# Getting a Piece of the Pie: An Analysis of Factors Influencing Women's Production of Sweetpotato in Northern Nigeria

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**Abstract**

This paper examines the conditions and factors that create opportunities for women to engage in market-oriented crop production. It uses as a case study of Nasarawa and Kwara states in northern Nigeria, where women have started to cultivate sweetpotato, a crop traditionally grown by men. Men's responsibility for providing staple food crops for household consumption (based on religious and cultural norms) and the practice of spouses cultivating separate plots controlled by the individual presented opportunities for women to produce sweetpotato for the market, challenging the commonly-held assumption that commercialization often disadvantages women. The sweetpotato case shows how the dynamic nature of production organization, intra-household roles and responsibilities, and gender ideologies in Sub-Saharan Africa make it difficult to predict how men and women farmers respond to market signals. The study finds that sweetpotato is generally a more important source of income for women than for men due to the crop's relatively low labor requirements and short maturity time. Yet despite strong female economic autonomy, women in the study locations face major gender-related structural constraints in crop production that are likely to restrict them from engaging in medium- or large-scale production.

**Key words:** *Gender; Intra-Household Resource Allocation; Sweetpotato; Agricultural Commercialization*

## Introduction

Agricultural commercialization is proposed as a key strategy for economic development and poverty reduction (World Bank, 2008; Wiggins *et al.*, 2011; Kirsten *et al.,* 2012). However, shifting from subsistence to more market-oriented production systems often has negative implications for women farmers, including a decline in their control over productive resources,

as cash crops are typically produced by men and new, more productive technologies are often not easily accessible to women. Yet studies have shown that increasing women's control of resources, income, and decision-making power tends to have positive effects on several development outcomes; such as education and child nutrition, not to mention women's own well-being (Quisumbing, 2003a). In Sub-Saharan Africa, where women make up an estimated 50% of the agricultural labor force (FAO, 2011), ensuring that women have equal opportunities to engage in commercial agricultural production is critical for achieving economic growth and development. Identifying factors that constrain or facilitate women's engagement in market-oriented agricultural production is therefore important for the design of gender-sensitive interventions that support agricultural commercialization.

While women's limited control over productive resources is a key reason for why they tend to lag behind men in market-oriented production (Peterman *et al.*, 2010), their responsibility for meeting household food needs coupled with social norms around which crops they can grow may limit the quantity of marketable surplus and relegate them to producing low value crops (Stockbridge, 2007). The importance of resource-related and socio-cultural constraints to women's efforts to produce for the market is not well understood in Sub-Saharan Africa, where a diversity of intra-household norms governing agricultural production, food provisioning, and household maintenance exist. While the literature abounds with examples of strategies adopted by African women farmers to compensate for their limited access and control over resources and improve their economic empowerment (Quisumbing and Meizen-Dick, 2001; Hodgson and McCurdy, 2001; Hill and Vigneri, 2011), the tendency to depict women as victims and men's and women's responses to agricultural commercialization as static and predictable persists. While the well-documented phenomenon whereby men start to grow or even take over production of crops previously dominated by women when they become more productive or profitable (von Braun and Webb, 1989; Lilja and Sanders, 1998; David, 1999; Kasante *et al.,* 2001; Doss, 2001; World Bank *et al.*, 2009; Fischer and Qaim, 2012) exhibits men's responsiveness to market signals, there are few accounts in the academic and development literature of women moving into the production of crops dominated by men in response to increased commercialization. Empirical cases of the latter would contribute to our understanding of the complex conditions and factors that support or limit women's ability to engage in commercialized agricultural production. Using a case study from northern Nigeria where women have started to cultivate sweetpotato, a crop traditionally grown by men, this

paper examines conditions and factors that create opportunities for women to engage in market-oriented crop production.

The rest of the paper is organized as follows: A review of the literature related to the gender dimensions of agricultural commercialization in sub-Saharan Africa is followed by a discussion of the methods used in this study. The next section presents and discusses the findings. The final section concludes with a summary of insights gained from the case study and recommendations.

