Puzzling is the finding that in Darbhanga MS villages seem to have significantly lower coverage than non-MS villages. We do not have an explanation for this result. In the econometric estimations we will control for potentially confounding factors.

Figure 6.3 Diphtheria immunization coverage by gender and district



Econometric analysis of immunization coverage

Since descriptive statistics do not take into account the effect of control variables, we analyze the likelihood of immunization with logistic maximum likelihood estimations. The dependent variables are dummies that indicate whether a child in the age group 0 to 13 years old has received the vaccines. Annex 2. contains the list of dependent variables, control variables and programme dummies. The main differences with the enrolment estimations are the addition of a measure of sanitation facilities within the household, as well as 'accessibility'-variables (the distance to the nearest town, to the nearest health center, the quality of the roads and the availability of public transport). The motivation to include these variables lies in the fact that in order to receive a vaccine, families often have to travel to a public health nurse. Moreover, the distance to the nearest town gives an indication of remoteness. Health awareness might be related to this indicator. School dummies are omitted.

Overall, two patterns emerge: one pattern for polio immunization, which has been strongly advocated with mass campaigns, and one for the other three types of immunization. Annex 4. gives a detailed description of the results of the preferred estimations. Control variables of the complete list were omitted from the final estimation if they were not individually and jointly significant.

Polio immunization

The analysis starts with the immunization against polio. We find that the coefficients of the two child variables are both highly significant in predicting the likelihood of polio immunization. Girls are significantly less likely to be immunized. This is worrisome since the governmental mass campaign should reach all children alike. Apparently, the gender bias prevalent throughout the rural society in Bihar is present as well with respect to immunization. Older children are also significantly less likely to be immunized. This could indicate increased immunization coverage over time, with children that are born nowadays significantly more likely to receive immunization.

Most household characteristics are not significantly related to polio immunization. Only the highest female education in the household is significantly and positively related to the immunization coverage of a child. This suggests that women play an important role in the decision to immunize, with higher educated women more aware of the importance. The poverty indicator is negatively related to immunization, indicating that poorer families are significantly less likely to immunize their children. The polio vaccine is free. The poverty measure could reflect a lack of time or money to travel to the health center. But none of the accessibility indicators are significant. Or else, it captures a more general household feature of marginalization.

Surprisingly and in contrast to the school estimations, we find no differences between the districts for immunization against polio. Moreover, the programme dummies are insignificant as well. Thus the results suggest that the likelihood of polio immunization is unrelated to the programme or the location: the campaign reaches all the villages in the study area to an equal extent. However, it is less successful in reaching girls and the poorest children.

Tuberculosis immunization
Looking at the immunization coverage against tuberculosis a new pattern emerges. Girls are no longer significantly less likely to be immunized. The negative coefficient for age remains significant. This suggests an increasing trend over time in tuberculosis immunization as well.

In contrast to the polio vaccinations, immunization against tuberculosis is significantly related to a large number of household characteristics. The findings suggest that children from the Schedules Castes, from Other Backward Castes and from Muslim families are significantly less likely to be immunized than the general caste, Hindu population. In addition to these partial correlations, we find that both a higher general education level within the household and a higher female education level within the household are positively related to tuberculosis immunization coverage. Moreover, the poorer a household is, the less likely its children are to be immunized. Finally, a larger household size is significantly and negatively related to the likelihood of immunization against tuberculosis.

Accessibility criteria are unrelated to the likelihood of immunization. However, we do find a significant difference between the Darbhanga district on the one hand, and Muzaffarpur and Sitamarhi districts on the other hand. Children living in the former district are significantly less likely to be immunized.

A surprising result emerges from the programme dummies. The membership dummy is insignificant, indicating that MS members do not immunize their children significantly more often against tuberculosis than non-members in their village after controlling for other characteristics. However, the coefficient on the MS village dummy is highly significant at the 1% error level. That is, regardless of child, household and community characteristics, and regardless of whether their mother participates in the MS programme, children living in villages where the Mahila Samakhya programme is active are substantially more likely to be immunized against tuberculosis than children in control villages.

Diphtheria immunization
The findings for the likelihood of immunization against diphtheria are consistent with the findings for tuberculosis. The only difference is that household poverty is not significant in the likelihood estimation for diphtheria. All other coefficients remain the same in sign and significance (i.e. age, caste, religion, household education, household size, and the Darbhanga dummy). The results for the programme dummies are similar as well. That is, membership as such is not significantly related to the dependent variable. However, living in a programme village significantly raises a child's likelihood of being immunized regardless of whether it's mother is actually a member of the Mahila Samakhya programme.

Measles estimation
Finally, we estimated the likelihood of immunization against measles. Immunization against measles is least prevalent of the four types of vaccines. Child characteristics are not significantly related to measles immunization (both the coefficients for sex and age are insignificant). This suggests that coverage of measles over time is not improving. Caste, religion and poverty of the household are not significantly related to the dependent variable either. On the other hand, the highest education level of the

household (both overall and of females only) is positively related to measles immunization. Significantly but negatively related to measles immunization is the size of the household.

Community variables have a similar relationship with the immunization against measles as against tuberculosis or diphtheria. The Darbhanga coefficient is significant and negative. Accessibility criteria are unrelated. Again we find a general increase in the likelihood of immunization for measles if the child lives in a programme village as compared to a control village. But in addition to this village effect, we find a significant increase in likelihood if a female member of the child's household is participating in the programme herself.

