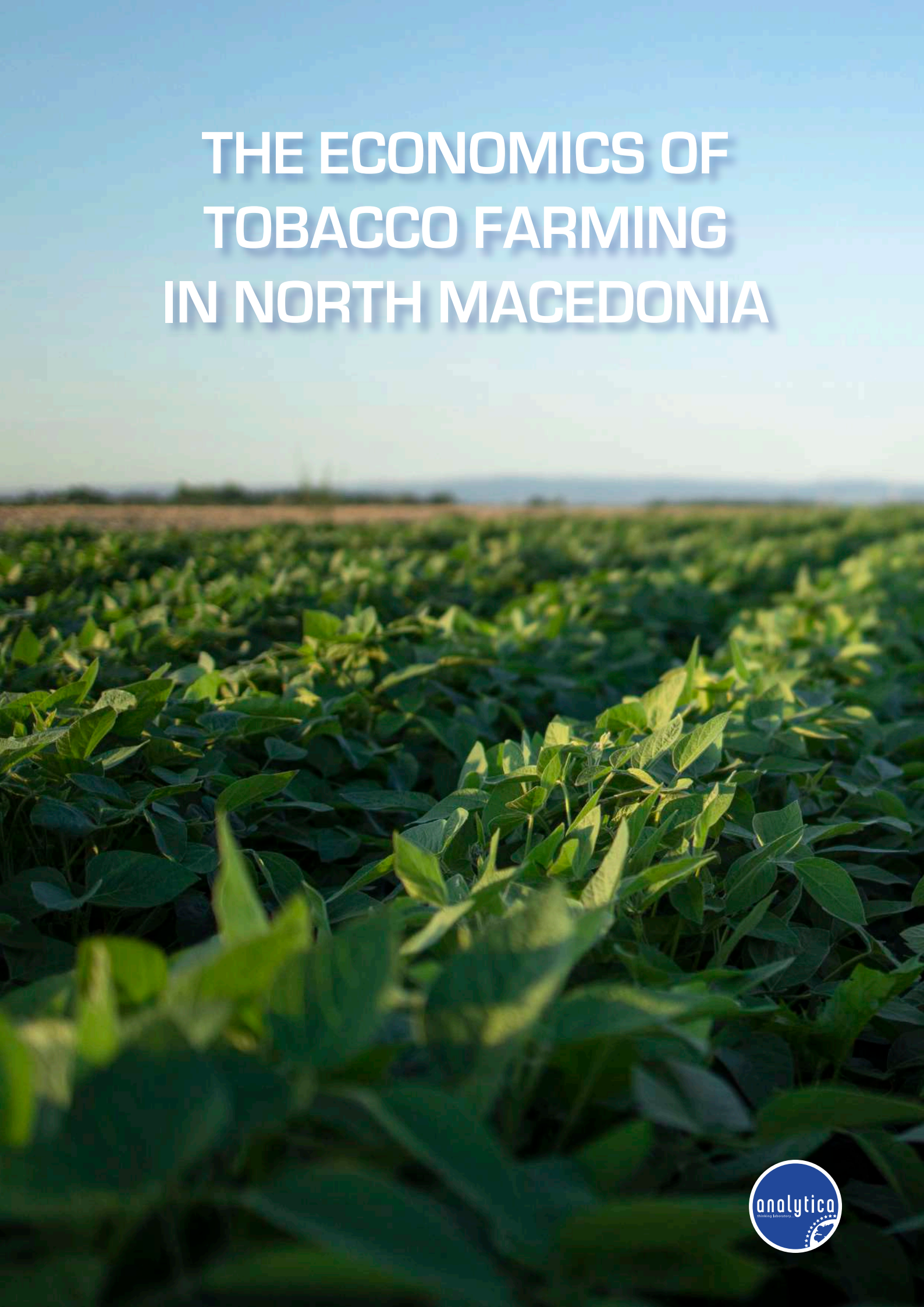
# THE ECONOMICS OF TOBACCO FARMING IN NORTH MACEDONIA




analytica

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Skopje 2023

## ACKNOWLEDGMENTS

Analytica is working in cooperation with the University of Illinois Chicago's (UIC) Institute for Health Research and Policy to conduct economic research on tobacco taxation in North Macedonia. UIC is a partner of the Bloomberg Initiative to Reduce Tobacco Use. The views expressed in this document cannot be attributed to, nor do they represent, the views of UIC, the Institute for Health Research and Policy, or Bloomberg Philanthropies.

The authors of this report are thankful to the UIC team, particularly to Dr. Jeffrey Drope and Ms. QingLi, for their valuable support.

This policy report was prepared by researchers from Analytica think tank from North Macedonia. The authors: Spasova Mijovic, T., Hristovska Mijovic, B, Trpkova-Nestorovska, M., Tashevska, B., Trenovski. B & Kozeski,.

# EXECUTIVE *SUMMARY*

This study analyzes the characteristics of tobacco cultivation and assesses the economic conditions of tobacco farmers as well as farmers in the same regions growing other crops. **The results of this research raise the question of how economically viable tobacco farming is in North Macedonia for many households. Contrary to the government's claims that tobacco is a strategic crop delivering high profits to tobacco farmers, the results of this research show that tobacco cultivation is not as profitable as suggested.** Analyzing data from an original nationally representative household economic survey of current, former, and never tobacco farmers, this reportestimates the economic profitability per hectare of land used for tobacco cultivation and per kilogram of tobacco cultivated.

The data show that farmers who grow other crops earn higher incomes than tobacco farmers. In addition, growing tobacco is a highly labor demanding activity that requires many hours of work and effort and thereby generates high unpaid household labor costs. Therefore, this potentially makes tobacco cultivation a less lucrative agricultural activity and suggests **reorienting to grow other crops would be more lucrative economically for tobacco farmers in terms of deploying their labor more efficiently and for overall profitability.**

**This report shows that the income of tobacco farmers decreases significantly when the opportunity costs of unpaid family labor involved in tobacco cultivation are calculated.** This islargely what makes growing tobacco less profitable, because households are misallocating scarce labor to less productive economic endeavors. Unfortunately, for many tobacco families, tobacco cultivation effectively results in significant loss. Nevertheless, the

long tradition of farming this crop in the country, the advanced age of most tobacco farmers, and the lack of information about alternatives keep many farmers in tobacco cultivation. Therefore, this study's results are very important in North Macedonia to help stakeholders—including the government and farmers—to use data and evidence-based strategies to help tobacco farmers reorient to alternative crops and other more lucrative livelihoods.

**Children's participation in the harvesting of tobacco is 2.3 times more common compared to other crops.** Fortunately, **children do not appear to be widely engaged in potentially harmful activities relat ed to pesticide/herbicide application** in North Macedonia. Regarding hired child labor for help with tobacco cultivation, none of the households surveyed state that they hire children outside the household for additional help.

**A vast majority of farmers report having a contract with a leaf buyer** (95 percent). Notably, a **large proportion of surveyed tobacco farmers are not satisfied with the amount they receive from tobacco sales** (44 percent not satisfied versus 28 percent satisfied). The rest did not answer or selected "neutral." **Many farmers report growing tobacco because that is what they have always done**. The survey results and interviews indicate that **farmers continue to grow tobacco because they do not know anything else.**

**Land ownership patterns vary between tobacco farmers and non-tobacco farmers.** Current tobacco farmers own the smallest plots of land on average. North Macedonia is known historically for growing oriental tobacco that is used for blending with other types of tobacco in cigarettes due to itsrich aroma. It is not a main ingredient in any type of cigarette. Perhaps because of this dynamic, farmers do not grow tobacco for mass production. Among all types of farmers, land ownership (72.4 percent) is more common than land rental (20.6 percent). This is especially true for never tobacco farmers (95 percent own versus 5 percent rent). Current tobacco farmers, however, are the most likely to rent land for farming compared to former and never tobacco farmers. Almost 30 percent of current tobacco farmers state that they rent land from others. In terms of their agricultural activities and economic livelihood, there is diversity among the current, former, and never tobacco farmers regarding the planted crops. **Never tobacco farmers have the broadest portfolio** (19 different cultures reported), followed by former tobacco farmers (17 cultures reported). **Current tobacco farmers have the least diversified crop portfolio with a reported 14 different cultures.** This suggests that shifting away from tobacco farming leads to increasing the range of crops grown. Te survey results suggest that **former tobacco farmers have shifted to other economic activities beyond agriculture.** For the majority of tobacco farmers (around two-thirds), tobacco revenue represents a large share of total household revenue. For 39.7 percent of responding households, tobacco revenue is the dominant revenue source (more than 90 percent of total household revenue).Current tobacco farmers rely more heavily on agricultural revenue than former tobacco farmers

andnever tobacco farmers. More than 90 percent of current tobacco farmers report receiving agriculturalrevenue, while 41.3 percent and 44.8 percent of tobacco farmers report receiving wages or other revenue, respectively. The results are very different for former tobacco farmers, out of whom only 37.5 percent report receiving agricultural revenue, and 73.3 percent of never tobacco farmers report receiving revenue from agriculture. On average, former tobacco farmers generate much higher household income than both never tobacco farmers and current tobacco farmers. The average former tobacco farmer generates USD 16,451.56 per year, while the average tobacco farmer generates USD 12,072.40 (using the average exchange rate from January 2022 to July 2022 of MKD 55 per USD). The higher household income of former tobacco farmers can be explained, among other reasons, by their shift towards non- agricultural activities that generate higher wages and other income (mostly pensions and remittances).

The poverty rate of former and never tobacco farmers, based on **per capita revenue**, is higher than the current farmers' poverty rate; however, **when considering per capita income, current tobacco farmers have the highest incidence of poverty and never tobacco farmers have the lowest incidence.** When poverty is calculated as head count ratio measured by per capita income (1.90 USD a day per person), current tobacco farmers have the highest incidence of poverty (22.59%), compared to former tobacco farmers and never tobacco farmers, who have significantly lower incidence of poverty 10.81% and 12.84% respectively). This might suggest that—although tobacco farmers gain relatively large tobacco revenues from sales and subsidies and from other sources (annual mean percapita revenue is above the national poverty line)—they also incur larger direct and indirect costs when cultivating tobacco. In addition, tobacco is a very labor-demanding crop. Once these costs are accounted for, the results reveal tobacco to be a rather unprofitable crop.

**Despite the high poverty rate among tobacco farmers, only a small share used some form of social assistance**. Current and former tobac co farmers rely more on social assistance than never tobacco farmers do. However, even in the first two groups, only a small share of households received assistance (4.5 percent of current and 5.26 percent of former tobacco farmers). **This minimal coverage of farmers with social protection indicates a possible lack of information for these farmers to apply for these benefits.**

**Tobacco farming is input intensive**, both in terms of direct inputs, such as fertilizers and chemicals,and farm labor, both hired and household. **Consistent with research in other countries, labor and non-labor input costs for growing tobacco are very high in North Macedonia, particularly compared to most other crops. Tobacco farmers typically use significantly less inputs for their nontobacco crops during the tobacco-growing season, which is important considering that many tobacco farmers also grow nontobacco crops**.

The median male individual in a household works 1,400 hours per year on tobacco cultivation, while the median female individual works 1,260 hours. The median individual (male and female) dedicates640 hours annually to nontobacco crops, in addition to hours spent on tobacco cultivation. In both regions for which the survey collected data on former tobacco farmers' labor costs, the **amount of labor current tobacco farmers dedicate to tobacco exceeds the amount of time former tobacco farmers and never tobacco farmers dedicate to their crops. In addition to time spent on tobacco cultivation, current tobacco farmers allocate an additional approximately half of that amount of time to their nontobacco crops.**

**Approximately half of tobacco farmers are not turning a real profit**. For many current tobacco farmers, the earnings from tobacco barely cover or fail to cover their costs. Once household labor costs are calculated, the median real profit from growing tobacco is negative, at USD −980. However, for current tobacco farmers, the median real profit for their nontobacco crops is USD 604.2. For former tobacco farmers, the median real profit for their current crops is USD 472.1, and never tobacco famers' median real profit is USD 390.8. **These results suggest that the median current tobacco farmer's agricultural activities in growing nontobacco crops are more profitable than those of the median former tobacco farmer and the never tobacco farmer**. Considering average values, on the other hand, never tobacco farmers seem to earn the highest average profit from nontobacco crops.

**Contrary to their real economic condition, the majority of current tobacco farmers did not report a need for loans to cultivate tobacco; this fact is likely partly related to the large role of remittances in the economy**. Out of 489 tobacco farmers, only 48 or 9.82 percent report needing credit. The low use of credit might be explained by the characteristics and the mentality of the farmers in the country. Remittances constitute an important part of the income of agricultural households and provide significant support for their consumption and standard of living. Namely, 44.8 percent, 52 percent, and 72.1 percent of current, former, and never tobacco farmers, respectively, report receiving other income such as remittances and pensions. Hence, instead of borrowing from banks they borrow from other family members or friends. Another possible explanation for the low use of credit is the low access to credit and burdensome administrative procedures.

**In addition, current tobacco farmers, on average, have lower levels of accumulated household and agricultural assets, compared to former and never tobacco farmers**. On average, never tobacco farmers have the highest value of accumulated capital. Current tobacco farmers

(females and males) older than age 60 have a higher proportion of reported illness in the last 30 days, compared to former tobacco farmers of the same age. In addition, green tobacco sickness symptoms are most reported by males and females aged 36–60.

According to the survey results, **former tobacco farmers report switching to other crops for a variety of reasons, stating the low price of tobacco as the primary reason and then followed by unfair grading and more attractive alternatives**. This signals an important potential for intervention and shifting possibilities.

Though current, former, and never tobacco farmers are generally not experiencing lucrative gains nor prosperous economic livelihoods, the results of this survey suggest that, on average, **former tobacco farmers are doing better economically than current ones. Former tobacco farmers' inputs and labor costs are much lowe than current tobacco farmers', and their overall income is typically higher**. In addition, former tobacco farmers spend far fewer hours in their fields, and there is clear evidence that many of them use that time to do other economically productive activities such as working for wages. Notably, **the median current tobacco farmer grows other crops more profitably than the median former tobacco farmer or never tobacco farmer, suggesting that shifting away from tobacco should be straightforward for them and likely more profitable.**

Despite strong evidence of poor prospects for profitable tobacco farming, around 20,000 tobacco farmers continue to cultivate tobacco leaf in North Macedonia. This dynamic begs an important question: why do farmers continue to grow tobacco? More than three quarters **(77 percent) of tobacco farmers said they would stop growing tobacco if they do not receive subsidies for it. In addition, 86.5 percent of tobacco farmers state that they grow tobacco because of familiarity with tobacco cultivation.** More than 70 percent of tobacco farmers report the existence of a secure contract market as an important reason for continuing to cultivate tobacco. These are some of the crucial reasons why tobacco farmers are reluctant to shift to other crops even though it is evident they do not earn nearly as much as they think. Clearly, tobacco growing is not as lucrative as it is presented in the public narrative. To improve the situation of tobacco farmers and generally of all farmers in the country, and to enhance the development of the agricultural sector, this report suggests the following recommendations:

- **The government should create comprehensive evidence-based policies to incentivize farmers to transition away from tobacco farming.**
- **Agriculture subsidies must emphasize long-term investment in the sector that contributes more broadly to increased productivity and efficiency instead of a supposed measure for obtaining "social peace**."
- **The government should create educational programs to help farmers learn to grow alternative crops that bring higher income and are suitable for local conditions.**
- **The government can establish financial and non-financial incentives to encourage cultivation of nontobacco crops**. **For example, this could be done by increasing low-interestcredit programs and allocation of state agricultural land. To improve productivity of alternative farming activities, the government should increase their investments in improvement of the quality of soil and improvement of irrigations systems to increasetheir output**.
- **Connecting farmers to processing factories to establish long-term relationships for nontobacco crop growing would help farmers to shift towards other crops and engender prosperity and security for those families.**

# 1 INTRODUCTION

**In North Macedonia, almost half of adults (48.4 percent) smoke tobacco,** far above the European Union (EU) average of 23%[1]. In the EU in 2020, among those who smoke cigarettes, the average daily consumption is 14.2 and only 8 percent of the smokers consumed more than 21 cigarettes per day. In North Macedonia in 2020[2], the prevalence of smoking among males is 57.9 percent, while among females it is 39 percent. In 2020, most adult smokers (44.4 percent) smoke on average more than 20 cigarettes per day and tobacco use continues to have a negative impact on health systems and a significant impact on preventable loss of life.

**Cigarette prices are very low in North Macedonia.** A pack of cigarettes in North Macedonia averages USD 1.3, a very low price by regional and global standards, which helps to explain the high prevalence of smoking.

**North Macedonia's government has introduced some measures to decrease smoking.** Beginning in 2003, public smoking was partially prohibited by the Law on Protection from Smoking, which allows designated smoking areas in public offices, restaurants, and bars. Since 2008, the partial public smoking ban has been amended to prohibit smoking in most public places, including schools and other public buildings that accommodate children and young people. A general ban on smoking in public places, including restaurants and bars, came into effect in North Macedonia on January 1, 2010. In early 2018, the Law on Protection was amended, and the smoking ban was weakened by allowing smoking in specially designated areas and open-air terraces.[3]

1 European Commission, Directorate-General for Communication, Directorate-General for Health and Food Safety, (2021) Attitudes of Europeans towards tobacco and electronic cigarettes: report. European Commission. https://data.europa.eu/doi/10.2875/490366

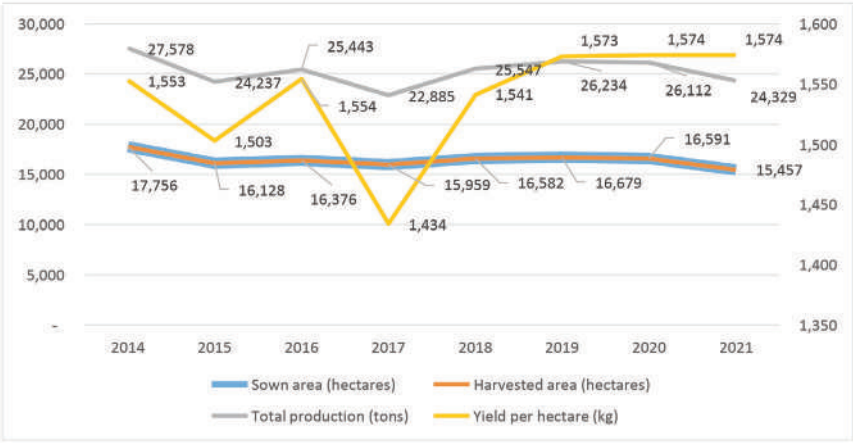
2. Hristovska Mijovic, B., Spasova Mijovic, T., Trenovski, B., Kozeski, K., Trpkova-Nestorovska, M., & Trajkova-Najdovska, N. (2020). Tobacco consumption in North Macedonia. Analytica, Skopje, North Macedonia Tobacco consumption in North Macedonia, 2020, Analytica Skopje, 2020

3. Law on smoking protection, Official Gazette of the Republic of North Macedonia number 36/95, 70/2003, 29/2004,37/2005, 103/2008, 140/2008, 35/10,100/11, 2018.

**North Macedonia ratified the Framework Convention on Tobacco Control (FCTC) in 2006**, which introduces a legal commitment for the reduction of tobacco production and consumption as well as to help those who are employed in the tobacco sector find alternative viable livelihoods.[4] The Common Agricultural Policy (CAP)'s restrictions on tobacco production in EU member states, as well as the need to eliminate subsidies for tobacco production, will place significant restrictions on tobacco production in North Macedonia in the short and long run. The case for ending these subsidies is stronger than ever as EU farming policies are increasingly linked with health and environmental goals. The process of EU integration will also impose requirements for reducing the area harvested by tobacco, making it even less profitable for farmers. The Government adopted a Strategy for Tobacco Production (2021–2027) in 2020.[5] The strategy includes an action plan, according to which the income support for tobacco farmers per kilogram remains during the short-term period (2021– 2024), but preparations will be made with education and counseling for future changes. In the medium term (2025–2027), a diversification of tobacco holdings is planned in compliance with the EU CAP regulations. Additionally, the action plan includes adaptation of the direct payments system into indirect or decoupled payments in the future, setting an amount for basic income support in production regions with similar socioeconomic and agro-ecological conditions, and liberalization of the system for negotiation in concluding tobacco contracts.

**Tobacco leaf cultivation occupies around 3.2 percent of total arable land in North Macedonia.**[6] The areas under tobacco cultivation are characterized by a stable trend that has seen a modest decrease in the last few years. In 2021, the total production of tobacco was 24,329 tons, which was the result of sowing and harvesting 15,457 hectares of land, with an average yield per hectare of 1574 kilograms (See Figure 1). Oriental tobacco varieties are produced: mainly Prilep (84 percent), Yaka (12 percent), and Basma (four percent).[7] Regionally, tobacco production is most represented in the Pelagonian and Southeast regions, where 87.9 percent of the total tobacco yield in 2021 was produced. The rest of the tobacco is produced in the Vardar region (6.8 percent), the Skopje region (2.4 percent), and the

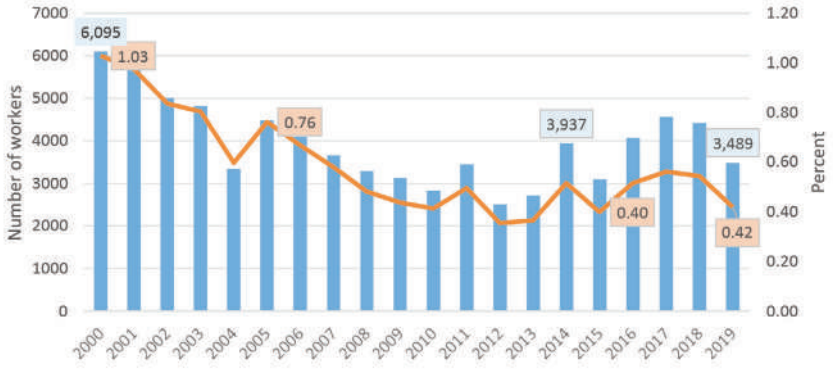
**Figure 1.** Tobacco cultivation in North Macedonia, 2014–2021
Source: State Statistical Office




4. Law on ratification of the Framework Convention of Tobacco Control of the World Health Organization, Official Gazette of the Republic of Macedonia, No. 68, 2006
5. Tobacco Production Strategy for the period 2021-2027, with Action Plan , Official Journal of the Republic of NorthMacedonia no.32/2021 from 08.02.2021
6 . Hristovska Mijovic, B., Spasova Mijovic, T., Trpkova-Nestorovska, M., Tashevska, B., Trenovski, B. & Kozeski, K., (2022) ***Tobacco Farming and the Effects of Tobacco Subsidies in North Macedonia***, Analytica, Skopje, North Macedonia.
7. Atlas Tobacco Growing Figures, Available at: https://atlas.tobaccoleaf.org/tfyr-of-macedonia/

Eastern region (1.6 percent), while the rest of the regions have production below one percent (See Table 1). More than 90 percent of tobacco is exported to the world market, and the remaining 10 percent is used in domestic cigarette manufacturing. The export of unmanufactured tobacco from North Macedonia in 2019 was 24,898 tons, while import of unmanufactured tobacco was 3,664 tons. In 2019, the main export destinations for raw tobacco were Greece, Bulgaria, Belgium, the United States, and Portugal.

**Figure 2.** Employment in the production of tobacco products industry (2000–2019)
Source: State Statistical Office Database




**The total number of tobacco farmers is declining.** According to the State Statistical Office (SSO), in 2020 there were 19,702 farmers who cultivated tobacco in the country, compared to 2010 when thenumber of farmers was 42,622. According to the latest data, the tobacco industry comprises four percent of the total industry production of the country, and the number of workers employed in the production of tobacco products was 3,489 in 2019—which, compared to 2000, represents a significant decrease (6,095). Employment in the tobacco production industry represents about 0.42 percent of total employment in North Macedonia as of 2019 (See Figure 2).

**According to the new National Strategy for Tobacco, the Macedonian government is considering certain reforms of the direct payments to tobacco farmers**, but concerns have beenraised about possible effects of any such reforms on tobacco farmers. Though there has been some research on tobacco farmers' employment and livelihoods,[8] there has not been systematic research based on nationally representative, household-level economic survey data of smallholder tobacco farmers to better understand the nature of the typical livelihoods of these farmers. This report fills this gap by reporting results of a nationally representative survey of smallholder tobacco farmers, with follow-up interviews to examine their livelihoods and to understand how the tobacco tax reforms might affect these households.

**The survey sample is nationally representative.** It comprises 806 current, former, and never tobacco farming households across the main tobacco-growing regions in the country (Pelagonia Region, East Region, and Southeast Region). The survey was conducted in 14 municipalities, including both urban and rural settlements, which are placed in the top tobacco-producing regions in North Macedonia.

Overall, the results from this study show that the income of tobacco farmers decreases significantly after calculating the opportunity costs (unpaid family labor) of tobacco cultivation. [8]

The main findings of this report include: 1) tobacco is not profitable for most farmers; 2) former tobacco-farming households' incomes are higher than current ones, and former tobacco farmers typically generate more income from nonagricultural enterprises; 3) when considering per capita income, current tobacco farmers have the largest incidence of poverty; 4) children's help in the harvesting of tobacco is 2.3 times more common compared to children's help in the harvest of other crops; and 5) females who are part of the tobacco cultivation process are more susceptible to disease than males.

The report is structured as follows: after this brief introduction, the next section describes the context of the agricultural and tobacco sector in North Macedonia. Section 3 is a discussion of the methodology and data analysis used to collect the survey data and the analytical approaches. Section 4 presents and analyzes the socioeconomic and demographic profile of farmers in the survey (current, former, and never farmer). Section 5 focuses on the economics of tobacco growing including contracts, production, prices, costs and profits, and farmers' credit and debt. This section also focuses on the other crops growing and the reasons why farmers continue to grow tobacco. Section 6 focuses on tobacco subsidies and tobacco farmers' attitudes toward these subsidies. Section 7 is a presentation of data and discussion about child labor. Section 8 examines farmers' well-being including asset accumulation and health status. Section 9 provides concluding remarks and recommendations in light of the results of the study.

8. Tobacco Production Strategy for the period 2021-2027, with Action Plan , Official Journal of the Republic of North Macedonia no.32/2021 from 08.02.2021

# 2 CONTEXT

The Gross Domestic Product (GDP) per capita in 2021 in North Macedonia was USD 6,721, which positions the country in the group of upper-middle-income countries. The **agricultural sector generates about 10 percent of GDP—far above the EU average.** Although agriculture's contributions to GDP have steadily declined over the years, it generates 9.3 percent of total trade and 14 percent of total employment. Of the total investments in fixed assets in 2020, only 2.24 percent were realized in agriculture, forestry, and fisheries combined.[9]

Agricultural and food products constituted 9.72 percent of North Macedonia's total exports in 2019. Total exports of agricultural products in 2019 amounted to around USD 500 million, while imports of agricultural products amounted to USD 736 million. The main export products from North Macedonia are tobacco, sweet biscuits (including waffles and wafers), wine, lamb, and processed and fresh vegetables and fruit. The main import products are meat (poultry, beef, and pork account for 20 percent of total agricultural imports), sunflower oil, chocolates and confectionery, cheese, processed foods, and grains.

