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**Correlates of Women's Participation in Self-help Groups in India**

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## INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

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## ABSTRACT

Governments and development organizations worldwide are considering group-based platforms as alternatives to government- or market-based approaches for service delivery. This paper analyses the correlates of women's membership in self-help groups (SHGs) using two datasets from India. Older women and those in villages without banks are more likely to join SHGs. Different findings across the two datasets highlight the drawbacks of using program evaluation data for guiding geographic targeting and placement of SHG programs. Our results emphasize the need to understand regional variations in membership and the unique characteristics of women, households, and villages when designing and targeting SHG platforms, particularly when using them for service delivery.

**Keywords:** India, Self-help groups, women, membership

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## ACRONYMS

<b>CBOs</b>	Community-based organizations
<b>IFPRI</b>	International Food Policy Research Institute
<b>IHDS</b>	Indian Human Development Survey
<b>IKP</b>	Indira Kranti Patham programme
<b>MoRD</b>	Ministry of Rural Development
<b>NCAER</b>	National Council of Applied Economic Research
<b>NGOs</b>	Non-governmental organization
<b>NLRM</b>	National Rural Livelihoods Mission
<b>OBC</b>	Other Backward Class
<b>OLS</b>	Ordinary Least Squares
<b>PRADAN</b>	Professional Assistance for Development Action
<b>SC</b>	Scheduled Caste
<b>SERP</b>	Society of Elimination of Rural Poverty
<b>SHG</b>	Self-help groups
<b>SGSY</b>	Swarnajanti Gram Swarajgar Yojana – National SHG programme
<b>ST</b>	Scheduled Tribe
<b>TLU</b>	Tropical Livestock Units
<b>WINGS</b>	Women Improving Nutrition through Group-based Strategies

## 1 INTRODUCTION

Globally, international organizations, governments, and nongovernmental organizations (NGOs) are increasingly looking towards group-based platforms as an alternative to government-or market-based approaches for delivering programs and services. Working through groups or networks of groups reduces the cost of delivering services to many individuals, making outreach and service delivery more cost effective (Meinzen-Dick et al., 2014). Participation in groups builds social capital, which may facilitate access to other forms of capital, such as financial capital through group-based microfinance programs and political capital through groups that encourage political participation and mobilization. Building social capital can also facilitate the accumulation of other forms of capital (Quisumbing and Kumar, 2011).

Because women are often disadvantaged in access to land, credit, and other factor markets, delivery platforms based on women's groups have attracted much attention. Perhaps the best illustration is in India, where women's self-help groups (SHGs) have been facilitated by NGOs, the government, and even the private sector (Desai and Joshi, 2014). SHGs are "membership-based organizations" whose members provide each other with mutual support while attempting to achieve individual objectives through access to savings and loans and linkages to banks (Shah, Rao, and Shankar, 2007; Tankha, 2002; Bouman, 1995), as well as collective objectives through community action (Chen et al., 2007 cited in Desai and Joshi, 2014). SHGs began in India in the 1980s, with a focus on reducing poverty and improving livelihoods in poor, rural communities. Early government initiatives focused on addressing credit constraints by linking SHGs to banks (Shah et al., 2007; Tankha, 2002), and microcredit for poverty reduction was the basis of the key national SHG programme, Swarnajayanti Gram Swarojgar Yojana (SGSY), which was implemented under the Ministry of Rural Development (MoRD) from 1999 to 2011 (extended to 2013) (OPM, 2014). Over the last few decades, SHG programs, particularly at the state level, have expanded to include efforts promoting social mobilization, social accountability, awareness of rights and entitlements and more recently, targeted programming to improve health and nutrition. Among these are SERP (the Society for Elimination of Rural Poverty) in Andhra Pradesh, which is linked to the Indira Kranti Patham (IKP) programme, JEEViKA in

Bihar and Kudumbashree in Kerala. Eventually, the National Rural Livelihoods Mission (NRLM) was launched as the Government of India's replacement for SGSY in 2011 (and re-launched in 2013) and is heavily influenced by the State level programmes such as SERP.<sup>1</sup> SHG programs in India have also expanded to urban areas given the increase in urbanization and the challenges unique to urban areas including rising slum populations and high rates of urban poverty (Ministry of Housing Urban Poverty and UNDP, 2009).

The rise of group-based platforms for service delivery has given rise to studies that examine the impact of participation in such groups on a range of outcomes including political participation, rights and entitlements awareness (Kumar et al., 2019), women's empowerment, health and nutrition (Kumar et al. 2018), and social capital. Despite the proliferation of studies on the impact of group-based programs, there is relatively little attention to the determinants or correlates of participation in such programs. Evaluations based on randomized controlled trials assume that unobservable characteristics that might affect the decision to join a group-based program are eliminated through randomization, while studies that use propensity score matching to create a counterfactual implicitly estimate regressions of the probability of being a program participant, conditional on observable characteristics, but these regressions are often buried, deemed less important than the impact estimates, and are very rarely reported (de Hoop et al., 2014; Osmani, 2007). Yet, understanding the determinants of program participation is important for the design and targeting of group-based programs. First, it enables program designers to identify characteristics of their proposed clientele and to design programs to meet their needs. Second, it helps implementors target programs to their intended beneficiaries, an important consideration given limited resources. Third, it helps evaluators assess whether programs are reaching these beneficiaries.

This paper contributes to the understanding of participation in group-based programs by analyzing the correlates of women's membership in SHGs using two data sets from India. The first was collected as part

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<sup>1</sup> Please refer to the following for greater details on these programs: NRLM ( <http://www.worldbank.org/en/news/feature/2011/07/05/the-national-rural-livelihoods-project> ), SERP ( <http://healthmarketinnovations.org/program/society-elimination-rural-poverty-serp-indira-kranthi-patham> ), JEEViKA ( <http://projects.worldbank.org/P090764/bihar-rural-livelihoods-project-jeevika?lang=en&tab=overview> )

of a quasi-experimental impact evaluation of a nutrition-sensitive agricultural program being implemented by Professional Assistance for Development Action (PRADAN), one of India's largest NGOs, in five states of India, while the second consists of two rounds of a nationally representative data set, the Indian Human Development Survey collected in 2005 and 2011. We use both data sets to estimate the correlates of the probability that a woman is a member of an SHG, controlling for individual, household, and community characteristics. We first estimate our regressions using the baseline data from the impact evaluation in five states. Because the baseline data are not a random sample of the population in these states, we re-estimate this regression using the IHDS data for the same five states. Additionally, we estimate these regressions using the all-India data, separately for rural and urban areas, to discern whether the correlates of membership differ significantly between urban and rural areas.

The paper is organized as follows. Section 2 reviews the literature related to gender differences in social capital and participation in SHGs. Section 3 describes the data and presents descriptive statistics, while Section 4 discusses methods. Section 5 presents the results and Section 6 concludes.

## 2 RELATED LITERATURE

Studies on the determinants of women's participation in groups are part of a broader literature on social capital, defined by Putnam (1995) as "features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation". This literature has examined the factors that affect an individual's (or household's) ability to accumulate social capital, operationalized by participation in formal groups and informal social networks, and the role that such groups and networks play in information exchange and technology adoption, risk-smoothing, political and civic participation, and women's empowerment. As pointed out by Meinzen-Dick et al. (2014), development practitioners are interested in social capital because they perceive that it is relatively easier for the poor to acquire, unlike other assets such as land or equipment. Participation in groups is a commonly used indicator of social capital, although alternative definitions exist (see surveys by Meinzen-Dick et al., 2014; Durlauf and Fafchamps, 2005). However, the poor may also face barriers to participation in groups. Participation is not costless—networking takes time, especially when formal group meetings are required, many groups require fees to participate (Meinzen-Dick et al., 2014), and social inequality and ethnic differences may create barriers to social capital accumulation (Alesina and La Ferrara, 2000).