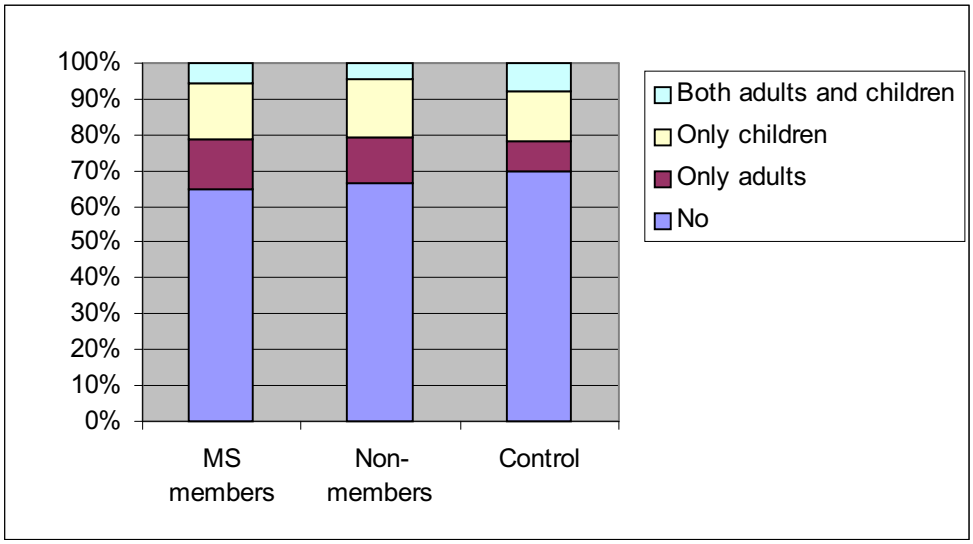
Conclusion
To summarize, the immunization against polio, most prevalent and strongly advocated through government mass campaigns, is mainly a matter of child characteristics (sex and age), female education and household poverty. The Mahila Samakhya programme seems unrelated to outcomes. For tuberculosis and diphtheria on the other hand, the Mahila Samakhya programme increases the likelihood of immunization significantly, irrespective of actual participation in the programme. Household characteristics (caste, religion, poverty, education and size) become much more important in predicting immunization coverage. Finally, the immunization against measles, lowest overall, shows a similar significant effect of the presence of MS in a village. On top of this effect, participants are significantly more likely to immunize their children. That is, part of the relationship with MS remains limited to the participants.

6.2 Health and hygiene

Immunization is only one of the indicators of healthy physical child development. Other indicators would consist for example of anthropometric measures. Unfortunately we do not have these detailed data for the children in the sample. We do have the occurrence of diarrhea in the family and the treatment thereof. Since occurrence of diarrhea could be considered a proxy for hygiene in the family, and treatment of the disease could be an indicator of health knowledge, we suggest to use this variable. Important in this respect is that a majority of the people suffering from diarrhea are children (see Figure 6.4), and that the consequences of diarrhea for young children can be severe (Young 1997).

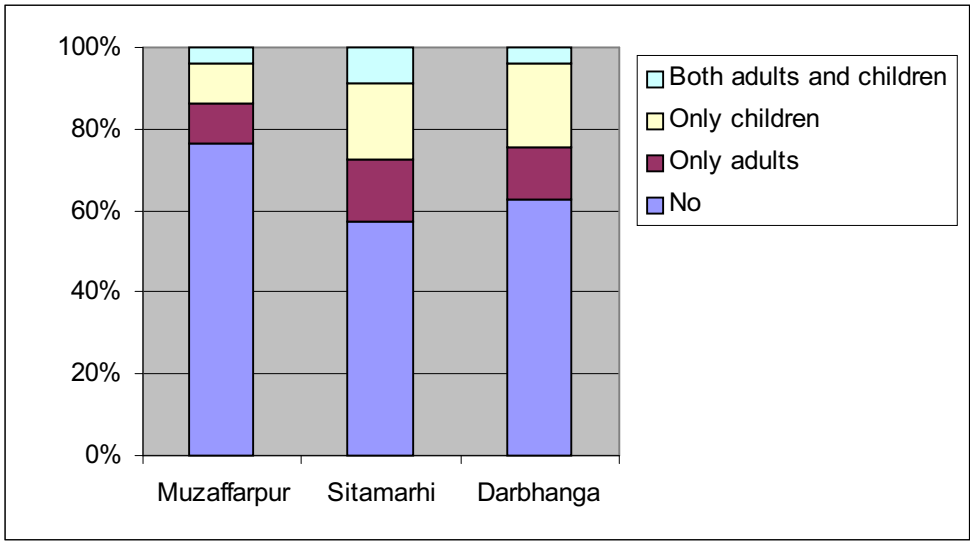
Descriptive analysis of the prevalence and treatment of diarrhea
There is a relatively high prevalence of diarrhea in the study area in general. Diarrhea occurred in about one third of all households during the last four weeks. Whereas it seems that slightly more MS household members have experienced diarrhea than members from the other households (see Figure 6.4), the difference is not significant. The better performance of non-participants and the control group could be caused by the fact that these families are relatively more often from general castes. The general caste group did not have diarrhea 79.1% of the time during last month compared to 67.3% of SC/ST families that did not suffer from diarrhea.

Figure 6.4 Prevalence of diarrhea in the household during the last four weeks



If we compare the three districts with each other, it becomes clear that hygiene differs substantially among them (see Figure 6.5). Muzaffarpur scores relatively well with about 25% of households with diarrhea (of whom 14% concerning children). In Sitamarhi and Darbhanga on the other hand 42% and 37% of the households respectively have experienced diarrhea (27% and 24% concerning children). Within the districts, again the difference between MS, non-MS and control households is generally insignificant.

