WOMEN TOBACCO FARMERS IN TANZANIA: COMPARING ACTUAL AND POTENTIAL EARNINGS

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Abstract

This study attempts to measure women tobacco farmers' labour input in Tanzania. A comparison is made with two other crops - maize and vegetables. For the coffee production cycle, women farmers' output share was estimated to be 1.97 million Tanzanian shillings. Assuming alternative employment were available at a minimum wage, women tobacco farmers would earn 5.7 million Tanzanian shillings, almost a three fold increase if they did work other than farm tobacco. Besides this, 72.58% of total women's labour for the period was earmarked for tobacco growing, while only 35.58% of total earnings are generated from tobacco production. 20.68% of women's labour was earmarked for maize growing; on the other hand 39.20% of total revenue is generated from maize production. Only 6.74% of womens' labour was earmarked for growing vegetables; whereas a substantial 25.22% of total revenue is generated from production of vegetables A Cobb Douglas type production was estimated, where output was regressed on labour input and acreage. While the returns from extra one-acre input were substantial and significant, returns from an extra one unit of labour yielded insignificant results. In other words, besides being hazardous to health, planting tobacco is not a worthwhile undertaking. Alternative employment should be sought.

Key words: Tanzania, women, tobacco, farmers, labour input, labour output

Introduction

Like many African countries, the economy of Tanzania is heavily dependent on agriculture. The latter constitutes more than 50% of gross domestic product (GDP) and employs about 60% to 80% of the labour force. Within the agricultural sector, tobacco farming appears to be growing relatively faster than other crops, enabling the country to generate

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more export earnings from this produce. In 2005-2006, total acreage devoted to tobacco was estimated to be 61.7 thousand hectares. This estimate almost doubled to 118.25 thousand hectares in 2011-2012. In 2012, export earnings from tobacco constituted 39.9% of earnings from other traditional cash crops (including coffee, cotton, tea, and cloves). The per cent has increased to 41.04% in 2013 (Kidane et al. 2013).

The above estimates may suggest that growing tobacco is practicable for export and for domestic input in cigarette production. However, such estimates do not take into consideration the huge amount of labour input earmarked for tobacco farming, along with the severely negative health effects of tobacco production and cigarette consumption. A large percentage of labour input in agriculture is undertaken by women tobacco farmers. The study presented here estimates the amount of labour input by women tobacco farmers in Tanzania. This result will be combined with a 'cost-benefit' approach in order to compare input with output of women's role in tobacco farming. Thus women's earnings from tobacco farming may be compared with alternative employment in other sectors.

This paper has five parts: the following section Part Two will review the importance of women's labour input in agriculture in general and in tobacco cultivation in particular. This includes a discussion of the importance of tobacco, alongside the negative effects of tobacco farming and cigarette smoking. Part Three will consider the general and specific objectives of the study followed by a discussion of data sources and method of analysis. Part Four will constitute the major findings of the study; the latter includes basic descriptive statistics, and an estimate of the magnitude of labour input into tobacco production. For comparison purposes we will also estimate women's labour input into maize and 'other' outputs – the latter captures backyard or vegetable production. Part Five offers a conclusion. The study is expected to inform policy and to consider pragmatic options for women's unique situations.

Some background of the role of African women in small scale agriculture

Several studies of women's labour in agriculture indicate significant contributions to GDP from this population segment (Gawaya 2008, Mutangadura 2001, Holmes and Slater 2008). Generally, the percentage of contribution from the women's labour force in agriculture varies from one country to another, and depending on the different roles assigned to women and what is expected of them. The World Farmers Organization

(WFO) reports that women comprise 43 per cent of the world labour force, with some countries reaching up to 70 per cent. Especially in Africa, women have been participating traditionally in domestic work. However, in rural areas of Africa women are engaged in both productive and reproductive work, while men are almost exclusively engaged in productive roles (Meeker and Meeker 1992). In this light, it is fair to speculate that African women are especially overburdened compared to their male counterparts.