Interest in using women's groups as a platform for service delivery has led to a number of studies exploring gender differences in participation in groups (Table 1). These studies examine the determinants or correlates of men's and women's participation in different types of groups, using different indicators of gender differences and different outcome measures. Some studies (e.g., Jagger and Pender, 2006) analyze differences in membership at the household level and use the sex of the household head as a proxy for gender differences; while others (e.g., Woldu et al. 2015, World Bank and IFPRI 2010, Quisumbing 2009, Godquin and Quisumbing 2008, Davis and Negash 2007) use individual observations on men and women to examine gender differences in participation in groups. In most of these studies, the sample of men and women is drawn from household heads and spouses, but the regressions control for individual and household characteristics. The use of headship as a proxy for gender differences has been criticized by Doss

et al. (2017) among others, for neglecting differences between men and women within male-headed households. Another study (Leino, 2007) uses the number of women on committees as the outcome variable in a randomized intervention where 50 percent of water user groups were given training to increase female participation.

Among the studies using headship as the gender indicator, Jagger and Pender (2006) find that, in Uganda, female headship is not significantly associated with participation in agricultural or environmental NGOs and community-based organizations (CBOs). In studies conducted among male and female household heads (but that control for individual and household characteristics), a three-country study conducted by the World Bank and IFPRI (2010) found that male household heads in Ghana are significantly more likely to belong to farmer organizations than female household heads; similarly, in Ethiopia, a significantly higher proportion of male than female respondents (from a sample of household heads and spouses) participated in agricultural cooperatives. In the same study's India study site, however, the authors did not find that the sex of the household head was significant in determining the number of institutional memberships per household. Women tended to participate in SHGs and women's groups, while men participated in forest groups, cooperative societies, and caste associations. The other studies summarized in Table 1 that examined the types of groups that men and women belonged to also found gender differences, with men more likely to belong to producer groups or agriculturally-oriented groups in such diverse countries as Kenya (Davis and Negash, 2007), the Philippines (Godquin and Quisumbing, 2008), and Bangladesh (Quisumbing, 2009).

The disparity between men's and women's participation in agricultural producer groups, as well as the desire to address other gender-based disparities in specific contexts, has led to group-based programming targeted specifically to women. Participation in a group-based program is the outcome of a decision made by the woman herself and depends on her own characteristics as well as her household and community's. Interestingly, the endogeneity of this decision has been approached in different ways by evaluations of these programs. Studies that randomize the treatment (say, placement of a group-based intervention) rely on the

randomization process to eliminate biases from unobservables that could affect impact estimates. Evaluations of interventions that were not (or could not) be randomized often use matching methods or instrumental variables techniques to address selectivity based on observables or unobservables, but these studies rarely report the first stage regressions because their emphasis is on the impact estimates and interpretation of the first stage coefficients is of secondary interest (see, for example, de Hoop et al., 2014; Osmani, 2007).

Nevertheless, some studies do examine the factors that are correlated with women's participation in groups; these are summarized in Table 2. Because these studies focus on women's participation in groups, they explore differences among women, not between women and men. Unsurprisingly, given the importance of SHGs in India, four out of six studies identified are from India, with the remaining two from Nigeria and Uganda. With the exception of Mohindra et al. (2008), with a sample size of 928 women, and Selhausen (2015) with 631 women, the sample sizes are small, ranging from 120 to 400 households. Many of the studies also include regressors that could result from being members of the SHG, so these studies should be interpreted as correlation or association studies, rather than studies that attempt to attribute causality (despite their self-identification as "determinants" studies).

In the Indian studies, individual characteristics positively associated with the probability of SHG membership include coming from a lower caste and being a household head. The woman's age does not have a consistent effect on the probability of being a member—Anjugam and Ramasamy (2007) find a negative correlation of the woman's age with the probability of SHG membership in their Tamil Nadu study, while Mohindra et al. find that women aged 31-44 years have higher odds of being an early or late joiner of SHGs than women under 30 years. Shah and Panigrahi (2015) find that SHG participation is positively correlated with age in their Odisha study. Possibly reflecting tradeoffs between group activities and domestic responsibilities, Shah and Panigrahi (2015) find that having any child is negatively correlated with SHG membership. Some of the inconsistent results may also be driven by the diversity of these group-based programs that may attract women with different characteristics.

The relationship of SHG membership with a woman's education is ambiguous: while having no education is associated with lower odds of being an early or a late joiner of SHGs (relative to being a nonparticipant) in a Kerala study (Mohindra et al., 2008), a study in Odisha (Shah and Panigrahi, 2015) find that SHG participation is negatively associated with education. There is some indication that SHGs can reach poorer women: the association with the value of household's productive assets is negative, and women living in upper caste communities are also less likely to be in an SHG. Community characteristics also affect the desirability of joining an SHG: it is positively associated with distance to a bank (Shah and Panigrahi 2015). Garikipati (2008, 2012) finds that duration of participation in the SHG is positively related to the size of the neighborhood cluster and whether the household belongs to a nondominant caste within the cluster. The small sample sizes of these studies make it difficult to arrive at definitive conclusions about both the statistical significance and the direction of many associations.

Arguably, many of these findings could be context specific. Although the Indian studies suggest a negative correlation with wealth, a study in Uganda found that participation in a coffee cooperative was positively related with the size of land owned by the woman before marriage—which could indicate both wealth and bargaining power within marriage (Selhausen, 2015). A study in Nigeria (Anyiro et al., 2014) suggests that SHG participation is positively correlated with annual contributions to the SHG's funds, access to credit, and farming as a primary occupation. These findings reflect women's ability to own land in both Uganda and Nigeria, which is rare in the Indian context.

Many of the studies exploring correlates of SHG membership include variables that may be related with SHG membership as regressors. For example, Anjugam and Ramasamy (2007) find positive correlations between SHG membership and loan size, and the presence of other microcredit programs in the village, although Garikipati (2008, 2012) finds that duration of membership is negatively associated with the household receiving credit from outside sources. Some of the studies find significant associations with programmatic variables. For example, in Nigeria, participation in an SHG was negatively associated with having membership rules that allow free entry and exit into the SHG (Anyiro et al., 2014). In Andhra

Pradesh, Garikipati (2008, 2012) finds that duration of membership is negatively related to the percentage of women in the respondent's group who use their loans for an enterprise they manage or help manage, possibly indicative the negative effects of peer pressure.

The review of the literature suggests that there is limited and inconclusive evidence on the specific set of characteristics that are associated with SHG participation. This paper contributes to the literature by identifying several important correlates of SHG participation in rural India where SHGs have been operating since the 1980s, using data from an impact evaluation and from two rounds of a nationally representative survey. The nationally representative data set, in particular, enables us to investigate these issues for both rural and urban areas.

### **3 DATA AND DESCRIPTIVE STATISTICS**

#### **3.1 Data**

This study uses two different datasets; a household survey that forms the baseline of an impact evaluation of nutrition-intensification efforts made by an Indian NGO, PRADAN, which is part of the Women Improving Nutrition through Group-based Strategies (WINGS) project and the Indian Human Development Survey (IHDS) which is a nationally representative survey. The WINGS baseline survey was conducted from September to December 2015 in eight districts of five states of eastern and central India - Madhya Pradesh, Orissa, Chhattisgarh, Jharkhand and West Bengal. Three blocks were selected in each district of the study, making a total of 24 blocks. From each of the blocks, between five and seven villages were chosen at random from the full list of villages. From each village, 20 women (the respondent woman) were selected at random from among all ever-married women aged 15-49 years old. The final sample size at baseline was 2744 women. The WINGS dataset consists of information on household demographic and socioeconomic characteristics, for the respondent women it has detailed information on health and nutrition practices and knowledge, empowerment and gender attitudes, membership in SHGs, etc. This survey was designed by researchers at IFPRI (two of the co-authors were part of this team) with inputs from PRADAN.

