Community Project Choice in Yemen's Labor Intensive Works Program

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Abstract

We show that the choice of project type in a community driven development intervention, Yemen's Labour Intensive Public Works Program, encompasses a choice not only between different types of public goods but also in the distribution of wages during the construction phase. Communities with a larger share of young men chose projects which give more benefits to unskilled workers while communities with a larger share of older men chose projects which give more benefits to skilled workers. This flexibility in adjusting project choice to local labour market conditions allowed the program to better benefit workers who had lost alternative employment opportunities during a period of political instability.

1. Introduction

The Labour Intensive Works Program (LIWP) is a cash-for-work rural employment program run by the Yemen Social Fund for Development (SFD). LIWP provides short-term work opportunities in poor communities in the construction of labour intensive community infrastructure projects such as repairing roads, clearing land, or constructing rainwater harvesting systems. A hallmark of SFD's management of LIWP is the participatory engagement of communities in decision-making regarding the choice of local projects to be funded. The decision making process takes the form of consensus-based decision making in an open village meeting. As such, these projects, like those in other Community Driven Development programs, should be responsive to local needs and conditions (Mansuri and Rao, 2012). We analyze here which needs and conditions are taken into account in community project choice.

There is a rich literature looking at how community dynamics and institutional quality impact the degree to which the type of infrastructure projects selected match local preferences (Foster and Rosenzweig, 2001; Rao and Ibanez, 2005; Dasguta and Beard, 2007; Araujo et al., 2008; Labonne and Chase, 2009; Olken, 2010; Park and Wang, 2010; Bandiera and Gilat, 2011; Baird, McIntosh, and Ozler, 2013; Glennester et al., 2013). Preferences of different subgroups within the community may be inferred based on assumptions about the relevant utility of types of infrastructure projects or stated preferences in a survey.

Previous work on community project choice has not focused on differential gains to community members during the construction process itself.Yet, the wage income benefits to community members who supply labour for project construction can be substantial. In the Yemeni public works program, we show that the distribution of these benefits varies dramatically depending on the type of project constructed. For households with high discount rates, the immediate benefit of labour income from work on project construction may outweigh any long-term indirect benefits from the infrastructure constructed. In spite of all projects in LIWP being intended to create low-skilled jobs for a large number of beneficiaries, a large share of the total wage income

distributed by the program went to households who supplied the types of labor skills necessary for the construction work. In some types of projects, households supplying skilled labour received almost four times as much total income from the program as households supplying only unskilled labour. For less technically demanding projects, the gains were more equally distributed. In general, road and water projects require more skilled labour inputs than land rehabilitation projects. Focusing on the distribution of wage income during the construction phase of the project allows us to see a new dimension along which community members have differing preferences regarding the choice of projects in a community driven development model.

Using a combination of administrative data and household surveys, we find that the choice of project type in the LIWP intervention encompasses not only a choice between different types of public goods, but also a choice about the distribution of wages during the construction phase. We show that community project choice is correlated with the age composition of the community's male population: a higher share of middle-aged men is correlated with the choice of more skill intensive projects.

To arrive at this result, the paper proceeds as follows. In section 2, we describe the LIWP intervention. Section describes the data. Section 4 establishes how labor demand varies by project type. Section 5 analyzes the relation between a community's demographic structure and project choice. In Section 6 we follow the distributional implications of project choice. Section 7 concludes on the role of flexibility in project choice in addressing the short-term welfare needs of the community's labor force.

2. The LIWP Intervention

Yemen's SFD was established as an autonomous state organization in 1997 and supports a variety of local development projects including education, water, health, and infrastructure. SFD designed the Labour Intensive Works Program (LIWP) in 2008 in response to the sharp increase in world food prices, and the program was rapidly scaled up, accounting for 30% of SFD funds in the period 2011-2015 (Al-Iryani et al., 2013). The LIWP intervention is designed as a twin-track approach, transferring cash to poor communities in the short term through a workfare program while providing communities with a chance to invest in public infrastructure. Communities targeted by the program choose a project consisting of one to three public goods components constructed with labour from community members paid by the program.

The community choice of what types of components to include in their project happens through a series of community meetings. First, SFD consultants organize a general meeting to introduce the program. During the following week, there is an awareness campaign about SFD objectives and standards and the consultants measure the size of the potential workforce to determine the size of the intervention that SFD would fund. The first project suggestions made by community members are usually not appropriate due to being overly capital intensive or only providing benefits for certain community members. SFD requires that the project infrastructure benefit the community as a whole and be technically feasible to complete using mostly unskilled labour. There is not a strict menu of possible projects, but in practice community members are encouraged to consider component types with which SFD has past experience. We can broadly characterize the range of potential component types as: land interventions (terrace rehabilitation, flood protection, clearing invasive plants, irrigation, and reforestation), water interventions (digging wells, rainwater harvesting schemes, and construction of large cisterns for water storage), and road interventions (construction or repair of rural roads connecting the village to larger roads and local markets).[1] By the end of the week, the SFD consultants have usually identified a short list of feasible project components. Another general meeting is held at which the community decides on the prioritization of these proposed components.

