

Deteriorating Quality of Life and a Desire to Stop Growing Tobacco Among Virginia and Burley Tobacco Farmers in Thailand

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PURPOSE This study aimed to examine the quality of life of tobacco farmers and their desire to stop growing tobacco.

METHODS A cross-sectional home-based survey was conducted between October 2021 and January 2022 among 2,970 Virginia and Burley tobacco farmers in Northern Thailand. Multivariate logistic regression models were used to determine the association between farmers' characteristics and their quality of life and a desire to stop planting tobacco.

RESULTS In total, 58.5% of the participants wanted to stop growing tobacco, and most had a lower quality of life than the mean. Nine independent variables were associated with a desire to stop tobacco farming: having a low level of economic quality of life (adjusted odds ratio [ORAdj], 5.42; 95% CI, 3.8 to 7.8); having a high environmental quality of life (ORAdj, 4.60; 95% CI, 3.3 to 6.5); belonging to the Tobacco Farmers' Association (ORAdj, 3.04; 95% CI, 2.1 to 4.5); growing tobacco on their own land (ORAdj, 2.12; 95% CI, 1.8 to 2.6); having a low social quality of life (ORAdj, 1.69; 95% CI, 1.4 to 2.1); having a low health quality of life (ORAdj, 1.69; 95% CI, 1.4 to 2.1); having a low spiritual quality of life (ORAdj, 1.41; 95% CI, 1.2 to 1.7); being Burley tobacco farmers (ORAdj, 1.33; 95% CI, 1.0 to 1.8); and having a low family quality of life (ORAdj, 0.49; 95% CI, 0.4 to 0.6).

CONCLUSION The majority of the tobacco farmers had a declining quality of life, particularly economic and environmental quality of life, resulting in reducing growing tobacco. National and regional support are needed to help these farmers effectively grow alternative crops, and financial support to make such conversions.

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INTRODUCTION

Tobacco farmers in Thailand are currently experiencing severe economic hardship as a result of continuous reductions in tobacco purchase quotas since 2017. Compared with 2014, the year with the highest sales of tobacco, the sales volume of Burley leaves has dropped from 38,060,038 to 20,571,445 kg.¹ Likewise, the purchase volume of Virginian tobacco has decreased from 17,548,548 kg to only 11,149,255.¹ This was due to a misapplication of tax measures, which allowed foreign tobacco companies to lower their prices to compete with domestic cigarettes. Consequently, some smokers in Thailand increase their purchases of imported cigarettes, and domestically produced cigarettes are sold at a considerably lower rate. For this reason, the Tobacco Authority of Thailand has to reduce cigarette production, which lowers the demand for tobacco leaves.¹ The situation regarding the continuous decline in the demand for tobacco leaves in Thailand is not different from other

tobacco-growing countries around the world. Despite the fact that tobacco farmers appear to make a lot of money from bulk sales, the income generated is often insufficient to cover the cost of production, resulting in a shortage of finance, endless debts, and a poor standard of living for tobacco farmers.²⁻⁵ Apart from economic and financial issues, tobacco farmers are also at high risk for the health effects of tobacco cultivation and processing. One of the considerable health issues among tobacco farmers is green tobacco sickness, which involves skin-to-skin contact with nicotine poisoning from tobacco leaves that is absorbed and inhaled, causing symptoms such as dizziness, nausea, and vomiting.⁶⁻¹⁰ In addition, through the harvesting of tobacco leaves, they are likely to be at risk of exposure to toxins and accumulated pesticides,¹¹ which were associated with an increased risk of cancer in farmers,¹² development of mental health problems because of depression, and increases in suicide because of poverty, debt, and family stress.¹³

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CONTEXT

Key Objective

To examine the quality of life of Thai tobacco farmers and their desire to stop growing tobacco.

