Conditions in Rural Yemen: Findings from the RALP Baseline Survey[1]

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Abstract

Despite decades of development efforts in rural areas of Yemen, there is little systematic reporting on conditions in these areas. In this report, which draws on a new survey that we conducted as a baseline for the evaluation of the Rainfed Agriculture and Livestock Project (RALP), we examine seven issues that are important for both understanding these areas and designing effective development programs: (1) development program targeting, (2) food security, (3) agricultural production, (4) community cooperation, (5) gender equity, (6) qat and health expenditures, and (7) inequality. We intend for this report to be a tool for future projects aiming to improve rural livelihoods in Yemen.

Summary

With nearly 70% of the population living in rural areas, there is a particular interest within the development community today to understand the needs of rural Yemenis and how best to target new resources to these areas. However, despite this interest in expanding development efforts in rural areas, there is little systematic data on either conditions in rural Yemen or how development agents might target development resources within rural areas.

In this report we study conditions is rural areas using a baseline survey that we collected for the evaluation of the Social Fund for Development's (SFD) Rainfed Agriculture and Livestock Project (RALP).[1] Though the RALP program focuses on communities that rely primarily on rainfall as a source of agricultural water, so-called "rainfed communities", these communities account for 75% of all rural communities and are also those of most interest to external donors. Thus, while our analysis is not representative of all rural communities, it still provides a valuable policy tool.

The survey's main findings are summarized below.

Targeting of Development Programs

While it is possible to target programs at the community-level and to easily identify the poorest members of these communities, effective development programs may require focusing resources away from the poorest community members. Simple data-driven approaches for targeting, both within- and across-villages, seem to be quite effective. RALP consultants were able to identify villages that were, on average, poorer than their neighbors and the village-level participatory rapid assessment tool effectively identified

[1] RALP is a World Bank funded project.

the poorest community member. However, the poorest community members are likely to be excluded from development-focused initiatives with limited budgets as they do not have sufficient capacity to benefit from these programs.

Food Security

Though rural households are individually food insecure, they are typically able to borrow food or money to meet their needs; indeed, the 2007-2008 food crisis seems to have had little impact on food security. That the majority of households reported food shortages during the previous year is unsurprising as it included the second half of the 2007-2008 food crisis. However, few households reported reductions in the amount of food consumed as access to food or monetary credit seems to have mitigated the effect of the crisis. Detailed data on caloric intake available in the RALP data indicate that the 2007-2008 food crisis seems to have no lasting impact on food security.

Limited access to nutritious foods - i.e. foods rich in protein and nutrients - remains a significant problem. While few households suffer from caloric deprivation, access to protein-rich sources - i.e. meat, eggs, milk, or fish - remains extremely limited with nearly one-third of households consuming a protein-rich source once a week or less. And though very few households reported consuming either fruits or vegetables more than twice a week, access to iron-rich food sources is particularly restricted.

Agricultural Production

Rampant disease has decimated the sheep and goat holdings of many households; few households are able to treat disease or to capture the full value of animals they do sell. Sheep and goats are second only to qat in their importance in rural agricultural. However, despite this importance, most households have neither access to a veterinarian nor knowledge about preventive measures and many households reported herd losses of one-third or more. They are also unaware of the full value of their animals, with most selling animals for the value of the meat alone.

Producers of honey - the third most important agricultural commodity in rainfed communities - demonstrate meaningful resourcefulness despite facing new marketing and environmental challenges. A lack of knowledge about disease and the emergence of new diseases have caused significant beehive losses. Limited marketing capabilities has created challenges for honey producers in capturing the full value of their

honey. However, these producers' entrepreneurship is demonstrated by their geographic flexibility, willingness to collaborate with other honey producers, and meaningful knowledge about nutritional supplements.

Terrace abandonment, which seems to be driven almost entirely by water shortages and the opportunity cost of labor, is less significant than suggested by previous studies; however, much of this abandonment is recent, suggesting that things will get worse before they get better. Though a specialized terrace module in the RALP survey demonstrates that terrace abandonment is less widespread than has been suggested by previous studies, this does not suggest that terrace abandonment is not an important issue. Indeed, few communities have maintained their traditional institutions for maintaining terraces, and nearly all communities reported terrace abandonment as a significant concern for the community. Importantly, the two dominant causes of terrace abandonment - a lack of rainfall and the opportunity cost of labor - are factors that development actors will have significant difficulty in mitigating.

Community Cooperation

Communities work together in solving public good problems, leave political decision-making to local elites, and do little to help individuals with problems. Nearly 60% of households reported that the community would come together to repair a damaged road or deal with a problem at the local school. However, communities were not at all involved in political decision making, contrary to the goals of the variety of local democracy movements. Surprisingly, the majority of households reported that nobody would help them during a personal crisis, with the poorest community members reporting the strongest isolation.

Gender Equity

Women have little control over household decisions and have highly restricted mobility; many women do earn an income though they seem to have little influence over how their own money is spent. Women have little influence over the most important decisions in their own and their children's lives - e.g. family planning, whether the child can go to the doctor when he is sick, and whether her female children are allowed to go to school. And women's mobility is so restricted that the vast majority of women reported that they could not take a child in critical condition to a doctor by themselves. While few

women have control over their inheritance, many reported earning an income and having some degree of control over it; however, few women reported the ability to make purchases themselves and there is not evidence that they spend money differently than their husbands.

Qat and Health Expenditures

Expenditures on qat in previous studies may be understated; however there is little evidence that qat expenditures are "beggaring". While previous data indicates that qat accounts for approximately 8% of expenditures in rural areas, the RALP data suggests that true consumption may be as much as 50% higher. Expenditures are roughly constant among poorer households - demonstrating the inelastic nature of this commodity. However, there is no evidence that the level of expenditures on qat consumption exacerbates food insecurity.

Expenditures on health services surpass those on qat. Expenditures on health services are significantly larger than those for qat, except among the wealthiest communities. This is perhaps surprising as health services are ostensibly free for these poor rural dwellers.

Inequality

Inequality estimates that rely on government household survey data may understate the true level of inequality in rural areas of Yemen; inequality within villages is as high as inequality across villages. Inequality calculations using detailed census data collected during the RALP baseline survey return estimates of inequality much higher than previously found for Yemen. These data also demonstrate that there is as much inequality within villages as across.

Chapter 1

Overview of RALP

The Rainfed Agriculture and Livestock Project (RALP) is a program designed to reach residents of communities that are at least 70% rainfed, which represent some of the poorest rural communities in Yemen. Using the community-based development strategy that the Yemeni Social Fund for Development (SFD) has used successfully for more than a decade, this program is designed to give members of these communities both training and resources to improve their economic situation.

This program targeted 92 communities in five governates in Yemen, reaching 498 villages with a total population of approximately 200,000 people (just under 1% of the population of Yemen). Figure 1.1 provides maps, sequentially, of (1) the governorates that were included in RALP, (2) the districts that were included in this first wave of the RALP intervention and (3) the villages that were targeted by the program. An additional 12 districts in these five governorates will participate in RALP's second wave in the summer of 2010 (not pictured).

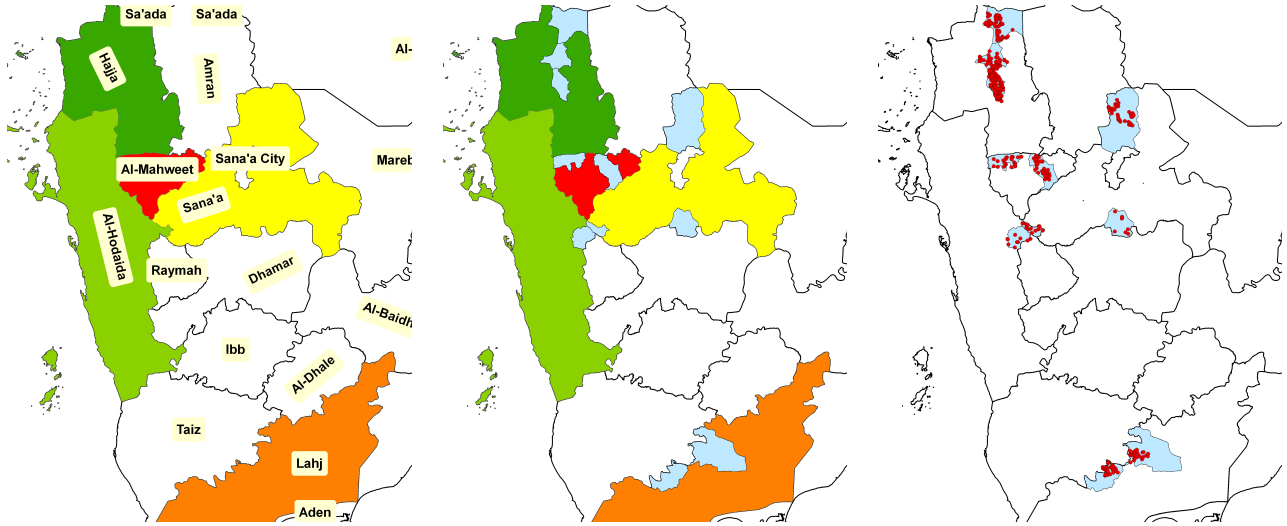
Though groups were formed initially in all 498 villages, fewer than 250 villages had more than one participant.[1] This relatively significant attrition, equivalent to a reduction of the total number of participants by nearly 60%, is a result of three factors: (1) migration of group members away from the village (both seasonal and permanent migration are likely to be significant), (2) lack of continued interest by prospective group members and (3) unwillingness to meet necessary financial contribution for participation. While this attrition is significant, the vast majority of communities (95%) still had at least one productive development group at the time of project implementation.[2]

[1]Based on data from 87 of the 92 communities, only 206 villages had more than one participant. 30% of these village have six or fewer participants and 18% of these villages have between 7 and 12 participants so that nearly 50% of the villages had 12 or fewer participants.

[2]This reflects data available on 87 of the total 92 communities.

Figure 1.1: RALP Governorates, Districts and Villages

RALP Governorates Targeted Districts (in blue) Targeted Villages

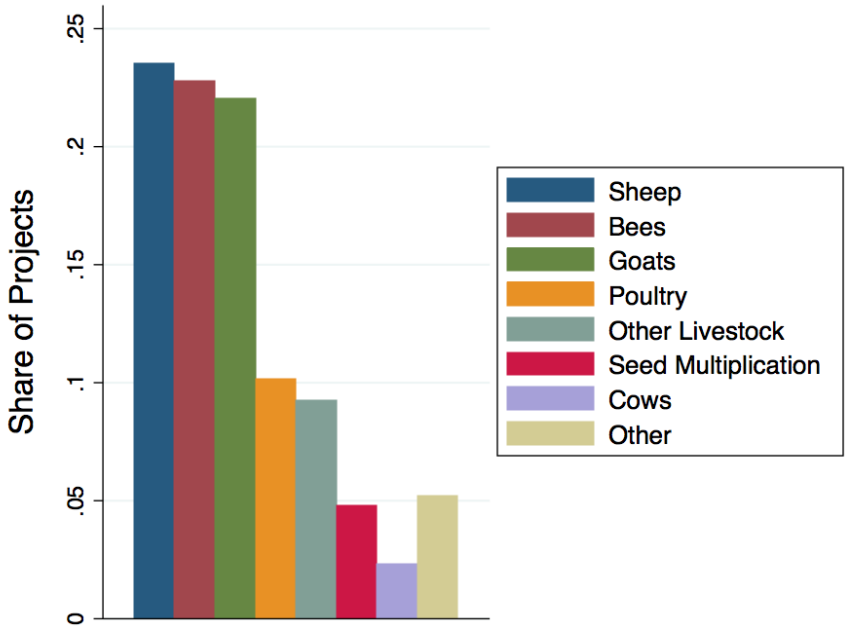


The RALP project has a variety of projects that it offers to project members.[3] These projects include livestock (i.e. sheep, goat, chicken and cow) raising and fattening, honey production, seed multiplication, irrigation and a few other projects. However, projects in sheep and goat raising and honey production represent the overwhelming majority of the projects. In particular, these two types of projects together represent 77% of the appoximate 8,000 requested projects.

Participants in RALP projects received two types of benefits. First, each group received financial support from RALP to supplement the monetary contribution that was required of all group members. Second, they received training before and during the implementation of the project. The training before implementation focused on group capacity-building in the development of by-laws, a business plan, etc. while the training during the project focused on practical skills to support their project (e.g. training on animal husbandry, etc.). Appendix A.3 provides a more detailed overview of the group capacity building exercises that were part of this program.

[3]As all SFD programs, the RALP projects are demand driven and committees of recipients must meet and agree on the type of projects that they would like. Note that the RALP project differs slightly in that the choice of communities was not demand driven, as they were selected based on their neediness, and thus differ slightly from the standard model of the SFD.

Figure 1.2: RALP Projects



Note: This figure based on detailed project data available for 8 of the 11 districts.