There was no administrative structure at the community level in Yemen until 2001 when local councils with very limited authority were formed (Bass 2005), so the data on project choices

[1] An additional category- sanitation projects- is not considered as the sample size is too small

in this program is a unique window onto how participatory decision making reflects community characteristics in Yemen. According to SFD consultants, there is often a vigorous discussion about the relative benefits of different projects along with calls for the community to come to consensus, because community members know that SFD projects can be cancelled if disagreements persist. It is very rare for the final decision to be made by a formal vote. After the community decides on prioritization of the potential projects, the local branch of SFD sends officers to do an economic and technical study to evaluate how much the projects will cost. The project funding is scaled to provide an average of 115 days of work per intended participating household in each community. The final intervention includes at least the top choice component of the community, with lower ranked projects added as additional components if there is sufficient funding. Due to conservative gender norms in Yemen, men and women deliberate and recommend separately. The preferences of the two groups are reconciled in some non-standardized fashion. In consequence of this gender segregated process, the relative sizes of the men's group and women's group are less likely to matter than the internal composition of the two groups.

By their technical nature, some types of projects require more skilled labour inputs that others. Clearing land of invasive cacti, for example, is a task that can be performed by women with minimal training and simple tools. Building roads and water storage facilities, on the other hand, require workers with construction skills. LIWP regulations require unskilled labour to be drawn from the local community while skilled labour is considered a complementary input that could be drawn from outside the community if necessary. This means that the local supply of skilled labour does not constrain the types of projects that can be chosen: even communities with few skilled workers could choose a skill-intensive project if they only care about the project infrastructure itself. However, as seen below, the number of potential skilled workers in the community can influence project choice in their desire to achieve short-term wage gains. In opposition to this, households without potential skilled workers that also care about their labour income from the project advocate for choosing less skill-intensive projects.

Skilled work and unskilled work are distinguished in the LIWP program design. While wages for unskilled tasks are set 10% below prevailing wage levels to promote self-targeting, wages for skilled tasks are set at the prevailing wage rate in the local labour market catchment area and may be even more attractive than wages offered by other employers to potential skilled participants because the work is located nearby their homes. (Christian, De Janvry and Sadoulet 2013) The median wages reported for skilled work in our household sample was 2124 riyals($10) per day and for unskilled work was 1200 riyals ($5.66) per day. As an example of the type of work considered skilled or unskilled, cutting and shaping stones, construction, and supervising others are listed as skilled tasks, while digging sand or dirt, carrying materials, removing invasive plants, and work site preparation are listed as unskilled tasks.

Since different projects require different levels of skilled labour inputs to complete, and the technical planning for how much of each type of labour is required is determined by SFD, the choice of project can be analyzed as the choice about preferred skill-intensity as well as the choice about what kind of infrastructure is desired by the community.

3. Data

Our analysis uses administrative data on all 449 community interventions with start dates in 2008-2013. For each intervention, we have the budget, description of project components, start and end dates, planned number and gender of jobs created, and actual number and gender of participants. For a subset of these projects–168 projects with start dates in 2010-2012–we additionally have administrative data on total wages received from the project, as well as whether these wages were for skilled or unskilled jobs within the project. We match the administrative data for the full set of interventions with the 2001 Population Census and 2004 Agricultural Census at the community level.

Additionally, a small number of communities (84) were part of an RCT impact evaluation. For this subsample, we have detailed household information for 12 randomly selected households

from the baseline and ex-post surveys. 40 treatment and 40 control communities were surveyed at baseline (May 2010) prior to intervention in the treatment areas, and again ex-post (November 2011) after some of the control communities had received the LIWP program. Figure 1 summarizes the different subsamples of the dataset of community interventions described above.

4. Difference in Labour Types Demanded by Project Type

An analysis of data on household earnings from the LIWP program shows that different project types were associated with different distributions of wage income for participants. We see this using the administrative data available for the subset of LIWP projects between 2010 and 2012. The findings in general confirm what we heard qualitatively from project staff about the relative skill intensity of different types projects. We compare projects in terms of the ratio of total project income for households with only unskilled workers (hereafter referred to as "unskilled households") versus households with at least one skilled worker ("skilled households") and categorize projects by the type of the primary infrastructure component. We concentrate on the ratio of returns to the different types of households because the level of piece rates varied geographically and across time according to the prevailing wage in the local labour market as described above.

In Table 1, we see a positive gradient in the relative returns of unskilled to skilled labour from roads, to water, and to land projects. The first variable considered is the ratio of total project income for households with only unskilled labour relative to households which contributed any skilled labour. Road projects have the lowest relative income for unskilled households (0.271), while land projects have the highest (0.455), with the differences between these project types being large and statistically significant. Breaking this total income down into relative number of days worked and relative average daily wages, we find that land projects have somewhat more days worked by unskilled households relative to skilled households than other project types, but the more notable difference is found in the higher average daily wages received by unskilled households relative to skilled households. In road projects the average wage of unskilled households was less than half the average wage of skilled households, while in land projects, the average wages of the two types of household were almost equal.