Knowledge Generated

The majority (58.5%) of tobacco farmers in Thailand wanted to stop growing tobacco, and most of them had low quality-of-life scores. A low economic quality of life, high environmental quality of life, low social quality of life, low health quality of life, low spiritual quality of life, and low family quality of life were more likely to advocate stopping tobacco farming.

Relevance

Major Thai tobacco farmers have experienced a decline in quality of life, particularly in economic and environmental domains, leading them to consider stopping tobacco farming. To encourage these farmers to stop growing tobacco and switch to growing alternative crops, government agencies should establish concrete measures such as guaranteeing alternative crop prices and providing low-interest loans.

For these reasons, the WHO has mandated in Article of the WHO Framework Convention on Tobacco Control to support activities that are economically beneficial to tobacco cultivation as one of the combined measures to reduce tobacco demand sustainably and to ensure that the member states meet the requirements of the Convention.¹⁴ These efforts, however, have not been easy to achieve because tobacco farmers need encouragement to stop growing it for a variety of reasons. The following characteristics were found to be associated with tobacco farmers who had the opportunity to grow alternative crops to replace tobacco farming: obtaining high education,¹⁵ decrease in household income from tobacco cultivation,² perceiving that tobacco cultivation can be harmful,^{2,15} having knowledge of tobacco crop replacement,¹⁵ recognizing the inefficiencies of growing tobacco compared with alternative crops,^{2,15} and believing that there will be a stable market for purchasing alternative crops to replace tobacco.¹⁶

By contrast, tobacco farmers who are reluctant to discontinue tobacco cultivation or who have a very limited chance of switching to tobacco alternatives have the following characteristics: believing that tobacco is a higher-income crop than other crops,¹⁷ believing that the buying market of tobacco is more stable than that of other alternative crops,¹⁸ receiving tobacco crop-related facilities from tobacco companies,¹⁷ and having geographical limitations (eg, low rainfall and poor soil conditions), resulting in difficulty in growing alternative crops.¹⁹ Lessons from the People's Republic of China confirm that the information on the factors correlating with the demand for stopping tobacco crops as mentioned above is vital and essential for strategic planning to determine a plan to promote alternative crop cultivation and a successful tobacco substitute career.^{20,21}

Thailand currently has approximately 16,000 farmers in Virginia and Burley tobacco, who are at risk of deteriorating quality of life because of the decline in tobacco purchases. In turn, this may lead to reluctance and a desire to stop growing tobacco, which needs government assistance and

supports. The purpose of this study was to investigate the quality of life and the desire to quit tobacco-growing among Virginia and Burley tobacco farmers in Thailand in an environment where the demand for tobacco is declining.

METHODS

This was cross-sectional survey research, conducted between October 2021 and January 2022. It was approved by the Ethics Committee in Human Research, Naresuan University, Project Number: COA No. 140/2021, IRB No. P3-0087/2564, certification date: April 24, 2021.

Sample Size and Sampling

The samples were tobacco-growing farmers in the northern region of Thailand who grew Virginia and Burley tobacco and registered as farmers with the Chiang Mai, Phrae, and Sukhothai Provincial Agriculture Office. The sample size was estimated by using the finite population proportion: $N = 16,300$, $P = .322$ (on the basis of a pilot survey among Burley tobacco farmers in a community, which found that 32.2% of people voluntarily planted tobacco alternatives¹), $\delta = 0.0161$ (5% of P), $\alpha = .05$, $Z(0.975) = 1.96$. When calculated by the formula, a sample of 2,700 people was obtained and to prevent nonresponse and incomplete responses, a 10% was added to the calculated sample number. Therefore, the total number of samples was 2,970 people. Stratified random sampling was used to distribute sample sizes proportionally to Burley framers ($N = 11,685$ people) and Virginia framers ($N = 4,615$ people). A systematic random sampling approach was then conducted using the ordinal numbers according to the list of farmers registered with the Chiang Mai, Phrae, and Sukhothai Agricultural Offices. A sample random sampling approach (lottery) was used to draw the first representative of the random number table.