Of the total number of employed persons in 2020 (602,722), 12,863 are employed in agriculture, forestry, and fisheries; of these workers, 9,794 work in crop and livestock production, hunting, and related service activities. In 2020, 1,669 workers were employed within the industry of tobacco products production, which reflects a decrease of 60 percent compared to 2010 (4,140 workers).[10] Domestic production of cigarettes has been decreasing, while imports have been significantly increasing, suggesting that domestic brands have been substituted with imported foreign brands of cigarettes. In 2021, the value of the export of tobacco products amounted to USD 6,868, while imported tobacco products amounted to USD 29,655. In the retail trade of food, beverages, and tobacco, there was a decrease in the number of employees (from 23,047 in 2011 to 21,487 in 2022).[11]

9 State Statistical Office (SSO) Data Base, Available at: http://makstat.stat.gov.mk/PXWeb/pxweb/mk/MakStat/MakStat PazarNaTrud Plati VraboteniNeto/201_PazTrud_M k_vraboteniG1_mk.px/table/tableViewLayout2/?rxid=2c5bcd43-b043-45e7-887f-ea4f138342aa

10 State Statistical Office Data Base http://makstat.stat.gov.mk/PXWeb/pxweb/mk/MakStat/MakStat PazarNaTrud Plati VraboteniNeto/201_PazTrud_M k_vraboteniG1_mk.px/table/tableViewLayout2/?rxid=2c5bcd43-b043-45e7-887f-ea4f138342aa

11 State Statistical Office Data Base Data Base http://makstat.stat.gov.mk/PXWeb/pxweb/mk/MakStat/MakStat VnatresnaTrgovija Bazna2015/125_Vt_mk_11_TrgDe j_ml.px/table/tableViewLayout2/?rxid=51967b06-d7e4-4e52-b072-7cf1876fb0d3

**A substantial gap exists between agricultural wages and the national average.**[12] [13] **Most workers in agriculture, forestry, and fisheries made less than USD 359 per month in 2020.** The average monthly net wage paid in June 2021 in North Macedonia was MKD 28,744 (USD 469), while in the agriculture, forestry, and fisheries sector it was MKD 23,117 (USD 377).[14] The minimum household consumer basket is not affordable for most tobacco farmers. In June 2021, the official statistics showed that a family of four needed USD 554 to cover basic monthly expenses. **Most farmers struggle financially, living with an average monthly income below the average net monthly wage and below the value of the minimum household consumer basket.**[15] According to the form and size of the tobacco economy, as well as the socioeconomic characteristics of tobacco farmers, most tobacco farmers do not earn enough income to sufficiently support their families.[16]

**Remittances are an extremely important component in determining the level of farmers' standard of living. Most agricultural households rely on remittances from abroad, due to the substantial migration from rural areas over the past decade.** Remittances constitute an important part of the income of agricultural households and provide significant support for their consumption and standard of living. During 2020, more than EUR 8.5 billion were sent from the countries of the EU to the Balkan countries. [17] In 2020, North Macedonia received USD 362 million in remittances from EU, which represents about 3.4 percent of GDP. In 2021, USD 345.79 million in remittances were sent in total from foreign countries through official channels.[18] Officially, registered remittances worldwide to North Macedonia have exceeded USD 1 billion since 2009, or about 16 percent of GDP, while remittances received through unofficial channels are thought to be considerably higher. Foreign exchange remittances are an extremely significant source of regular and additional funds for farmers, as they ease the burden of daily consumption and livelihood and further improve their standard of living. Accordingly, remittances are primarily used for current consumption rather than investment, which indicates many Macedonian farmers' reliance on remittances more than anything else.

**Tobacco farming appears to be declining in North Macedonia.** There is a declining trend in the cultivated land in hectares, suggesting a natural shift away from tobacco. The number of tobacco farmers is decreasing as well: in 2020, the number of tobacco farmers was 19,702 which is less than half of the number it was in 2010 (42,622).[19] Tobacco farmers usually are middle-aged men, indicating that younger generations are not very interested in tobacco farming.

On the whole, the transition from tobacco farming to cultivation of other crops represents an objective need that is the result of being a candidate country for EU membership, [20] but it also reflects the reduction of tobacco consumption on a global level. The shift from tobacco production will require resources and strong political commitment and support.

12 Eurostat Data base: Data on the net wage in May 2022 (31,407 MKD (USD513USD average net wage in North Macedonia, 25,638 MKD (USD419) in Agriculture, forestry and fisheries)

13State Statistical Office Data Base

http://makstat.stat.gov.mk/PXWeb/pxweb/mk/MakStat/MakStat PazarNaTrud Plati MesecnaBrutoNeto/175_PazTru d_Mk_neto_ml.px/table/tableViewLayout2/?rxid=3a6033d4-4498-4f94-a284-ffc024df877c

14 According to SSO Database: Of the total number of employees in Agriculture, Forestry and Fisheries in 2020, about 27.5 percent have a monthly net wage of 14,001-16,000 MKD, 13 percent receive a monthly net wage of 16,001 to 18,000 MKD,15.3 percent 18,001-20,000 MKD, 12 ,4 percent 20000 – 22000

15 State Statistical Office announcement: https://www.stat.gov.mk/PrikaziSoopstenie.aspx?rbrtxt=40

16 43.5 percent of them have an average annual income in the range of 100 001 to 300 000 MKD, or 29.80 percent have from 300 001 to 600 000 MKD, 12.3 percent have from 600 001 to 1 000 000 MKD, 8.48 percent have up to 100 000 MKD and 4.13 percent have an average annual income that is over 1 000 000 MKD.

17 Eurostat database

18 Statistics, National Bank of the Republic of Macedonia, available at: https://www.nbrm.mk/statistika.nspx

19 Hristovska Mijovic, B., Spasova Mijovic, T., Trpkova-Nestorovska, M., Tashevska, B., Trenovski, B. & Kozeski, K., (2022). ***Tobacco Farming and the Effects of Tobacco Subsidies in North Macedonia***, Analytica, Skopje, North Macedonia.

20 As a candidate country for the EU, North Macedonia must comply with the EU Common Agricultural Policy (CAP)

# 3 METHODS

## 3.1. Sampling and survey instrument

### Pre-fieldwork assistance/fieldwork facilitation

In order to create a solid representative sample, obtain relevant data on targeted population distribution, and achieve contact information for designing the respondents list, official contact was made with the Ministry for Agriculture, Forestry and Water Economy of the Republic of North Macedonia. With their help, data collection was accomplished successfully and on time. Other relevant institutions (at the central and local government levels) were contacted in order to facilitate the fieldwork and increase response rates. Additional public sources and respondent lists were used for allocating the targeted respondents.

### Recruitment and training – implementing agency

A market research and consulting firm, Rating Agency, based in Skopje, North Macedonia, was responsible for coordinating the data collection. A Rating Agency project manager provided overall direction for implementation of the survey in all the regions of North Macedonia and was in continuous day-to-day communication with the director of Analytica think tank to ensure that all procedures were properly followed. The training for all personnel involved in the field operations was conducted in six regional sessions in North Macedonia in the period from September to November 2021. Project managers served as trainers, while participants in regional training sessions included regional supervisors, fieldwork supervisors, and fieldwork interviewers. Each training session covered survey concepts and definitions as well as questionnaire administration.

### Survey design and methodology

***Sampling frame***. The bases for determination of the sampling frame were: a) the general population census of North Macedonia in 2002; b) the database on agricultural production obtained from the Ministry of

Agriculture and State Statistical Office; and c) the database on farmers and ex-farmers growing tobacco that was obtained from an agricultural civil society organization that collects such data. The sampling unit is the village.

***Survey design***. A multistage sampling design was used in the study. The first stage was based on the clustering sampling method, wherein the sample size for each municipality was weighted according to the proportions of tobacco and ex-tobacco farming households. In the second stage, a village was regarded as the primary sampling unit (PSU), wherein 100 were selected based on the proportion ofthe total population in each targeted municipality.

In the third stage, sampling was done by listing and mapping of every PSU according to the three types of respondents. From the list of households, 806 were selected randomly, plus a replacement household for each household, based on random sampling numbers, for the interview. Target groups (category of respondents) for this study are the following:

1. tobacco farmer (the respondent is a farmer who grew tobacco in 2021);
2. former tobacco farmer (the respondent is a farmer who grew tobacco in any year before 2021 and now cultivates other agricultural crops); and
3. farmers that never grew tobacco (the respondent is a farmer who cultivates any agricultural crop other than tobacco and never cultivated tobacco previously).

***Sample size***. For the purposes of this project, a nationally representative sample was designed. The goal was to collect information from 806 respondents including: a) current tobacco farmer households, b) former tobacco farmer households, and c) farmers that never grew tobacco crops. The survey was conducted in 14 municipalities, including urban and rural settlements, in the top tobacco- producing regions in North Macedonia.

## Survey instrument

The survey instrument is based on similar surveys in other countries. It is particularly influenced by recent survey-based research on the economics of tobacco farming in Indonesia, research itself drawn

considerably from the World Bank's Living Standards Measurement Study.[21] The questionnaire was developed in English, translated to the Macedonian language, and adapted and modified to the context of North Macedonia. CATI programming and a pilot test showed that the approximate survey duration is around 100–120 minutes, and the timing varies depending on the target group. The questionnaireis divided into 36 sections and includes the following major topics.

21 Sahadewo, G.A., Drope, J., Witoelar, F., Li, Q., & Lencucha, R. (2021). The Economics of Tobacco Farming in Indonesia:Results from Two Waves of a Farm-Level Survey [Report]. https://www.tobacconomics.org/files/research/654/indonesia-economics-of-tobacco-farming.pdf

**Table 1.** Content of the survey instrument

| SECTION | NAME | TARGET GROUP |
|---|---|---|
| COV | COV | All respondents |
| | FILTER QUESTION ABOUT THE RESPONDENT | All respondents |
| SC | SC. (Sampling information) | All respondents |
| AR | AR. (LIST OF HOUSEHOLD MEMBERS) | All respondents |
| A | A. (HOUSEHOLD MEMBER CHARACTERISTICS) | All respondents |
| A | HEALTH (A13–A16) | All respondents |
| A | SOCIAL PROTECTION (A16–A23) | All respondents |
| B | B. MARKETING PARTNERSHIP/CONTRACT | Tobacco farmers |
| C | C. CURRENT WORK | All respondents |
| C | MAIN JOB (C12–C21) | All respondents |
| C | SECOND JOB (C22–C33) | All respondents |
| D | D. LIVESTOCK, FISHERIES, PLANTATION, FRUIT-BEARING TREES, AND NON-AGRICULTURAL HOUSEHOLD ENTERPRISES/ACTIVITIES | All respondents |
| DP | DP00 – DIRECT PAYMENTS/SUBSIDIES | Tobacco farmers |
| E | E. LAND OWNERSHIP AND PRODUCTION | All respondents |
| F | F. TOBACCO CROPS – SALES | Tobacco farmers |
| G | G. TOBACCO CROPS – INPUTS | Tobacco farmers |
| H | H. TOBACCO CROPS – HOUSEHOLD LABOR INPUTS | Tobacco farmers |
| I | I. TOBACCO CROPS – HIRED LABOR INPUTS | Tobacco farmers |
| J | J. NON-TOBACCO CROPS AND WOODS | All respondents J00 |
| K | K. NON-TOBACCO CROPS – INPUTS | All respondents |
| L | L. NON-TOBACCO CROPS – HOUSEHOLD LABOR INPUTS | All respondents |
| M | M. NON-TOBACCO CROPS – HIRED LABOR INPUTS | All respondents |
| Q | Q. CURING METHOD AND FERMENTATION [DURING THE LAST TOBACCO SEASON] | Tobacco farmers |
| R | R. TOBACCO PRODUCTION – CONTRACT FARMING | Tobacco farmers |
| SC | S. TOBACCO LEVIES | Tobacco farmers |
| SA | SA. SATISFACTION ON FARMING | All respondents |
| RP | RP. [THE FOLLOWING HYPOTHETICAL QUESTIONS ESTIMATE A FARMER'S RISK-AVERSION LEVEL] | All respondents |
| T | T. HOUSEHOLD INCOME | All respondents |
| U | U. DEBTS AND CREDITS | All respondents |
| V | V. BANK ACCOUNTS | All respondents |
| X | X. ASSETS | All respondents |
| Y | Y. FUTURE REQUIREMENTS | Tobacco farmers |
| Y | Y. FUTURE REQUIREMENTS, Y09–Y15 | Current and former tobacco farmers |
| Z | Z. AWARENESS AND PERCEPTION | Tobacco farmers |
| Y | Y. FUTURE REQUIREMENTS, Y16–Y20 | All respondents |
| SW | SW. [SUBJECTIVE WELL-BEING] | All respondents |

Sample size and sampling points are allocated based on the latest officially available data and additional internal insights and projections based on experts' data in this field.

**Table 2.** Survey respondents by region and municipality – realized

| Region | Municipality | Respondents |
|---|---|---|
| Pelagonia Region | Prilep | 210 |
| | Dolneni | 165 |
| | Krivogashtani | 85 |
| | Bitola | 31 |
| | Mogila | 54 |
| | Krushevo | 30 |
| | Demir Hisar | 27 |
| | Other municipality | 1 |
| East region | Karbinci | 28 |
| Southeast region | Strumica | 62 |
| | Novo Selo | 10 |
| | Vasilevo | 28 |
| | Bosilovo | 20 |
| | Konche | 6 |
| | Radovish | 49 |
| Total | | 806 |

## Data Analysis

The analysis consists of both descriptive and multivariate analyses. The descriptive analysis aims to elucidate the breadth and depth of farmers' general characteristics. The multivariate analyses aims to explore the causality of selected key relationships. For ethical considerations related to conducting a face-to-face survey during the ongoing COVID-19 pandemic, please see the detailed explanation in the Appendix.

# 4 FARMER CHARACTERISTICS

## 4.1. Sociodemographic profile

The majority of tobacco farmers are married middle-aged males with a primary or secondary schooleducation. Table 3 reports characteristics of former and current tobacco farmers. Most of the heads of tobacco-farming households, 94.1 percent, are male. Slightly less than two thirds (64.2 percent) ofthe heads of tobacco-farming households are between 36 and 60 years old, while slightly more than one quarter (26.2 percent) are more than 60 years old. Around two-thirds of tobacco household heads in North Macedonia are 45 years or older, [22] while the average age of the population is 40.1 years according to results from the 2021 census. However, tobacco farmers seem to have a younger age structure compared to other agricultural household heads. The share of younger people (≤35) is higher for current tobacco farmers (9.6 percent) compared to former tobacco farmers (3.9 percent) and never tobacco farmers (2.4 percent). In addition, current tobacco farmers have the lowest share of people over 60 years old and the lowest share of widowed farmers.

Most tobacco farmers are married (86.9 percent). The percentage of divorced farmers is also very low (0.2 percent). Approximately half of tobacco farmers report completing secondary school, and slightly more than one-third (36.0 percent) completed primary school, which is approximately the same across the three groups of farmers. The percentage of people with a secondary degree is similar to allemployed persons in the country. In addition, 4.3 percent of tobacco farmers hold a university degree, while this percentage is even higher for former tobacco farmers (9.9 percent). Both are lower compared to around one quarter of all employed persons in the country holding university degrees.

22 Tobacco Production Strategy for the period 2021-2027, with Action Plan , Official Journal of the Republic of North Macedonia no.32/2021 from 08.02.2021

The biggest share of tobacco farmers (46.2 percent) relies on agricultural work as their main activity, while the share of current tobacco farmers who rely mostly on non-agricultural work is 30.9 percent. The main activity of more former tobacco farmers is non-agricultural work (31.6 percent) over agricultural work (25 percent), suggesting that some share of farmers switch from tobacco-growing to other economic endeavors not related to agriculture. Around half (55.2 percent) of never tobacco farmers mainly rely on agricultural work, and 18.2 percent mainly rely on non-agricultural work. Interestingly, around a quarter of never tobacco farmers (24.2 percent) and former tobacco farmers (27.6 percent) are retired, while only 12.3 percent of current tobacco farmers are retired, which is related to the larger share of people above 60 years old in the first two groups.

**Table 3.** Characteristics of former, current, and never tobacco-farming household heads

| | Current | Former | Never | Total |
|---|---|---|---|---|
| Gender (%) | | | | |
| Male | 94.07 | 94.08 | 95.15 | 94.29 |
| Female | 5.93 | 5.92 | 4.85 | 5.71 |
| | | | | |
| Age (years) (%) | | | | |
| 21–35 | 9.61 | 3.95 | 2.42 | 7.07 |
| 36–60 | 64.21 | 52.63 | 50.91 | 59.31 |
| >60 | 26.18 | 43.42 | 46.67 | 33.62 |
| | | | | |
| Marital status (%) | | | | |
| Never got married | 5.32 | 7.89 | 1.82 | 5.09 |
| Married | 86.91 | 76.32 | 88.48 | 85.24 |
| Divorced/separated | 0.20 | 1.32 | 1.21 | 0.62 |
| Widowed | 7.36 | 13.82 | 8.48 | 8.81 |
| Other | 0.20 | 0.66 | 0.00 | 0.25 |
| | | | | |
| Education (%) | | | | |
| No education/uncompleted primary education | 5.93 | 1.97 | 3.03 | 4.59 |
| Primary education | 35.99 | 33.55 | 40.61 | 36.48 |
| Secondary education | 53.78 | 53.95 | 53.33 | 53.72 |
| University | 4.29 | 9.87 | 3.03 | 5.09 |
| Master of Sciences | 0.00 | 0.66 | 0.00 | 0.12 |
| | | | | |
| Main activity (%) | | | | |
| Agricultural work | 46.22 | 25.00 | 55.15 | 44.04 |
| Non-agricultural work | 30.88 | 31.58 | 18.18 | 28.41 |
| Home tasks | 10.02 | 12.50 | 2.42 | 8.93 |
| Retired/adult | 12.27 | 27.63 | 24.24 | 17.62 |
| Unemployed (looking for job) | 0.61 | 3.29 | 0.00 | 0.99 |
| Observations | 489 | 152 | 165 | 806 |

**Note:** CURRENT FARMER - a person that grows tobacco and/or other agricultural crops; FORMER FARMER - a farmer that grew tobacco in any year before 2021 and now cultivates other agricultural crops); NEVER FARMER - a person that never grew tobacco.

Members of both tobacco and non-tobacco-farming households rely on farming activities as their main source of livelihood. Table 4 presents the results on the self-reported main source of livelihoodfor all household members included in the survey. The results distinguish between current, former, and never tobacco - farming households. More than 70 percent of individuals in each group participated in farming activities within the last 12 months (about 78 percent of individuals in the tobacco - farming households), which is quite typical in the agricultural sector. Around three quarters of individuals in tobacco-farming households participated in tobacco farming activities, and 22 percent participated in nontobacco farming activities. Around 70 percent of former and never tobacco-farming household members have been involved in nontobacco farming activities. Around 22–29 percent of household members have worked for a wage, salary, commission, or another payment, and this percentage is higher for nontobacco farmers than for tobacco farmers. A negligible share of farmers report that they ran a business or helped in a household-run business without beingpaid.

**Table 4.** Main source of livelihood by self-report for all household members

| | Current farmer (N=1783) | Former farmer (N=433) | Never farmer (N=530) |
|---|---|---|---|
| | (%) | (%) | (%) |
| In the last 12 months | | | |
| Work for a wage, salary, commission, or any payment | 22.4 | 27.5 | 29.1 |
| Run a business of any size for themselves or another household member | 1.2 | 2.3 | 2.1 |
| Help without being paid in any kind of business run by this household | 1.2 | 1.6 | 4.2 |
| Work on this household's farm | 77.7 | 74.6 | 70.8 |
| Participate in tobacco farm activities | 76.2 | / | / |
| Participate in nontobacco farm activities | 22.5 | 72.7 | 69.4 |

**Note:** N in Table 4 is the number of household members

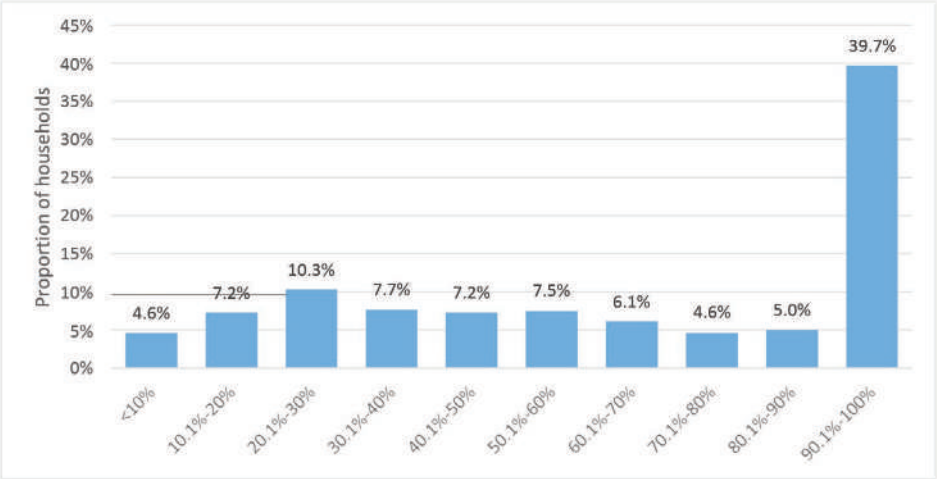
Revenue and income are calculated and analyzed based on the survey data for current, former, and never tobacco farmers'. Total household revenue is defined as the sum of agricultural sales (revenuesfrom nontobacco sales, tobacco sales, and tobacco subsidies), enterprise sales (revenues), wages, and other revenues.

The household revenue incorporates the received sums of money from different sources but does not account for costs. Costs are included in the calculation of total household income. Following previous research on the economics of tobacco farming,[23] household labor costs are incorporated into the calculation of total household income. Total household income is obtained by subtracting the total costs of farming and business activities (input costs, rent, depreciation, hired labor costs, and household labor costs) from the total household revenue.[24]

As farming, particularly tobacco farming, is a labor-demanding activity, and most of the household members are engaged in these activities, estimating household labor costs is important for the calculation of total household income. Since household members are not being paid for their work, the concept used provides an estimation of the opportunity cost of household labor. Household laborcost is defined as the total opportunity costs of household labor. Previous research on the economics of tobacco farming are followed for the estimation method used in this study.[25] Labor costs are calculated by multiplying the agricultural minimum hourly wages (USD 2.29 for tobacco and USD 1.65 for nontobacco crops) by the number of household labor hours reported.

Tobacco farmers rely heavily on tobacco revenue to provide their livelihood. Figure 3 depicts the proportion of tobacco revenue to total household revenue. For the majority of tobacco farmers (around two thirds), tobacco revenue represents a large share of total household revenue. What is striking is the fact that, for 39.7 percent of responding households, tobacco income is by far the dominant income source (more than 90 percent of total household revenue). This supports the notion that most tobacco-farming house holds are focused on growing tobacco as a main source of their livelihood. This could perhaps be attributed to the tradition of families growing tobacco, to the generous subsidies provided by the government, and to the contract market for tobacco leaf. This could also suggest that growing tobacco is considered more profitable by tobacco farmers than growing other crops. The reasons tobacco farmers continue to grow tobacco are explored in further sections.

**Figure 3.** Proportion of tobacco revenue to total household revenue




23 Chavez, Jenina Joy, Jeffrey Drope, Qing Li, and Madeiline Joy Aloria. 2016. "The Economics of Tobacco Farming in the Philippines." Quezon City. http://aer.ph/industrialpolicy/wpcontent/uploads/2016/09/REPORT-The-Economics-of-Tobacco-Farming-in-thePhilippines-LAYOUT.pdf; Goma, Fastone, Jeffrey Drope, Mr Richard Zulu, Ms Qing Li, Grieve Chelwa, Ronald Labonté, and Mr Johnny Banda. 2017. "The Economics of Tobacco Farming in Zambia." Lusaka. https:// www.cancer.org/content/dam/cancer-org/research/economic-and-healthy-policy/ economics-tobacco-farming-zambia-2017.pdf; Makoka, Donald, Jeffrey Drope, Adriana Appau, Ronald Labonte, Qing Li, Fastone Goma, Richard Zulu, Peter Magati, and Raphael Lencucha. 2017. "Costs, Revenues and Profits: An Economic Analysis of Smallholder Tobacco Farmer Livelihoods in Malawi." Tobacco Control 26 (6): 634–40. https://doi.org/10.1136/tobaccocontrol-2016-053022;Sahadewo, Gumilang Aryo, Roberto Magno Iglesias, Edson Correia Araujo, Nigar Nargis, Pandu Harimurti, Jeffrey Drope, Qing Li, Josefine Durazo, Firman Witoelar, and Bondan Supraptilah Sikoki. 2018. "The Economics of Tobacco Taxation and Employment in Indonesia: Health Population and Nutrition Global Practice." Washington D.C.: World Bank Group. http://documents.worldbank.org/curated/en/919961507699751298/health -population-and-nutrition-global-practice.

24 More specifically, Total household income is the sum of tobacco farming profit—calculated by subtracting revenue with farming costs (including paid labor)—non-tobacco farming profit; household enterprise profit; wage income; and otherincome, minus rent and household labor costs (Drope, Li, et al. 2018; Sahadewo et al. 2020).

25 Chavez et al. 2016; Makoka et al. 2017; Drope et al. 2018; and Sahadewo et al. 2018.

Table 5 presents the percentage of current, former, and never tobacco farmers who receive revenue from four main source categories (agriculture, enterprise, wages, and other). The results show that current tobacco farmers rely more heavily on agricultural revenue than former tobacco farmers and never tobacco farmers. Nearly all current tobacco farmers (91.2 percent) report receiving agricultural revenue, while 41.3 percent and 44.8 percent of tobacco farmers report receiving wages or other revenue, respectively. Table 5a shows that 92 percent of current tobacco farmers report receiving revenue from tobacco sales, and almost the same percentage received tobacco subsidies, implying the strong connection between tobacco subsidies and tobacco farming. For most of them, the agricultural revenue comes exclusively from tobacco, as only 16 percent of tobacco farmers report revenue fromsales of nontobacco crops, and only 6.1 percent receive nontobacco subsidies.

The results are very different for former tobacco farmers: only 37.5 percent of them report generating agricultural revenue from crop sales. Many of them (26.3 percent) receive nontobacco subsidies— the same percentage that receive wage revenue—whereas slightly more than half report receiving other revenue. This result suggests that former tobacco farmers or those who are not that dependenton agricultural income are more likely to have shifted to other economic activities, rather than agriculture. On the other hand, more than 73.3 percent of never tobacco farmers report generating agricultural income, 72.1 percent from other sources, and 46.7 percent from wages. A very smallpercentage of total farmers report receiving enterprise income.