Not only do skill-intensive projects offer higher income to households that can supply skilled-labour relative to other households, but they offer this higher level of income to a larger number of households. In the fourth column of table 1, we see that the share of households with a skilled participant was significantly higher in road projects than water projects and slightly higher in water projects than land projects. From the perspective of a households with members that could potentially work as skilled workers in a LIWP project, therefore, they were most likely to benefit in the short term from road projects, and to a lesser extent, water projects. The important insight from this difference in labour demanded by project type is that when community members choose to use program funds to build a new road rather than improved grazing area for goats, for example, they are not necessarily only basing this choice on the relative returns to improved transportation or grazing area, but also on the degree to which they care about creating more short-term well-paid jobs for skilled labour. We argue below that this desired skill-intensity is well predicted by demographic characteristics of the community.

For the remainder of the paper, we use the share of planned female jobs as an indicator of project expected skill-intensity. The jobs appropriate for women in these projects are always unskilled and, due to being less physically demanding, had lower piece rates. Table 1 confirms that the share of planned and actual female jobs follows the same pattern relative to project type as the returns to unskilled participants, with fewer opportunities relative to skilled workers in road projects and more opportunities in land projects. We confirm that planned female job share is strongly negatively correlated with the share of project income going towards skilled households (Table 2). This association is robust to inclusion of branch fixed effects, which suggests that it is not due to other geographic factors. The planned female job share was reported ex ante for all projects in our sample based on the technical assessment by SFD, so it can be interpreted solely as a characteristic of the type of project selected, rather than the supply of unskilled or female

labour or interest in participating in the project at the time of the actual construction.

5. Demographic Structure and Project Choice

5.1. High Female Population is Negatively Correlated with Selection of Projects with High Planned Female Job Share

In looking at the characteristics of communities recorded in the population and agricultural censuses, the most notable correlate of skill-intensity as proxied by planned female job share, as shown in Table 2, is that planned female job share is strongly negatively correlated with female population of the community from the 2001 population census. The negative correlation of female job share with female population is robust to the inclusion of branch level fixed effects or average land area which gives us some confidence that it is not driven by excluded geographic characteristics, such as more agricultural communities having more interest in land clearing or terrace building projects. (Regressions using the share of returns to skilled households in the subset of projects from 2010-2012 showed similar patterns, but were not statistically significant due to the small sample size.) The remainder of this section explains our theory of why this strong negative correlation is found.

Although many other studies find intracommunity inequality to be a significant predictor of project choice (Foster and Rosensweig, 2001; Dasgupta and Beard, 2007, Araujo et al., 2008; and Bandiera and Levy, 2011), we do not find that in this case. As shown in table **??**, there is no significant correlation between inequality as captured by the Gini coefficient for land ownership as reported in the 2004 Agricultural Census) and the skill intensity of the selected project. (The Gini coefficient for land ownership is calculated based on the available data which gives the number of households that own no land, less than 5 hectares, 5-20 hectares, and more than 20 hectares.)

5.2. High Female Population Represents Fewer Young Men

The relationship between high female population and low planned female job share must be interpreted in light of the fact that, in most Yemeni villages, the gender ratio of the population is driven by emigration of relatively young, unskilled men for employment in cities or abroad, and sending money back to their parents, wives, and children who remain in the village. Villages with high shares of females are those with the highest share of migrants. We argue below that having a higher share of migrants means that more of the remaining men are those most likely to benefit from skill-intensive projects.

To justify this description of village demography, we can turn to the household survey data on age and gender composition of the households in our household survey sample. The household sample included randomly selected communities included in LIWP from across Yemen. [2] We see in Figure 2 that communities with a high share of women in the adult population are mostly missing younger men. We split the communities in the sample into communities where the gender distribution is roughly balanced (34 communities with a mean gender ratio of 48% women) and communities where women predominate (50 communities with a mean gender ratio of 56% women). The right-hand population pyramid shows the ages of gender of household members in communities where women predominate. Communities with high female population are mostly missing men under the age of 22, and unlike gender balanced communities, do not have more men than women in the 22-32 age range. We can test this directly by regressing the age group of randomly selected men from the household survey on the share of women in the household survey to show that villages with higher shares of women also had significantly more men in the 40-65 age group, with a 1 percentage point increase in the share of females in the population corresponding to a 0.69 percentage point increase in the probability that a man in the population sample was over the age of 37(See Table 4). The inclusion of branch fixed effects to control for regional

[2]The RCT sample was selected randomly from among communities scheduled to participate in LIWP after stratifying at the branch level.

characteristics has little effect on the coefficient, while the coefficient declines in magnitude but remains significant when we look at the correlation between communities over time. The third column of Table 4 shows the relationship of the change in the share of women with the change in the share of older men between baseline and ex-post (standard errors are clustered at the community level).

