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What do we mean by 'women's crops'?

Commercialisation, gender, and the power to name

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Abstract

We explore the relationship between commercialisation and gender for groundnuts in Eastern Province, Zambia, using a mixed methods approach. Women saw themselves as having greater control over groundnuts than other crops, and both sexes saw groundnuts as controlled by women. Focus Group Discussions reported higher levels of control than found in a household survey. Propensity Score Matching showed that the machine shelling and higher sales did not reduce women's perceived level of control over groundnuts. Women welcomed greater male participation in machine shelling because it reduced the drudgery of shelling by hand. This suggests that commercialisation did not disempower women.

1. Introduction

The commercialisation of food crops is widely believed to disempower women. Traditional gender roles view women as the providers of food and men as the providers of wage goods. When food crops become commercialised, these gender roles conflict. As gender studies illustrate, men then assert their role as providers as wage goods to gain control of the income from food crops, with women to suppliers of labour. The paradigmatic case is irrigated rice in The Gambia, where commercialisation subverted women's rights to land, increased male control over their labour power, and turned women farmers into hired workers (Carney and Watts, 1990, 1991). The adverse impact of commercialisation on women in The Gambia became a veritable cottage industry, and remains the central point of reference on this topic.[i] In eastern Africa the evidence tells a similar story, whether for French beans in Kenya (Dolan, 2001) or hybrid maize in Zambia (Kumar, 1994). In short, everything we know suggests that commercialisation is bad news for women.

Two aspects of gender and commercialisation have received particular attention. One is the concept of 'women's crops'. Historically, Africa was 'the region of female farming *par excellence'* (Boserup, 1989).[ii] This is no longer true. A survey of cassava-growing areas in six SSA countries in 1989-91 revealed that 51% of total labour requirements for root crops, rice and maize, were provided primarily by men (Enete et. al., 2002). Likewise, in Ghana no crops were grown exclusively by women, whether by households headed by women, or on fields held by women, or on fields from which women kept the income (Doss, 2002). Hence, 'women's crops' are no longer based on a gender division of labour. By contrast, the concept of 'women's crops' has kept its value in terms of the 'gender division of control' (Geisler, 1993). We were alerted to this at a recent meeting with women farmers in Zambia (Orr et. al., 2014a). Women working alone contribute only 6% of the labour for groundnuts, while men and women working together provide 25 % (Mofya-Mukuka and Shipekesa, 2013). However, when we suggested this meant that groundnuts was not a 'women's crop', the result was uproar. We were left in no doubt that women regarded groundnuts as firmly under their control.

The second aspect is the centrality of language. As Chomsky (1979) argues, 'questions of language are basically questions of power', and this clearly influenced thinking on commercialisation and gender in The Gambia.[iii] Commercialisation leads to disputes over the meaning of 'women's crops'. Ultimate control belongs to those who have 'the power to name' (Carney and Watts, 1990: 230). Whoever has the power to specify a crop's gender attributes also has the power to control the product. Thus, the power to name is a litmus test for the impact of commercialisation on gender equity.

This paper explores the process of commercialisation for groundnuts in the Eastern Province, Zambia, where groundnuts have historically been regarded as a 'women's crop'. Six in ten farm households in Eastern Province grow groundnuts, and one-fifth of the harvested crop is sold (Mofya-Mukuka and Shipekesa, 2013). Recently, increased demand has resulted in new investment in seed production, processing, and grain trading. The Eastern Province Farmers' Cooperative (EPFC) is a farmers' organisation that buys and sells groundnut seed. Women traditionally shell groundnuts by hand but in 2012 EPFC distributed machine shellers to selected seed producer groups. Scenting cash, men began to operate these shellers and to claim a greater role in decision-making for groundnuts, including a greater share of the income from sales.

We tested five hypotheses regarding 'women's crops':

1. Women have greater control over groundnuts than other field crops;
2. Men and women disagree over the level of women's control;
3. The higher women's share of the workload, the greater women's control of the crop;
4. Women maintain control over groundnuts by ceding men control over cotton; and
5. Machine shelling and commercialisation reduce women's control over groundnuts.

To measure control, we developed a simple tool which we applied using a mixed methods approach that combined qualitative and quantitative instruments. A Q-squared approach is useful for the study of social processes that are difficult to capture using only quantitative methods (Davis and Baulch, 2011). However, testing hypotheses about social processes requires quantitative data (Gladwin et al., 2002).

The paper is divided into six sections. Section two outlines a conceptual framework and section three describes our data and methods. Section four presents results while section five discusses some implications. Finally, we summarise our conclusions.

2. Conceptual Framework

Figure 1 shows a conceptual framework for the analysis of 'women's crops'. We hypothesise that commercialisation disempowers women because they can no longer enforce their claims to access and control.

INSERT FIGURE 1 HERE

We distinguish three different types of control. As Doss (2001) argues, 'women's crops' are defined not only by who controls the output, but also by 'who chooses the crops to grow and who makes the management decisions'. We define 'strategic' control as the power to choose 'how' resources are allocated between competing crops, and 'operational' control as the power to choose 'what' and 'when' crop management operations are implemented. Finally, we define 'financial' control as the power to choose 'who' receives the realised value or income from the crop.

'Decision-making' is the term that social scientists generally use to operationalise 'control'. The standard practice is to identify key decision points, determine what role women play in making these decisions, and combine the answers into a single index (Alkire et. al., 2013). In Figure 1, we use the concept of 'decision-making' to cover decisions about all the three types of control – strategic, operational, and financial.

We distinguish between 'access' and 'control'. 'Access' has been defined as 'the ability to derive benefits from things' (Ribot and Peluso, 2003) which equates access with effective control. However, 'access implies the right to use or benefit from a productive resource; control refers to the effective exercise of such rights' (Berry, 1989). In Figure 1, we define access as the ability to use a given resource, without implying control over or the use of benefits.

Rights and claims' are the mechanisms by which individuals negotiate 'access' and 'control'. Ribot and Peluso (2003) define a right as 'an enforceable claim'. A 'right' is therefore a claim

whose validity is recognised by law, custom, or popular opinion, whereas a claim is not so recognised. In Africa, rights to property are not indivisible because women and men can have rights over different uses of the same plant (Howard and Nabanoga, 2007) or to different categories of cattle (Oboler, 1996), or hold rights on behalf of others, as women hold rights in cattle for their sons (von Bulow, 1992).

