



Original Investigation

Explaining Why Farmers Grow Tobacco: Evidence From Malawi, Kenya, and Zambia

Adriana Appau PhD,¹ Jeffrey Drope PhD,² Fastone Goma PhD,³ Peter Magati PhD,^{2,4} Ronald Labonte PhD,⁵ Donald Makoka PhD,⁶ Richard Zulu MPhil,³ Qing Li MA, MEd,² Raphael Lencucha PhD¹

¹Faculty of Medicine, School of Physical and Occupational Therapy, McGill University, Montreal, Canada; ²Economic and Health Policy Research, American Cancer Society, Atlanta, GA; ³School of Medicine, University of Zambia, Lusaka, Zambia; ⁴African Population and Health Research Center, Nairobi, Kenya; ⁵Institute of Population Health, University of Ottawa, Ottawa, Canada; ⁶Centre for Agricultural Research and Development, Lilongwe, Malawi

Corresponding Author: Adriana Appau, Faculty of Medicine, School of Physical and Occupational Therapy, McGill University, Montreal, Quebec, Canada. Telephone: 1514-638-5538; Fax: 1514-398-6360; E-mail: adriana.appau@mail.mcgill.ca

Abstract

Introduction: Tobacco production continues to increase in low- and middle-income countries creating complications for tobacco control efforts. There is the need to understand and address the global tobacco leaf supply as a means of decreasing tobacco consumption and improving farmers livelihoods in line with Article 17 of the WHO Framework Convention on Tobacco Control. This study aims to understand the reasons why farmers grow tobacco and identify factors that influence these reasons.

Methods: Primary survey data ($N = 1770$) collected in Kenya, Malawi, and Zambia in the 2013–2014 farming season. Data analysis uses both descriptive and multinomial logistical regression methods.

Results: Majority of farmers started and are currently growing tobacco because they believed it was the only economically viable crop. Compared with Malawi, farmers in Kenya and Zambia have a 0.2 and 0.4 lower probability of growing tobacco, respectively because they perceive it as the only economically viable crop, but a 0.04 and 0.2 higher probability of growing tobacco, respectively because they believe it is highly lucrative. There are district/county differences in the reasons provided with some districts having a majority of the farmers citing the existence of a ready market or incentives from the tobacco industry. Statistically significant factors influencing these reasons are the educational level and age of the household head, land allocated to tobacco and debts.

Conclusion: There is the need to address the unique features of each district to increase successful uptake of alternative livelihoods. One consistent finding is that farmers' perceived economic viability contributes to tobacco growing.

Implications: This study finds that perceived economic viability of tobacco is the dominant factor in the decisions to grow tobacco by smallholder farmers in Malawi, Kenya, and Zambia. There is the need to more deeply understand what contributes to farmers' perceived viability of a crop. Understanding and addressing these factors may increase the successful uptake of alternative livelihoods to tobacco. Furthermore, this study demonstrates that a one-size fits all alternative livelihood intervention is less likely to be effective as each district has unique features affecting farmers' decisions on growing tobacco.

Introduction

Tobacco use is the leading preventable cause of premature death and morbidity, with approximately 8 million people dying annually and millions more suffering from tobacco-attributable diseases. There has been a marked shift in the burden of tobacco in low- and middle-income countries (LMICs), where an estimated 80% of tobacco consumption now occurs.¹ As of 2016, the total economic cost of smoking was roughly 2 trillion dollars (purchasing power parity).² LMICs bear 40% of this economic cost, an enormous burden on already under-resourced countries.² Demand reduction interventions in the WHO Framework Convention on Tobacco Control (FCTC) are being implemented by governments around the world with signs of success,³ but tobacco supply remains a pressing and often neglected issue.

In part, the challenge of tobacco supply stems from the continued demand for tobacco products. Almost 6 trillion cigarettes continue to be consumed each year.⁴ Global tobacco leaf production increased from approximately 6.5 million tonnes in 2006 to 7.2 million tonnes in 2014.⁵ There is also a complex political economy that perpetuates tobacco growing in countries around the world,^{6,7} including government policies—such as direct tax incentives to the processing firms that buy leaf from farmers—that support tobacco production. Sub-Saharan Africa is a major and increasingly important producer of tobacco leaf for the global market. There was a 60% increase in tobacco leaf production from 2006 to 2014 in Africa, while in the same period there was a 20% production decrease in Europe.⁵ This increase is largely driven by narratives of economic prosperity for both government revenue and tobacco farmers' livelihoods.^{7,8} The tobacco industry has also continued to reproduce and refine its supply chains further driving tobacco production.^{9,10} Despite this narrative of prosperity, empirical household-level studies demonstrate that most smallholder farmers in these countries are making little, if not losing, money.^{11–15}