**Literature Review**

The literature on the gender dimension of smallholder agricultural commercialization in sub-Saharan Africa focuses on two inter-related issues: Gender-related constraints to market-oriented production and the differentiated impact of commercialization on men and women. A large body of literature explores why African women farmers are often relegated to subsistence production while men are more engaged in production for the market. Many studies show how structural socio-cultural barriers to women's access to productive resources, markets, information, and technologies limit their productivity, creating a "gender gap" (Quisumbing, 2003b; Hill and Vigneri, 2011; FAO, 2011; Quisumbing *et al*., 2014). The key conclusion of this literature is that, all else being equal, productivity outcomes are usually not significantly different among male and female farmers. The body of work that focuses on intra-household relations documents how women's responsibility for the domestic and subsistence needs of their households hampers their responses to economic incentives (Palmer, 1991; Elson, 1995; Blackden and Bhanu, 1999; Ilahi, 2000; Ellis *et al*., 2006). Some studies show that even when women have independent control over income, they are often unable to transform their income into wealth and power because of their responsibility for family welfare. In some situations, husbands withdraw from household provisioning when wives' incomes increase, a decision based in ideologies that hold that women should take care of household consumption (Cornwall, 2001; Britwum, 2009).

A key finding of the literature is that the impact of agricultural commercialization on men and women depends on how production is organized at the household level; specifically, who provides labor, makes decisions, and controls income. Several studies show increased conflict and tensions between spouses when male-dominated cash cropping activities reduce female autonomy in terms of access to land and control over their own labor (see Stockbridge, 2007,

for a review of several studies). In situations of interdependence between spouses (especially for labor), women may opt to bargain, cooperate, or withdraw from the household. Where men and women have different preferences, separate income streams, and do not pool their income, research shows that economic inefficiencies arise from "the non-unitary nature of household norms and arrangements" and suggests that allocative decisions are determined by normative rather than efficiency considerations around the gendered division of labor (Wold, 1997). For example, in cotton producing Burkinabe households, differences in men's and women's preferences muted the response to price increases (Alderman *et al.*, 2003; Smith and Chavas, 2003).

The literature highlighted has moved away from early analyses associated with the women in development (WID) paradigm of the 1970s and 1980s, which involved a stereotyped dichotomy wherein men grew cash crops and women grew food crops. Three principal models—depending on the wife for subsistence, intra-household gender conflicts arising from male-dominated cash cropping, and separate economic conjugal spheres—are commonly mentioned in the literature to describe how households respond to agricultural commercialization. However, none of these models adequately reflect the complex realities of rural African households in an increasingly commercialized world (Whitehead and Kabeer, 2001).

There is need for more analyses from a wider spectrum of socio-cultural and geographic contexts in Africa, analyses that take into account the complexity of factors—such as intra-household resource allocation, gender ideologies, the variability of gendered roles, and technical characteristics of specific crops—that shape how agricultural commercialization impacts men and women. In response to a call for more empirical research aimed at achieving a nuanced understanding of relations between women and men (Okali, 2011), the Nigerian sweetpotato case presented in this paper examines how conjugal social norms and obligations regarding household provisioning, as well as the organization of agricultural production at the household level, contribute to creating opportunities for women to move into the production of a male-dominated staple food crops for the market.

## Methodology

This paper draws on findings from a qualitative study undertaken in Nasarawa and Kwara states in northern Nigeria in 2012 as part of a situation analysis of the roles of men and women in

sweetpotato production (David and Madu, 2014). Nasarawa is located in the north-central part of the country, while Kwara is situated in the north-west. The study was conducted in six communities selected on the basis of the importance of sweetpotato production and accessibility (Table 1).

Table 1: Description of study locations and gender composition of informants interviewed

| **Location** | **Ethnic groups** | **Local Government Area** | **Agro-ecological zone** | **Numbers involved in interviews** | | **Number of key informants** | |
|---|---|---|---|---|---|---|---|
| | | | | Women | Men | Women | Men |
| Nasarawa State | Hausa, | | | | | | |
| Obi | Hausa-Fulani, | Obi | Savannah | 27 | 20 | N/A[a] | N/A[a] |
| Adogi | Alaho, | Lafia | Savannah | 25 | 21 | N/A[a] | N/A[a] |
| Dorowa | Megili, Mada-Eggon, Jaba, Tiv | Karu | Savannah | 17 | 25 | 2 | 2 |
| Kwara State | | | | | | | |
| Kayaoja | Predominantly Yoruba | Asa | Savannah | 17 | 25 | 2 | 2 |
| Igosun | | Oyun | Rainforest | 20 | 25 | 2 | 2 |
| Agbamu | | Irepodun | Rainforest | 15 | 16 | 2 | 2 |

[a]No key informants were interviewed during preliminary field visits in two communities.

