Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 7, Issue, 11, pp.22938-22942, November, 2015

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

# GENDER DIFFRENCE AND ITS IMPACT ON AGRICULTURAL PRODUCTIVITY: THE CASE OF SHEKO DISTRICT IN BENCH MAJI ZONE OF SNNP, ETHIOPIA

[1*]Tadele Melaku Challa and [2]Dr. A. Mahendran,

[1]Department of Rural Development and Agricultural Extension, Ambo University, P. O. Box: 19, Ambo, Ethiopia
[2]Department of Cooperatives, ICDS, Ambo University, P. O. Box: 19, Ambo, Ethiopia

ARTICLE INFO

*Article History:*
Received 27th August, 2015
Received in revised form
22nd September, 2015
Accepted 04th October, 2015
Published online 30th November, 2015

*Key words:*

Gender difference,
Agricultural productivity,
Household, Sheko District,
Ethiopia.

## ABSTRACT

The study examined the gender difference and its impact on agricultural productivity in Sheko district of Bench Maji zone, located at 573 km south west of Addis Ababa, the capital of the country. The specific objectives were to assess the extent to which the agricultural production system is gender oriented; to examine access and control over productive resources; and to estimate men's and women's productivity in agriculture. Cross-sectional data collected from a total of 150 respondents were used in this study whereby 75 were female headed and 75 were male headed households. The data were analyzed using Statistical Package for Social Science (SPSS). Descriptive statistics such as frequency, mean, percentage, t-test and chi-square were used to summarize and compare the information between the two groups. Moreover, Cobb-Douglas (CD) production function was used to estimate the productivity difference in agriculture between male and female headed households. Results of the study showed that male headed household s (MHH) own more of productive resources such as land, livestock, labour and other agricultural inputs as compared to female headed households (FHH). Moreover, the estimate of CD production function shows that livestock, herbicide use, land size and male labour were statistically significant for MHH while livestock, land size, herbicides use and female labour were significant variables for FHH. The comparison of the marginal value product (MVP) with the factor cost showed that MHH could increase productivity using more herbicides and male labour while FHH could do so by using more herbicides, male and female labour. The agricultural productivity difference between MHH and FHH was about 66.76% in the study area. However, if FHH had equal access to the inputs as MHH, gross value of the output would be higher by 21.39% for FHH. This may suggest that FHH would be more productive than MHH if they had equal access to inputs as MHH. Based on the results obtained, the following policy implication can be drawn: accessing FHH to inputs that increase the productivity of agriculture such as herbicides, livestock and male labour; increasing the productivity of land; and introducing technologies that reduce the time and energy of women.



***Citation***: Tadele Melaku Challa and Dr. A. Mahendran, 2015. "Gender diffrence and its impact on agricultural productivity: The case of sheko district in bench maji zone of snnp, Ethiopia", *International Journal of Current Research*, 7, (11), 22938-22942.

## INTRODUCTION

Ethiopia is one of the least developed countries in the world with poverty stricken economy. Agriculture is the most important sector which accounts for about 47% of the national GDP, Almost 90% of the foreign exchange earnings and 85% of total employment (AGP, 2010).Moreover, agriculture in Ethiopia is crucial for the countries food security and the sector is the largest contributor to overall economic growth and poverty reduction. But, it is dominated by small-holder and largely subsistence farming with low productivity on fragmented and highly degraded land (AGP, 2010).

***Corresponding author: Tadele Melaku Challa,***
*Department of Rural Development and Agricultural Extension, Ambo University, P. O. Box: 19, Ambo, Ethiopia.*

Given this low productivity, a significant number of people have suffered in food shortage. Obviously, women and children are the usual victim of the problem. Like in most developing countries, women in the rural part of Ethiopia account for 50 percent of the rural population, and about 88 percent of the country's women live in the rural area, nearly 85 percent of their labor spent on agricultural activities such as food processing, storage, weeding, harvesting, marketing of produce, preparing trashing field and caring for animals (Bogalech, 2000).Overcoming low productivity by effective utilization of the untapped resources mainly depends on increasing agricultural productivity. In Ethiopia, like in many other parts of sub-Saharan Africa, where labor, land, capital and other resources are of paramount importance. Therefore, this study is initiated in view of understanding the agricultural productivity difference between men and women farmers in Sheko district of Bench Maji zone of SNNP Regional State.

## MATERIALS AND METHODS

### Study area

Sheko district is one of the 11 districts found in Bench Maji Zone of SNNP Regional State. It is located at 573km South West of Addis Ababa, the capital city of the Ethiopia. There are three major crops productions are: Coffee dominated production system, Cereal based production system and animal husbandry, vegetable and fruit based production system.