'Rights' and 'claims' to control are mobilised in two ways. First, through the 'conjugal contract', that 'sets the terms by which husbands and wives exchange goods, income, and services, including labour' (Whitehead, 1981). Like rights, the terms of conjugal contract are not fixed but are re-negotiated in response to changing circumstances. Second, they are mobilised by the identification of specific 'gender attributes', which are culturally defined ways of classifying resources in terms of whether they share male or female traits. The social construction of gender is expressed in these attributes and in the conjugal contract, which are interlinked. 'Women's crops', for example, are defined by feminine attributes, such as their importance for 'relish' or a balanced meal, and women's responsibility to provide this part of the household diet then becomes part of the conjugal contract (Padmanabhan, 2007).

3. Data and Methods

3.1 Measuring 'women's 'control'

Figure 2 shows the tool we developed to measure 'women's control'.[iv] The crops ($C_1 – C_4$) in each quadrant are the crops for which women's control is compared. The decisions ($D_1 – D_6$) are the key decisions for crop production and sale for which the degree of women's control is measured. The scores ($S_1 – S_6$) measure the degree of control that women have over these key decisions. Finally, the weights ($W_1 – W_6$) are the relative importance that women give to these key decisions ($D_1 – D_6$). The weighted scores are aggregated to produce a weighted gender control index (WGCI).

INSERT FIGURE 2 HERE

The household-level sex-disaggregated weighted gender control index (WGCI) was defined for each crop as follows:

$WGCI_g = \frac{\sum_{j=1}^{k} W_{jg} S_{jg}}{\sum_{j=1}^{k} W_{jg}}$ where the subscript j is a decision, k is the number of decisions and g refers to either male (husband) or female (in polygamous households, the first-married wife).

3.2 Qualitative data and methods

We held focus group discussions (FGDs) with (1) 'commercial' groups with more than three years' experience of selling to EPFC (2) 'commercial sheller' groups with at least three years' experience with the machine sheller and (3) 'non-commercial' groups that had recently joined EPFC. We purposively identified six villages with EPFC groups in one of these categories.[v] To ensure a common understanding of 'control' we used the Chichewa verb '*kulamulira*' ('being in charge'). [vi] FGDs were held separately with men and women. Each FGD scored how much control *women* had over each decision using a scale of 0-100, and a scale of 0-5 for the importance of each decision for overall control. Discussions among participants were recorded and translated for analysis.

3.3 Quantitative data and methods

A household survey was conducted with smallholder farmers in three purposively selected villages at least 15 km apart within the same agro-ecological zone. One was the 'treatment' village where an EPFC group had used a sheller for two seasons, and where we also conducted FGDs. The other two were 'control' villages without a sheller, in one of which we also conducted FGDs. In order to compare perceptions between men and women, only households with both male and female adults were selected for interview. Husbands and wives were interviewed separately by male and female enumerators, respectively. Within each village, 100 households were randomly selected for interview, giving a total of 100 households from the village with the sheller and 200 households from the two villages without a sheller.

We collected gender-disaggregated data on the perceived share of workload for different crop management operations, including land preparation, planting, fertilizer application, weeding, harvesting, stripping (groundnuts only), transport to storage, shelling (groundnuts only), winnowing, sorting and grading, and transport to market. These were weighted using data on labour requirements from on-station trials in the 2013 crop season, while the time for transport to

market was collected from each household. The household-level gender share of workload (GSW) can be defined for each crop as follows:

$$GSW_g = \frac{\sum_{j=1}^{k} w_{jg} S_{jg}}{\sum_{j=1}^{k} w_{jg}}$$

where w is the labour requirement, S is the perceived share of workload expressed in percent, the subscript j is the stage in the farming process, k is the number of stages involved, and g refers to either the husband or the main wife.

To test hypotheses 1-4, we used univariate and bivariate analysis. Since both WGCI and GSW are indicators of *perceived* levels and the sum of men's and women's figures is generally not equal to 100, relatively objective indicators of control and workload can be defined by taking the average of men's and women's perceptions. That is, the relatively objective control indicators for women and men can be defined as:

$$OWGCI_f = \frac{1}{2}\{WGEI_f + (100 - WGCI_m)\}$$

$$OWGCI_m = \frac{1}{2}\{WGEI_m + (100 - WGCI_f)\}$$

where f and m refer to female and male, respectively. Likewise, the relatively objective gender share of workload can be defined as:

$$OGSW_f = \frac{1}{2}\{GSW_f + (100 - GSW_m)\}$$

$$OGSW_m = \frac{1}{2}\{GSW_m + (100 - GSW_f)\}$$

Obviously, $OWGCI_f + OWGCI_m = OGSW_f + OGSW_m = 100$ holds for each household. The deviation of these indicators from parity (i.e., 50) can be used to test the statistical significance of the gender gap in decision making for control and workload.

To test hypothesis 5, we used multivariate regression analysis. Since access to the sheller was not randomised the results are open to sample selection bias. To reduce this bias, we used matching techniques.

Rosenbaum and Rubin (1983) suggest that it suffices to match individuals based on balancing score measures, such as the propensity score, as opposed to the vector of observable covariates *per se*. A conditional probability of group membership (propensity score) is predicted from observed covariates by logistic (or probit) regression, to create a counterfactual group. To test for robustness, we employed different matching algorithms. In view of the small sample size, our first choice of matching algorithm was nearest one-neighbor matching (Becker & Ichino, 2002; Dehejia, 2005). For the nearest one-neighbor matching, matching without replacement is also considered. Without replacement (and a caliper), the variance of the estimator decreases since more information on the control group is used. However, the matched pairs can differ considerably in their propensity scores (Dehejia and Wahba, 2002). For the radius matching, there is no way of determining, *a priori*, an acceptable size for caliper (Smith and Todd, 2005), and the appropriate caliper that achieves a balance while minimizing the loss of observations and the variance of the estimator was found by trial and error. To confirm the validity of the matching we tested for covariate imbalance. Finally, the following regression model is estimated by including the households from the sheller group and the matched households from the non-sheller groups:

$$y_i = \beta_0 + \beta_1 x_i + \beta_2 S_i + \varepsilon_i \quad (i \in matched\ pairs)$$

where y is women's WGCI for groundnut, x is a vector of covariates, S is the group dummy (1 for the sheller group, 0 otherwise), ε is the random error term, and i refers to the household. As a measure of commercialization we used the area planted to groundnuts, since figures for production and sales were judged less reliable. Area planted to groundnut was significantly greater in the sheller group ($p < .000$). Lastly, β_2 is designed to capture the average treatment effect on the treated (ATT) to be estimated.