Figure 6.5 Prevalence of diarrhea during the last four weeks by district

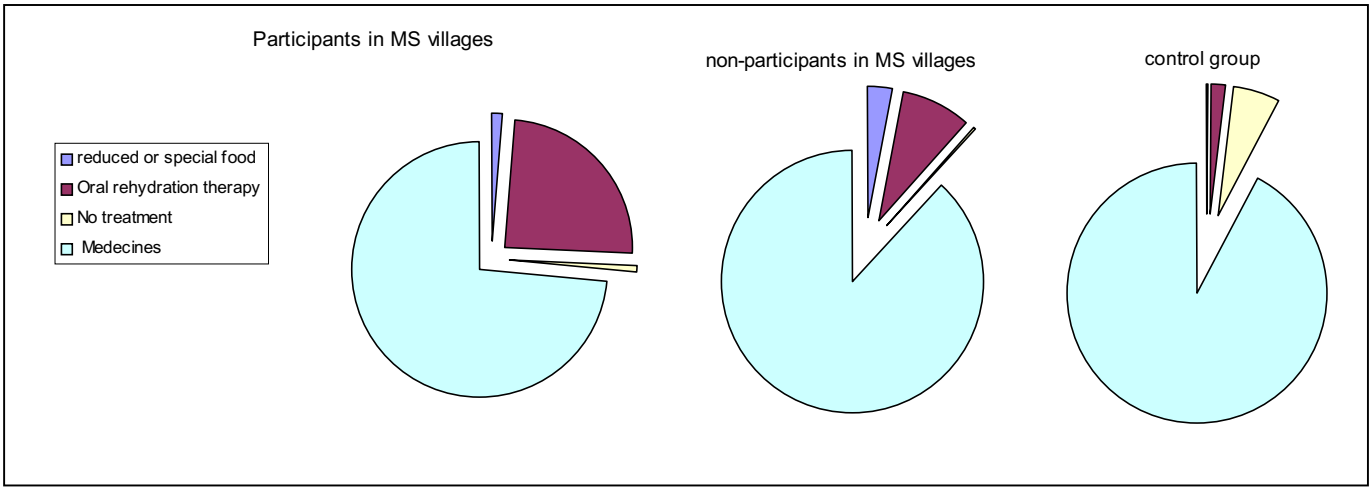


A different pattern arises if we consider the main means of treatment of diarrhea (see Figure 6.6). In general, Oral Rehydration Therapy (ORT) would be the most appropriate treatment of diarrhea. In the control villages only 2% of the households that experienced diarrhea used ORT. 92% of the households treat the disease with medicines and 6% provide no treatment at all. In MS villages both groups are better

aware of possibilities. The MS members give ORT 25% of the time and give medicines in only 73% of the cases. Less than 1% of the households does not treat the disease. Even non-members use ORT 9% of the time and medicines 88% with again less than 1% who does not provide treatment. These differences are significant at the 1% level. The other percentages include giving reduced or special food.

It seems that, although hygiene practices do not significantly differ between the groups, treatment strategies for diarrhea are more based on ORT in MS villages (especially within MS families). Moreover, families living in MS villages hardly ever leave the disease untreated in contrast to 6% of the control families.

Figure 6.6 Treatment of diarrhea



Estimation of health indicators

To disentangle the relationship between diarrhea occurrence/treatment and the programme from the effects of other variables, we estimate the maximum likelihood of occurrence and treatment controlling for household and community characteristics.

The results show that household caste, religion and education are not significantly related to the occurrence of diarrhea in the household during the last four weeks. Surprisingly, the presence of adequate sanitation facilities in a household is unrelated to diarrhea as well. However, we should realize that the overall percentage of sanitation facilities in the region is extremely low: 15%. In contrast, occurrence of diarrhea becomes significantly more likely with increasing poverty, increasing household size and increasing dependency ratio. That is, poorer households suffer more from diarrhea as well as households with a larger number of children. Both in Sitamarhi and Darbhanga diarrhea is more prevalent than in Muzaffarpur. This could be related to the start of the Unicef sanitation project effectuated through the Mahila Samakhya programme in the latter district.

We find a significant and positive programme village effect. Presence of the MS programme in a village significantly decreases the prevalence of diarrhea compared to households in control villages. The results do not support the hypothesis that active participation in the programme has an additional effect on hygiene within the household.

The results of the logistic estimation for the treatment of diarrhea shows a similar programme village relationship, with households in MS villages significantly more likely to use ORT than those in control villages. Moreover, the results show that active participants in the programme are significantly more likely to treat diarrhea with ORT instead of medicines than non-participants in their village.

Looking at both the estimations for treatment with ORT and with medicines, we find an almost mirrored result. Overall, households from the Scheduled Castes and Other Backward Castes as well as Muslim households are significantly more likely to use medicines and less likely to use ORT than households from the General Castes. People in Darbhanga are significantly more likely to use medicines instead of ORT as well. Also, better-educated households are more likely to treat diarrhea with medicines than with ORT. However, the likelihood of ORT does increase if the highest *female* education level within the household increases. This suggests that women play a distinct role in household health issues. A final finding is related to the household size: the larger the size of the household the less likely the household is to use medicines to treat diarrhea. For this variable we do not find an increase in the use of ORT, suggesting that larger households leave diarrhea untreated more often.

Although the means of treatment differ, the majority of households do give treatment. In particular, general caste households and all households in Muzaffarpur always treat diarrhea. Among the SC/ST, OBC and Muslim households in Sitamarhi and Darbhanga districts, the results indicate that households are most likely to leave diarrhea untreated if they are less educated, have lower female education, and are poor. Moreover, larger households are more likely not to treat the disease. But if the number of children in the household increases, likelihood of treatment increases as well.

7. Conclusion

In this report, we analyze the role of social capital in early childhood development outcomes: pre- and primary school enrolment, immunization coverage and the occurrence and treatment of diarrhea as a proxy for health practices. In particular, we have investigated the relationship between a women's empowerment programme and child outcomes in programme and control villages in rural Bihar, India.

We hypothesized that the relationship could be based on two types of social capital. First, social capital can be interpreted as a resource for individuals, in this case the child. We formulated the hypothesis that the Mahila Samakhya programme increases informational resources within the social network of a child's parents, thereby increasing parental knowledge and awareness of child development issues. On the one hand, this refers to informational resources within the women's groups. On the other hand, information can flow through wider community networks and reach non-members as well.

Second, social capital can be thought of as the willingness of a community to cooperate and engage in school and community projects. The report investigated the hypothesis that the women's empowerment programme increases cooperative behavior within the women's groups, which in turn would result in increased participation in school and in community projects. Again, a related hypothesis tests whether this increased cooperation reaches beyond the immediate women's groups' boundaries.

Both pathways, increased awareness and increased collective action, were then assumed to lead to better child outcomes. Although we cannot directly infer causality from the results, the findings are strongly suggestive of a relationship between both sources of social capital and child outcomes.

In Chapter 4 we show that members of the Mahila Samakhya programme are significantly more aware of the importance of education for both girls and boys, and of the value of appropriate early childhood development, than non-participants in programme villages. Since an important part of the programme consists of increasing awareness on educational issues, this finding suggests that the information and knowledge of education in the participants' network has increased. Second, members of the Mahila Samakhya programme are significantly more likely than non-members to participate in the management of the school, to participate in (pre-)school activities and to contribute to the construction of (pre-)schools. Again, the emphasis of the programme on increased collective action among its members' suggests a positive relation between participation in the programme and the willingness to cooperate and engage in collective action.

Some caution is necessary with respect to the inference of causal effects. Participation in the programme is based on self-selection. Members might have been particularly interested in education (and other child issues) already prior to participation. However, the limited initial awareness among the target group and the slow process of motivating women into joining a women's collective suggest that a significant part of the differences in attitudes and behavior between participants and non-participants is related to programme activities.