We argue below that the middle-aged men who are over-represented in villages with high female shares have a vested interest in skill-intensive project types.

5.3. Middle-Aged Men More Likely to Be Qualified for Skilled Work

In the context of the LIWP intervention, skilled work still refers to relatively low-skill tasks such as stone cutting for which the necessary qualification is work experience rather than education. Also, the employment offered in the LIWP intervention was short term only. So the potential beneficiaries of skilled work opportunities in the program were not the most skilled workers in the community, but workers with higher than average work experience and also low opportunity cost. We cannot directly predict from household data which men are most likely to have thought of themselves as potential skilled workers rather than unskilled workers in a LIWP project. However, we find that age is a strong predictor for probability of being employed as a skilled worker. Table 5 shows the demographic characteristics that predict that household members will have a skilled job in a LIWP project in the ex-post household survey. In column 1, we see that men in the age range 37-66 are significantly more likely than other household members to have skilled work in LIWP. (The oldest women age 67 and above are the omitted category and have zero participation in skilled work). Columns 2-3 show that among men, younger men are significantly less likely to have skilled work in LIWP, while middle-aged men are significantly more likely to have skilled work in LIWP. Note that the population distribution is skewed toward young people and only 15% of the sampled household members are men in the 37-66 age range, while 28% are men in the 17-36 age range. Overall, 14% of male LIWP participants had skilled work.

Considering the type of work that is characterized as skilled, we expect and find an association between work experience in construction or other skilled jobs at baseline, and skilled work in LIWP observed in the ex-post survey. However, because individual household members could not be matched between baseline and ex-post, we control for work experience only at the household level.

5.4. Women's Limited Influence on Decision-Making

We showed earlier that demographic composition of communities is predictive of the type of project selected, with communities that are likely to have a larger share of older men opting for more skill intensive projects. There are several reasons why the greater share of women in the village is unlikely to directly affect project choice decisions in the direction of increasing job opportunities for women. If men and women are segregated for the community discussions, the relative weight of men's and women's conclusions is not likely to be changed by having a larger number of women in the women's meeting. Secondly, women whose husbands are absent are less likely to attend community meetings due to cultural norms about unaccompanied women. Finally, in spite of SFD's emphasis on involving women in community decision making, traditional community norms are strongly patriarchal.

On that basis, the paradoxically negative relationship we find between female population and female jobs in this context shows that female influence on decision making should not be interpreted naively as a function of the number of women involved in a context with gender segregated deliberation.

In figure 3, we show that among communities in the RCT sample, there is similarly a strong negative correlation between the share of planned female jobs and the share of female-headed households. This is a useful check that the relationship we observe between female population and planned female jobs is not a spurious correlation. Like the share of women in the population

overall, the share of female headed households generally proxies for the level of out-migration. So, here too, we believe that the true driving factor is the higher share of middle-aged men who are likely to advocate for more skill-intensive projects.

6. Distributional Implications

If men who advocate for and benefit from skilled projects are from better-off households, this could be seen as a type of elite capture. Actually, however, we find mixed evidence regarding the degree to which skill-intensive projects favored better-off households, as the households that benefited from skilled work in LIWP were better-off in some respects, but also lost more income during the economic and political crisis of 2011.

6.1. Characteristics of Skilled Households

In Table 6 we show that households with skilled work in LIWP had significantly higher baseline monthly labour income even after adjusting for household size, with 3484 riyals ($16) more per equivalent adult per month at baseline than households that contributed only unskilled workers to LIWP.

The first column shows that households that participate in LIWP had similar incomes to those of non-participating households at baseline as a group. The second column shows that within the set of households that participated in LIWP, those that participated as skilled workers had higher wage income at baseline. Because labor market conditions were different in the baseline and ex-post periods, however, we would also like to check whether households with skilled workers would have had higher wage income at ex-post survey time. We can distinguish between active and inactive projects during the ex-post data collection. While it is conceivable that project type is related to the timing of projects, whether the project was active in the month before the ex-post survey was mostly a result of other random factors. Approximately half of the projects in treated communities had already been completed for more than a month at the time of the ex-post survey. Others were still on-going or had been on-going within the past month (the recall period for questions about income). The timing of the projects was initially staggered due to administrative capacity, with further delays occurring due to weather or disagreements in the community. We can show that there is no significant difference in the average share of planned female jobs or the type of the project components included between active and inactive projects. (Table A3 in Appendix). The third column shows that at ex-post, within the set of projects which were not active at the time of the ex-post survey collection and therefore wage income did not include LIWP wage income, it was no longer the case that households that participated in skilled work had higher incomes than those that participated in unskilled work.

An important context here is that the household survey data were collected before (baseline) and after (ex-post) the Arab Spring in Yemen that turned violent in mid-2011. The political and economic crisis caused a collapse in demand for skilled work in construction or other non-agricultural sectors.