The IHDS is a nationally representative household survey that collects information on health, education, employment, economic status, marriage, fertility, gender relations and social capital. The survey was organized by researchers in the University of Maryland and the National Council of Applied Economic Research (NCAER) in New Delhi. In 2005, IHDS collected data from 41,554 households in 1503 villages and 971 urban neighbourhoods across all states and union territories of India, except Andaman Nicobar and Lakshadweep. The sample was drawn using stratified random sampling and consists of 27,010 rural and 14,543 urban household. In the 2011 round of the IHDS, 83 percent of the first-round households were re-interviewed. Among the households that were re-interviewed in 2011, 12 percent had one or more split households, leading to a balanced panel of 40,018 households.

For the analysis undertaken in this paper, we use a subset of the IHDS panel data. To make the IHDS data as comparable to the WINGS data as possible, we restrict our analysis to all panel households in the IHDS that have at least one ever-married woman between 15 and 49 years old, referred to from here on as the eligible woman.<sup>2</sup> This reduced the sample size to 30,159 per round and additional data checks<sup>3</sup> reduced the sample further to a total of 17,826 households in the rural areas India-wide, 6,583 in the urban areas, and 4,470 located in rural WINGS intervention states.

### **3.2 Descriptive statistics**

To assess the comparability of eligible women in the two data sets, we discuss key characteristics of women, households and villages in our WINGS and IHDS datasets. In the WINGS baseline survey, we find that 38 percent of women belonged to an SHG in 2015 (Column 1, Table 3). In the IHDS dataset, SHG membership in rural areas rose from 10 percent in 2005 to 26 percent in 2011 within the states in the WINGS data (Columns 2 and 3, Table 3). Nationally, SHG membership in rural India in 2011 was 24 percent (Column 5, Table 3). The higher prevalence of SHG membership in the WINGS data set is partly attributable to the sampling design for the impact evaluation. This is because while households were randomly selected as part of the WINGS impact evaluation, blocks in two of the treatment arms were selected conditional on PRADAN's presence and activities.

The average age of women in the WINGS baseline survey was approximately 33, almost five years younger than the average age of women in the IHDS data from 2011 in rural areas. Years of formal schooling completed by women in both the WINGS and IHDS -specifically the 5 WINGS states in 2011- surveys was very low – 2.30 and 2.86 years, respectively. Not surprisingly, the average years of schooling completed by women nationally in urban areas was significantly higher, at 6.82 years in 2011. Around 93 percent of

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<sup>2</sup> Modules on health, education, fertility, family planning and gender relations in the household and the community were answered by the eligible woman in the household.

<sup>3</sup> These checks included consistency checks such as making sure household characteristics that are invariant over time do not change between the 2005 and 2011 round, caste of the household head being an example.

women in the WINGS survey were currently married, and we see roughly similar rates across the other sub-samples in the IHDS data (Columns 2 to 7, Table 3).

Most households in the WINGS data belong to the Scheduled Tribe (ST) caste - approximately 67 percent. In contrast, most households in the IHDS identified as belonging to the Other Backward Class (OBC) caste category - approximately 36 percent across most rural sub-samples. This difference in caste composition across the two data sources is again due to sampling for the evaluation of PRADAN's activities (which are targeted to the most remote areas in the country)<sup>4</sup>. The average household size in the WINGS data was 4.65, compared to roughly 5.15 in the IHDS data from 2011 in the five northern states.

Next, we look at the socio-economic characteristics of households in our two datasets. We construct a wealth index for households using principal components analysis that captures aspects of wealth such as access to electricity, dwelling conditions, ownership of agricultural land and livestock. By construction, we know that 20 percent of households in the WINGS data have a wealth index that falls in the poorest wealth quintile.<sup>1</sup> In the IHDS sub-sample restricted to the 5 WINGS states and rural households (Columns 2-3, Table 3), we find that 44 percent of households have a wealth index that falls in the poorest national wealth quintile in 2011. In the urban areas, two percent of households in 2011 had a wealth index that fell in the poorest national wealth quintile (Column 7, Table 3). This reflects the generally higher levels of wealth in urban areas compared to rural areas.

Turning to some of the village-level characteristics, we find that the average years of schooling for women in a village is 2.30 years in the WINGS data (Column 1, Table 3), and 2.86 years in the IHDS five wings states rural data sample from 2011 (Column 3, Table 3). When examining the range between the highest and lowest wealth index within a village -a proxy for wealth inequality-, we find that wealth inequality is slightly higher in the WINGS data compared to the IHDS sub-samples restricted to rural households (Columns 1-5, Table 3). However, wealth inequality at the village level seems to be lowest in urban areas.

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<sup>4</sup>As stated on their website, PRADAN works with the marginalized and majority of the people the work with belong to scheduled castes and tribes. <http://www.pradan.net/our-impact/#pradanbythenumbers>

Finally, 89 percent of villages in the WINGS data had at least one primary school and only five percent of villages had at least one bank. In the IHDS data, for which we have information only in rural areas, 24 percent of rural villages nationally had at least one bank (and 14 percent in the 5 wings states), while 98 percent of rural villages nationally had at least one primary school (and 99 percent in the 5 wings states) as of 2011.

## 4 METHODS

### 4.1 OLS regressions with WINGS baseline data

Following the discussion in the literature review, we estimate an ordinary least squares (OLS) model where SHG membership is the dependent variable. The independent variables are grouped under the following broader categories: women's demographic characteristics; household demographic characteristics; household socioeconomic characteristics; access to and use of wood and water; and village characteristics. The choice of independent variables is driven in part by our decision to focus on relatively exogenous variables that are unlikely to have been affected by SHG membership. To examine the associations, we estimate equation 1:

$$Y_{ihvds} = \beta_0 + \beta_1 W_{ihvds} + \beta_2 H_{ihvds} + \beta_3 V_{ihvds} + \zeta_s + \eta_d + \epsilon_{ihvds} \quad (1)$$

In equation 1,  $Y_{ihvds}$  is a dummy variable that is 1 if the woman is an SHG member and 0 otherwise. The subscript indicates that the SHG membership is for individual  $i$  in household  $h$  of village  $v$  of district  $d$  in state  $s$ .  $W$  is a vector of women's demographic characteristics, including age, education and marital status.  $H$  is a vectors of household characteristics which include household head caste, household size, and percent of children/adults in various age brackets; socioeconomic characteristics including monthly logged consumption expenditure per capita, household wealth index, and types of assets owned; and, variables associated with access to and use of wood and water.  $V$  is a vector of village-level characteristics such as whether the village has at least one primary school and bank as well as a proxy of wealth inequality in the village captured by the difference between the highest and lowest wealth index in our sample. We also include district- and state-level fixed effects. Standard errors  $\epsilon_{ihvds}$  are clustered at the level of the block, given our block-level sampling design. This also accounts for correlations between the SHG membership residual and unobservable factors that may vary at the block level.

### 4.2 Panel regressions with IHDS data

We complement the above-mentioned analysis with analogous analysis done on the IHDS panel data. This exercise allows us to check whether any relationships estimated with the WINGS baseline data are robust to estimation using nationally representative data. We estimate three specifications - OLS, random effects, and household fixed effects – using the IHDS panel data. We also estimate these specifications for three sub-samples:

1. Rural households from the five states in the WINGS data (Madhya Pradesh, Jharkhand, West Bengal, Chhattisgarh, and Odisha).
2. Rural households across all states in India.
3. Urban households across all states in India.