Measurement

Data were collected by using a self-reported questionnaire, developed by the researchers. The desire of tobacco farmers to quit growing tobacco is the dependent variable,

measured by using three checklist questions, comprising (1) the desire to quit growing tobacco in the next 1 year (yes/no), (2) reasons for the desire to quit growing tobacco (low prices/lower planting quotas/health issues/natural disasters/lack children to continue), and (3) proposals on the need for government supports if having a demand to stop tobacco cultivation (issuing low-interest loans/providing alternative vocational training/insuring the price of alternative crops/finding a market to buy products).

General characteristics of tobacco farmers were assessed by 10 open-ended and checklist items, including sex (male/female), age (year), education level (no study/primary school/secondary school/diploma or degree), annual income from tobacco cultivation (Baht), tobacco growing experience (years), size of tobacco growing area (rai), tobacco-growing quota source (public/private sector), debts (yes/no), nature of possession of tobacco growing land (own/rent/both), and membership of the Tobacco Farmers Association (yes/no). The quality of life of tobacco farmers was measured by using 31 items with 3-Likert's scale options (high/medium/low) and consisted of six aspects: (1) economy (six items): income from tobacco leaf sales; ability to pay debt; ability to spend money on family consumption; amount of household debt; amount of savings or deposits in the bank; and funds for improving the condition of the residence, (2) health (five questions): physical fitness; sleeping; chemical exposure and occupational injuries; sickness and diseases; and ability to perform daily activities, (3) spirituality (five items): feelings of security in life; satisfaction in life and well-being; self-esteem; stress at work and everyday life; and happiness in life, (4) family (five items): living conditions of family members; satisfaction in family life; ability to support their child's education; travel and recreation of family members; and the relationship among family members, (5) society (five items): participation in community activities; political participation; performing religious activities; relationship with community members; and the safety of life and property, and (6) environment (five items): the quality of soil from tobacco farming; quality of water from tobacco farming; air pollution from tobacco farming; chemicals contaminating the environment from tobacco farming; and natural disasters such as floods and droughts.

Content validity was verified using the index of item-objective congruence by three experts. It was found that every question had an index of item-objective congruence value of more than 0.5. The questionnaire was then tried out with a total of 35 tobacco farmers who were not in the sample group in Phetchabun province to test the questionnaire's reliability using the Cronbach's alpha coefficient. A reliability value of 0.70 or greater was found for all six aspects of the quality-of-life questionnaire (economy = 0.80, health = 0.92, spirituality = 0.88, family = 0.85, society = 0.88, and environment = 0.96).

Data Collection

A total of 30 data collectors were informed and trained in a 1-day workshop before the survey regarding (1) the research objectives, (2) the data collection process (protocol), (3) the compensation, and (4) the skills required to collect field data. After receiving signed consent from all participants, data were collected using a face-to-face home-based survey within the restrictions of the COVID-19 prevention measures. The researchers acted as mentors, offering advice and monitoring progress via their mobile phones daily. At the final step, a total of 2,816 questionnaires were returned to the researchers with a 94.81% response rate.

Data Analysis

The data were analyzed using the statistical package SPSS version 17.0 (Chicago, IL). Descriptive statistics such as number, percentage, mean, and standard deviation were used to describe the independent and dependent variables. Binary logistic regression statistics were used to determine predictors related to the desire to stop tobacco farming among the Burley and Virginian tobacco farmers. A total of seven dichotomous variables were entered into an initial model. The continuous variables were then converted to be measured on a dichotomous scale (ordinal scale) using their means as the cutoff point, including ages (mean = 52.01 years) annual income from tobacco farming (mean = 155,891 Baht), tobacco-growing experience (mean = 20.82 years), the size of tobacco-planting areas (mean = 6.58 rai), economic quality of life (mean = 10.96 points), health quality of life (mean = 11.73 points), spiritual quality of life (mean = 9.89 score), family quality of life (mean = 9.28 score), social quality of life (mean = 9.60 score), and environmental quality of life (mean = 10.34 score).

