

## Gender Differentials in the Productivity of Cereal Crop Farmers: A Case Study of Maize Farmers in Oluyole Local Government Area of Oyo State

O.A. Adeleke, O.I. Adesiyan, O.A. Olaniyi, K.O. Adelalu and H.M. Matanmi

Department of Agricultural Economics and Extension,  
Ladoke Akintola University of Technology, P.M.B. 4000,  
Ogbomosho 210001, Oyo State, Nigeria

**Abstract:** This study broadly investigated in details, Gender and Productivity Differentials among maize farmers in Oluyole Local Government Area of Oyo State. In its specific objectives, it describes the socio-economic characteristics of the farmers, analyze the factors that affect maize production as well as compare the productivities of the male and female cassava farmers in the study area. A farm-level data was collected from 70 smallholder (35 each of male and female) farmers. The respondents were selected through a multistage sampling technique from five major farming settlements (i.e., Onidajo, Akintola, Alata, Abanla and Onipe). The data collected were analyzed by Descriptive Statistics, Multiple Regression Analysis and Chow F-test to check for the existence of structural stability in the male and female maize farmers' production enterprises. The findings of this research showed that they exist certain differences that are gender specific exist between the selected male and female farmers' socio-economic characteristics in the study area. These gender specific socio-economic characteristics do not however reflect any differences in the productivity levels of the sampled male and female farmers. One of the implications of the findings is that in spite of the identified gender, specific characteristics in the study area, no serious barrier that can affect agricultural productivity, especially of the women has been established. If the same levels of agricultural incentives were granted the women as their men counterparts, there will be increase in the overall productivity of the entire farming populace.

**Key words:** Productivity differentials, gender, Cobb Douglas function, Oluyole, Oyo State, Nigeria

### INTRODUCTION

Past studies, e.g., Chiebowska (1990), Mijindadi (1993), Adekanye (1985), Olawoye (1996), Staudt (1982), NCEMA (1990) and CBN (1994) among others, have extensively investigated productivity differentials among farmers especially in rural Africa with bias towards women farmers. Their findings are in the area of Africa's food production where women contribute 80% and the responsibility of Nigeria's women in actual farm work is found to be about 70%. The findings also include: Contribution of women to food production in Asia (50-60%), in the Caribbean 46%, in North Africa and the Middle East (31%) and in Latin America which is slightly more than 30%. Few studies however described specifically farm operation and activities as being carried out by both male and female farmers. These include: Bush clearing, stumping and heaping which men do more while women do more of weeding, harvesting, marketing and processing (Afolami and Ajani, 1995). In male headed households, the labour input of women and children constitute the major input into household enterprises (FAO, 1985). These studies found that women have

moved from traditional roles of being housewives and providing labour on the husband's farms only, to also owning farms of their own. Women were also found to be active in both on-farm and off-farm operations. Some operations are however more gender friendly than others. Among food crop enterprises, some crops which are gender friendly include maize and yam while some which are gender neutral are cassava, cowpea and other cereals or vegetables are also gender neutral (Amaza, 2000). Female maize farmers are easily found than female yam farmers in the northern part of south western Nigeria (Ajani, 2001).

Other studies have also shown that women play major roles in farm level decision making. Whether men are more efficient (productive) than women in farm production is passionately debated. Only few studies have examined this issue in Africa, one example is found by Hait (1992). The gender differential, apparently, is caused by the difference in the yield intensity, with which measured inputs of labour, manure, fertilizer are applied on plots controlled by men and women, rather than by differences in the efficiency with which these inputs are used.

In production function estimate, for all crops (sorghum and vegetable crops, in which women specialized), Amaza and Olayemi (1999) found, for example, that except in the case of sorghum, the coefficient of the gender variable was not significant. One of the major reasons, for the neglect of women in maize development projects in West Africa is the erroneous, yet pervasive assumption that female farmers are less efficient than their male counterparts. Thus, even in regions of West Africa, where women are the traditional maize growers together with some other arable crops (cassava, vegetables) which are considered as women's crops, development project choose to focus on men and not women.