This additional analysis using IHDS data allows us to not only understand similarities and differences in characteristics of women and households that are SHG members between our WINGS data and IHDS data, but also examine specific attributes of rural and urban households across India that are associated with SHG membership. Importantly, not all questions in the WINGS baseline survey were identical to the IHDS. Some questions were phrased differently, while others were not asked at all in the IHDS. Nevertheless, we construct variables to be as similar as possible between the two surveys and estimate models with this common set of variables.<sup>5</sup>

Similar to the regressions estimated using the WINGS data, we define SHG membership as our dependent variable and include a series of independent variables grouped under similar categories as in the WINGS analysis. The OLS model is specified as follows:

$$Y_{ht} = \beta_0 + \beta_1 W_{ht} + \beta_2 H_{ht} + \beta_3 V_{ht} + \zeta_s + \eta_d + \epsilon_{ht} \quad (2)$$

In equation 2,  $Y_{ht}$  is a dummy variable that is 1 if anyone in the household belongs to an SHG and 0 otherwise. The subscript indicates that the SHG membership is for household  $h$  in time  $t$ .  $W$  is a vector of women's characteristics including age, education, occupation and marital status. Vector  $H$  includes

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<sup>5</sup> For more details on how each variable was defined for both the datasets please refer to Annex Table A1.

household characteristics including demographic variables such as household caste, size, and percent of children and adults in various age brackets; socio-economic characteristics which include a wealth index and a dummy for whether the household falls in the poorest wealth quintile; and variables associated with access to and use of wood and water. Finally,  $V$  is a vector of village-level characteristics including mean education per village, wealth inequality in the village and average asset ownership in the village. We also include district and state fixed effects. Standard errors  $\epsilon_{hd}$  were adjusted for the degrees of freedom lost in estimating  $N$  individual means (Angrist, 2009) and were clustered at the village level.

In addition to the OLS specification in equation 2, we also estimate a random effects regression, allowing us to include time invariant variables such as household caste which may have some influence on our dependent variable. Finally, we also estimate a household fixed effects regression using the IHDS data that allows us to control for household unobservable time-invariant characteristics that may bias the coefficients of some of the key independent variables (Angrist, 2009).

## 5 RESULTS

### 5.1 WINGS baseline OLS results

Results from our main OLS WINGS specifications (Table 4, column 1) highlight the association between different characteristics at the woman, household and village level and the probability of being an SHG member. Similar to the studies of Mohindra (2008) and Shah (2015), the relationship between women's age and SHG membership is positive, displaying quadratic life cycle effects as indicated by the positive coefficient on age squared. However, we find that infrastructure-related demands on women's time (as proxied by use of firewood for cooking and the woman fetching water) are not significantly associated with SHG membership. Note, however, that the use of firewood for cooking and fetching water could also reveal a lack of access to infrastructure, which could be an indicator of poverty.

The observed relationship of SHG membership with the woman's age may partly reflect time for reproductive work (younger women have younger children and are also responsible for other household chores) and lack of autonomy, both of which are less constraining for older women.

Although the WINGS sample has villages with a large fraction of households belonging to scheduled castes and scheduled tribes (implying these are poorer villages), households with higher monthly per capita household consumption are more likely to be SHG members. Similarly, there is a positive association between the average tropical livestock units (TLU) owned by households in a village and the likelihood of women participating in an SHG. Additionally, the coefficient on the household head belonging to a scheduled tribe is negative, although only weakly significant (at 10%). This indicates that, even in a low-income setting, women from better-off households and villages are more likely to participate in a SHG. Not surprisingly, women are less likely to be SHG members when their village has at least one bank, possibly because women would not need the services of alternative finance platforms such as SHGs. Our findings are consistent with Shah and Panigrahi (2015), who find a positive association between distance to bank and SHG membership.

No significant relationship exists between having a large share of young children in the family and SHG membership. However, we do find a significant and positive relationship between the existence of a primary school in the village and SHG membership. In other words, while the presence of young children within the household may not deter women from joining SHGs, the existence of a primary school could suggest more free time for women to join an SHG if their children have educational opportunities.

## **5.2 IHDS panel data results**

We estimated three different specifications for three different IHDS subsamples. Our analysis focuses mainly on the random effects specification, as we are interested in understanding how differences across households are associated with SHG membership. Table A3 in the annex present the results of the OLS and fixed effects specifications for the three subsamples.

First, we compare results from our WINGS evaluation sample to rural households in the WINGS states from the IHDS data set (Table 4, columns 2 and 3). The regressions are estimated on the variables that exist in both data sets. Given the differences in sampling design and sample size, it is unsurprising that regressions estimated on common covariates yield inconsistent results. The only results that are consistent across both data sets is the higher likelihood of older women being SHG members and lower likelihood of women in villages with access to banks to being SHG members. Associations with wealth indicate that wealthier households in the WINGS evaluation sample are more likely to be SHG members—households in the lowest quintile are less likely to be members, and households in villages with more livestock on average are more likely to be members. This result is not shown in the IHDS data, which shows higher probabilities of SHG membership associated with household heads being SC, STC, or OBC and household use of wood as cooking fuel, and higher probabilities of SHG membership in villages with higher wealth inequality. Similarly, years of schooling is positively associated with SHG membership in the IHDS data but does not have a similar significant relationship in the WINGS sample. The difference in findings across the two samples is likely driven by selection criterion of the WINGS sample and underscores the importance

of not generalizing the findings from the evaluation sample for the five states in this sample. The finding that SHG membership may be more attractive for women from wealthier households shows up only in villages with high concentration of scheduled castes and tribes and high within-village wealth inequality, and not in the villages with a more “balanced” caste and wealth distribution.

Next, we compare results from the all-India rural and urban subsamples of the IHDS panel data (Table 5). The panel analysis shows that age of the eligible women, caste categories, and whether the household uses wood as cooking fuel are significantly positively associated with SHG membership in both, the rural as well as the urban subsamples. More specifically, we find that households where the household heads identify themselves as ST, SC or OBC have a greater likelihood of having a family member in an SHG. Similarly, households that use wood as cooking fuel are more likely to have a household member that participates in an SHG compared to those who use electricity or gas. This suggests that belonging to a lower caste and being poor enough to use wood as cooking fuel is positively and significantly associated with SHG membership when looking at nationally representative data.

Important differences emerge in the correlates of SHG membership in urban and rural areas. An eligible woman with more years of schooling is more likely to be an SHG member in rural, but not urban, areas. Having an eligible woman in the household whose main occupation is day labourer increases the likelihood of SHG membership in urban areas but has no significant association in the rural areas. Whether the adult woman fetches water is correlated with a lower likelihood of being an SHG member in rural areas, but with a higher likelihood in urban areas. These likely reflect different constraints that women face—fetching water is a demand on women’s time in general, and may be greater in rural areas, given greater distances to water sources. In urban areas, having to fetch water may be an indicator of poverty.

Wealth indicators also have different associations with SHG membership in urban and rural areas. The wealth index is negatively associated with SHG membership in urban areas, but has a positive but insignificant association in rural areas, so we fail to reject the null hypothesis that SHG membership is uncorrelated with wealth (as measured using the wealth index). Rural women whose households own more

livestock than the village mean also are more likely to belong to SHGs (livestock ownership in urban areas is so low that this would not be a good measure of wealth in urban areas). Interestingly, belonging to the lowest wealth quintile is weakly negatively associated with SHG membership in urban areas, and no similar negative relationship exists in rural areas. This is consistent with the results for wealth index and SHG membership.

Village-level characteristics play different roles in rural and urban areas as well. Wealth inequality - determined by the range between the highest and lowest wealth index of households in the village - is positively associated with SHG membership in rural areas and negatively associated with SHG membership in urban areas (though not statistically significant). In other words, as wealth inequality rises within a village, households are more likely to participate in SHGs in rural areas. While this could reflect households in rural areas joining SHGs in order to bridge the wealth gap, this could also reflect targeting of areas with higher inequality by NGOs that organize rural SHGs. NGOs that organize SHGs may also be targeting poorer villages, as indicated by the higher probability of women in villages with lower mean numbers of livestock units to be SHG members. Villages with higher mean levels of education are associated with higher probability of SHG membership in rural, but not urban, areas.

### **5.3 Probit regression results**

As a robustness check, we re-estimate the WINGS regressions using a probit model (Annex Table A2). The results are similar to the linear probability model estimates, with slight differences in the magnitude of the estimated coefficients.

## 6 DISCUSSION AND CONCLUDING COMMENTS

This paper aimed to deepen our understanding of participation in group-based programs by analyzing the correlates of women's membership in SHGs using one data set from an impact evaluation of a nutrition-sensitive agricultural program being implemented by a large NGO in five states of India and a nationally representative panel data set.