Data was collected through group interviews with 132 male and 121 female sweetpotato farmers and interviews with 16 key farmer informants. In each community, extension agents and local leaders invited approximately 30 male and female sweetpotato farmers to attend a half day group meeting with the research team, making efforts to include a cross-section of wealth categories. All farmers interviewed were therefore purposively selected. During group interviews, information was gathered from mixed and single sex groups; the topics ranged from crops grown, ownership, gendered division of labor, timing of agricultural activities, income sources, sweetpotato varieties grown, vine sourcing behavior, production constraints, and decision-making about the allocation of sweetpotato. Following each group interview, the researchers used a case study approach and interviewed two male and two female purposively-selected key informants per location on the same topics. As only one spouse per household was

interviewed, information about the other spouse was obtained from the interviewee. Content and narrative analysis were used to analyze the data.

## Results

### *Gender Dimensions of Smallholder Farming in Nasarawa and Kwara States*

Agriculture was the main economic activity and source of livelihood of men and women in Nasarawa and Kwara states. Off-farm economic activities undertaken by women in both states included petty trading, craft production, hair dressing, and food processing. Men were involved in tailoring, artisanal activities (carpentry, masonry, blacksmithing), and petty trading. Nasarawa State is characterized by a predominantly Muslim, multi-ethnic population that includes Hausa, Hausa-Fulani, and five other major ethnic groups; whereas the population of Kwara State is predominantly Yoruba, with a near equal representation of Christians and Muslims. Although both men and women engaged in farming, men played a more dominant role in terms of the number and range of crops cultivated. Men were the main producers of the staple food crops: Yam, cassava, sorghum, sweetpotato, maize, and rice (Table 2).

Table 2: Major crops grown by gender and location

| Crop | Nasarawa | Kwara |
|---|---|---|
| Yam | Both but predominantly men | Both but predominantly men |
| Vegetables | Both | Both but predominantly women |
| Cassava | Both but predominantly men | Both but predominantly men |
| Sweetpotato | Both but predominantly men | Both but predominantly men |
| Maize | Both but predominantly men | Both but predominantly men |
| Rice | Both but predominantly men | N/A |
| Sorghum | Both but predominantly men | N/A |
| Millet | Both but predominantly men | N/A |
| Groundnuts | Both | Both |
| Soybean | Both but predominantly women | N/A |
| Melon (*egusi*)[a] | Both | N/A |
| Tomato | N/A | Both but predominantly women |

[a] Melon or *egusi* seeds are the fat- and protein-rich seeds of certain cucurbitaceous (squash, melon, gourd) plants widely consumed in Nigeria.

Women exclusively or mainly cultivated a few crops, namely cocoyam, Bambara nuts, soybean, and cashew in Nasarawa and pepper, tomato, and green leafy vegetables in Kwara. Men exclusively grew rice, mango, kola nut, and avocado in Kwara. Gender differences in crop priorities appear largely related to male and female responsibilities over household provisioning (discussed below) and women's more limited control over resources such as land

and labor (which makes it difficult for them to cultivate crops such as rice, kola nut, and cocoa). In both states there was a weak gender division of labor in farming: Men and women engaged in the same tasks with the exception of land preparation, ridging/mounding, and pesticide application, which were carried out only by men. There were no farm tasks exclusively carried out by women.

Farmers cultivated all crops on personal plots controlled by the individual farmer. Women made all decisions about what they grew on their own plots and controlled the income derived from sales without any interference from their husbands. Notably, there were clear ideological differences between ethnic groups in Nasarawa regarding whether women should engage in farming. In Obi and Adogi, younger Hausa women engaged in farm work, while older women remained at home; whereas Hausa-Fulani men in Dorowa claimed their wives did not farm themselves but hired male labor to do the work for them. However, in-depth interviews with women revealed that while many Hausa-Fulani women were principally traders, some farmed without hired male labor.