In recent times however, the concern of many developing economies is to develop women in all areas of human endeavour so as to address the perceived gender imbalance. This study is therefore, set to examine in details some of the characteristics of rural and farm family households that have been considered pertinent in creating this imbalance. The resultant imbalance is viewed differently as women's low income generating capabilities peaking in a vicious circle of poverty. A study of this nature can provide headway to the methods that can be adopted to improve the lot of rural women in developing countries.

## MATERIALS AND METHODS

The data required for this study were obtained from smallholder male and female farmers by way of a sample survey. Information on socio-economic and farm specific characteristics was obtained from the farmers. Also collected were information on farm production and input-output levels of the farmers. The data collection was made possible by means of detailed structured questionnaire.

A total of 70 respondents (35 each of male and female farmer types) were chosen through a multistage sampling procedure. The study area consists of 5 major farming settlements namely: Onidajo, Akintola, Alata, Abanla and Onipe. These settlements are located within the Oluyole Local Government Area of Oyo state Ibadan/Ibarapa zone of the Oyo State Agricultural development programme. Maize is a predominant annual crop grown in the study area. Yam, cassava, vegetables and legumes are however, grown in bits alongside maize. Domestic animals are also raised as backyard livestock.

Descriptive statistics were used to describe the pattern of the socio-economic and farm specific variables of the respondents. These variables are expected to impact on the gender characteristics of the respondents.

A Cobb-Douglas production function was also fitted to estimate the coefficients and other parameters that affect the respondent's productivity. The production function is of the following implicit form:

$$Y = f(X_1, \dots, X_n)$$

Where,

- Y = Output (in farm Gross Margin-Naira).
- X<sub>1</sub>-X<sub>7</sub> = Production inputs.
- X<sub>1</sub> = Farm size in hectares.
- X<sub>2</sub> = Seed cost in Naira.
- X<sub>3</sub> = Chemical fertilizer cost in Naira.
- X<sub>4</sub> = Cost of implement in Naira.
- X<sub>5</sub> = Pesticide cost in Naira.
- X<sub>6</sub> = Family labour used in production (in standard days).
- X<sub>7</sub> = Cost of hired labour.

The choice of Cobb-Douglas' production function was essential because it is a celebrated example of logarithmic function, which up till now, is one of the most widely used production functions, in empirical studies, Olayemi (1998). Additionally, it was adopted in this study because of its ease of linearization and especially for its production function approximating abilities.

## RESULTS AND DISCUSSION

**Gender characteristics of farmers:** Ten major characteristics of the sampled farmers were considered and analyzed. These characteristics are expected to be imparting on the productivity levels of the men and women maize farmers. The results of the analysis describing these characteristics are presented in Table 1. The summary statistics are discussed as follows:

**Age:** Most of the men (37.14%) and women (34.28%) were in the active productive ages (40-49 years) with men dominating. The men and women in this age group were expected to be actively involved in maize production. This implies that high productivity will be associated with men and women in this age group but more with men farmers in the study area.

**Marital status:** A large majority of the sampled farmers (88.57% men and 85.71% women) were married. None of the sampled women farmers was single.

**Level of formal schooling:** Results show that most sampled farmers (about 42.28% men and 57.14% women)

Table 1: Descriptive statistics of socio-economic and farm characteristics of the sampled farmers by gender