Our results show that women SHG members tend to be older, in both rural and urban areas. Similar to other studies from impact evaluations showing inconsistent associations with years of schooling, the results from our WINGS dataset show no association with years of schooling, but the nationally representative data set indicates that women with more education are more likely to be members of SHGs in rural areas. Consistent with other Indian studies, our results from the nationally representative data set show that SHGs appear to be successful in reaching households from scheduled castes, scheduled tribes, and other backward classes. Although this indicates that SHGs are reaching marginalized and excluded groups and reach households that are less well-off (as indicated by women having to fetch wood and water), it is possible that they do not reach the very poor. Although we cannot make any claims about causality, SHG membership is positively associated with per capita consumption in the WINGS dataset and with livestock ownership in the rural IHDS sample. Village characteristics are also associated with SHG membership, although with different directions of association in urban and rural areas. In rural areas, women living in villages with more educated women, a primary school, higher wealth inequality, lower livestock ownership, and no bank are more likely to join SHGs. In contrast, in urban areas, women are more likely to join SHGs if they live in villages with less educated women. Some of the differences in findings between rural and urban areas probably reflect differences in the underlying distribution of infrastructure, SHG program placement, and the interaction of both factors. For example, we find that in rural areas women living in villages without a bank are more likely to join an SHG, because SHGs offer an alternative platform for financial services.

The inconsistency of results between the program evaluation dataset and the nationally representative data set speaks to the drawbacks of using program evaluation data for making generalizations that might affect the targeting and placement of SHG programs. The WINGS data set has rich information on program-level outcomes, albeit for a smaller sample. However, to use this data set to make generalizations about SHGs on a national scale is unwise. Similarly, the IHDS lacks the granularity that might inform the details of SHG operations but is better at painting a broad picture of SHG membership, particularly the differences between rural and urban areas. Both data sets are useful for different purposes. The WINGS dataset has information on the population of the areas in which SHGs typically work—poorer communities with higher representation of marginalized groups. Some of the information in the WINGS dataset would have been useful to have at a national scale—for example, information on financial services available at the village level, landownership, and schooling infrastructure. Having this information in the IHDS urban sample would have made possible an analysis of whether SHGs tend to be located where they can act as alternative delivery platforms and substitute for government services, or whether they are located in places that require public infrastructure to be present, in which case SHG services act as complements to government services. Our other work (Kumar et al. 2019) suggests that participation in an SHG makes women more knowledgeable about government entitlements and more likely to avail of them. Understanding variations in the relationship between public services and SHG membership and the extent to which these substitute for or reinforce each other is important for designing more effective rural service delivery platforms. Our results also indicate the importance of exploring regional variations in SHG membership and understanding the unique characteristics of women, households and villages when designing, targeting and leveraging SHG platforms as vehicles for positive social change.

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## TABLES

**Table 1: Summary of studies on gender differences in participation in groups**

Author(s) (year)	Country	Sample size	Use of/access to input				Gender indicator	Outcome measure	Effect size	Comments
			Type of group	Women	Men	Unit				
Davis & Negash (2007)	Kenya	88 farmers	Dairy goat organization	52	48	%	Stratified by gender: female farmers	Participation	0.18 (0.67)	Descriptive analysis finds gender has a significant impact on type of group farmers participate in. Males dominate agricultural- oriented groups, while females dominate women/clan/village groups.
			Water group	9	33				8.09 (0.00)***	
			Farm group	2	12				3.24 (0.07)**	
Godquin & Quisumbing (2008)	The Philippines	304 households	Group membership (general)	63.2	58.7	%	Male and female household members	Participation	0.144 (0.97)	Simple model of participation in a group finds that gender does not impact group participation; however, there are gender differences in the types of groups to which men and women belong, and significantly more men are members of production-oriented groups.
			Production groups	14.5	22.4	%			-4.20 (-2.31)*	
Jagger & Pender (2006)	Uganda	451 households	Agriculture & environmental organizations	-	-	-	Female heads	Involvement in organization	0.128 (nr)	Probit regression finds that female head is not significantly associated with participation in agricultural/environmental NGOs and CBOs.
Leino (2007)	Kenya	168 respondent s	Water user committees	-	-	-	Female committee members	Number of women on committees	1.060 (0.159)***	Study evaluated randomized intervention across 334 communities where 50% of water user groups were given training designed to increase female participation. Analysis using instrumental variable approach finds number of females on committees increased, which did not, however, translate to changes in water source maintenance outcomes.
		805 respondent s		-	-	-				
Quisumbing (2009)	Bangladesh	745 men, 745 women (husband- wife pairs)	Any group	0.51	0.11	%	-	Probability of belonging to any group; number of groups	-	Regressions estimated separately for husbands and wives show that the probability of belonging to a group and the number of groups to which husbands belong increase with husband's years of schooling. Membership in women's groups is also progressive with respect to initial wealth, with both the probability of joining a group and the number of groups decreasing as the size of owned land increases. Having an older woman in the household increases both the probability of belonging to a group and the number of groups to which a wife belongs.
			Number of groups	0.69	0.14	Groups	-		-	
Woldu, Tadesse, and Waller (2015)	Ethiopia	1877 observation s (household heads and spouses)	Cooperative				Whether person is male	Whether member of cooperative	0.093** (0.041)	The probability of belonging to a cooperative is higher if the individual is male, older, belongs to a larger household, held official, village, or traditional position, or if his/her relatives held similar positions.
							Whether person is male (controlling for headship)	Whether member of cooperative	0.008 (0.019)	Once headship is controlled for, being male is no longer a significant correlate of membership. Membership in the cooperative is higher if a person is the household head, belongs to a larger household, holds an official position, or if his or her relatives held an official position.

Author(s) (year)	Country	Sample size	Use of/access to input			Gender indicator	Outcome measure	Effect size	Comments	
			Type of group	Women	Men					Unit
World Bank & IFPRI (2010)	India	966 households	Community- based organizations <sup>c</sup>	-	-	-	Female heads	Number of institutions household belongs to	0.033 (0.086)	OLS regression shows gender of head insignificant in determining number of institutional memberships per household; however, women participate mainly in self-help groups/women's groups, while men participate in forest groups, cooperative societies, caste associations.
	Ghana	1,168 heads	Farmer- based organizations	-	-	-	Male heads	Membership	0.079 (0.029)**	Probit regression shows that male heads are significantly more likely to belong to/participate in groups than are female heads (controlling for ecological zone, literacy of head, and household wealth proxy).
	Ethiopia	1,761 heads & spouses	Agricultural cooperatives	4	24	%	Male heads	Involvement	S*** (nr)	Descriptive and bivariate analysis shows a significantly higher proportion of male than female respondents participate in agricultural cooperatives.

Notes: Articles listed in alphabetical order of first author's last name; *Effect size* refers to gender indicator coefficients with standard errors in parentheses unless otherwise noted; S = significant, NS = not significant, nr = not reported; \* indicates significant at 10 percent; \*\* significant at 5 percent; \*\*\* significant at 1 percent. Outcome measures of *adoption* refer to rate of adoption of corresponding input type.

<sup>a</sup> Civil society organizations are defined as those that deliver public goods and services to territory-based communities. Men usually participate in civil society organizations related to community-level governance, physical infrastructure, environmental improvements, and neighborhood security, whereas women participate in organizations focusing on family welfare, economics, and health. As a result, the survey asked men and women about participation in different organizations.

<sup>b</sup> Self-help groups (building household assets, social/economic support), water groups, dairy goat groups, and coffee groups were the four most common types of groups.

Descriptive statistics reported in graphic form, but numbers were unassigned.

<sup>c</sup> Including agricultural CBOs.