**Table 5.** Percentage of farmers receiving revenue from main sources

| | Agriculture | Enterprise | Wage | Other |
|---|---|---|---|---|
| Current (N=489) | 91.2% | 0.4% | 41.3% | 44.8% |
| Former (N=152) | 37.5% | 4.6% | 37.5% | 52.0% |
| Never (N=165) | 73.3% | 4.2% | 46.7% | 72.1% |

Note: Total number of households that provided information about tobacco income is 456. Total number of current tobaccofarmers in the survey is 489, out of which 330 report some type of income. The total number of former tobacco farmers is 152, out of which 106 report some type of income. The total number of never tobacco farmers is 165, out of which 160 report some type of income.

**Table 5a.** Percentage of farmers deriving revenue from main sources

| | Sales from tobacco | Sales from nontobacco-crops | Tobacco subsidies | Nontobacco subsidies | Wages | Enterprise | Other |
|---|---|---|---|---|---|---|---|
| Current (N=489) | 92.0% | 16.0% | 91.4% | 6.1% | 41.3% | 0.4% | 44.8% |
| Former (N=152) | 0.0% | 37.5% | n/a | 26.3% | 37.5% | 4.6% | 52.0% |
| Never (N=165) | 0.0% | 73.3% | n/a | 47.9% | 46.7% | 4.2% | 72.1% |

**Figure 4.** Proportion of different revenue sources in household revenue

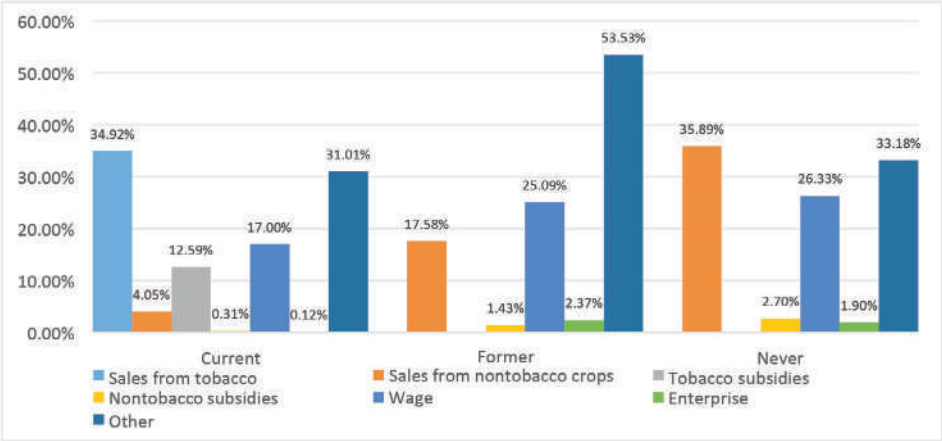



Figure 4 presents the proportions of different revenue sources in household revenue. The proportion of tobacco sales (revenues) among current tobacco farmers is 34.92 percent, and the proportion of tobacco subsidies is 12.59 percent. In addition, the proportion of other revenues (pensions and remittances) is 31.01 percent, thus contributing significantly to household revenue. Current tobaccofarmers generate a lower proportion (17 percent) of wages. At the same time, former tobacco farmers generate a lower proportion of agricultural revenue (17.58 percent participation of nontobacco cropsales), while the proportion of other revenues and wages are significantly higher (53.53 percent and

25.09 percent, respectively), indicating their economic orientation towards non-agricultural activities. Sales from nontobacco crops of never tobacco farmers have the highest participation in their total household revenues (35.89 percent). Nevertheless, never tobacco farmers have the highestparticipation of wages (26.33 percent) in comparison to current and former tobacco farmers, while the other revenues contribute significantly (33.18 percent) to their household revenue. This indicates that this group of farmers have the most balanced proportion of agricultural and nonagricultural activity contributing almost equally to their household revenues. Hence, it can be concluded that current tobacco farmers rely mostly on tobacco farming and tobacco subsidies (comprising together

47.51 percent of their total revenue). More importantly, former tobacco farmers have higher shares of revenue from the other sources, suggesting that former tobacco farmers may rely on revenue sources other than agricultural revenue.

When analyzing the "Other income" category, the results show that current tobacco farmers rely more on remittances (25.56 percent) compared to former tobacco farmers (18.43 percent). Many farmers' households also rely heavily on pensions for additional income. Therefore, remittances and pensions are two of the most important components for maintaining an adequate level of income and standard of living in tobacco farmers' families.

**Figure 4a.** Participation of each income type in the category "Other income," by percentage of farmers

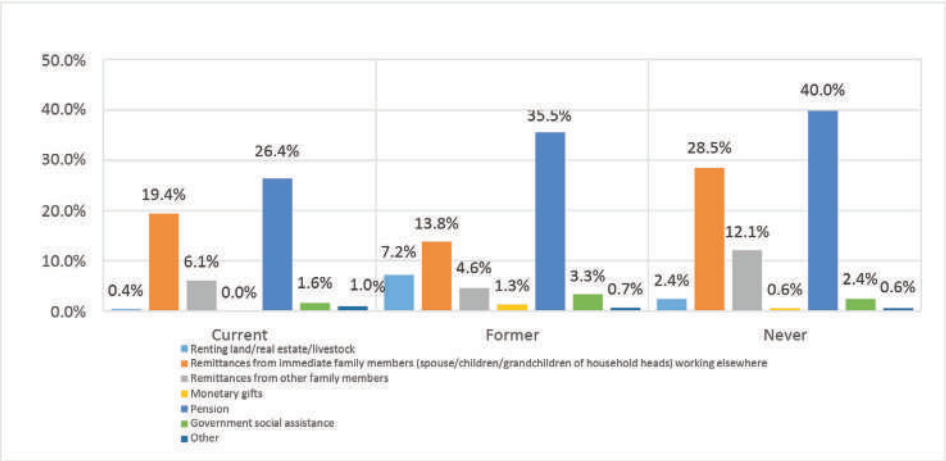



**Table 5b.** Average income from different sources (in USD)

| | Current | | Former | | Never | |
|---|---|---|---|---|---|---|
| | Income | Valid N | Income | Valid N | Income | Valid N |
| Nontobacco crops profit | 5,819.01 | 15 | 5,237.26 | 15 | 12,519.78 | 33 |
| Nontobacco crops income | 1,290.27 | 63 | 1,057.44 | 48 | 2,600.89 | 88 |
| Tobacco income | -279.54 | 336 | n/a | 0 | n/a | 0 |
| Enterprise income | n/a | 0 | -31,854.55 | 1 | -22,145.45 | 2 |
| Wage income | 6,456.02 | 202 | 7,223.85 | 57 | 7,915.71 | 77 |
| Other income | 10,863.89 | 219 | 11,119.98 | 79 | 6,455.62 | 119 |
| Total household income | 12,072.40 | 363 | 16,451.56 | 74 | 12,858.24 | 109 |

Table 5b shows the average income from different sources, where income represents revenues minus costs. The categories are calculated by definitions set in Box 1. On av erage, former tobacco farmers generate much higher household income than both never tobacco farmers and current tobacco farmers. The average former tobacco farmer generates USD 16,451.56, while the average tobacco farmer only generates USD 12,072.40. The higher household income of former tobacco farmers can be explained, among other reasons, by shifting to non-agricultural activities that generate higher wages as well as other income sources (mostly pensions and remittances). The difference between former tobacco farmers and never tobacco farmers is that, even though never tobacco farmers realizemuch higher nontobacco crops income than former tobacco farmers, their realized other income is much lower. This suggests that narratives about tobacco being a highly profitable crop are unfounded. Namely, results from the survey show that farmers who grow other crops earn higher incomes than tobacco farmers. In addition, growing tobacco is a highly labor-intensive activity that requires many hours of work and effort and thereby generates high unpaid household labor costs. Therefore, this potentially makes tobacco cultivation a less lucrative agricultural activity and suggests it would be much easier for tobacco farmers in terms of labor and economic efficiency t reorient to grow another crop.

**Table 5c.** Testing the statistical significance of the average annual income by type of farmers using analysis of variance

| | Sum of squares | Degrees of freedom | Mean square | F-stat. | Sig. |
|---|---|---|---|---|---|
| Between groups | 21,608,420,192 | 2.0 | 10,804,210,096 | 0.906 | 0.405 |
| Within groups | 8,840,036,908,844 | 741.0 | 11,929,874,371 | | |
| Total | 8,861,645,329,035 | 743.0 | | | |

Table 5c uses analysis of variance to test whether the differences in average annual income between the three groups of farmers is statistically significant. The significance level  = 0.405, which is greater than the cutoff point of 0.05, indicates there are no statistically significant differences in average annual income between the current, former, and never tobacco farmers.

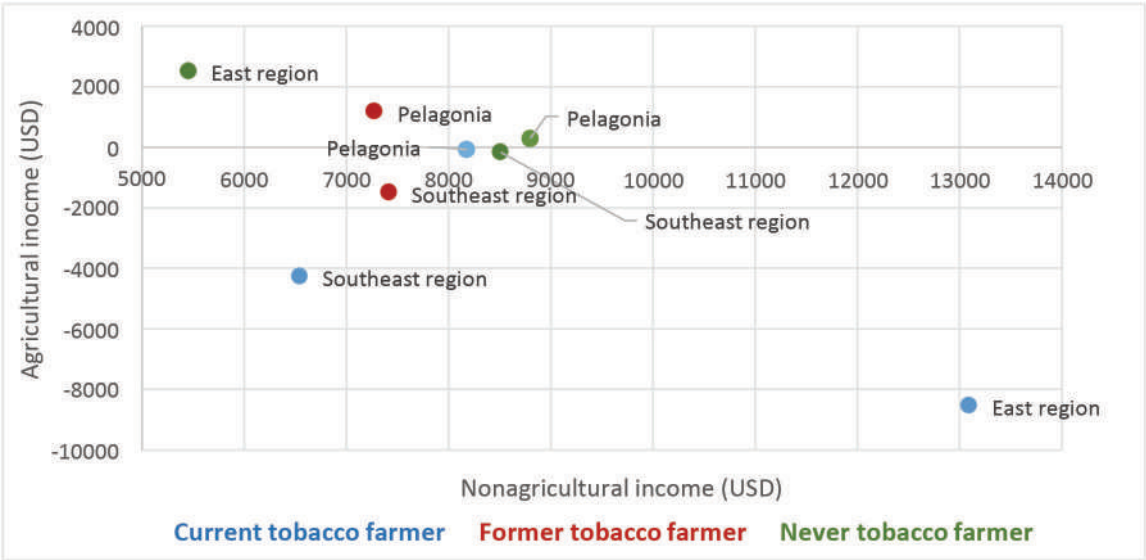
**Box 1.** Definitions of various measures of income

- Revenue is defined as the received sum of money from different sources but does not account for costs.
- Income is calculated when all types of costs are deducted from revenues (input, hired labor, and household labor). Following previous research on the economics of tobacco farming, household labor costs are incorporated into the calculation of total household income.
- Nontobacco crops profit is defined as crop sales plus subsidies minus inputs and costs of hired labor.
- Nontobacco crops income is defined as crop sales plus subsidies minus inputs, costs of hired labor, and household labor costs.
- Agricultural income is defined as tobacco and nontobacco farming incomes.
- Non-agricultural income is defined as income from enterprises, agricultural and non-agricultural wages, and other income.
- Tobacco income is defined as tobacco sales plus subsidies minus inputs, costs of hired labor, and household labor costs.
- Total household income is defined as agricultural sales plus subsidies, wage income, non-farming income, and other income minus input costs, rent, depreciation, costs of hired labor, and household labor costs.

Figure 5 depicts the differences between the three tobacco-growing regions in North Macedonia (Southeast region, East region, and Pelagonia region) in terms of agricultural versus non-agricultural income. Pelagonia is the region where farmers generate the highest median annual income. All categories of farmers in all three regions report earning higher non-agricultural than agricultural income. This might point to the lower earnings in the agricultural sector of the country relative to other industries (the gross earnings in agriculture are lower than the country's average). Regarding current tobacco farmers, farmers in the East region seem to fare better than the other two regions for nonagricultural income, while the income from agriculture is lowest and negative in this region. Current tobacco farmers from Pelagonia have lower nonagricultural income than those in the East region; while the income from agriculture is not negative, the revenues here seem to match the expenses, thus the income from agriculture is near to zero. The current tobacco farmers from the South East region have negative income from agriculture and the lowest nonagricultural income regionally.

Former tobacco farmers earn higher (and positive) median agricultural income in Pelagonia than in the Southeast region (there were no data for former tobacco farmers in the East region), while the non-agricultural median income in the two regions is almost the same. The never tobacco farmers in the East region report the highest median agricultural income (in fact, they have the highest reported median agricultural income of all categories of farmers across all three regions), and never tobacco farmers in the Southeast region report the lowest. Meanwhile, never tobacco farmers in the Pelagonia region earn the highest non-agricultural income, and those in the East region earn the lowest.

**Figure 5.** Median agricultural and non-agricultural annual income, by region



## 4.2. Poverty

The nationwide poverty rate in North Macedonia was 21.8 percent in 2020,[26] while the head count poverty ratio, calculated using the World Bank international poverty line of USD 1.90/day (2011 PPP)[27] was 2.39 percent (and it fell to 2.03 percent in 2022).[28] Results from an analysis of poverty rates among current, former, and never tobacco farmers are presented in Table 6. The poverty status of farmers is determined based on two measures, per capita revenue and per capita income, and using two poverty lines, the World Bank international poverty line and the national poverty line.

For every group of farmers, the poverty rates calculated using per capita income are significantly higher than the poverty rates calculated using per capita revenue. This stems from the definition of household income, which incorporates household costs, including the estimated household labor cost. Using per capita revenue, the poverty rate among current tobacco farmers is extremely low at 2.3 percent, using the international poverty line of USD 1.90 a day per person, and 6.5 percent, calculated with the national poverty line of MKD 211,351 (USD 3,842.75) annual revenue for a four- person household. Using the more realistic measure of per capita household income, the poverty ratesamong current tobacco farmers jump dramatically to 22.6 percent and 30.6 percent, according to the World Bank international measure and the national measure, respectively.

The poverty rate of former and never tobacco farmers, based on per capita revenue, is higher than the current tobacco farmers' poverty rate; but when considering per capita income, current tobacco farmers have the highest incidence of poverty while never tobacco farmers have the lowest incidence. In terms of income, current tobacco farmers have the highest incidence of poverty calculated based on the World Bank international poverty line, and they have similar rates to former tobacco farmers when calculated using the national poverty line. This might suggest that, although tobacco farmers gain relatively large tobacco revenues from sales and subsidies and from other sources (annual mean per capita revenue is above the national poverty line), they also incur larger direct and indirect costs when cultivating tobacco. In addition, tobacco is a very labor-demanding crop. Once these costs are accounted for, the results reveal that tobacco's actual profitability does not match the reputation promoted and perpetuated by tobacco companies and often the government, too.

26 State Statistical Office (SSO) Available at:PX-Web - Table (stat.gov.mk)

27 Fact Sheet: An Adjustment to Global Poverty Lines, World Banka, Available at: https://www.worldbank.org/en/news/factsheet/2022/05/02/fact-sheet-an-adjustment-to-global-poverty-lines 2.15 (2017 PPPs) https://www.worldbank.org/en/news/factsheet/2022/05/02/fact-sheet-an-adjustment-to-global-poverty-lines

28 Sustainable Development Report 2022 (sdgindex.org)

**Table 6.** Poverty status of current, former, and never tobacco farmers

| Poverty status | Poverty at USD 1.90 a day per person (2011 PPP) | | | Poverty at national poverty line MKD 211,351 (USD 3,842.75), annual revenue for four-person household (2019) | | |
|---|---|---|---|---|---|---|
| | Current farmer | Former farmer | Never farmer | Current farmer | Former farmer | Never farmer |
| Head count ratio measured percapita revenue (for all farmers N=745) | 2.30% (N=479) | 4.72% (N=106) | 5.00% (N=160) | 6.47% (N=479) | 18.81% (N=106) | 13.75% (N=160) |
| Head count ratio measured byper capita income (for all farmers N=546) | 22.59% (N=363) | 10.81% (N=74) | 12.84% (N=109) | 30.58% (N=363) | 31.08% (N=74) | 22.02% (N=109) |

**Note:** Poverty at national poverty line of MKD 211,351 annual income for four-person household for 2019 was taken fromLaeken poverty indicators in 2019 report, issued by the State Statistical Office.[29]

**Table 6a.** Per capita household revenue/income

| | Current farmer | Former farmer | Never farmer |
|---|---|---|---|
| Annual mean per capita revenue | (N=479) | (N=106) | (N=160) |
| MKD | 262,036.03 | 273,344.10 | 248,395.76 |
| USD | 4,764.78 | 4,969.89 | 4,516.27 |
| Annual median per capita revenue | | | |
| MKD | 194,800.00 | 198,100.00 | 193,462.50 |
| USD | 3,541.82 | 3,601.82 | 3,517.5 |
| Annual mean per capita income | | | |
| MKD | 198,379.77 | 278,359.43 | 212,823.90 |
| USD | 3,606.91 | 5,061.08 | 5,142.25 |
| Annual median per capita income | | | |
| MKD | 130,440.00 | 194,783.33 | 171,912.50 |
| USD | 2,371.64 | 3,541.52 | 3,125.68 |

**Note:** TOTAL HOUSEHOLD INCOME = REVENUES – COSTS ***Revenues =*** Agricultural sales + Wage income + Nonfarming income + Other income + Tobacco subsidies + Tobacco sales+ Nontobacco subsidies ***Costs =*** Input costs + Rent + Depreciation + Levies + Cost of hired labor + Household labor costs

[29] State Statistical Office (SSO), Available at: https://www.stat.gov.mk/PrikaziSoopstenie.aspx?id=115&rbr=13505

Only a small share of tobacco farmers report using some form of social assistance. Table 7 presents the share of current, former, and never tobacco farmers who receive various forms of social assistance benefits from the programs implemented by the government. Current and former tobacco farmers rely more on social assistance than never tobacco farmers. However, even in the first two groups, only a small share of households receive assistance—4.5 percent of current and 5.26 percent of former tobacco farmers. Within each group, the most widely used type of benefit is the guaranteed minimum assistance. Around half of agricultural workers in the country are informal workers. This could be due in part to the larger proportion of informal agricultural workers, primarily family workers, who are not covered with social protection and to the lack of information on the available benefits and how toapply for them. The survey results do not permit drawing such conclusions and more thorough analysis is needed to understand this better.

**Table 7.** Share of farmer households receiving social benefits (in percentage %)

| Indicators | Current farmer (N=489) | Former farmer (N=152) | Never farmer (N=165) |
|---|---|---|---|
| Percentage of households who receive financial help from social protection | 4.50 | 5.26 | 1.82 |
| Benefit 1: Percentage of households who receive guaranteed minimum assistance | 1.84 | 2.63 | 1.82 |
| Benefit 2: Percentage of households who receive disability allowance | 0.61 | 0.00 | 0.00 |
| Benefit 3: Percentage of households who receive cash benefitfor help and care for another person | 0.41 | 0.00 | 0.00 |
| Benefit 4: Percentage of households who receive compensationfor part-time salary (due to care of a child with physical or mental disabilities) | 0.20 | 0.00 | 0.00 |
| Benefit 5: Percentage of households who receive housing allowance | 0.00 | 0.00 | 0.00 |
| Benefit 6: Percentage of households who receive permanentcompensation | 0.20 | 0.00t | 0.61 |
| Benefit 7: Percentage of households who receive one-time financial aid | 0.20 | 0.00 | 0.00 |
| Benefit 8: Percentage of households who receive right to health care | 0.20 | 0.66 | 0.00 |
| Benefit 9: Percentage of households who receive child allowance | 1.23 | 0.66 | 0.00 |
| Benefit 10: Percentage of households who receive other types of help | 0.61 | 1.32 | 0.00 |

The Government of North Macedonia also implements national health insurance. Table 8 provides information on the participation of farmers in the government health insurance and the receipt of government health benefits. The results show the vast majority of households has a government paid health insurance (GPHI), reflecting the wide coverage of the population by GPHI in the country. The percentage of current tobacco farmers who received government health benefits in the last 12 months is 63.2 percent and was lower than for never tobacco farmers (70.3 percent) and former tobacco farmers (72.4 percent). In addition to having a GPHI, almost a third of never tobacco farmers have private healthcare insurance and almost the same share have used it in the surveyed period. On the other hand, less than 10 percent of current and former tobacco farmers had private healthcare insurance in the last 12 months and around half of them have used it.

**Table 8.** Current, former, and never tobacco farmers using government-paid health insurance (GPHI)

| **Indicators** | Current farmer (N=489) | Former farmer (N=152) | Never farmer (N=165) |
|---|---|---|---|
| Average household size (members) | 3.65 | 2.85 | 3.21 |
| Percentage of households that have government paid healthinsurance | 88.96 | 89.47 | 83.64 |
| Percentage of household members that have GPHI | | | |
| 1 member | 2.66 | 11.18 | 9.09 |
| 2 members | 20.45 | 34.21 | 29.70 |
| 3 members | 21.27 | 21.05 | 16.36 |
| 4 members | 23.72 | 17.76 | 16.97 |
| 5 members | 14.11 | 2.63 | 7.88 |
| 6 members | 6.75 | 2.63 | 3.64 |
| Percentage of household members that used the GPHI in the last12 months | 63.19 | 72.37 | 70.30 |
| Percentage of household members that have private healthcare insurance | 8.38 | 7.24 | 29.70 |
| Percentage of household members that have private healthcareinsurance – household size | | | |
| 1 member | 2.86 | 1.97 | 8.48 |
| 2 members | 3.07 | 1.32 | 13.94 |
| 3 members | 1.02 | 1.97 | 4.24 |
| 4 members | 0.82 | 1.97 | 2.42 |
| 5 members | 0.41 | 0.00 | 0.00 |
| 6 members | 0.20 | 0.00 | 0.61 |
| Percentage of household members that used the private healthcareinsurance in the last 12 months | 4.91 | 4.61 | 23.64 |

## 4.3 Land use

Table 9 presents results (mean value in hectares) from an analysis of land ownership and cultivation in the last 12 months. It should be emphasized that there was a lack of responses on land cultivated with tobacco, except for the Pelagonia region. Thus, no comparison can be made regarding land cultivated with tobacco. Current tobacco farmers in the East region owned and cultivated smaller land sizes than farmers in the Pelagonia and Southeast regions (the latter two regions were approximately the same). For example, on average a farmer in the East region owns 0.30 hectare of land, whereas the average farmer in the Pelagonia region owns 0.44 hectares, and a farmer in the Southeast region owns 0.39 hectares. The average never tobacco farmer owns and cultivates larger land sizes than tobacco farmers, particularly in the Southeast region, a traditional agricultural region. Namely, the average never tobacco farmer owns and cultivates the largest land area (4.03 ha) and the current tobacco farmer the smallest (0.56 ha).

**Table 9.** Mean total land owned (hectares), under cultivation and tobacco cultivation by region, current, former, and never tobacco farmers

| Region | Current | | | | Former | | | Never | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Owned | Cultivated | Tobacco | Total | Owned | Cultivated | Total | Owned | Cultivated |
| Pelagonia | 0.56 | 0.44 | 0.54 | 0.38 | 0.95 | 0.82 | 0.95 | 0.46 | 0.45 | 0.46 |
| East | 0.30 | 0.30 | 0.30 | n/a | n/a | n/a | n/a | 3.36 | 3.25 | 3.09 |
| Southeast | 0.54 | 0.39 | 0.48 | n/a | 0.53 | 0.45 | 0.53 | 6.31 | 5.89 | 6.31 |
| Total | 0.56 | 0.44 | 0.54 | 0.38 | 0.87 | 0.75 | 0.87 | 4.03 | 3.85 | 4.03 |

Most farmers own their land, but there is also a non-negligible share of tobacco farmers who rent land. Table 10 presents the legal entitlement of land to current, former, and never tobacco farmers. The parcel is used as the main unit of analysis, as farmers might own more than one parcel of land. Land ownership (82.9 percent) is a more common legal entitlement to farmland than rental (17.1 percent). This is true for all three types of farmers, and the dominance of ownership is most prominent for never tobacco farmers (95.5 percent versus 4.5 percent). Current tobacco farmers are in fact most likely to rent land for farming compared to former and never tobacco farmers. In the survey, 22.2 percent of current tobacco farmers and 13.7 percent of former tobacco farmers state that they rent land from others.

**Table 10.** Legal entitlement of land – current, former, and never tobacco farmers, by parcel

| Ownership | Tobacco farmer | Former farmer | Never farmer | Total |
|---|---|---|---|---|
| Owned | 941 | 239 | 400 | 1,580 |
| Rented | 268 | 38 | 19 | 325 |
| Total | 1,209 | 277 | 419 | 1,905 |

# 5 THE ECONOMICS OF *TOBACO GROWING*

## 5.1. Characteristics of tobacco farming: Contracts, production, and prices

This section presents analyses of several characteristics of tobacco farming. It specifically focuses on the varietal and contractual structure of tobacco farming and tobacco leaf sales across the three surveyed regions, as well as across the three types of tobacco buyers. In addition, the price per kilogram is described for tobacco leaf by tobacco type paid to the farmers.

In North Macedonia, almost exclusively oriental tobacco varieties are grown. It is the second largest producer of oriental-type tobacco leaf, after Turkey.[30] Table 11 presents the main types of tobacco leaf in the two major tobacco-growing regions. The dominant type of tobacco leaf is the Prilep variety 66, in all regions, grown by 98.7 percent of respondents.[31] Pelagonia is the largest tobacco-growing region, accounting for almost half of the total tobacco leaf cultivation area in the country. Almost all tobacco grown in this area belongs to the Prilep variety, while in the Southeast region[32] tobacco of the Jaka variety can also be found. Tobacco, particularly the oriental type, can be grown in poorer soils that are presumably less suitable for other agricultural production.

**Table 11.** Type of tobacco leaf grown by region

| Region | Prilep - variety 66 | Prilep - variety 72 | Jaka - variety 48 | Jaka - variety 125 | Other | Total |
|---|---|---|---|---|---|---|
| Pelagonia | 422 | 2 | 0 | 0 | 1 | 425 |
| Southeast | 30 | 1 | 2 | 0 | 0 | 33 |
| Total | 452 | 3 | 2 | 0 | 1 | 458 |

30 The four major producers of oriental type tobacco are Turkey, North Macedonia, Greece, and Bulgaria, where natural and climate conditions are suitable for this crop.

31 Miceska, G., & Dimitrieski, M. (2018). Variety structure as essential factor for sustainable development of the production of oriental tobacco in Republic of Macedonia and marketing of tobacco production competitive in foreign markets. International Journal of Agriculture Innovations and Research, IJAIR, 3(3), 1-8.