An historical analysis suggests that male dominance of agriculture in Nasarawa and Kwara was not always the case. For example, in pre-colonial times in the area that is presently Nasarawa, Eggon men and women both participated in intensive, terraced hill farming of millet, sorghum, and *fonio* on household fields (Dorward, 1987). However, the transformation of the farming system that came with colonization, the introduction of taxes, and the need to earn tax money led to a significant change in gender roles in agriculture, to women's detriment. Men claimed the newly introduced yam as a "man's crop", relegating women to providing labor on male-controlled fields and tending their own gardens (where they grew vegetables and condiments). Similarly, in certain areas of Hausaland the increased use of slave labor (starting in the sixteenth century) and the establishment of Shari'a law under the Sokoto Caliphate in the early nineteenth century led to a decline in women's role in agriculture, as this type of work was associated with slave status (Callaway and Creevey, 1994). High male involvement in farming in Yorubaland can be traced to the long tradition of urbanization and the frequency of wars among the Yoruba states in the nineteenth century, which made it dangerous for women to engage in farming (Johnson, 1986). Yoruba women's involvement in trading is well documented (McIntosh, 2009; Denzer, 1994), although many combine farming and trading. These three historical accounts show the declining role of women in agriculture, particularly from the nineteenth century onward. As the case of sweetpotato described below illustrates, women's

increased engagement in farming in more recent times is driven by their need for cash to cover personal and family expenses, as well as provide food for their households.

*The Commercialization of Sweetpotato Production in Nasarawa and Kwara States*

Sweetpotato was the main staple food in only two of the study locations (Igosun and Agbamu in Kwara); in the other four locations, it was of secondary importance compared to yam, maize, cassava, and sorghum. Farmers in Nasarawa had two planting seasons (March-August; August-December) on upland plots, whereas farmers in Kwara cultivated sweetpotato up to four times a year in some locations in upland (first and second season) and lowland (third and fourth seasons) fields. The commercialization of sweetpotato started in early 2000s (slightly later in Kayaoja) in response to increased demand from urban areas such as Abuja and Kano and the neighboring Niger Republic (Nasarawa), leading to an increase in the number of farmers growing the crop and the expansion of farms. The first sweetpotato value chain study conducted in Nigeria in 2011 estimated that sweetpotato has a 55 percent lower cost of production compared to cassava (Onumah *et al.*, 2012). Commercialization also led to a drop in genetic diversity, with farmers dropping non-marketable sweetpotato varieties. Of the 11 and 7 landraces farmers identified in Nasarawa and Kwara respectively, most farmers grew only 2-3 in Nasarawa and 1-2 in Kwara.

Root prices varied by time of year, variety, and point of sale. The average price of a 50 kg bag of the most common variety sold in local markets in 2012 ranged between N1,000-2,000 ($6-$13) during the September harvesting period and N3,000 ($19) at the start of the August harvesting period. Farmers who belonged to cooperatives that collected and transported roots on behalf of their members to urban markets (such as Lagos) obtained premium prices of between 10-15 percent and, by cutting out middlemen, got up to 25 percent higher income per bag (Onumah *et al*., 2012). Farmers typically sold roots in local markets or more rarely at farm gate (Nasarawa only). While women dominated in retail sale of roots in Nasawara, both men and women sold sweetpotato in local markets in Kwara, with the number of male sellers tending to be higher than that of women sellers.

The commercialization of sweetpotato had a significant impact on households in the two states. Men, the main producers of the crop, began selling roots that had previously been kept for home consumption, resulting in shortages in some households. An increased number of women began growing sweetpotato primarily for personal income. At the time of the study in 2012,

women constituted an estimated 20-40 percent of producers in the Nasarawa locations and 30-50 percent in Kwara, up from 5 percent and 10 percent, respectively. In both states, women were likely to cultivate fewer and smaller plots than men and in Kwara, they were less likely to grow the crop in the more lucrative off-season. Reasons for these gender-based differences are discussed below.

Table 3: Farmers' perceptions of the characteristics of top income earning crops, by state

| | **Nasarawa** | **Kwara** |
|---|---|---|
| Yam | Storability[a], high price, marketability | Storability |
| Maize | Storability, fast maturing, marketability | High yields, marketability[b] |
| Sweetpotato | Fast maturing, high yielding, marketability | Marketability, high yields |
| Cassava | Storability | Storability, marketability, high yields |
| Sesame | Storability, high price, marketability | N/A |
| Melon | Storability, fast maturing, high price | N/A |
| Groundnuts | Fast maturing | N/A |
| Pepper | N/A | Marketability, high yields |
| Tomato | N/A | Marketability, high yields |

As Table 3 shows, farmers valued sweetpotato for its short maturity period, yields, and marketability. Women were somewhat more likely to rank sweetpotato highly as a source of income compared to men. Women in three of the six locations compared to men in two locations (both in Kwara State) considered sweetpotato among their top two most important sources of income (Table 4).