Source: Adapted by authors from Peterman et al. (2014)

**Table 2: Summary of findings on the determinants of women’s participation in group-based programs**

Author(s) and year	Country	Sample size	Outcome variable	Methodology	Results/Findings
Anjugam and Ramasamy (2007)	India (Tamil Nadu)	140 SHG members and 80 non-members	Dummy variable: Women’s participation in a SHG microfinance program	Probit model	SHG participation is positively correlated with coming from a lower caste, loan size, and the presence of other microcredit programs or SHGs in the village. SHG participation is negatively correlated with age and the value of the household’s productive assets.
Anyiro, Ajuka, Emerole, and Orji (2014)	Nigeria (Isuikwuato local government area, Abia State)	120 women	Dummy: participation in SHG.	Probit regression	SHG participation is positively correlated with annual contribution, access to credit, and farming as a primary association. SHG participation is negatively associated with household size, years of membership experience, and whether there was free entry and exit into the SHG.
Garikipati (2008, 2012) <sup>a</sup>	India (Andhra Pradesh)	291 households; female spouses participating in SHG: 117 Nonparticipants: 174	Duration of participation in the SHG in years	Tobit regression used in first stage regression	Duration of participation is positively related to the size of the neighborhood cluster and whether the household belongs to a caste other than the dominant caste in the cluster; it is negatively related to the percentage of women in the respondent’s group who use their loans for an enterprise they manage or help manage (an indicator of peer pressure) and whether the household received credit from outside sources.
Mohindra, Haddad, and Narayana <sup>b</sup> (2008)	India (Kerala)	928 women from 18 to 59 years old in households below the poverty line. Early joiners (> 2 years): 150 Late joiners (2 or less years): 442 Nonmembers: 100 Nonmember in households without SHG members: 236	SHG participation: defined as early joiner, late joiner, non-member, and non-member of SHG in households without SHG members.	Multinomial logistic regression	Having no education is associated with lower odds of being an early or a late joiner, compared to non-participants (reference group). Having a primary education is associated with lower odds of being an early joiner compared to non-participants. Women belonging to the middle age category (31 to 44 years) have higher odds of being an early or late joiner than younger women (under 30 years).

Author(s) and year	Country	Sample size	Outcome variable	Methodology	Results/Findings
Selhausen (2015)	Uganda	421 women members and 210 nonmembers of BJC, a microfinance and coffee-producing producer cooperative in Western Uganda	Dummy: whether member of BJC	Probit regression	Participation in BJC is positively related with the woman's age, whether she participated in agriculture skills training, and the size of land owned by the woman before membership; it is negatively related to the woman's ability to read and write.
Shah and Panigrahi <sup>c</sup> (2015)	India (Odisha)	300 microfinance clients from 40 SHGs; 100 non-clients	Dummy variable: Participated in SHG & availed of credit	Logistic regression	SHG participation is positively correlated with age, female headship, and distance to a bank. SHG participation is negatively correlated with education, having any child, and being in an upper caste community.

Notes: <sup>a</sup>Regression examining the determinants of participation in groups was a first stage regression in a model estimating the impact of SHGs on other outcomes

<sup>b</sup>Regression on determinants of being a late or early joiner (relative to a nonjoiner) in a study examining effects of SHG participation on exclusion from and access to healthcare, agency, and wellbeing.

<sup>c</sup>The analysis did not distinguish between the decision to join an SHG and to avail of credit.

**Table 3: Summary statistics**

Variable	WINGS	IHDS-WINGS		IHDS rural		IHDS urban	
	2015 (1)	2005 (2)	2011 (3)	2005 (4)	2011 (5)	2005 (6)	2011 (7)
Whether SHG member	0.38 (0.49)	0.10 (0.30)	0.26 (0.44)	0.12 (0.32)	0.24 (0.42)	0.07 (0.25)	0.16 (0.37)
<b>Woman's demographic characteristics</b>							
Age	32.89 (8.35)	32.33 (8.38)	37.71 (9.38)	32.65 (8.17)	38.17 (9.23)	33.57 (8.00)	39.67 (8.77)
Age squared	1,151.10 (566.67)	1,115.59 (551.25)	1,509.59 (722.74)	1,133.08 (543.29)	1,541.84 (715.17)	1,190.82 (542.80)	1,650.71 (696.53)
Years of schooling	2.30 (3.60)	2.36 (3.46)	2.86 (3.73)	3.27 (4.13)	3.62 (4.27)	6.54 (5.05)	6.82 (5.09)
Agricultural or non-agricultural day labor	0.37 (0.48)	0.50 (0.50)	0.38 (0.49)	0.37 (0.48)	0.33 (0.47)	0.06 (0.23)	0.04 (0.20)
Housewife	0.26 (0.44)						
Currently married	0.93 (0.26)	0.96 (0.20)	0.90 (0.30)	0.94 (0.24)	0.87 (0.33)	0.94 (0.23)	0.89 (0.31)
<b>Household demographic characteristics</b>							
Whether household head belongs to Scheduled Caste (SC)	0.12 (0.32)	0.23 (0.42)	0.23 (0.42)	0.25 (0.43)	0.25 (0.43)	0.19 (0.39)	0.19 (0.39)
Whether household head belongs to Scheduled Tribe (ST)	0.67 (0.47)	0.20 (0.40)	0.20 (0.40)	0.10 (0.31)	0.10 (0.31)	0.03 (0.16)	0.03 (0.16)
Whether household head belongs to Other Backward Class (OBC)	0.17 (0.37)	0.39 (0.49)	0.39 (0.49)	0.41 (0.49)	0.41 (0.49)	0.39 (0.49)	0.39 (0.49)
Household size	4.65 (1.80)	6.35 (3.11)	5.15 (2.21)	6.35 (3.18)	5.25 (2.34)	5.61 (2.53)	5.02 (2.14)
<b>Access to and use of wood and water</b>							
Whether household uses wood as cooking fuel	0.71 (0.46)	0.69 (0.46)	0.81 (0.39)	0.60 (0.49)	0.65 (0.48)	0.26 (0.44)	0.25 (0.43)
Whether adult women fetch water	0.34 (0.48)	0.77 (0.42)	0.79 (0.41)	0.58 (0.49)	0.57 (0.50)	0.30 (0.46)	0.29 (0.45)
Log month per capita expenditure	6.26 (0.89)						
Wealth Index	0.00 (1.76)	-1.36 (1.45)	-1.26 (1.62)	-0.62 (1.55)	-0.53 (1.61)	1.69 (1.19)	1.42 (1.05)
Poorest wealth quintile	0.20 (0.40)	0.42 (0.49)	0.44 (0.50)	0.27 (0.44)	0.27 (0.44)	0.02 (0.13)	0.02 (0.14)
Number of types of assets owned by woman	4.06 (2.79)						
HH owns more land than village average	0.35 (0.48)						
HH owns more TLU than village average	0.38 (0.49)	0.41 (0.49)	0.40 (0.49)	0.38 (0.49)	0.37 (0.48)	0.09 (0.29)	0.08 (0.28)

**Village characteristics**

Women's average years of schooling	2.30 (1.33)	2.36 (1.56)	2.86 (1.54)	3.26 (2.39)	3.62 (2.34)	6.51 (3.30)	6.82 (3.27)
Range among highest and lowest wealth index in village	4.76 (1.31)	3.47 (1.28)	4.11 (1.24)	3.38 (1.16)	3.65 (1.26)	2.24 (1.20)	2.07 (1.26)
Average size of land owned by household head (acres)	1.93 (1.12)						
Average number of TLUs owned by household	1.48 (0.90)	1.49 (0.95)	1.14 (0.74)	1.30 (1.06)	0.99 (0.68)	0.15 (0.38)	0.10 (0.22)
Village has at least one primary school	0.89 (0.31)						
Village has at least one Bank	0.05 (0.22)						
Whether household experienced crop loss due to floods/droughts in village	0.91 (0.28)						
Number of households experiencing crop loss due to floods/droughts at village level	4.28 (3.30)						
<b>Observations</b>	<b>2,744</b>	<b>4,470</b>	<b>4,470</b>	<b>17,826</b>	<b>17,826</b>	<b>6,583</b>	<b>6,583</b>

