Understanding Farmers' Decision to Move Away from Tobacco Cultivation in Sri Lanka

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INTRODUCTION

Since the 1990s, the policy support provided to tobacco cultivation dropped sharply with the global drive against tobacco. The cultivated area dropped significantly from 8,920 hectares (0.47% of agricultural land) in 1990 to 1,338 hectares (0.06% of agricultural land) in 2019. The production too has declined dramatically, from 10,352 MT in 1990 to 5,048 MT in 2019 (Department of Census and Statistics, n.d.). The number of tobacco farmers remained less than 3,000 farmers dispersed in certain areas of *Polonnaruwa, Anuradhapura, Ampara, Badulla, Matale, Kandy, Nuwara Eliya, Kurunegala*, and *Jaffna* districts (DOA, 2019). All these highlights a drastic decline in the importance of tobacco in the cultivated crop mix (Thibbotuwawa & Dissanayaka, 2019).

Many international organizations including United Nations (UN) portrayed tobacco as "a major threat not just to health, but also to social and economic development and environmental sustainability" (Geist et al., 2009). Such negative consequences include high labour requirements of tobacco cultivation (Magati, 2016), health risks associated with leaf harvesting and leaf-curing (Lecours, 2014), and environmental degradation (Ministry of Environment and Renewable Energy, 2014). Article 17 of the WHO Framework Convention on Tobacco Control (FCTC) which Sri Lanka is a ratified member requires the implementation of economically sustainable alternatives to tobacco growing due to the environmental and health impacts of tobacco production addressed in Article 18 (Kienle et al., 2015).

However, shifting is a decision by individual farmers based on various external reasons as they may or may not be aware of environmental degradation or possible health risks as perceived by global literature. However, Sri Lanka is lacking in this area of research. Therefore, the main objective of this study is to find out the factors affecting farmers' decision to switch to other alternative crops instead of growing tobacco. The findings of this study are expected to better equip the policymakers in making evidence-based policy decisions related to the efforts in controlling tobacco-related issues.

METHODOLOGY

The sample (n=207) consists of current and former tobacco farmers in Sri Lanka. The study used a multi-stage cluster sampling in selecting the sample from three leading tobacco-producing districts of Sri Lanka; Polonnaruwa (n=53), Kurunegala (n=79) and Matale (n=75).

Bivariate logistic regression was used to find out the factors affecting the tobacco farmers' decision to switch to an alternative crop. The dependent variable in the model is the decision to switch to other crops (DTS), which is a dichotomous variable; 1=farmers that have switched to other alternatives from tobacco, 0= farmers who were not switched to other alternatives. The independent variables of the model were selected using both previous literature (Drope et al., 2018; Chavez et al., 2016; Goma et al., 2015; Magati et al., 2016; Makoka et al., 2016) and the author's intuition. Sahadewo, 2020 suggested using demographic characteristics of the households such as age, employment status, the experience of farming, cultivated land acres, cropping patterns in wet and dry seasons, contract farmer or not etc.

$$DTS = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 \ln X_6 \ldots \beta n Xn \quad (1)$$

Where, X1: Age (years)

X2 : Education

X3 : Employment status, measures using a dummy variable, 0: farmer, 1: own account employee/ private/public sector employee

X4 : Experience in tobacco farming(yrs);

X5 : Whether used Hired labour or not;

X6 : Total revenue from tobacco in the last season;

X7: having an alternative water source in Yala season, measured using a dummy variable. 0: Rainfed, 1: Irrigation water, 2: Agro well, 3: Deep well, 4: Other.

X8 : Other crop cultivations (pattern of growing in Yala and Maha), measured using a dummy variable, 0: No other crops in Yala or Maha, 1: Other crops in Yala only, 2: Other crops in Maha only, 3: Other crops in both Yala and Maha.

X9 : having a contractual arrangement with leaf buyer, measures using 0: not having a contractual agreement with tobacco buyer, 1: have a contractual agreement with tobacco buyer;

X10 : Cultivated land area (acres);

X11 = Whether had taken a loan for tobacco cultivation or not, measured using a dummy variable.

The Average Marginal effects (AME), the average effect of changes in the explanatory variables on the change in the probability of outcomes in logistic regression was calculated using Equation 2.

$F(X) = P(Y=1|X)$,

Marginal Effect for $X_k = P(Y=1|X) * P(Y = 0|X) * b_k$. (2)

FINDINGS

The socio-demographic characteristics of the survey respondents are presented in Table 1.

