

DEVELOPING AGRICULTURAL TECHNOLOGY FOR NIGERIAN WOMEN FARMERS: FARM LABOUR PERSPECTIVE

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Abstract

Nigerian women farmers are less likely than men to adopt improved crop varieties and management system. This paper addresses two issues: How does gender affect technology adoption among Nigerian farmers? How does the introduction of new technologies affect women's well-being? Three conclusions come out of an extensive and critical review of the literature. First, Nigerian households are complex and heterogeneous. Second, gender roles within Nigerian households and communities cannot be simply summarized. Third, gender roles and responsibilities are dynamic, they respond to changing economic circumstances. The paper demonstrates the complexity and importance of efforts to design interventions for Nigerian women.

Keywords: Technology adoption, gender, Farm labour.

Introduction

For years, activities, donors, and researchers have pushed agricultural research institutions to do a better job of targeting their research toward women. These institutions have responded, spending considerable resources on research intended to benefit women. Nonetheless, women farmers exhibit relatively low rates of adoption of high-yielding varieties and improved management system. Most farmers in Nigeria continue to be limited by choices and constraints at the household level, and women often face particularly severe constraints. Where new technologies have been adopted, concerns are often raised that these technologies have differential impacts on the well-being of men and women.

This paper addresses the issues described above: How does gender affect technology adoption among Nigerian farmers in relation to farm labour? How does the introduction and adoption of new technologies affect women's well being?

Much of the early works on women in agriculture assumed that women would benefit if project designs would simply 'take into account' women's roles and responsibilities. Including women would result in efficiency gains that would benefit everyone. Although many projects and technological development still do not take even this initial step towards incorporating women, it is now clear that 'taking women into account' is not sufficient. Developing technologies that will improve women's well-being poses a much more difficult challenge. Gender affects farmers access to labour, land, and other agricultural inputs.

This paper examines issues in farm labour that have bearing in designing agricultural technology for Nigerian women farmers.

Farm Labour

The willingness to adopt new agricultural technology depends, in part, on the farmer's expectations for increased output and/or the alleviation of constraints to production. One such constraint is the lack of labour. Many factors affect a household's labour constraints, including the gender division of labour and access to household and hired labour. To the extent that men and women perform different tasks or have different access to household or hired labour, the gender of the farmer may affect the adoption of technology.

The patterns of labour allocation also have important implications for the well-being of individual family members. New technologies frequently change the labour allocations within the household. Increased productivity may not benefit all household members equally as changes in agricultural production may involve reallocations of labour inputs across household members as well as relocation of control over outputs.

(a) Gender Division of Labour

In many places in Nigeria, there has been a division of labour by gender in agriculture based on crop, task or both. These divisions are not static and may change in response to new economic opportunities.

In some areas, men and women tend to grow different crops. One frequently made distinction is that cash crops and export crops are 'male crops'. While subsistence crops are 'female crops' (Koopman, 1993; Kumar, 1987; Randolph, 1988). A standard explanation for the division of crops by gender is that women are responsible for feeding the family and thus prefer to grow subsistence crops. Men are responsible for providing cash income and to this end grow cash and export crops. It is difficult to tell, however, whether women grow lower-value subsistence crops because they have different priorities or because they have less access to land, inputs, credit, information or markets. Recent work on gender patterns of cropping suggests that these

distinctions are problematic, women are involved in cash cropping, although to a lesser extent than men. Similarly, many men are involved in the production of food crops for home consumption (Doss, 2001).

The distinction between cash crops and subsistence crop is not always clear. Consider the case of maize. Like many food crops, maize is both a cash and a subsistence crop; sometimes certain varieties are preferred for home consumption and other varieties are sold in the market. In many areas, high-yielding varieties were initially treated as cash crops. Many of the early high-yielding varieties were considered to have inferior processing, cooking, and storage characteristics, compared to local varieties. Consequently, local varieties were often considered 'women's crops' and high-yielding varieties were considered 'men's crops' (Gladwin, 1992; Alwang and Siegal, 1994). This implies that not only the crop, but also the variety of a given crop, may vary by gender. But, as researchers develop high-yielding varieties that meet the consumption preferences of small holder farmers, the distinctions between subsistence and cash varieties becomes blurred. (Smale and Heisey, 1994). In addition, as local food markets develop, the division of cash versus subsistence crops becomes less clear. Women are increasingly involved in marketing crops for urban consumers.

Often crops are defined as men's or women's based on who controls the output. This may not be the only useful distinction, however, for the purpose of understanding technology adoption. It is also important to consider who chooses the crops to grow and who makes the management decisions. Different people may be involved with any given crop at various stages. Although traditional notions of appropriate crops may condition the adoption of a crop variety for men and women, these norms change as economic circumstances shift.