Notes: Standard deviations in parentheses. TLU=Tropical Livestock Units

**Table 4: Correlates of SHG membership, WINGS and IHDS-WINGS Datasets: Linear probability model estimates**

VARIABLES	(1) WINGS	(2) WINGS	(3) IHDS- WINGS: RE
<b>Woman's demographic characteristics</b>			
Age	0.056** (0.013)	0.057*** (0.012)	0.008** (0.004)
Age squared	-0.001** (0.000)	-0.001*** (0.000)	-0.000* (0.000)
Years of schooling	0.003 (0.003)	0.004 (0.003)	0.006*** (0.001)
Agricultural or non-agricultural day labor	0.002 (0.026)	n.c.	n.c.
Housewife	-0.046 (0.031)	n.c.	n.c.
Currently married	0.032 (0.047)	0.034 (0.045)	0.000 (0.016)
<b>Household demographics characteristics</b>			
Whether household head belongs to Scheduled Caste (SC)	-0.055 (0.062)	-0.032 (0.059)	0.102*** (0.020)
Whether household head belongs to Scheduled Tribe (ST)	-0.104* (0.055)	-0.072 (0.050)	0.044* (0.025)
Whether household head belongs to Other Backward Class (OBC)	-0.019 (0.060)	0.006 (0.054)	0.042** (0.020)
Household size	0.004 (0.008)	0.003 (0.007)	0.003 (0.002)
<b>Access to and use of wood and water</b>			
Whether household uses wood as cooking fuel	0.060 (0.046)	0.054 (0.044)	0.030** (0.014)
Whether adult women fetch water	-0.005 (0.023)	n.c.	n.c.
<b>Households socioeconomic characteristics</b>			
Log of Total monthly consumption expenditure, per capita	0.035** (0.011)	n.c.	n.c.
Wealth index	0.021 (0.015)	n.c.	n.c.
Poorest wealth quintile	-0.001 (0.043)	-0.064* (0.035)	0.008 (0.011)
No. of types of assets woman owns	0.005 (0.003)	n.c.	n.c.
HH owns more land than leave out mean in that village	0.018 (0.020)	n.c.	n.c.
HH owns more TLU than leave out mean in that village	0.007 (0.022)	0.023 (0.017)	0.004 (0.009)
<b>Village characteristics</b>			
Women's leave out mean education per village	-0.004 (0.013)	-0.007 (0.015)	-0.003 (0.004)
Range among highest and lowest wealth index in village	-0.019 (0.014)	-0.016 (0.014)	0.010* (0.006)
Leave out mean of hh land owned in village (acres)	0.021 (0.013)	n.c.	n.c.

Leave out mean of hh TLU owned in village	0.033** (0.014)	0.037** (0.016)	-0.003 (0.008)
Village has at least one primary school	0.086** (0.027)	0.080** (0.030)	-0.026 (0.045)
Village has at least one Bank	-0.115** (0.053)	-0.134*** (0.042)	-0.112*** (0.017)
Indicator var: HH crop loss due to floods/droughts in village	-0.123 (0.076)	n.c.	n.c.
Number of HH crop loss due to floods/droughts at village level	0.005 (0.006)	n.c.	n.c.
PRADAN area	0.041 (0.024)	n.c.	n.c.
State and District fixed effects	YES	YES	YES
Observations	2,662	2,686	8,807
R-squared	0.116	0.101	
Number of unique households			4,465

Notes: RE=random effects. All regressions control for age and sex composition of the household. Robust standard errors in parentheses. n.c.=not computed because variables are not available for the particular sample or the data was not clean. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 5: Correlates of SHG membership, IHDS Dataset: rural and urban**

VARIABLES	(1) IHDS-rural: RE	(2) IHDS-urban: RE
<b>Woman's demographic characteristics</b>		
Age	0.007*** (0.002)	0.006** (0.003)
Age squared	-0.000*** (0.000)	-0.000 (0.000)
Years of schooling	0.005*** (0.001)	0.000 (0.001)
Agricultural or non-agricultural day labor	0.006 (0.006)	0.043** (0.021)
Farmer	0.102 (0.074)	-0.051 (0.063)
Currently married	0.012 (0.008)	-0.005 (0.013)
<b>Household demographics characteristics</b>		
Whether household head belongs to Scheduled Caste (SC)	0.066*** (0.008)	0.024*** (0.009)
Whether household head belongs to Scheduled Tribe (ST)	0.041*** (0.013)	0.003 (0.024)
Whether household head belongs to Other Backward Class (OBC)	0.025*** (0.008)	0.019** (0.008)
Household size	0.000 (0.001)	0.000 (0.001)
<b>Access to and use of wood and water</b>		
Whether household uses wood as cooking fuel	0.022*** (0.007)	0.029*** (0.010)
Whether adult women fetch water	-0.014** (0.006)	0.015* (0.009)
<b>Households socioeconomic characteristics</b>		
Wealth index	0.003 (0.003)	-0.015*** (0.004)
Poorest wealth quintile	-0.002 (0.007)	-0.040* (0.023)
HH owns more TLU than leave out mean in that village	0.013*** (0.005)	n.c.
<b>Village characteristics</b>		
Women's leave out mean education per village	0.005** (0.002)	-0.002* (0.001)
Range among highest and lowest wealth index in village	0.003 (0.003)	-0.005 (0.004)
Leave out mean of hh TLU owned in village	-0.004 (0.004)	n.c.
Village has at least one primary school	0.008 (0.032)	n.c.
Village has at least one Bank	-0.060*** (0.007)	n.c.
State and District fixed effects	YES	YES
Observations	34,203	12,993
R-squared		
Number of unique households	17,684	6,546

Notes: RE=random effects. All regressions control for age and sex composition of the household. Robust standard errors in parentheses. n.c.=not computed because variables are not available for the particular sample or the data was not clean. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## ANNEX TABLES

**Table A1: Variable definition**

Variable	Definition under wings dataset	Definition under IHDS dataset
Whether SHG member	1 if woman respondent is an SHG member, 0 otherwise	1 if anyone in the household is an SHG member, 0 otherwise
<b>Woman's characteristics</b>		
Agricultural or non-agricultural day labor	1 if respondent's main occupation is agricultural or non-agricultural day labor, 0 otherwise	1 if respondent's main occupation is agricultural or non-agricultural day labor, 0 otherwise
<b>Time allocation</b>		
Whether household uses wood as cooking fuel	1 if wood is the type of fuel used by household for cooking, 0 otherwise	1 if wood is the type of fuel used by household for cooking, 0 otherwise
Whether adult women fetch water	1 if adult women in household fetch water other than tap or borewell, 0 otherwise	1 if adult women in household spend any time during the day collecting water, 0 otherwise
<b>Income and credit access</b>		
Wealth Index	Principal component analysis of different wealth measures – ownership of assets, utilities, food security and house conditions – was used to construct an index	Principal component analysis of different wealth measures – ownership of assets, utilities and house conditions – was used to construct an index
Poorest quintile	1 if household belongs to the group with the lowest wealth index quintile, 0 otherwise	1 if household belongs to the group with the lowest wealth index quintile, 0 otherwise
Number of types of assets owned by woman	Different types of assets respondent woman owns in the household	
HH owns more land than village average	1 if household owns more agricultural land than village average, 0 otherwise	
HH owns more TLU than village average	1 if household owns more tropical livestock units than village average, 0 otherwise	1 if household owns more tropical livestock units than village average, 0 otherwise
<b>Village characteristics</b>		
Leave out mean of HH land owned in village (acres)	Average agricultural land owned by households in the village, leaving out a household's own land.	
Leave out mean of HH TLU owned in village (acres)	Average TLU owned by households in the village, leaving out a household's own TLU.	Average TLU owned by households in the village, leaving out a household's own TLU.
<b>Variables that are likely to be affected by SHG membership</b>		
Woman participates in decisions regarding health expenses	1 if woman respondent makes or participates in decisions affecting direct family members health, 0 otherwise	
Has own money	1 if woman respondent has money that she can use for what she wants, 0 otherwise	