Despite substantive rhetorical changes impelled by the United Nations' Fourth World Conference on Women (Beijing) in 1995, the dominant perception and expectation remain that women's appropriate role of employment is in domestic and reproductive work. This attitude perpetuates women's relative invisibility in the public domain; and it has had a limiting effect on women's participation in productive work such as agriculture. This fact has provoked criticism, especially in the analysis of labour force statistics (Youssef 1977, Fong 1980). It is also noteworthy that women's participation in the domestic labour force and in the agricultural sphere is not included in the Gross National Product (GNP) (Jain et al. 1979, International Centre for Research on Women 1980, Rogers 1980). Lack of recognition, inadequate documentation, and the suppressed cultural value accorded female labour participation in agriculture, collectively attribute to inadequate resources which in turn prevent women from performing their tasks effectively and efficiently. For decades, it has been well documented that the majority of women do not have access to productive resources (Boserup 1970, 1985, Goody 1976, Staudt 1988). The fact that limited access to productive resources increases women's poverty (Oppong, 1997) has been one of the major policy issues in developing countries (Peters 1983). Lack of access to and control of resources translates further into extreme inequality between men and women (Doss 1999) and the widely observed feminization of poverty. The literature maintains that sex segregation in the labour market and discrimination in virtually all areas of public life have prevented any improvement in women's earnings relative to men (Pearce 1978).

Poverty is dynamic and affects women, men and children differently. These population groups also have different strategies to improve their livelihoods and to walk away from poverty. Migration is one such strategy – the literature maintains that migration contributes significantly to improved livelihoods in areas of origin (Bryceson et al. 2003, Lockwood 1990, Mendonsa 1982). However, there is no consensus on the benefits of migration to both migrants and families in areas of origin, since some

scholars argue that returning migrants show insignificant improvement in their earning power and living standards. Other scholars argue that rural-urban migration is not closely linked to economic development (World Bank 2000, Bryceson et al, 2009).

Historically, men are known to be the dominant gender in migrating (Dungumaro 2013). During colonial times in Tanzania, policies were formulated and effectively implemented to ensure that women could not migrate to towns, to engage in work on plantations and in mining (Mbilinyi 1985). Times have changed and we are currently seeing a significant increase in female migration. However, migration remains sex and age selective, with males migrating more than women and more travelling by younger persons than older. It is therefore safe to suppose that females continue to participate in agriculture as perhaps the only option to improve their livelihoods and support their families.

Contribution of agriculture to Tanzania's national economy

In Tanzania agriculture has been the lead contributor to GDP. In 2013 and 2014, for example, the sector contributed 23.83% and 23.03% to the national GDP (Bank of Tanzania 2016). Agriculture is a major source of livelihood among 70.9% of the rural Tanzanian population (URT 2016). In Tanzania the population engaging in agriculture is 50 per cent male and 50 per cent female. However, some regions have more female farmers (such as in Lindi, Iringa and Mbeya), while others have more males than females (as in Manyara and Tabora) (United Republic of Tanzania 2007). The highest percentage of the population involved in agriculture as their main activity is also the most active age group (18 to 44 years); these statistics collectively indicate that nation-wide, females play a greater role in agriculture than do males.

Tobacco farming in Tanzania

Tobacco is one of the major cash crops grown in Tanzania, with the literature indicating that there is a recent increase in tobacco growing throughout the country (Otañez 2008, Geist et al. 2009). In 1999 tobacco ranked as the fifth agricultural export of Tanzania (Union Republic of Tanzania's Ministry of Agriculture and Food (MoAF) 1999) and by 2011 it had moved up to second (United Nations' Food and Agriculture Organization (FAO) 2014). Whereas women's engagement in tobacco farming might be seen as a strategy out of poverty, it can actually be a factor leading to more pervasive poverty and hunger. One reason for this is that agriculture in Tanzania is labour intensive, and tobacco as a crop is

itself extremely labour intensive; it involves a lot of processing which includes clearing the bush for cultivation, tilling the land, construction of nursery beds and many others before plucking tobacco leaves and drying them. Further, most regions of Tanzania are endowed with low investment levels so that women engaged in tobacco farming, whether on small farms or large plantations, are more likely to use crude tools so that clearing and tilling takes many more hours than if the chores were mechanized. Since much of this work is essentially manual (Haviland 1954), the time taken leaves women with less energy to engage in food production, meal preparation, and household chores. Given the feminization of poverty, it is unclear whether women could financially manage to hire additional labour especially during the busy season (harvesting, curing and early grading).