Using a proxy wealth score developed by SFD for rapid targeting (columns 4-5 of Table 6) shows that households in LIWP are poorer than non-participants, but households with only unskilled participants do not differ significantly from households with skilled participants. The variables used in the proxy score include house size, roof and floor type, sanitation type, family size, enrollment of children in school, and ownership of certain durable goods. Higher scores reflect lower probability that the household is poor. Households with skilled participants had higher sub-scores for durable good ownership, but this was countered by lower sub-scores for enrollment of children in school and household size. In fact, the higher wage income of these households is partly attributable to the fact that their sons were significantly more likely to be employed rather than enrolled in school at baseline.

6.2. Impacts on Income Inequality

A more direct way of measuring the distributional impact of the LIWP intervention is to look at the change in inequality of wage income in the past month.

Again, the context of the collapse in demand for skilled work after the political crisis in 2011 is important. This is visible in the difference between skilled household wage income at baseline compared to ex-post in table 6. The number of individuals reporting having any non-LIWP related skilled jobs also declined sharply over this period. The number of reported skilled jobs in the household survey in construction, skilled self-employment, other private skilled work, and government work, dropped collectively by almost 50%. The only categories in which there were more jobs reported post-crisis were unskilled self-employment and unskilled agricultural labour. (See Table A2 in Appendix.) Qualitatively, SFD consultants reported that interest in participating in LIWP increased substantially after the economic crisis, as households who had previously had better outside options turned to participation in the program to replace lost income.

Table 7 shows regression results for LIWP impact on the Gini index of monthly income within the RCT subgroup of projects. The variable of interest- "Active in past month" indicates communities with LIWP treatment and active programs during the month prior to the survey. The variable "Ex-post" captures the time trend between the baseline (May 2010) and ex-post (November 2011) rounds of household surveys. As seen in the negative coefficient on "Ex-post", there was a general trend of worsening wage inequality between baseline and ex-post in control and inactive communities due to the economic crisis, particularly in areas with high female population. We see that the greatest program effect on reducing inequality was in areas with high female population, in other words, in those areas that were likely to choose more high-skill intensive projects.

6.3. Distribution of Benefits from Finished Projects

While the majority of this paper has focused on the distribution of cash benefits from projects, the long-term value provided by the completed project is also clearly an important factor in project selection. Our information on this aspect of the project is incomplete, but there is some evidence that the completed projects are similar to the distributional characteristics of the work itself.

Qualitatively, it is expected that road projects reduce travel time and cost. Water projects are also good at generating longer-term gains for development through reduced fetching time and better sanitation. In contrast, land projects are less likely to enhance productivity, since terrace repair or invasive plant removal require high effort in ongoing maintenance and the economic productivity of arable land is very low to start with.

The distribution of these benefits also differs by project type. For example, almost all respondents in road projects noted that they would benefit from reduced travel time; only the most marginal of households are uninvolved in economic activities for which they would benefit from better roads, while presumably better off households that own vehicles benefit the most. With water storage projects, benefits are concentrated among households that live nearby, and a monitoring report on SFD water projects found that, in spite of SFD rules, some elite capture occurs via charging for access to water. Land projects, on the other hand, appear in the data to have more direct beneficiaries. In the household survey, community members were asked if they directly benefited from the completed project or planned to benefit in the future. The overall share of households that stated they directly benefited from a project was highest for road projects (92%), followed by land projects (82%), with the lowest share for water projects (68%).

Looking at the correlation between directly benefiting from a project and participating in LIWP as a skilled or unskilled worker, we find in Table 8 that the probability of benefiting directly from project infrastructure is negatively correlated with the probability of working in the project, especially for skill-intensive projects. Overall, the coefficient on this relationship is positive and significant at the 10% level, indicating that households that participate as workers are also more likely to benefit from the infrastructure created. When we split the sample between projects with low female share and projects with high female share, we see that the positive

correlation between participating as a worker and benefiting from the project infrastructure is mostly driven by the high skill projects, where not only the wages but also the direct benefits are more concentrated. While in low skilled projects, 75% of households benefited, in high skill projects, only 62% of households benefited.

In the long term, the projects that were highly skilled also happen to be those that one would guess to be potentially more important for economic growth. Land clearing projects, for example, if not maintained over time, will not have much long-run value to the community, while the economic benefits of increased access to water are measurable in terms of decreased fetching time and more months per year of water availability. So while the benefits of highly skill intensive projects might flow to a smaller subset of households, it is arguable that they may also be the best choices for the community as a whole in terms of direct benefits.

We also assume that the marginal utility of current income is higher for poorer households, so they are more likely to prefer projects that deliver relatively more income for unskilled workers in the short term rather than long-term direct infrastructure benefits, even leaving aside the issue of the distribution of these benefits.