| Age (years)                                 | Men (%) | Women (%) |
|---|---------|-----------|
| 20-29                                       | 8.57    | 20.00     |
| 30-39                                       | 27.15   | 17.14     |
| 40-49                                       | 47.14   | 44.48     |
| 50-59                                       | 17.14   | 18.38     |
| <b>Marital status</b>                       |         |           |
| Single                                      | 5.71    | -         |
| Married                                     | 88.58   | 88.72     |
| Widowed                                     | 5.71    | 14.28     |
| <b>Level of formal schooling (years)</b>    |         |           |
| None  | 22.85   | 34.28     |
| Primary                                     | 42.28   | 57.14     |
| Secondary                                   | 28.57   | 8.58      |
| Tertiary                                    | 6.30    | -         |
| Headship of household                       | 94.28   | 14.28     |
| <b>Ownership structure of farm holdings</b> |         |           |
| Own   | 18.25   | -         |
| Family land (temporary)                     | 42.15   | 62.85     |
| Family land (permanent)                     | 65.88   | 37.15     |
| Rented                                      | 14.29   | -         |
| Freehold (squatting)                        | -       | 25.71     |
| Communal land                               | -       | 2.80      |
| <b>Income (Naira/Hectare)</b>               |         |           |
| 6,000-9,000                                 | 2.87    | 11.42     |
| 10,000-13,900                               | 17.14   | 34.28     |
| 14,000-17,900                               | 65.71   | 51.43     |
| 18,000-21,900                               | 14.28   | 2.86      |
| <b>Types of agricultural enterprises</b>    |         |           |
| Crop farming (maize and others)             | 100.0   | 100.0     |
| Livestock (backyard)                        | 85.75   | 25.00     |
| <b>Use of agricultural inputs</b>           |         |           |
| Improved seeds                              | 65.94   | 77.30     |
| Pesticides                                  | 8.23    | 31.35     |
| Fertilizer                                  | 95.60   | 97.28     |
| Farm credits                                | 25.75   | 15.20     |
| <b>Sources of credit</b>                    |         |           |
| Money lenders                               | 17.90   | 3.34      |
| Merchants                                   | 35.50   | 20.45     |
| Rural banks                                 | 5.25    | 1.30      |
| Cooperatives                                | 13.40   | 16.65     |
| Friends/relations                           | 8.70    | 25.70     |
| Personal/own saving                         | 82.30   | 30.80     |
| <b>Farm size (hectares)</b>                 |         |           |
| 0.5-1.4                                     | 5.72    | 20.00     |
| 1.5-2.4                                     | 88.31   | 80.00     |
| 2.5-3.4                                     | 3.52    | -         |
| 3.5 and above                               | 2.45    | -         |

\* Contain mutually exclusive percentages

had only primary education. Some men (about 6%) had tertiary education while no woman had tertiary education. The results indicate that the productivity levels of the sampled farmers could have been higher if many had more formal education to understand fully, the proper use of resources.

**Headship of household:** Since most of the sampled men and women farmers are married, it is expected that the women who assumed the headship of farming household would be primarily composed of the widows. That explained why the percentage of women heads is equal to that of the widows (about 14.28%). The responsibility of headship is enormous, this implies that women heads

would tend to be more hard working and better engaged in farm activities to meet basic subsistence needs. In as much as we can not provide evidence for the position of some authors e.g., Tinker (1976, 1990), Chancey (1984), Moser (1989), Sayne (1991) and a host of others, "that one-third of the world's households are headed by women", we make bold to submit that women, especially the widows in the study area have actually taken a great challenge to provide for the family even in the face of gender imbalance.

**Ownership structure of farm holdings:** Few men (about 18%) own their farm holdings. Majority of the men (about 66.88%) farm permanently on family land while most of the women (about 62.85%) farm temporarily on family land. The dependence of women on temporary family land can impose several constraints on the women, the prominent of which is their inability to grow crops of their choice, especially perennial crops. This is because the land can be reclaimed at short notice, so, the women are compelled to grow annual crops. The absence of title to land by the women can also deny them sustainable farm income, Jackson (1996), in his remark posited that the endowing of men with land may adversely affect women's bargaining position within households". This is another poverty indicator which potentially distorts the understanding of gendered deprivation by use of male yardstick.

**Farm size:** Majority of the sampled farmers (about 88% men and 80% women) have farm sizes ranging from 1.5-2.4 ha. Farm size greater than 2.5 ha were owned by men. The women's inability to hold up to 2.5 ha is due to their lack of access to enough land.

**Income:** The level of income generated by the sampled men and women is a reflection of the ownership structure and of course size of farm holdings. The prominent income category common to both men and women is N14, 000-N17, 900. A sizeable number of men (about 14.28%) have income above this range as compared to only few women (about 2.86%) generating income above that range. Differences in farm management strategies could be a factor responsible for the income difference here. In confirming this assertion, a similar observation was made by Zeuli and King (1998).