### Sampling techniques and the data

Both primary and secondary data collected from Sheko district were used in the study. Primary data was collected from sample households (both male and female headed) through structured questionnaire. The questionnaire covered information on demographic and farm characteristics, crop and livestock production, household income and ownership of farm inputs. The secondary data collected from Agriculture and Rural Development Office, Education Bureau, Women Affair Office, and Administration Office of the district. The participatory assessment methods such as Focus Group Discussions, case studies and key informant interviews were applied to gather information pertinent to the research problem. A two stage random sampling technique was used to select the sample households in the study area. The first stage was simple random sampling of 6 PAs from the 24 PAs found in the district. Then from these 6 PAs 75 male headed and 75 female headed households) were randomly selected. Hence, a total of 150 household were interviewed (Table 1).

**Table 1. Distribution of sample households by FA and sex of household head**

| Name of FA | Total | | Sample | |
|---|---|---|---|---|
| | Male Headed | Female Headed | Male Headed | Female Headed |
| Gizmeret | 517 | 143 | 5 | 13 |
| Shimi | 682 | 70 | 6 | 7 |
| Mehal Sheko | 2495 | 135 | 23 | 13 |
| Bayineka | 1688 | 196 | 16 | 19 |
| Shayita | 693 | 89 | 7 | 8 |
| Gayzika | 1872 | 158 | 18 | 15 |
| Total | 7947 | 791 | 75 | 75 |

Source: Administration Office Baseline Survey and Survey Sampling (2012)

Both descriptive and economic analyses were employed to meet the specific objective of the study. By applying descriptive statistics, one may compare and contrast different categories of sample units with respect to the desired characters so as to draw some important conclusions. In this study descriptive statistics such as mean, frequency, percentage, t-test, chi- square were used to analyze the collected data.

### Cobb-Douglas Production Function

Cobb-Douglas (CD) production function was used to examine the agricultural productivity difference between the male and female headed households. According to Gujarati (1995), the generalized form of the CD production function can be specified as:

$$Y = AX_1^{B_1} X_2^{B_2} X_3^{B_3},\ldots\ldots\ldots\ldots\ldots\ldots, X_n^{B_n} e^{U_i} \quad (1)$$

Where, Y is gross value of farm outputs in Birr per ha, $X_i$'s are explanatory variables such as land size, oxen, seed, fertilizer use, herbicides use, male or female labor and capital. $B_i$'s are coefficients or elasticities of output and indicates how strongly each input affects output. A is efficiency parameter and represents the level/state of technology and $U_i$ is disturbance term.

Since the CD production function is a power function, it is impossible to directly use the Ordinary Least Square (OLS) method. Therefore, logarithmic transformation will be made to obtain its linear form and to estimate the parameters. In this study the natural logarithm will be employed. To estimate whether the production function of male headed (MHH) and female headed household (FHH) are different from each other, Equation (1) was estimated separately for MHH and FHH. Moreover, pooled data set without and with a dummy gender variable was estimated. The respected transformed models are shown as follows.

Production function for Male Headed Household represented as:

$$\ln Ym = \ln A_m + B_{1m} \ln X_{1m} + B_{2m} \ln X_{2m} + B_{3m} \ln X_{3m} + \ldots + B_{7m} \ln X_{7m} + Um$$

Production function for Female Headed Household represented as:

$$\ln Y_f = \ln A_f B_{1f} \ln X_{1f} + B_{2f} \ln X_2 + B_{3f} \ln X_{3f} + \ldots + B_{7f} \ln X_{7f} + U_f$$

Production function using pooled data represented as:

$$\ln Y_p = \ln A_p + B_{1p} \ln X_{1p} + B_{2p} \ln X_{2p} + B_{3p} \ln X_{3p} + \ldots + B_{7p} \ln X_{7p} + U_p$$

Production function using pooled data with dummy empowerment variable is:

$$\ln Y_p = \ln A_p + B_{1p} \ln X_{1p} + B_{2p} \ln X_{2p} + B_{3p} \ln X_{3p} + \ldots + B_{7p} \ln X_{7p} + DG + U_p$$

Where,

m = MHH, f = FHH, p = pooled data set, G = Gender dummy variable (G = 1 for MHH; G = 0 otherwise) and D is the regression coefficient for the dummy variable and it indicates productivity difference in technical efficiency. $B_{im}$, $B_{if}$ and

$B_{ip}$ (i = 1, 2, 3, ..., 7) are output elasticities of i[th] input under MHH, FHH and pooled data sets, respectively.