In much of the world, men and women tend to work at different tasks. Numerous time allocation studies have detailed which household members perform which farm tasks (Hirschmann and Vaughan 1984; Mcsweeney 1979, Pala, 1983, Saito, 1994). These studies often identify some tasks as men's tasks and other as women's tasks. Relatively few tasks, however, are done only by men or only by women.

Although tradition often specifies some tasks or crops as women's and some as men's, these change over time. As early as 1928, Baumann noted that women's involvement in agriculture increased as new opportunities for men to work outside of agriculture arose (Baumann, 1928). Boserup (1970), claimed that the roles of women in agriculture were related to population densities and economic opportunities. Past studies show that as new opportunities arise, gender divisions of labour are becoming less rigid (Kranz and Fiege, 1983; Berio, 1984; Suda, 1996). Yet, typically men are not taking over women's agricultural activities, specifically, the production of food for home consumption. Men typically move into women's activities when these activities become profitable. New technology may be a catalyst for increasing crop profitability. Thus, programs need to ensure ways for women to maintain control over their activities once they become profitable.

Many studies suggest that women's burdens increase with new technologies (Berio, 1984; Kranz and Fiege, 1983, Suda 1996). This may occur because women take on additional tasks, because their tasks become more burdensome (such as the increased need for weeding when fertilizer is applied), or because they are involved with processing increased levels of output. As women's labour burdens and responsibilities increase, however, their control over their labour and output may also increase. Increased labour input may be accompanied by increased independence and control over the output. Thus, a net increase in women's well being may result. Obviously, if a technology both decreases women's burdens and increases their independence and control, the benefits to women will be more substantial. But when there are both positive and negative effects, the women themselves must be the ones to judge the direction of the net effect.

The seasonality of tasks is especially important in Nigeria and it interacts with the gender division of labour to provide additional constraints (Delgado and Ranade, 1987). Labour bottlenecks are common during the planting and harvesting seasons and may be exacerbated by the gender division of labour. To the extent that male and female labour are not substitutes, the household faces seasonal constraints for each. Guyer (1980) found that a clear peak in men's labour requirements during the cocoa harvest was matched by an increase in women's income generating activities during this period as women took advantage of the additional cash in the local economy. Thus, it is important to consider the relationships between the seasonality of labour among men and women and between agricultural and non-agricultural activities.

Gender is only one criterion for classifying labour allocations. The age and status of the individuals may also affect their responsibilities. Warner, Al-Hassan and Kydd, (1997), identified five categories of social standing for women: retired cooking wives, active cooking wives, junior wives, unmarried women, and divorced women. Women in these categories had different roles, opportunities, and responsibilities. Few studies have looked at the differentiation of individuals by age and status when analyzing agricultural

production and technology adoption. The effects of new technology may also vary by religion or ethnicity. For example, the benefits of irrigation scheme in Nigeria differed by ethnic and religious groups. Muslim women who were involved in trading, production, and selling snack foods benefited from the project while the labour of non-Muslim women was increasingly demanded on the men's fields and they had less time to work on their own plots (Jackson, 1985).

The gender division of labour changes in response to changing economic opportunities. The extent to which these changes benefit or disadvantage women and men is not always clear, and it is difficult to predict a priori what will occur. Because the adoption of new technologies may cause a reallocation of labour across tasks and alter the balance between household and outside labour, it is usually inappropriate to compare adopting and non adopting households. Instead, studies must compare the characteristics of households before and after new technology is adopted.

Labour Availability

A farmer's access to labour, especially during the peak demand for labour, will affect the choices of activities and technologies. A farmers may gain access to labour by mobilizing household labour or workgroups and through the market. Although many empirical studies on agricultural production and technology adoption use households size and composition as important explanatory variables, these factors are endogenous to agricultural production (Delgado, & Ranade, 1987; Suda, 1996; Doss, 2001). Household size and composition are both a response to agricultural opportunities and a determinant of these agricultural opportunities (Memillan, 1987).

Household size and composition are critically affected by migration. Throughout Nigeria, women are *de facto* heads of households because men have migrated to earn higher wages elsewhere. This is especially true in Western Nigeria. (Otunaiya et al 2005), Migration, especially of healthy adult men, results in fewer men being available in rural areas for agricultural work. The shortage of male labour within the household is often cited as a constraint on agricultural productivity (Rukuni and Eicher, 1994). But, men are most likely to migrate when the expected returns from migrating are higher than their productivity on the farm (Chipande, 1987). Thus, in theory, increasing agricultural potential in an area may increase the labour supply available for crop production by encouraging men to remain in the areas. (Goetz, 1993), although little empirical evidence exists to substantiate or refuse this claim.