32 We received only one response for the East region, therefore it was merged with the data on the Southeast region.

A vast majority of farmers report having a contract with a leaf buyer. Table 12 shows the distribution of contract and independent farmers by region. Almost all tobacco farmers in the two major tobacco- growing regions have signed contracts with tobacco leaf buyers; only 6 percent (all from the Pelagonia region) report being independent farmers. This is expected, since to be eligible for subsidies (which represent a considerable amount of tobacco farmers' income[33]), tobacco farmers must have a signed contract with a tobacco leaf buyer. Typically, these farmers receive cash or physical inputs from the leaf buyer (such as raw material, agricultural machines, and other means and equipment, or a financial payment—though most typically it is raw materials) in advance of the planting season without requiring payment at that time. This advanced payment is later deducted from the payment of the purchased tobacco upon delivery to the purchaser.

**Table 12.** Distribution of contract and independent tobacco farmers by region

| Region | Contract farmer | Independent farmer | Total |
|---|---|---|---|
| Pelagonia | 418 | 27 | 445 |
| Southeast | 43 | 0 | 43 |
| Total | 462 | 27 | 489 |

The sales and prices of tobacco leaf do not vary significantly across the two regions. Table 13 reports on the median tobacco volume of sold leaf, price, and sales revenue by region. There is variation across regions with regard to sold quantities of tobacco leaf, with the lowest median volume in the Southeast region (1.2 tons) and the highest in the Pelagonia region (1.4 tons). Average prices, on theother hand, are higher in the Pelagonia region (USD 3.58) and lower in the Southeast region (USD 3.38). However, these differences are not very big. Median household tobacco revenue from sales waslower in the Southeast region (USD 4.272.73), probably due to the lower median volume sold by households and due to the lower average price compared to the Pelagonia region. The higher median sales revenue is reported in the Pelagonia region (USD 4,818.2), where the price per kilogram is higher and the median volume sold is larger.

**Table 13.** Median tobacco volume sold, price, and sales revenue by region

| Region | Volume sold (tons) | N | Price per kg (USD) | N | Sales (USD) | N |
|---|---|---|---|---|---|---|
| Pelagonia | 1.40 | 425 | 3.58 | 417 | 4,818.18 | 419 |
| Southeast | 1.20 | 32 | 3.38 | 31 | 4,272.73 | 32 |
| Total | 1.40 | 458 | 3.55 | 449 | 4,818.18 | 452 |

The sales revenues of tobacco leaf varies across leaf types. Table 14 presents median volume sold of tobacco leaf, price, and total sales revenues by leaf type. There is a considerable variation in the volume of tobacco leaf sold. The Prilep variety 66 is distinguished by far from the others, with a median volume sold of 1.40 tons, while the volume sold for the other types varies from 0.6 to 0.8 tons. On the other hand, there is much less variation in the median price of tobacco leaf sold. Given the significantly larger median volume sold of the Prilep variety 66,

[33] The subsidy accounts for approximately one quarter of the value per kilogram of tobacco leaf (more precisely, 26.3 percent on average for the period 2009-2019). See more in the report: Tobacco Farming and the Effects of Tobacco Subsidies in North Macedonia, Skopje March 20222, Analytica Skopje

and considering the small variation in price, the median sales revenues were by far largest for the named type (USD 4,864), and smallest for the Prilep variety 72 (USD 2,036). The median volume sold, the price, and sales for all leaf types combined are the same as for the Prilep variety 66 (except a small discrepancy in sales) because this is the dominant variety grown in North Macedonia.

**Table 14.** Median volume sold, price, and sales revenues by leaf type

| Leaf type | Volume sold (tons) | N | Price per kg(USD) | N | Sales (USD) | N |
|---|---|---|---|---|---|---|
| Prilep – variety 66 | 1.40 | 452 | 3.55 | 443 | 4,863.64 | 446 |
| Prilep – variety 72 | 0.60 | 3 | 3.45 | 3 | 2,036.36 | 3 |
| Jaka – variety 48 | 0.65 | 2 | 3.45 | 2 | 2,236.36 | 2 |
| Total | 1.40 | 457 | 3.55 | 448 | 4,818.18 | 451 |

The achieved price of tobacco leaf depends not only on the type of tobacco but also on the grade, or the quality of the leaf. The contract signed between the tobacco farmer and the tobacco leaf buyer states the purchase price by leaf type and the agreed quantity. The tobacco leaf delivered to the purchase site is appraised by an authorized appraiser holding a license issued by the Ministry of Agriculture, Forestry and Water Supply. The tobacco class and type are determined according to adopted measures and methods for qualitative and quantitative assessment of tobacco. Table 15 reports the average price for the different leaf types and the quality grades within each type. Grade I Prilep variety 66 is sold at the highest average price of USD 3.97/kg, while the Grade IV of the same type is sold at the lowest average price of USD 2.55/kg. Though it should be noted that Grade IV tobacco leaf is not sold in other varieties, and it is natural for the price to decline moving from higher to lower grades of tobacco leaf. In terms of grades II and III, the Jaka variety 48 has a higher average price / kg than the Prilep variety 66. There are no data for the average price of Jaka variety Grade I. For the grades for which the survey data contains responses for both types of tobacco, the Jaka variety is reported to achieve a higher average price than Prilep. According to the official report from the Agricultural Information System, the average purchase price for the 2021 harvest in the country was USD 3.64 per kilogram, with the Jaka type achieving a higher price for each grade of tobacco leaf than the Prilep type.[34]

[34] Overview of the quantity od sold row leaf tobacco in leaf for the 2021 harvest year. available at:https://zpis.gov.mk/Vesti/97

**Table 15.** Average tobacco price (USD per kg) by grade and leaf type

| Grade | Prilep – variety 66 (N=433) | Prilep – variety 72 (N=3) | Jaka – variety 48 (N=2) |
|---|---|---|---|
| I | 3.97 | 3.82 | n/a |
| II | 3.63 | 3.45 | 3.64 |
| III | 3.16 | n/a | 3.27 |
| IV | 2.55 | n/a | n/a |
| Other | n/a | n/a | n/a |
| Total | 3.52 | 3.58 | 3.45 |

Regarding the rating of their tobacco leaf, the number of farmers that state they are satisfied and thenumber of farmers that state they are not satisfied with the grade given to their tobacco is approximately the same. However, many tobacco farmers in the country are not satisfied with the purchase price by type when the prices of inputs and other living expenses increase.[35] This is confirmed by the greater number of surveyed farmers who are not satisfied with the amount received from tobacco sales (44 percent not satisfied versus 28 percent satisfied); 27 percent of the farmers state they do not know the amount.

Tobacco farmers sell their leaf to several different types of tobacco leaf buyers. Table 16 presents the types of buyers of the farmers' tobacco leaf by region.

**Table 16.** Types of tobacco leaf buyers, by region

| Region | Contracting representative | Company collector | Company warehouse | Tobacco purchasing companies | Other | Total |
|---|---|---|---|---|---|---|
| Pelagonia | 260 | 139 | 25 | 135 | 1 | 425 |
| Southeast | 23 | 7 | 2 | 16 | 0 | 32 |
| Total | 284 | 146 | 27 | 152 | 1 | 458 |

[35] Тутунарите незадоволни од проценката по класи, се поскапе само цената на тутунот остана ниска | Вечер ...1963 | Vecer MK; Добар квалитет, ниска цена - Тутунарите очекуваа откупна цена од минимум 200 денари - Moja Farma. Available at: https://www.vecer.press/%D1%82%D1%83%D1%82%D1%83%D0%BD%D0%B0%D1%80%D0%B8%D1%82%D0%B5-%D0%BD%D0%B5%D0%B7%D0%B0%D0%B4%D0%BE%D0%B2%D0%BE%D0%BB%D0%BD%D0%B8%D0%BE%D0%B4-%D0%BF%D1%80%D0%BE%D1%86%D0%B5%D0%BD%D0%BA%D0%B0%D1%82/

## 5.2. Costs of tobacco farming

Analyses of the main nonlabor and labor inputs identified by tobacco farmers in the survey and the associated costs are compared with the inputs and costs identified by nontobacco farmers.

> Tobacco farming is an input and labor-demanding activity, incurring significant costs of production. Tobacco production is labor-demanding and laborious, from the beginning of the seedling to the last harvest the engagement of workers is very large and intense. Hence, the subsidies for this product are much higher than the subsidies for other products."
>
> *– Deputy Minister for Agriculture*

Tobacco farming mainly incurs higher input costs compared to nontobacco farming. Table 17 presents the proportion of tobacco farmers who use different input items for growing tobacco and the average cost of each of them per year. The mean input cost is USD 280.3, and the median is USD

118.2. Fertilizers are the most common and consistently one of the largest expenses. Nearly all tobacco farmers (96.7 percent) report purchasing fertilizers, out of whom around two-third use non-organic fertilizers and one-third uses organic fertilizer. The average cost for those purchasing non-organic fertilizer is USD 221.7 and USD 156.2 for organic fertilizer. The costliest input for tobacco farming is oil, used by 84.25 percent of respondents, reaching an average price of USD 572.4. Another commonly used item is a mattock (83.4 percent) (a hand tool used for digging, prying, and chopping), however data on its average price is lacking. Almost two-thirds of respondents use pesticides for their farming activities, with an average cost of USD 81.9. Only 5.5 percent of households report renting equipment or livestock for the purpose of growing tobacco.

**Table 17.** Main inputs for tobacco farming and average costs per year

| Input | Proportion of farmers who use the item (N=489) | Proportion of farmers who know the input costs (N=489) | N | Average cost (USD) |
|---|---|---|---|---|
| Non-organic fertilizer | 64.82% | 40.49% | 198 | 221.71 |
| Organic fertilizer | 31.90% | 7.57% | 37 | 156.17 |
| Pesticides | 64.21% | 36.31% | 179 | 81.93 |
| Gasoline for tobacco-growingequipment | 25.56% | 4.70% | 23 | 232.65 |
| Oil | 84.25% | 42.47% | 209 | 572.41 |
| Backpack sprayer | 31.90% | 0 | 0 | n/a |
| Rollers | 7.77% | 0 | 0 | n/a |
| Sprayer | 48.47% | 5.32% | 26 | 211.82 |
| Renting equipment / livestock | 5.52% | 1.23% | 6 | 90.91 |
| Transport (to market) | 56.44% | 5.52% | 27 | 85.62 |
| Water pump | 20.85% | 0 | 0 | n/a |
| Mattock | 3.44% | 0 | 0 | n/a |
| Other | 11.04% | 0.20% | 1 | 181.82 |

Many tobacco farmers also grow nontobacco crops. Therefore, Table 18 presents analyses of the maininputs used by tobacco farmers for nontobacco crops and the average costs of these inputs per year. The mean input cost for nontobacco production in tobacco-growing households is USD 143.3, and themedian is USD 127.3. The most common inputs are oil (26.2 percent of tobacco farmers), non-organic fertilizer (24.7 percent), mattock and pesticides (both 20 percent). Transport to market was reported with the highest average input cost (USD 181.8) but used by only 14.1 percent of the farmers. Non- organic fertilizer is the second highest average input cost for tobacco farmers' nontobacco crops at USD 177.3. Equipment rental and rollers are least used (by less than one percent of farmers), but there are no data on their costs.[36]

**Table 18.** Tobacco farmers' inputs for cultivating nontobacco crops per year

| Input | Proportion of farmers who use the item (N=489) | Average cost (USD) |
|---|---|---|
| Non-organic fertilizer | 24.74% | 177.27 |
| Organic fertilizer | 8.38% | n/a |
| Pesticides | 19.84% | 127.27 |
| Gasoline for nontobacco growing equipment | 8.59% | 272.73 |
| Oil | 26.18% | 128.00 |
| Backpack sprayer | 5.32% | n/a |
| Rollers | 0.61% | n/a |
| Sprayer | 16.56% | n/a |
| Renting equipment / livestock | 0.61% | n/a |
| Transport (to market) | 14.11% | 181.82 |
| Water pump | 11.04% | n/a |
| Mattock | **19.84%** | n/a |
| Other | **2.66%** | n/a |

For comparison with tobacco farmers, Table 19 reports former tobacco farmers' main inputs for cultivating nontobacco crops. The average input cost is USD 175.8, and the median is USD 54.55. Almost the same percentage of former tobacco farmers use non-organic fertilizer, while more formertobacco farmers use organic fertilizer (47.4 percent) compared to tobacco farmers. It is noticeable that fewer former tobacco farmers use oil—52.6 percent compared to 84.3 percent of current tobaccofarmers—and their average cost for oil is lower. The average cost of non-organic fertilizer is lower atUSD 139.0, while the average cost of organic fertilizer is higher (USD 200.0). Roughly, the same proportion of former tobacco farmers rent equipment compared to their tobacco-growing peers. Thesame applies for the use of pesticides; however, according to the responses, growing nontobacco crops incurs higher average costs for pesticides compared to tobacco farming.

[36] In fact, it should be noted that there are insufficient data for the average cost of inputs for cultivatingnontobacco crops.

For comparison with tobacco farmers, Table 19 reports former tobacco farmers' main inputs for cultivating nontobacco crops. The average input cost is USD 175.8, and the median is USD 54.55. Almost the same percentage of former tobacco farmers use non-organic fertilizer, while more former tobacco farmers use organic fertilizer (47.4 percent) compared to tobacco farmers. It is noticeable that fewer former tobacco farmers use oil—52.6 percent compared to 84.3 percent of current tobacco farmers—and their average cost for oil is lower. The average cost of non-organic fertilizer is lower at USD 139.0, while the average cost of organic fertilizer is higher (USD 200.0). Roughly, the same proportion of former tobacco farmers rent equipment compared to their tobacco-growing peers. The same applies for the use of pesticides; however, according to the responses, growing nontobacco crops incurs higher average costs for pesticides compared to tobacco farming.

**Table 19.** Former tobacco farmers' main inputs for cultivating nontobacco crops per year

| Input | Proportion of farmers who use the item | N | Average cost (USD) | Number and percent of farmers that do not know the cost |
|---|---|---|---|---|
| Non-organic fertilizer | 61.18% | 9 | 138.96 | 22 (2.73%) |
| Organic fertilizer | 47.37% | 4 | 200.00 | 15 (1.86%) |
| Pesticides | 61.84% | 7 | 153.04 | 25 (3.11%) |
| Gasoline for nontobacco growing equipment | 25.66% | 3 | 59.09 | 14 (1.74%) |
| Oil | 52.63% | 9 | 309.09 | 14 (1.74%) |
| Backpack sprayer | 24.34% | 0 | n/a | 0 |
| Rollers | 5.92% | 0 | n/a | 0 |
| Sprayer | 32.24% | 0 | n/a | 0 |
| Renting equipment / livestock | 5.26% | 0 | n/a | 2 (0.25%) |
| Transport (to market) | 31.58% | 4 | 54.55 | 14 (1.74%) |
| Water pump | 46.71% | 0 | n/a | 0 |
| Mattock | 76.32% | 0 | n/a | 0 |
| Other | 16.45% | 1 | n/a | 7 (0.87%) |

In addition to the main physical inputs presented above, other costs that are associated with farming are calculated in terms of land, equipment, and other payment obligations. Table 20 presents the costs for depreciation of the farming equipment, rent for land, and government levies for tobacco farmers. Depreciation is calculated using the following accounting formula: depreciation = (purchase price of asset – approximate present value of asset)/years of use of asset. The costs vary between the two regions and across farmer types. Depreciation costs are consistent across regions for current and former tobacco farmers, but they are significantly higher for never tobacco farmers. While current and former tobacco farmers in the Southeast region report the highest depreciation costs, the never farmers from Pelagonia incur higher depreciation costs than their counterparts from the other regions. Farmers from the Southeast region tend to pay the lowest median amount for rented land. Regarding government levies, data only exist for the Pelagonia region, with median levies paid in the amount of USD 54.55.

**Table 20**. Median non-labor costs (USD), current, former, and never tobacco farmers, by region

Current tobacco farmers

| Region | Depreciation | N | Valid N | Rent | N | Valid N | Levies | N | Valid N |
|---|---|---|---|---|---|---|---|---|---|
| Pelagonia | 109.09 | 445 | 17 | 154.55 | 445 | 97 | 54.55 | 445 | 5 |
| Southeast | 155.36 | 43 | 14 | 109.09 | 43 | 15 | n/a | 43 | 0 |
| Total | 119.09 | 489 | 32 | 145.45 | 489 | 112 | 54.55 | 489 | 5 |

Former tobacco farmers

| Region | Depreciation | N | Valid N | Rent | N | Valid N |
|---|---|---|---|---|---|---|
| Pelagonia | 109.09 | 121 | 7 | 290.91 | 121 | 6 |
| Southeast | 163.64 | 31 | 7 | 136.36 | 31 | 4 |
| Total | 136.36 | 152 | 14 | 177.27 | 152 | 10 |

Never tobacco farmers

| Region | Depreciation | N | Valid N | Rent | N | Valid N |
|---|---|---|---|---|---|---|
| East | 501.82 | 28 | 11 | 645.45 | 28 | 2 |
| Southeast | 207.80 | 88 | 10 | 186.36 | 88 | 8 |
| Total | 311.69 | 165 | 23 | 222.73 | 165 | 10 |

* Data for the Pelagonia region is excluded from the table because there were only two (2) valid observations, so a reliableinference could not be drawn from it.

**Median tobacco input costs are higher than median nontobacco input costs.**[37] In addition, median tobacco and nontobacco input costs for farmers vary considerably across regions. Table 21 compares current and former tobacco farmers' nonlabor median input costs across regions per year. The results show much higher median input costs for tobacco for the Southeast region[38] than for the Pelagonia region. Median tobacco input costs are USD 337.3 in Pelagonia and USD 545.5 in the Southeast region. Nontobacco input costs are also drastically higher in the Southeast region than in the Pelagonia region, at USD 600.0 compared to USD 109.1 (however, there are data for only one tobacco farmer in terms of nontobacco input). Nontobacco input costs are also higher in the Southeast than in the Pelagonia region for former tobacco farmers, however the difference is much smaller, at USD 291 compared to USD 218.2.

[37] This is consistent with previous research for other countries (e.g, Briones 2015; Chavez et al., 2016; Goma et al., 2015; Keyser and Juita, 2005; Magati et al., 2016; Makoka et al., 2016; Mulyana, 2015).

[38] There was only one observation from the East region, therefore its data was merged with the data on the Southeast region.

**Table 21.** Median input costs for current and former tobacco farmers by region (USD) per year

| | | Tobacco input | | Nontobacco input | |
|---|---|---|---|---|---|
| | Region | Median | Valid N | Median | Valid N |
| Current farmer | Pelagonia | 337.27 | 254 | 109.09 | 5 |
| | Southeast | 545.45 | 37 | 600.00 | 1 |
| Former farmer | Pelagonia | n/a | 0 | 218.18 | 5 |
| | Southeast | n/a | 0 | 290.91 | 4 |

Tobacco farming is recognized as a labor-demanding economic endeavor. Recent studies show that it generates enormous labor costs, sometimes as high as double the labor needed to produce other similar crops.[39] [40] This applies to the Republic of North Macedonia as well[41] and is evident in Table 21. It should be noted that tobacco farming is characterized by an extensive use of seasonal workers, part-time workers, unpaid family labor, and other informal laborers.[42] In addition, some tobacco- farming households are also engaged in growing other crops.

[39] Tobacco Farming - TobaccoTactics

[40] Vast literature confirms the labor-intensive nature of tobacco cultivation. For example: Sahadewo GA, Drope J, Witoelar F, Li Q, Lencucha R. 2020. The Economics of Tobacco Farming in Indonesia: Results from Two Waves of a Farm-Level Survey. Chicago, IL: Tobacconomics, Health Policy Center, Institute for Health Research and Policy, University of Illinois at Chicago.www.tobacconomics.org.; Goma F, Drope J, Zulu R, Li Q, Banda J. The Economics of Tobacco Farming in Zambia. Lusaka: University of Zambia School of Medicine and Atlanta: American Cancer Society. December, 2015; Growing | Tobacco Atlas; Evaluating Labor Costs in the North Carolina Tobacco Industry | Agricultural and Resource Economics | NC State University (ncsu.edu)

[41] Hristovska Mijovic, B., Spasova Mijovic, T., Trpkova-Nestorovska, M., Tashevska, B., Trenovski, B. & Kozeski, K., (2022). Tobacco Farming and the Effects of Tobacco Subsidies in North Macedonia, Analytica, Skopje, North Macedonia.

[42] National Cancer Institute, Available at http://cancercontrol.cancer.gov/brp/tcrb/monographs/21/index.html , p.547

The results in Table 22 suggest that the median current tobacco farmer dedicates more time to growing crops than the median former or the median never tobacco farmer. For example, the median male individual in a household works 1,400 hours on tobacco cultivation, while the median female individual works 1,260 hours, within one tobacco farming season. Both the median male and the median female tobacco farmers dedicate 640 hours to nontobacco crops in addition to the hours spent on tobacco cultivation. In contrast, the median former tobacco farmer dedicates far less time to their crops. The median male spends 1000 hours on cultivating his crops while the median female spends 900 hours. The median never tobacco farmer spends more time on his crops than the former tobacco farmer, but less than the median current tobacco farmer. The table also shows that, in almost all farmer categories and age groups, male farmers spend more time farming than female farmers. Female farmers work the same or more hours only at a younger age, probably before marriage and childbirth.

**Table 22.** Median hours worked by farming household members by gender, age, and tobacco / nontobacco crops

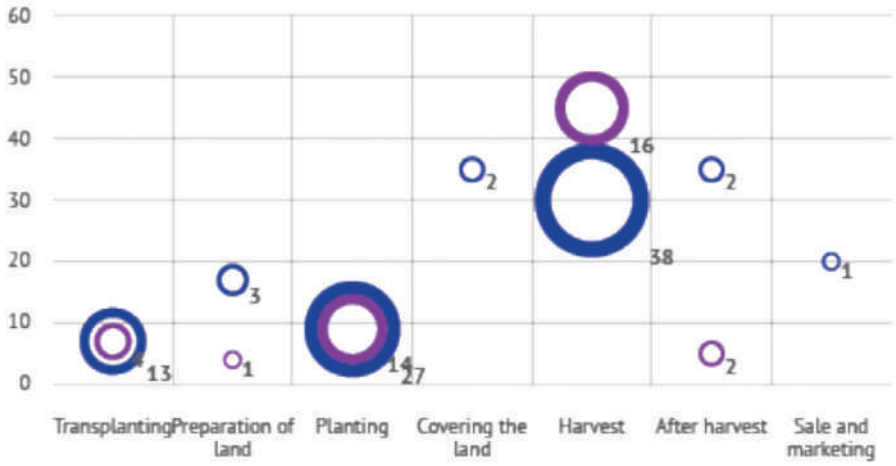
| Age | Tobacco farmers | | | | Former tobacco farmers | | Never tobacco farmers | |
|---|---|---|---|---|---|---|---|---|
| | Tobacco | | Nontobacco | | Nontobacco | | | |
| | Male | Female | Male | Female | Male | Female | Male | Female |
| <15 | 207.5 | 1,800 | 8 | 400 | 90 | n/a | 10 | n/a |
| 15–20 | 1,278 | 1,260 | 120 | 150 | 144 | 750 | 135 | 112.5 |
| 21–35 | 1,230 | 1,152 | 336 | 396 | 800 | 700 | 270 | 600 |
| 36–60 | 1,536 | 1,350 | 808 | 730 | 900 | 990 | 1,540 | 1,500 |
| >60 | 1,455 | 1,155 | 912 | 740 | 1,200 | 960 | 1,200 | 960 |
| All | 1,400 | 1,260 | 640 | 640 | 1,000 | 900 | 1,260 | 1,080 |

A small number of households hire non - household workers to assist with tobacco cultivation. The hired laborers are adults. Farmers also hire labor to work on agricultural tasks. Table 23 presents theaverage days of hired labor by gender and by specific tasks. The table illustrates that non-household workers are most commonly hired for planting, transplanting, harvesting, and after harvest activities. For example, the average household hires males for 45 days and females for 30 days for the harvest. On average, females are also hired for 35 days for covering the land, for 35 days after the harvest, and for 17 days for preparation of land (laborers are typically hired by the day, not the hour). The average tobacco farming household is also more likely to hire female farmers, who work longer hours than male farmers, except for harvesting.

**Table 23.** Hired labor for tobacco farming by gender – days (average)

| Activity | Adult male | | Adult female | |
|---|---|---|---|---|
| | Days | Valid N | Days | Valid N |
| Transplanting | 7 | 4 | 7 | 13 |
| Preparation of land | 4 | 1 | 17 | 3 |
| Planting | 9 | 14 | 9 | 27 |
| Covering the land | n/a | 0 | 35 | 2 |
| Harvest | 45 | 16 | 30 | 38 |
| After harvest | 5 | 2 | 35 | 2 |
| Sale and marketing | n/a | 0 | 20 | 1 |

**Figure 6.** Hired labor for tobacco farming by gender – days (average)




**Blue bubble** – adult female, **purple bubble** – adult male

**Note:** Bubble size is the number of non-missing cases that ever reported a value. For adult males, no values were reportedfor covering the land and sales and marketing.

Due to the exceptional labor-intensive nature of tobacco growing, tobacco farming incurs high opportunity costs. Recent studies have found that: by dedicating so many hours to tobacco production many farmers miss out on economic opportunities and/or human capital development, such as investing time in other economic pursuits and/or their education.[43]

Following the example of previous research on the economics of tobacco growing,[44] the average hired, and household (opportunity) costs are calculated for the surveyed current, former, and never tobacco farmers, and results are provided in Table 24. For the current tobacco farmers, the value of labor between tobacco and nontobacco crops is also broken down. Evidently, current

[43] The Tobacco Atlas, Available at: Growing | Tobacco Atlas

[44] Chavez, Jenina Joy, Jeffrey Drope, Qing Li, and Madeiline Joy Aloria. 2016. "The Economics of Tobacco Farming in the Philippines." Quezon City. http://aer.ph/industrialpolicy/wpcontent/uploads/2016/09/REPORT-The-Economics-of- Tobacco-Farming-in-thePhilippines-LAYOUT.pdf; Goma, Fastone, Jeffrey Drope, Mr Richard Zulu, Ms Qing Li, Grieve Chelwa, Ronald Labonté, and Mr Johnny Banda. 2017. "The Economics of Tobacco Farming in Zambia." Lusaka. https:// www.cancer.org/content/dam/cancer-org/research/economic-and-healthy-policy/ economics-tobacco-farming-zambia- 2017.pdf; Makoka, Donald, Jeffrey Drope, Adriana Appau, Ronald Labonte, Qing Li, Fastone Goma, Richard Zulu, Peter Magati, and Raphael Lencucha. 2017. "Costs, Revenues and Profits: An Economic Analysis of Smallholder Tobacco Farmer Livelihoods in Malawi." Tobacco Control 26 (6): 634–40. https://doi.org/10.1136/tobaccocontrol-2016-053022; Sahadewo, Gumilang Aryo, Roberto Magno Iglesias, Edson Correia Araujo, Nigar Nargis, Pandu Harimurti, Jeffrey Drope, Qing Li, Josefine Durazo, Firman Witoelar, and Bondan Supraptilah Sikoki. 2018. "The Economics of Tobacco Taxation andEmployment in Indonesia: Health Population and Nutrition Global Practice." Washington D.C.: World Bank Group. http://documents.worldbank.org/curated/en/919961507699751298/health -population-and-nutrition-global-practice

tobacco farmers rely more on household labor than on hired labor, and the incurred opportunity costs related to household labor therefore exceed the labor costs for hired workers. This applies both to tobacco and nontobacco crops. The average labor costs (household and hired labor combined) borne by tobacco farmers for tobacco farming are significantly higher than labor costs for non-tobacco farming. In both regions where data are available on former tobacco farmers' labor costs, the amount of tobacco farmers' labor dedicated to tobacco exceeds the amount former and never tobacco farmers dedicate to their crops. On top of that, the current tobacco farmers also allocate around a third of that amount to their nontobacco crops. However, this is due to the large household labor costs. Current tobacco farmers bear lower hired labor costs for tobacco growing compared to former and never tobacco farmers for their crops.