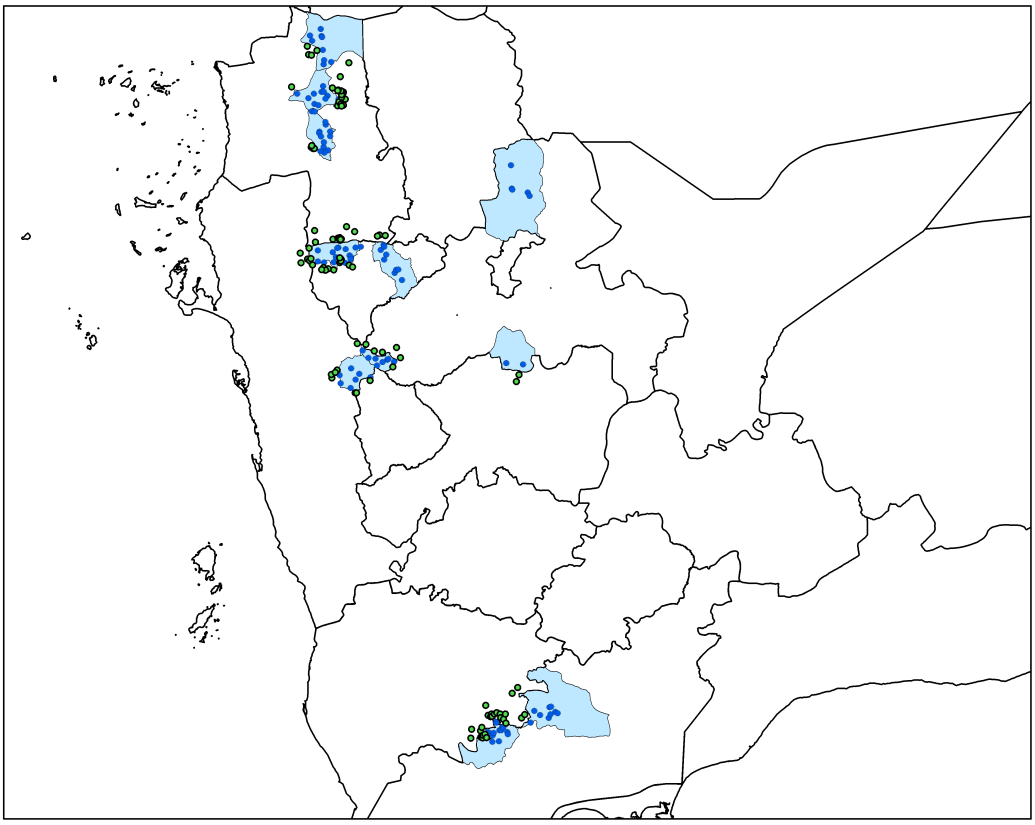
1.1 Data

This report use two types of data: (1) A baseline survey for the RALP impact evaluation. This survey, which includes villages from 95 RALP communities and 95 control communities, includes a household questionnaire, a village questionnaire, a village census, and a terrace questionnaire. (2) Three different types of governmental data - i.e. the 2005-6 Household Budget Survey, the 2001 Agricultural Census and the 1994 and 2004 Population censuse.

1.1.1 RALP Baseline Survey

The RALP baseline survey contains data on a total of 295 "rainfed" villages - i.e. villages that rely on rainwater for more than 70% of their agricultural water needs. These villages are not intended to be a representative of rural Yemen. Indeed, these villages are clustered around the 11 districts that were selected for RALP as demonstrated in Figure 1.3. However, these villages are a somewhat representative sample of rainfed rural villages, though the villages in this sample are somewhat poorer than the overall population (see Section 2 for details).

Figure 1.3: RALP Governorates, Districts and Villages



Of these 295 villages, 149 of these villages (50.5%) are "treatment" villages, i.e. there was a RALP program under implementation, and 146 of these villages (49.5%) were "controls", i.e. do not have a RALP project planned as of yet.[4] As the project was already under implementation before the beginning of the survey, control villages were not randomly selected, but instead selected using a sequential matching approach as described in Appendix B.

Though the survey sampled 295 villages, the sampling unit for the survey was the same as that used by RALP program officers - i.e. the "community". A rural "community", a group of small neighboring villages, is a concept defined by the SFD to help facilitate RALP's work; many rural villages are too small to accommodate a program like RALP. Thus, even though 295 villages were included in the sample, the survey teams only visited 190 communities. The discrepancy resulted from the approach used for constructing the sampling frame - i.e. though only one village in each community was identified for surveying,

[4]These control communities may get preference in future SFD projects but will not receive any SFD projects for the duration of the evaluation.

enumerators were often required to add a second or third village as the sampling frame was required to be a minimum of 80 households. Appendix C has more details on the construction of the sampling frame.

The RALP baseline survey has four key components. The first component of the survey was a mini-census of all the households included in the sampling frame (i.e. 80-120 households per community visit). This census includes the results from the standard participatory rapid assessment (PRA) used for measuring poverty, household animal assets and several different measures of within-village cooperation. The goal of this census was to validate the PRA approach, measure within-village asset inequality and assess the overall capacity of these communities to sustain development projects based on the existing degree of within-village cooperation.

The second component of the survey was a household survey. Though this survey had standard components including a household roster, dwelling characteristics and a list of agricultural assets (i.e. animals and land), it also had several innovative components. First, as measuring food security in a relatively direct way was a major goal of the survey, we developed a new approach for rapidly assessing daily caloric consumption. This approach measured the volume of consumption of each of the primary grains consumed in Yemen, which account for 71% of total caloric consumption in rural areas, which could then be later converted into calories.[5] Second, as the major focus of the impact evaluation were households involved in either animal raising or beehive groups, specialized modules were designed to assess both the specific difficulties that households involved in either kind of economic activity face as well as their capacity (e.g. knowledge about nutrition, disease prevention and treatment, etc.). The third novel module, at least in the Yemeni context, was a set of questions designed to measure the economic and personal freedoms of the women in these communities.[6]

The third component of the survey was a village questionnaire. This was the most standard component of the RALP baseline survey and contained a variety of questions on demographics and the aggregate economic conditions in the village.

The fourth component of the survey was designed to ascertain the conditions of the agricultural terraces in the village. This component was only issued in villages that had terraces or had had terraces at some point and was filled out once for each village during

[5]For this conversion we assume that the density of these grains, i.e. the quality, is relatively constant throughout the country. The reported estimate of caloric consumption is the authors' estimate using the 2005-2006 Household Budget Survey and includes the following grains: wheat, corn, sorghum, millet, white flour, rice and barley.

[6]This module was based on that used in the Egypt Labor Market Panel Survey of 2006, though significantly modified for the Yemeni context (http://www.erf.org.eg/cms.php?id=ELMPS_Dataset). We would like to thank Ghada Barsoum for making this module available to us.

an interview with a local leader. This part of the survey was designed to ascertain the condition of these terraces, i.e. the degree of terrace abandonment and deterioration, as well as to better understand the relationship between local customs for maintaing these terraces and the current situation in the village.

1.1.2 Government Surveys

Three additional governmental data sources are used to supplement this analysis. The first supplementary dataset is the 2005-2006 Household Budget Survey (HBS). The HBS contains data on more than 13,000 households across Yemen and contains a variety of modules that are of particular use for the analysis presented here. First, the HBS contains detailed data on household expenditures which allows us to validate the reliability of our results for caloric consumption as well as qat and medical expenditures. Second, the HBS contains detailed income data, and in particular income data from agricultural production which are useful for verifying the RALP data on economic productivity in rural areas.

The second type of data is the 2001 Agricultural Census, which is a survey of agricultural resources with data for every village in Yemen.[7] As this survey contains detailed data on the share of land that relies on rainfall for agricultural production as well as both animal and beehive holdings at the village-level, it is particularly useful for the selection of control villages for the evaluation (see Appendix D for details). This data is also useful in assessing the targeting of the intervention as it allows comparison of the agricultural asset wealth in the targeted communities to all other communities throughout Yemen.

Finally, two Population Censuses, from 1994 and 2004, which contain a variety of demographic and service provision data were used. These were also used for the selection of control groups as described in Appendix D. These variables are also very useful in measuring the effectiveness of the program in targeting poor communities.

[7] The data for the governorate of Al-Jawf is not available.

Chapter 2

Targeting

Development donors typically have two types of targeting goals: (1) targeting programs to reach the poor, and (2) targeting programs to maximize the effectiveness of their programs. The first goal defines development donors who focus on the provision of humanitarian assistance and the second are the donors focused on medium- and long-term development outcomes.

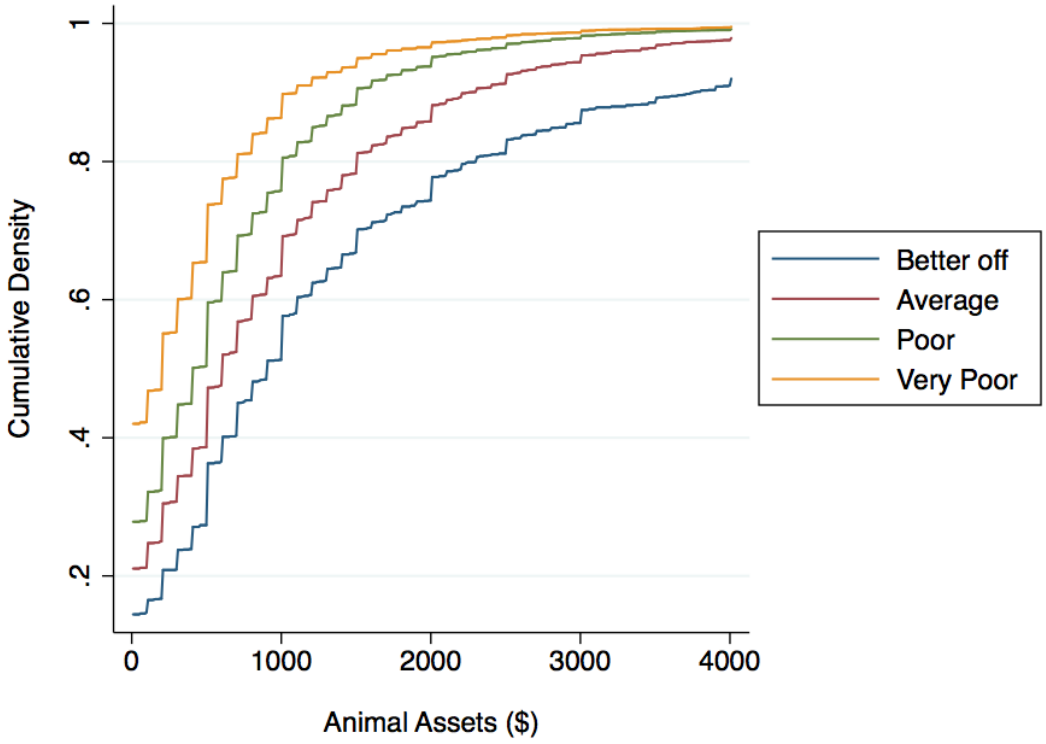
In this section, we assess three aspects of targeting. First, we evaluate the effectiveness of the participatory rapid assessment (PRA) approach as a tool for identifying within-village inequality. Second, we study how the goals of a development-focused program affect within-village resource allocation. Third, we study the effectiveness of SFD consultants in identifying appropriate villages for intervention. This last aspect is of perhaps the most significance as there is a perception that community-level targeting of development programs in Yemen is often political.

Participatory rapid assessment (PRA) is an effective tool for identifying within-village poverty. PRA is a technique that is often used by the SFD and other agencies as a tool for within-village targeting. This technique draws on the knowledge of key informants to categorize households according to wealth or some other similar index. The wealth, or similar measure, is defined locally by working with these key informants before they are asked to categorize all of the households. In the case of the villages surveyed for the baseline, these key informants were asked to rank all the households in the village as either "better off", "average", "poor" or "very poor" by wealth (using the locally defined measure).

In Figure 2.1 we examine the effectiveness of the PRA in sorting people according to their true assets. The clear ordering of the cumulative distributions in this figure demonstrate the overall effectiveness of this technique. While there are some households assessed as "better off" that report having little or no animal assets this likely reflects the fact that

not all households hold wealth in animal assets and that some households may have been unwilling to report their true animal holdings.[1]

Figure 2.1: Cumulative Distribution of Animal Wealth - by PRA



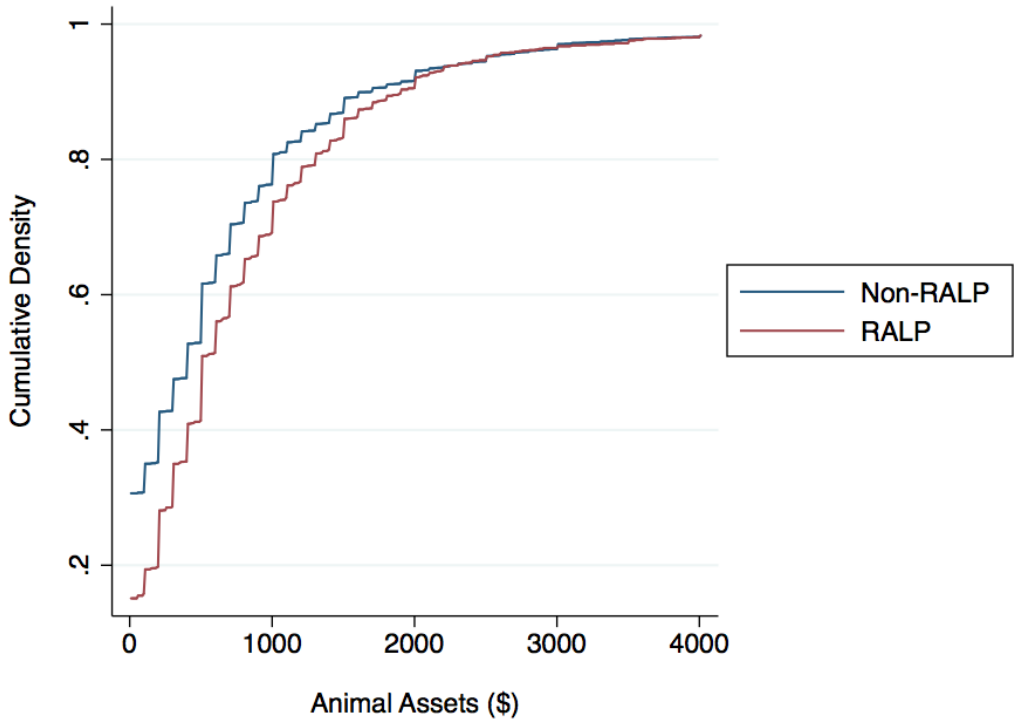
Effective development-focused initiatives may underrepresent the poorest community members. The central goal of the RALP project was to improve the long-term productive capacity of these communities. Thus, the specific within-village goal of RALP consultants was to identify those households that had the capacity to benefit from these projects. There is some evidence that the RALP program did succeed in this goal: RALP participants were twice as likely to report being involved in some sort of collaborative productive activity and somewhat more likely to be involved with an NGO or other cooperative group.