Despite the mounting evidence of the economic struggle of smallholder farmers that grow tobacco, little is known about the factors that shape these farmers' agro-economic decisions. Tobacco farmers' situations are relevant to policy not least because Article 17 of the WHO FCTC requires tobacco-growing countries to promote economically viable alternatives.¹⁶ Thus, understanding the factors that shape tobacco-growing households' decision-making is critical for approaching supply reduction strategies. The aim of this study is to understand the reasons why farmers grow tobacco and identify the factors associated with this decision across three major tobacco growing countries: Kenya, Malawi, and Zambia.

Background on Tobacco Farming

Tobacco production is influenced by many factors. To begin to understand household-level decisions it is important to provide a brief overview of these factors. The economies of many tobacco-growing countries in Sub-Saharan Africa are heavily reliant on agriculture. Historically, promotion of cash crop production, such as tobacco, was aimed at improving economic growth through foreign exchange generation and increasing farm incomes and household food security (by providing cash from crop sales to purchase grain staples).¹⁷ The goal of export-led growth has driven governments to promote crops that can be sold in the global marketplace.¹⁸

Smallholder tobacco farmers, unlike many nonfarm households, are responsible for both the allocation of inputs (including labor) for agricultural production and the allocation of their income

in consuming both agricultural and nonagricultural goods and services.¹⁹ Farmers can supplement their consumption (including food) using revenue from their cash crops, and/or employ paid labor if production demands exceed available family labor, presumably with the goal of further enhancing production. A tobacco-producing household may allocate their capital and labor inputs to both tobacco cultivation and cultivation of staple food for household consumption. Alternatively, some farmers may principally seek to maximize profits, allocating most of their resources to tobacco production and then using their profits to buy food and nonagricultural commodities and services. Recent research demonstrates that the revenues from selling tobacco leaf barely cover or even frequently outstrip farmers' physical input costs (eg, fertilizer, seeds or seedlings, agricultural chemicals).¹⁴ But there is another vital dimension: tobacco farming is incredibly labor intensive, involving more than 12 different major discrete tasks from nursery care to final packaging for selling.²⁰ Survey data from Kenyan smallholder farmers in 2006 estimated that tobacco requires an average of 227 laborer days per season (household and hired labor), significantly more than other cash-crops such as soya beans (54 laborer days), passion fruit (43 laborer days), pepper (86 laborer days), water melon (52 laborer days), and even pineapples (173 laborer days).²⁰ Most of this labor is typically borne by family members and not incorporated by the farmer into their input costing. The exclusion of this cost gives farmers a perception that overstates the profitability of growing tobacco. This narrative of profitability is amplified and exaggerated by the tobacco leaf buyers.²¹ In light of this emerging evidence questioning the economic viability of tobacco farming, it remains unclear why smallholder farmers choose to grow tobacco.

Farmer Crop Choices

There are at least four main categories of factors that influence farmers' crop choice—environmental, farm and household (including demographic), economic, and institutional. Environmental factors include land characteristics, type of soil, weather seasons, and closeness to water sources, roads, and urban cities.^{22,23} Greig²³ found that the season (rainy/dry season) was the most important factor in choosing what crop to grow.

Farm and household characteristics include household size, educational level, gender, farm equipment, land size, and food security.^{22,23} Studies have found larger, younger households are more likely to cultivate labor-intensive crops with the quantity of available household labor positively associated with the number of cash crops a farmer cultivates.²⁴ Age and educational level of the household head have also been shown to be associated with a farmers' decision to become a contract farmer¹⁴ and in other instances, farmers' decision to exit tobacco farming.²⁵ Doss²⁶ found that there are some gendered patterns of cropping in Ghana where at the district level some crops were disproportionately grown by a certain gender. For example, he found that all the sampled households that farmed tobacco were male-headed households. Results from Udry²⁷ suggest that plots controlled by women are farmed less intensively.