Table 4: Ranking of crops as sources of income, by gender

| | Nasarawa | | Kwara | |
|---|---|---|---|---|
| Rank | **Men** | **Women** | **Men** | **Women** |
| 1st | Yam | Melon | Yam | Sweetpotato |
| | Yam | Groundnuts | Cassava | Cassava |
| | Yam | Groundnuts/cassava | Sweetpotato | Sweetpotato |
| 2nd | Melon | Sweetpotato | Sweetpotato | Cassava |
| | Rice | Rice | Maize | Maize |
| | Groundnuts | Green leafy vegetables | Cashew | Maize |
| 3rd | Sweetpotato | Sesame | Cassava | Cashew |
| | Sweetpotato | Sweetpotato | Sweetpotato | Sweetpotato |
| | Ginger | Melon | Kola nuts | Tomato |

*Each row corresponds to results from a specific location.

In Kwara, however, the crop had virtually the same rank as a source of income for men and women. Other important sources of crop income for women included cassava, melon (*egusi),* and maize, while yam, cassava, rice, and maize were among the top income earning crops for men. Factors that facilitated women's entry into sweetpotato production are discussed below.

*Gender Responsibility for Household Provisioning*

Gender responsibilities for household provisioning were similar in the two states despite ethnic and religious differences. In all study locations, husbands were expected to provide the main staples (yam, maize, sweetpotato, sorghum), while women were responsible for providing vegetables, cooking oil, and condiments (pepper, bouillon cubes, salt, etc.). Men were also expected to provide protein sources (meat, fish) across locations in Nasarawa, but there was some variation between locations in Kwara. Whereas male responsibility for household provisioning among the Yoruba appears to be linked to cultural norms modeled after Western colonial expectations (Cornwall, 2001), men's responsibilities for household provisioning in Nasarawa were closely tied to Islamic norms, whereby men are legally responsible for the overall upkeep and provisioning of their households. Men pointed out that if they evade their responsibility to feed their families, their wives have the right to divorce them: "In Islam, a women is not [supposed] to feed the house except if she wants to do so willingly" (Interview, Adogi, 10 May 2012). Cases of husbands purchasing chickens from their wives' poultry business to feed the family illustrate how women draw on the cultural ideology of men as providers to conserve their earnings. Such behavior challenges the notion of altruism as a "natural" female trait and supports the view proposed by some researchers that women will invest in non-household or child-related areas, if and when other options exist (Kabeer, 1999; Devereux, 2002) and where men fully take on responsibility for household well being.

Both male and female informants concurred that husbands provided most of the sweetpotato roots consumed by their households—even where wives grew the crop—because "they are the head of the home". It was common practice in Kwara for wives to use their roots for household consumption only when those provided by their husbands ran out. These provisioning arrangements benefit women by giving them the freedom to sell most of their roots. While men also sold most of their sweetpotato roots—especially in areas where the crop was not a major staple food—informants reported that women sold a slightly higher proportion of the roots they produced compared to their husbands: In Nasarawa, 90-95 percent compared to 80-90 percent sold by husbands and 80-90 percent in Kwara compared with 70-80 percent sold by

husbands. For example, a female informant in Kwara sold 5 of the 6 bags of roots she harvested in the second season of 2011 and all 15 bags of roots harvested in the first season of 2012. By contrast, in Ebonyi State, south-eastern Nigeria, women (the main producers of sweetpotato) were expected to supply most of the roots consumed by their households even if their husbands grew the crop (David and Madu, 2014).

The gap between cultural ideals and reality in household provisioning and the extent to which spouses negotiate financial and provisioning responsibilities—even where a strong ideology of men as providers exists—has been well documented (David, 1996; Britwum, 2009). Given the separation of men's and women's economic spheres and farming activities in Nasarawa and Kwara, it is likely that men seek to avoid fulfilling their provisioning responsibilities when possible. Women in Nasarawa observed that in the early days of sweetpotato commercialization "men were not releasing enough sweetpotato for household consumption; they were selling most of the sweetpotato they produced" (Interview, Adogi, 10 May 2012); this implies that some women initially started growing the crop to meet household food needs. The following comment by a male farmer in Nasarawa also alludes to a high degree of secrecy between spouses about crop allocation and sale: "I do not let my wife know how much I earn from selling sweetpotato. After selling my products I will buy her a wrapper [piece of cloth] to pacify her" (Interview, Obi, 9 May 2012). Quantitative data is needed to complement and confirm qualitative observations made about household resource allocation. Specifically, data on the allocation of sweetpotato roots by spouses based on a representative sample of households is needed. An in-depth study of spouses' income and expenditure patterns should be carried out to discern trends and variation among different socio-economic categories of households (e.g. age, wealth status, ethnicity, etc.).