**Table 24.** Average household and hired labor costs (USD) for current and former tobacco farmers,by region

Current tobacco farmer

| Region | Tobacco | | | | Nontobacco | | | |
|---|---|---|---|---|---|---|---|---|
| | Hired labor | Valid N | Household labor | Valid N | Hired labor | Valid N | House-holdlabor | Valid N |
| Pelagonia (N=445) | 1,605.96 | 54 | 9,247.11 | 248 | 493.09 | 13 | 3,167.93 | 89 |
| Southeast (N=43) | 562.55 | 5 | 13,335.38 | 39 | 1,701.82 | 1 | 4,336.09 | 7 |
| Total (N=489) | 1,517.53 | 59 | 9,806.8 | 288 | 579.44 | 14 | 3,253.11 | 96 |

Former tobacco farmer

| Region | Nontobacco | | | |
|---|---|---|---|---|
| | Hired labor | Valid N | Household labor | Valid N |
| Pelagonia (N=121) | 1,525.33 | 6 | 3,535.84 | 46 |
| Southeast (N=31) | 2,363.64 | 4 | 4,980.11 | 23 |
| Total (N=152) | 1860.65 | 10 | 4017.25 | 69 |

Never tobacco farmer

| Region | Nontobacco | | | |
|---|---|---|---|---|
| | Hired labor | Valid N | House-holdlabor | Valid N |
| Pelagonia (N=49) | 378.18 | 15 | 3,830.16 | 19 |
| East (N=28) | 2,949.82 | 6 | 1,334.31 | 20 |
| Southeast (N=88) | 4,526.24 | 19 | 6,602.45 | 63 |
| Total (N=165) | 2,734.25 | 40 | 5,053.07 | 102 |

Cultivation of crops incurs significant costs for farmers, especially labor. This applies for both tobacco and nontobacco farmers, but labor costs are more pronounced for tobacco growing. Table 25 presents the mean of sales, subsidies, and each major cost for tobacco and nontobacco crops. Once household labor costs are accounted for (as opportunity costs), mean costs exceed mean sales revenue. Household labor costs are almost as high as sales for nontobacco crops and are 1.6 times the value of sales for tobacco growing. This is attributable to the higher labor intensity of tobacco farming. However, if subsidies are included, then household labor costs for tobacco are 1.2 times the amount of revenue coming from sales and subsidies. This indicates the substantial government support to tobacco farmers. The number of observations varies across items because not all farmers incur every cost (for example, most of the farmers own their land), and not all farmers provided answers for eachcost or for their revenues.

**Table 25.** Average costs of farming (USD) of current tobacco farmers

| Variable | Mean | Observation |
|---|---|---|
| **Shared cost** | | |
| Depreciation | 259.13 | 32 |
| Rent | 322.13 | 112 |
| Nontobacco crop | | |
| Sales | 3,982.29 | 78 |
| Nontobacco subsidies | 781.09 | 30 |
| Hired labor cost | 579.44 | 14 |
| Household labor cost | 3,253.11 | 96 |
| Input cost | 262.73 | 6 |
| **Tobacco** | | |
| Sales | 5,954.01 | 450 |
| Subsidies | 2,161.33 | 447 |
| Hired labor cost | 1,517.53 | 59 |
| Household labor cost | 9,806.80 | 288 |
| Input cost | 679.98 | 291 |
| Levies | 65.45 | 5 |

## 5.3. Profits

Tobacco is a labor- and input-intensive crop that causes health and environmental harms, including endangering food security by diverting scarce land for tobacco cultivation, all while tobacco farmers struggle to make a living.[45] For many farmers, the earnings from tobacco barely cover or fail to cover their costs. This section presents and compares calculations of the "perceived" and "real" profits for current, former, and never tobacco farmers. Perceived profits are calculated in the following way: (tobacco sales + tobacco subsidies) – tobacco farming non-household labor input costs.[46] In order to account for the opportunity costs of household labor engaged in tobacco production, real profits are also calculated: (tobacco sales + tobacco subsidies) – (tobacco farming nonlabor input costs + tobacco farming household labor input costs).

First, Table 26 presents the results for median profits per hectare. Per-hectare profit is profit divided by total cultivated land for tobacco farming. Most farmers cultivate small tobacco fields. In fact, most tobacco-growing operations are small family farms, averaging less than one (1) hectare, as in many low- and middle-income countries, where family members are an integral part of the labor force. In North Macedonia agricultural holdings dedicated to tobacco production are generally small—around three quarters of one (1) hectare or smaller. Hence, some of the numbers will seem to be of a large (usually negative) magnitude, but readers should take into account that the majority of households cultivate only part of a hectare. Recent studies on tobacco farming in other countries also indicate a low profitability for most smallholder tobacco farmers.[47]

The results in Table 26 show that current tobacco farmers' median perceived profits per hectare from tobacco are higher than perceived profits from nontobacco crops, while real profits from tobacco are negative. The median perceived profit from growing tobacco is USD 7,022.7 per hectare, while the median real profit is USD –980.0.

Nontobacco crops are also compared for current, former, and never tobacco farmers. Former and never tobacco farmers' perceived profits per hectare are higher than the perceived profits per hectare from nontobacco crops by current tobacco farmers; but once costs are accounted for the real profits from nontobacco crops are higher for current tobacco farmers. For the current tobacco farmers, their median perceived profit for their nontobacco crops is USD 2,561.4/hectare, while the median real profit is USD 604.2. For former tobacco farmers, the median perceived profit is USD 4,045.5, while the median real profit is USD 472.1. In addition, for never tobacco farmers the median perceived profit is USD 5,654.7, while the median real profit is USD 390.8. These results suggest that the agricultural activities of the median current tobacco farmer in growing other crops are more profitable than the median former or never tobacco farmer. Considering average values, on the other hand, never tobacco farmers seem to earn the highest average profit from nontobacco crops.

45 World Health Organization, Tobacco Cultivation, Available at: Fact_Sheet_TFI_2014_EN_15314.pdf (who.int)

46 Direct nonlabor expenses including physical inputs (such as fertilizer, pesticides, and equipment), hired labor, marketing expenses, and transportation.

47 Chavez, Jenina Joy, Jeffrey Drope, Qing Li, and Madeiline Joy Aloria. 2016. "The Economics of Tobacco Farming in the Philippines." Quezon City. http://aer.ph/industrialpolicy/wpcontent/uploads/2016/09/REPORT-The-Economics-of- Tobacco-Farming-in-thePhilippines-LAYOUT.pdf; Goma, Fastone, Jeffrey Drope, Mr Richard Zulu, Ms Qing Li, Grieve Chelwa, Ronald Labonté, and Mr Johnny Banda. 2017. "The Economics of Tobacco Farming in Zambia." Lusaka. https:// www.cancer.org/content/dam/cancer-org/research/economic-and-healthy-policy/ economics-tobacco-farming-zambia- 2017.pdf; Makoka, Donald, Jeffrey Drope, Adriana Appau, Ronald Labonte, Qing Li, Fastone Goma, Richard Zulu, Peter Magati, and Raphael Lencucha. 2017. "Costs, Revenues and Profits: An Economic Analysis of Smallholder Tobacco Farmer Livelihoods in Malawi." Tobacco Control 26 (6): 634–40. https://doi.org/10.1136/tobaccocontrol-2016-053022; Sahadewo, Gumilang Aryo, Roberto Magno Iglesias, Edson Correia Araujo, Nigar Nargis, Pandu Harimurti, Jeffrey Drope, Qing Li, Josefine Durazo, Firman Witoelar, and Bondan Supraptilah Sikoki. 2018. "The Economics of Tobacco Taxation andEmployment in Indonesia: Health Population and Nutrition Global Practice." Washington D.C.: World Bank Group. http://documents.worldbank.org/curated/en/919961507699751298/health -population-and-nutrition-global-practice

**Table 26.** Median profits per hectare (USD) – former, current, and never farmers

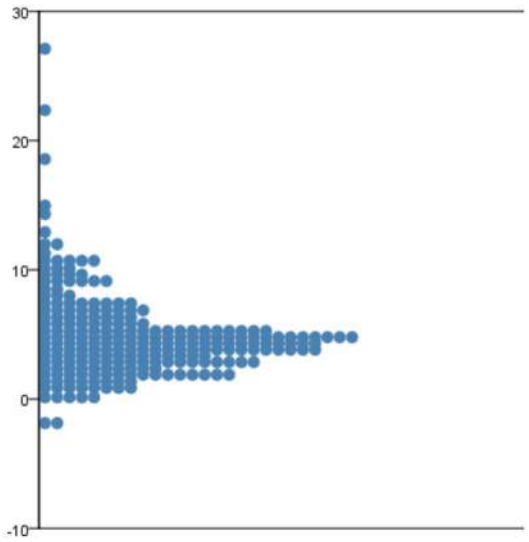
| | Tobacco | | | | Nontobacco | | | |
|---|---|---|---|---|---|---|---|---|
| | Perceived | | Real | | Perceived | | Real | |
| | Median | Valid N | Median | Valid N | Median | Valid N | Median | Valid N |
| Current | 7,022.73 | 275 | -987.98 | 331 | 2,561.39 | 15 | 604.20 | 60 |
| Former | n/a | 0 | n/a | 0 | 4,045.46 | 15 | 472.11 | 48 |
| Never | n/a | 0 | n/a | 0 | 5,654.73 | 33 | 390.77 | 86 |
| Total | 7,022.73 | 275 | -987.98 | 331 | 2,901.48 | 1563 | 479.62 | 194 |

Average profits per hectare (USD) – former, current, and never farmers

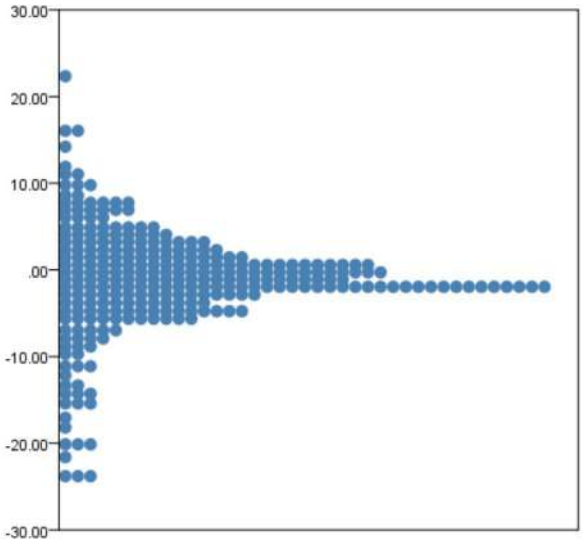
| | Tobacco | | | | Nontobacco | | | |
|---|---|---|---|---|---|---|---|---|
| | Perceived | | Real | | Perceived | | Real | |
| | Average | Valid N | Average | Valid N | Average | Valid N | Average | Valid N |
| Current | 8,034.72 | 275 | -725.84 | 331 | 2,857.81 | 15 | -84.25 | 60 |
| Former | n/a | 0 | n/a | 0 | 4,249.05 | 15 | -1,073.41 | 48 |
| Never | n/a | 0 | n/a | 0 | 9,651.04 | 33 | 393.81 | 86 |
| Total | 8,034.72 | 275 | -725.84 | 331 | 6,747.42 | 63 | -117.07 | 194 |

Around half of tobacco farmers are not turning a real profit. Figure 7 depicts the distribution of perceived and real profits per hectare from tobacco farming. Current tobacco farmers achieve positive perceived profits, with only a few households showing negative perceived profits. However, around half of the tobacco-farming households achieve negative real profits. This points to the extremely high labor intensity of tobacco farming and the substantial engagement of household labor in these activities.

**Figure 7.** Distribution of profit per hectare for tobacco farming (USD)




Perceived profit




Real profit

Next, the median tobacco-growing profits per hectare are compared across regions, analyzing tobacco and nontobacco profits separately. There is a larger variation in median real profits across regions than in median perceived profits, probably mainly due to the difference in hours allocated by household labor to cultivation. The perceived profits from both tobacco and nontobacco crops are somewhat higher in the Southeast region, but the real profits are lower. This could be attributable tothe larger number of hours reported by household members to cultivate tobacco leaf and other crops.

**Table 27.** Median profit (USD) per hectare for current tobacco farmers by region

| | Tobacco | | | | Nontobacco | | | |
|---|---|---|---|---|---|---|---|---|
| | Perceived | | Real | | Perceived | | Real | |
| Region | Median | Valid N | Median | Valid N | Median | Valid N | Median | Valid N |
| Pelagonia | 6,975.75 | 249 | -226.70 | 300 | 2,561.39 | 13 | 694.47 | 55 |
| Southeast | 8,845.46 | 25 | -6,919.46 | 30 | 1,614.38 | 2 | -2,209.70 | 5 |
| Total | 7,022.73 | 275 | -987.98 | 331 | 2,561.39 | 15 | 604.20 | 60 |

As noted earlier, most tobacco farmers cultivate small fields of less than a hectare, and median profits per hectare may not be a meaningful metric. Therefore, a more relevant measure of profit is calculated, median profits per kilogram of tobacco. Moreover, tobacco subsidies are awarded per kilogram of tobacco leaf, increasing the significance of measuring profit per kilogram of tobacco. Theresults are presented in Table 28. The median perceived profits per kilogram are positive in the two regions (higher in the Southeast region), and real profits for tobacco are negative in both regions. The results also indicate that more tobacco household labor is used in the Southeast region, because the median perceived profit is higher, and the median real profit is lower than in Pelagonia. The perceived per-kilogram profits for nontobacco crops are positive in the Pelagonia and the Southeast regions. Real per-kilogram median profit for nontobacco crops, on the other hand, is positive only in the Pelagonia region and negative in the Southeast region, indicating again higher household labor costs. In general, median real tobacco profit is negative, whereas median nontobacco profit is positive (almost all observations are from the Pelagonia region).

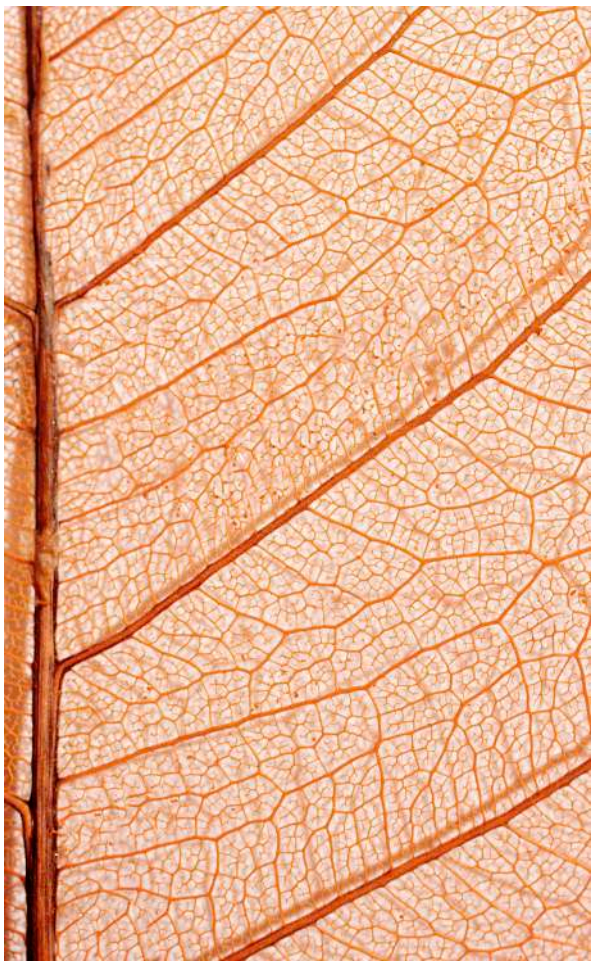
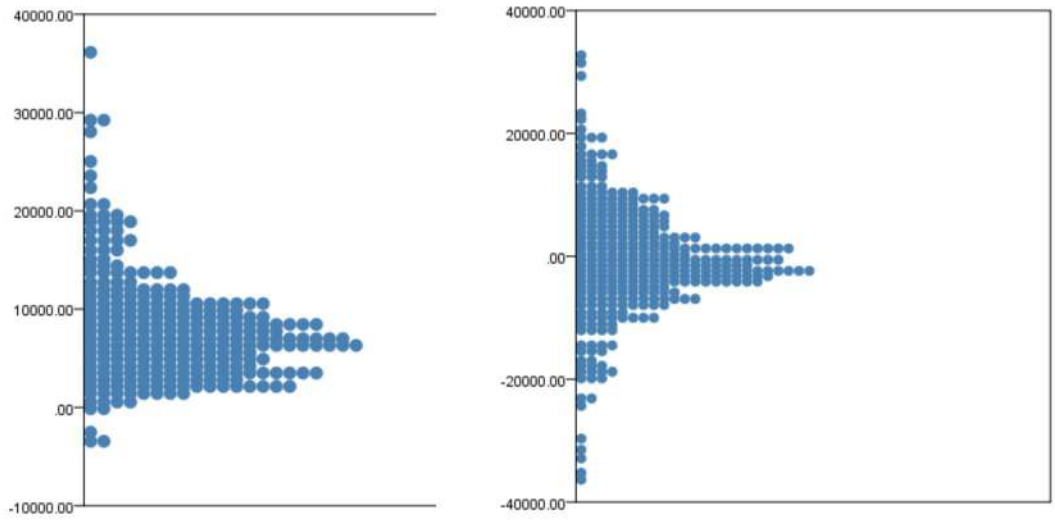


**Table 28.** Current tobacco farmer median profits per kilogram (USD) by region

| | Tobacco | | | | Other crops | | | |
|---|---|---|---|---|---|---|---|---|
| | Perceived | | Real | | Perceived | | Real | |
| Region | Median | Valid N | Median | Valid N | Median | Valid N | Median | Valid N |
| Pelagonia | 4.31 | 212 | -0.54 | 257 | 0.23 | 13 | 0.09 | 55 |
| Southeast | 5.01 | 25 | -4.48 | 29 | 0.21 | 2 | -0.09 | 4 |
| Total | 4.36 | 238 | -1.01 | 287 | 0.23 | 15 | 0.06 | 59 |

There is a noticeable variation in profit per kilogram from tobacco cultivation. Figure 8 depicts the distribution of the real and perceived profits per kilogram for both tobacco and non-tobacco crops for current tobacco farmers. Perceived tobacco profit is almost exclusively positive, whereas there is a wider variation in the real tobacco profit, with the majority of observations in the range somewhere between -5 and 5 USD/kg. The modal real profit is slightly below zero. The situation is quite different in terms of nontobacco profit. There is a wide variation of perceived profit (all positive, but smaller than for tobacco), whereas real profits were concentrated around zero.

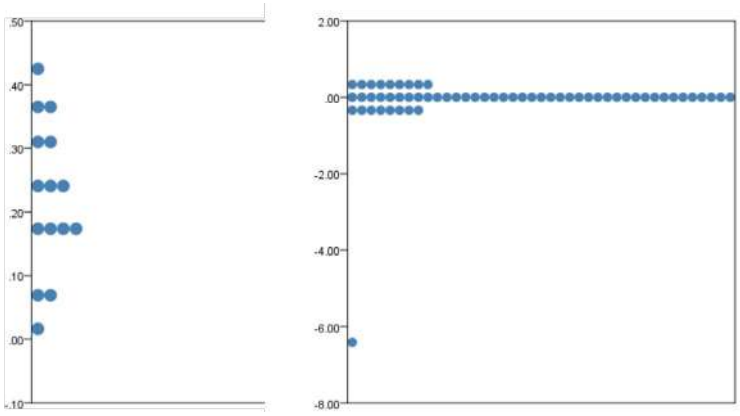
**Figure 8.** Distribution of tobacco profits per kilogram for current tobacco farmers (USD)




Perceived profit

Real profit

**Figure 9.** Distribution of nontobacco profits per kilogram for current tobacco farmers (USD)




Perceived profit Real profit

Former and never tobacco farmers mostly report positive perceived profit per kilogram and positive, though extremely small, real profit. These results are presented in Table 29. Analyzed by regions, the median perceived profits per kilogram are positive in all regions. The highest perceived profit per kilogram was reported in the Southeast region. For the median real profits, on the other hand, this isthe only region with reported negative values. Again, the large difference between perceived and real profits implies that household labor costs are higher in this region compared to the other two regions.However, compared to the current tobacco farmers' profitability (Table 28), the losses for former andnever tobacco farmers are similar in magnitude to the losses in profit for current tobacco farmers for nontobacco crops and smaller compared to the losses from tobacco crops. This suggests again the high labor intensity of tobacco cultivation.

**Table 29.** Former and never tobacco farmer median nontobacco profits per kilogram (USD) byregion

| | Former | | | | Never | | | |
|---|---|---|---|---|---|---|---|---|
| | Perceived | | Real | | Perceived | | Real | |
| Region | Median | Valid N | Median | Valid N | Median | Valid N | Median | Valid N |
| Pelagonia | 0.18 | 8 | 0.1 | 24 | 0.2 | 10 | 0.12 | 15 |
| Southeast | 0.23 | 6 | -0.22 | 23 | 0.34 | 17 | -0.02 | 54 |
| Total | 0.23 | 14 | 0.03 | 47 | 0.24 | 32 | 0.05 | 84 |

In addition to the analysis of the median perceived and real profit per kilogram of former and never tobacco farmers, the distribution of their real and perceived profits per kilogram is presented in figures 10 and 11. A similar distribution is registered between the perceived profits of former tobacco farmers per kilogram compared to the distribution of nontobacco farming profits of current tobacco farmers presented above in Figure 9 (the variation in tobacco farming profits is tighter), while there is a marginally wider distribution of perceived profits of never tobacco farmers. Again, all perceived profit is positive. Regarding the real profits, most of the profits of former tobacco farmers are concentrated around zero, with a far tighter distribution than for tobacco farming profits and somewhat wider than the distribution of nontobacco profits of current tobacco farmers. The distribution of never tobacco farmers' real profits is quite similar to the distribution of nontobacco farming profits of current tobacco farmers.

Figure 10. Distribution of nontobacco profits per kilogram for former tobacco farmers (USD)

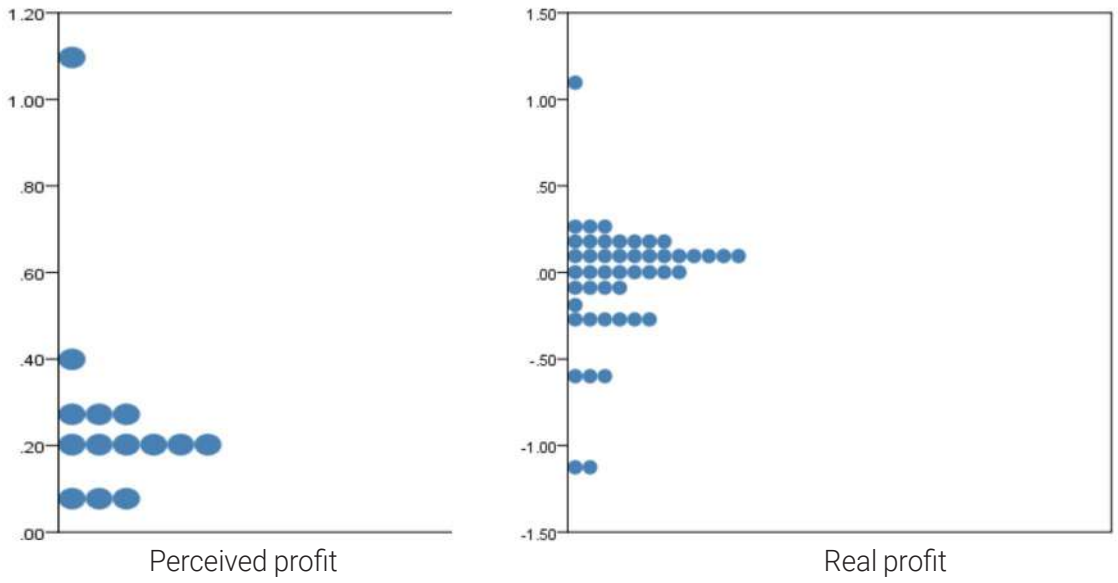
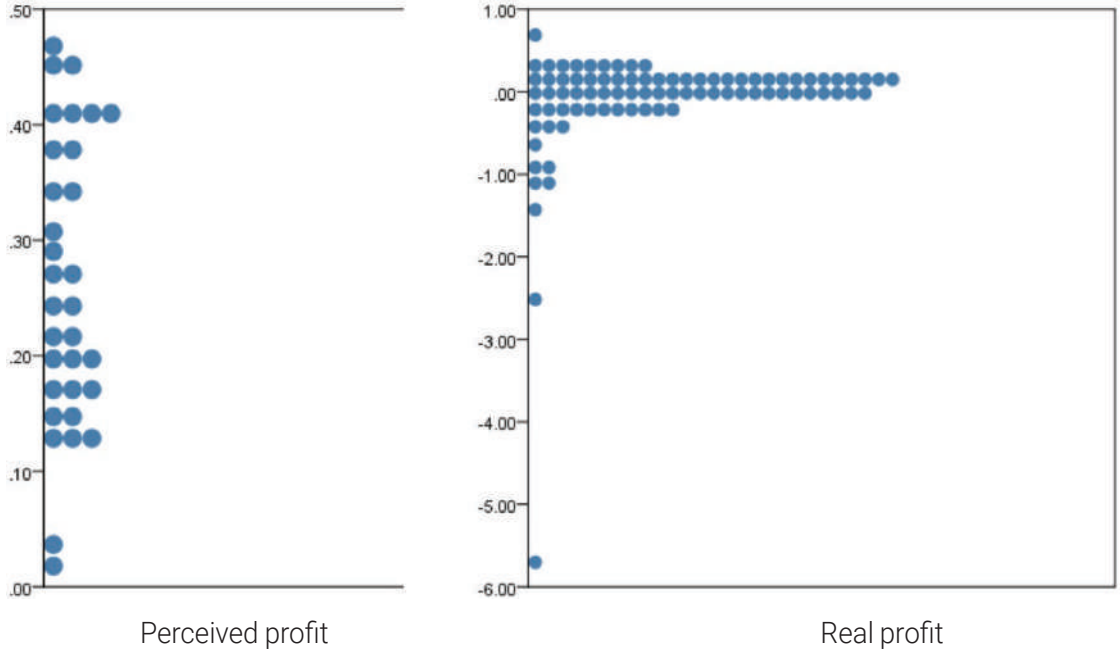


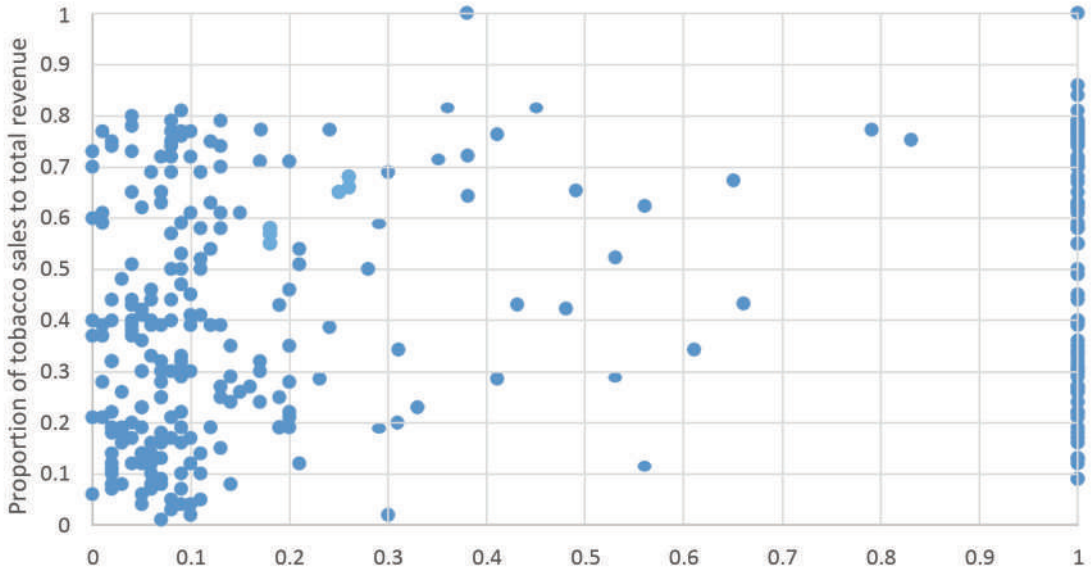

Figure 11. Distribution of nontobacco profits per kilogram for never tobacco farmers (USD)




A comparison is also made between current tobacco farmers' share of total costs dedicated to tobacco growing and the share of revenues that come from selling tobacco leaf. Figure 12 plots these two variables, with the share of total costs (both labor and nonlabor) spent on tobacco farming on the X- axis and the tobacco sales share of total household revenue on the Y-axis. Although tobacco farmers often grow other crops either for their own consumption or for sale, the livelihood of many tobacco farmers depends on tobacco crops. A large proportion of tobacco farmers allocate their resources almost exclusively to growing tobacco, but there is also an even greater proportion of farmers who dedicate a significant part of their resources to other crops.

