

Economic Efficiency and Supply Response of Women as Farm Managers: Comparative Evidence from Western Kenya

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Summary. — This paper assessed the relative economic efficiency and output supply and input demand responses of women farmers in western Kenya. The results showed that women are as technically and allocatively efficient as men. However, neither men nor women have absolute allocative efficiency. Women farmers are equally responsive to price incentives in terms of output supply and input demand. While education and extension contact have significant effects on overall maize supply and input demand, only extension contact has significant effects among women farmers. The paper discusses a number of significant results and concludes with implications for policy.

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Key words — efficiency, supply response, input demand, women, Africa, Kenya

1. INTRODUCTION

A large volume of literature has documented the key roles of women in agricultural production in developing countries, ranging from providing a significant share of labor for food as well as cash crop production (Boserup, 1970; Dixon, 1982; FAO, 1985; Gladwin, 1991) to managing their own fields (Moock, 1976; Quisumbing, 1996; Saito, Mekonnen, & Spurling, 1994; Udry, 1996; Udry, Hodinott, Alderman, & Haddad, 1995). However, traditional biases against women have led to an asymmetric distribution of rights, resources, and responsibilities (Udry, 1996). There is a large and growing volume of literature showing that women farm-

ers have limited access to both physical and human capital, including land, labor, education,

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extension, and credit (Bindlish & Evenson, 1993; Birkhaeuser, Evenson, & Feder, 1991; Doss, 2001; FAO, 1985; Quisumbing, 1996). For instance, in a review of 25 years of literature on designing agricultural technologies for African farmers, Doss (2001) found that female farmers, especially female-headed households, are often not contacted by extension services.

The need for correcting gender imbalances in access to resources and support services has long been recognized, in the view of women's major contribution to agricultural production and the argument that women farmers are as efficient as men. However, whether women are in fact as efficient as men has been debated. This has motivated a lot of empirical work on measuring and explaining male-female differences in agricultural productivity. In Africa, there are fewer studies investigating gender differentials than in other parts of the developing world, and the results are also mixed (e.g., Mook, 1976, Kenya; Bindlish, Evenson, & Gbetibuou, 1993, Kenya; Bindlish *et al.*, 1993, Burkina Faso; Saito *et al.*, 1994, Kenya & Nigeria; Udry *et al.*, 1995, Burkina Faso; Adesina & Djato, 1997, Côte d'Ivoire). No significant gender differences were found in Kenya (Bindlish & Evenson, 1993; Mook, 1976; Saito *et al.*, 1994) and Côte d'Ivoire (Adesina & Djato, 1997). Mixed results were obtained for Nigeria (Saito *et al.*, 1994) and Burkina Faso (Bindlish *et al.*, 1993; Udry *et al.*, 1995). In Nigeria (Saito *et al.*, 1994), household level analysis revealed no gender differentials, but plot level analysis showed that women were less productive than men. In Burkina Faso, Bindlish *et al.* (1993) found that women were less productive than men, but Udry *et al.* (1995) found that, except in sorghum production, there were no significant gender yield differentials.

Quisumbing (1996) reviewed the empirical literature and concluded that, in general, male and female farmers are equally efficient as farm managers, and the lower yields of women farmers are attributable to their use of lower levels of inputs and human capital than men. However, the review singled out methodological problems associated with the use of production functions that do not account for the endogeneity of input choice as the major limitation of past work and recommended further rigorous measurement of gender differences in agricultural productivity. Specifically, it pointed out that estimating profit or cost functions instead

of production functions would address concerns about the endogeneity of input choice (Quisumbing, 1996).

Apart from accounting for endogeneity, the profit function would indeed allow the investigation of women's relative allocative efficiency and supply response. Although allocative efficiency has long been the major subject of research on farmer efficiency, largely motivated by the famous "poor but efficient" hypothesis (Schultz, 1964), it has been ignored in the literature on gender efficiency differentials. The apparent disconnect between the actual subject of the investigation of male-female differences (i.e., technical efficiency) and the early influential work on peasant efficiency (i.e., allocative efficiency) means that empirical evidence on gender efficiency differentials thus far cannot be used to validate the "poor but efficient" hypothesis as it relates to women farmers. The gender implications of economic reforms have also been increasingly recognized. There has been a growing concern that the emphasis of adjustment policies on producer prices of cash crops, at the expense of food crops, might deteriorate the position of women farmers relative to men (Warner & Campbell, 2000).

This paper uses the profit function approach to assess relative technical and allocative efficiency as well as output supply and input demand responses of women farm managers in Kenya. The systems of restricted profit, maize supply, and input demand equations are estimated, incorporating the full range of price and non-price factors. Given that maize is both the major food crop and a cash crop in Kenya, it can serve as an interesting case with which to examine gender differentials in technical, allocative, and economic efficiency. The remainder of the paper is organized as follows. The next section presents the analytical model and hypotheses, whereas the data and empirical econometric procedures are discussed in the third section. The results are presented and discussed in the fourth section and the last section draws conclusions and implications for policy.

2. ANALYTICAL MODEL

(a) *Normalized restricted profit function*

This paper applies the popular restricted normalized profit function approach¹ (Lau, 1976;

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