Remittance from migrating men may negate the labour constraints. Remittances may give a household the opportunity to hire labour and may provide capital to increase the use of inputs. Off-farm income is frequently used to finance farming (Rohrbach, 1989; Smale, 1991). The extent to which remittances are available for investing in agriculture, rather than in housing or children's education, will influence the effects of migrating on agriculture (Francis and Hoddinott, 1993).

The gender of the household head affects agricultural productivity and technology adoption. Frequency households are defined as female-headed only if no adult male is present. Since male-headed households almost always include at least one adult female, the distinction between male and female headed households is both an issue of the gender of the household head and of household composition. The latter may be more important. Definitions of female headed households vary across studies, making comparisons difficult. Some studies includes *de facto* female heads while others do not. Comparing female-and male-headed house-holds provides only limited information about broader gender concerns because it ignores the majority of women who live and farm in male headed households (Rogers, 1995; Peters, 1995).

Although there is great heterogeneity among female-headed households, on average they tend to be smaller than male-headed households and have lower incomes. They are typically less likely to adopt new technologies. It is difficult, however, to disentangle the causal relationships among these factors. To the extent that household size and composition affect productivity, female-headed households will be less productive. Reverse causality may also apply: a household may be female-headed because the farm had low productivity and the male head left to find better paying work. Correlations also arise when women have less access to credit and other inputs. Controlling for household and farm size, income, and access to inputs, we would not necessarily expect empirical studies to present a clear relationship between female headship and the adoption of technology.

One study that examines both the gender of the head of the household and the gender of the farmer finds that women do not necessarily make different decisions about the adoption of improved varieties of maize from men, but that female-headed households are less likely to adopt modern varieties (Doss and Morris, 2001). Examining the gender of the head of household only captures one component of the many gender-linked barriers to technology adoption.

Farmers access to non-family labour, especially during critical periods, may affects both the adoption

of technology and the levels of production. The ability to obtain off-farm labour and to provide labour for wages will affect an individual well-being.

Labour market in most parts of Nigeria reflect important gender influences. Typically, there are segmented markets for male and female wage labour, with female agricultural wage labour generally remunerated at much lower rates than male labour. In some situations women's domestic responsibilities may limit their ability to participate in wage labour.

Wage labour in non-agricultural sector is rare in many rural areas, but off-farm activities, such as agricultural processing and trading, frequently supplement household income. Reardon (1997) found that non farm income provided 22.93% of total rural incomes. Relatively little work has been done on the relationship between agricultural productivity and off-farm opportunities, especially by gender.

Conclusion

Three general conclusions can be drawn. First, there is enormous complexity and heterogeneity among Nigerian households. Second, there is no simple way to summarize gender roles within Nigerian households and communities. Third, gender roles and responsibilities are dynamic. In particular, they change with new economic circumstances. This information may be used to guide researchers and policy-makers to develop technologies and policies that are appropriate in specific areas and to alert them to possible unexpected consequences of their actions.

References

- Alwang, J., & Siegel, P. B. (1994). *Rural Poverty in Zambia: An Analysis of Causes and Policy Recommendations*. Washington, DC: Human Resources Division, Southern Africa Department, The World Bank.
- Baumann, H. (1928). The Division of Work According to Sex in African Hoe Culture. *Journal of the International Institute of African Languages and Cultures*, 1, 289-319
- Berio, A. J. (1984). The Analysis of Time Allocation and Activity Patterns in Nutrition and Rural Development Planning. *Food and Nutrition Bulletin*, 6, 53-68
- Boserup, E. (1970). *Women's Role in Economic Development*. New York: St. Martin's Press.
- Chipancle, G. H. R. (1987). Innovation Adoption Among Female-Headed Households. The Case of Malawi, *Development*, 15, 315-327.
- Delgado, C. L., & Ranade, C. G. (1987). Technological Change and Agricultural Labour use. In J. W. Mellor, C. L. Delgado, & M. J. Blackie (Eds), *Accelerating Food Production in Sub-Saharan Africa*. Baltimore, MD: John Hopkins University Press.
- Doss, C. R. (2001). *Mens crops? Woman's Crop? Gender Patterns of Cropping in Ghana*. Paper Presented at the American Agricultural Economics Meetings, Chicago, August 5-8.
- Doss, C. R., & Morssi, M. (2001). How Does Gender Affect the Adoption of Agricultural Innovations? The Case of Improved Maize Technology in Ghana, *Agricultural Economics*, 25, 27-39.
- Francis, E., & Hoddinott, J. (1993). Migration and Differentiation in Western Kenya: A Tale of two sub-locations. *The Journal of Development Studies*, 30, 115-145.
- Gladwin, C. H. (1992). Gendered Impacts of Fertilizer Subsidy Removal Programs in Malawi and Cameroon. *Agricultural Economics*, 7, 141-153.
- Goetz, S. J. (1993). Interlinked Markets and the Cash Crop-Food Crop Debate in Land-Abundant Tropical Agriculture, *Economic Development and Cultural Change*, 41, 343-360.
- Guyer, J. (1980). *Household Budgets and Women's Incomes*. Boston, MA: African Studies Centre.
- Hirschmann, D., and Vaughan, M. (1984). *Women Farmers of Malawi: food Production in the Zomba District*. Berkeley, CA: University of California.