Unlike other annual and perennial crops, the effect of tobacco production and cigarette consumption on the health of consumers in general and on tobacco farmers in particular does not appear to have been taken into consideration by those who have advocated this new direction for Tanzanians' sustainable development agenda. Cigarette manufacturers appear to be interested in more revenue earning or profit maximization than in the human rights violations they may be committing (Crow 2005).

We take note that women are not a homogeneous group. Women tobacco farmers might have different experiences and resources, hence be affected in completely different ways. We have not seen any study which has attempted to quantify issues that have been set for analysis in the present study; notably we have not seen recorded the time spent on tobacco farms as opposed to maize farms. Generally, time allocation for various competing roles and responsibilities of women in rural areas has been an important concern since the pioneering days of gender and development studies (Boserup 1970). But in the twenty first century this aspect of the workload imposed by globalization is under-documented. In this study, an attempt will be made to estimate the time element of women's labour input in tobacco farming. The latter will be quantified to a monetary value by multiplying work hours with the prevailing wage rate. This implicit monetary value of women's labour input will be compared to the revenue earned from tobacco farming; this may enable us to verify whether tobacco growing is a viable option. This measurement strategy will be discussed further in the methodology section.

Objectives of the study

The overall objective of this study is to estimate the productivity of female tobacco farmers by comparing women's labour input into tobacco, maize and vegetables. The aim is to quantify and verify whether tobacco growing is feasible or viable as a productive undertaking. The specific objectives are:

- To estimate labour input by male household heads, spouses and children. Labour will be estimated in terms of man days; a man day is equivalent to eight hours of work per day.
- To estimate and compare women's labour input into tobacco, maize, and vegetables
- To estimate and compare the output of tobacco, maize, and vegetables in monetary units
- To compare earnings from tobacco farming with alternative employment in other sectors
- To estimate a production function of output on labour and acreage inputs by measuring output elasticity, and to check if putting more labour into tobacco farming is a feasible undertaking

Source of data and method of analysis

The data for this study is based on a 2015 survey conducted among tobacco maize and vegetable farmers in the Tabora region of Tanzania. A structured quetionnaire that included some open ended questions was designed, pilot tested, revised and administered. The method of sampling is stratified random sampling which aims at including as many sub regions of the country as possible. The sample size is 408 farmers and the unit of observation is a household. All respondents are female spouses of male headed households as well as female headed households. The decision to take a sample of 408 houeholds is dictated by the size of the quetionnaire, by budget and time constraints; it is not easy to ask women detailed questions as this may interfere with their other duties

The questionnaire included basic information on demographic and socio economic characteritics, acreage owned, rented, planted, harvested and ownership of land. Labour input of women, men and childrem in tobacco, maize and vegetable farming was also collected. The labour input is measured at different stages of tobacco, maize and vegetable production.. Other questionns included health status of household members, wealth ownership, debt incurred as well as questions pertaining to decision making process within a household. Questions that indicate access to alternative empoymnt such a distance to a major road or town were also included. The open ended questions enabled us to deeply look into various

problem that affect women tobacco farmers. The collected data appears to be within acceptable limits, however some outliers had to be dropped.

The method of analysis include simple and cross clasified descriptive statistics, Contingency Tables with Chi Squared values, followed by a Cobb Douglas type producion function where output is regressed on women's labour input and careage inputs.

Empirical findings

Some descriptive statistics

Before presenting the empirical evidence for the objectives identified above, we highlight some basic socio-economic and demographic characteristics of the respondents. The results are given in Table 1.