There is a wide variation in the share of tobacco sales in total revenues for the farmers who grow only tobacco. This can be attributed to the different share of other revenue sources, such as remittances or wages. It is noteworthy, though, that this figure only takes into account the tobacco sales revenue and does not include the subsidy, which is by far the most generous for tobacco compared to other crops. The tobacco subsidy is granted to tobacco farmers per kilogram of delivered dry tobacco leaf and accounts for approximately one quarter of the value per kilogram of tobacco leaf,[48] or it is one- third of the purchase price. However, it is of importance to analyze the share of tobacco sales in total revenue, since in the future, as an EU candidate country, North Macedonia will need to shift away from this type of subsidy.

**Figure 12.** Share of tobacco farming costs versus share of total revenue




## 5.4. Credit and debt

The majority of surveyed farmers do not rely on loans to finance their tobacco-farming activities. Out of 489 tobacco farmers, only 48 or 9.8 percent report needing credit. This percentage is 5.3 percent for former tobacco farmers (8 out of 152 farmers) and 10.9 percent for never tobacco farmers (18 out of 165 farmers). The number of farmers who applied for credit in the last 12 months is low: 10 (2.0 percent) for current farmers, four (2.6 percent) for former farmers and seven (4.2 percent) for nevertobacco farmers. Out of 10 current farmers who applied for credit, seven farmers manage to obtain it (70 percent). Out of seven never tobacco farmers, five were given credit (71.4 percent). Although tobacco farming is particularly input-intensive, the farmers probably cover their financing needs with tobacco revenues and other income (as noted earlier, farmers report a large share of other income).

It is worth noting that these numbers are particularly small for drawing substantial conclusions. For former tobacco farmers this rate is lower (50 percent), or two out of four farmers were granted a loan. Nevertheless, based on the obtained data, Table 30 presents the reasons reported by farmers for needing loans. Although around half of tobacco farmers report needing loans for buying inputs, they also report many reasons beyond inputs. Buying a house or a vehicle were also reported as reasons by current farmers, while medical expenses were an important reason for former and current farmers. Never farmers require loans for land and assets for growing another culture and for meeting their daily needs.

**Table 30.** Reasons reported for needing loans

| | Current | | Former | | Never | |
|---|---|---|---|---|---|---|
| | N | percent | N | Percent | N | percent |
| Assets for growing tobacco | 11 | 52.38 | 0 | 0.00 | 0 | 0.00 |
| Land for growing tobacco | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Assets for growing other culture | 0 | 0.00 | 0 | 0.00 | 1 | 20.00 |
| Land for growing other culture | 0 | 0.00 | 0 | 0.00 | 1 | 20.00 |
| Schooling | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Buying a house | 1 | 4.76 | 0 | 0.00 | 0 | 0.00 |
| Buying a vehicle | 2 | 9.52 | 0 | 0.00 | 0 | 0.00 |
| Investing in business | 1 | 4.76 | 0 | 0.00 | 0 | 0.00 |
| Special events | 1 | 4.76 | 0 | 0.00 | 0 | 0.00 |
| Daily needs | 1 | 4.76 | 0 | 0.00 | 1 | 20.00 |
| Medical expenses | 2 | 9.52 | 1 | 33.33 | 0 | 0.00 |
| Other | 2 | 9.52 | 2 | 66.67 | 2 | 40.00 |
| Total | 21 | 100 | 3 | 100 | 5 | 100 |

## 5.5. Other crop growing

All three categories of farmers (current, former, and never tobacco farmer) cultivated a wide varietyof crops. Out of them, never tobacco farmers grew a far wider variety than the other two categories of farmers and current tobacco farmers appear to have the least diversified farming portfolio. Table

31 presents the proportion of current, former, and never tobacco farmers growing common nontobacco crops in the country in order to sell. Never tobacco farmers have the broadest portfolio (19 different cultures reported), followed by former tobacco farmers (17 cultures reported). Current tobacco farmers have the least diversified crop portfolio, with reported 14 different cultures. This suggests that abandoning tobacco farming leads to increasing the range of crops grown.

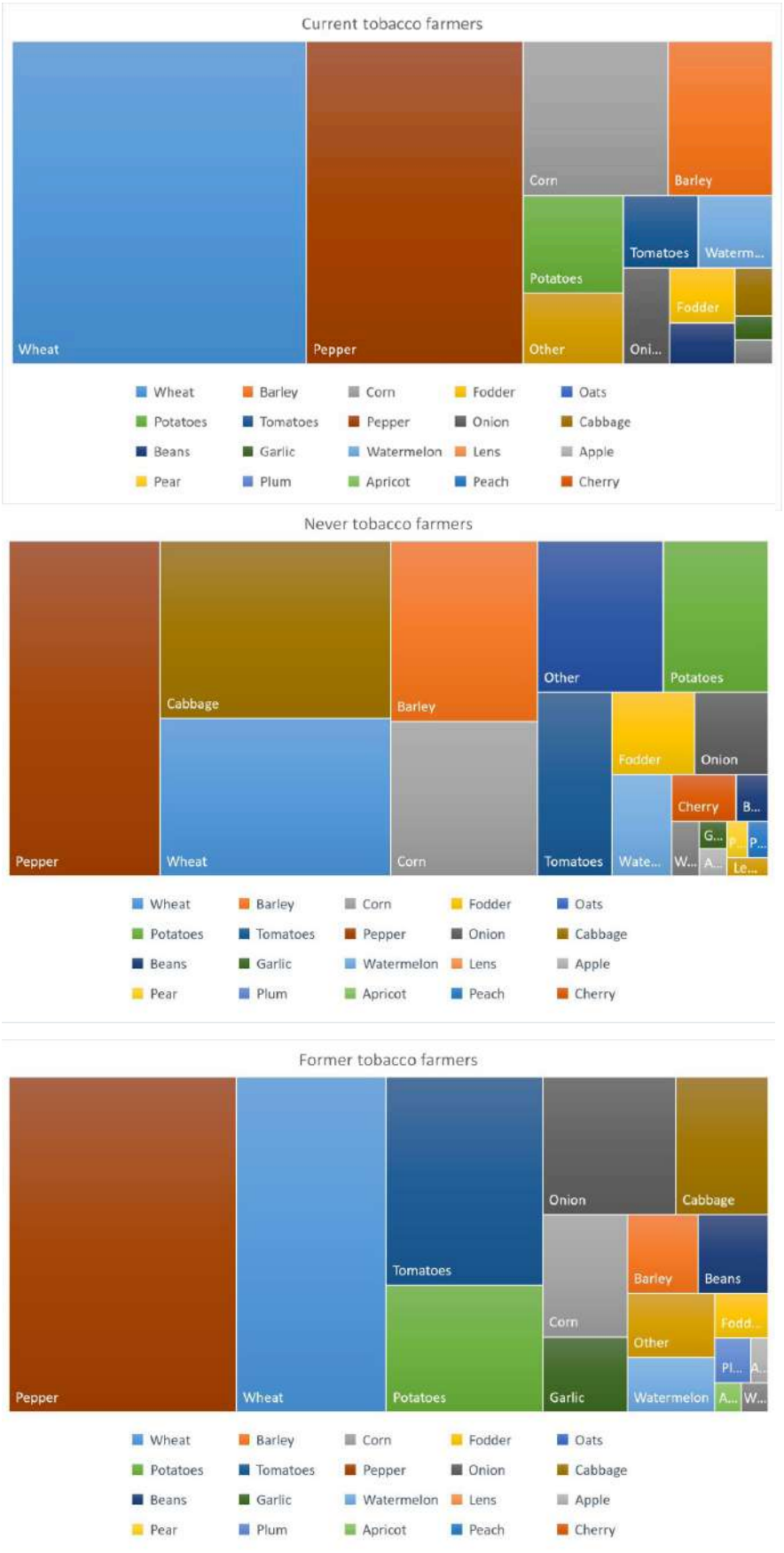
Some of the most common crops grown by all three categories are barley, cabbage, corn, onion, pepper, potatoes, and wheat. Never tobacco farmers cultivate the broadest cross-section of nontobacco crops. Some crops that are not very common with current and former farmers are cultivated by a majority of or all never farmers (such as garlic, legumes, walnut, and apples).

Comparing current and former tobacco farmers, it is clear that the diversification of their nontobacco production does not differ substantially. The only crops that are far more common for former farmersare barley and corn (and other no specified crops). Evidently, current tobacco farmers are growing asimilar cross-section of nontobacco crops with their former tobacco-farming counterparts, suggesting that farmers already have experience with cultivating other crops, and abandoning tobacco farming does not necessarily mean increasing the range of crops grown.

**Table 31.** Proportion of crop grown to sell (in percentage %)

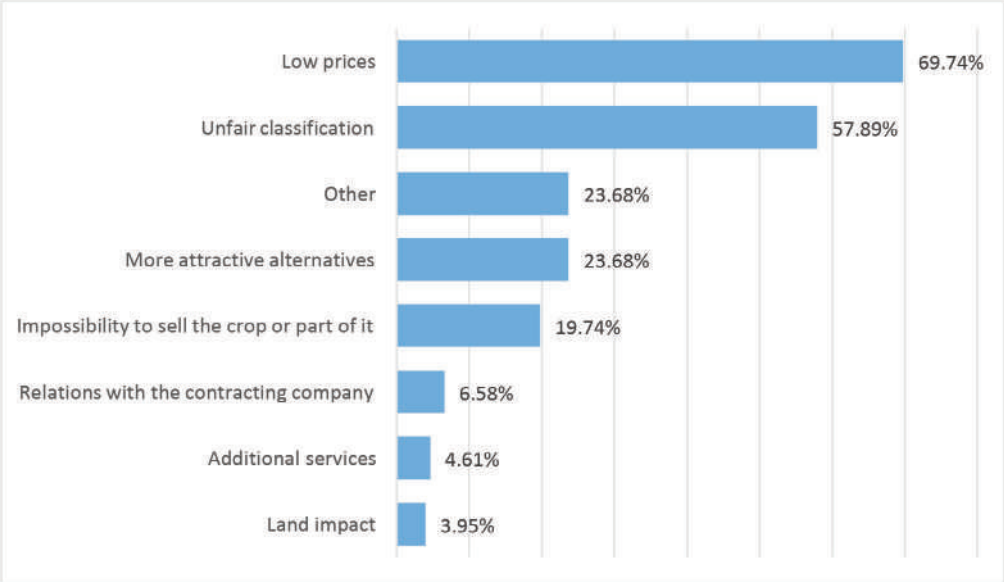
| Crop | Current | Former | Never |
|---|---|---|---|
| Apples | n/a | 0.00 | 100.00 |
| Apricot | n/a | n/a | n/a |
| Barley | 7.14 | 61.54 | 52.94 |
| Beans | 25.00 | 16.67 | 100.00 |
| Cabbage | 50.00 | 37.50 | 100.00 |
| Cherry | n/a | n/a | 100.00 |
| Corn | 58.82 | 66.67 | 55.56 |
| Fodder | 33.33 | 0.00 | 42.86 |
| Garlic | 0.00 | 0.00 | 100.00 |
| Legumes | 0.00 | n/a | 100.00 |
| Lens | n/a | n/a | n/a |
| Oats | n/a | n/a | n/a |
| Onion | 60.00 | 25.93 | 77.78 |
| Other | 28.57 | 40.00 | 58.33 |
| Peach | n/a | n/a | 100.00 |
| Pears | n/a | n/a | 100.00 |
| Pepper | 92.86 | 59.81 | 95.68 |
| Plums | n/a | 0.00 | n/a |
| Potatoes | 72.73 | 45.16 | 91.30 |
| Tomatoes | 28.57 | 15.38 | 88.00 |
| Walnut | n/a | 0.00 | 100.00 |
| Watermelon | 66.67 | 25.00 | 100.00 |
| Wheat | 79.23 | 77.36 | 77.11 |
| Total | 72.49 | 52.21 | 82.93 |

Figure 12a. Proportion of crops grown to sell by current, former, and never tobacco farmers



Further analyses of the reasons for former tobacco farmers to switch to growing other crops reveals **a** variety of reported reasons including low prices, unfair classification (grading), and more attractive alternatives. Figure 13 presents the main reasons provided by former tobacco farmers for shifting away from tobacco farming. The main reason stated for switching away from tobacco leaf production is the low prices they receive for their product (69.7 percent of respondents). The second major explanation is unfair grading of their tobacco leaves (57.89 percent) – this has repeatedly been a subject of dissatisfaction for tobacco farmers. As noted above, in the survey, the number of farmers that state they are satisfied and the number of farmers that state they are not satisfied with the grade given to their tobacco is approximately the same. However, tobacco farmers in the country are not satisfied with the purchase price by type when the price of inputs and other living expenses increase.[49] This is confirmed by the greater number of surveyed farmers who are not satisfied with the amount received from tobacco sales (44 percent not satisfied versus 28 percent satisfied). Almost a quarter of respondents have switched to other more economically attractive alternatives, and the same percentage have switched due to other, no specified reasons. Almost 20[49] percent said that the inability to sell the crop or part of it discouraged them from continuing to grow tobacco.

**Figure 13.** Reasons given by former tobacco farmers for switching from tobacco




Note: N=152 The appendix below presents the logistic regression analysis of willingness to switch to alternative crops.

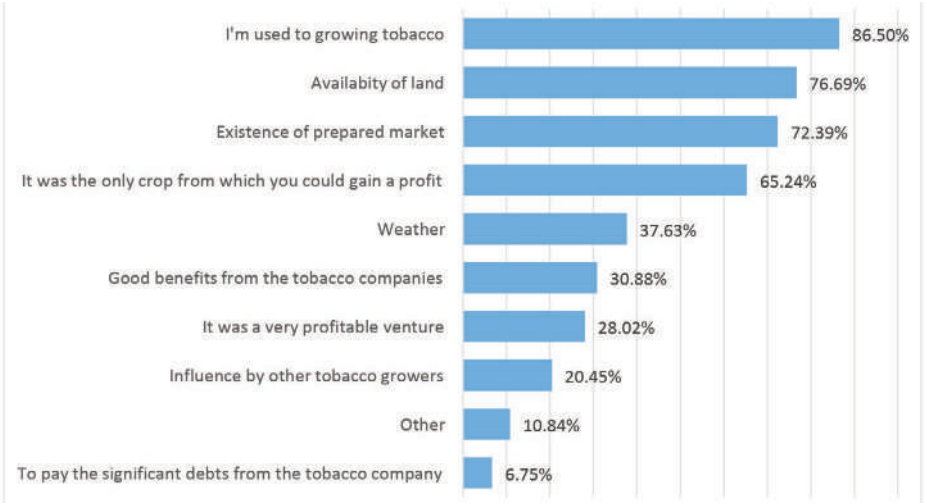
## 5.6. Why farmers continue to grow tobacco

The number one reason that farmers report for growing tobacco is tradition in growing tobacco: they are used to growing tobacco. This is in accordance with the fact that North Macedonia is a traditional tobacco-producing country, with many families cultivating tobacco for generations. Although the number is smaller than before, around 20,000 tobacco farmers still cultivate tobacco leaf in the country. Knowing the upcoming unavoidable need to comply with the requirements of the FCTC, to which North Macedonia is a Party—to reduce and reorient tobacco farming to other crops and livelihoods—and to the Common Agricultural Policy of the EU, the survey asked tobacco farmers their reasons for growing tobacco.[50] The results are presented in Figure 14.

The most common reason is that farmers are used to growing tobacco (86.5 percent). More than 70 percent of tobacco farmers also report that availability of land and the existence of a prepared market are important reasons for continuing to cultivate tobacco. Two-thirds of respondents see tobacco as the only crop from which they could gain a profit, but less than one-third perceive growing tobacco as a very profitable venture. For families that have traditionally grown tobacco, this is understandable, since switching to other crops is resource-demanding and sometimes skills-demanding, and the incentives provided by the government in terms of subsidies and a prepared market for tobacco leaf leaves them expecting a sure revenue, even if it is not large.

Importantly, 77 percent of tobacco farmers state that if the subsidies are taken away, they would stopgrowing tobacco.

**Figure 14.** Current tobacco farmers' reasons for growing tobacco




Note: N=489

# 6 FINANCIAL SUPPORT IN AGRICULTURE: *SUBSIDIES AS DIRECT PAYMENTS*

## 6.1. Tobacco subsidies – attitudes and satisfaction of tobacco farmers to subsidies

Tobacco farming subsidies usually come in the forms of input - based financial support, output - based cash payment, loans for purchasing inputs, and loans for purchasing agricultural machinery. These subsidies are intended to increase farmers' income and decrease their financial burden. Another potential function for farming subsidies is to promote and facilitate sustainability, which could help to address some of the challenges presented earlier with respect to environmental damage, impacts on food insecurity, and health harms related to tobacco farming.

There are few studies analyzing the impact of farming subsidies on sustainability. [51,52] Nevertheless, some evidence shows that if subsidies are implemented with the goal of agricultural sustainability, they can increase productivity and help to maintain long-term efficiency. [53] Government support can motivate farmers to work efficiently and increase their productivity, and one way to increase the efficiency is to transform into sustainable farming.[54] Studies show that subsidies can be used for sustainability, but only if they are specified for motivating sustainable agricultural policies.[55] Therefore, in order for tobacco subsidies to be efficient and produce results that further develop the agricultural sector, it is necessary to change the current subsidy policy.

51 Yi, F.; Sun, D.; Zhou, Y. Grain subsidy, liquidity constraints and food security—Impact of the grain subsidy program onthe grain-sown

51 Yi, F.; Sun, D.; Zhou, Y. Grain subsidy, liquidity constraints and food security—Impact of the grain subsidy program onthe grain-sown areas in China. Food Policy 2015,

52 Li, Y.; Westlund, H.; Liu, Y. Why some rural areas decline while some others not: An overview of rural evolution in the world. J. Rural Stud. 2019

53 Li, C.; Sha, Z.; Sun, X.; Jiao, Y. The Effectiveness Assessment of Agricultural Subsidy Policies on Food Security: Evidence from China's Poverty-Stricken Villages. Int. J. Environ. Res. Public Health 2022, 19, 13797. https://doi.org/10.3390/ ijerph192113797

54 Hemming D et al. Agricultural input subsidies for improving productivity, farm income, consumer welfare and wider growth in low- and lower-middle-income countries. Campbell Systematic Reviews 2018:4DOI: https://doi.org/10.4073/csr.2018.4

The process of direct payments (subsidies) in North Macedonia started in 2006. Direct payments in agriculture are a key tool for maintaining North Macedonian agricultural production. This type of direct financial assistance is essential for many farmers and complements their income, directly affecting the profitability of agricultural activity. For more than a decade, subsidies have been one ofthe key measures to support agricultural production by all governments in North Macedonia throughthe years, regardless of their political background.

As a major producer of tobacco leaf, North Macedonia's tobacco-farming activities have a significant impact on the tobacco market, not only domestically but also regionally. North Macedonia utilizes subsidies far more proportionally to the rest of the national agricultural sector and the broader economy than most other countries in the region. In 2020, the government spent €30 million on tobacco-farming subsidies. The government claims this measure is a major support of and helps to maintain competitiveness for farmers in the regional and global market.[56]

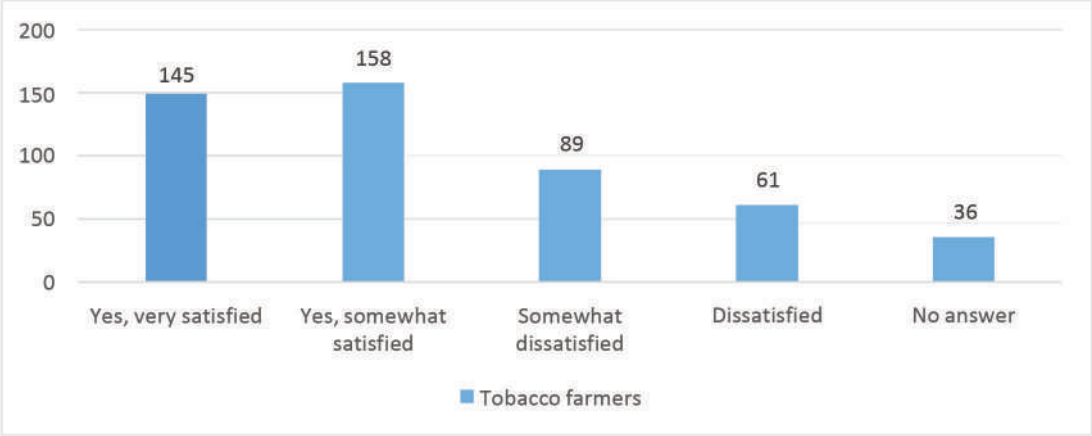
Key informants confirmed the crucial role of the subsidies in encouraging farmers to grow tobacco:

- *"Currently tobacco is profitable to grow, especially because of the subsidies that provide a cleanincome."* – President of the Tobacco Association "Golden List," Municipality of Dolneni
- *"Subsidies cover a large part of the income of tobacco growers and we look forward to themevery year."* – President of the Association of Farmers and Tobacco Producers

The problem here is in the constant increase of tobacco subsidies that motivates tobacco farmers to grow more tobacco to get more subsidies, despite not being certain they will be able to sell the produced quantity. Hence, the subsidies contribute to and exacerbate market distortions.

When asked about their level of satisfaction with the received amounts of tobacco subsidies, almost 62 percent of tobacco farmers express positive opinions (Figure 15).

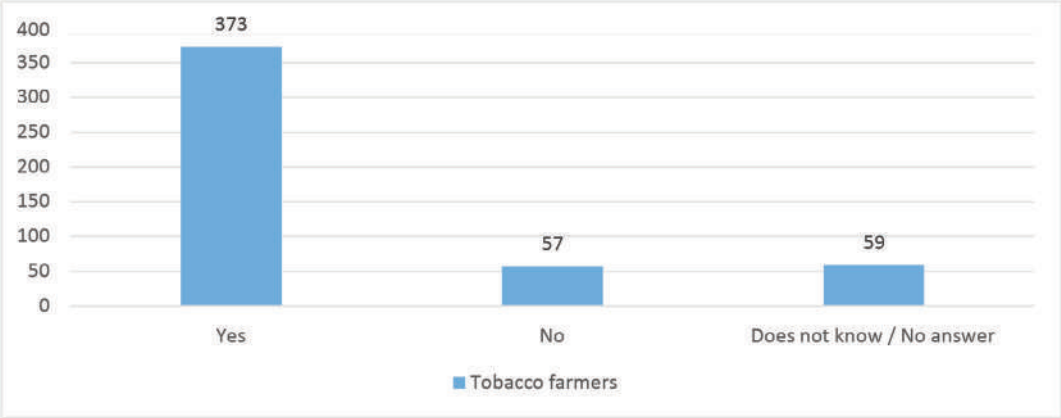
**Figure 15.** Satisfaction with received tobacco subsidies




[56] Tobacco Farming and the Effects of Tobacco Subsidies in North Macedonia, Hristovska Mijovic, B., Spasova Mijovic, T.,Trpkova-Nestorovska, M., Tashevska, B., Trenovski, B. & Kozeski, K., (2022).

Tobacco subsidies act as an encouragement for farmers to continue or increase efforts in tobacco cultivation. This is evident in Figure 16 below, where 77 percent of tobacco farmers say they would stop growing tobacco if they do not receive subsidies for it.

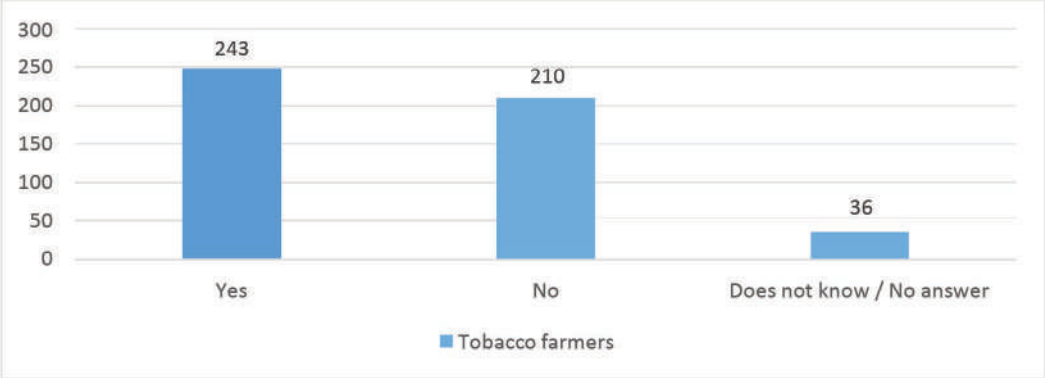
Figure 16. If the subsidies are taken away, would the tobacco farmer stop growing tobacco?