Unobserved variables that affect assignment into treatment and the dependent variable simultaneously can result in hidden bias to which matching estimators are not robust. We

followed the bounding approach proposed by Rosenbaum (2002) and applied by DiPrete and Gangl (2004) and Becker and Caliendo (2007). Sig+ (*p*-value) is obtained from Wilcoxon signed rank tests for the ATT while setting the level of hidden bias to a certain value Γ, which reflects our assumption about unmeasured heterogeneity or endogeneity in treatment assignment expressed in terms of the odds ratio of differential treatment assignment due to an unobserved covariate. At each Γ a hypothetical significance level is calculated, which represents the bound on the significance level of the treatment effect in the case of endogenous self-selection into treatment status. By comparing the Rosenbaum bounds at different levels of Γ we can assess the strength that unmeasured influences would require in order that the estimated ATT would have arisen purely through selection effects.

4. Results

4.1 Hypothesis 1: Women have greater control over groundnuts than other field crops

Figure 3 compares the weighted scores for women's perceptions of control over eight key decisions for groundnuts, sunflower, maize, and cotton. The left hand panel presents results from the FGDs while the right hand panel shows results from the household survey. In terms of crops, women perceived they had less control over cotton, but felt they controlled all the major decisions over groundnuts. Control over maize was evenly shared between women and men. In terms of method, women in FGDs perceived greater differences in control than women interviewed in the household survey. However, the difference between cotton and groundnut for the household survey was highly significant for all eight decisions (*p*–value for the paired t-test < 0.001) so in this respect the qualitative and quantitative results were similar.

INSERT FIGURE 3 HERE

4.2 Hypothesis 2: Men and women disagree over the level of women's control

Figure 4 shows that for groundnuts women perceived themselves as having more control (blue line), while men perceived women as having less control (red line). For cotton, women perceived themselves as having minimal control, whereas men perceived women as having more control. In terms of method, both FGDs and the household survey gave similar results. However, women

in FGDs perceived they had greater control over groundnuts, and less control over cotton than did women in the household survey.

INSERT FIGURE 4 HERE

Table 1 presents the result of the paired t-test on the difference between women's control perceived by women and women's control perceived by men. The test compared the difference between $OWGCI_f$ and 100 - $OWGCI_m$. The difference was statistically significant in all cases. Thus, women believed that they had more control over decision-making than men thought they had.

INSERT TABLE 1 HERE

4.3 Hypothesis 3: The higher women's share of the workload, the greater women's control of the crop

Table 2 compares the correlation between perception of their share of the workload (GSW_f) for maize and groundnuts with perception of their degree of control over these crops, as measured by their total control ($WGCI_f$) and their control over the use of income. Workload was positively correlated with total control and control over use of income. For women, the correlation between their share of the workload and their control was statistically significant for both maize and groundnuts, suggesting that women's workload did confer some degree of control. For men, the correlation between workload and control was statistically significant for maize but not for groundnuts in either type of control.

INSERT TABLE 2 HERE

4.4 Hypothesis 4: Women maintain control over groundnuts by conceding men's control over cotton

Table 3 shows the magnitude and statistical significance of correlation between women's control over groundnuts and men's control over maize and cotton, as perceived by men and women. The relationship is negative and statistically significant, implying that the higher women's control over groundnuts, the higher their control over maize and cotton. The same applies to men's

perception as well. This suggests there is no reciprocity between women's control over groundnuts and men's control over cotton.

INSERT TABLE 3 HERE

4.5 Hypothesis 5: Machine shelling and commercialisation of groundnuts does not reduce women's control

Table 4 presents the outcome of the balancing test and the estimates on ATT for different matching methods. For algorithms (6), (7), and (9), bandwidth=0.002, caliper=0.06, and caliper=10 are used, respectively. In general, the estimates of ATT are found to be statistically significant and positive, indicating that the sheller leads to an increase in $WGCI_f$ for groundnut by an approximate range of 5 to 8. This suggests that the machine sheller increased women's control over groundnuts. The sign of the bias is negative, meaning that the estimator without matching underestimates the effect of the treatment. Among the PSM algorithms the nearest 1 neighbor without replacement (2) gave the best match, and the ATT estimator is statistically highly significant.

INSERT TABLE 4 HERE

Table 5 shows the results of the matched regression using the selected matching algorithm. The women's Weighted Gender Control Index ($WGCI_f$) is positively related to membership of a sheller group, and the coefficient is statistically significant at the 5 % level. This implies that the machine sheller increases women's control over groundnuts. Other covariates also significantly affect women's control. The results suggest that women in polygamous households have greater control over groundnuts, while higher rates of adoption of improved seeds reduce women's control, perhaps because men in such households are more actively involved in farming decisions.

INSERT TABLE 5 HERE

Although the area planted to groundnuts is a key determinant of receipt of treatment (i.e., provision of machine shellers), its effect on women's control is not statistically significant. Moreover, replacing area planted to groundnuts with the volume of groundnuts sold also gives an insignificant coefficient (p=0.307). This suggests that the commercialisation of groundnuts does not reduce women's control. In terms of specific decisions, women with access to the sheller perceived they had greater control over land preparation (p=0.0976), weeding (p=0.0167), harvesting (p=0.0016), and the use of income (p=0.0296) from groundnuts (Orr et. al., 2014b). Hence, post-harvest mechanisation increased women's operational and financial control but strategic control (area planted) remained under male control.

Table 6 summarises the Rosenbaum bounds for the ATT. The critical level of Γ at which we would have to question the identified ATT is between 1.9 and 2.0, i.e. if an unobserved covariate caused the odds ratio of treatment assignment to differ between the treatment and control groups by a factor of about 2.0. For the selected algorithm, it would require a hidden bias of Γ between 1.2 and 1.3 to render the ATT spurious.

INSERT TABLE 6 HERE

5. Discussion

5.1 Mixed methods

Although both methods identified groundnuts as a 'women's crop', the FGDs gave more extreme results (Figure 3). Similarly, women in FGDs justified their control over groundnuts by claiming reciprocity with men's control over cotton. *If a woman wants to plant 50 kg of groundnut seed, men won't allow it and say it's too much, but they will plant 50 kg of cotton seed. So we don't allow then to deny us, since we don't deny them for cotton* (Kapenya) [vii]. However, the household survey revealed that women with greater control over groundnuts also had greater control over cotton and maize (Table 3).