Table 1: Some Descriptive Statitics of Women Tobacco Farmers - Tabora Region, Tanzania

Variable	Mean (Percent)	Standard Deviation
Age of male houehold head	43.4	13.6
Age of respondent	35.0	11.3
Years in tobacco production	5.7	2.8
Per cent of land owned	87.3	
Household size	6.1	2.4
Area cultivated in hectares	2.2	1.3

Source: Survey results

The above table shows the mean age of women respondents as 35 years (8.4 years younger than their spouses). On the average, women farmers have been engaged in tobacco farming for 5.7 years. Also 87.3 per cent of respondents stated that they own the land they cultivate, suggesting the tendency of farmers to undertake a long term investment in their land. On the other hand, the mean area cultivated is 2.2 hectares, which indicates that all the respondents are small scale peasant farmers. The mean household size is 6.1 which is slightly higher than the national average of **5.6.**

Household labour input

Table 2 below shows the labour input of adult males, adult females, and children within a household setting. Inputs are also classified by type of crop, namely: tobacco, maize, and vegetables.

Table 2 Household Labour Input* for Tobacco, Maize and Other Farming Tabora Region, Tanzania				
Crop type	**Men**	**Women**	**Children**	**Total**
Tobacco	105.5	83.8	9.7	198.7
Maize	20.0	23.8	1.4	45.2
Vegetable	5.2	7.5	0.6	13.3
Total	130.7	115.1	11.7	257.5

Source: Survey results - * measured in mandays - one manday equals 8 hours (i.e. eight hours per day)

From table 2 above, the following obervations are in order**:** 257.9 out of 365 days are spent in farming. The contribution of men, women, and children is 51, 45, and 6 per cent repectively. Tobacco takes 77 % of the total time allocated for farming, which indicates that tobacco growing is more labor intensive in comparison with maize and other annual crops. Out of the total mandays earmarked for tobacco farming, 42.1% are spent by women. This is a realively high value when one considers the role of women in household activities such as cooking, searching for wood, raising children and related labour intensive in-house activities. Lastly, it appears that the contribution of children is relatively low.

Table 3 shows women's labour input by crop type; the three crops under conideration are tobacco, maize, and vegetables. The mean man days of women's labour input among the three crops (tobacco, maize, and vegetables) are 80.80, 23.02 and 7.50 man days, respectively. In other words, 78% of women's labour is devoted to tobacco, confirming the notion that tobacco growing is highly labour intensive. Only 7.2 per cent is earmarked for vegetables (mostly backyard gardens). In a later section we will compare the returns or income from the three crops.

Table 3: Women's labour Input in Tobacco Farming by Crop Type						
Man days	Tobacco		Maize		Vegetables	
	Number	Per cent	Number	Per cent	Number	Per cent
< 40	70	17.37	335	82.11	395	96.81
40-79	138	34.24	63	15.44	12	2.94
80-119	131	32.51	9	2.21	0	0

Table 3: Women's labour Input in Tobacco Farming by Crop Type						
Man days	Tobacco		Maize		Vegetables	
	Number	Per cent	Number	Per cent	Number	Per cent
120-159	48	1191	0	0.00	1	0.25
200-	16	3.97	1	0.25	0	0
Total	403	100.00	408	100.00	408	100.00
Mean	80.80		23.02		7.50	
St dev.	40.41		25.08		14.00	
CV in %	50.01		108.94		187.00	

Source: Survey results

Variations in women's labour input by household size and age

We hypothesize that the size of household may affect women's labour input. Large size households may imply higher labour potential and thus a relative reduction in women's labour input. A cross classified contingency table of women's labour input and household size along with a Chi squared value is given in table 4A. The result suggests that the two variable are independent; in other words a large household size does not imply less women's labour input or vice versa.