Each reformed variable was then entered to a model to test the initial correlation between the independent and dependent variables by chi-square statistic. Each variable with a $P < .05$ was entered into the initial model with a crude analysis by analyzing the relationship between the independent and dependent variables. Only the variables that had a $P < .05$ were then analyzed by multivariate logistic regression with the backward Wald method to control the effect of variables that had relationships until the adjusted odds ratio (ORAdj) was obtained. The statistical results were presented as crude OR, ORAdj, 95% CI, and P with a statistical confidence level of 95%.

RESULTS

Demographic Characteristics

Overall, 2,816 tobacco farmers, classified as 2,000 Burley tobacco growers and 816 Virginia tobacco growers, completed the questionnaire. The participants were primarily male (53.7%) and did not have formal education or completed primary school (65.4%). The mean age was 52 years. The mean household income from tobacco-growing was 155,891 Baht per year, the

TABLE 1. Demographic Characteristics and Quality of Life of the Tobacco Farmers and the Results of the Preliminary Correlation Analysis

Independent Variable	Total, No. (%)	Want to Stop, No. (%)	Not Want to Stop, No. (%)	P
Cultivated tobacco varieties (n = 2,802)				< .001*
Virginia	806 (28.8)	352 (43.7)	454 (56.3)	
Burley	1,996 (71.2)	1,286 (64.4)	710 (35.6)	
Sex (n = 2,792)				.489
Male	1,499 (53.7)	866 (57.8)	633 (42.2)	
Female	1,293 (46.3)	764 (59.1)	529 (40.9)	
Age, years (n = 2,802)				.740
< 60	1,937 (69.1)	1,128 (58.2)	809 (41.8)	
≥ 60	865 (30.9)	510 (59.0)	355 (41.0)	
Education level (n = 2,788)				.029*
No formal education/completed primary school	1,823 (65.4)	1,038 (56.9)	785 (43.1)	
Higher than primary school	965 (34.6)	591 (61.2)	374 (38.8)	
Household annual income from tobacco farming, Baht (n = 2,802)				.876
Less than or equal to the mean	1,638 (58.5)	960 (58.6)	678 (41.4)	
Higher than the mean	1,164 (41.5)	678 (58.2)	486 (41.8)	
Tobacco growing experience, years (n = 2,802)				.100
Less than or equal to the mean	1,679 (59.9)	1,003 (59.7)	676 (40.3)	
Higher than the mean	1,123 (40.1)	635 (56.5)	488 (43.5)	
Size of tobacco farming land, rai (n = 2,802)				.970
Less than or equal to the mean	1,738 (62.0)	995 (57.2)	743 (42.8)	
Higher than the mean	1,064 (38.0)	643 (60.4)	421 (39.6)	
Sources of tobacco farming quota (n = 2,784)				.667
Tobacco Authority of Thailand	1,138 (40.9)	672 (59.1)	466 (40.9)	
Private company/dealer	1,646 (59.1)	958 (58.2)	688 (41.8)	
Tobacco land ownership (n = 2,801)				< .001*
Own land	1,876 (67.0)	1,278 (68.1)	598 (31.9)	
Rented land	925 (33.0)	360 (38.9)	565 (61.1)	
Member of the Tobacco Farmers Association (n = 2,788)				< .001*
Yes	2,541 (91.1)	1,539 (60.6)	1,002 (39.4)	
No	247 (8.9)	90 (36.4)	157 (63.6)	
Debt (n = 2,797)				.038*
Yes	2,697 (96.4)	1,587 (58.8)	1,110 (41.2)	
No	100 (3.6)	48 (48.0)	52 (52.0)	
Economic quality of life (n = 2,799)				< .001*
Less than or equal to the mean	1,705 (60.9)	1,079 (63.3)	626 (36.7)	
Higher than the mean	1,094 (39.1)	556 (50.8)	538 (49.2)	
Social quality of life (n = 2,799)				< .001*
Less than or equal to the mean	2,163 (77.3)	1,342 (62.0)	821 (38.0)	
Higher than the mean	636 (22.7)	293 (46.1)	343 (53.9)	
Spiritual quality of life (n = 2,799)				.043*
Less than or equal to the mean	2,128 (76.0)	1,266 (59.5)	862 (40.5)	
Higher than the mean	671 (24.0)	369 (55.0)	302 (45.0)	