Economic factors include crop prices, input and transportation costs, cash crop promotion programs, farm size, debt, availability of credit, and access to markets.^{22,23} Households also consider food security in their cropping decisions though the logic varies, ranging from growing a considerable amount of food crops for household consumption to allocating most or all land for cash crops in order to purchase food with the revenues.^{28,29}

Institutional factors include input subsidy programs and availability of extension officers.^{22,30} Lukanu et al.²² found that in conceptualizing profitability of a cash crop, farmers focus on factors such as reliability of prices, assurance of buyers, and availability and easy access to extension workers. A study in Southern Niassa Province in Mozambique examined cash crop cultivation, such as cotton, tobacco, sunflower, and lemon grass, and found that although farmers preferred producing staple food crops over cash crops, they tended to cultivate cash crops that helped them access inputs and extension services, and which had a ready market for selling. Certainly, the availability of credit and inputs influence farmers' crop choice.^{31,32}

Methods

This study employs an analysis of primary survey data collected from smallholder tobacco farming household heads in Kenya, Malawi, and Zambia in the 2013–2014 farming season. The total sample was 1,770 farming household heads (Malawi: $n = 685$ from 6 districts, Kenya: $n = 585$ from 4 counties, Zambia: $n = 500$ from 7 districts) with an average age of 40 years (see [Supplementary File 1](#) for district maps). The survey methods have been described in a previous study,¹⁴ but, briefly, a stratified random sampling method was adopted to collect survey data in major tobacco-farming districts with high concentrations of smallholder farmers. A survey method was chosen for this study as it allowed us to obtain both quantitative and qualitative information from individual perspectives in a large, representative population sample of tobacco farmers.³³ In addition to understanding the distribution of variables in the sample, survey methods allow us to examine the relationship between variables of interest at the population level while accounting for country differences.³⁴ The sample size for each country was calculated adjusting for the total population size of tobacco farmers and using a standard deviation of 0.5, a 95% confidence interval and allowing for a 4% to 4.5% margin of error. The data analysis utilized both descriptive and logistical regression methods. Histograms and a chromatic circle are used to present descriptive analysis of the reasons why farmers started and are currently growing tobacco.

The dependent variable is “the reasons why a farmer is currently growing tobacco.” Farmers were asked to give reasons why they are currently growing tobacco. The reasons provided were grouped under nine categories: (1) existence of ready market, (2) it is the only viable crop, (3) accustomed to growing, (4) availability of land, (5) influenced by other tobacco producers, (6) good incentives from the tobacco companies, (7) highly lucrative crop, (7) to repay outstanding debts, and (8) other. We anticipated that the underlying construct for some of these options may overlap (eg, only viable

crop and highly lucrative), therefore detailed explanations for each was provided to respondents to ensure they understood the differences ([Supplementary Table 3](#)). The variables were also validated with local partners during the survey development stage to ensure differentiation between constructs. Because the dependent variable is categorical and nominal, multinomial logistic regression is utilized. Country differences on perceived reasons for tobacco growing, human capital, and different constraint variables do exist and are controlled for, using Malawi as the comparison base group. Several key household and farm characteristics are included in the model based on the literature discussed above. Age, years of education, household size, total land size available to the farmer, and the fraction of total land assigned to tobacco farming in acres are continuous variables, where coefficients represent the estimated average effect of a one unit increase of each variable on the probability of selecting a specific reason. Gender, contract status, outstanding debt, and food security are dichotomous variables, where model coefficients represent the estimated average effect of having such characteristics on the probability of selecting a specific reason. Stata (V.13.1 IC) was used for all analyses (-mlogit-) with the -mlogtest- postestimation command to obtain a joint covariance matrix for all estimated coefficients.

Results

Household characteristics are presented in [Table 1](#), revealing some clear distinctions across countries. For instance, from the current study, Malawi has the lowest proportion of female headed-households. Kenyan farmers have the smallest cultivatable land size (2.8 acres compared with 5.6 for Malawi and 6.6 for Zambia). In general, a very small proportion of cultivatable land is rented by farmers in this sample. Kenya has the highest proportion of the arable land that is utilized for tobacco growing. Kenya also has the highest portion of farmers on contract at more than 80%, and notably Kenyan farmers have more outstanding debt and are the least food secure.