We offer three explanations for these differences. First, women in FGDs may have exaggerated their control over groundnuts. Although researchers consider FGDs informal, for villagers they are in fact a formal, very public arena, where the views expressed are normative (what 'ought to

be') rather than 'what is' (Mosse, 1994). *We make a bowl of peanut butter for the men and the children. The rest is for us. It's our money* (Kapenya). *Men come with a bleeding heart, not forcibly, but know that if they come humbly their wife will increase the amount of money from groundnuts she will give them*. (Kazingizi). FGDs therefore offered women a highly public opportunity to defend their 'right' to control over groundnuts as a 'women's crop'.

Secondly, women in FGDs may have experienced an energising sense of power as a group, encouraging them to challenge the status quo to meet their need for greater control. This reflects the empowering effect of women's groups. Alternatively, women may have faced group pressure to exaggerate their right to control. 'Women' are not a homogeneous group. Some may have felt compelled to show solidarity with others or been influenced by more vocal members of the group, or deferred to older, better-off members with more to lose if they lost control over groundnuts. The 'Asch effect', where members subordinate their own judgement to that of the group, is well known to social psychologists (Asch, 1955).[viii] Although Participatory Rural Appraisal (PRA) relies heavily on small groups, it has paid scant attention to the importance of group dynamics. [ix] Using FGDs to resolve conflicts of interest remains 'a frontier for participatory methods' (Chambers, 1994). Where gender rights are at stake, the social dynamics of FGDs may polarise perceptions of control.

Finally, women in FGDs might have downplayed their control over cotton to legitimize their right to groundnuts. *No matter what you say, cotton is up to the men* (Kapenya). *You can't even say anything about hired labour for cotton, it's a man's crop. That's the way marriages end* (Kazingizi). As for control of cotton sales, *We can't even try* (Kapenya). *Cotton gives ownership of money to go and drink beer and even marry another wife* (Kapenya). Women's role was simply to provide labour. *You can work a few days on the groundnuts but the rest of the time you need to weed cotton. You can't even say anything* (Kazingizi).

Mixed methods often produce contrasting or even conflicting results (Davis and Baulch, 2011). Previous studies on gendered decision-making have noted discrepancies between FGDs and individual interviews (von Bulow, 1992). Quantitative data on household decision-making are 'simple windows on complex realities' that show the direction of control rather than exact measurements (Kabeer, 1999: 447). As one participant explained, decisions about control are

'bedroom decisions' – a private matter between husbands and wives. The value of the FGDs, therefore, was not to confirm the quantitative data but to make 'bedroom' decisions visible and highlight normative views on 'women's crops'.

5.2 Commercialisation and gender relations

To our surprise, women perceived that the machine sheller increased their control, while commercialisation (in the form of increased area planted or volume of sales) did not significantly change their control (Table 5). Women in EPFC groups with access to the sheller had greater levels of control over key decisions like harvesting and use of crop income (Orr et al., 2014b). The explanation may be that these women were members of commercial seed-producer groups, which had empowered them and given women greater control than if they were growing groundnuts individually.

FGDs provide additional insights. Machine shelling significantly reduced women's workload. A machine sheller did the work of 20 women in one day.[x] However, mechanisation also opened the door to men's control. *Men got interested in the machine. Women will shell one bag a day then stop and do household chores, but men can spend the whole day shelling 20 bags. When it was shelled by hand, men had no control* (Kagunda). However, women had no objection to sharing control for shelling. *Women decide to use the groundnut sheller because they know that men will not help shell by hand. While women cook, men can be busy doing the shelling* (Kagunda). Thus, women growers were happy to relinquish some control over shelling in exchange for male labour. In addition to shelling, men now searched for improved seed, checked if groundnuts were ready for harvesting, and provided a bicycle or ox-cart to take groundnuts to market.

Men exerted strategic control over groundnuts through their right to land. Eastern Province lies within Africa's 'matrilineal belt', where marriage is uxorilocal and land is inherited from mother to daughter (Lancaster, 1976). However, when Chipata district was re-settled in 1941, rights to land were vested in male village headmen who gave usufruct rights to male heads of household (Pletcher, 1979; Skjonsberg, 1989). Consequently, marriage was usually virilocal and land was owned by men, giving them control over the area planted to groundnuts. Although women did not challenge this right, they argued that increasing the area planted to groundnuts would benefit

the household as a whole. *We don't come with land but if we have control of land other decisions will be easier to make*" (Kazingizi). *You cannot talk of cash income from groundnuts if you don't have control over land* (Kazingizi). Higher prices for groundnuts had made men more receptive to this argument, but they also used increasing women's access to land as a bargaining chip to claim greater control over income from groundnuts.

Women resisted these claims on the grounds of their greater workload. *Few men pay attention to the groundnuts field. When you work there, that's when your husband takes a bath and goes to drink beer.* (Kapenya). There was a significant correlation between women's perceived share of the workload and their control (Table 2). In women's minds, therefore, 'women's crops' were associated with women's labour. Although women were scathing about men's share of the workload, nevertheless we found no evidence of a gender division of labour for groundnuts.

Women were therefore engaged in a difficult balancing act: keeping their 'right' to control over groundnuts while using men's labour to reduce their own workload, which in turn exposed them to male 'claims' for greater control. But women were in no doubt that they had the best of the bargain. *Men now do shelling. They never used to do that. Men never used to help us but now they know there's money, they have joined us, so we are very happy* (Kazingizi). Thus, women saw their reduced control over shelling as a welcome liberation from drudgery.

5.3 Women's crops and the power to name

'Women's crops' are part of a wider system of beliefs on gender roles. Among the matrilineal Chewa, crop agriculture was historically the concern of women (Morris, 1988). Although inheritance in our survey area was no longer matrilineal, the older culture was reflected in traditional beliefs about gender roles. Women were responsible for the daily meal and for the relish crops. Responsibility for maize, the staple food crop, was shared between men and women. Men were responsible for providing cash for essential items and for buying maize when stocks ran out.[xi] In the settler economies of eastern Africa where the colonial state limited the export crops that Africans could grow, the main source of cash income was employment on commercial farms. In Zambia, the association of cash income with men goes back at least to the colonial

period, when the imposition of hut tax forced men to supply labor for wages on white-owned farms and mines (Pletcher, 1979). Cash became a male domain.[xii]

Women in FGDs echoed these traditional beliefs. *Groundnuts are a food, so we control food for the household* (Kapenya). *Maize is a critical crop. If a man decides not to keep some bags to eat, it's his responsibility to find piece-work to earn cash to buy maize* (Kapenya). *When we need income quickly, we decide to use the sheller. The man is responsible for bringing in cash income* (men's FGD, Kagunda). *Men have to make sure there's money in the house. That's why they're interested in groundnuts* (Kazingizi). Hence, the conjugal contract served as a reference point both for women defending their right to groundnuts and for men staking claims to the cash from groundnut sales.