The MVP of the factor can be computed as follows;

$$MVP = b_i * \frac{Y}{X_i}$$

Where, $b_i$ is the regression coefficient (output elasticity), Y is the gross value of farm output (geometric mean) and $X_i$ the geometric mean value for factor i (Ellis, 1988). Finally, Oaxaca decomposition model (Oaxaca, 1973) of the productivity differential between empowered and non-empowered women farmers were used to decompose the productivity 20difference. Although, this approach was used to decompose the income gap, it can also be applied to decompose productivity difference between, say, men and women farmers (Quisumbing, 1995). The decomposition model adopted was presented as follows:

$$\text{Ln}\left(\frac{Y_m}{Y_f}\right) = \left[(B_{im} - B_{if})LnX_{if}\right] + \left[B_{im}Ln\left(\frac{X_{im}}{X_{if}}\right)\right]$$

Where, $Y_m$ and $Y_f$ represent mean output (geometric mean) of male nad female farmer respectively, $X_{im}$ and $X_{if}$ are geometric mean levels of inputs of male nad female farmer, $B_{im}$ and $B_{if}$ are estimated output elasticities of male headed and female headed farmer as defined earlier.

**Estimation Technique and Testing Procedures**

The Variance Inflation Factor (VIF) was estimated by following the method of Gujarati (1995), which is:

$$VIF_i = \left(\frac{1}{1 - R_i^2}\right)$$

Where, $R^2_i$ is the coefficient of determination that is obtained when the continuous explanatory variable is regressed against all the other explanatory variables. As $R^2_i$ approaches 1, the VIF approaches infinity. That is, as the existence of collinearity increases, the variance of the estimator increases and in the limit it can be infinity. If there is no collinearity between regressors, the value of VIF will be 1. As a rule thumb, if VIF of a variable exceeds 10, that variable is said to be highly collinear (Gujarati, 1995).

## RESULTS AND DISCUSSION

The finding of the survey shows that 80 % of the MHH have access to credit service at least sometimes, whereas 94% of the FHH have no access to credit service in the district. The women farmers utilized loans for various purposes such as purchase of agricultural inputs, livestock, home consumption, medication, children education, clothing, trade, wedding and festivals. About 60.7% of the MHH reported that they used credit for purchase of livestock. Therefore, their livestock ownership dramatically increased. Similarly, about 34% of MHH used the credit for purchase of agricultural inputs. Hence, having access to complementary inputs and resources resulted in increased productivity through increased soil fertility. The saving culture of the MHH and FHH was also assessed. The average amount of saving was 158 and 66 birr for the MHH and FHH respectively. As the t-test indicated that the mean difference among the MHH and was statistically significant (t=3.4, P=0.001). This implies that those MHH have better saving than the FHH. The results on the dependency of women on others indicated that the 16.3 % of the MHH depend always on their husbands for food consumption, clothing and medication, 39.8% of the FHH depend always on themselves.

**Land holding:** The total area of land owned by the sample farmers was about 236 ha with the average of 1.07 ha per household compared to the regional average of 1.23 ha. The average land owned by MHH and FHH was 1.06 and 0.72 ha respectively, which is statistically different at 1% probability level (t = 3.35). This indicates that the land holding of the FHH is smaller by about 47% than that of MHH.

**Livestock holding**: The mean livestock size owned by the sample farmers was 2.19 TLU. Comparison of the livestock ownership between MHH and FHH shows that MHH on average own 2.69 TLU while FHH own 1.61 TLU, which is significantly different at 1% probability level (t = 3.38). This implies that MHH are relatively wealthier than FHH, since livestock is considered as one of the indicator of wealth status in the study area.

**Labor Utilization:** Respondents were also asked to quantify the amount of labour they put on major activities of crops production. Accordingly, the average man-days of family labour used to produce crops on a hectare of land was reported to be 147 and 88 for MHH and FHH, respectively (t = 3.4, P = 0.001). On the other hand, the average man-day of hired labour for MHH and FHH was 10 and 12, respectively, which is not significantly different. About 41% of MHH and 68% FHH reported that labor shortage constrains effective undertaking of their agricultural activities. The chi-square test shows the existence of significant difference in labor shortage for different activities between MHH and FHH ($\chi^2$ = 9.73. P = 0.002). This means that FHH has been more constrained by labor compared to MHH. The average wage rate and working hours for all activities were 30 Birr and 8 hours per day, respectively. The major strategies used by MHH towards over-coming labor shortage were hiring labor (32%), assistance from relatives (29%) and through social support such as *Guza* and *Marro* (39%). The corresponding figures for FHH were 34%, 34% and 14% respectively and about 18% of the FHH were not able to overcome the problem at all.