Table 1: Socio-Demographic Characteristics and cultivation related details of Respondents

characteristic		Farmers who did not switch		Farmers who switched	
		No	%	**No**	%
Age (years)	Min	19		34	
	Max	76		81	
	Mean	51		55	
Gender	Male	127	90	61	92
	Female	14	10	5	8
Family Size	Min	1		2	
	Max	7		6	
	Mean	4		4	
Level of Education	No schooling	5	4	3	5
	Primary level (1-5)	38	27	13	20
	Middle level (6-9)	30	21	22	33
	Secondary/Ordinary level (10-11)	51	36	22	33
	Post-secondary/ Advanced Level (12-13)	16	11	6	9
	Tertiary and above	1	1		
HH Income (LKR per month)	Non-agricultural income	46,946		45,583	
	Agricultural income	18,121		30,273	
Employment Status	Farmer	132	94	52	79
	Casual labourer	4	3	1	2
	Private sector employee	3	2	0	0
	Government Employee	0	0	0	0
	Own account worker	0	0	8	12
	Other	2	1	5	7
Tobacco cultivated land (acres)	Max	5.4			
	Min	0.04			
	Mean	1.47			
Leaf production (Kgs/ acre/month	Average production per month	1,459.62			
Monthly profit from other cultivations (LKR/acre/month)	Tobacco	22,675			
	Chili	67,700			
	Cabbage	38,300			
	Brinjal	37,970			
	Big onion	16,041			

The estimated parameter and the marginal effects for the logit approach are presented in Table 2.

Table 2: The Results of the Logistic Regression and Marginal Effects

Variable	Coefficient	Marginal effect dy/dx	*p*-value
Age	0.0667**	0.0123	0.002
Education	0.0285	0.0052	0.884
Employment status	-0.5218*	-0.0961	0.085
Experience in tobacco farming(yrs)	-0.0582**	-0.0108	0.002
Cultivated land acres	0.2235**	0.0415	0.005
Partnership with a contractor	0.1163	0.0214	0.806
Other crop cultivation pattern	-0.1420	-0.0263	0.449
Alternative water sources in Yala	0.4361**	0.0809	0.019
Hired labour	-0.1063	-0.0200	0.815
Log_tobacco revenue	-0.9838**	-0.1826	0.000
Received inputs/loans	-0.5218	-0.0934	0.317

Number of observations = 206
LR chi2(10) = 70.49
Prob > chi2 = 0.0000
Pseudo R2 = 0.2728

Note: ** p<0.05, *p<0.1.

As the results indicate the age of the farmer, total cultivated land area, having an alternative water source during *Yala* season have positive and statistically significant (5% level) impacts on the switching decisions. Similarly, employment status, experience in tobacco farming, other crop cultivation patterns, and revenue from tobacco have negative and statistically significant impacts on the switching decisions (5% and 10% levels).

Based on the estimated marginal effects, an increase in age by one year increases the probability of taking the decision to switch by 1.2%. Older farmers are more likely to switch to other crops compared to young farmers. This is probably because making comparisons across different alternatives is much easier for older farmers with their prolonged exposure and experiences in cultivating a variety of different crops. However, the marginal effect of the tobacco farming experience variable depicts that for a 1-year increase in experience of tobacco farming, the probability of taking the switching decision decreases by 1.08% implying farmers who are having more experience in tobacco farming were less likely to switch to other crops.

Furthermore, a 1-acre increase in cultivated lands increases the probability of taking the decision of switching by 4.1%, indicating that those who own more cultivatable lands are more likely to swich from tobacco to other crops.

Those who have alternative water sources, such as deep wells or agro wells are more likely to shift to other crop cultivations. On the contrary, those who depend on conventional irrigation and rainfall would be more likely to stay with tobacco cultivation. Since tobacco is considered a drought-tolerant crop, farmers are naturally inclined to choose tobacco over the other alternative crops during *Yala* season, unless they have a good water source. Moreover, farmers who could not generate a considerable income from tobacco are more likely to switch to alternatives.

The positive marginal effect of the employment status variable indicates that engaging in an occupation other than farming increases the likelihood of taking the switching decision by 9.6 percent. In the study area, farmers interviewed had chosen Paddy (35%), Maize (14%) as the main alternative crops after leaving tobacco cultivation. Others had crop choices such as Brinjal, Chilli, Big Onion, Cabbage, Ground Nut, and Okra.

Furthermore, the survey sought to examine the farmer's expectations from the government if they are to move out from tobacco cultivation to alternative crops. Twenty-eight percent of the farmers expect an input subsidy to switch to other crops. Another 26 percent of farmers expected an assured market for the new crops and 22 percent is in favour of government extension support followed by 19 percent for well-established contracts.

CONCLUSIONS

The decision to switch to other crops is mostly influenced by age of the farmer, the farmer's years of experience in tobacco cultivation, total cultivated land, having an alternative water source in *Yala* season, total tobacco revenue, and employment status of the farmer. Several crops such as Paddy, Maize, Brinjal, Chilli, Big Onion, Cabbage, Ground Nut, and Okra were the main alternative crop choices available for farmers.

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