A second main finding of chapter 4 is that both the increased awareness and the increased cooperation do not remain limited to participants. Non-participants living in villages where the programme is active in turn seem to be significantly more aware than women in control villages of the value of children's education, especially of girls, and of preschool. Moreover, participation in school management and activities as well as contribution to the construction of (pre-)schools is significantly higher among non-participating households in programme villages than among households in control villages. These findings suggest strong spillover effects of the programme on other, non-participating community members.

It could be possible that differences in characteristics between programme and control villages explain part of these effects. However, the programme is active especially in the most disadvantaged blocks with lowest socio-economic indicators. If anything, unobserved differences are likely to result in a downward bias of the programme village correlations.

Chapter 5 relates the presence of and participation in the programme to preschool and primary school enrolment. The results confirm a significant and positive relationship, even after controlling for child, household and community characteristics. Overall, children are significantly more likely to be enrolled in preschool if their mother (or another female household member) is a member of Mahila Samakhya. In addition, the likelihood of enrolment increases if they live in programme villages, regardless of active participation. Moreover, preschool enrolment is significantly related to the number of preschools, which in turn is positively correlated to the existence of the programme in a village.

These results seem to confirm the hypothesized relationship with both sources of social capital. On the one hand, the presence of the Mahila Samakhya programme in a village increases the number of preschools through community collective action. This in turn is positively related to enrolment. On the other hand the programme raises awareness about education among community members. The significant coefficient of the programme variables in addition to the number of preschools suggests that the increased awareness plays a separate and distinct role in the likelihood of preschool enrolment. Since both the dummies for programme village and programme membership are highly significant, it seems that participants benefit most from the programme but that non-participants benefit as well.

The estimations for primary/middle school enrolment show a similar effect of the programme on children from participating households. However, the spillover effects on non-participants living in programme villages are not equally large for all children at the primary/middle school level. The results suggest that girls and SC/ST children in programme villages are more likely to be enrolled than in control villages even if their mothers do not actively participate. We do not find this relationship for boys and children from other castes or from Muslim families.

Chapter 6 focuses on the health of young children. The study does not contain data on attitudes regarding immunization or hygiene, so the report only tests the relationship of child health outcomes with programme variables.

With respect to immunization we need to distinguish between immunization against polio on the one hand and against tuberculosis, diphtheria and measles on the other. The effects of the recent mass polio campaigns conducted by the government are clearly visible. A significantly larger percentage of children is immunized against polio than against the other diseases. Programme variables are insignificant in this respect, indicating that the mass campaign reaches all households alike. However, girls as well as children from the poorest households are significantly less likely to get a polio immunization. This indicates that the campaign might be gender biased and non-inclusive.

In contrast, the presence of the Mahila Samakhya programme seems to play a significant role in immunizations against the other three types of preventable diseases. Children in programme villages are significantly more likely to be immunized than their counterparts in control villages. Surprisingly, for tuberculosis and diphtheria we only find a significant coefficient for the village dummy, and not for the individual membership dummy. That is, the results suggest that the relationship between the programme and immunization is not limited to members but is community wide. In other words, the spillover effects of the programme would be equal in size to the direct effect on members. Note that for measles, we do find a significant coefficient on membership.

As a proxy for hygiene and health knowledge in the household we used the prevalence and treatment of diarrhea. We could not find a relationship between the programme and the prevalence of diarrhea, suggesting that the programme has not been very successful yet in improving hygiene practices among its members. On the other hand, this positive relationship is significant for the treatment of diarrhea. That is, we find that members of Mahila Samakhya are significantly more likely to treat diarrhea, and if they do, to use ORT instead of medicines. Moreover, the results again suggest external effects of the programme with non-participating households more likely to treat, and to treat with ORT than control households.

In summary, the findings of the report are strongly suggestive of a positive relationship between the Mahila Samakhya programme, increased social capital among its members and child outcomes such as preschool enrolment, primary school enrolment, immunization coverage, and the treatment of diarrhea. Moreover, the findings suggest substantial spillover effects on other members of programme villages. These are very promising findings as they show that a women's empowerment programme can have potentially large direct and indirect effects. The report suggests that the programme increases the social capital not only of participating households but also of other non-participating families in the community.

Further research is needed to gain more insight in the processes at work. First of all, the econometric analysis has not yet taken into account the effects of selection into the programme. The women in programme villages can decide themselves whether they want to participate or not. Because of this self-selection process we might overestimate the impact of the programme. Participating women might differ in (unobservable) characteristics from women who decide not to participate, such as motivation or a more open attitude towards new knowledge. It is very well possible that these characteristics also influence parental behavior with respect to child issues,

regardless of programme participation. Thus, the child outcomes of participating and non-participating families could be different, in part because of programme effects but also because of other individual characteristics that are more or less prevalent among participants. In order to measure more precisely the impact of the programme, furter analysis should control for this effect.

Second, the underlying mechanisms of social capital were only touched upon in the report. A more thorough analysis is necessary to understand the determinants and dynamics of social capital. For example, if information on child development flows through the social network in a community, we would like to know who is reached by the information and who not (and why not); which type of relations are most effective in the transmission of knowledge; whether the structure of the network in a community matters, etc. With respect to the increased collective action, further research is needed to better understand for example the main determinants of co-operation, characteristics of community groups that are particularly successful in organizing collective action, or the factors that contribute to norms of cooperation in the wider community.

Finally, we have used preschool enrolment as a proxy for (cognitive) early childhood development. To measure actual cognitive and socio-emotional development a more integrative measurement tool for ECD would be most useful. On the one hand, it enables the evaluation of preschool quality and the effects of preschool enrolment. On the other hand, such a measurement tool can yield better and broader insight in children's developmental outcomes. Improved parental awareness not only translates into increased preschool enrolment but also into changing parenting practices.

Annex 1. Sampling method and data collection

A 1.1 Sample region

The sample covers three districts in the north of Bihar: Muzaffarpur, Sitamarhi and Darbhanga. In these districts the Mahila Samakhya programme has been active since 1992, 1993 and 1998 respectively. Thereby the sample covers two older and one younger district.

Of the three districts, Muzaffarpur is closest to the capital and relatively well connected by rail and road. It is one of the centers of political activity in Bihar. It has the highest overall and female literacy rates of the three districts (48.2% and 35.2% respectively). It also has the highest percentage of Scheduled Caste population as well as General Caste population. Sitamarhi, south of the border with Nepal, is the most rural of the three with highest population growth, lowest sex ratio and lowest literacy rates (39.4% overall and 26.4% female). The district is relatively isolated and suffers from severe floods every year, which results in seasonal mass migration. Darbhanga's situation lies between these two extremes. It is a bit better connected than Sitamarhi, suffers more from floods than Muzaffarpur and has an overall literacy rate of 44.3% and a female literacy rate of 30.4%. Darbhanga has a relatively large Muslim population compared to the other two districts (India Census Office, 2001b).