7. Conclusion

Our findings on the determinants of project choice in SFD's Labour Intensive Works Program show that participatory engagement of communities in project choice makes the demographic composition of the community and potential labour supply a relevant factor in project choice. The responsiveness of the program to changes in the supply of skilled labour can also be seen as an illustration of the way in which delegating decision making to the community level allows for greater community buy-in, a key feature of the Social Fund's success in administering programs in a highly unstable environment. The CDD approach allowed the portfolio of projects selected by communities to adjust toward absorption of available and willing skilled labour, with the additional benefit of supporting projects likely more favourable to growth in the long-term. Because of the gender-segregated nature of village deliberations, the rising share of women in the community was not reflected in project choice. Results show that skill responsiveness does not necessarily imply project choice reflecting elite capture and harm to the poor as households supplying skilled labour are not necessarily wealthier than those supplying unskilled labour, in spite of having had higher incomes at baseline.

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Table 1.: Skill Intensity and Project Type

	Ratio for Unskilled to Skilled HHs			Skilled Jobs	Female Jobs	Female Jobs
Project Type	Income	Days	Wage		Planned	Actual
Road	0.271	0.491	0.546	0.652	0.115	0.0444
	(0.183)	(0.349)	(0.183)	(0.235)	(0.101)	(0.0632)
Water	0.363	0.484	0.731	0.383	0.182	0.119
	(0.194)	(0.170)	(0.304)	(0.236)	(0.139)	(0.142)
Land	0.455	0.607	0.970	0.302	0.199	0.111
	(0.270)	(0.801)	(0.617)	(0.310)	(0.104)	(0.132)
Road vs. Water	0.0915*	-0.00763	0.185***	-0.268***	-0.0674***	-0.0750***
t-test	(1.92)	(-0.13)	(2.67)	(0.15)	(-3.69)	(-4.11)
Water vs. Land	0.0926**	0.123	0.239***	-0.0810*	-0.0169	0.0080
t-test	(2.13)	(1.16)	(2.67)	(-1.67)	(-1.30)	(0.56)
N	139	140	140	159	432	430

Comparison by project type of benefits for unskilled participants relative to skilled participants. Data is for all 2008-2013 interventions in the MIS, excluding some with a missing or uncommon project type. For 159 projects that took place between 2010 and 2012, household level income data are available, but in 19 of these projects there are no skilled participants. The first three columns compare households with only unskilled workers to households with at least one skilled worker, showing that the relative benefits for skilled workers were highest in road projects. Column 4 shows the share of individuals with any skilled work in the program. (While income data is only available at the household level, type of work is available at the individual level). Columns 5 and 6 show the planned and actual share of female workers in the project.

Table 2.: Planned Female Job Share as an Indicator of Skill-Intensity

	Share of Project Income to Skilled Households		Share of Actual Female Jobs	
	(1)	(2)	(3)	robustfemalenew4
Actual Female Job Share	-0.609***	-0.487***		
	(-4.59)	(-3.96)		
Planned Female Job Share			0.262***	0.284***
			(4.98)	(4.89)
Branch FE	No	Yes	No	Yes
R sq.	0.119	0.368	0.0534	0.103
Mean Dep. Var	0.634	0.634	0.116	0.116
Observations	158	158	441	440

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Correlation between planned share of female jobs and skill-intensity of project which suggests the use of planned female jobs as the primary dependent variable for analysis. In columns 1-2, observations are from the set of interventions in 2010-2012 for which household income data is available (10 communities were missing actual female job share in the dataset). In columns 3-4, observations are from the MIS dataset of interventions in 2008-2013. Branch fixed effects are used to proxy for unobservable differences in implementation by LIWP branch office and regional geographic and economic characteristics.

Table 3.: Correlates of Planned Female Job Share

	Share of Planned Female Jobs			
	(1)	(2)	(3)	(4)
Females as Percent of Population	-0.303***	-0.270***	-0.273***	-0.274***
	(-3.22)	(-2.85)	(-2.88)	(-2.88)
Avg Land Ownership		0.00246**	0.00276**	0.00293**
		(2.44)	(2.46)	(2.25)
Land ownership Gini Coefficient			0.0205	
			(0.60)	
Share Land Owned by Wealthiest Tenth				0.0280
				(0.57)
Branch FE	Yes	Yes	Yes	Yes
Mean Dep. Var.	0.183	0.183	0.183	0.183
Observations	455	455	455	455

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Negative relationship between share of female population in the 2001 census and the number of planned female jobs for the intervention.

Table 4.: Share of Older Men Explained by Gender Ratio

	Share of Men Age 40-65 in HH Survey		
	(1)	(2)	(3)
Females as % in HH Survey	0.689**	0.687**	0.434**
	(2.39)	(2.36)	(2.02)
Branch FE	No	Yes	No
Community FE	No	Yes	Yes
Mean Dep. Var.	0.356	0.356	0.356
Observations	84	84	168

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Dependent variable is the indicator variable for man being between ages 37-67. Analysis is at the community level. First two columns include only baseline data. Data taken from the household survey.