Commercialisation threatens the conjugal contract because it reverses traditional gender roles. Women now find themselves growing a cash crop that rivals cotton. By insisting that groundnuts should remain a 'women's crop', women were usurping male identity. Preserving the conjugal contract therefore means re-thinking the status of groundnuts as a 'women's crop'. For some men, the solution is to make groundnuts a 'men's crop'. According to the men's FGD in Kagunda, *Groundnuts are not necessarily a women's crop because it fetches a higher price than cotton.* For others, the solution was to make groundnuts a crop for both women *and* men. *It used to be a woman's crop. Now it's a crop for everyone* (men in plenary, Kagunda). Women, on the other hand, were torn between wanting to retain control and the knowledge that without access to male labour they cannot reap the full benefits of commercialisation. They rationalised this by an ideology of altruism, seeing it as the price they must pay to bring greater benefits for the family. *We thank men for coming in to help growing groundnuts, we can go higher and higher* (plenary, Kazingizi). Nevertheless, the idiom they used was still one of men 'helping' women rather than being treated as equal partners.

The 'power to name' uses a set of attributes that classify crops according to cultural beliefs about gender roles. When hybrid maize was first introduced in Zambia it was named a 'man's crop' because its poor taste and storage qualities made it more suitable for sale (Geisler, 1993). Likewise, improved cowpea in northern Ghana became a 'man's crop' because chemical sprays required a knowledge of 'medicine' that belonged to men (Padmanabhan, 2007). Women in

FGDs identified four attributes of women's crops in Zambia: (1) 'no market' (ie. low prices) (2) little labour by men (3) used as a relish to supplement the meal and (4) required patience because they were shelled or picked from a pod. While men may not succeed in re-naming groundnuts as a 'men's crop' (based on the 'male' attribute of high market prices), they may succeed in re-naming groundnuts as somehow gender-neutral, like maize. *Groundnuts are now the main cash crop. Husbands have to decide with their wives how to use the income from groundnuts. The decision has to be made jointly. Men deciding alone would mean the end of the marriage* (men's FGD, Kagunda). Re-naming groundnuts as *'a crop for everyone'* leaves open the thorny question of 'the power to name' and ultimate control.

Framing the relationship between commercialisation and gender in terms of 'women's crops' conceptualizes commercialisation as a zero sum game. The impact of commercialization on gender is evaluated by investigating changes in women's autonomy, or their degree of control. However, these categories are finite. One person's loss of autonomy is another's gain. There can only be winners and losers. This outcome is reflected in language, with commercialisation portrayed in military metaphors as a gender 'conflict' where men and women contest 'terrain', establish 'beach-heads' and turn households into 'battlegrounds' (Carney and Watts, 1991). As we have seen, this narrative of commercialisation and gender which combines both Marxist and feminist perspectives, originates with irrigated rice in The Gambia, and its magnetic pull is hard to resist. Yet while women groundnut growers in Zambia expressed views that fitted this narrative they also expressed views that did not.

Commercialisation can also be viewed as a non-zero sum game, where women and men cooperate to raise the total income for the household. In particular, women seemed prepared to trade some degree of autonomy in exchange for greater male participation in shelling groundnuts. We expected women to see male involvement as a threat. Instead, they saw it as freeing them from drudgery. Moreover, by relieving this post-harvest bottleneck, women saw male participation in shelling as an opportunity to increase income for the whole household. This suggests that women did not see groundnuts as a zero sum game, and were willing to bargain and negotiate, welcoming greater male participation while seeking to retain operational and financial control.

In some cases, bargaining has proved an effective way for women to retain control as 'women's crops' become commercialised (Sorensen, 1996). In eastern Africa women's bargaining power rests primarily on their labour power. *If a man just keeps and spends his money, women will not cultivate his [cotton] field next season* (Bwanunkha). *If my wife doesn't agree, we cannot grow cotton* (Kagunda). On the other hand, this power is weakened by the consequences of divorce if they insist on retaining full control (Dolan, 2001; Lim et. al., 2007). Disputes over the meaning of 'women's crops' may therefore be determined by mutual interest rather than by outright victory for one side. As happened with women's vegetable gardens in The Gambia, what starts as a war of words over 'the power to name' can end in a compromise that leaves women with a significant degree of control (Schroeder, 1996). This suggests new research questions. How much autonomy are women groundnut growers in Zambia women willing to trade in order to increase overall household income? Do women really have a choice? How much control would satisfy men if overall income increased? What bargain would satisfy both parties? Why does bargaining apparently work in some contexts but not in others?

6. Conclusion

Our results confirmed that in Zambia's Eastern Province groundnuts was a 'women's crop'. FGDs showed greater perceived gender differences in control than found in a household survey. We attribute this to group dynamics in FGDs, which provided a public forum for women to defend rights and men to stake claims over groundnuts. The strong emotions aroused in FGDs reflected the threat that commercialization posed to traditional gender roles and the conjugal contract.

Contrary to expectation, women did not perceive that commercialisation reduced their level of control over groundnuts. In fact, women with access to a machine sheller reported higher levels of control for key decisions, including control over the use of income from groundnuts. Women welcomed men's participation in machine shelling, which reduced the drudgery of hand shelling. In exchange for greater participation by men, women seemed willing to surrender some degree of their control over the crop.

The dominant narrative sees commercialisation as a zero sum game where men or women struggle for autonomous control. This is only part of the story. Women groundnut growers in Zambia also saw commercialisation as a non-zero sum game in which greater cooperation between men and women could benefit the household as a whole. It is not our intention to replace the current narrative of commercialisation and gender with one based on cooperation rather than conflict. Rather, we see room for both depending on the specific historical context and variations in women's bargaining power. Which narrative will prevail is an empirical question. In the present case, commercialisation looks set to change the status of groundnuts in Zambia as a 'women's crop', reducing women's operational and financial control, but women may consider this a price worth paying if they can negotiate shared control over a bigger cash income.