- Jackson, C. (1985). *The Kano River Irrigation Project* West Hartford, Conn; Kumarian Press.
- Koopman, J. (1993). The Hidden Roots of the African Food Problem: Looking within the Rural Household. In N. Folbre, B. Bergmann, B. Agarwal, and M. Floro (Eds.), *Women's Work in the World Economy* (pp. 82-103), New York: New York University Press.
- Kranz, J., and Fiege, K. (1983). The Work Never Ends: Problems of Women in the Farm Economy of the Ivory Coast, *Development and Cooperation*, 6; 12-13
- Kumar, S. K. (1987). Women's Role and Agricultural Technology. In J. W. Mellow, C. L. Delgado, and M. J. Blackie (Eds.), *Accelerating food Production in sub.*
- McMillan, D. (1987). Monitoring the Evolution of Household Economic System Over Time in Farming Systems Research. *Development and change*, 18, 295-314.
- McSweeney, B. G. (1979). Collection and Analysis of Data on Rural Women's Time Use. *Studies in Family Planning*, 10, 379-383.
- Otunaiya A. O., Idowu A. O., Shittu A. M., and Onitilo A. B. (2005). Socio-Economic Factors Motivating Rural-Urban Migration: Some Evidence from Ogun State, Nigeria. *Journal of Research in Agriculture*, 2, 1:57-61,
- Pala, A. O. (1983). Women's Access to Land and their Role in Agriculture and Decision-making on, the Farm: Experience of the Joluo of Kenya. *Journal of Eastern African Research and Development*, 13, 69-85
- Peter, P. E. (1995). Uses and Abuses of the Concept of Female Headed Households in Research on Agrarian Transformation and Policy. In D. F. Bryson (Ed.), *Women Wielding the Hoe: Lessons from Rural Africa for feminist Theory and Development Practice*. Washington, DC: Berg Publishers.
- Randolph, S. (1988). Constraints to Agricultural Production in Africa: A Survey of Female Farmers in the Ruhengeri Prefecture of Rwanda. *Studies in Comparative International Development*, 23, 78-98.
- Rogers, B. L. (1995). Alternative Definitions of Female Headship in the Dominican Republic. *World Development*, 23, 2033-2039.
- Rohrbach, D. D. (1989). *The Economics of Smallholder Maize Production in Zimbabwe: Implications for food Security*. East Lansing, MI: Michigan State University
- Rukuni, M., and Richer, C. K. (Eds.), (1994) *Zimbabwe's Agricultural Revolution*, Harare, Zimbabwe: University of Zimbabwe Publication.
- Saito, K. A. (1994). *Raising the Productivity of Women Farmers in Sub-Saharan Africa*. World Bank Discussion Paper No. 230, Washington, D. C.
- Smale, M. (1991). *Chimanga cha Makolo Hybrids and Composites: An Analysis of Farmers' Adoption of Maize Technology in Malawi 1989-91*. Mexico, DF: CIM-MYT.
- Smale, M., & Heisey, P. (1994). Gendered Impacts of Fertilizer Subsidy Removal Programs in Malawi and Cameroon, Comment. *Agricultural Economics*, 10, 95-99.
- Suda, C. A. (1996). Household Labor use and Changes in Gender Roles on Small Farms in Ndhiwa Division, Western Kenya: The Challenge of Comparing the Contributions of Different Workers. Nairobi, Kenya: Institute of African Studies.
- Warner, M. W., Al-Hassan, R. M., and Kydd, J. G. (1997). Beyond Gender Roles? Conceptualizing the Social and Economic Lives of Rural Peoples in sub-Saharan Africa. *Development and Change*, 28, 143-168.