Table 5.: Characteristics of Households with Skilled Work in LIWP

	Skilled Work in LIWP		
	All Members	Men Only	Men Only
Man Age 37-66	0.0890***	0.0560***	
	(5.01)	(3.69)	
Man Age 17-37	0.0352***		-0.0381***
	(3.64)		(-3.09)
Man Age 67+	0.00871		
	(0.95)		
Woman Age 37-66	0.00177		
	(0.36)		
Woman Age 17-37	0.00544		
	(1.30)		
Any HH Member Has Construction Experience	0.0165**	0.0363**	0.0382**
	(2.09)	(2.17)	(2.25)
Any HH Has Skilled Work Experience	0.00944	0.0264*	0.0269*
	(1.38)	(1.96)	(1.97)
Community FE	Yes	Yes	Yes
Observations	3156	1471	1471
Mean Dep Var	0.0282	0.0537	0.0537

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Dependent variable is indicator variable for individuals working in skilled jobs in LIWP as reported in ex-post household survey. The first column includes all household members age 17 and over, while the second and third columns are restricted to only male household members.

Table 6.: Characteristics of Households that Participate in LIWP

	Monthly Wage Income			Proxy Wealth Score	
	Baseline		Expost	Baseline	
	All	LIWP HHs	LIWP HHs (Inactive Projects)	All	LIWP HHs
LIWP	615.9			-0.330***	
	(0.67)			(-2.88)	
Skilled LIWP		3484.5**	-182.9		-0.146
		(2.10)	(-0.09)		(-1.02)
Constant	6725.3***	6447.6***	6544.9***	2.101***	1.781***
	(9.97)	(21.40)	(24.45)	(24.76)	(68.59)
Observations	493	364	182	486	359

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Comparison of monthly wage income and proxy wealth scores for households with and without participants in LIWP from the household survey data. Column (1) includes all non-replaced households in treated communities. Column (2) includes non-replaced households in treated communities where at least one member participated in LIWP. Household monthly wage income of all workers is scaled by the square root of the household size. (Other equivalence scales for adjusting with respect to household size give qualitatively similar results.) Higher scores indicate lower probability of poverty. Some observations are missing compared to the first two columns due to unavailable information for one or more of the characteristics that make up the proxy wealth score.

Table 7.: Impact on Wage Income Inequality by Project Type

	Gini Coefficient		
	All	Low Female Pop	High Female Pop
Expost*Active in past month	-0.077**	-0.063	-0.112*
	(0.038)	(0.056)	(0.061)
Expost	0.076***	0.017	0.149***
	(0.019)	(0.030)	(0.037)
Community FE	Yes	Yes	Yes
Mean Dep. Var	0.521	0.536	0.505
N	156	50	56

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Estimated impact of LIWP intervention within the past month on wage inequality, controlling for time trend of worsening inequality due to the crisis. Data from the 78 communities in the RCT with at least 10 household surveys with complete wage income data. The Gini coefficient for inequality is calculated based on 10-12 randomly selected households. Because wage income is collected for the previous month, the coefficient of interest is on the variable identifying treatment communities with projects active in the past month. For columns (2) and (3), the LIWP household data are merged with census data using administrative information to distinguish between low and high female population communities. Due to imperfect consistency between the household survey project numbers and administrative project numbers records, and to imprecision in recording village names, only 53 out of the 78 communities could be matched with census data.

Table 8.: Correlation Between Direct Benefit from Project Infrastructure and Proxy Wealth Scores

	Directly Benefit from Project		
	All	Low Planned Female Share	High Planned Female Share
LIWP Participant	0.110*	0.0534	0.182**
	(1.82)	(0.65)	(2.29)
Project FE	Yes	Yes	Yes
Mean Dep. Var.	0.666	0.750	0.616
Observations	434	212	211

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The first column includes all households in actually treated communities in the household sample (this consists of only 434 households as some of the communities assigned to treatment had canceled projects and questions about benefiting from the projects were not asked in the communities originally assigned to control). In the next two columns, the sample is split between low female share (less than 16% female jobs) and high female share (greater than or equal to 16% female jobs).