*The Organization of Agricultural Production and Labor Requirements*

The cultivation of personal plots (which gives the owner full decision-making power and control over the allocation of the crop), a relatively weak gender division of labor, and the availability of hired labor, were critical factors that enabled women in Nasarawa and Kwara to start growing sweetpotato as a cash crop. The absence of household plots in these locations means women face few conflicts over allocating their labor in farming (as compared with societies where farming is carried out on both household and personal plots). As there were few gender-specific tasks in sweetpotato production and labor requirements are relatively low compared to yam

and rice, women carried out most tasks on their farms themselves and mainly depended on both male and female hired labor. Women relied on communal work groups in only one community in Nasarawa. Spouses provided little labor on each other's sweetpotato farms generally, although women worked more on their husbands' farms than the reverse. Men in Nasarawa (but fewer in Kwara) used their social authority to involve women and children in planting, weeding, and harvesting sweetpotato on their farms during peak labor periods. In Kwara, husbands sometimes assisted their wives in sourcing vines, harvesting, and selling roots, while wives sometimes helped their husbands harvest and transport roots. Both genders relied heavily on hired—and to some extent child—labor (Table 5).

Table 5: Sweetpotato labor calendar

| | Nasarawa | | Kwara | |
|---|---|---|---|---|
| Activity | **Women's farms** | **Men's farms** | **Women's farms** | **Men's farms** |
| Land preparation/clearing | W, HM, or M | M, HM, W | HM or W, tractor | M, HM, tractor |
| Making ridges | HM | M, HM, W | HM, tractor | M, HM |
| Looking for and transporting vines | W+H or W | M | M or HM or W | M |
| Planting | W, communal female labor groups (D) | M, W, HM | HM or HF, W, sometimes H | M, HM |
| Weeding | W | M, W, HM | HM or HF, W | M, HM |
| Applying fertilizer | W | M,W, HM/HF | W (K) only or M only (I) | M |
| Harvesting | W, communal female labor groups (D) | M, W, HM/HF | HM or HF, W, M (I) | M,HM or HF, W |
| Transporting | W alone or W,M | M, W, rented vehicle | HM or HF, W, M (I) | M, HM or HF, W |
| Selling | W+M | M (for far distances), W (locally) | W or M or only W | M |

M=man; W=woman; HM=hired male labor; HF=hired female labor; D=Dorowa; K=Kayaoja; I=Igosun

Male hired labor (typically students and poor men) was used for all field activities, while female hired labor was used mainly for harvesting and transporting roots and for planting and weeding in some locations in Kwara. The short maturity period of sweetpotato (3-5 months, depending

on the variety) also made it relatively easy for women to access upland fields through their families, their husbands, or by renting.

*Gender-Based Constraints on Sweetpotato Production*

This paper has shown that in Nasarawa and Kwara, women farmers' high degree of economic autonomy—due to existing ideologies around male responsibility and the system of spouses farming on separate personal plots—opens opportunities for them to engage in growing sweetpotato as a cash crop. However, to be able to use this opportunity to significantly improve their economic livelihoods by moving into medium- or large-scale production, women farmers need access to and control over productive resources and need to be able to use these resources to engage in new production and value addition opportunities.

We now turn to exploring women's access to and control over labor, capital, vines, land, technologies, and markets. Compared to men, women in the study locations had fewer income earning opportunities from crop and off-farm sources, which resulted in a shortage of funds to invest in agriculture generally and contributed to sub-optimal resource allocation (land, hired labor, inputs). Women face distinct disadvantages regarding access to farm labor even when hired labor is available. As mentioned earlier, women have little control over their husbands' labor and so are highly reliant on male hired labor for land preparation and mounding/ridging (which determine farm size cultivated). Also, as recognized by women themselves, they are constrained by having "less strength" than men, possibly alluding to health and nutrition problems (e.g. iron deficiency anemia) which specifically affect women and contribute to lower labor productivity. Notably, women's domestic responsibilities restrict the amount of time they spend on farming. The consequences of these gender-based labor constraints include smaller farm size, a reduction in the number of cropping seasons, and, in Kwara, women being less likely to engage in more labor intensive off-season production in the lowlands.