**Use of fertilizer, herbicides and improved seed**: About 88% of MHH and 54% of FHH applied commercial fertilizer, while 15% of MHH and only 5% of FHH used improved seeds of maize, sorghum, potatoes and onion. The average amount of fertilizer used by MHH and FHH was 120 and 51 kg/ha, respectively. These figures show that there were significant differences in the amount of fertilizer used by the two groups at 1% probability level (t = 5.14). With regard to herbicides, about 23% of MHH and 11% of FHH used herbicides to control weeds. The mean amount used by MHH and FHH was about 0.26 and 0.19 liter respectively.

**Table 2. Parameters of Cobb Douglas Production Function**

| Variables | Unit | Pooled (N=150) | | MHH (N=75) | | FHH (N=75) | |
|---|---|---|---|---|---|---|---|
| | | Coefficient | t-value | Coefficient | t-value | Coefficient | t-value |
| Constant | | 4.654 | 21.052*** | 5.271 | 17.798*** | 4.122 | 11.75*** |
| Oxen | TLU | 0.137 | 1.871* | 0.213 | 2.077** | 0.179 | 1.702* |
| Land size | Ha | 0.336 | 4.381*** | 0.383 | 4.047*** | 0.306 | 2.588** |
| Seed | Kg/ha | 0.061 | 0.953 | 0.115 | 1.385 | 0.106 | 1.033 |
| Fertilizer use | Kg/ha | 0.030 | 0.401 | 0.015 | 0.154 | 0.003 | 0.032 |
| Herbicide use | Liter/ha | 0.153 | 2.549** | 0.156 | 1.799* | 0.156 | 1.025* |
| Male labor | Man-day | 0.166 | 2.386** | 0.352 | 3.587*** | 0.281 | 2.049* |
| Female labor | Man-day | 0.275 | 4.337*** | 0.228 | 2.074** | 0.338 | 3.264*** |
| Adjusted $R^2$ | | | 57.2% | | 55.5% | | 55.6% |
| F-value | | | 27.52*** | | 14.19*** | | 12.44*** |
| Durbin Watson | | | 2.01 | | | | |

Source: Model Output (2012) NB:*, ** and *** indicate statistically significant at 10%, 5% and 1% probability level, respectively.

**Crop yield**: The average yield of Coffee for MHH and FHH was about 9.2 and 4.1 Qt/ha, respectively, which was statistically significant at 10% (t=7.0). The average yield of Coffee, maize, and bean was about 9.2, 5.1, 5.6 Qt/ha for MHH (N=75), respectively and for FHH (N=75) the respective yield of these crops was 4.1, 4.25 and 4.94 Qt/ha. This indicates that MHH produced higher yield per ha of land compared to the FHH.

**Composition of farm income:** About 76% of MHH and 52% of FHH reported that they earned cash income from sales of cash crop where as about 43% of MHH and 49% of FHH earned cash income from sales of live- stock and /or livestock by- products. The average cash income from different crops was about Birr 345 for MHH and Birr 150 for FHH, the difference is significant at 1% probability level.

**Access to and control over productive resources**

**Land**: The land used for cultivation is about 96% of MHH and 86% of FHH. That means about 14% of FHH and 4% of MHH have no land. The others access land through renting and borrowing. Moreover, about 3% of FHH have no access to land at all while the entire sample of MHH accessed to land through renting, borrowing or share cropping.

**Oxen**: On the average, MHH had about 0.85 oxen while FHH had 0.5 oxen, which was significant at 5% probability level (t = 2.59). The survey indicates that about 45% of MHH and 55% of FHH did not possess any oxen, while those owing only one Ox constitute 27% of MHH and 38% of FHH.

**Institutional services**: The findings of the survey indicated that 37.3% of the women have access to credit service. From MHH and FHH only 86% exercised their land access and control right properly. The total land owned and put under cultivation was 77% and 52% for MHH and FHH respectively, which is statistically different at 1% probability level (t =3.35).

**Econometric Analysis:** Estimation of the Production Function: In this seven explanatory variables were included among which four variables namely, Oxen, herbicides use, land size, male and female labor were statistically significant for MHH and FHH production function.

**Source of Productivity Difference**

The total sources of productivity difference were decomposed into output elasticities and inputs endowments.