This goal, while likely important to the success of a development-focused program like RALP, has an important implication: the poorest community members are likely to be underrepresented as they have much more limited capacity. Indeed, RALP participants tended to be wealthier than the rest of the community. This is demonstrated in Figure 2.2 where the cumulative distribution of animal assets for the RALP participants stochastically

[1]Some of the field researchers indicated that a few respondents hesitated in responding to questions about assets as there was a perception that this data might be used for taxing purposes. Every effort was made to abate these concerns, but it is possible that some people, especially wealthier people who may be at a particular risk for taxation, may not report their full animal holdings.

dominates that for those that did not participate in projects.

Figure 2.2: Cumulative Distribution of Animal Wealth - by program participation



Large development programs can be effectively targeted to poor communities. Unlike the majority of projects implemented by the SFD, RALP was not demand-driven at the community level. While the standard SFD protocol is to collect project requests from communities and then intervene in those communities deemed most worthwhile, RALP was a targeted project designed to reach residents of the most marginalized rural communities in Yemen. As such, RALP is the most similar to many of the targeted projects currently being considered by foreign donors.

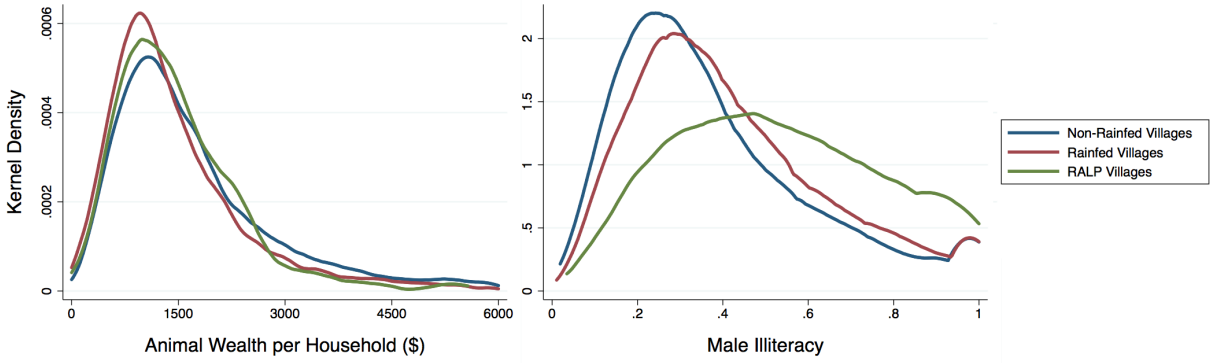
The RALP targeting had three key stages. In the first, available agricultural data was used to identify districts that relied on rainfall for agriculture and were particularly impacted by water shortage.[2] Then in the second stage, SFD consultants worked with the local councils to identify communities that satisfied the RALP criteria (see Section 1). Finally, communities were visited to verify that they satisfied the RALP criteria and that there was local interest in participation. Appendix D.1 provides more details on the factors that were considered during the community selection.

Figure 2.3 assesses the effectiveness of the RALP targeting in two different ways. The

[2]The selection of participating districts was done in consultation with various government officials including representatives from the Ministry of Agriculture.

left panel plots the distribution of livestock assets in the RALP communities versus the universe of rural areas in the 5 governorates included in the RALP program and the right panel plots the analogous distributions of male and female literacy rates. Interestingly, while we find no evidence that these communities had less productive resources, as demonstrated by the left panel, the targeted communities do have higher rates of illiteracy. As illiteracy is a stronger proxy for village wealth than animal assets, as these communities rely primarily on emigrant wage earners to sustain their livelihoods, this suggests that the RALP community-level targeting approach was indeed effective in targeting poorer communities.

Figure 2.3: Effectiveness of Village Targeting



Chapter 3

Food Insecurity

Yemen is often characterized as one of the most food insecure countries in the world, and a country that was particularly impacted by the food crisis. Indeed, while nearly 22% of the population suffered from food insecurity in 2006 (Kabbani and Wehelie 2005), reports suggest that the level of food insecurity surged in the wake of the food crisis. One prominent example is a recent report from the International Food Policy Research Institute (IFPRI) that food insecurity in rural areas to be more than 37% and nearly one-third overall (Ecker, Breisinger, McCool, Diao, Funes, You, and Yu 2010). Unfortunately, as these reports use different approaches to estimating food security, it is impossible to compare the point estimates directly to assess the total change in food security.[1]

Detailed data on caloric intake available in the RALP data indicate that the 2007-2008 food crisis seems to have no lasting impact on food security. The RALP survey provides a new tool for estimating the potential impact of the food crisis on food security in rural Yemen. In particular, the RALP survey contains detailed household consumption data that allows us to calculate the level of food insecurity in 2009. The impact of the food crisis on food security can then be assessed by comparing the data in the 2005-2006 HBS to these data from 2009.

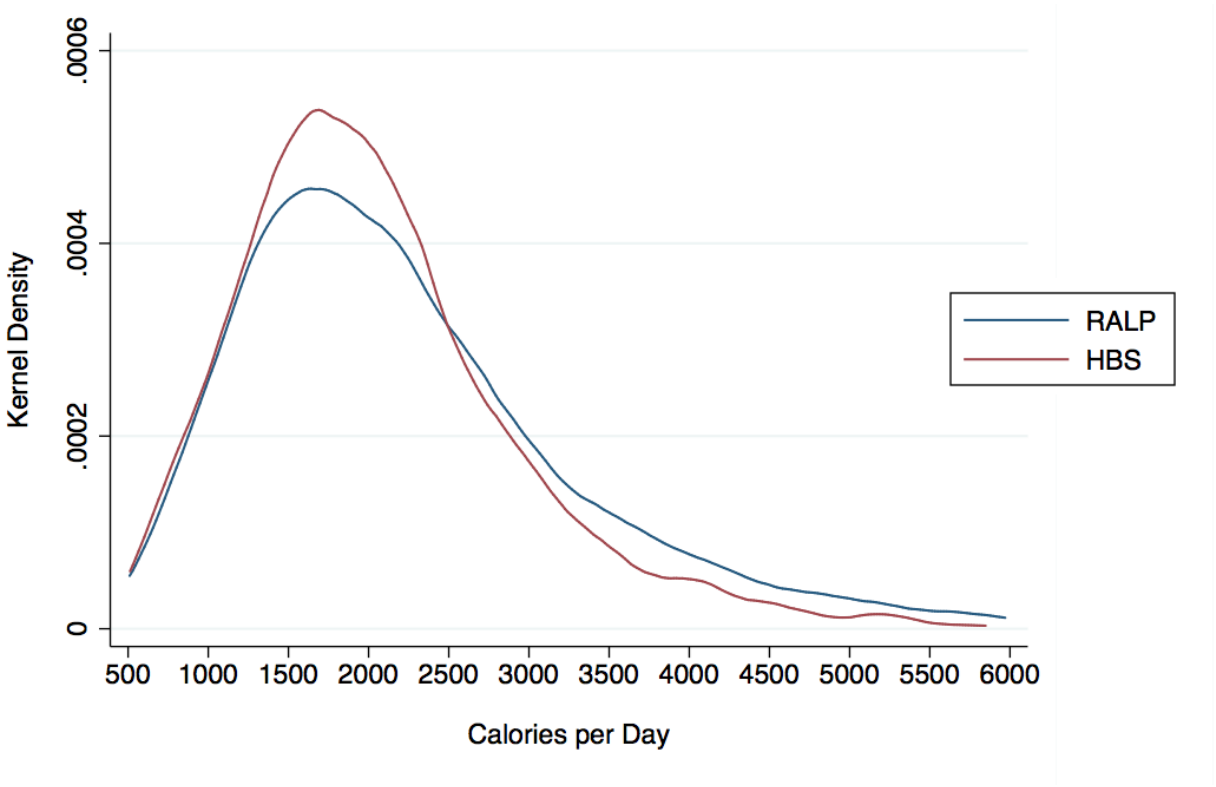
First, we calculate the degree of food insecurity in 2009 using the RALP survey. In particular, we use a novel module contained in this survey to calculate daily household caloric consumption and then compare this value to household needs.[2] The consumption module contains two types of questions that allow calculation of daily household caloric consumption.

[1]Though the IFPRI report uses data that is contemporaneous to that used by (Kabbani and Wehelie 2005) for their estimation of 2009 food insecurity levels, they unfortunately do not report their estimates of food security for the previous period.

[2]The other approaches for measuring consumption are either too difficult to do in a single interview, i.e. the HBS that uses a diary to record the total consumption of households over a four week period, or not sufficient to measure the impact of a program on caloric consumption, i.e. World Food Programme surveys that ask only about the frequency of consumption of key food items.

First, households were asked to report their total consumption of eight key food items during the previous day and the day before that.[3] These aggregates, which were reported in volume using a standardized measuring vessel, were converted to calories using the standard density of each item and a weight-calorie conversion table that has been developed for Yemen.[4] Second, household daily consumption was calculated by first dividing the total number of calories by the number of meals served during the previous two days, to control for the possibility that guests had been invited to the home, and then multiplying by the number of members of the household.[5]

Figure 3.1: Kernel Density Estimates of Average Household Caloric Consumption: HBS and RALP



By comparing these estimates of daily household caloric consumption to daily household needs, it is possible to assess the severity of food security in 2009. To do this, we

[3]These eights items account for 77% of the average total daily caloric consumption in rural areas in the 2005-2006 HBS. The share of total caloric consumption for the eight items is as follows: wheat (35%), flour (21%), rice (9%), sugar (8%), corn (2%), sorgum (1%), millet (1%) and barley (0.2%).

[4]This is available from the authors upon request.

[5]These numbers were then inflated by 25% to account for the fact that these items only account for 77% of total caloric consumption.

adopt the approach used by Ecker, Breisinger, McCool, Diao, Funes, You, and Yu (2010) and calculate the total caloric needs of each household using the individual caloric needs reported in their Table 2. In order to account for the differing caloric requirements based on the type of work that individuals engage in, all household members that reported working were assigned the 'Maximum' value and all other household members were assigned the 'Average' value. This approach perhaps overstates the household caloric consumption as household members with government jobs, etc. likely consume an 'Average' amount while those engaged in agricultural work or working as day laborers probably consume closer to the 'Maximum' amount. While this approach allows maximum compatibility with the HBS for the second part of our analysis, and is thus our preferred estimate, we also report food insecurity estimates using two different approaches: (1) assuming that all household members have average consumption and (2) assuming that only agricultural workers and day laborers have caloric needs equivalent to the maximum. The first column of Table 3.1 reports our three estimates for food insecurity in 2009.

Second, we study the potential impact of the 2007-2008 food crisis by comparing these 2009 estimates with estimates of food insecurity from before the food crisis. In particular, the 2005-2006 HBS provides a tool for estimating food insecurity in the years immediately before the crisis began (in 2007). To provide maximum similarity to the 2009 estimates we use an approach that is almost identical to that used for the RALP data, i.e. we use the same eight items, inflate the estimates by 25% and calculate household needs in the same way. There are two key differences: (1) we can only calculate two estimates of household caloric needs as the HBS does not allow us to separate agricultural work and day labor from other type of employment and (2) 2e do not adjust for the number of meals consumed but rather focus on total household consumption in the fourth week of the survey and divide that value by 7 to get average daily household caloric consumption. As the second is a potentially major concern, we also consider a specification when we exclude household members that are either studying or working outside the village from our calculation of the caloric requirements.

As demonstrated in the second and third columns of Table 3.1, the estimates of food insecurity using the 2005-2006 HBS data are generally higher than those obtained using the 2009 data. Only one estimate for 2005-20066 is below the comparable estimate for 2009, i.e. the estimate that excludes all household members that studied or worked for at least one day outside the village, and this number represents a maximum lower bound. Though the data collection approach is different, so that the estimation strategy necessarily differs, this is evidence against a strong impact of the food crisis.[6]

[6]It is important to note that the high estimates of food insecurity reported for 2005-2006 in Table 3.1 are not sensitive to the approach that we have adopted here. Indeed, we obtained nearly an identical result

Table 3.1: Food Insecurity Before and After the Crisis

		Year:	2009	2005-2006	2005-2006
		Data:	RALP	HBS	HBS
		Sample:	All	All	Restricted (see note below)
Three Methods for Calculating Household Caloric Needs	(1)	All working household members have caloric requirements equal to the `Maximum'	47%	63%	49%
	(2)	All household members have caloric requirements equal to the `Average'	35%	44%	33%
	(3)	Household members engaged in agricultural work or employed as day laborers have caloric requirements equal to the `Maximum'	44%		

Note: The restricted sampled of the HBS excludes all household members of the household that reported working or studying outside the village **at all** (i.e. at least one day) during the previous year.

Though rural households are *individually* food insecure, communities as a whole do not seem to be insecure as households are able to borrow either food or money to meet the majority of their basic needs. As one of the specific goals of the RALP evaluation was to analyze the impact of RALP on the food security of the targeted communities, it contains a variety of other questions that allow examination of the overall food insecurity of rural Yemeni households as well as the potential impact of the food crisis. In particular, the survey includes several standard recall questions of food insecurity with a one-year recall window. In addition to being useful for describing food security overall, these

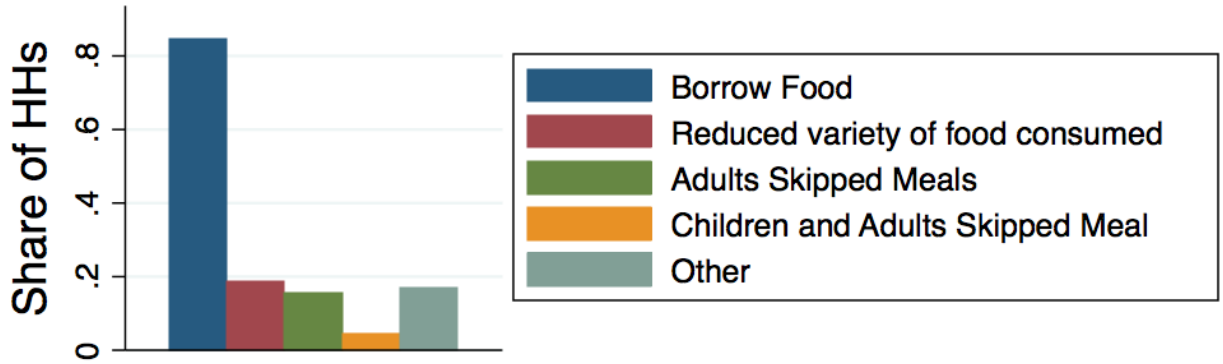
to that reported in column 2 when following the approach used by Ecker, Breisinger, McCool, Diao, Funes, You, and Yu (2010).

questions capture the impact of the food crisis as the survey was less than one year after the peak of the food crisis.