(Continued on following page)

TABLE 1. Demographic Characteristics and Quality of Life of the Tobacco Farmers and the Results of the Preliminary Correlation Analysis (Continued)

Independent Variable	Total, No. (%)	Want to Stop, No. (%)	Not Want to Stop, No. (%)	P
Health quality of life (n = 2,799)				< .001*
Less than or equal to the mean	1,374 (49.1)	977 (71.1)	397 (28.9)	
Higher than the mean	1,425 (50.9)	658 (46.2)	767 (53.8)	
Family quality of life (n = 2,799)				< .001*
Less than or equal to the mean	1,713 (61.2)	845 (49.3)	868 (50.7)	
Higher than the mean	1,086 (38.8)	790 (72.7)	296 (27.3)	
Environmental quality of life (n = 2,799)				.021*
Less than or equal to the mean	952 (34.0)	585 (61.4)	367 (38.6)	
Higher than the mean	1,847 (66.0)	1,050 (56.8)	797 (43.2)	

NOTE. One rai approximately 0.395 acres, one THB (Thai Baht) approximately 0.029 USD (US dollar).

* $P < .05$.

mean tobacco-growing experience was 21 years, and the mean tobacco growing area was 7 rai. Most of the participants received quotas for growing tobacco from private companies (59.1%) and the government (40.9%), grew tobacco on their own land (67%), were members of the Tobacco Farmers Association (91.1%), and had household debts (96.4%; [Table 1](#)).

Quality of Life of Tobacco Farmers

Quality-of-life assessment results ([Table 1](#)) were divided into two groups: those with a quality of life below or equal to the mean and those with a quality of life above the mean. It was found that most of the participants had a lower level of

quality of life than the mean in almost all aspects (four out of six). The highest quality-of-life scores among those who had lower quality of life than the mean was the social aspect, which accounted for 77.3%, followed by spiritual, family, and economic aspects, representing 76.1%, 61.2%, and 60.9%, respectively. Among the same group, health and environmental quality of life had the lowest score, representing 49.1% and 34.0%, respectively.

Desire to Stop Growing Tobacco

A total of 1,638 respondents (58.5%) had a desire to stop growing tobacco. The reasons behind this were because the decrease in the purchase price of tobacco, the reduction in tobacco cultivation quotas, poor health, impacts of natural disasters such as droughts and floods, and a lack of children pursuing their careers. Tobacco farmers had proposed government assistance in the transition to tobacco replacement crops, including providing a market for purchasing products and securing a price for alternative crops, providing low-interest loans to invest in alternative crops or practice alternative occupations, providing a market for purchasing products, and arranging training and field trips to practice occupations in place of tobacco production ([Table 2](#)).

Factors Related to the Desire to Stop Growing Tobacco

The results of the preliminary correlation test between independent variables and dependent variables by chi-square statistic ([Table 1](#)) revealed that a total of 11 out of 17 independent variables were significantly related to the desire to stop growing tobacco at the 95% confidence level. After all variables were entered into the initial model, a crude analysis revealed that all variables were associated with a desire to quit growing tobacco ($P < .05$). According to the multivariate logistic regression analysis using the backward Wald ([Table 3](#)), a total of nine independent variables were associated with a desire to stop tobacco farming, in order from the variable with the highest to the lowest ORAdj: having a low

TABLE 2. Desire to Stop Growing Tobacco, Its Reasons, and Proposals for the Government