Note: Total number of tobacco farmers is 489.

On a similar note, 50 percent of tobacco farmers based their decisions to grow other crops upon the amounts of subsidies they receive for those crops (Figure 17).

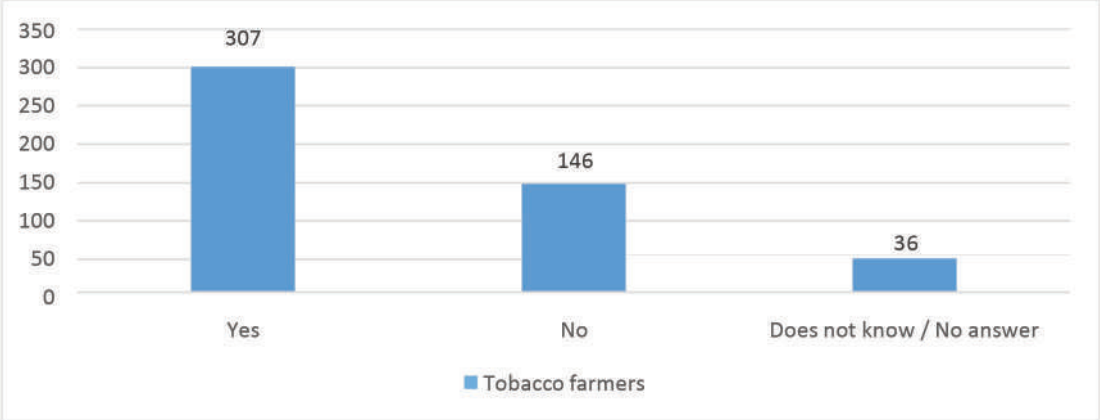
Figure 17. Do subsidies affect your decision to grow other crops?




Note: Total number of tobacco farmers is 489.

When asked about the price of tobacco, 307 out 489 (around 65 percent) answered that price is the main motivator for growing tobacco, while 30 percent of farmers do not consider price as a motivator(Figure 18).

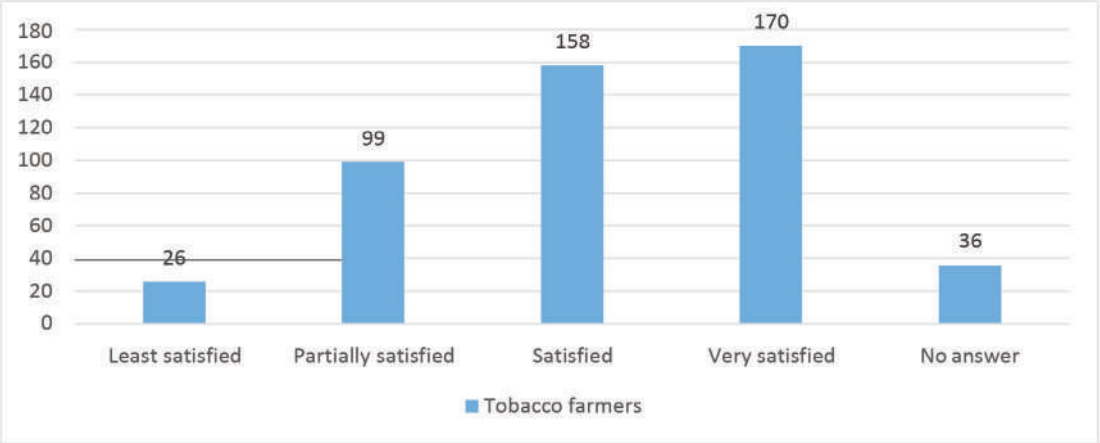
Figure 18. Does the price motivate you to grow tobacco?




Note: Total number of tobacco farmers is 489.

From Figure 19 it is evident that 87 percent of the tobacco farmers are generally satisfied with the process of administration of subsidies by the government.

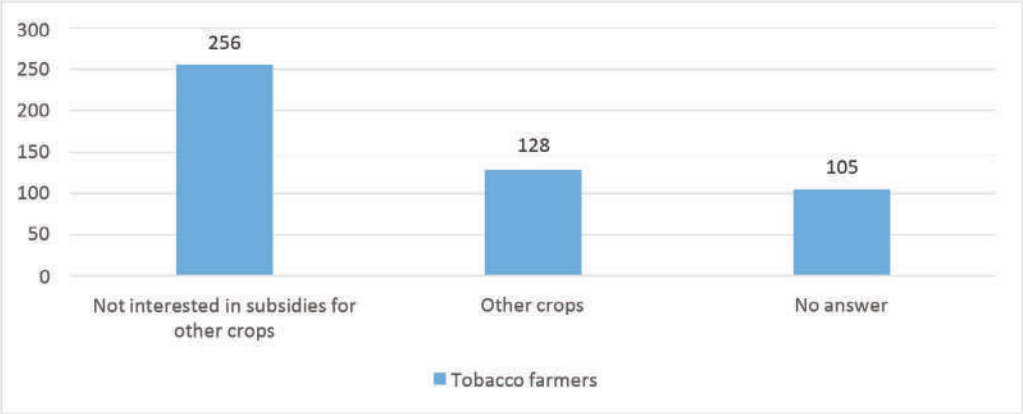
Figure 19. How well do you think the government distributes tobacco subsidies?




Note: Total number of tobacco farmers is 489.

Many countries and regions have been progressing towards phasing out tobacco subsidies in a systematic manner. At the same time, some countries consider alternative crops to replace tobacco. On the question about which crops, other than those being subsidized, they would like to be included in the subsidy, more than half of tobacco farmers (52 percent) answered they are not interested in subsidies for other crops, while 26 percent are interested in subsidies mostly for all other crops and vegetable crops (Figure 20 and Table 32).

**Figure 20.** Which crops, other than those being subsidized, would you like to be included in thesubsidy?




**Note:** Total number of tobacco farmers is 489.

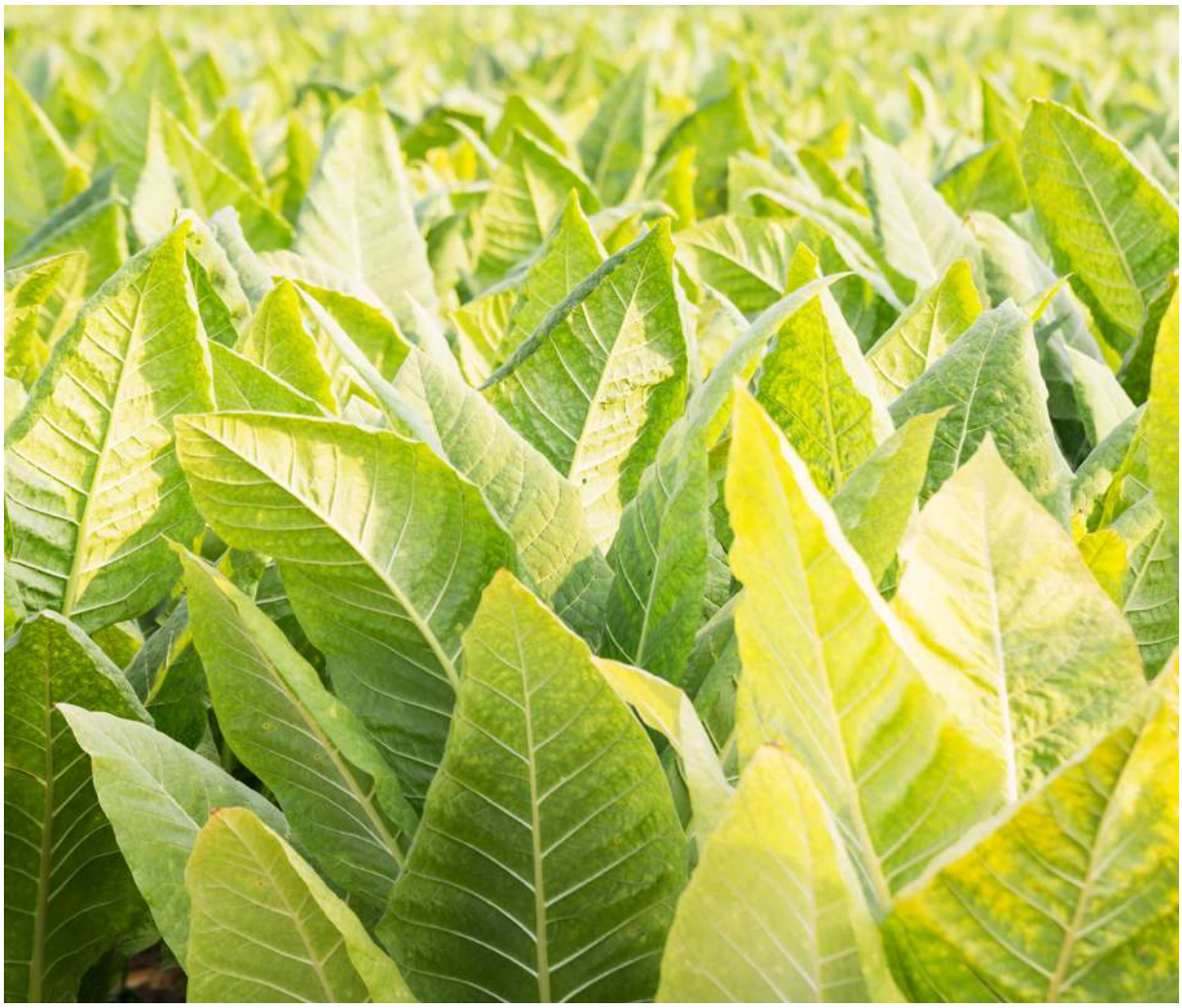


Table 32. Which crops, other than those being subsidized, would you like to be included in thesubsidy?

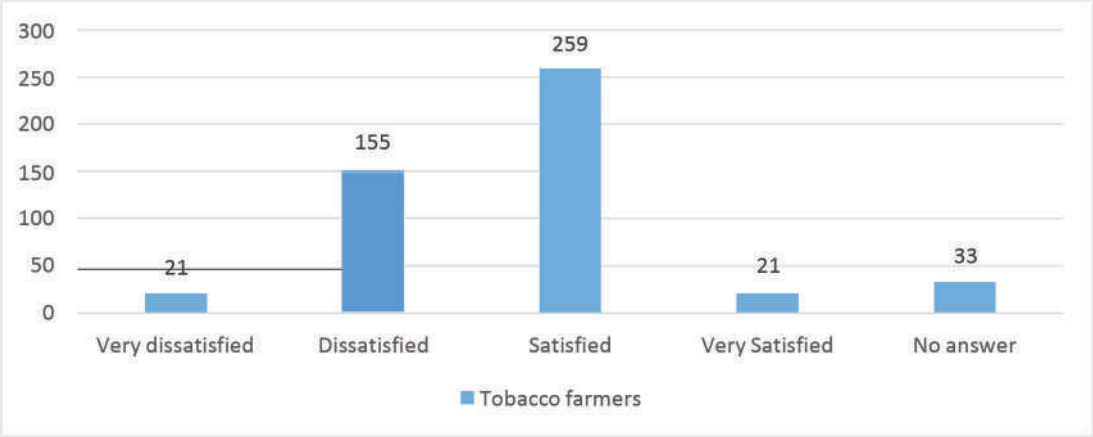
| Crop | Responses | Percentage |
|---|---|---|
| All crops | 65 | 50.78% |
| Vegetable crops | 23 | 17.97% |
| Potatoes and cabbage | 4 | 3.13% |
| Corn | 4 | 3.13% |
| Fruit production | 3 | 2.34% |
| Corn and sunflower | 3 | 2.34% |
| Sunflower | 3 | 2.34% |
| Vegetable crops and sunflower | 2 | 1.56% |
| Fruit production and wheat | 2 | 1.56% |
| Wheat | 2 | 1.56% |
| Corn and cabbage | 2 | 1.56% |
| Industrial crops | 2 | 1.56% |
| Asparagus | 1 | 0.78% |
| Watermelons and vegetable crops | 1 | 0.78% |
| Watermelons | 1 | 0.78% |
| Potatoes and beans | 1 | 0.78% |
| Alfalfa | 1 | 0.78% |
| Raspberries | 1 | 0.78% |
| Corn and beans | 1 | 0.78% |
| Corn and pepper | 1 | 0.78% |
| Corn, pepper, and wheat | 1 | 0.78% |
| Sunflower and potatoes | 1 | 0.78% |
| Sunflower and wheat | 1 | 0.78% |
| Sunflower, wheat, and corn | 1 | 0.78% |
| Leek | 1 | 0.78% |
| Total | 128 | 100.00% |

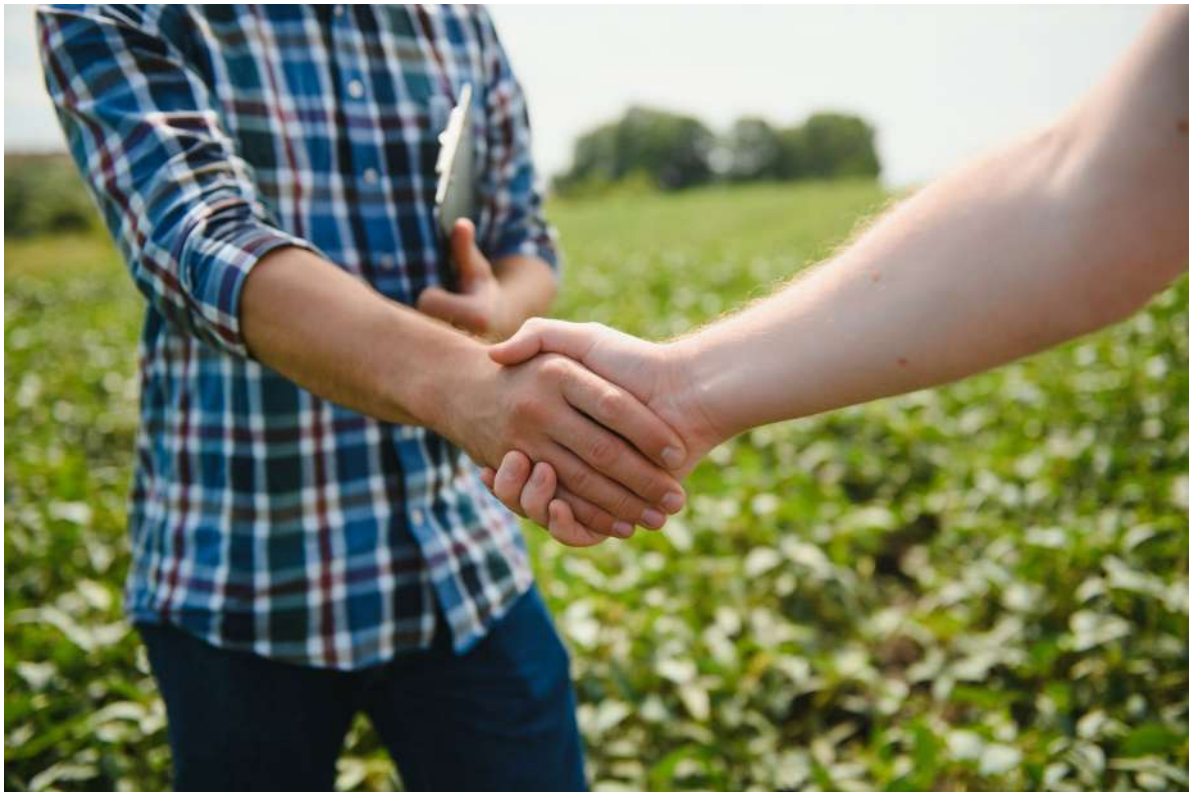
For tobacco farmers in North Macedonia, the subsidies appear to provide additional income that enables them to survive but does not necessarily motivate increased productivity nor improvements in sustainability. Rather than exacerbating market distortions, farming subsidies should serve to promote strategically important crops such as wheat, corn barley, sunflowers, and rice, which would improve the country's capacity for self-sufficiency in food production. Restructuring farming subsidies with the aim of improving the sustainability of the agriculture sector, rather than encouraging farmers to grow ever more harmful and unnecessary crops, would increase productivity and decrease the food and trade deficits.

## 6.2. Satisfaction of current, former, and never tobacco farmers

As noted above, a vast majority of North Macedonian tobacco farmers report having a contract with a leaf buyer. Almost all tobacco farmers in all major tobacco-growing regions have signed contracts with tobacco leaf buyers; only 6 percent report being independent farmers. The chart below demonstrates that 57 percent of tobacco farmers are satisfied with the concluded tobacco agreement, while 36 percent are not (Figure 21).

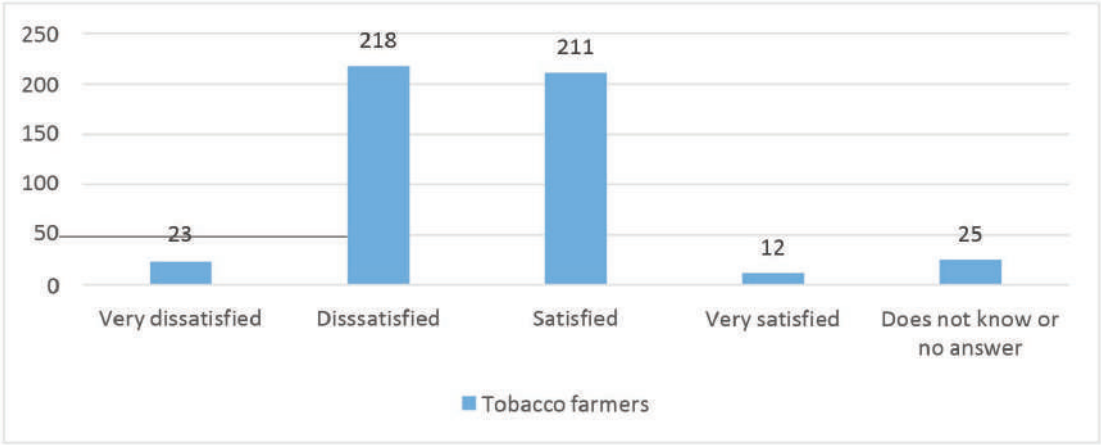
Figure 21. In general, how satisfied are you with the concluded tobacco agreement?



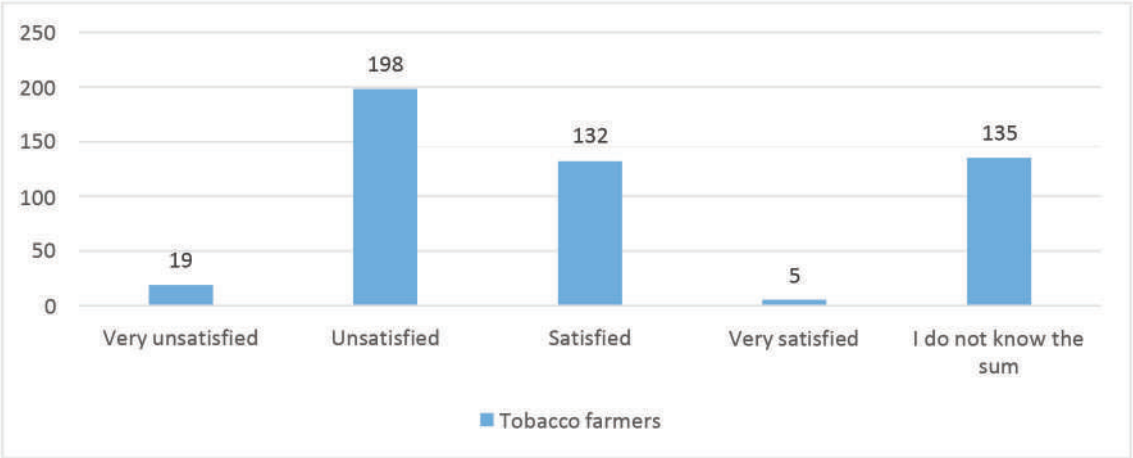
Regarding the appraisal of tobacco grades, 49 percent of tobacco farmers are dissatisfied with the appraisal their tobacco received, while 42 percent are satisfied (Figure 22).

Figure 22. Satisfaction with the grade given for tobacco crop



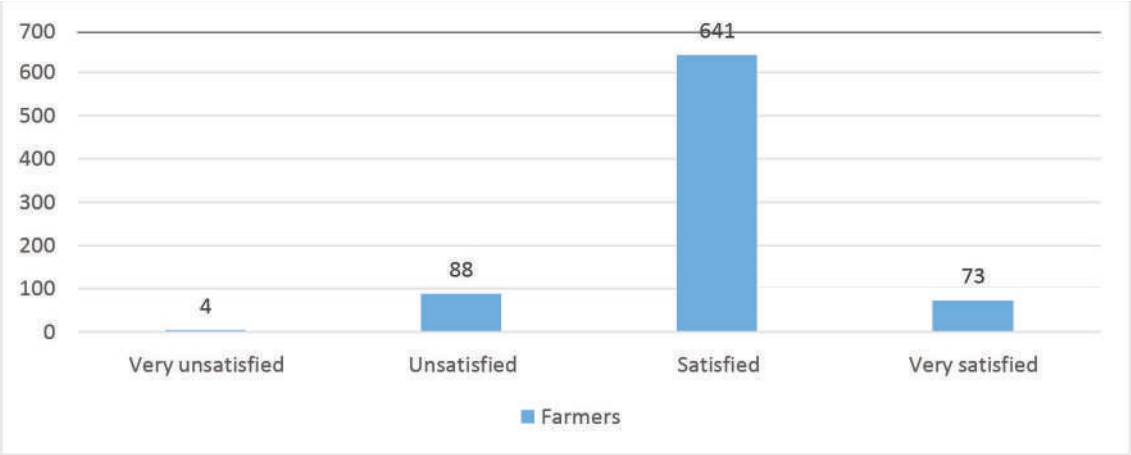

Farmers were asked to state their satisfaction with the amount received from tobacco sales in the 2021 season. Figure 23 shows that 44 percent of tobacco farmers are not satisfied with the amount they received from tobacco sales in the 2021 season and 28 percent are satisfied, while 27 percent do not know the amount received.

Figure 23. Satisfaction with amount received from tobacco sales in 2021 season



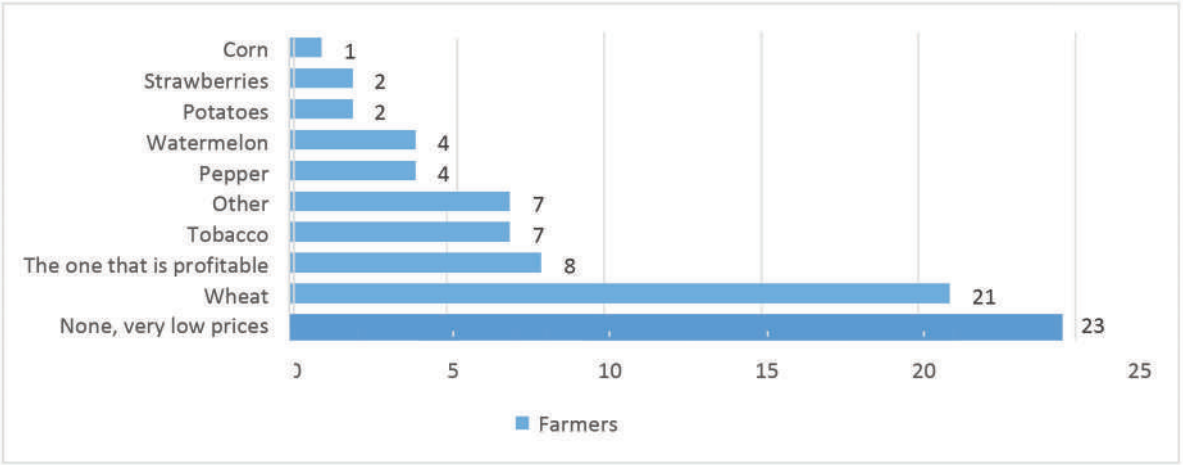

When asked about their satisfaction with the allocation of all farmers' land for growing different types of crops, the results in Figure 24 show that 88 percent of all farmers are satisfied.

Figure 24. Satisfaction with allocation of farmer's land for growing different types of crops



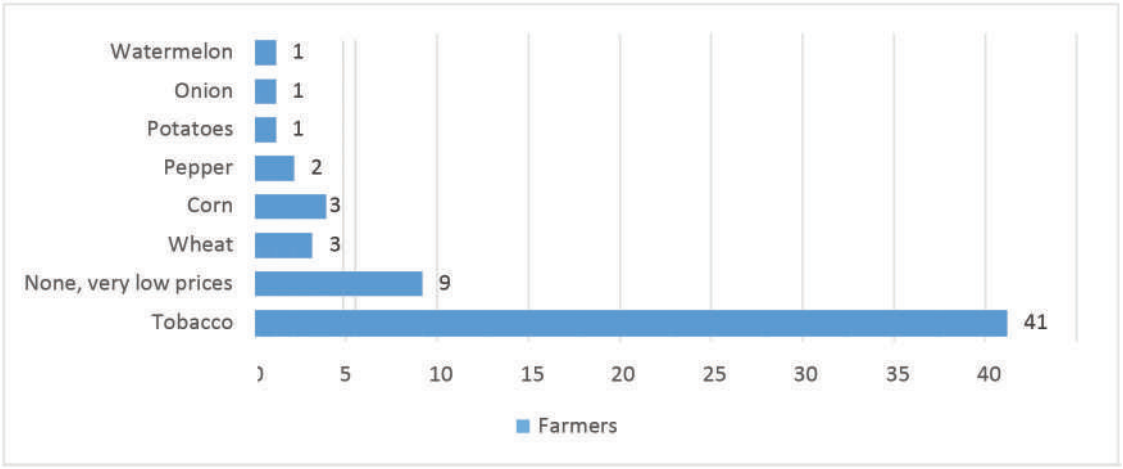

When farmers were asked which crop they would like to grow more, the answers were revealing. Even though the number of respondents is low (79 of 806 farmers), the most popular answer suggests an area for further analysis. Namely, 23 farmers out of 79 say they do not want to grow any other crop because of the low prices other crops receive. This might serve as a confirmation of the fact that generally the economic condition of all farmers in the country is unsatisfactory. Most likely they farm because they have no other choice, but the low prices of crops do not meets their needs (figures 25 and 26). However, the most wanted crop for cultivation is wheat (selected by 21 out of 79 respondents). It is worth noting that, when farmers were asked which crop they would like to grow less, 41 farmers (out of 61) say tobacco is the least desirable crop to grow. This may be due to the fact that tobacco is the most labor-intensive of all crops. This notion is also confirmed by the follow-up interviews conducted with farmers.

Figure 25. Which crop would you like to grow more?




Note: 79 farmers out of 806 provided a valid response.