**Types of agricultural enterprises:** All the sampled farmers are into crop farming with maize forming the prominent crop grown. Majority of the men (66%) and only 25% women also keep livestock at the homestead. It was however discovered that the entire farming household shares the responsibility of livestock keeping.

Table 2: Cobb-douglas model estimates for men, women and the pooled data

| Variable                          | Men       | Women     | Pooled   |
|-----------------------------------|-----------|-----------|----------|
| Land (X <sub>1</sub> )            | 0.444*    | 0.321**   | 0.373*   |
| Seed (X <sub>2</sub> )            | 0.261**   | 0.2791*   | 0.288*   |
| Fertilizer (X <sub>3</sub> )      | -0.001887 | -0.004993 | 0.002518 |
| Farm implements (X <sub>4</sub> ) | 0.139     | 0.274*    | 0.182*   |
| Pesticides (X <sub>5</sub> )      | -0.06402  | -0.04506  | 0.04714  |
| Family labour (X <sub>6</sub> )   | -0.09440  | -0.06601  | -0.07064 |
| Hired labour (X <sub>7</sub> )    | -0.04550  | -0.02143  | -0.03959 |
| Constant                          | 5.260     | 4.709     | 5.152    |
| Adjusted r-square                 | 0.738     | 0.805     | 0.789    |
| Standard error                    | 0.09820   | 0.08068   | 0.08587  |
| F ratio                           | 14.658    | 21.009    | 37.758   |

\*Variable significant at 1%, \*\*Variable significant at 5%

**Use of agricultural inputs:** Women farmers have more access to improved seeds and fertilizer than their men counterparts. For example over 77% of the women use improved seeds as against 66% of the men. They also have better flair for fertilizer (about 97%) more than the men (96%). The higher income generated by the men could however be due to the fact that the women were less adequately capable to manage their farm holdings.

**Sources of credit:** The men also have more access to credit from most sources. Only from cooperatives and friends/relations did the women have better access. Access to credit is also a major determinant of output and in effect increased productivity of farmers. The findings here are not uncommon; for example in a study of gender characteristics of rural financial institutions in Uganda, Fendru and Adipala (2001), found that there is limited access to credit by both men and women, but this affects women the more.

**Production function analyses:** The estimated Cobb Douglas production functions (regression equations), by methods of least squares for the men, women and the pooled data are presented in Table 2. The coefficient of land, seed and farm implements are all positive. The coefficients of land (for men), seeds (for women) and land, seed and farm implements (for the pooled data) are all significant at 1% level. The coefficient of seeds (for men) and land (for women) are all significant at 5% level. However, the coefficients of fertilizer, pesticides, family and hired labour are all negative and insignificant. Though they are all expected to be positively related to the output (a priori), their negative relationships with the maize output in this study are not unexpected for two reasons. One, almost three-quarters of the sampled farmers used improved seeds as planting materials (Table 1), especially hybrid maize. Two, hybrid maize only requires good soil and only a little quantity of chemical fertilizer. The need for intensive labour use may not be necessary from the germination to the maturity stage. In

essence, inputs like fertilizer, pesticides, family and hired labour were overused in the context of this study. This means that expected yield (in monetary terms) for both men and women of the sampled farmers could have been lowered by making use of the inputs that have negative signs and are insignificantly related to the output.

To check for the structural stability of the regression equations estimated for both men and women, Chow (1960) test was conducted to ascertain if the 2 relationships differ significantly. Chow test is essentially an F-test (Koutsoyiannis, 1981; Gujarati and Damodar, 1995; Oredipe and Akinwumi, 2000). Since the F computed (0.325) was less than the theoretical F (2.51 at 1% and 1.94 at 5%), the null hypothesis that there is no significant difference in the coefficients obtained from the 2 different functions for men and women was accepted. This in effect, means there was no significant difference in the productivity levels of both men and women.