Table 4A. Variation in women's labour input by household size					
Household size	Women's labour input				
	< 40	40-79	80-119	120-	Total
<=2	3	11	8	4	26
3-4	26	26	26	18	96
5-6	19	37	39	19	114
7-8	11	30	30	15	86
9-	11	32	26	7	76
Total	70	136	129	63	398
Chi Squared and Prob	14.52, Pr = 0.268				

Table 4B. Variation in women's labour input by age of women tobacco farmers					
	Women's labour input				
Age of women tobacco farmers	< 40	40-79	80-119	120-	Total
<=20	10	8	4	3	25
21-29	32	48	30	16	126
30-39	12	40	40	14	106
40-49	9	25	25	4	63
50-	2	11	17	4	34
Total	65	132	116	41	354
Chi Squared and Prob	28.52, Pr=0.005				

Source for Tables 4A and 4B: Survey results

We also hypothesise that when compared to younger women, older women are less likely to be engaged in agriculture. In other words we assume that there is a negative relation between women's ages and their participation in agriculture. Table 4B provides a Contingency Table on the association between women's labour input and their age. The Chi squared value appears to show a highly significant association between the two variables. The direction of the association appears to be positive. Compared to younger women, older women are more likely to be engaged in agricultural labour. This is further verified by estimating a simple correlation coefficient between women's age and labour input which yield a value of 0.12

Labour input, acreage input and earnings

In the preceding paragraphs, an attempt was made to estimate the amount of women's labour in agriculture (tobacco, maize, and vegetables). In this section we present women's labour and acreage input and compare the latter with earnings or output. There are several ways of making such a comparison. We will follow three approaches.

First we compare estimated earnings of women farmers from tobacco growing and compare these results with women's alternative employment in other sectors. We assume that minimum daily wage is the offer, and that all women will be employed. The total revenue from tobacco farming attributable to women tobacco farmers (114.4 man days) is estimated to be 1.93 million Tanzanian shillings. The potential total earning of women tobacco farmers given a minimum daily wage rate of 5000 Tanzanian shillings per man day (for 114.3 man days) is 5.72 million Tanzanian shillings. Thus compared to being engaged to tobacco farming, women tobacco farmers could earn almost three times as much if engaged in daily labour outside the farm. In other words, women tobacco farmers are much better off being employed in the market at a minimum wage rate. But this conclusion presupposes that daily labour at minimum wage is readily available in nearby localities. Women working as wage earners are expected to be relieved from 'in house' activities such as cooking, raising children, fetching water, collecting fuel, and so on. This may not be realistic.

Secondly, we estimated the allocation of total cultivated acreage, average women's labour, as well revenue per woman's labour. Each crop output was estimated in kilograms. The latter was converted to monetary values by multiplying physical output by the prevailing market price of tobacco, maize, and vegetables. The result is given in Table 5.

Table 5 Allocation of women's labour, acreage and revenue share (per cent)

Crop	Acreage	Women's labour	Revenue per woman's labour*
Tobacco	48.69	72.58	35.58
Maize	39..30	20.68	39.20
Vegetables	12.01	6.74	25.22
Total	100.00	100.00	100.00

Source: Survey results *Adjusted for acreage

With regard to revenue per women's labour, these results show the following:

- 72.58% of women's labour was earmarked for tobacco growing; on the other hand, only 35.58% of total earning was generated from tobacco production
- 20.68% of women's labour was earmarked for maize growing; on the other hand, 39.20% of total revenue was generated from maize production
- Only 6.74% of women's labour was earmarked for growing vegetables; on the other hand, a substantial 25.22% of total revenue was generated from production of vegetables

Acreage allocation to tobacco, maize, and vegetables are 48.69%, 39.30% and 12.01% respectively. When this is compared with earnings per labour, allocating more acreage to vegetables and less acreage to tobacco both appear to be the much better option. The above results suggest that earmarking more labour in tobacco production does not yield the desired result.

Production function

The third alternate approach of comparing the costs and benefits of tobacco, maize, and vegetables is to estimate a Cobb Douglas Production Function[5] where we regress the log of earnings on the log of women's labour input and log of acreage. This approach will enable us to compare the productivity of women's labour with acreage. The results are given in Table 6.