As mentioned above, women in the study locations generally did not face difficulties in accessing land for sweetpotato production, having use rights mediated through husbands or male relatives. But in situations that necessitate borrowing or renting land (e.g. where there are few areas with suitable soils for sweetpotato cultivation, in situations of land fragmentation, or where farmers are not indigenous to the area), women faced more difficulties compared to men for a number of reasons. They are excluded from male social networks where negotiations for land allocation take place; are limited by their lower income level; and as studies elsewhere

show (FAO, 2011), tend to be allocated the least productive land. These disadvantages contribute to women's smaller farm sizes.

Due to the long dry season and cattle grazing in Nasarawa and parts of Kwara, sweetpotato farmers are unable to conserve vines and face difficulties in accessing vines at the right time in the desired quantity. Women in particular face challenges in accessing vines from off-farm sources due to their limited mobility, fear of being cheated by male commercial vine multipliers, and lack of time and money—all of which may lead to reduced area planted. It is unclear whether women's reliance on their husbands to purchase vines for them results in late planting and the resulting yield losses. Women are also less likely to have access to purchased inputs (such as fertilizer) due to their more limited access to cash and gender-based discrimination in accessing sweetpotato technologies (such as new varieties); this is due to the assumption made by researchers and extension agents that the crop is grown by men. While accessing markets for sweetpotato roots is a constraint for both men and women, domestic responsibilities and gender-related factors that restrict mobility make women less likely than men to travel to periodic or large urban markets where prices are higher.

**Conclusions**

This case study of sweetpotato production in northern Nigeria shows how the complexity, diversity, and dynamic nature of production organization, intra-household roles, and responsibilities and gender ideologies in Sub-Saharan Africa make it difficult to predict how men and women farmers respond to market signals. In Nasarawa and Kwara, men's responsibility for providing staple food crops for household consumption and the practice of spouses cultivating separate plots controlled by the individual opened opportunities for women to start producing sweetpotato for the market, challenging the commonly-held assumption that commercialization always disadvantages women. Furthermore, the gender division of crop production in Nasarawa and Kwara disputes the stereotyped notion of sweetpotato being a "female crop" across Africa. The study found that sweetpotato is generally a more important source of income for women than for men due to the crop's relatively low labor requirements and short maturity time. But despite strong female economic autonomy, women in the study locations and worldwide face major gender-related structural constraints in crop production that are likely to restrict them from moving from small-scale to medium- or large-scale production. Recommendations to encourage gender-sensitive sweetpotato value chains in Nigeria include: Focusing production interventions on an individual producer rather than at household level; introducing labor-saving technologies (tractors, small motorized carts for transporting farm produce, herbicides) to address labor constraints; setting up women-friendly credit facilities; supporting the development of associations/cooperatives open to female

participation for marketing sweetpotato and accessing inputs, and carrying out a gendered value chain analysis for sweetpotato. Additionally, because sweetpotato has received little attention despite Nigeria's status as the world's second largest producer of sweetpotato after China, strong efforts should be made to advocate and promote the crop at national and state-level as a woman-friendly crop for food and nutrition security and value addition.

This study highlights the need for further research aimed at understanding Nigerian households from a broader livelihoods perspective, "as a complex and shifting arena of separations and interdependencies" (Whitehead and Kabeer 2001). Studies on the organization of agricultural production, husbands' and wives' crop allocation, income and expenditure patterns, and analyses of how spouses negotiate roles and responsibilities using a multi-methods approach to collect qualitative and quantitative data should be carried out in different regions of the country to document the diverse and dynamic nature of gender relations in rural households. Such studies should adopt a farming systems approach rather than focus on a single crop or enterprise.

**Acknowledgements**

This study was carried out under the Reaching Agents of Change (RAC) Project implemented by the International Potato Center (CIP) and Helen Keller International (HKI). I am grateful to Tessy Madu of the National Root Crops Research Institute, Umudike, Nigeria, who was involved in the fieldwork for this study. I am indebted to the farmers who patiently answered our many questions and to Okalo Sule Ose and Ibrahim Maisaje in Nasarawa State and Ibrahim Onimgo and Rafiu Bello in Kwara State who worked tirelessly as translators.

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