Previous studies e.g., Jacoby (1992) and Ajetomobi (1995) found that men contributed a greater share to the farm output and by extension income and are more productive at the margin than women. They also found that men are more efficient in their use of basic farm inputs than women. The validity of their findings may have been questioned in so far as women farmers have been brought into limelight through various developmental programmes by several NGOs, research institutions in the developed and developing economies. The present study however, provides an eye-opener to the impact of such development programmes geared towards improving women in their different endeavours. Though this study was not meant to estimate the marginal productivity on the basis of the individual inputs (resources), the multi-factors (total factors) productivity indices showed that the relative difference in the production efficiencies of both the men and women could be insignificant, judging by the result of the Chow -F test. Studies such as those of Odii (1994) and Rhaji (1998, 2001) and quite a number of more recent ones have results which support the findings here. Some of the findings even have results which indicate that women's performances in terms of overall productivity and resource-use efficiencies have surpassed those of their men counterparts (Macours and Swinnen, 2000; Kuponiyi, 2003).

## CONCLUSION AND RECOMMENDATIONS

The study was meant to highlight and analyze the differences that exist in the basic socio-economic characteristics of male and female farmers in the study area. These characteristics were expected to reflect a difference in the productivity levels of the sampled

farmers. However, the study shows no difference in the average productivity of the sampled male and female farmers. This means that in spite of identified gender specific characteristics in the study area, no barrier has been established that can affect agricultural productivity especially of the women.

The findings here have implications for sustainable agricultural development hence the following recommendations are made.

Women who have farm families are composed mainly of widows, in order to make them improve on their farming activities, more attention should be paid to their needs of basic input with minimal bottlenecks. Majority of the women were also found to be farming on temporary lands; a situation which only allows them to cultivate farm sizes smaller than those of their male counterparts. An aggregate effect in this regard is the generation of low income (though this may be in relative terms). Institutional and cultural practices that will allow the women farmers to have an unfettered access to farm lands should be readdressed. This is to the extent that rights and privileges to acquire lands (especially for farming purposes) by women are not infringed upon.

On average basis, women had more access to improved seeds and fertilizer than their male counterparts. The reason for this may not be far-fetched; there is the tendency of the suppliers of the improved seeds and fertilizers to be "compassionate" on the women's demand for those basic inputs. The many developmental programmes of the present day Nigeria accord such privileges to women especially in the rural areas.

In conclusion, a sustainable agricultural and rural development would be attained when women's needs for improved livelihood are met. The various rural development programmes by many developing economies such as those springing up in Nigeria would impact on women in particular and on the rural communities in general if the same levels of incentives are granted the women as their male counterparts.