Total decomposition of productivity difference between MHH and FHH showed in the table

**Table 3. Decomposition of productivity Difference between MHH and FHH**

| Source of productivity difference | Percentage Contribution | |
|---|---|---|
| | Due to output elasticities | Due to input endowments |
| Total estimated difference (66.76%) | -21.39 | 88.15 |
| oxen | 2.70 | 7.73 |
| Land size26.3 | 3.88 | 9.10 |
| Seed | 1.04 | 6.60 |
| Fertilizer use | 2.31 | 3.74 |
| Herbicide use | 0.01 | 0.84 |
| Male labor | 51.82 | 68.92 |
| Female labor | 78.69 | 41.98 |

Source: Own computation (2012)

**Policy Implication**

Based on empirical results and discussion, the following points need to be considered as a possible policy implication in order to increase the productivity of farmers; Raising the productivity of land by utilizing herbicides and pesticides, increase in the application of improved seed, increase income due to the microcredit intervention to self-reliance and economic empowerment. Since ox is one of the significant factors intervention should be encouraged.

## REFERENCES

Addis Tiruneh, 2000. The Missing Link Between Micro and Macro Level Gender Dis-aggregated Economic Data in Economic Policy Formulation and Planning in Ethiopia. WID/Department of Economics, Unpublished paper, Addis Ababa University, Ethiopia.

AGP (Agricultural Growth Project), 2010. Project Information Document (PID),Report No.AB5416, Financed by World Bank, Ethiopia.

Bogalech Alemu, 2000. Mainstreaming Gender in National Development Programmes. Economic Focus, Vol. 3, No. 3, Ethiopia.

Cropenstedt, A. and Mulat Demeke 1997. An Emperical study of cereal crop production and Technical Efficiency of Private farms in Ethiopia: A Mixed Random Approach Applied Econometrics, Vol. 29, pp.1217-1266. In: Sharadaweir Working Paper Series, University of Oxford.

CSA (Central Statistics Authority), 2005. Ethiopia Statistical Abstract 2005, Ethiopia.

Duggan, L., 1997. Households and Family. In: The Women, Gender and Development Reader, pp. 103-107, Visvanathan, N.(eds),USA.

Ellis, F., 1988. Peasant Economics: Farm Households and Agrarian Development. Cambridge University Press, New York.

GOE (Government of Ethiopia), 1995. National Program of Action for Children and Women. Addis Ababa.

Gujarati, D., 1995. Basic Econometrics, 3rd ed. Mc Graw Hill Inc, New York.

Koutsoyiannis, A., 1997. Theory of Econometrics: An Introductory Exposition of Econometric Methods, 2nd ed. Macmillan Publishers Ltd, USA.

MoFED (Ministry of Finance and Economic Development), 2002. Sustainable Development and Poverty Reduction Strategy Paper, Unpublished Paper, Ethiopia.

MoPED and UNICEF (Ministry of Planning and Economic Development and United Nations Children's Fund), 1994. Proceedings of the Workshop on Gender and Development. Dire Dawa, Ethiopia.

Oaxaca, R., 1973. Male-Female Differences in Urban Labour Markets. *International Economic Review*, Vol. 14, No. 1, pp. 693-709.

Quisumbing, A., 1993. Gender Issues in Agriculture: Overcoming Barriers to Increased Productivity and Welfare. Population and Human Resource Division, South Asia Department III. World Bank, Washington D.C, USA.

Saito, K., Hailu, M. and Spurling, D., 1994. Raising the Productivity of Women in Sub Saharan Africa. The International Bank for Construction and Development of the World Bank,Washington D.C, USA.

Seyoum, E., Battese, G. and Fleming, E., 1998. Technical Efficiency and Productivity of Maize Producers in Eastern Ethiopia: A study of Farmers Within and Outside the Sasakawa-Global 2000 Project. Agricultural Economics, Vol. 19, No. 3, pp.341-348.

Shahnaj, P. and Ingrid, L., 2004. Empowerment of Rural Women in Bangladish: A Household Level Analysis. Paper presented at conference on Rural Poverty Reduction through Research for Development and Transformation,5-7 October 2004, Berlin.

Tadele Melaku, 2007. *The effect of Women Empowerment through Education,* Unpublished Paper, Haramaya University, Ethiopia.

Tiruwork Tizazu, 1998. Access to Resources and Productivity of Female-headed Households: The Case of East Gojjam and North Shoa, MA Thesis, Addis Ababa University, Ethiopia.

*******