Descriptive Results: District Level Analysis

Malawi

The majority of tobacco farmers in all districts started growing tobacco because they believed it was the only economically viable crop. However, some districts had a larger proportion of farmers choosing certain reasons than others ([Supplementary Figure 1](#)). For example, we found that there was a larger number of farmers who started growing tobacco because of the ready market in the Rumphu and Kasungu districts compared with the other districts. Also, apart

Table 1. Household Characteristics of Farmers

| Country | Malawi | Kenya | Zambia | Total |
|----------------------------------|--------|--------|--------|--------|
| Female | 9.93% | 23.93% | 19.80% | 17.34% |
| Age | 40.65 | 40.20 | 40.37 | 40.43 |
| Years of education | 7.47 | 9.16 | 7.48 | 8.02 |
| Household size | 6.66 | 6.37 | 8.30 | 7.02 |
| Land Size (acres) | 7.68 | 3.55 | 14.06 | 8.09 |
| Cultivated land | 5.6 | 2.8 | 6.6 | 4.9 |
| Land assigned to tobacco farming | 2.16 | 1.81 | 1.85 | 1.96 |
| Contractor | 44.8% | 81.71% | 70.72% | 64.27% |
| Outstanding debt | 10.36% | 41.19% | 25.97% | 24.96% |
| Food secure | 75.62% | 59.83% | 71.76% | 69.28% |

from Rumphu and Dowa districts, all other districts had more than 15% of respondents stating because they were influenced by other tobacco farmers.

Kenya

The most often cited reason for initiating tobacco cultivation for all counties was the belief that tobacco was the only economically viable cash crop. Compared with other counties, a large percentage of participants in Migori further reported the presence of a ready market. In addition, more participants in Migori and Meru compared with Bungoma and Busia stated that other tobacco farmers influenced them to start tobacco cultivation. Strikingly, 21% of participants in Meru started cultivating tobacco because of incentives from the tobacco companies compared with 4% and 1% of participants from Bungoma/Busia and Migori, respectively, suggesting a strong institutional dimension.

Zambia

A greater percentage of farmers in Chipata and Kapiri Mposhi districts started cultivating tobacco because they believed that it was highly lucrative. On the other hand, a greater percentage of participants in Choma, Kalomo, and Serenje started cultivating tobacco because they believed it was the only economically viable crop. As shown in [Supplementary Figure 3](#), a large percentage of people in Lundazi started cultivating tobacco because they were influenced by other tobacco farmers.

The perception of crop viability was the most common factor reported by participants ([Table 2](#)). The perception of a ready market was consistently the second most chosen reason for growing tobacco across the three countries. Very few farmers are cultivating tobacco because of incentives from the tobacco industry with almost no farmers from Malawi indicating that they were cultivating tobacco for this reason ([Table 2](#)). Surprisingly, only a small portion (less than 10%) of farmers in Kenya and Malawi are currently cultivating tobacco because they believe it is highly lucrative, with the portion being 19% in Zambia.

Descriptive Results: Reasons for Continuing to Grow Tobacco

We also compared the reasons why farmers started tobacco farming to the reasons why they are currently growing tobacco. The chromatic circle in [Figure 1](#) shows the number of farmers who changed reasons for growing tobacco (the chromatic circle includes only

categories that had more than 20 farmers reporting different reasons). The reasons provided for currently growing tobacco than for why they began were generally different. For farmers who started growing tobacco because it had a ready market (the assurance of an already existing market irrespective of making profits or not), almost half are currently growing tobacco because they identify it as the only economically viable crop (thus tobacco being the only crop that farmers can grow and recoup costs for farming). Of farmers who started growing tobacco because it was the only economically viable crop, 40% are currently growing tobacco because of ready market, while 31% are growing tobacco because they have grown accustomed to doing so and 15% because they believe it is highly lucrative. Of farmers who started growing tobacco because their parents farmed it, 45% are still growing tobacco because they identify it as the only economically viable crop and 21% because they have grown accustomed to growing it. Of farmers who started growing tobacco because they were influenced by other tobacco producers, 48% are currently growing tobacco because they identify it as the only economically viable crop, 16% because they have grown accustomed to growing it, 16% because it was highly lucrative, and 12% because of its available market.

For the 145 farmers who started growing tobacco because they thought it was highly lucrative, 62% are still growing tobacco because they believe it is the only economically viable crop and 15% because they have grown accustomed to it.

Multivariate analysis of factors influencing farmer's choice to grow tobacco

Statistically significant factors that influence the farmers' choices to continue growing tobacco include (1) educational level of the household head, (2) size of land allocated to growing tobacco, (3) outstanding debts, and (4) age of household head ([Table 3](#)). The level of education of participants appears to contribute to farmers decisions: for every 1-year increase in educational attainment there is a 0.8% and 0.7% increased probability that farmers who are currently growing tobacco identify ready market and only economically viable crop as the reasons for growing tobacco. However, a 1-year increase in education decreases the probability of a farmer currently growing tobacco by 0.5% and 0.4% because of being accustomed to it or believing that it is highly lucrative.