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Table 1. Paired t-test on perceived difference in women's control

	N	Women's Control		Mean Difference	t-statistic	*p*-value
		Women's perception	Men's perception			
Maize	287	42.9	35.6	7.3	8.5	0.000
Groundnut	286	47.7	39.1	8.6	9.3	0.000
Cotton	206	39.4	34.1	5.3	6.2	0.000
Sunflower	183	45.0	43.1	1.9	2.9	0.004

Source: Household Survey, 2014

Table 2. Correlation between shares of workload and control in farming of maize and groundnuts

Gender	Control	Maize	Groundnuts
Women	Total control	0.462 [a] $p = 0.000$	0.278 $p = 0.000$
	Control over use of income	0.222 $p = 0.001$	0.269 $p = 0.000$
Men	Total control	0.111 $p = 0.061$	0.032 $p = 0.596$
	Control over use of income	0.157 $p = 0.012$	0.095 $p = 0.116$

[a] Pearson's coefficient of correlation.

Table 3. Correlation between women's control over groundnuts with men's control over maize and cotton

	Women's control over groundnut vs.	
	Men's control over maize	Men's control over cotton
Women's perception	- 0.760 [a] p = 0.000	-0. 587 p = 0.000
Men's perception	- 0.753 p = 0.000	- 0.497 p = 0.000

a Pearson's coefficient of correlation

Table 4. Average Treatment Effect on the Treated (ATT) with alternative matching algorithms

	Matching Algorithm		Propensity Score Type	Pseudo R2	LR $\chi 2$ (*p*-value)	Mean Standardized Bias	Sample Size on Common Support		ATT (*p*-value)
							Treated	Control	
(0)	Before matching		-	0.120	40.67 (*p*=0.000)***	19.368	89	176	5.001 (*p*=0.005)***
(1)	After matching	Nearest 1 neighbour	Logit	0.041	9.83 (*p*=0.631)	12.912	86	176	5.669 (*p*=0.033)**
(2)	After matching	Nearest 1 neighbour without replacement	Logit	0.032	3.65 (*p*=0.989)	6.256	86	176	6.530 (*p*=0.002)***
(3)	After matching	Nearest 1 neighbour	Probit	0.066	15.54 (*p*=0.213)	13.099	85	176	7.557 (*p*=0.003)***
(4)	After matching	Nearest 1 neighbour without replacement	Probit	0.020	4.68 (*p*=0.968)	9.605	85	176	5.338 (*p*=0.013)**
(5)	After matching	Nearest 2 neighbours	Logit	0.013	3.10 (*p*=0.995)	6.468	86	176	7.890 (*p*=0.001)***
(6)	After matching	Kernel (bandwidth=0.002)	Logit	0.028	6.50 (*p*=0.889)	8.947	86	176	6.586 (*p*=0.005)***
(7)	After matching	Radius (caliper=0.06)	Logit	0.008	1.75 (*p*=1.000)	4.634	84	176	5.558 (*p*=0.006)***
(8)	After matching	Mahalanobis	-	0.078	19.24 (*p*=0.083)*	15.605	89	176	5.948 (*p*=0.016)**
(9)	After matching	Mahalanobis with caliper (=10)	-	0.088	18.32 (*p*=0.106)	11.778	75	176	4.763 (*p*=0.065)*

***, **, and * indicates statistical significance at 1, 5, and 10 % levels, respectively.

Table 5. Result of Matching Regression (nearest 1 neighbor without replacement)

Dependent Variable: Women's Gender Control Index ($WGCI_f$) for groundnuts				
Treatment Variable: Sheller Group (yes=1)				
Matched Regression	Variable	Coefficient	t-statistic	*p*-value
F (13, 158) = 2.58	Sheller Group (yes=1)	6.56	3.17	0.002
p-value = 0.003	Area planted to groundnuts	1.82	1.37	0.172
R^2 = 0.175	Spouses of same religion (yes=1)	0.88	0.41	0.681
	Husband has official position in EPFC group (yes=1)	-2.00	-0.53	0.594
	Wife has official position in EPFC group (yes=1)	1.80	0.48	0.632
	Polygamy (yes=1)	10.71	2.31	0.022
	Sum of age	0.11	2.00	0.047
	Gap in age (age of husband – age of wife)	-0.37	-1.79	0.076
	Sum of experience with groundnuts	-0.11	-1.42	0.157
	Gap in experience with groundnuts Experience of husband – experience of wife)	0.09	0.28	0.782
	Household size	-0.37	-0.74	0.462
	Household adult female ratio	-31.60	-1.71	0.089
	Area planted to improved seed, all crops (%)	-8.57	-2.16	0.033
	Constant	59.69	5.68	0.000

Table 6. Rosenbaum bounds for the ATT

Matching Algorithm		Γ	sig+	sig-	t-hat+	t-hat-	CI+	CI-
(2)	Nearest 1 neighbor without replacement	1.2	0.029	0.000	3.846	6.759	-0.120	10.894
		1.3	0.056	0.000	3.278	7.525	-0.614	11.685

N = 86 matched pairs
gamma - log odds of differential assignment due to unobserved factors
sig+ - upper bound significance level
sig- - lower bound significance level
t-hat+ - upper bound Hodges-Lehmann point estimate
t-hat- - lower bound Hodges-Lehmann point estimate
CI+ - upper bound confidence interval (a = 0.95)
CI- - lower bound confidence interval (a = 0.95)

Figure 1: Conceptual framework for 'women's crops'