In general, the MS programme starts in a few blocks that are particularly backwards. The selection criteria of Mahila Samakhya for districts as well as blocks are:

- a low level of female literacy rate;
- a high percentage of population living below the poverty line;
- a high percentage of population belonging to Scheduled Castes and/or Scheduled Tribes.

The Mahila Samakhya programme usually starts in a few blocks per district. Only after these blocks are (almost) fully covered, that is, when facilitators have visited almost all villages, the programme expands to new blocks in the district. In Sitamarhi however, the programme has covered most blocks right from the start, but is active in a limited number of villages in each block. Table A 1.1 gives more information on the programme.

Table A 1.1 Programme data by district

	Darbhanga	Muzaffarpur	Sitamarhi
Total nr. of blocks	18	16	17
Total nr. of blocks with MS	2	5	13
Total nr. of villages in MS blocks	1269	1833	846
Total nr. of villages with MS	250	409	300
% of villages covered	19.7%	22.3%	35.5%
Nr. of active groups(not including emerging groups)*	190	374	345**

Source: Mahila Samakhya District Project Offices (Darbhanga, Muzaffarpur, Sitamarhi), March 2003.
** Source: (Mahila-Samakhya 2002), data as of March 2002.*
*** In some villages more than one group is active.*

In Darbhanga we selected both programme blocks for the sample. In Muzaffarpur we selected the three initial blocks. The other two blocks were entered only recently. As control blocks, the programme managers at the district level choose two non-MS blocks that are relatively similar in the key indicators to the MS blocks. In Sitamarhi, we selected eight of the thirteen programme blocks (based on travel considerations). Since in these blocks the programme is active in a limited number of villages, we choose the control villages from one block without the programme as in Darbhanga and Muzaffarpur, and from two blocks where MS has been partially introduced.

A1.2 Sample size and selection

The sample size was set at 35 villages in each district (25 MS villages and 10 control villages) and 20 households in each village. In the MS villages, the household interviews encompass 10 MS participants and 10 non-participants.

The survey is based on a two stage clustered stratified sampling design. We first choose villages (the 'clusters') and second, we choose the households within the selected villages. Note that in the clustering stage, we also stratify by MS and control village to ensure coverage of both.

The first stage consisted of selection of the villages per district. From the list of all MS villages and of all the control villages, the appropriate number was selected using systematic random sampling. Some villages were replaced because of their extreme remoteness and lack of roads. Some MS villages were replaced because the sahyogini had only recently started to visit the village and a real group did not exist yet. We could not use a sampling probability proportionate to size because the village populations were not available at the time of sampling. Therefore we will correct for the sampling method to make the sample representative of the covered area.

In the second stage, we again used disproportionate sampling of participants and non-participants to ensure coverage of both in the sample. That is, although on average 8.3% of women in a village participate in the programme, we ensure through our sampling method to have 50% in the sample. This will be taken into account in the analysis through appropriate weighting of the observations.

From a list of all MS members in a village, we randomly choose ten participants. Likewise, from the village voter lists, we choose ten non-participating households in programme villages, and twenty households in control villages. Note that by choosing households instead of women in the non-MS groups the sample of respondents might be biased towards older women within the household with domestic chores as main daily task.

A1.3 Comparison of programme villages and control villages.

In general the MS villages seem to have slightly less facilities within their boundaries as compared to non-MS villages, but the differences are not significant (see Table A 1.2). Although the MS villages have somewhat less facilities within the village, they are substantially closer to a town on average. This is significant at the 1% error level.

Table A 1.2 Accessibility characteristics of programme and control villages

	MS villages		Control villages	
	% of villages with facility within village	If facility not in village, average nr. of kilometers from center to facility	% of villages with facility within village	If facility not in village, average nr. of kilometers from center to facility
Market	35.3 %	2.7	40.3 %	2.1
Post office	24.9 %	2.2	42.7 %	2.1
Telephone	59.9 %	2.8	64.9 %	4.1
Town		13.8*		24.9*
Bus stop	26.3 %	2.9	26.6 %	2.7
Bank	13.1 %	3.4	16.5 %	3.3
Health center	37.0 %	3.1	33.9 %	3.1

*: $p<0.01$

In 53.4% of the MS villages public transport is regularly available, as compared to 47.6% of the control villages. A more or less equal percentage has mainly dirt roads within the village (52.9% of the MS villages and 51.6% of the control villages). These differences are not significant. About 4/5 of all villages in the regions under study have been flooded in the last three years, MS villages and control villages alike. About half of all villages (MS and control) have also experienced a draught in the last years.

The picture changes if we compare the differences between districts. Overall, Muzaffarpur and Darbhanga villages have considerably more facilities within their boundaries than villages in Sitamarhi. Also, both control and MS villages in Muzaffarpur and Darbhanga are significantly closer to a town than in Sitamarhi. These differences are significant up to the 5% or even 1% level. Villages of Muzaffarpur do not differ significantly from Darbhanga villages.

The Muzaffarpur districts experienced less floods (only 65% of the villages) in comparison with the other two districts where virtually all sample villages have been flooded. With respect to draughts, again Muzaffarpur was better off (only 25% of the villages were hit), followed by Darbhanga with 37% of the villages hurt, and Sitamarhi where 92% of the villages experienced a draught during the last three years.

About the same percentage of MS villages and control villages have school facilities within their boundaries (see Table A 1.3). The only noticeable difference concerns preschools. This is mainly due to the fact that part of the MS groups has set up a preschool in their village.

Table A1.3 School facilities in programme and control villages

% with at least one of the following school types:	MS village	Control village
Preschool	63.3%*	25.6%*
Primary school	85.5%	88.3%
Middle school	24.3%	24.5%
High school	5.9%	3.3%

*: $p<0.01$

Comparison of the districts shows that they do not differ with respect to the availability of middle and higher education. Both in Sitamarhi and Muzaffarpur about two thirds of the villages have access to a preschool. In Darbhanga this percentage is about 23% only. An obvious explanation would be that the Mahila Samakhya programme has been active in Darbhanga since a few years only. It is to be expected that over time the number of preschools established by the MS groups in Darbhanga will increase as well. The highest number of primary schools is found in Sitamarhi, followed by Muzaffarpur.