A large share of households reported shortages of food and money with nearly 60% of households reporting a food shortage and more than 80% of households reporting a shortage of money. However, 35% of the households experiencing economic hardship did not report facing any difficulties acquiring an adequate supply of food and only 2.5% of these households reported that children were forced to reduce their food consumption.

Thus, though rural households may be *individually* food insecure at times, communities as a whole do not seem to be insecure as households are able to borrow either food or money to meet the majority of their basic needs. Indeed, as demonstrated in Figure 3.2, the dominant coping strategy for a food shortage was to borrow food, with nearly 80% of those households facing food shortages reporting that they had borrowed food. The two next most common coping strategies - i.e. reduced variety of consumption and adults skipping meals - were each employed by less than 20% of households facing food shortages.

Figure 3.2: Household Responses to Food Shortage



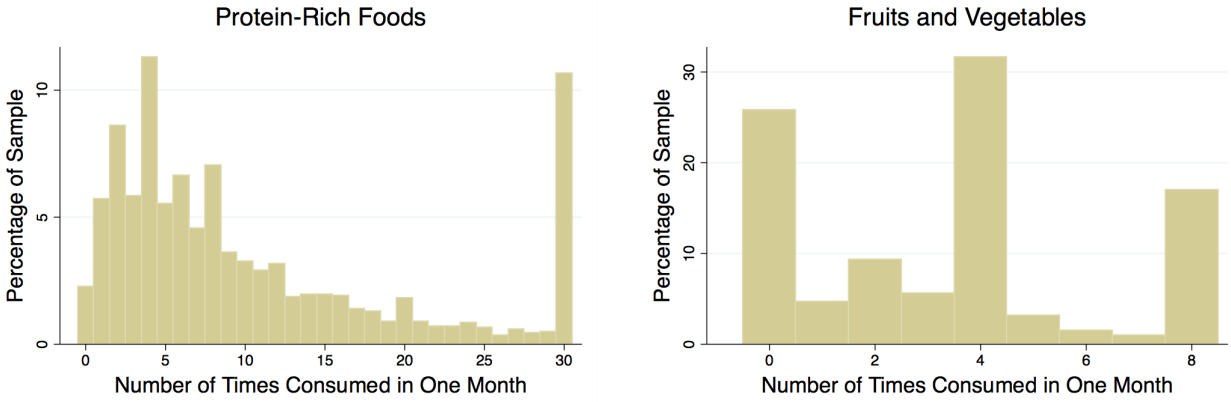
Note: Responses do not add up to 1 as households were allowed to report more than one response.

Limited access to nutritious foods - i.e. foods rich in protein and nutrients - is the most significant food security problem faced in rural communities. The central food challenge facing Yemen is not that Yemenis are starving, but rather that they are suffering from a lack of quality foods. This fact is highlighted in a 2009 report from the World Food Programme that notes that the most food insecure households typically suffer from a low-nutrition diet, dominated by cereal, tea and sugar. Importantly, the same lack of nutrition extends to many so-called food secure households as nearly 80% of children suffer from micronutrient deficiencies, such as iron, while only one-third of households are estimated to be food insecure (FAO/WFP 2009).

In order to study the ability of rural households to access nutritious foods, the RALP

survey asked respondents to report their consumption of the most common sources of proteins and micronutrients. As consumption of these foods is relatively infrequent, the survey asked how many times that each food was consumed during the previous month.

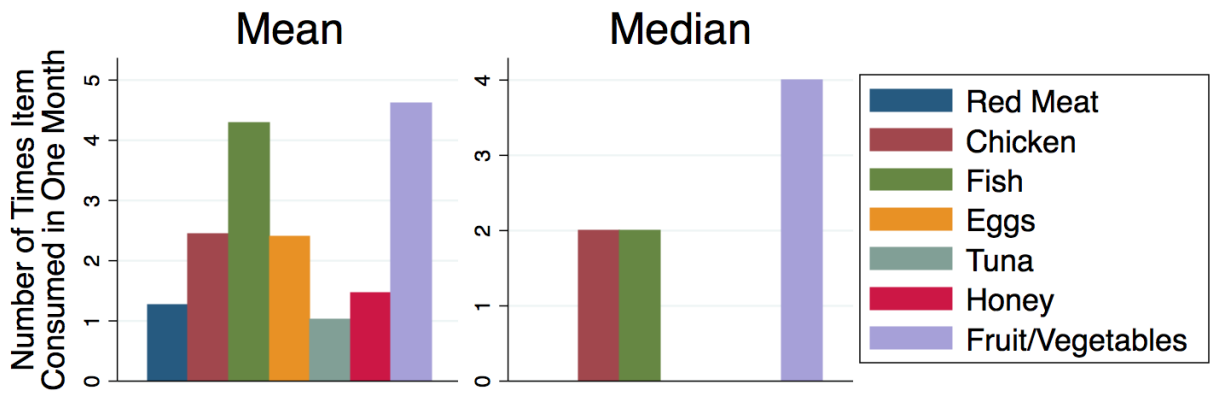
Figure 3.3: Consumption of Proteins, Fruits and Vegetables†



†: Protein-rich foods include red meat, chicken, fish, eggs and tuna.

The limited consumption of protein-rich and nutrient-rich foods is demonstrated in Figure 3.3. The left-panel of this figure reports the number of days that either red meat, chicken, fish, eggs or tuna was consumed. Only 10% of households reported consuming one of these protein-rich sources daily and nearly one-third of households reported consuming a protein-rich source once a week or less.

Figure 3.4: Consumption of Nutritious Foods



Our data also corroborate the nutrient deficiencies documented in the World Food

Programme's report (FAO/WFP 2009). Indeed, the right-panel of Figure 3.3, which reports consumption of nutrient-rich fruits and vegetables, demonstrates the overall lack of nutrients in the rural Yemeni diet. More than one-quarter of all households reported zero consumption of fruit and vegetables and very few households reported consuming fruits and vegetables more than twice a week. And the lack of iron - a key nutrient for growing children - is highlighted in Figure 3.4. In particular, this figure demonstrates that very few households consume iron-rich meat sources and that the key sources of protein are chicken and fish.[7]

[7]While neither chicken nor fish are good sources of protein, chicken livers are. However, as liver tends to be relatively expensive, few rural families are able to afford it.

Chapter 4

Agricultural Production

Agricultural production still remains an important source of income for rural households despite a continuing reliance on emigrant wage labor to sustain livelihoods. Agricultural production accounted for nearly 20% of the total household income in these communities as demonstrated in Figure 4.1.[1]Understanding the ability of these communities to adapt their agricultural production to the stresses induced by reduced water availability and the enhanced disease environment induced by the improved transportation system is thus of clear importance.[2]

As a major goal of the RALP is to strengthen the local productivity of these rainfed communities, the RALP survey contains a variety of questions that provide insight into the challenges faced in agriculture production as well as the capacity of these households to overcome these conditions. The survey focuses on three types of agricultural production, sheep and goat raising, honey production and agricultural terraces, which are discussed separately in the following sub-sections.

4.1 Sheep and Goats

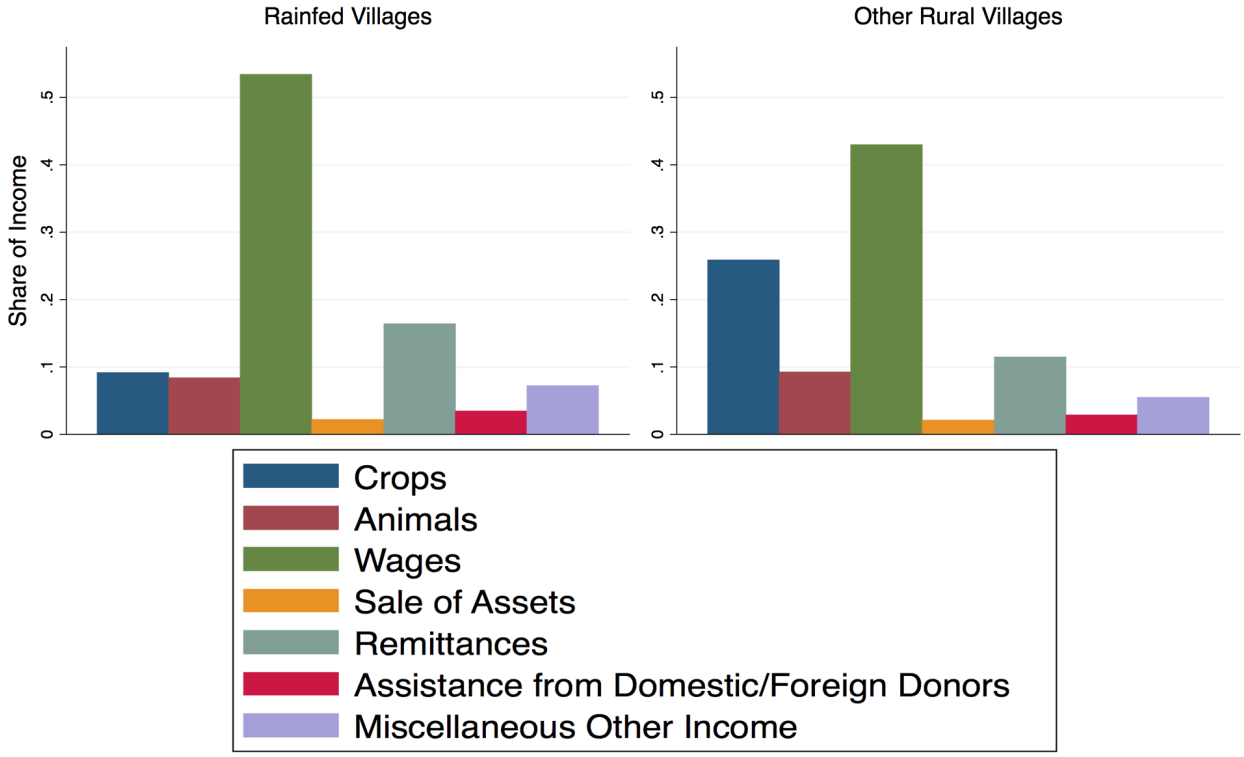
Sheep and goat herds are particularly sensitive to disease: a general lack of access to veterinarians and knowledge about measures to prevent disease has translated into average herd losses of nearly 35%. Yemeni farmers have seen a very significant fall in the size of their herds from the summer of 2008 to 2009. While large falls in herd size are not unprecedented in similar environments during times of stress, more than half of households reported animal losses with average herd size falling by almost 35% among those

[1]These data are from the 2005-2006 Household Budget Survey.

[2]The same improved transportation system that made travel to city centers feasible and affordable has exposed the animals in rural areas to new diseases for which traditional treatments are no longer effective.

reporting losses.[3] Understanding the factors driving these losses is clearly essential as sheep and goat raising accounts for the vast majority of income earned from animal sources, and thus for nearly 10% of rural incomes (see Figure 4.1).

Figure 4.1: Income Sources among Rural Yemeni Communities



Note: Authors' calculations using the 2005-2006 Household Budget Survey.

The leading cause of losses among sheep and goats was disease, which dwarfs the secondary causes of animal loss as demonstrated in Figure 4.2. While sickness is certainly not a new phenomenon, a variety of new animal diseases have entered Yemen in recent years and traditional approaches are not adequate to treat these diseases. Thus, that less than 50% of households use veterinarians for the treatment of sick animals as demonstrated in Figure 4.3 indicates the continuing vulnerability of these households over the coming years.

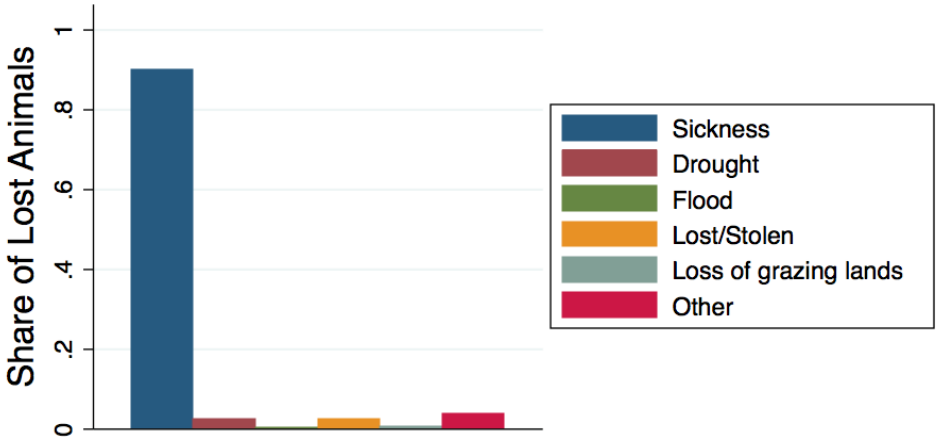
There also seems to be a general lack of awareness of the variety of preventive measures that can be used to keep animals healthy. Perhaps most importantly is that less than 50% of households said that they vaccinated their animals, which was attributed to either the high cost, distance or unavailability of a veterinarian in 85% of the households.[4] Also, given

[3] Yami and Merkel (2008) report average annual mortality of 23% for sheep and 25% in the central highlands of Ethiopia.