Desire to Stop Growing Tobacco, Its Reasons, and Proposals for the Government	No. (%)
Desire to stop growing tobacco (n = 2,802)	
Yes	1,638 (58.5)
No	1,164 (41.5)
Reasons behind the desire (apply more than one answer; n = 2,910)	
Low tobacco price	1,442 (49.6)
Decrease in tobacco farming quotas	301 (36.1)
Poor health	1,050 (10.3)
Natural disaster impacts (eg, droughts, floods)	64 (2.2)
Lack of children to continue farming	53 (1.8)
Proposals for government in case stopping tobacco farming (apply more than one answer; n = 5,723)	
Alternative crop price insurance	2,651 (46.3)
Low-interest loans	2,476 (43.3)
Finding a market to buy products	413 (7.2)
Alternative vocational training/field trips	183 (3.2)

TABLE 3. Crude OR and Adjusted OR of Factors Related to the Desire to Stop Growing Tobacco

Independent Variables	Desire to Stop Tobacco Farming No. (%)	Crude OR			Adjust OR		
		OR	95% CI	P	OR	95% CI	P
Cultivated tobacco varieties							
Virginia	352 (43.7)	1			1		
Burley	1,286 (64.4)	2.34	2.0 to 2.8	< .001*	1.33	1.0 to 1.8	.047*
Education level							
No formal education/completed primary school	1,038 (56.9)	1			1		
Higher than primary school	591 (61.2)	1.20	1.0 to 1.4	.028*	1.20	0.9 to 1.5	.075
Tobacco land ownership							
Renting	360 (38.9)	1			1		
Owner	1,278 (68.1)	3.35	2.9 to 4.0	< .001*	2.12	1.8 to 2.6	< .001*
Member of the Tobacco Farmers Association							
No	90 (36.4)	1			1		
Yes	1,539 (60.6)	2.68	2.0 to 3.5	< .001*	3.04	2.1 to 4.5	< .001*
Debt							
No	48 (48.0)	1			1		
Yes	1,587 (58.8)	1.55	1.0 to 2.3	.032*	1.24	0.8 to 2.0	.385
Economic quality of life							
Higher than the mean	556 (50.8)	1			1		
Less than or equal to the mean	1,079 (63.3)	1.67	1.4 to 2.0	< .001*	5.42	3.8 to 7.8	< .001*
Social quality of life							
Higher than the mean	293 (46.1)	1			1		
Less than or equal to the mean	1,342 (62.0)	1.91	1.6 to 2.30	< .001*	1.69	1.4 to 2.1	< .001*
Spiritual quality of life							
Higher than the mean	369 (55.0)	1			1		
Less than or equal to the mean	1,266 (59.5)	1.20	1.0 to 1.4	.039*	1.41	1.2 to 1.7	.001*
Health quality of life							
Higher than the mean	658 (46.2)	1			1		
Less than or equal to the mean	977 (71.1)	2.87	2.5 to 3.4	< .001*	1.69	1.4 to 2.1	< .001*
Family quality of life							
Higher than the mean	790 (72.7)	1			1		
Less than or equal to the mean	845 (49.3)	0.37	0.3 to 0.4	< .001*	0.49	0.4 to 0.6	< .001*
Environmental quality of life							
Higher than the mean	1,050 (56.8)	1			1		
Less than or equal to the mean	585 (61.4)	1.21	1.0 to 1.4	.019*	4.60	3.3 to 6.5	< .001*

Abbreviation: OR, odds ratio.