Does not need permission to go to at least one place	1 if the respondent does not need permission to go to 1 out of the 7 places identified (such as the market, friends/family's house, place of worship, public village meeting, meeting of an association, outside the village and health care provider), 0 otherwise
Has bank account	1 if woman respondent has a bank account, 0 otherwise
Respondent women voted in the last election	1 if the woman respondent voted in the last election, 0 otherwise
Respondent women has ever participated in <i>mahila gram sabha</i>	1 if the woman respondent participated in the <i>mahila gram sabha</i> , 0 otherwise

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**Table A2: WINGS linear probability model (LPM) and probit estimates**

VARIABLES	(1) SHG member, LPM	(2) SHG member, Probit
Pradan area	0.041 (0.024)	0.048* (0.026)
<b>Woman's demographic characteristics</b>		
Age of respondent	0.056*** (0.013)	0.065*** (0.014)
Squared age of respondent	-0.001*** (0.000)	-0.001*** (0.000)
Respondent woman's education: number of years	0.003 (0.003)	0.003 (0.004)
Ag & Non-Ag day Laborer	0.002 (0.026)	0.003 (0.028)
Housewife	-0.046 (0.031)	-0.051 (0.033)
Married	0.032 (0.047)	0.034 (0.052)
<b>Household demographics characteristics</b>		
Caste of household head, SC	-0.055 (0.062)	-0.052 (0.067)
Caste of household head, ST	-0.104* (0.055)	-0.106* (0.060)
Caste of household head, OBC	-0.019 (0.060)	-0.012 (0.064)
Household size	0.004 (0.008)	0.005 (0.008)
<b>Time related variables</b>		
Wood used as cooking fuel	0.060 (0.046)	0.069 (0.053)
Women fetch water from distant source, winter/summer	-0.005 (0.023)	-0.006 (0.024)
<b>Households socioeconomic characteristics</b>		
Log of total monthly consumption expenditure, per capita	0.035*** (0.011)	0.038*** (0.012)
Wealth index	0.021 (0.015)	0.023 (0.016)
Poorest wealth quintile	-0.001 (0.043)	0.000 (0.048)
No. of types of assets woman owns	0.005 (0.003)	0.005 (0.004)
HH owns more land than leave out mean in that village	0.018 (0.020)	0.018 (0.021)
HH owns more TLU than leave out mean in that village	0.007 (0.022)	0.006 (0.024)
<b>Village characteristics</b>		
Women's leave out mean education per village	-0.004 (0.013)	-0.006 (0.015)
Range among highest and lowest wealth index in village	-0.019 (0.014)	-0.021 (0.015)

Leave out mean of hh land owned in village (acres)	0.021 (0.013)	0.022 (0.013)
Leave out mean of hh TLU owned in village	0.033** (0.014)	0.035** (0.015)
Village has at least one primary school	0.086*** (0.027)	0.095*** (0.033)
Village has at least one Bank	-0.115** (0.053)	-0.131** (0.055)
Indicator var: HH crop loss due to floods/droughts in village	-0.123 (0.076)	-0.140* (0.083)
Number of HH crop loss due to floods/droughts at village level	0.005 (0.006)	0.005 (0.006)
State and District fixed effects	YES	
Observations	2,662	2,662
R-squared – Pseudo R-squared	0.116	0.0923

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Notes: All regressions include controls for age and sex composition of the household. Robust standard errors in parentheses.

Marginal effects in specification 2 are being estimated at covariate means.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A3: IHDS: OLS and fixed effects regressions for the WINGS, rural and urban subsamples**

VARIABLES	(1) IHDS: OLS	(2) IHDS: HH fixed effects	(3) IHDS: OLS	(4) IHDS: HH fixed effects	(5) IHDS: OLS	(6) IHDS: HH fixed effects
<b>Woman demographic characteristics</b>						
Age	0.007* (0.004)	0.015* (0.008)	0.007*** (0.002)	0.009** (0.004)	0.005** (0.003)	0.012** (0.006)
Age squared	-0.000* (0.000)	-0.000 (0.000)	-0.000*** (0.000)	-0.000 (0.000)	-0.000* (0.000)	-0.000 (0.000)
Years of schooling	0.003** (0.002)	0.010** (0.004)	0.003*** (0.001)	0.006*** (0.002)	-0.001 (0.001)	0.004* (0.002)
Agricultural or non-agricultural day labor	-0.010 (0.009)	-0.022 (0.020)	0.008 (0.006)	-0.016 (0.012)	0.053** (0.022)	-0.007 (0.040)
Farmer	-0.148*** (0.032)	0.050 (0.109)	0.086 (0.071)	0.175 (0.107)	-0.035 (0.059)	-0.122 (0.184)
Currently married	0.004 (0.017)	-0.013 (0.034)	0.022*** (0.007)	-0.004 (0.017)	-0.000 (0.013)	-0.048* (0.029)
<b>Household demographics characteristics</b>						
Whether household head belongs to Scheduled Caste (SC)	0.104*** (0.019)	n.c.	0.061*** (0.008)	n.c.	0.016* (0.009)	n.c.
Whether household head belongs to Scheduled Tribe (ST)	0.042* (0.023)	n.c.	0.034** (0.013)	n.c.	-0.001 (0.023)	n.c.
Whether household head belongs to Other Backward Class (OBC)	0.042** (0.019)	n.c.	0.022*** (0.008)	n.c.	0.013 (0.008)	n.c.
Household size	0.005** (0.002)	0.008** (0.004)	0.002** (0.001)	0.001 (0.002)	0.002 (0.001)	0.004 (0.003)
<b>Access to and use of wood and water</b>						
Whether household uses wood as cooking fuel	0.019 (0.014)	0.021 (0.021)	0.018** (0.007)	0.004 (0.014)	0.029*** (0.009)	0.012 (0.020)
Whether adult women fetch water	-0.021 (0.014)	-0.011 (0.027)	-0.015** (0.006)	-0.021* (0.013)	0.017** (0.009)	-0.029 (0.019)
<b>Households socioeconomic characteristics</b>						
Wealth index	0.001	0.020*	0.003	0.015**	-0.005	-0.001

	(0.005)	(0.012)	(0.003)	(0.006)	(0.004)	(0.009)
Poorest wealth quintile	-0.000	0.029	-0.008	0.013	-0.024	-0.003
	(0.012)	(0.026)	(0.007)	(0.015)	(0.024)	(0.052)
HH owns more TLU than village average	0.009	-0.025	0.013***	0.008	n.c.	n.c.
	(0.010)	(0.022)	(0.005)	(0.011)		
<b>Village characteristics</b>						
Women's leave out mean education per village	-0.008**	0.003	0.004**	0.018**	-0.002	-0.000
	(0.004)	(0.017)	(0.002)	(0.009)	(0.001)	(0.006)
Range among highest and lowest wealth index in village	0.001	0.010	-0.001	0.005	-0.001	-0.021**
	(0.005)	(0.015)	(0.003)	(0.008)	(0.004)	(0.009)
Leave out mean of hh TLU owned in village	0.008	-0.007	0.005	-0.005		
	(0.007)	(0.023)	(0.005)	(0.011)	n.c.	n.c.
Village has at least one primary school	-0.042	0.083	-0.014	0.096		
	(0.043)	(0.086)	(0.030)	(0.071)	n.c.	n.c.
Village has at least one Bank	-0.008	-0.082***	-0.012	-0.047***		
	(0.018)	(0.029)	(0.007)	(0.012)		
year = 2011	0.171***		0.116***		0.094***	
	(0.019)		(0.008)		(0.008)	
State and District fixed effects	YES	YES	YES	YES	YES	YES
Observations	8,806	8,806	34,203	34,203	12,993	12,993
R-squared	0.193	0.613	0.220	0.647	0.167	0.605

Notes: FE= fixed effects. All regressions include controls for age and sex composition of the household. Robust standard errors in parentheses n.c.=not computed because variables are not available for the particular sample or the data was not clean.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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