[4] 44% of households said that the veterinarian was unavailable. The cost and distance of the veterinarian

the frequency of disease among these animals, that 35% of households do not separate sick animals from the rest of the herd is a significant concern.[5]

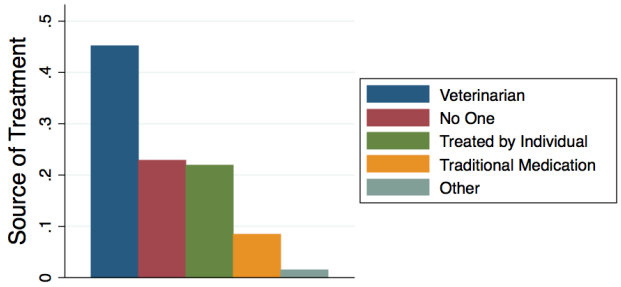
Figure 4.2: Leadings Causes of Animal Herd Losses



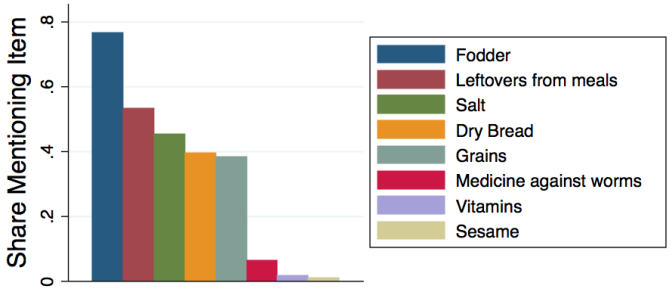
However, when prompted to mention the variety of things that could be used to help their animals grow and stay healthy in addition to taking the animals for grazing, 30% of households with animals were unable to mention anything and just over 10% were able to mention three distinct items. The results from this question are reported in Figure 4.3 and demonstrate that there was little knowledge of two of the most cost-effective types of supplements that can be given to these animals, i.e. de-worming medication and vitamins.

Figure 4.3: Animal Health and Raising

Primary Health Provider for the Animals



Knowledge about Animal Raising Practices



Yemeni farmers do not not take full advantage of the potential value of their animals. In Yemen, sheep and goats are raised primarily for meat and herders seem to have

was mentioned, respectively, by 18% and 15% of the respondents.

[5]The majority of households (70%) cited the lack of additional space to separately house the sick animals as the reason for not separating sick animals. A lack of knowledge was the second most prominent explanation (17%).

little knowledge of the secondary products that can be produced from these animals.[6] Less than 20% of herders were aware of the value of animal leather, which can be recovered from animals who die and do not make it to the market, which accounted for more than 85% of animal exports in neighboring Ethiopia (Rodriguez 2008).[7] And while the majority (71%) of herders are aware of the benefit of the animals as a source of fertilizer, only 7% were aware of the value of the animals' wool and less than 20% were aware that these animals could be used for cheese production. Thus, the fact that only 10% of rural incomes is derived from animal production is at least partially the result of a lack of knowledge of how to best exploit these assets.

4.2 Honey Production

Limited knowledge about local diseases, dependence on older beehive technologies and challenges in marketing have restricted the effectiveness and success of Yemeni honey producers. Honey production is a valuable source of income among households in rainfed communities. It is the third most important agricultural commodity, in aggregate and per producer terms, among these communities according to the 2005-2006 Household Budget Survey with the average beekeeper earning more than $430 from his honey production in a year.[8] The magnitude of this amount is highlighted by the fact that the average qat producer earned only $750.[9] The large returns from honey production as well as its minimal environmental impact have likely contributed to honey being targeted as one of five strategic products targeted for export by the Yemeni government.[10]

There are two key challenges that beekeepers, and potential beekeepers, face. The first is taking care of their bees. Nearly 55% of beekeepers reported a reduction in the number of their beehives during the previous 12 months, with the average beekeeper losing more than 60% of his bees.[11] The primary cause of beehive loss was due to disease, which reflects the general lack of knowledge about the types of disease that affect beehives. Though disease is recognized as the cause of the beehive loss, fewer than 10% of the beehive owners said that they could identify a farwa infection, one of the leading causes of bee disease in Yemen.

[6]The lack of importance of secondary products is highlighted by the fact that the Household Budget Survey does not even ask farmers about non-meat production.

[7]Interestingly, Rodriguez also notes that pastoralist farmers in Ethiopia, which are the most similar to the herders being studied here, seem to be unaware of the value of the leather and that this value is being extracted by larger urban merchants.

[8]The estimates of the average income from honey from the RALP survey is slightly lower at $300.

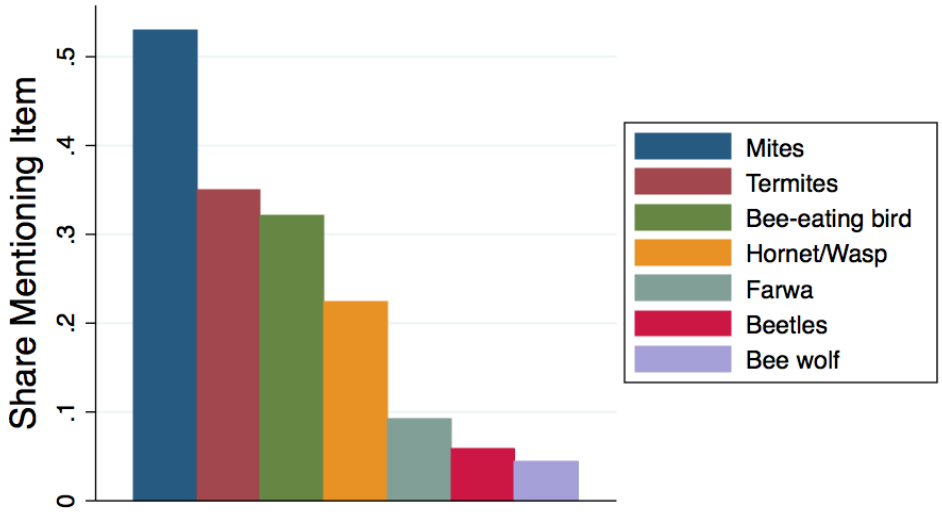
[9]The second most important commodity is fruit. Coffee, another celebrated Yemeni crop, is a distant sixth in per capita terms - and eighth in aggregate terms - earning only $90 over a year.

[10]See http://www.yementimes.com/DefaultDET.aspx?i=912&p=business&a=1.

[11]31% reported no change and the remaining 14% reported an increase in their number of beehives.

Fewer than one-third could mention most of the variety of diseases that are common among these beehives as demonstrated in Figure 4.4. Even among those that are able to recognize when their bees are sick, less than 50% said that they could treat the disease. Interestingly, nearly all of those with the ability to treat the disease said that they would turn to a bee specialist for assistance, demonstrating the general lack of capacity of these beekeepers in treating disease.

Figure 4.4: Knowledge about Leading Bee Diseases/Infestations



In addition to a lack of knowledge about disease, Yemeni beekeepers seem to be reliant on older and less productive technologies. An important example of this is beehive technology. Despite the availability of more modern and more productive beehive technologies, traditional beehives account for more than 95% of the hives owned by beekeepers sampled in the RALP survey. Similarly, more than 95% of beekeepers reported using traditional methods (i.e. by hand) for extracting their honey and more than 70% reported using the traditional method (i.e. dividing) for breeding their bees.

The second challenge facing beekeepers is marketing their product. The impact of this second challenge can be observed in the large gap between the international market price of Yemeni honey and that received by beekeepers in rainfed areas. Indeed, despite international market prices in excess of US$100 per kilogram for some select varieties of honey, only 18% of the beekeepers sampled in the RALP survey reported selling their honey for more than US$25 and the mean sale price was just over $17.[12]

[12]The comparable numbers from the HBS are significantly lower with only 3% of households reporting

While the majority of beekeepers (86%) reported being able to get recognition for the quality of their honey, this gap suggests that they could do even better if they were more effective in marketing their honey. While very few reported labeling their honey, with either the type of honey or the producer group, this does not seem to have a very significant effect on the sale price of the honey. However, beekeepers who reported selling their honey in governorate capitals or Sana'a sold their honey for twice the price of other beekeepers. Though this was a very small and potentially very select group, this result is suggestive of the potential benefit of creating direct linkages to large urban markets for these beekeepers.

Geographic flexibility, willingness to collaborate with other honey producers and meaningful knowledge about nutritional supplements and beehive maintenance have bolstered the success of honey producers. Though there are significant challenges facing beekeepers, there are also signs that beekeepers are adapting to these challenges. Nearly 50% of beekeepers said that they moved their beehives during times of drought, more than 30% said that they actively worked to preserve the local environment for their bees and 10% said that they planted special trees for their bees. Nearly all beekeepers (1) recognized the value of sugar as a nutritional supplement for the bees, (2) provided their bees with water, (3) cleaned their beehives, and (4) recognized the importance of keeping the extracted honey in a cool, dark place. Perhaps most interestingly, however, is that more than 40% of beekeepers are involved in intraregional bee collaborations in that they would either leave their bees with someone in a different area during a time of drought or another person would leave their beehives with them.

4.3 Terraces

Mountain terraces, which account for an estimated 20-25% of arable land, have played and continue to play a dominant role in crop production among rainfed mountain communities. Despite their historical importance, a growing number of terraces have been falling into disuse. And while there are many qualitative studies that discuss the abandonment of these terraces (cf. Aw-Hassan, Alsanabani, and Bamatraf (2000), Al-Hebshi (2005)), to our knowledge there have been few efforts by scholars to systematically measure the magnitude of this abandonment in Yemen as a whole.[13]

sale prices over $25 with a mean price of close to $10. These numbers refer to the average price for sales during the previous 12 months. The respondents from the RALP reported an average of over $25 per kilo for the most recent transaction.

[13]There are two important notes that need to be made. The first is that there are isolated reports of terrace abandonment with prominent examples including Varisco (1991), who reports terrace abandonment estimates of up to 70% for one area (Wadi Zabid), and Spurlock (2009), who studied 11 villages in three

A village-level terrace questionnaire that was included as a component of the RALP survey provides a new tool for studying terrace abandonment. And in addition to simply asking questions about the degree of terrace abandonment, it contains information on (1) the factors driving terrace abandonment and deterioration, (2) the types of customs that are used to maintain these terraces and (3) the factors affecting the functionality of these customs today. Though not nationally representative, these data provide a systematic understanding of the challenges facing these terraces across the country because governorates from throughout the country were included.

Terrace abandonment is less significant than suggested by previous studies; however, much of this abandonment is recent suggesting that things will get worse before they get better. Terrace abandonment is perhaps less widespread than has been suggested by previous studies as the median percentage of terraces abandoned was only 20% among the 45 communities studied.[14] However, what is particularly concerning is that much of this abandonment has occurred recently, with the median community responding that 50% of the abandonment had occurred with the last ten years.[15]

A lack of rainfall and the opportunity cost of labor are the dominant causes of terrace abandonment. A variety of development programs implemented over the past 20 years have aimed to help communities reclaim abandoned terraces, and there are several programs with a similar goal under implementation right now. Understanding the factors driving terrace abandonment is thus clearly essential for the design of effective terrace rehabilitation programs. Importantly, while a variety of factors have been implicated as playing a contributing role in terrace abandonment - e.g. over-utilization, lack of maintenance, disputes, credit market failures, falling profits, etc. - two factors dominate all others: a lack of rainfall and the opportunity cost of labor.[16] Indeed, as demonstrated in Figure 4.5, more than three-quarters of households reported water shortage as a key cause of terrace abandon-

governorates and reports abandonment estimates from 0-70%. The second is that a recently published report suggests that there has been no additional terrace abandonment, in aggregate terms, during the past ten years as the amount of rainfed land under cultivation has remained constant (Al-Khuledi, Abdullah, AbuoGanem, Rageh, Al-Shurai, Al-Dalas, Mokred, Silan, and Al-Nassiri 2009, see table entitled "Table Agricultural spaces (ha) and total arable crop for the years 1997-2006,in the Republic of Yemen"). This result is particularly interesting in that the Yemeni Groundwater and Soil Conservation Project found a 50% decrease by comparing data from 1970 with the same data from 2005 (the presentation of this last result is available at http://siteresources.worldbank.org/INTWAT/Resources/7.4_Improving_Agricultural_Rainwater_Management.pdf, downloaded on March 28, 2010.)

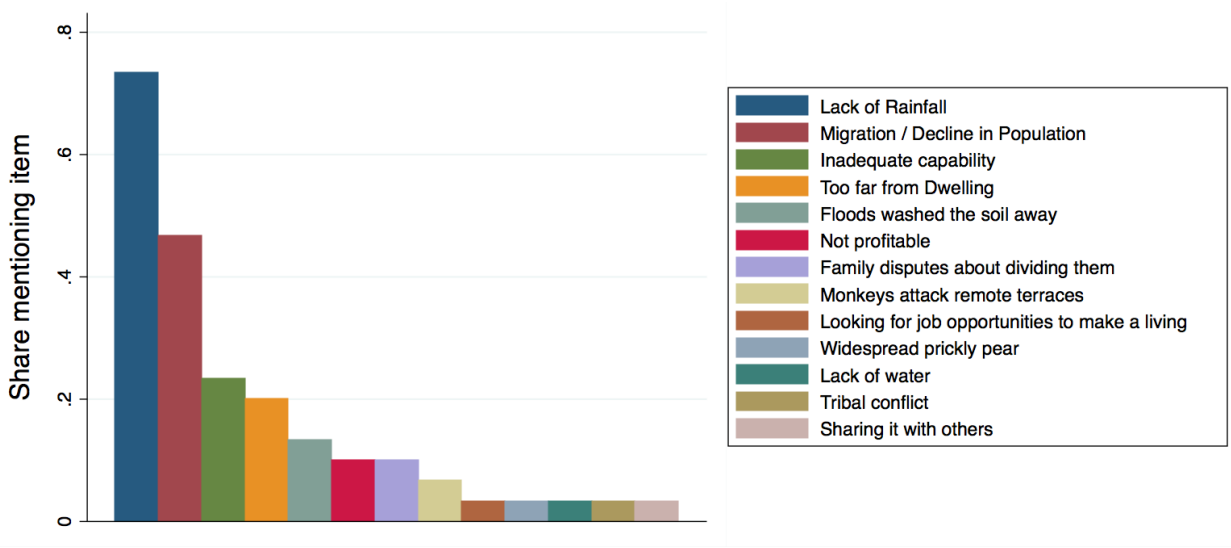
[14]The mean is slightly higher at 27%.