Table 6: Production function for tobacco maize and other crop (Dependent variable = Monetary value of output)

Variables	Tobacco			Maize			other		
	Coeff.	S.E	t	Coeff.	S.E	t	Coeff.	S.E	t
Acreage*	0.873	0.082	10.62**	0.848	0.088	9.59**	0.596	0.144	4.13**
Women's labour*	-0.056	0.060	-0.93	0.040	0.057	0.69	-0.096	0.082	-1.17
Contant	14.560	0.271	53.96**	12.182	0.212	57.40**	12.182	0.212	57.40**
R^2 unadj	0.399			0.213			0.092		
R^2 adj	0.392			0.208			0.081		
F	(2,179)=59.42			F(2,364)=49.17			F(2,173)=8.79		
Prob>F	0.00			0.00			0.00		
N	182			367			176		

Source: Survey results, *in log, **significant at 5%

[5] [The Cobb-Douglas Production Function represents the relationship between two or more inputs and the number of outputs that can be produced from them.—Ed.]

The following observations may be made from Table 6.

Each of the three regression estimates appear to be well fitted with significant F values. For each equation, the effect of acreage on revenue yield (output) appears to be significant and in the desired direction. In each equation, acreage input yielded significant results while women's labour input did not. The coefficients (which are also elasticities) show that a 10 per cent increase in acreage input will yield an 8.73% increase in tobacco output; the corresponding values for maize and vegetables are 8.48% and 5.96% respectively.

On the other hand, for each estimated equation the effect of women's labour input on revenue yield appears to be non-significant, suggesting that an increase of women's labour in tobacco, maize, and vegetable farming output will not yield significant output. In other words, the productivity of labour input in the production of tobacco, maize, and vegetables is not significantly different from zero. For each estimated equation the constant term appears to be significant, suggesting that there may be other variables that help increase yield. Fertilizer, better seed, extension services, and other factors, may enhance output.

Conclusion

In this exercise we attempted to quantify the amount of labour input among women tobacco farmers. We were able to observe that women constitute about 40 per cent of the labour force. This estimate is above and beyond other very time consuming activities in which women farmers are obliged to engage, including household chores, raising children, tending domestic animals, cooking, searching for water and collecting firewood.

75.2% of women's labour is earmarked for tobacco production. Thus, one is tempted to conclude that more labour input on tobacco farming is a waste of time. The gestation period of tobacco (from land clearing to harvesting, storing, and marketing tobacco leaves) is about ten months. Compared to maize and vegetable production, tobacco labour input is substantial and payoff is minimal.

It appears that tobacco farmers in Tanzania seem to consider only the selling price of the final product (selling price of tobacco leaves is 4000 Tanzanian shillings, while the corresponding price of maize and of vegetables is 1250 and 2000 shillings respectively). Tobacco farmers do not seem to consider the costs of their own labour. One reason for this is that alternative forms of employment may not be readily available.

Distance from home to a major road in general, and distance to a major city in particular, may hinder free mobility and the choice to search for alternative sustainable employment. Besides, women tobacco farmers are involved in raising children and other household chores; so they cannot afford to leave their homes unattended.

We have already noted that women's labour productivity is insignificant; adding one extra man day will not increase output. In other words, engaging in tobacco farm is not a rational undertaking. It appears that being engaged in maize and vegetable farming will yield a higher return. However, unlike tobacco there may not be a ready market for maize and vegetables; the latter is also perishable. On the other hand, there are always buyers for tobacco leaves by tobacco and cigarette manufacturing establishments. In Tanzania there are only three to four monopolistic buyers; tobacco farmers are price takers.

It should also be noted that being engaged in tobacco farming is very likely to expose women (and men) to tobacco farming-related illnesses such as exposure to smoke inhalation while curing tobacco, as well as illnesses related to fertilizer and chemical sprays. The long hours in tobacco fields are likely to have a negative effect on women tobacco farmers. Engaging in tobacco farming for up to ten months in a row is exhausting. Furthermore, it is not unusual to see women tobacco farmers in Tanzania working in the field while pregnant or with children on their backs. The negative health effects of tobacco production and cigarette consumption upon the health of the population at large need to be taken into consideration.

The only way forward is for policy makers to adopt policies aimed at generating alternative employment for women farmers in general and for tobacco farmers in particular.

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