Each additional member of the household increases the probability of farmers currently cultivating tobacco because it is the only economically viable cash crop by 0.7% but decreases the probability

Table 2. Reasons for Growing Tobacco

| Reasons | Malawi | | Kenya | | Zambia | |
|---------------------------------------|----------------|---------------|----------------|---------------|----------------|---------------|
| | Initiation (%) | Currently (%) | Initiation (%) | Currently (%) | Initiation (%) | Currently (%) |
| Ready market | 6 | 9.2 | 13 | 12 | 12 | 16 |
| Only viable crop | 63.5 | 58.8 | 31 | 50 | 31 | 31 |
| Inherited | 8.5 | N/A | 7 | N/A | 4 | N/A |
| Accustomed to growing | N/A | 10.9 | N/A | 6 | N/A | 6 |
| Availability of land | 0.3 | 0.3 | 2 | 2 | 0 | 1 |
| Influenced by other tobacco producers | 15.3 | 1.5 | 12 | 5 | 15 | 2 |
| Incentives from tobacco companies | 0.3 | 0.1 | 8 | 7 | 6 | 5 |
| Highly lucrative | 6.1 | 3.9 | 19 | 7 | 15 | 19 |
| Repay outstanding debts | N/A | 0 | N/A | 2 | N/A | 1 |
| Other | 0 | 0 | 5 | 5 | 11 | 10 |
| Missing | 0 | 15.2 | 3 | 4 | 6 | 9 |