[15]This result is in contradiction with some previous reports (see footnote 13).

[16]As an example, (Al-Hebshi 2005) concludes that terrace abandonment is a result of over-utilization due to recent population growth.

ment while opportunity cost of labor - which is reflected in a variety of reported categories (e.g. migration, inadequate capability, not profitable, etc.) - is the clear second.

Figure 4.5: Causes of Terrace Abandonment



Note: Responses do not add to one as villages were allowed to mention more than one cause.

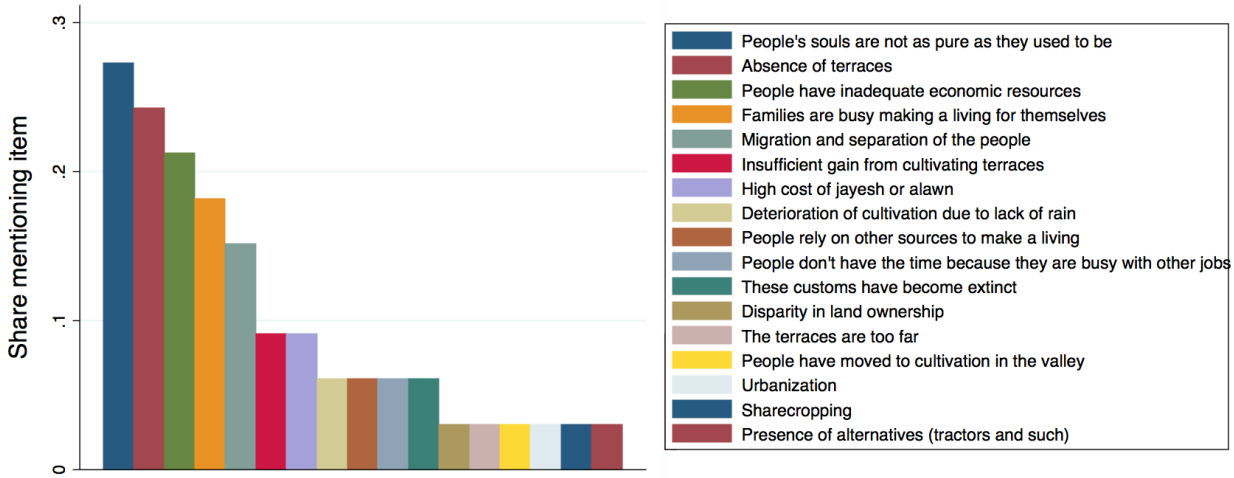
Terrace deterioration is as important an issue as abandonment. Deterioration of terraces that are currently in use is perhaps less discussed, but is as significant an issue as terrace abandonment. This is demonstrated by the fact that the median community reported significant degradation of 10% of terraces.[17] And while only two-thirds of the communities reported deterioration, nearly all of the communities were concerned with the possibility of deterioration in the future. Pointing to the lack of current terrace maintenance, inadequate local capability to reconstruct terraces, accelerated soil erosion in recent times and a shortage of water that has made terraces non-economical, these communities are concerned that the deterioration of terraces will mean the end of the terrace tradition that has been the source of their livelihood for generations.

Few communities have maintained their traditional institutions for maintaining terraces. Terraces have been in these communities for thousands of years, and there is a general perception that all of these communities have developed community customs to help each other maintain their terraces. It is interesting, therefore, that only 60% of the communities in the sample reported having a custom of some kind. And among the

[17]The mean was nearly twice that, at 18%.

60% of the communities that said that they did have customs for maintaing terraces, nearly 60% of the communities reported that these customs had ended a long time ago. Given the deterioration of these customs, it is therefore perhaps not surprising that more than 70% of individuals in these communities said that no one would help them if their terraces were damaged (see Figure 5.2). Figure 4.6, which reports the explanations that were offered for the disappearance of these customs, demonstrates that economic development, broadly understood, has had a deleterious impact on these important community customs.

Figure 4.6: Reasons that Terrace Maintenance Customs have not been Maintained



Note: (1) Responses do not add to one as villages were allowed to mention more than one cause.
(2) Some responses provided in this figure seem unusual - this is because the question was left as an open question.

Chapter 5

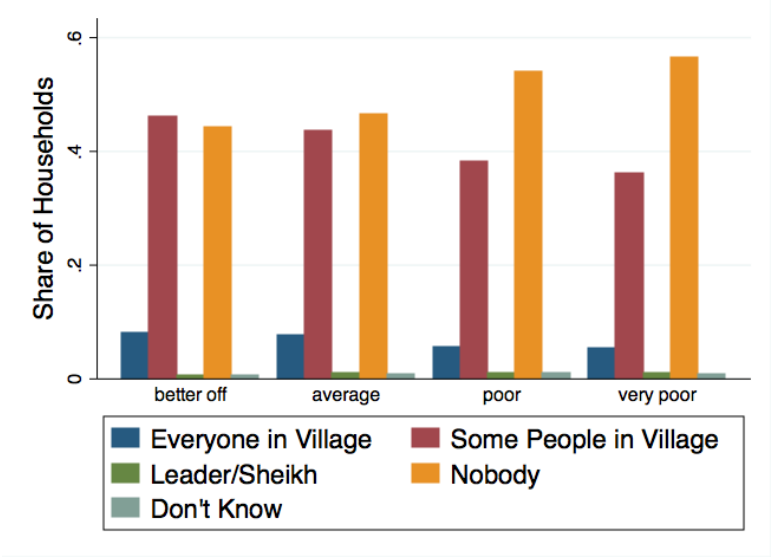
Community Cooperation

The standard perception is that the community plays an important role in the lives of rural Yemenis and that, in particular, community members help one another in times of difficulty or crisis. This notion is central to the efforts of the SFD and other development agents who rely on community cooperation in implementing projects and who hope that sustainable development can be achieved by enhancing the capacity of these communities. As this idea is also a central component of the RALP intervention, the mini-census investigated the degree and nature of community-level cooperation.

Community support for individuals during time of personal crisis is quite limited; this phenomenon is particularly pronounced among the poorest community members. The first type of community cooperation studied is support for individuals within the community who are facing difficulties. In particular, household respondents were asked who would help them if they experienced a personal crisis such as severe sickness within the family or unemployment.

While less than 50% of individuals reported that someone from the community would help them in the time of crisis, Figure 5.1 demonstrates that the the poorest individuals in the community are also the most likely to feel that they will not be supported by their community in a time of need. Indeed, while only 44% of the wealthiest individuals felt that no one would help them if they faced a personal problem, nearly 60% of the poorest households in the village felt that no one would help them. Thus, there is little indication that the community functions effectively as a social safety net for the individuals in these rural communities.

Figure 5.1: Sources of Support during Personal Crisis (by wealth ranking)



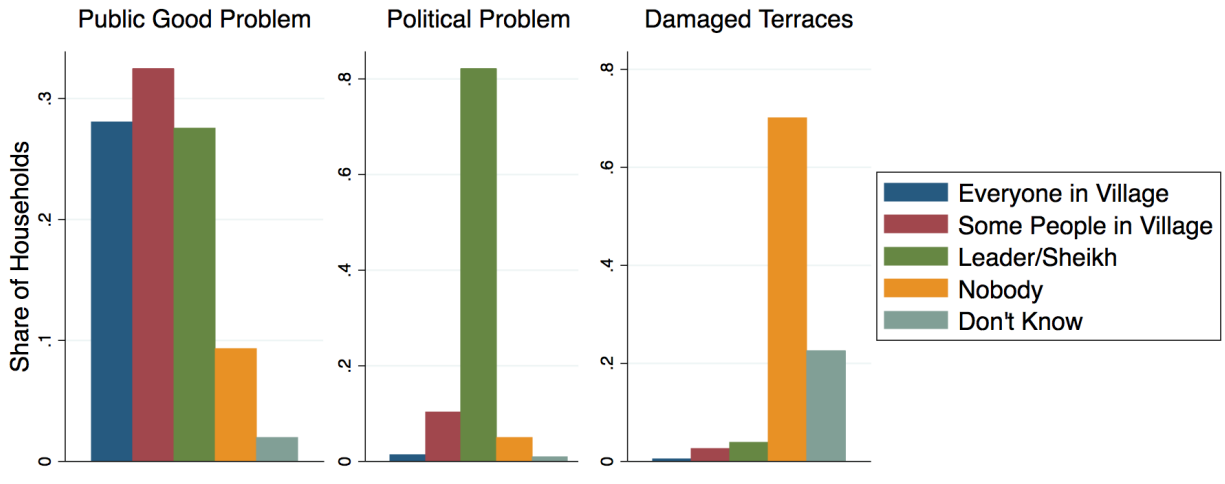
This result seems somewhat incongruous with (1) our discussion in Chapter 3 where we found evidence that people were able to borrow from their neighbors during a time of economic crisis and (2) our discussion in Section 4.2 that discussed collaborations between honey producers. As these data do not allow us to explore this anomaly, this suggests that understanding within-community social and economic networks may be important for designing development programs.

Communities work together in solving public good problems, leave political decision making to local elites, and do little to help individuals with problems. In addition to asking about support during a time of personal crisis, the survey also asks how the community would respond when faced with one of three different community-level problems. These three community-level problems are as follows: (1) how a community would respond if confronted with a public good problem (e.g. road damaged by floods, school closed), (2) how the community would resolve a political problem within the village such as a family or tribal conflict, and (3) who would help an individual repair his terraces, which are a quasi-public good as damage to any individual's terrace will affect all downstream terraces.

The responses to these community-level questions are reported in Figure 5.2. Community members seem to only be involved in helping solve public good problems. Indeed, while nearly 60% of respondents reported that community members played the lead role in resolving public good problems, political problems were left almost entirely to the traditional local leader. Interestingly, though damaged terraces have a clear community-wide effect, neither community members nor the traditional elite seem to play a role in helping repair damaged

terraces.

Figure 5.2: Community Resolution of Public-Type Problems



Chapter 6

Gender Equity

One of the novel components of the RALP survey was a module designed to assess the economic and personal freedoms of women. One of the stated goals of the SFD is gender equality and this module provides a tool for studying the impact of participating in an SFD program on gender equality. It also provides the first representative description of gender equity in rural Yemen.

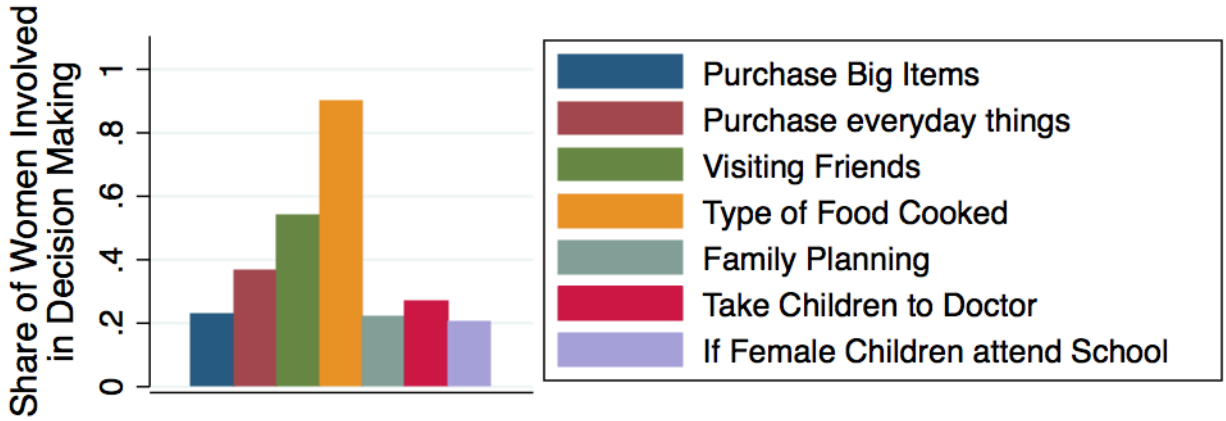
The survey allows analysis of several aspects of women's lives in rural Yemen. First, in order to improve our understanding of the influence that women have in everyday household decisions as well as decisions about fertility and child schooling, a series of questions about within-household decision making were asked. Second, we examine another aspect of these women's independence by examining their ability to move in and around their villages. Third, several questions about a woman's control over her own income and her inheritance provide insight into women's economic freedom.