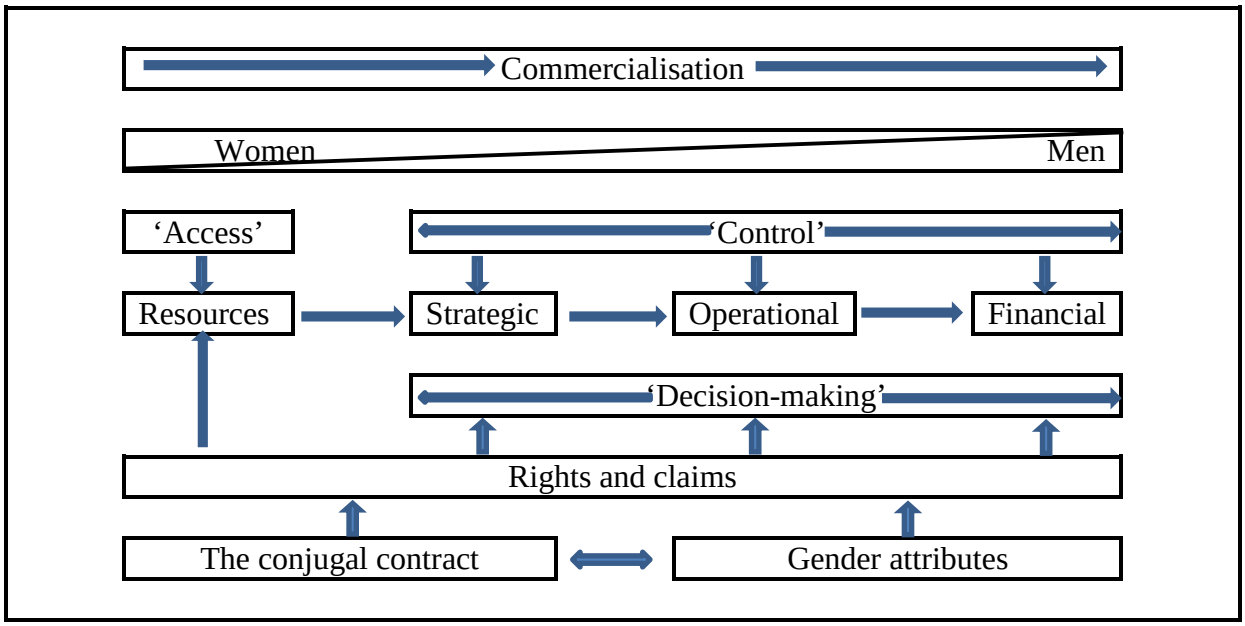


Figure 1: The 'Women's Crop Tool'

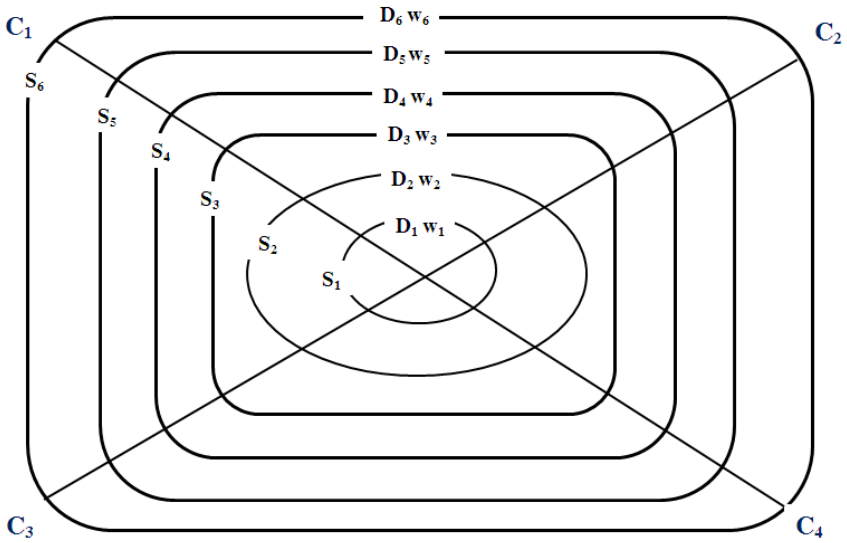
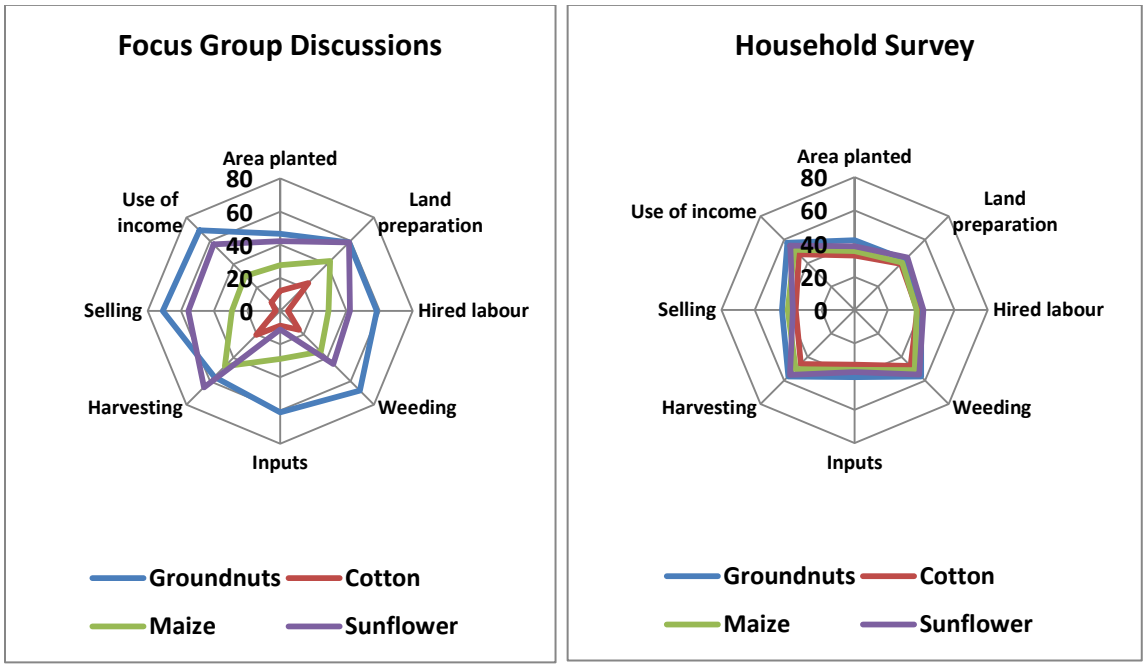
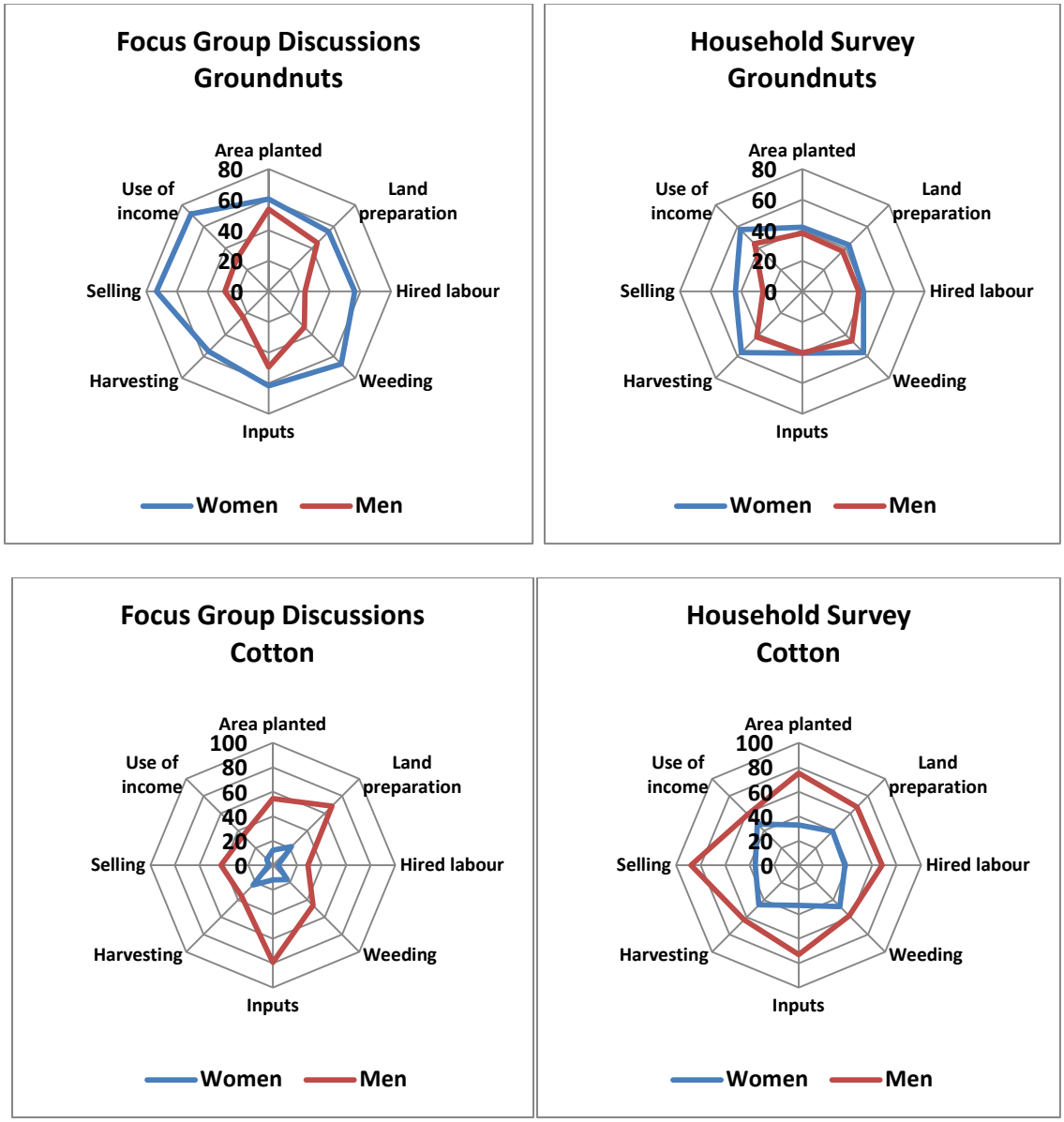