To summarize, the differences in facilities, connections, and floods and draughts between the MS villages and control villages are relatively small and not significant. Likewise, school facilities are equally available among the two groups. The only exception is the category of preschools that are more prevalent in villages where Mahila Samakhya is active.

Differences between the districts on the other hand are larger and significant. Overall, Muzaffarpur and Darbhanga have more facilities, are better connected, and experience less draughts than Sitamarhi. However, the floods occur in Darbhanga and Sitamarhi substantially more often than in Muzaffarpur. With respect to educational facilities, Darbhanga scores lowest.

A1.4 Data collection

A first exploratory field visit took place in October 2002. During this visit Mahila Samakhya directors and officials were interviewed as well as women's groups in the field. These interviews were qualitative and served as inputs into the questionnaire design. From March to June 2003, the actual data collection took place. The English draft of the questionnaire was discussed with Mahila Samakhya officers and translated into Hindi. Although the rural population usually speaks dialect, everyone can speak Hindi as well. A week long pilot of the draft resulted in a final version of the household questionnaire and the village questionnaire, both with closed-end questions.

The interviewers are all involved in the Mahila Samakhya programme at the district level in their own district, for example as trainers. They were female except for one interviewer. The interviewers received a three-day training including a try-out in the field.

About two thousand women were interviewed based on the household questionnaire. Per district two or three supervisors worked each with a group of four to five interviewers. The supervisors performed the group interviews while the interviewers went to the households. To cover one entire village took between one and two days.

Due to the unreliability of two interviewers in Muzaffarpur two control villages were entirely dropped from the sample as well as 49 household interviews in programme villages. In Darbhanga, one interview team got into conflict with a Mahila Samakhya group after the sahyogini refused to cooperate. This village was dropped as well. Thus, the final sample consists of 1991 household interviews (instead of 2100) in 102 villages (instead of 105).

Apart from the survey, secondary quantitative data on village and group characteristics were collected from the Mahila Samakhya offices, the Bihar Education Project offices and the Census office. Also, these offices provided the researchers with background materials and documentation.

Annex 2. Description of the variables

Table A 2.1 Description of the dependent and independent variables

Variables[8]	Description	Nr. of obs.[9]	Mean[10] (weighted for sample selection)	S.e. (weighted for sample selection)	Min	Max
Dependent variables						
Preschool (only children 3-6 years of age)	Does/did go to preschool=1; otherwise=0	1443	.23	.022	0	1
Primary/middle school (only children 6-13 years of age)	Is currently enrolled in primary/middle school=1; otherwise=0	2551	.80	.020	0	1
Polio immunization	Immunized against polio=1; otherwise=0	4712	.89	.010	0	1
Tuberculosis immunization	Immunized against tuberculosis=1; otherwise=0	4673	.60	.026	0	1
Diphtheria immunization	Immunized against diphtheria=1; otherwise=0	4646	.56	.027	0	1
Measles immunization	Immunized against measles=1; otherwise=0	4643	.48	.032	0	1
Occurrence of diarrhea	If any of the household members experienced diarrhea in the last month=1; otherwise=0	1915	.33	.018	0	1
Use of ORT	If diarrhea in household in the last month: did mainly use ORT=1; did not mainly use ORT=0	641	.08	.019	0	1
Use of medicines	If diarrhea in household in the last month: did mainly use medecines=1; did not mainly use medecines=0	641	.88	.025	0	1
No treatment	If diarrhea in household in the last month: gave no treatment=1; gave treatment=0	641	.02	.006	0	1
Child characteristics						
Sex	Female=1; male=0	4762	.47	.011	0	1
Age		4809	6.51	.096	0	13
Preschool (only children 6-13 years of age)	Does/did go to preschool=1; otherwise=0	2661	.18	.021	0	1
Household characteristics						
Scheduled Caste / Scheduled Tribe	Household belongs to SC/ST=1; otherwise=0	1991	.23	.024	0	1
Other Backward Castes	Household belongs to OBC=1; otherwise=0	1991	.53	.024	0	1
Muslim	Household is muslim=1; household is hindu=0	1991	.13	.017	0	1
Highest education in household	No schooling, illiterate=1 No schooling, somewhat literate=2 Primary school incomplete=3 Primary school complete=4 Middle school complete=5 High school complete or higher education=6	1962	3.91	.138	0	6
Highest female education in household	See highest education in household, for female household members only	1957	2.30	.099	0	6
Household poverty score	Poverty score derived from iterated principal factor analysis.[11]	1921	-.08	.053	-4.62	1.44

[8] Child characteristics refer to all children in the age group of 0 to 13 years, unless mentioned otherwise.

[9] The total number of children aged 0 to 13 years in the sample is 4821. The number of observations per variable may differ because of missing values or "don't know" responses.

[10] The mean of 0-1 dummies can be interpreted as a percentage.

[11] The poverty score is derived from an iterated principal factor analysis based on 17 household assets and facilities: quality of walls, roof, floor, home ownership, separate kitchen, type of fuel, sanitation facilities, water facilities, garbage disposal, electricity, ownership of clock, cycle, radio, television, sewing machine, motor, fridge, car. The first (unrotated) factor, with an eigenvalue of 3.684, is

Female head of household	Female head of household=1; male head of household=0	1991	.10	.012	0	1
Household size	Number of household members	1991	6.84	.101	1	22
Child dependency ratio	Number of children under 16 divided by household size	1991	.80	.027	0	4
Sanitation facilities	Flush toilet available to household=2, pit toilet or latrine available to household=1; otherwise=0	1970	.28	.030	0	2
Community characteristics						
Sitamarhi district	Sitamarhi district=1; otherwise=0	1991	.32	.024	0	1
Darbhanga district	Darbhanga district=1; otherwise=0	1991	.23	.021	0	1
Number of preschools	Number of preschools in the community	1991	.70	.098	0	3
Number of primary schools	Number of primary schools in the community	1991	1.26	.113	0	4
Distance to town	Distance from village to nearest town in kilometers	1991	16.68	.861	0	50
Distance to health center	Distance from village to health center in kilometers (if center present in village = 0)	1991	1.87	.237	0	11
Public transport	If public transport available in community=1; otherwise=0	1991	.57	.056	0	1
Road quality	If roads in village mainly: asphalt/cement=1, paved (brick/stones)=2; dirt road=3	1991	2.35	.102	1	3
Programme dummies						
Member of MS	If member of Mahila Samakhya=1; otherwise=0	1991	.05	.004	0	1
MS village	If MS programme active in village=1; otherwise=0	1991	.76	.022	0	1

retained. The poverty index is calculated using the factor loadings of the first factor. The average index is about zero. It increases and becomes positive with above average poverty (i.e. decreasing asset ownership and quality of the house and facilities). It decreases and becomes negative with above average wealth.
For a motivation of using a score to proxy household wealth based on weightings for household assets, see Filmer and Pritchett (2001).