Women have little control over both basic and important familial decisions relating to their own and their children's lives. In Figure 6.1 we examine women's role in household decision-making.[1] Overall, women seem to have relatively little control over key decisions in the lives of their children or even their own. Barely one-half reported that they could decide if they wanted to visit their own friends and less than 40% could not leave the home to purchase items from the local store. And only 20% of the women were involved in making three of the most important decisions that a Yemeni woman may face in her life: (1) family planning (i.e. when and how frequently she will get pregnant), (2) whether the children could go to the doctor when they were sick and (3) whether her female children would be allowed to attend school and how long they would be allowed to attend

[1]For each of these decisions women were asked whether (1) they were the decision maker, (2) the decision was made jointly with the husband or (3) the decision was made by the husband alone. In constructing Figure 6.1, the first option was coded as a value of one, since the woman made the decision herself, while the second and third options were coded as 0.5 and 0, respectively.

school.[2]

Figure 6.1: Women's Role in Decision Making

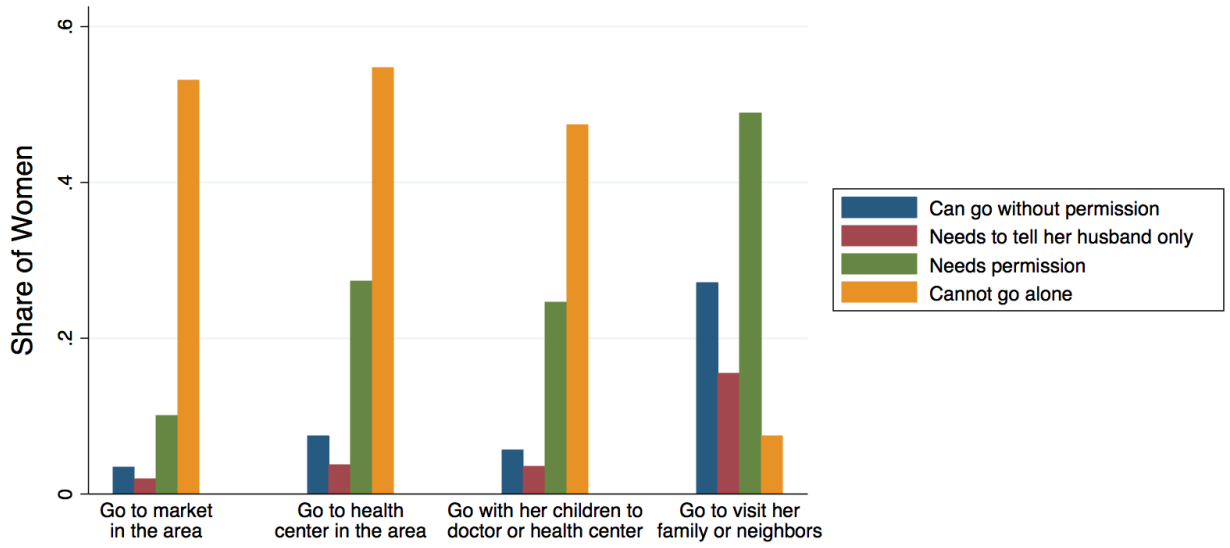


Women have highly restricted geographical mobility, limiting their ability to access healthcare and other services outside their village. Women's mobility is an important way of assessing their independence. While this may seem like a trivial issue to those unfamiliar to rural Yemen, only 30% of women reported that they could take a child in critical condition to a doctor by themselves. A similar result is found for other types of mobility as demonstrated in Figure 6.2. While the inability to travel to the market is perhaps not essential, the inability of these women to go visit a health center of their own accord should be of central concern to those building and staffing these health centers. What is perhaps of particular interest is that less than 30% of the women said that they could visit a neighbor or close family member without telling her husband in advance - a clear demonstration of the limited freedom of these women.

Though women have little control over their marital assets, the majority (70%) of women reported earning an income of some kind. The survey allows analysis of women's control over both assets and income, two key aspects of economic freedom. The first, the ability of women to control their own assets, was assessed directly by asking women whether they were able to sell or pawn these assets. Despite the fact that Islamic law dictates that women should be able to do with these assets as they please, less than 30% of the women in the sample reported that they could pawn or sell their own inheritance without getting permission from their husbands.

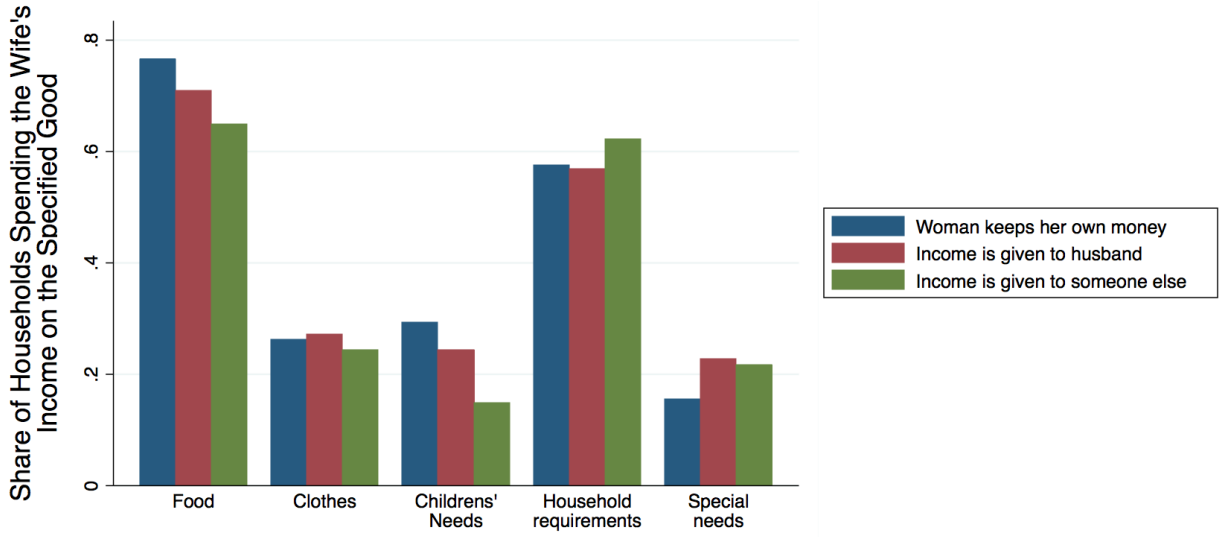
[2]The second is particularly important in the cases when the husband lives outside the village.

Figure 6.2: Women's Mobility



Though rural women tend be involved in primarily family agriculture, nearly 70% of the women reported having earned an income of some kind. Interestingly, while less than 10% of women with incomes were able to save any of the money they earned, 60% of these women reported that they were able to control the money that they earned.[3]

Figure 6.3: Expenditures From and Control Over Women's Income



[3]Unfortunately, the quantitative nature of our survey does not allow us to identify what 'control' means in this setting. And other related variables do not help explain what this control might mean. Indeed, few woman reported the ability to purchase items directly (discussed above) and women's income seems to be spent in similar ways whether it is controlled by the man or the woman (see below). Thus, this issue of control could be an important topic for future research.

Contrary to a result found in other developing countries, a woman's income seems to be spent similarly whether spending decisions are made by the husband or the wife. In many developing contexts, women have been found to be more likely to invest in child nutrition, education and housing (cf. Ashraf 2009). In order to examine this situation in Yemen, in Figure 6.3 we examine how the control over the women's income affects how that money is used. Though the result is only descriptive, we find no evidence that women's income is more likely to be spent on food and children's needs.

Chapter 7

Expenditures on Qat and Health Services

Qat consumption is commonly perceived as a leading problem facing Yemen. And while the negative impact of qat consumption on health and on Yemen's limited water supply are irrefutable, there are few studies that address the commonly made claim that qat is a contributing cause to rural poverty.

In this section we study qat expenditures in two ways. First, we compare expenditures on qat to expenditures on health services, the other leading type of non-food expenditure. Health services, unlike qat, clearly have a direct positive impact. However, expenditures on health can be quite deleterious as they are large and, typically, unexpected. For this reason, many Yemenis believe that health expenditures - which in principle should not exist as health care should be freely available to rural dwellers - are more likely to force a household into poverty than qat consumption. Second, we examine the relationship between poverty and qat expenditures.

Previous surveys suggest that qat and health services account for one-fifth of total expenditures and that expenditures on qat are roughly double those on health services. Qat and health services are the two most important non-food consumption items in rural Yemen. Together they account for over 20% of regular monthly expenditures in urban areas and nearly 20% in rural areas. While the amount of resources spent on qat has received significant attention, expenditures on health services are also quite large. Data from the 2005-2006 Household Budget Survey indicate that qat consumption accounts for over 13% of all regular monthly expenditures in urban areas and over 8% of expenditures in rural areas, while health supplies and services accounted for over 7% of expenditures in both urban and rural areas.

Qat expenditures in rainfed communities is understated in previous studies; also, the inequality of qat consumption is massively understated in these previous

studies. In order to explore the importance of expenditures on qat in the rainfed areas targeted by the RALP program, the RALP survey asked households to report aggregate qat consumption during the past month. Average per month qat consumption reported in the RALP survey, at just over 5,000 YR, is similar to that found in the HBS as shown in Table 7.1. However, the variance of the reported qat expenditures is much higher, suggesting that previous surveys understate the degree of consumption inequality in these communities.

Table 7.1: Monthly Expenditures on Qat, Tobacco Products and Medical Services (in YR)

		Mean	SD	N =
Qat	Urban (HBS)	6976	11110	8273
	Rural (HBS)	3069	5285	4863
	Rainfed (HBS)	3753	6673	2627
	Rainfed (RALP)	5149	21705	1855
Health Services	Urban (HBS)	3382	12308	8273
	Rural (HBS)	2703	7553	4863
	Rainfed (HBS)	3173	8560	2627
	Rainfed (RALP)	10382	29584	1855

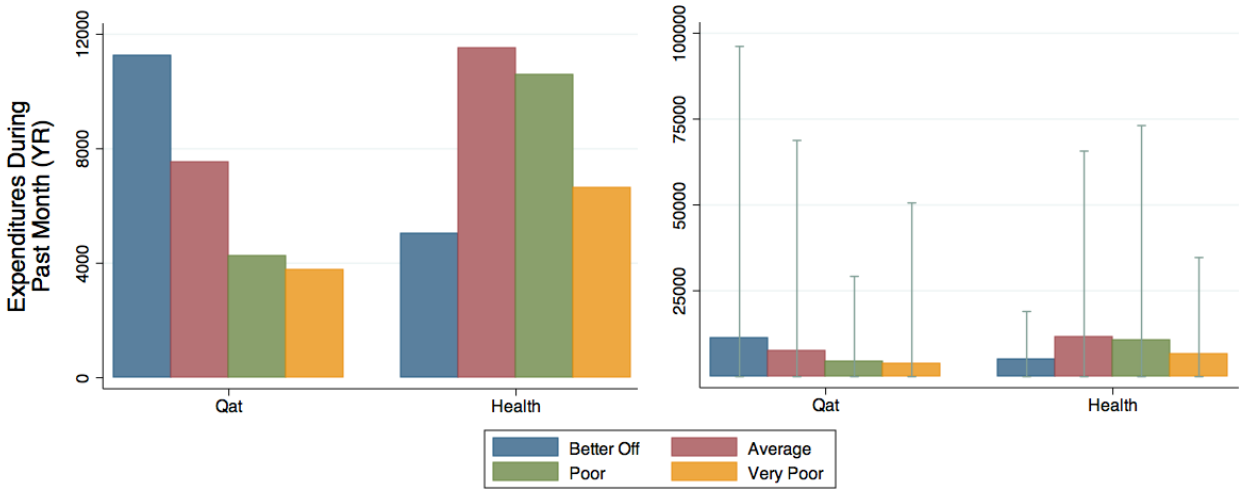
Total household expenditures on health services in rainfed areas is understated in previous surveys; expenditures on health services actually surpass qat expenditures. There is a large gap between expenditures on health reported in the RALP survey as compared to the HBS. Indeed, the expenditures on health services reported in RALP are more than 3-times larger than those reported in the HBS (see Table 7.1) and the reported health expenditures in the RALP actually exceed the reported expenditures for qat for the three groups that are the largest in terms of population.[1]

[1]The "better off" group accounts for less than 3% of the total sample.

The large gap between the RALP and HBS surveys for total health expenditures may seem anomalous. The most likely explanation for the difference between the result in the two different surveys is a difference in the data collection. Indeed, while the HBS collected data on several different specific components of health expenditures, the question from the RALP survey is more general and asks respondents to report total expenditures on health services of any kind. In particular, the question in the RALP survey simply asked for total expenditures for medicines, tests and operations during the previous month.[2]

There is little evidence that rural dwellers are reducing food or other expenditures in order to consume qat; however, qat consumption is quite high among some households. The RALP survey allows two ways to explore whether households reduce food and other expenditures in order to consume qat. The first approach is quantitative. In particular, we can compare the relationship between household expenditures on qat and the measures of food insecurity used in Section 3. We find no meaningful relationship between qat expenditures and either measure of food insecurity.[3]

Figure 7.1: Qat, Tobacco and Medical Expenditures by PRA Wealth Ranking (past month)



The second, descriptive, approach is provided in Figure 7.1 which reports the relationship between average expenditures on both qat and health separately for each of the four within-village PRA wealth ranking categories. The left-panel of this figure is consistent

[2]There was some concern from field researchers that the one month recall period for health expenditures might give unreliable results as individuals might report expenditures during 2-3 months or even longer. There is no empirical evidence that this did occur, and as the recall period for qat and tobacco was identical and immediately preceding that for health care, it seems unlikely that this was driving our result.

[3]Both the pairwise regression of qat expenditures on caloric consumption and the probit of qat expenditures on the calorie based measure of food insecurity return a statistical zero. The regression of qat on whether the family had experienced a food crisis during the past 12 months returns a similar result.

with the quantitative results in that qat expenditures, while meaningful, are less than total expenditures on health.

Chapter 8

Inequality

With a GINI estimate of 0.44 using the most recent per capita expenditure data available, Yemen is in the upper-quartile of the most unequal countries in the world.[1] However, though this GINI indicates that inequality is more severe in Yemen than has been suggested in a variety of prominent reports (cf. UNDP 2006, Bibi and Nabli 2010), it still understates the degree of inequity in rural areas.[2]

Though the RALP survey does not allow estimation of expenditure inequality, it does allow two different estimates of agricultural asset inequality.[3] First, detailed data on the amount of familial landholdings in the household survey allows estimation of land asset inequality.[4] Second, data on the number of animal assets in both the household surveys and the village census allow estimation of animal asset inequality. Though there is some concern that this second measure may understate inequality in areas with more diversified economies, animal asset inequality is still a useful tool as (1) the value of animals is constant throughout Yemen[5], (2) animals are, along with land, the most important type of rural asset[6] and (3) animals are used as a store of wealth since land accumulation is very difficult.[7]

[1]The reported GINI is the authors' estimate based on per capita expenditure in the 2005-2006 Household Budget Survey. The ranking is based on the data reported in UNDP (2006).

[2]GINI estimates using the 2005-2006 suggest that rural areas are *more* equal than urban areas, with GINI estimates of 0.45 and 0.36 for urban and rural areas respectively.