#### REFERENCES

- Adekanye, T.O., 1985. Access of women farmers to land resource. *Nig. J. Rural Soc.*, 4: 86.
- Afolami, C.A. and O.I. Ajani, 1995. Gender Participation of Women in Cassava Processing in Abeokuta, Ogun State. A Proceeding of the 75th Annual Conference of the Nigerian Association of Rural Sociological Society of Nigeria.
- Ajani, O.I.Y., 2001. Resource Productivity in Food Crop Farming in the Northern Area of Oyo State, Nigeria, Ph.D. Thesis, University of Ibadan, Nigeria.
- Ajetomobi, J.O., 1995. Economic Efficiency of women Farmers within the Ondo State Agricultural Development Programme, M.Sc. Thesis, Obafemi Awolowo University, Ile-Ife, Nigeria.
- Amaza, P.S., 2000. Efficiency of Food Crop Production in Gombe State Ph.D. Thesis, University of Ibadan, Nigeria.
- Amaza, P.S. and J.K. Olayemi, 1999. An Investigation of Production Efficiency in Food Crop Enterprises in Gombe State, Nigeria. *J. Rural Econ. Dev.*, 13: 111-120.
- Central Bank of Nigeria (CBN), 1994. *Stat. Bull.*, pp: 25.
- Chancey, E.M., 1984. *Women of the World: Latin America and the Caribbean*, Washington, D.C. United States Bureau of the Census.
- Chiebowska, G.H., 1990. The World Distribution of Women. *Int. J. Rural Soc.*, 19: 68-75.
- Chow, C.G., 1960. Test of Equality between Sets of Coefficients in Two Linear Regressions, *Econometrica*, 28: 591-605.
- Fendru, I. and E. Adipala, 2001. Gender Characteristics of Rural Financial Institutions in Uganda. *African Crop Sci. J.*, 9: 549-565.
- Food and Agriculture Organization (FAO), 1985. *Land Tenure and Related Social Problems*.
- Gujarati, N. and Damodar, 1995. *Basic Econometrics*, McGraw-Hill, Inc.
- Hait, M.O., 1992. Gender Differentials in Agricultural Production System. *Int. J. Rural Soc.*, 21: 61-68.
- Jackson, C., 1996. Rescuing Gender From the Poverty Trap, *World Dev.*, 24: 489-504.
- Jacoby, H., 1992. Productivity of Men and Women and the Sexual Division of Labour in Peasant Agriculture of the Peruvian Sieva. *J. Dev. Econ.*, 37: 265-287.
- Koutsoyiannis, A., 1981. *Theory of Econometrics*, Mcmillan Edu. Ltd. Hondmills, Basingtoke. Hampshire.
- Kuponiya, F.A., 2003. Gender Role Specification In Agricultural Production: The Case of Women in Tobacco Cultivation in Nigeria. *J. Rural Dev.*, 36: 85-91.
- Macours, K. and J.F.M. Swinnen, 2000. Causes of Output Decline in Economic Transition: The case of Central and Eastern Agriculture. *J. Comparative Econ.*, 28: 172-207.
- Mijindadi, N.B., 1993. *Agricultural Extension for Women: Experience from Nigeria*. Paper Presented at the 13th World Bank Agriculture Symposium on Women in Agricultural Resource Management, Washington D.C.
- Moser, C.O.N., 1989. *Gender Planning in the Third World: Meeting Practical and Strategic Needs*. *World Dev.*, 17: 1799-1825.

- National Centre for Economic Management and Administration (NCEMA), 1990. Women's Contribution to Agriculture: A Global Perspective. NCEMA J., 8: 28-37.
- Odi, M.C.A., 1994. Gender Considerations in the Resource Allocation and Food Production Behaviour of Farming Households in South-Eastern Nigeria Unpublished PhD Thesis, Department of Agricultural Economics. University of Ibadan Nigeria.
- Olawoye, J.E., 1996. Empowerment for Rural Women. In: Women Empowerment and Reproductive Health. Social Sciences and Reproductive Health Network, Ibadan.
- Olayemi, J.K., 1998. Elements of Applied Econometrics, Elshaddi Global Ventures Ltd., Ibadan, Nigeria.
- Oredipe, A.A. and J.A. Akinwumi, 2000. Resource Productivity and Efficiency Among Farmers Adopting Improved Maize Technology in Ogun State, Nigeria. Nig. Agric. Dev. Stud., 1: 27-38.
- Rhaji, 1998. Gender Aspect of Farm Household Time Allocation in South-Western Nigeria, Wnrock International: Interim Report.
- Rhaji, 2001. Gender Productivity Differentials and Returns to Schooling in Farm Households in South Western Nigeria. Nig. Agric. Dev. Stud., 2: 13-21.
- Sayne, P.L., 1991. Food for thought: Making women visible. Environ. Urbaniz, 3: 46-56.
- Tinker, I., 1976. The Adverse Impact of Development on Women. In: I. Tinker and M.B. Bramsen (Eds.). Women and World Development, Washington, D.C. Overseas Dev. Council, pp: 22-34.
- Tinker, 1990. A Context for the Field and for the Book. In: I. Tinker (Ed.). Persistent Inequalities: Women and World Development, New York: Oxford University Press, pp: 3-13.
- Zeuli, K.A. and R.P. King, 1998. Gender Differences in Farm Management. Rev. Agric. Econ., 20: 513-529.