

Gender Diversity in Agricultural Productivity in India

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Introduction

Agricultural productivity of women managed plots is found to be lower compared to that of men. The determinants for lower productivity of female managed plots in Africa were found to be older status of female plot holders, child dependency ratio and access to male labor in female managed plots, agricultural input usage and crop choices. The inexperience of women in agricultural production processes is one of the major determinant explaining the decreased productivity in female managed plots in India.

With this background, it is necessary for policy makers to understand the resources women farmers are lacking to compete with men or have equal productivity, so that governments can help improve their resources.

Objectives

The objectives of this work are two-fold:

1. To understand if gender gap exist in India today in agricultural productivity depending on a) plot ownership, and b) household decision making on agricultural activities
2. To explore if there is any difference in male and female labor use between plots owned by respective gender and its effect on productivity

Materials and methods

For the purpose of empirical analysis, the primary survey data used is the Village Dynamics in South Asia (VDSA) panel dataset (<http://vdsa.icrisat.ac.in>), collected by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in collaboration with International Rice Research Institute (IRRI) and Indian Council of Agricultural Research (ICAR) Institutes. The data include the several modules of socioeconomic nature from 12808 cultivated plots belonging to 1129 households during 2009 to 2015 period from 30 villages, (two villages from each of 15 districts), covering 9 states of India.

Blinder-Oaxaca decomposition, a counterfactual method, is used to understand the differences in mean outcome by gender groups. It divides the group differences in to part one explained by the group characteristics that determine the outcome and part two the unexplained part or the discrimination part.

The agricultural productivities, the crop value (logarithm) and net profit (inverse hyperbolic sine transformation) of the two groups using the plot and household level controls and input variables are studied. It is also used to understand the differences in productivities when decisions are taken by both husband and wife together against the decisions taken by women only or men only. This is implemented in STATA 14 and the linear model used is $Y_i = X_i' \beta_i + \epsilon_i$, where Y is the outcome variable, X is a vector of predictors, β contains the slope parameters an intercept, I is group A or group B.

The mean outcome difference is $R = E(Y_A) - E(Y_B)$; divided in to three parts: $R = E + C + I$

where E is the share due to endowments effect or the effect of the differences in control variables or the explained part and C is due to differences in coefficients or the unexplained part attributed to discrimination, I, the interaction of these two groups.

Results

- The gender gap in agricultural productivity using the plot ownership as gender indicator could not be found using Oaxaca decomposition and regression model.
- Labor cost is higher in male owned plots whereas women owned plots have to spend more on material inputs.
- Usage of both family and hired female labor is higher in female owned plots and usage of owned and hired male labor is higher in male owned plots.

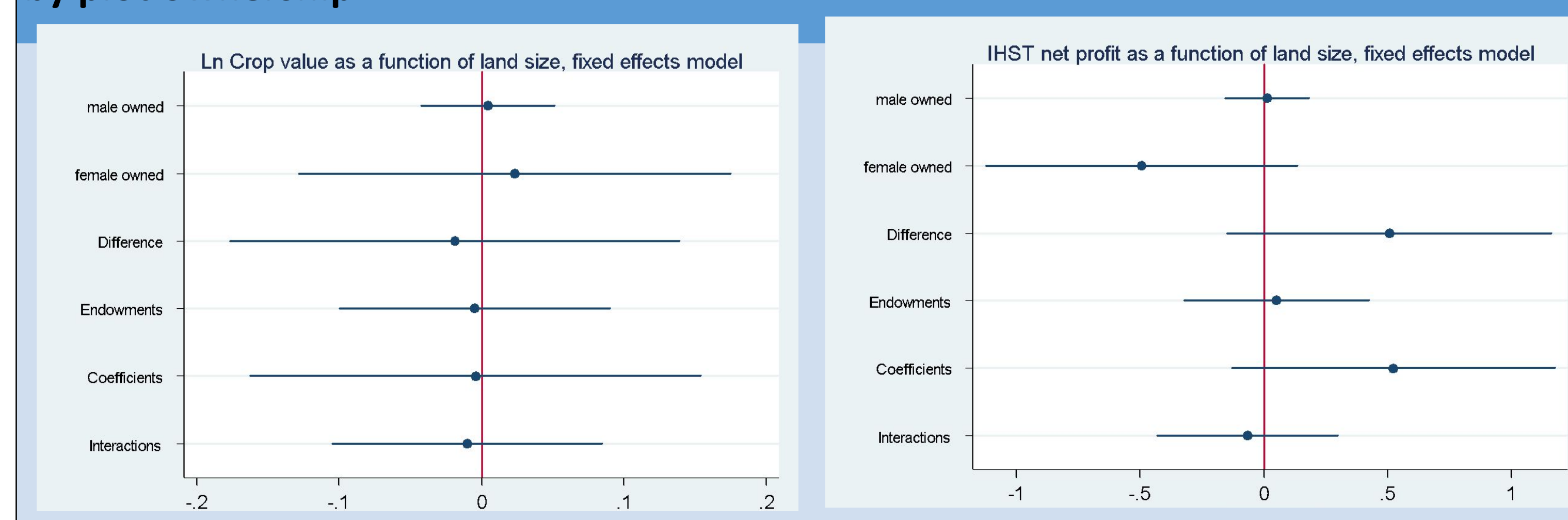
- Expenditure on machinery is more in female owned plots. Share of irrigated area is more in female owned plots
- Average number of male members and men in the productive age (15-64 years) of the female owned plots was lower compared to male owned plots.
- Male labour, both family and hired, show significant positive effect on crop value in female owned plots as well as male owned plots.
- Higher share of leased out plots were owned by women and also higher share of fallow plots were found to be women owned.
- Crop productivities are better when crop production decisions are taken by both man and woman together compared to decision by any single person when both of them reside in the same household.

Descriptive statistics of key attributes of male and female owned plots used in the VDSA sample, 2009-2014

Dynamic variables	Male owned	Female owned	Significance
Mean value of total crop output obtained from the plot over all seasons in a year in INR/ha	56190	59932	**
Net profit from plot over all seasons in a year per ha (INR/ha) (including family labor costs)	26311	29881	**
Average plot size in ha	0.5	0.6	*
Owned area in ha	0.5	0.6	*
Leased in area in ha	0.5	0.6	*
Labor cost per ha	20184	18228	
Input material cost (INR/ha)	17919	20460	**
Hired male labor value (INR/ha)	3071	2212	**
Hired female labor value (INR/ha)	4211	5369	**
Family male labor value (INR/ha)	7404	4953	**
Family female labor value (INR/ha)	2882	3290	**
Machine value (INR/ha)	3796	4740	**
Share of area which is irrigated	0.52	0.60	**
Static variables			
Number of male members in the family	3.3	2.7	**
Number of male members of the family in productive age (15-64)	2.2	1.8	**

Note: Significance tests are done with Wilcoxon rank sum test for continuous variables ; * , ** denote significance at 5% , 1% levels respectively

Coefficient plots of Oaxaca model results of plot level productivity of India separated by plot ownership



Conclusions/implications

- In contrast to literature, we could not find that women owned plots are less productive compared to their male counterparts using the VDSA data.
- The most exciting inference from the study is that when men and women decide together in crop production activities, they produce more compared to when decisions are taken alone in spite of couple staying together in the same household.