Annex 3. Logit estimations of enrolment

Table A 3.1 Estimation of preschool enrolment

Dependent variable: Preschool enrolment of children 3-6 years old[12]	Complete estimation	s.e.	Preferred estimation	s.e.
Child characteristics				
Sex	.011	.203	-.017	.216
Age	.181	.081**	.167	.077**
Household characteristics				
SC/ST	.487	.561		
OBC	.545	.477		
Muslim	-.356	.570	-.751	.287**
Household education	-.023	.570		
Female education	.076	.094		
Household poverty indicator	.173	.180		
Female head of household	-.533	.353		
Household size	.005	.050		
Dependency ratio	.156	.147		
Community variables				
Sitamarhi district	1.923	.342***	2.039	.366***
Darbhanga district	-.250	.457	-.109	.451
Number of preschools	.587	.201***	.667	.222***
Programme variables				
Member of MS	1.130	.197***	1.293	.287***
MS village	1.992	.437***	1.890	.410***
_constant	-5.757	.857***	-4.990	.669***
Number of observations	1361		1432	

*: p<0.10; **: p<0.05; ***: p<0.01

[12] The dependent variable is preschool enrolment of children in the age group of 3 to 6 years. The dummy is equal to 1 if the child is currently going to preschool or went to preschool and is currently enrolled in primary school. It is equal to 0 otherwise.

Table A 3.2 Estimation of primary/middle school enrolment

Dependent variable: Primary school enrolment of children 6-13 years old	Complete estimation	s.e.	Preferred estimation	s.e.
Child characteristics				
Sex	-.249	.178	-.289	.175*
Age	.141	.052***	.147	.049***
Preschool	1.697	.265***	1.744	.277***
Household characteristics				
SC/ST	-.557	.339		
OBC	-.263	.360		
Muslim	-.449	.304		
Household education	.243	.055***	.251	.055***
Female education	.300	.146**	.297	.135**
Household poverty indicator	-.619	.223***	-.588	.228**
Female head of household	-.166	.506		
Household size	-.077	.050		
Dependency ratio	-.249	.166		
Community variables				
Sitamarhi district	-.649	.330***	-.685	.326**
Darbhanga district	-.769	.288***	-.734	.287**
Number of primary schools	-.369	.113***	-.383	.114***
Programme variables				
Member of MS	.532	.197***	.476	.217**
MS village	.082	.211	.075	.228
_constant	1.211	.808	-.120	.628
Number of observations	2404		2404	

*: p<0.10; **: p<0.05; ***: p<0.01

Annex 4. Logit estimations of immunization

	Preferred estimation	s.e.	Preferred estimation	s.e.	Preferred estimation	s.e.	Preferred estimation	s.e.
Dependent variable:	**Polio immunization**		**Tuberculosis imm.**		**Diphtheria imm.**		**Measles imm.**	
Child characteristics								
Sex	-.268	.155*	-.179	.123	-.150	.098	-.120	.103
Age	-.344	.034***	-.078	.019***	-.054	.013***	-.020	.014
Household characteristics								
SC/ST			-1.165	.516**	-1.160	.402***		
OBC			-1.050	.528**	-1.056	.412**		
Muslim			-1.560	.510***	-1.361	.421***		
Household education			.094	.041**	.155	.040***	.148	.053***
Female education	.168	.095*	.222	.079***	.250	.071***	.260	.061***
Household poverty score	-.388	.232*	-.252	.109**				
Female head of household								
Household size			-.096	.025***	-.092	.027***	-.134	.030***
Dependency ratio								
Community variables								
Sitamarhi district			-.398	.251	-.413	.271	.065	.313
Darbhanga district			-1.239	.302***	-1.547	.461***	-1.103	.342***
Distance to nearest town								
Distance to health center								
Road quality								
Public transport								
Programme variables								
Member of MS			.243	.192	.287	.185	.296	.178*
MS village			.679	.233***	.576	.218**	.494	.237**
_constant	4.939	.559***	2.116	.637***	1.507	.469**	-.054	.298
Number of observations	4396		4363		4494		4491	

*: p<0.10; **: p<0.05; ***: p<0.01

Annex 5. Logit estimations of health practices

Table A 5.1 Estimations for the occurrence of diarrhea

Dependent variable: Occurrence of diarrhea in the household in the last four weeks	Complete	s.e.	Preferred estimation	s.e.
Household characteristics				
SC/ST	.068	.307		
OBC	.062	.270		
Muslim	-.052	.330		
Household education	-.029	.051		
Female education	.073	.055	.060	.040
Household poverty indicator	.227	.126*	.263	.070***
Female head of household	.110	.223		
Household size	.079	.028***	.075	.028***
Dependency ratio	.242	.104**	.264	.099***
Community variables				
Sitamarhi district	1.113	.211***	1.011	.192***
Darbhanga district	.813	.214***	.793	.213***
Distance to nearest town	-.011	.008		
Distance to health center	.005	.028		
Sanitation facilities present	-.016	.193		
Programme variables				
Member of MS	-.215	.127*	-.195	.120
MS village	.287	.175	.376	.149**
_constant	-2.183	.383***	-2.398	.249***
Number of observations	1814		1819	

*: p<0.10; **: p<0.05; ***: p<0.01

N.B.: Female education and membership in MS are kept in the preferred estimation because an F-test rejects their joint insignificance.