[3]The lack of a consistent way to value land makes it difficult to construct the required weights to combine these assets though other authors have used factor analysis approaches to create these weights (cf. Sahn and Stifel 2003).

[4]Note that it was not possible to use land assets in calculating aggregate rural inequality as both land values and the units used for measuring land are not constant across areas.

[5]This GINI index is based on the following animal valuations: 1 cow = \$1,000, 1 sheep or goat = \$100, 1 beehive = \$60.

[6]The size of an animal herd also functions as a proxy for land holdings as it is quite costly to own animals without owning land. Indeed, animal owners who use others' land for grazing are commonly required to pay a substantial \$2 or more fee per day.

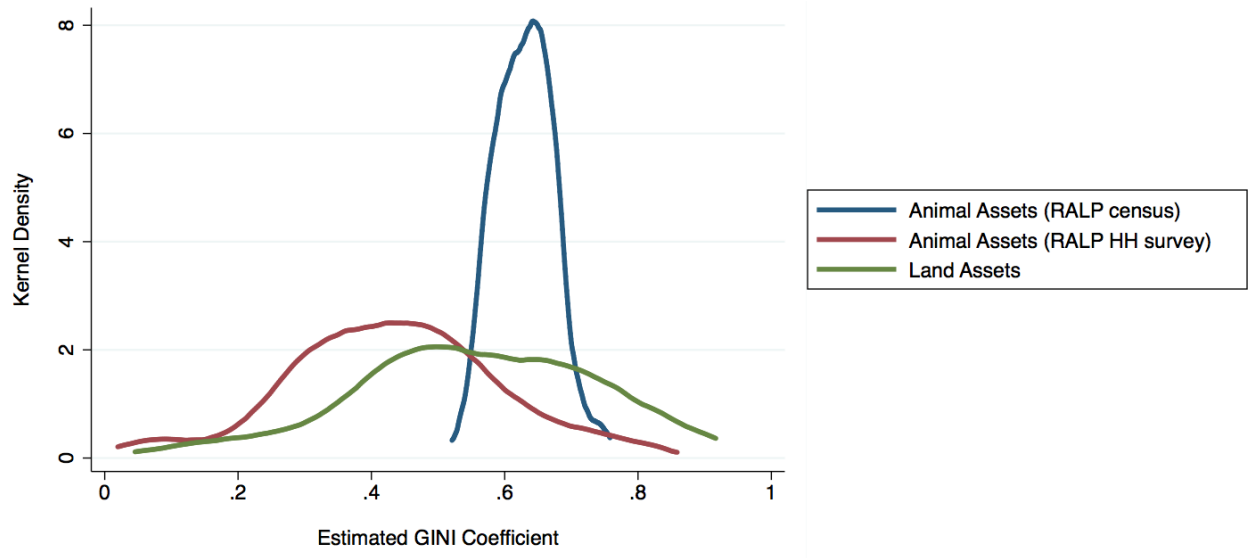
[7]Though other measures of asset inequality are possible (cf. Sahn and Stifel (2003)), the value of other classes of assets can be highly variable across regions.

Agricultural asset inequality calculated using RALP data implies a high degree of within-village inequality. Though the social inequality of rural villages in Yemen has been documented (e.g. Gerholm 1977), there has been little analysis of economic inequality within villages. And indeed there seems to be a prevailing misperception that most of rural inequality in Yemen is between communities as opposed to within them.

All three approaches return high estimates of within-village inequality, with average GINI estimates of 0.63 using animal assets reported in the RALP census, 0.46 using animal assets from the household survey and 0.59 using land assets from the household survey. Importantly, the three GINI measures are strongly correlated ($\rho = 0.40 - 0.48$) suggesting the broad comparability of these different approaches.

Figure 8.1, which reports the kernel density estimates of the distribution of the GINI estimates for the three different approaches, demonstrates two important results. The first is that land asset inequality is significantly higher than animal asset inequality. This can be seen by comparing the distribution of animal and land asset GINI estimates calculated using the household survey, though the mean GINI for animal assets is also significantly lower. This likely reflects the fact that animals are a fungible asset while land is generally owned by a few families and that inherited land typically passes to only a few descendants. This result is interesting given the fact that one would anticipate greater redistribution given the prominence of Islamic law in land issues.

Figure 8.1: Distribution of Village-Level Estimates of Inequality



Aggregate inequality in rainfed areas is much higher than reported in previous surveys. Inequality estimates that rely on expenditure data may understate

the true level of inequality in rural areas of Yemen. The RALP census is unique in that it has data on the animal assets of every household in every visited village. Thus, it allows estimation of the true aggregate inequality in these communities. Using this approach we find an estimated GINI index of 0.64, which is quite high but consistent with the notion of a highly unequal rural society. And as this number is massively higher than that reported elsewhere, it suggests that previous approaches may may understate the true prevalence of inequality.

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Appendix A

RALP Details

A.1 Timeline

Step 1: Approximately one year before funds are first allocated (March 2008)

→ SFD staff meet with district leaders to identify 15 potential communities for each district

Step 2: ∼11 months before funds are first allocated (April 2008)

→ Communities are visited by SFD consultants to identify whether they qualify for the program
→ Expected yield of about 10 communities per district

Step 3: ∼10 months before funds are first allocated (May 2008)

→ Listing process is done for each community

Step 4: 6-8 months before funds are first allocated (September 2008)

→ Groups are formed within the communities

Step 5: 1-2 months before funds are first allocated (March-April 2009)

→ Projects and sub-projects are selected

Step 6: First allocation of funds (May 2009)

Step 7: Every two weeks following the allocation of funds

→ Consultant or Community Organization Officer (COO) meets with group to provide training, monitoring, etc.

A.2 Community Capacity Building

Representatives of the SFD will meet with the participating communities (as well as a few other communities) on a variety of occasions. Here we describe these interactions:

1. This is *Step 2* as described above. Consultants spend about 2-3 days in each community evaluating whether these communities qualify for the program. This is the first time that the Rainfed Agriculture SFD staff interact with communities.

2. This is *Step 3* as described above. SFD staff meet with the community to discuss issues of poverty and to identify the most 'at risk' individuals of their community.

3. This is *Step 4* as described above. This is designed to be a community mobilization process where SFD representatives meet with communities and form ∼10 groups per community. Communities and their groups then go through the first stage of project selection.

   This initial stage is designed to be a capacity-building and learning stage for the community. Many of the groups that were initially formed are expected to not actually participate in the project (as people learn about what it means to work together in this type of cooperative business enterprise) and new groups are expected to form as people become more comfortable with the SFD. This process likely has a non-trivial effect on the possible outcome of the program. In particular, it allows the RALP program to select groups and individuals that are likely to benefit most from the program.

   Also, the initial proposals for projects during this phase are not the projects that the groups will necessarily undertake. Indeed, this initial stage is primarily an opportunity for the groups to work together in designing a business plan, to work together as a community and to learn more about the program.

4. This is *Step 5* as described above. Consultants spend 3 days in the community working with individual groups to design final project ideas. Part of this process is also a second community mobilization process.

A.3 Group Capacity Building

Before the money is actually distributed, each group will have between 5-8 meetings with representatives of the SFD. Each meeting lasts between approximately 45 and 90 minutes.[1]

[1]The duration of these meetings is limited by the availability of the group members.

These meetings will happen in either the home of a group member or a local public facility, such as a school.

1. This is *Step 4* as described above. Individuals in the community are asked to form groups over a two day process (the consultant/COO leaves and returns two days later). Groups design a mission statement, a team name, choose a treasurer and leader as well as the class of project that they are interested in.

2. This is *Step 5* as described above. Consultants spend three days in the community (spending two nights in the community) to meet with groups and to help them design the specifics of their programs. Groups are encouraged to adopt a diversity of complementary projects (e.g. one group focuses on animal raising and a second on animal fattening as opposed to both groups attempting both activities).

3. This is *Step 6* as described above. Consultants meet with the treasurer to distribute the funds and to go to the market to buy necessary equipment, etc.

4. This is *Step 7* as described above. Consultants have a plan for the type of training over the future weeks:

    - Individual groups meet with related specialists (consultants) on a bi-weekly basis.
    - Groups have access to resources by phone (i.e. can call Wadi'a, COO, consultant)

Appendix B

Selection of Treatment Villages

In this subsection, we describe the sampling procedure that was used to select a total of 95 control villages. Though a total of 104 villages are included in the sampling, they are organized into 95 'site visits'. Thus it is appealing to similarly include 95 visits to control villages.

The selection of these 95 control villages was done in the following steps:

1. Identify selected treatment villages with both population and agricultural census data - we are able to match all except for three of the selected villages ($N_T = 101$)

2. Identify all possible control villages in either (1) the governorates of the RALP intervention in non-intervention (T1 and T2) districts or (2) in neighboring governorates ($N_C \sim 12,000$)

3. Restrict pool of controls to all villages within 15 km of one of the 101 sampled treatment villages ($N_C \sim 2,500$)

4. Drop all villages that are within 2 km of a treatment village and are possibly within a treatment community ($N_C \sim 2,450$)

5. Use the 'nnmatch' technique to select 4 possible matches (with replacement) for each of the selected treatment villages ($N_C = 180$)

6. Use the 'psmatch2' technique to select 101 control villages ($N_C = 101$)

7. Drop 6 of the 101 villages (to obtain 95 villages) by identifying pairs of small neighboring villages and randomly dropping one of them[1]

[1] In practice, when the teams go to the field to sample these control villages there is a high probability that the other village will be sampled as part of the effort to obtain the minimum of 80 households.

Appendix C

Sampling *within* Villages

During a site visit, there are two major stages in the sampling of individuals. In this section, we will outline each of the following two stages:

1. Identification of sampling 'population' (designed to contain 80-120 households)
2. Identification of households to be included in the household survey

C.1 Selection of Population

When the sampling teams arrive in the selected village, the first thing that they will do is identify the sampling 'population'. If the village has between 80 and 120 households, then the entire village will represent the sampling population. However in the case that the initial village, or the initial villages in the case of the 8 clusters of villages for the treatment sampled, is not within the 80-120 household range, the following procedure will be used:

- Villages with less than 80 households
    1. Identify closest village to initial village and include
    2. Repeat (1) until a minimum of 80 households is achieved
- Villages with more than 120 households
    1. Segment village into clusters identified by the village elders
    2. Select contiguous clusters that include 80-120 households (for treatment villages, it is important to work with the village elders to make sure the selected clusters have at least 11-12 members of sheep, goat and bee groups)

Note: All households included in this sampling population will be surveyed as part of the mini-census.

C.2 Households

During each site visit, a total of 12 households will be sampled for inclusion in the more extensive household survey. A two-stage process will be used to identify these households:

1. *Wealth Ranking Exercise:* All households in the population to be sampled during the site visit will be given a wealth ranking by local informants as part of the PRA process. Every household in the sample will be given a ranking of either (1) very poor, (2) poor, (3) average or (4) well off.

2. *Selection of Households:* Individuals will be sorted into piles by the wealth ranking given to them in the first stage (*Note: in treatment villages, only households with at least one member in a sheep, goat or bee group will be included in this process - all other households will not be included in the household sampling.*

   Six individuals who have been identified as very poor, three that have been identified as poor and three that have been identified as average will then be randomly selected from each of the piles for sampling. In the case where there is less than the specified number of households in one of the piles, the researchers are to draw an additional household from the next poorest category if available. If there is an insufficient number of households in this category, then they should draw from the next richest category.

Appendix D

RALP Selection Criteria

D.1 Community Selection Criteria

Community Selection Criteria: Communities qualify for inclusion in the project if they satisfy the following criteria:

- Agriculture and animal husbandry are the predominant economic activities
- Communities are socially homogenous and women are actively involved in community life
- Rainfall accounts for at least 70% of water used for agriculture and animal husbandry
- Community is between 200-600 households
- 35% of the population lives below the poverty line
- Small ownership of farmland prevails (2 hectares and less)

D.1.1 Group Member Selection Criteria

(1) Capital-Building: Individuals qualify for these types of projects if they satisfy AT LEAST THREE of the following criteria:

- Owns no cultivable land or owns <0.5 hectares of cultivable land but derives no income from this land
- Owns no cattle or camels
- Owns between 0 and 4 goats or sheep (combined total)
- Receives financial aid from the Social Welfare Fund

(2) Innovative Projects: All individuals within a community can participate in these innovative projects *except* that there cannot be more than two members in any group that satisfy more than one of the following criteria:

- Household head lives outside the community
- Household has one or more members with a government job
- Household owns a car, a truck or a tractor or other large asset capable of generating income
- Household owns 2 hectares or more of cultivable land

Table D.1: Variables Used in Control Selection

	Stage 2 (Abadie et al. [2001])	Stage 3 (Propensity Score)
2001 Agricultural Census Variables	# beehives per HH	# beehives per HH
	# sheep & goats per HH	# sheep & goats per HH
	# chickens per HH	# chickens per HH
	% of HHs with agricultural production	% of HHs with agricultural production
	% of agricultural households with *only* animals	% of agricultural households with *only* animals
	% of agricultural households with *only* plants	% of agricultural households with *only* plants
	% of agricultural households using machines	% of agricultural households using machines
	% of agricultultural land that is rainfed	% of agricultultural land that is rainfed
	Cultivable land per HH	Cultivable land per HH
	Share of total land used for qat	Share of total land used for qat
	Number of coffee trees per HH	Number of coffee trees per HH
	Percent of landholders with < 5,000 m^2 of land	Percent of landholders with < 5,000 m^2 of land
	Percent of landholders with 5,000-20,000 m^2 of land	Percent of landholders with 5,000-20,000 m^2 of land
2004 Population Census Variables	% of adult males that are illiterate	% of adult males that are illiterate
	% of adult females that are illiterate	% of adult females that are illiterate
	% of population without electricity	% of population without electricity
	Poverty index	Poverty index
Geographic Data	Altitude	
	< 5 kms from a RALP village	
	< 10 kms from a RALP village	
	< 20 kms from a RALP village	