Figure 3: Women's perceptions of control over groundnuts, cotton, maize, and sunflower in Eastern Province, Zambia (weighted scores)



Source: Focus Group Discussions and Household Survey, 2014

Figure 4: Contrasting perceptions of women's control for groundnuts and cotton, by sex, Eastern Province, Zambia (weighted scores)



Source: Focus Group Discussions and Household Survey, 2014

[i] Besides Carney and Watts (1990, 1991) cited above, see also the studies by Dey (1981, 1982), by von Braun and Webb (1989) not to mention Carney (1988, 1992 and 1998).

[ii] Although researchers have challenged Boserup's thesis on several fronts 'they have not dislodged the fundamental premise that female labour is central to African agriculture'. (Bryceson 1995: 7).

[iii] Carney and Watts (1990) article, *Manufacturing Dissent*, was a play on Herman and Chomsky's *Manufacturing Consent* (1988), which examined the influence of the media on public opinion.

[iv] For a fuller description of this tool and applications, see Orr et. al., (2014b). For a similar tool applied in a different context see Shrestha (2002).

[v] The villages were Kagunda and Mafuta (commercial + sheller), Bwanunkha and Kapenya (commercial) and Kazingizi and Stephen (non-commercial). All were located in Chipata district except for Bwanunkha which was located in Chadisa district.

[vi] Other Chichewa words suggested by participants included *kulongola* ('lead or go before'), *kudongosola* ('arrange or speak in order'), and *ndondomekho* ('following an agreed plan or procedure'). For the English definitions of *kulamulira* and *kulongola*, see Guerin (1985), sv; for *kudongosola*, see Scott (1965), sv; and for *ndondomekho*, see Pass (2013), sv.

[vii] The name of the village where the FGD was conducted is given in parentheses. All quotations are from women FGDs unless otherwise specified.

[viii] The original Asch experiment involved a group of seven to nine men, of whom all but one were primed give the incorrect answer. Group pressure resulted in incorrect answers by the minority group member in 32 % of cases. Further experiments revealed that the minority member gave the same percentage of incorrect answers when the majority against them was only three to one (Asch, 1955).

[ix] A trawl through all 66 volumes of the journal *Participatory Learning and Action* failed to discover a single study of how group dynamics affected the results from FGDs.

[x] The machine sheller used by EPFC seed producer groups is operated by three people and can shell four 50 kg bags in one hour or 32 50 kg bags in a working day of eight hours, averaging 533 kg per person. In one eight-hour day a woman can shell 25 kg by hand. Thus, in one working day the machine sheller does the work of 20 women. Farm Management data from Eastern Province in the 1970s show that it required 2,426 hours ha^{-1} to cultivate groundnuts, of which 950 hours (39%) was spent on shelling (Skjonsberg, 1989, p. 46 note 9).

[xi] Our main source for traditional gender roles and responsibilities in the survey area was the 1977 study of Kefa village (Skjonsberg, 1989: 37-38, 83, 88). Kefa is located 30 km from Chipata town, compared to an average of 50 km for our survey villages. For similar traditions in other parts of Zambia, see Geisler (1993) for the southern region and Crehan (1983) for the north-west. We use the label 'traditional' in a restrictive sense because pre-colonial views of gender roles may have been very different (von Bulow, 1992).

[xii] This sometimes worked to women's advantage. Women in Malawi resisted attempts by the colonial state to make them sell groundnuts for cash in order to pay hut tax, because this payment was a male responsibility. They continued to sell groundnuts to Indian traders, but for cloth (Bezner-Kerr, 2010).