* $P < .05$.

economic quality of life (ORAdj, 5.42; 95% CI, 3.8 to 7.8), having a high environmental quality of life (ORAdj, 4.60; 95% CI, 3.3 to 6.5), belonging to the Tobacco Farmers' Association (ORAdj, 3.04; 95% CI, 2.1 to 4.5), growing tobacco on their own land (ORAdj, 2.12; 95% CI, 1.8 to 2.6), having a low social quality of life (ORAdj, 1.69; 95% CI, 1.4 to 2.1), having a low health quality of life (ORAdj, 1.69; 95% CI, 1.4 to 2.1), having a low spiritual quality of

life (ORAdj, 1.41; 95% CI, 1.2 to 1.7), being Burley tobacco farmers (ORAdj, 1.33; 95% CI, 1.0 to 1.8), and a low family quality of life (ORAdj, 0.49; 95% CI, 0.4 to 0.6).

DISCUSSION

According to the results of this study, most Virginia and Burley tobacco farmers in Thailand had the below-mean quality of life in almost every aspect, especially in social,

spiritual, family, and economic quality. In line with a number of findings,²⁻⁵ the majority of tobacco farmers do not earn enough money from tobacco leaf sales to offset the cost of production, especially labor, which is the major factor causing them to become poor, in debt, and have poor living standards. However, major tobacco farmers still rated their health as having a high level of quality.

More than half of Thailand's tobacco farmers (58.5%) had a desire to quit growing tobacco in the next year. The most influencing factor in the decision to quit growing tobacco is the economic quality of life. Tobacco farmers with an economic quality of life below or equal to the mean had 5.4 times more desire to quit growing tobacco than those with a higher average economic quality of life. This finding is consistent with previous research,^{2,15,17} which found that tobacco farmers who faced the problem of lower income from tobacco cultivation than in the past and had learnt that the income from growing tobacco is not economically cost-effective compared with other alternative crops had a greater chance of quitting tobacco cultivation. By contrast, it was found that tobacco farmers with an above-mean environmental quality of life had a 4.6 times greater desire to quit growing tobacco than tobacco farmers with lower or equal environmental quality of life than the mean. It is due to the fact that geographical limitations such as floods, droughts, or environmental conditions are so harsh that alternative crops cannot be grown instead of tobacco, which is more durable. Therefore, tobacco farmers are reluctant to decide to switch to other economic crops.¹⁹

Most of the farmers proposed government assistance in growing successful tobacco substitutions by encouraging the cultivation of alternative economic crops, guaranteeing their pricing, and establishing confidence in the purchasing market to provide a feeling of security for tobacco farmers who are willing to stop growing tobacco. It has been

confirmed that such confidence has a profound effect on decision making to grow alternative tobacco crops.² In addition, they suggested relevant agencies organize training or field trips on the cultivation of replacement crops or alternative occupations to increase opportunities. This proposal is in line with the successful promotion of tobacco-alternative crops in China's model communities.^{20,21} There are two limitations of this research. First, the research data in this study were collected during a global economic recession caused by the COVID-19 pandemic, which may pose a challenge to the application of the research findings in other contexts or conditions. Thailand should therefore conduct a regular survey of the quality of life and impacts of tobacco planting among tobacco farmers to use this information in planning and promoting the need to stop growing tobacco in line with the real problem and needs. Second, the quality of life of tobacco farmers was assessed from the perspectives and experiences of tobacco farmers themselves against personal expectations, which may differ from person to person or family. Consequently, the results of the quality-of-life assessment may be underestimated since the farmers expect the government to recognize the issues and raise tobacco prices. Therefore, future research should consider a collection of empirical data, for example, toxic residues in the bloodstream and occupational exposure to nicotine.

In conclusion, most tobacco farmers have a declining quality of life, particularly economic and environmental quality of life, resulting in reducing growing tobacco. Therefore, the government organizations such as the Tobacco Authority of Thailand, the Ministry of Finance, and the Tobacco Farmers Association should consider establishing concrete measures such as guaranteeing alternative crop prices and providing low-interest loans to encourage these farmers to stop growing tobacco and switch to grow alternative crops.

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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

The following represents disclosure information provided by authors of this manuscript. All relationships are considered compensated unless otherwise noted. Relationships are self-held unless noted. I = Immediate Family Member,

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