Table A 5.2 Estimations of the treatment of diarrhea

	Preferred estimation	s.e.	Preferred estimation	s.e.	Preferred estimation	s.e.
DEPENDENT VARIABLE:	Use ORT		Use medicine		No treatment	
Household characteristics						
SC/ST	-2.322	.806***	2.727	.723***		
OBC	-1.762	.617***	2.516	.638***		
Muslim	-1.657	.947*	2.601	.876***		
Household education	-.309	.164*	.131	.077*	-.376	.140***
Female education	.344	.153**			-2.434	.938**
Household poverty indicator					.668	.524
Female head of household						
Household size			-.076	.045*	.132	.086
Dependency ratio					-.688	.686
Community variables						
Sitamarhi district	.202	.475	-.029	.425		
Darbhanga district	-2.801	.629***	2.472	.601***		
Distance to nearest town						
Distance to health center						
Programme variables						
Member of MS	1.847	.351***	-1.635	.314***	1.331	1.009
MS village	1.417	.752*	-.232	.480	-2.419	.855***
_constant	-1.896	1.068	-.039	.793	.504	1.848
Number of observations	633		633		492	

*: p<0.10; **: p<0.05; ***: p<0.01

N.B.:

- Household poverty, household size and the dependency ratio are kept in the preferred estimation because an F-test rejects their joint insignificance.
- In the "No Treatment"-estimation, the caste of the household is omitted from the estimation because belonging to the general caste perfectly predicts the "no treatment" variable (= always equal to 0). That is, general caste households always treat diarrhea.
- In the "No Treatment"-estimation, the district dummies are omitted from the estimation because living in the Muzaffarpur district perfectly predicts the "no treatment" variable (= always equal to 0). That is, households in Muzaffarpur always treat diarrhea.

REFERENCES

Bourdieu, P. (1986). The forms of capital. Handbook of theory and research for the sociology of education. J. G. Richardson (ed.). New York, Greenwood.

Braatz, J. and R. D. Putnam (1998). Families, Communities, and Education in America: Exploring the Evidence. Rebuilding the Village: Social Capital & Education in America. G. G. Wehlage and J. A. White (eds.). London, Falmer Press.

Coleman, J. S. (1988). "Social Capital in the Creation of Human Capital." American Journal of Sociology **94**(Supplement): S95-S120.

Coleman, J. S. (1990). Foundations of Social Theory. Cambridge, MA, Harvard University Press.

Dreze, J. and A. Sen (2002). India: Development and Participation. Oxford, Oxford University Press.

Evans, J. L., R. G. Myers, et al. (2000). Early Childhood Counts: A Programming Guide on Early Childhood Care for Development. Washington, DC, World Bank.

Filmer, D. and L. Pritchett (2001). "Estimating Wealth Effects without Expenditure Data -- or Tears: An Application to Educational Enrollments in States of India." Demography **38**(1): 115-132.

Furstenberg, F. F. J. and M. E. Hughes (1995). "Social Capital and Successful Development among At-Risk Youth." Journal of Marriage and the Family **57**(3): 580-592.

Harpham, T. (2002). Measuring the social capital of children. London, Young Lives: An International Study of Childhood Poverty**:** 14.

India Census Office (2001a). Census of India 2001: Bihar. Provisional Population Totals 2: Rural-urban Distribution of Population. Patna, Bihar, Census Operations.

India Census Office (2001b). Census of India 2001: Provisional Population Totals. Paper 1 of 2001. New Delhi, Census of India.

Jack, G. and B. Jordan (1999). "Social Capital and Child Welfare." Children & Society **13**: 242-256.

Kirpal, S. (2002). Communities Can Make a Difference: Five Cases Across Continents. From Early Child Development to Human Development. M. E. Young (ed.). Washington, DC, World Bank**:** 293-360.

Krishna, A. and N. Uphoff (1999). Mapping and Measuring Social Capital: A Conceptual and Empirical Study of Collective Action for Conserving and Developing Watersheds in Rajasthan, India. Washington, DC, World Bank.

Loury, G. C. (1977). A dynamic theory of racial income differences. Women, minorities, and employment discrimination. P. A. Wallace and A. M. La Mond. Lexington, MA, Heath Publishers**:** 153-186.

Loury, G. C. (1981). "Intergenerational Transfers and the Distribution of Earnings." Econometrica **49**(4): 843-867.

Mahila Samakhya (1995). Mahila Samakhya-Bihar: A journey in Women Empowerment. Patna, Bihar Education Project**:** 40.

Mahila Samakhya (2002). Mahila Samakhya Bihar: Forward & Onward 1992-2002. Patna, Mahila Samakhya Bihar.

Narayan, D. (1999). Bonds and Bridges: Social Capital and Poverty. Washington, DC, World Bank.

Ostrom, E. (1990). Governing the Commons: The Evolution of Institutions for Collective Action. New York, Cambridge University Press.

Ostrom, E. (2000). "Collective Action and the Evolution of Social Norms." Journal of Economic Perspectives **16**(2): 339-366.

Portes, A. (1998). "Social Capital: Its Origins and Applications in Modern Sociology." Annual Review of Sociology **24**: 1-24.

Runyan, D. K. et. al. (1998). "Children Who Prosper in Unfavorable Environments: The Relationship to Social Capital." Pediatrics **101**(1): 12-18.

Snijders, T. A. B. (1999). "Prologue to the Measurement of Social Capital." The Tocqueville Review **20**(1): 27-44.

Uemura, M. (1999). Community Participation in Education: What do we know? Washington, DC, World Bank**:** 36.

Uphoff, N. (2000). Understanding Social Capital: Learning from the Analysis and Experience of Participation. Social Capital: A Multifaceted Perspective. P. Dasgupta and I. Serageldin (eds.). Wasington, DC, World Bank**:** 215-249.

Willms, J. D. and M.-A. Somers (2001). "Family, Classroom, and School Effects on Children's Educational Outcomes in Latin America." School effectiveness and school improvement **12**(4): 409-445.

Winter, I. (2000). Towards a theorised understanding of family life and social capital. Melbourne, Australian Institute of Family Studies**:** 18.

World_Bank (1997). India -- Third District Primary Education Project Bihar (DPEP III). Washington, DC, World Bank**:** 62.

Young, M. E. (ed.), (1997). Early Child Development: Investing in our Children's Future. Amsterdam, Elsevier.

Young, M. E. (ed.), (2002). From Early Child Development to Human Development. Washington, DC, World Bank.

The Amsterdam Institute for International Development (AIID) is a joint initiative of the Universiteit van Amsterdam (UvA) and the Vrije Universiteit Amsterdam (VU).

Correspondence: AIID
Roetersstraat 31
1018 WB Amsterdam
The Netherlands
tel.: +31 (0)20 444 9097
fax: +31 (0)20 444 9095
e-mail: info@aiid.org
www.aiid.org