Figure 1.: Community Interventions Included in the Data

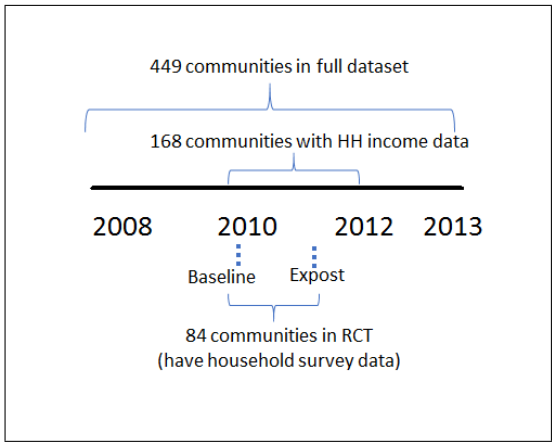
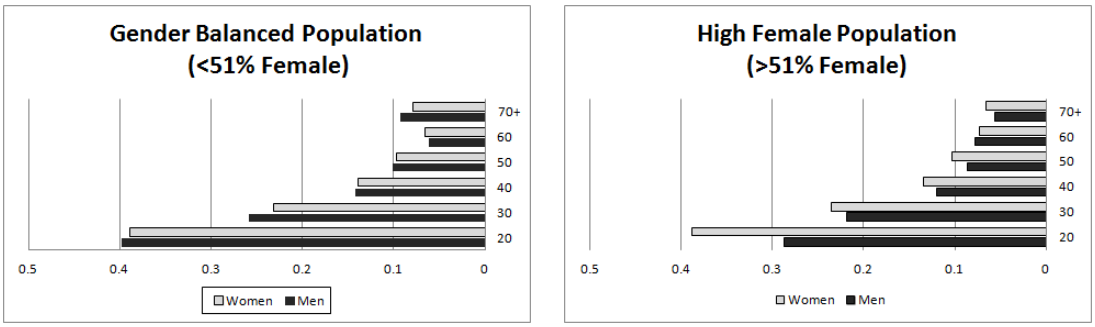
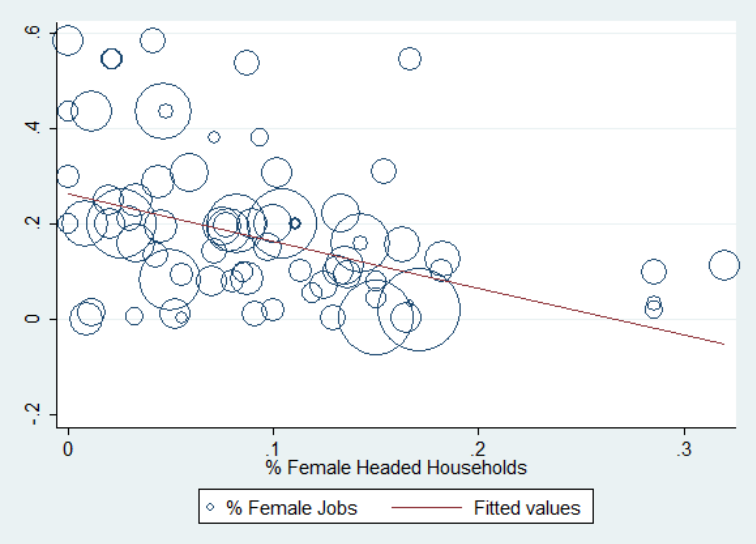


Figure 2.: Age Distribution by Gender in Communities with Low vs. High Female Shares



Left-hand figure represents 34 communities and right-hand figure represents 50 communities. The vertical axis shows the ages at the top of the age range represented by the bar. (To avoid age heaping, the age groups are defined as elsewhere in the paper with cutoffs at 22, 32, etc.)

Figure 3.: Inverse Relationship Between Share of Female Headed Households and Share of Female Jobs in Project



Observations are at the village level, weighted by the size of the village. Communities for the purpose of designing projects often were defined to include 2-3 neighboring villages. Data are taken from MIS and village survey which accompanied the household survey for the RCT.

Appendix A. Appendix

Table A1.: All LIWP Projects by Intervention Type Category

	Number of Projects
Water Only	134
Water and Land	42
Water and Road	24
Land only	117
Land and Road	7
Land and Water	50
Road only	40
Road and Water	23
Road and Land	10
Observations	447

Most projects had multiple components, with the first component being the larger part of the project. Where projects are divided into three groups, the type of the first component is used.

Table A2.: Jobs Reported in Baseline and Ex-post Household Surveys by Category

	Pre-Crisis	Post-Crisis
Governmental	128	81
Private agriculture, skilled	17	25
Private agriculture, unskilled	88	146
Private construction, skilled	42	17
Private construction, unskilled	57	32
Private other, skilled	96	44
Private other, unskilled	171	85
Self-employed, skilled	193	113
Self-employed, unskilled	342	395

Table A3.: Test for Differences in Active and Inactive Projects

	Share planned female jobs	Road component	Water component	Land component
Active Project	-0.0261	0.114	0.0530	-0.136
During Expost Survey	(-0.44)	(0.68)	(0.29)	(-0.74)
Mean Dep. Var	0.175	0.286	0.600	0.457
Observations	34	35	35	35

Table A4.: Summary Statistics on Wage Income Inequality Within Communities

	Gini Coefficient			
	All	Roads	Water	Land
Control and Inactive Baseline	0.479	0.505	0.479	0.487
	(0.128)	(0.136)	(0.131)	(0.126)
Control and Inactive Expost	0.562	0.597	0.561	0.575
	(0.153)	(0.129)	(0.159)	(0.141)
Active LIWP Baseline	0.496	0.503	0.493	0.506
	(0.111)	(0.109)	(0.114)	(0.116)
Active LIWP Expost	0.537	0.540	0.542	0.528
	(0.150)	(0.145)	(0.134)	(0.146)
N	80	55	77	59

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure A1.: Kernel Density of Ages of Men in Communities with Low vs. High Female Shares