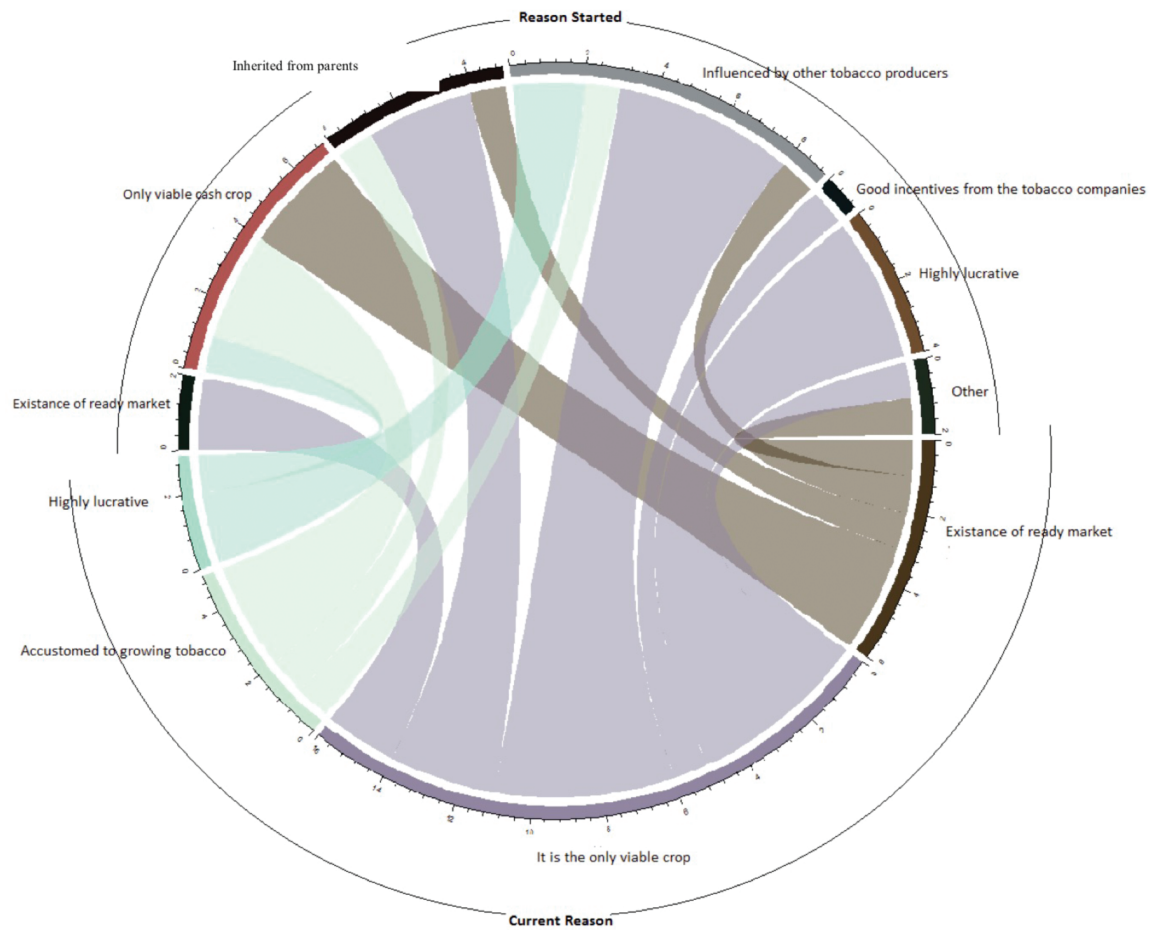


Figure 1. Change of reasons from initiation to current farming period.

Table 3. Factors Associated With the Different Reasons Why Farmers Are Currently Growing Tobacco

| Variables | Ready market | Viable crop | Accustomed to growing | Available land | Farmer influence | Incentive by TI | Lucrative | Repay debts |
|------------------------------|----------------------|----------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | <i>b</i> / <i>SE</i> | <i>b</i> / <i>SE</i> | <i>b</i> / <i>SE</i> | <i>b</i> / <i>SE</i> | <i>b</i> / <i>SE</i> | <i>b</i> / <i>SE</i> | <i>b</i> / <i>SE</i> | <i>b</i> / <i>SE</i> |
| Age | 0.001 (0.001) | -0.001 (0.001) | -0.002** (0.001) | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) | 0.001 (0.001) | 0.000 (0.000) |
| Education | 0.008*** (0.003) | 0.007* (0.004) | -0.005** (0.002) | 0.000 (0.001) | 0.000 (0.001) | 0.000 (0.002) | -0.004* (0.003) | 0.001* (0.001) |
| Land growing tobacco | -0.016** (0.007) | 0.015* (0.009) | -0.002 (0.005) | -0.003 (0.003) | 0.000 (0.004) | 0.010 (0.003) | 0.002 (0.004) | -0.004 (0.003) |
| Land ^a cultivated | 0.002** (0.001) | -0.002 (0.002) | 0.000 (0.001) | 0.000 (0.000) | -0.001 (0.001) | -0.001 (0.001) | 0.001 (0.001) | 0.000 (0.000) |
| Outstanding debts | -0.041* (0.022) | 0.150*** (0.030) | -0.035* (0.021) | -0.008 (0.007) | -0.017 (0.011) | -0.038 (0.012) | -0.009 (0.018) | 0.006 (0.005) |
| Food secure | 0.011 (0.019) | -0.030 (0.028) | 0.012 (0.017) | 0.006 (0.006) | 0.020 (0.011) | -0.049* (0.011) | 0.042** (0.018) | 0.005 (0.006) |
| Kenya | 0.017 (0.023) | -0.218*** (0.034) | -0.051** (0.020) | 0.025** (0.012) | 0.036** (0.013) | 0.065*** (0.013) | 0.039** (0.017) | 0.016** (0.007) |
| Zambia | 0.060** (0.026) | -0.352*** (0.035) | -0.048** (0.021) | 0.003 (0.005) | 0.003 (0.010) | 0.073 (0.019) | 0.15*** (0.025) | 0.014* (0.008) |

(base: Malawi)

No. of observations = 1433, pseudo R² = 0.1042.

^aF-test of joint significance was conducted. The null hypothesis was rejected for all independent variables except land cultivated.

of doing so because it is highly lucrative by 0.4%. As with household size, a one-acre increase in land allocated to tobacco increases the probability that a farmer is currently growing tobacco because they believe it is the only economically viable cash crop but decreases the probability of it being due to a ready market. In the case of farmers' outstanding debt, a dollar increase in debts decreases the probability of growing tobacco due to existence of a ready market by 4% and of being accustomed to doing so by 3.5%. On the other hand, an increase in indebtedness is more likely to make a farmer more dependent on tobacco growing, perceiving that it is the only crop that can get them out of debt. Farmers in Kenya and Zambia have a lower probability of currently growing tobacco because they perceive it as the only economically viable crop compared with Malawi. Similarly, they have a higher probability of growing tobacco because they are accustomed to growing the crop. Farmers in Zambia have a 0.15% higher probability of growing tobacco because they believe it is highly lucrative compared with farmers in Malawi. Being a contract farmer and the gender of the household head had no statistically significant influence on the reasons why a farmer is currently growing tobacco.

Discussion

Though we found some differences among and within countries, the most consistent and strongest findings are the importance of perceived economic viability of the crop and access to markets. Not surprisingly, many farmers identify market access as a key factor in their decision making. For instance, in Malawi a higher percentage of farmers in the Rumphi and Kasungu districts started growing tobacco because of the existence of a well-structured market for tobacco, which is not present for other crops. The importance of the existence of a well organized market in Malawi corresponds with Altman et al.'s findings³⁵ that the access to processing plants was a key factor in crop choice. Similar results were found in Indonesia and Philippines where tobacco farmers expressed that they continued to grow tobacco because of the lack of an existing well-structured market for other crops amongst other things.³⁶ A sustainable alternative livelihood in these districts would therefore require not only an economically viable alternative market for an agricultural commodity comparable to that of tobacco leaf, but for farmers to be aware of and perceive that they have ready access to these markets as they consider their cropping decisions. Studies conducted in China, Kenya, and Brazil found that interventions to stimulate alternative livelihoods were more successful in improving farmers income from alternative crops when market channels were clearly identified and robustly developed.^{37,38}

Apart from market access, farmers' perception of the crop's economic viability frames farmers' decisions. A further examination comparing reasons why farmers started growing tobacco to why they are still growing tobacco revealed that more than 50% of these farmers are currently growing tobacco because they believe it is the only economically viable crop or because they have grown accustomed to growing it. For example, 62% of farmers who started growing tobacco because they thought it was highly lucrative are currently growing it because they now believe it to be the only economically viable crop. These results point to the perceived lack of economically viable alternatives irrespective of the reasons why the farmer started growing tobacco in the first place, coupled with the initial perception that tobacco growing is a lucrative endeavor. Furthermore, results from the statistical analysis suggest that more

educated farmers were more likely to cultivate tobacco because of the existence of ready market or it being the only economically viable crop and not because it is highly lucrative. Previous research in Malawi has also shown that educated farmers are more likely to farm under contracts, hence have a predetermined buyer for their crops.¹⁴ In addition, it is also possible that more educated farmers do not see tobacco as highly lucrative because they are able to accurately account for their labor cost (which significantly reduces the profitability of tobacco) in determining profitability.

Agro-ecological conditions also appear to contribute to notions of viability of the crop.³⁹ For example, in Zambia, a larger percentage of farmers in Choma, Kalomo, and Serenje compared with Chipata and Kapiri Mposhi stated that the reason why they started cultivating tobacco was because they believe that it was the only economically viable crop, despite the region has poor agro-ecological conditions for the crop. It seems that the overall growing conditions for all crops are less favorable in these districts—for example, low rainfall and poor soil conditions—and farmers perceive that they have limited economically viable competitive alternatives to tobacco farming. It is worth noting that in many districts of these countries, farmers have noted that they had the most interaction with agricultural extension services from the tobacco leaf companies and diminishing or even no services from the government providing guidance on other crops.^{13,40} In other words, there was little or no educational exposure to nontobacco crops making the farmers' scope of knowledge very narrow. Recent research demonstrates that other crops are economically viable in these countries,^{41,42} but this information is not reaching many farmers, and perhaps if it were, the perceptions of viability might shift significantly.

These results suggest that most smallholder farmers are growing tobacco not because it is profitable or because of a ready market but because they now believe there is no economically viable alternative. Many of these smallholder farmers have gained years of experience in tobacco farming and may perceive it to be risky or uncertain to shift to another crop, perhaps especially if they have lower educational levels. This is consistent with results found by Beach et al.⁴³ In their study on tobacco farmer's interest and success in alternative livelihoods, they found that farmers with lower educational levels were less likely to shift from tobacco farming. In addition, farmers who indicated the need for additional skills to cultivate other crops were more likely to allocate more land to tobacco cultivation.⁴³ Interventions that have had extensive training of farmers as an integral part of their model have shown that training farmers made it more feasible especially for farmers with little to no formal education to transition to alternative crops.^{37,44} These findings highlight the need to provide farmers not only with viable alternatives to tobacco but also to offer them agricultural assistance in the form of extension services and education on growing other locally viable crops. The factors that contribute to farmers' perception of viability also require further exploration. Supply chains are both dynamic, in that they shift based on a number of political and economic factors, and stable, in that historical patterns of agricultural production of certain crops can make them difficult to change.⁴⁵

It is important to note that economic viability did not necessarily correspond to farmers' perceptions of tobacco as a lucrative crop. In Zambia, a larger percentage of farmers in Chipata and Kapiri Mposhi compared with the other districts reported that they farmed tobacco because they believed that it was highly lucrative. Farmers in Chipata typically have more fertile land than those in other districts and can produce higher quality tobacco leaf

(higher grade) which commands a better price.⁴⁶ When they are not receiving a good price in Zambia, farmers in Chipata also have the option to sell for a better price in Malawi because of geographic proximity. Somewhat similarly, Kapiri Mposhi is situated where three trade routes meet, making it easier for farmers to transport their tobacco in any direction where better prices exist. The lesson for governments in terms of promoting alternative crops is to develop and continue to invest in comparable dynamic markets for other agricultural goods.

In Kenya, a larger number of participants in Meru county stated that they started growing tobacco because tobacco companies provided them with incentives. Meru county has fertile land and higher agricultural productivity compared to many other districts and farmers can cultivate other profitable crops.⁴⁷ Similar results have been found in other studies. Kibwage et al. examined why farmers started growing tobacco in South Nyanza in Kenya and found that 20.8% of participants started growing tobacco because the tobacco companies provided inputs.⁴⁸ The findings here suggest that small incentives for farmers to switch to other crops might be equally effective. For example, in a crop substitution project in Yuxi, China,³⁷ tobacco farmers who had volunteered to switch to alternative crops obtained farm inputs such as seeds and pesticides at very low costs among other incentives, which enabled these farmers to start cultivating alternative crops.³⁷ Another important finding is that there appears to be a relationship between indebtedness and tobacco growing. Farmers who have higher reported debts are less likely to report continuing to grow tobacco because of the existence of a ready market or because they have grown accustomed to it. The reason may simply be to repay their debts; and there is a need to explore further how indebtedness changes over time once a farmer enters into a contract with leaf-buying companies. This exploration can clarify whether debt drives contractual relationships or if contractual relationships lead to increases in debt.

This study has some limitations. First, the more rigid format of a survey questionnaire mitigates nuance in some responses. Detailed qualitative interviews would have provided further insights on some of the results identified through the survey. For example, it is not clear how educational level of the household influences the reasons why farmers grow tobacco. Second, although we ensured that farmers understood the difference between variables, the results suggest that there is an important relationship among perceived economic viability, ready market and the lucrativeness of farming and some of these concepts may overlap.

Conclusion

Understanding smallholder farmers' motivations to grow tobacco provides useful insights into how to help them to shift to viable economic alternatives. Though recent research shows that most smallholder tobacco farmers in sub-Saharan Africa and many other countries are doing very poorly economically,^{11,13-15} this research suggests that many continue to believe that tobacco is their most, if not their only, viable option. We seem to see an important dynamic whereby the decision to grow tobacco is conditioned not simply by perceived profitability but by the attractiveness of knowing that leaf will be sold due to the structure of the market system and the lack of similar markets for other agricultural commodities. Future research should examine the factors that contribute to viability and the relationship among viability, market access and profitability to inform alternative livelihood interventions.

At the same time, consistent with findings across Sub-Saharan Africa generally,⁴⁹ most of these farmers are also reporting very little or no agricultural training in the form of extension services or other government-sponsored agricultural education. They are typically receiving vigorous extension services directly from tobacco companies, which is a key component of contracts, the implication being that few options beyond tobacco are being presented to them.^{13,40,50} Similarly, the readily available local supply chain of the tobacco sector appears to affect farmers' decisions to cultivate tobacco. Farmers report difficulty selling many crops, but little problem selling tobacco leaf, even if it is at low prices that often lead to net losses and increased indebtedness. If governments are serious about getting tobacco farmers to shift away from tobacco, they are going to need to help enhance supply chains for other goods to offer reasonable alternatives to tobacco.

The heterogeneity across districts of the reasons why farmers grow tobacco suggests that a successful and sustainable one-size-fits-all alternative livelihoods intervention is unlikely to succeed. Rather, while considering the similarities highlighted here, there is also a need to address some of the unique features of each district to increase successful uptake of alternative livelihood initiatives.

Supplementary Material

Supplementary data are available at *Nicotine and Tobacco Research* online.

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Declaration of Interests

None declared.

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