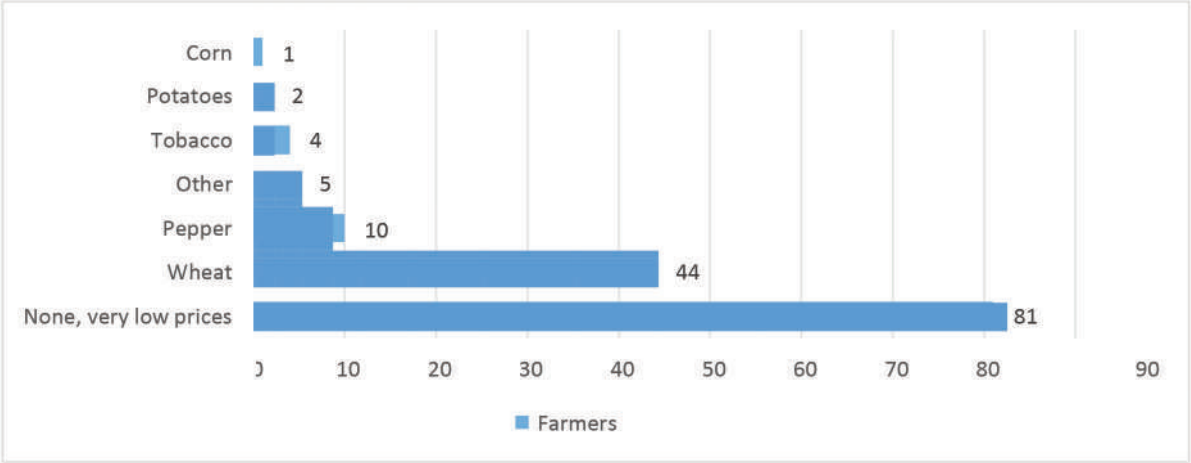
Figure 26. Which crop would you like to grow less?




Note: 61 farmers out of 806 provided a valid response.

When asked which crop is easiest to sell, Figure 27 shows that 81 farmers (out of 147 respondents to this question) state that no crop is easy to sell, because of the low prices. However, the second most popular answer for which crop is easiest to sell is wheat (44 out of 147 farmers).

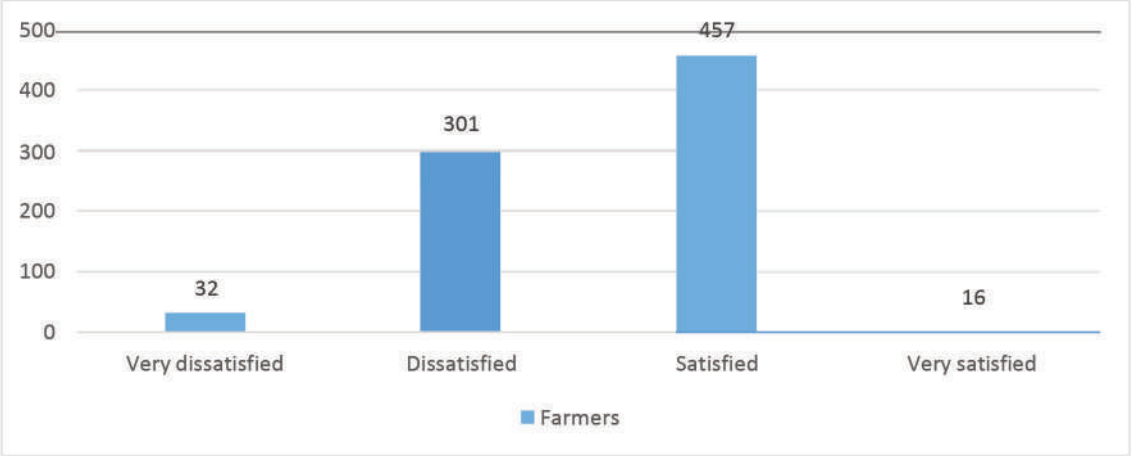
Figure 27. Which crop that you grow is easiest to sell?




Note: 147 farmers out of 806 provided a valid response.

The results presented in Figure 28 indicate that 59 percent of all farmers are satisfied with the financial process for growing crops, while 41 percent are not.

Figure 28. Satisfaction with the financial process for growing crops




When asked about their overall life satisfaction, despite the fact that their income is below the national average and many expressed dissatisfaction with the crops they produce and sell, 55 percent of farmers say they are satisfied with life as a whole. Only 11 percent state that they are dissatisfied with life, while 34 percent are neither satisfied nor dissatisfied (Figure 29).

Figure 29. Satisfaction with life as a whole

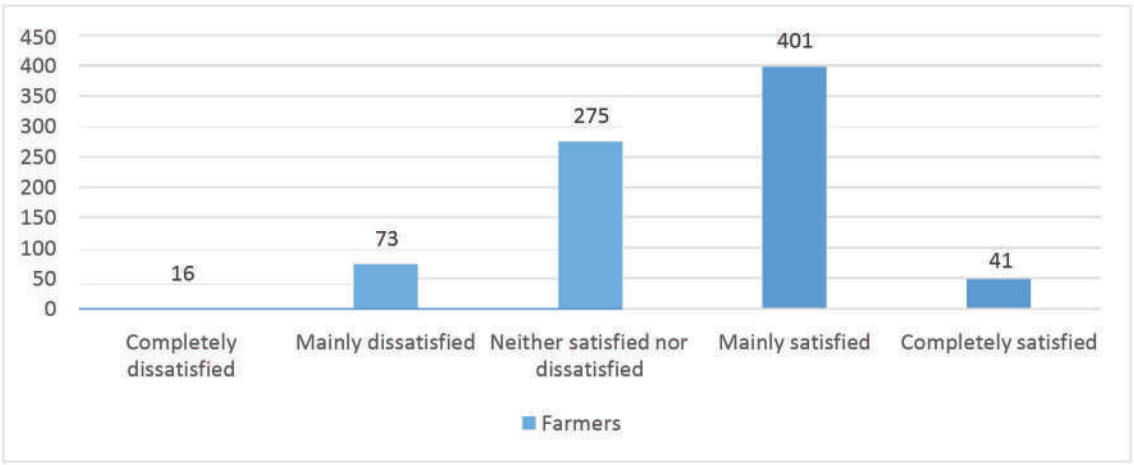
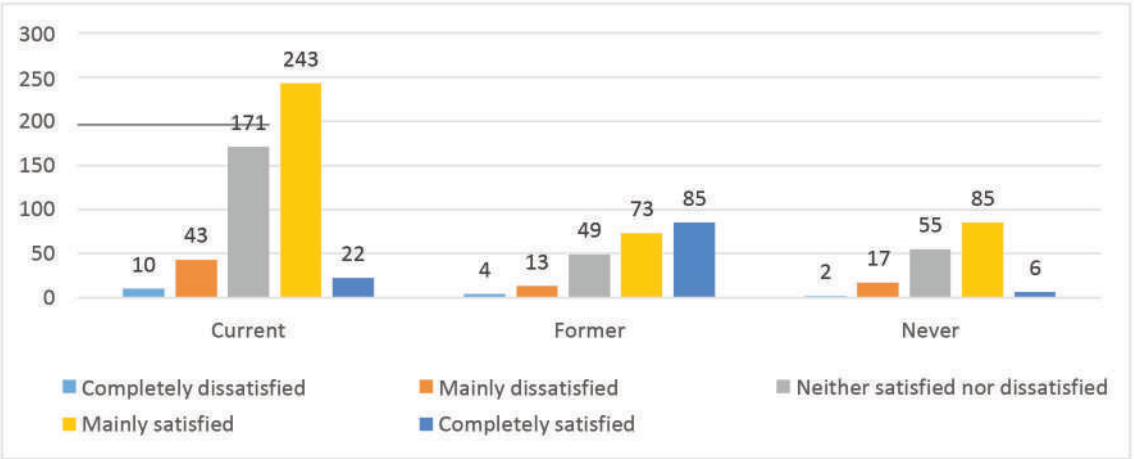
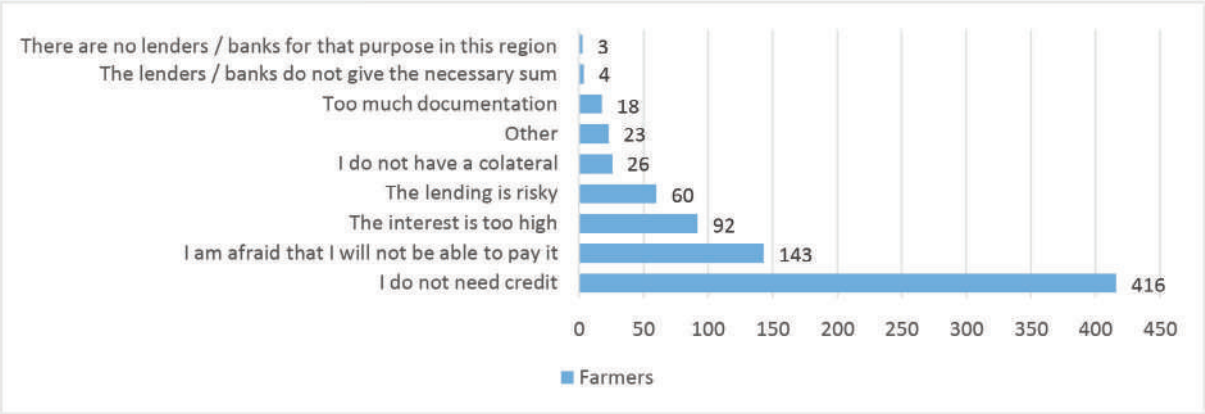



Figure 29a. Satisfaction with life as a whole (by farmer type)



When analyzing why farmers do not apply for credit, 53 percent say they do not need credit, 18 percent state they are afraid that they will not be able to pay it back and 11 percent say the interest rate is too high. This may reflect aspects of North Macedonian culture and specifically that of farmers in the country: people tend to rely more on borrowing from family members or friends, and even more depend on remittances from abroad (Figure 30).

**Figure 30.** Reasons why farmers do not apply for credit




**Note:** 785 farmers out of 806 provided a valid response.

Table 33 shows the reasons farmers choose other crops instead of tobacco. Most farmers state that they choose to grow another crop because it is easier to grow—especially wheat, barley, corn, pepper,and tomatoes.

**Table 33.** What are the reasons to choose other cultures instead of tobacco?

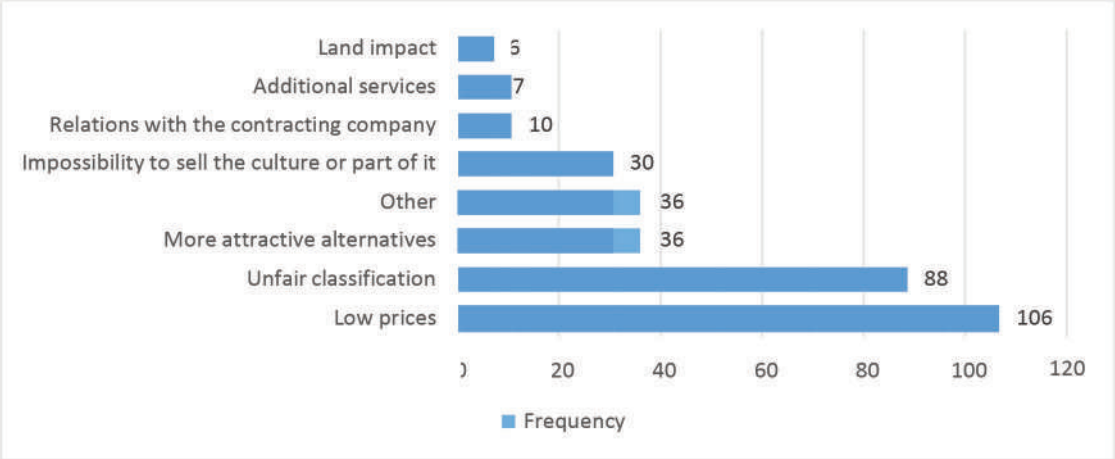
| Reason | Wheat | Barley | Corn | Fodder | Oats | Tobacco | Potatoes | Tomatoes |
|---|---|---|---|---|---|---|---|---|
| Existence of a prepared market | 4 | 1 | / | 1 | / | 5 | 2 | / |
| It is the only culture from whichan income could be made | 2 | 2 | 2 | / | / | 1 | 1 | / |
| It is a very profitable venture | 3 | 20 | 2 | / | / | / | 3 | / |
| Easier to grow | 29 | 1 | 17 | / | / | 1 | 11 | 3 |
| Good benefits from the tobacco-companies/ the government | / | / | / | / | / | / | 1 | / |
| Time/season/water | / | / | / | / | / | / | 1 | / |
| Other | 2 | 24 | 1 | / | / | / | 2 | 1 |

| Reason | Pepper | Onion | Cabbage | Beans | Garlic | Watermelon | Lentils | Apple |
|---|---|---|---|---|---|---|---|---|
| Existence of a prepared market | 1 | / | / | 1 | / | 2 | / | / |
| It is the only crop from which an income could be made | / | / | / | / | / | / | / | / |
| It is a very profitable venture | 3 | 5 | 1 | / | / | / | / | / |
| Easier to grow | 20 | 6 | 6 | 2 | 1 | 8 | / | 1 |
| Good benefits from the tobacco companies/ the government | / | / | / | / | / | / | / | / |
| Time/season/water | / | / | / | / | / | / | / | / |
| Other | 6 | / | / | / | / | / | / | / |

| Reason | Pear | Plum | Apricot | Peach | Cherry | Walnut | Legumes | Other |
|---|---|---|---|---|---|---|---|---|
| Existence of a prepared-market | / | / | / | / | / | 1 | / | 6 |
| It is the only crop from which an income could be made | / | / | / | / | / | / | / | 3 |
| It is a very profitable venture | / | / | / | / | / | / | / | 14 |
| Easier to grow | / | / | / | / | / | / | / | 9 |
| Good benefits from the tobacco companies/ the government | / | / | / | / | / | / | / | / |
| Time/season/water | / | / | / | / | / | / | / | / |
| Other | 1 | / | / | / | / | 1 | / | 6 |

Former tobacco farmers were asked why they chose to switch from growing tobacco to another crop.The results are shown in Figure 31. A third (33 percent) of farmers cite the low prices of tobacco as areason to change to another crop. More than a quarter (27 percent) of the farmers cite unfair classification of tobacco grades, and 11 percent say there are more attractive alternatives to grow.

**Figure 31.** Reasons why farmers switch from growing tobacco to current crop(s)



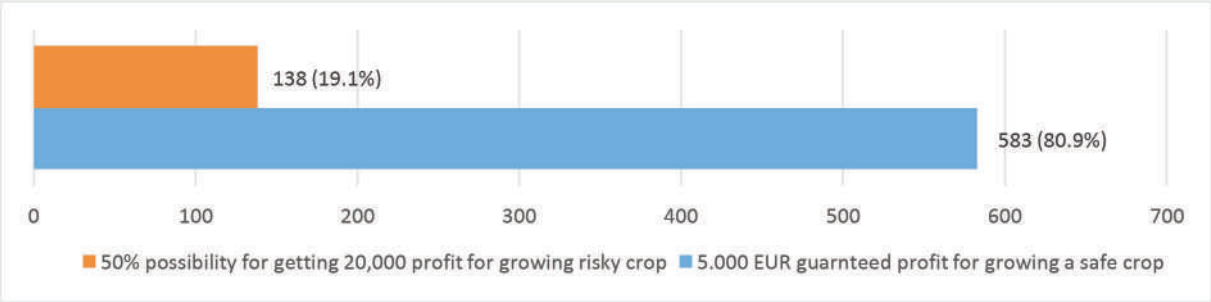

**Note:** There were 319 answers provided from 152 total respondents (only former tobacco farmers answeredthese questions). Multiple answers were allowed to be selected.

## 6.3. Estimation of farmer's risk-aversion level

Current, former, and never tobacco farmers were asked questions to assess their level of risk aversion. Two conditional questions were asked to start the series and 10.4 percent of farmers demonstrated that they did not understand the line of inquiry and were not asked any further questions in the series. For the remaining farmers, generally their responses suggest strongly that the majority of farmers are mostly risk-averse,

When the hypothetical question was asked whether their preference was EUR 5,000 guaranteed profit for growing a safe crop or the option of a 50 percent possibility of getting EUR 20,000, the majority of farmers (583, or 72.3 percent) answered that their preference is EUR 5,000 guaranteed profit. Only 138 farmers (17.1 percent) chose the potentially more lucrative but riskier option. About 10 percent (85 farmers) did not respond.

Figure 32. Which of the following would you choose?




Farmers were presented with another hypothetical situation:

- EUR 7,500 guaranteed profit – 597 answered positively (74.1 percent);
- 50% possibility for getting EUR 20,000 profit for growing a risky crop – 124 respondents (15.4 percent) accepted this option.

Figure 33. Which of the following would you choose?


When the sum was increased, responses changed slightly:

- EUR 10,000 guaranteed profit for growing a safe crop – 647 answered positively (80.3 percent)
- 50 percent possibility for getting EUR 20,000 profit for growing a risky crop – 74 respondents (9.2 percent) accepted this option.

Figure 34. Which of the following would you choose?


For the last hypothetical situation, two options were given. For the first option, 12,500 euros guaranteed profit for growing safe crop, positively answered 663 farmers (82.3 percent), and for the second option, 50 percent possibility for getting EUR 20,000 profit for growing a risky crop, positively answered 58 farmers (7.2 percent). Again, 85 farmers (10.5 percent) did not respond.

Figure 35. Which of the following would you choose?


# 7 CHILD *LABOR*

Child labor is a major challenge faced by almost all economies, especially developing and/or agricultural countries, and North Macedonia is no exception. In 2020, 18.8 percent of children aged 5–14 participated in some form of work, especially in the agricultural sector and farming activities.[57] Still, 97.6 percent of children aged 5–14 attend classes regularly. The proportion of children aged 7– 14 who combine work and school amounts to 20.6 percent. These relatively low numbers show that North Macedonia is making some progress in protecting children from premature involvement in the labor market, but there is still room for improvement. According to a survey of child labor across sectors and industries, farming activities are the sector where most children are involved, followed by street work, including vending small items and cleaning vehicle windshields.[58]

North Macedonia has ratified several important international conventions regarding child labor that protect children from paid and unpaid forms of labor that can threaten their physical, mental, social, and educational development. According to the Convention on the Rights of the Child (CRC),[59] the government commits to protecting children from economic exploitation and from performing any work that may be dangerous or hinder the child's education, or harm their mental, spiritual, moral, or social development, as well as harm their health. However, it must be noted that the minimum age (15) at which children are permitted to work in North Macedonia does not conform to international standards. At the age of 15, children should still formally be engaged in compulsory education. Hence, there is an opportunity for children to be encouraged to leave the mandatory education process (primary and secondary education are mandatory) and to join the labor market early.

55 Puntsagdorj, B.; Orosoo, D.; Huo, X.; Xia, X. Farmer's Perception, Agricultural Subsidies, and Adoption of Sustainable Agricultural Practices: A Case from Mongolia. Sustainability 2021, 13, 1524.

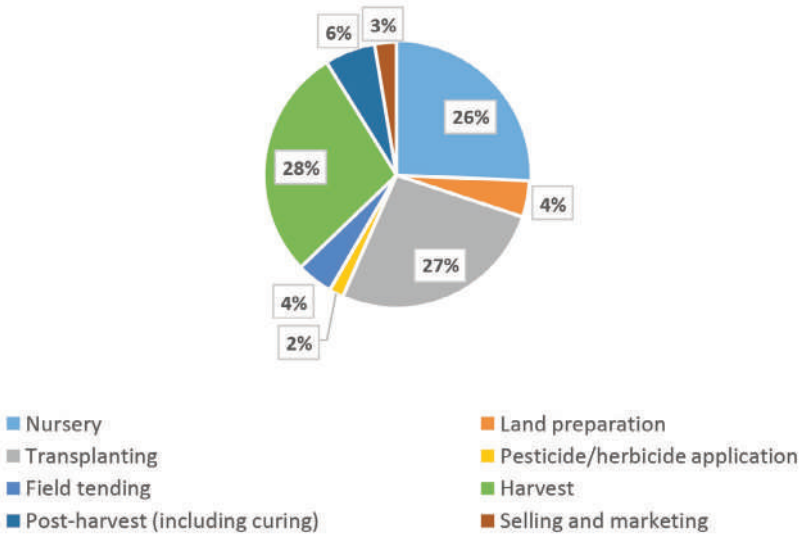
58 International Child Labor & Forced Labor Report, North Macedonia Findings on the worst forms of Child Labor 2020, Bureau of International Labor Affairs

Part of the analyses carried out on children's participation in economic activities show that only 3.8 percent of children aged 5–11 participate in economic activities for at least one hour a week. This percentage is higher among males (4.7 percent) compared to females (3.0 percent). Children living inrural areas are three times more likely to participate in economic activities than children in urban areas (6.6 percent versus 2.1 percent), which reflects the increased prevalence of child labor in farming. About 6.0 percent of children who come from the poorest families participate in child labor.Within the poorest strata of the population, the percentage of children aged 12–14 who work up to 14 hours a week is 7.6 percent, while 2.7 percent work more than 14 hours per week. Among the poorest children aged 15–17, 22.8 percent work up to 14 hours per week.

Although only a small number of children are involved in child labor, it is worth noting that children from low-income families, particularly those living in rural areas, are involved in child labor, particularly in the agricultural sector with a focus on farming activities. The data show that in 2021 4,369 youth aged 15–19 were formally employed, which means they are either completing school in parallel with child labor or have left the educational system to work.[60] This kind of involvement in child labor—the contribution of children to casual work on farms—contributes to their lower participation in the educational process or, at the very least, the parallel realization of child labor and education. Both outcomes have negative repercussions for the creation of human capital in the country.

Child labor in North Macedonia is significantly higher in tobacco cultivation compared to other agricultural crops. Children's help in harvesting tobacco is 2.3 times more common compared to children's help in the harvest of other crops. The distribution of activities related to tobacco cultivation covers all phases: nursery, land preparation, transplanting, pesticide/herbicide application, field tending, harvest, post-harvest (including curing), and selling and marketing (Table 34 in the Appendix). Figure 36 presents the results for the participation of household children (non-hired) in tobacco farming activity. Based on the analysis, 113 children were found to participate in tobacco activities The analysis shows that the total cases where children participate in tobacco farming activities is 113. Household children are mostly used in the tobacco harvest (28 percent), transplanting the tobacco leaf (27 percent), and the nursery (26 percent). A smaller proportion of children help in post-harvest activities, especially in curing the tobacco leaf (six percent), land preparation (four percent), and selling and marketing (three percent). Of the total cases where the help of children in tobacco-related tasks is observed, only two percent involve the help of children in pesticide/herbicide application. None of the households says they hire other children for additional help.

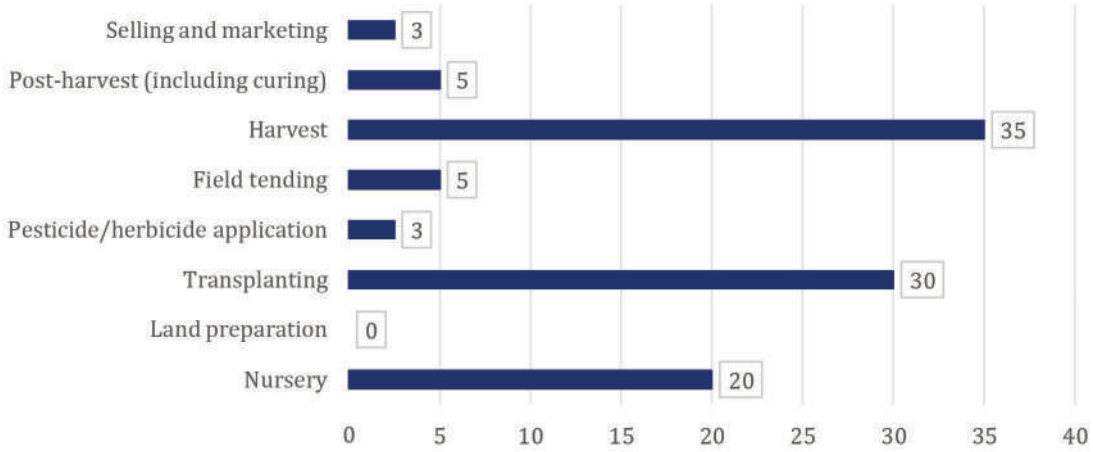
Figure 36. Child agricultural labor (<15 years old) – help of children for tasks related to tobacco cultivation




The need for children's assistance with nontobacco crop tasks is significantly lower. The total number of cases where household child help is observed in other agricultural crops is 40, which is 2.8 times less than for tobacco-related activities. However, the highest representation of child agricultural labor for nontobacco crops is in the domain of harvest (35 percent), transplanting (30 percent), and nursery (20 percent) (Figure 37). Help of children in the domain of field tending is observed only in five percent of cases, while in the domains of selling and marketing and pesticide/herbicide application it is 3 percent. In nontobacco crop work, there is no participation of child labor in land preparation activities.

Tobacco cultivation utilizes significantly more child labor compared to all other agricultural crops. Given that tobacco is collected in the early hours of the morning, the involvement of children in the tobacco cultivation process has a direct impact on their physical and mental health, as well as their psychological state in general. These children are not taken care of adequately in these households, and therefore do not have enough time to concentrate on school activities, sleep and rest, but instead are occupied with activities related to tobacco cultivation. Since teaching takes place only in the morning in rural areas, child school attendance is questionable not only when tobacco is transplanted but also when tobacco is harvested and in the nursery—all the activities where child labor is most visible.

Figure 37. Child agricultural labor (<15 years old) – help of children for tasks related to nontobaccocrops (%)



# WELL-BEING

8

## 8.1. Asset accumulation

The possession and accumulation of assets, which also serve as security factors and the foundation for economic development, is one of the basic indicators of a society's level of development. The possession of capital and durable consumer goods has a significant impact on the income status of households as well as their future well-being. In 2021, 83.7 percent of households in North Macedonia had access to the Internet, and most report that they use it daily.[61] In addition, in 2021, approximately

90 percent of households own a mobile phone, while approximately two-thirds own a car.[62] Concerning housing, approximately 95 percent state that they live in their own apartment and have the basic durable consumer goods.[63]

Regarding household assets, almost all farmers own a television and a mobile phone. Nearly two- thirds (65.44 percent) of current tobacco farmers own a computer, while former farmers (53.95 percent) and never farmers (54.55) are less likely to own a computer (Figure 38). More than four- fifths (84.25 percent) of current tobacco farmers own a vehicle worth USD 2,380, while about 65.79 percent of former tobacco farmers own a vehicle worth USD 3,459. Among never tobacco farmers,

86.06 percent own their own vehicle, with an average value of USD 3,837. Compared to never tobaccofarmers, former and current tobacco farmers have a lower level of well-being, have less accumulated capital, and have difficulty meeting basic needs.

59 Convention on the Rights of the Child, 1989, General Assembly resolution 44/25 of 20 November 1989 entry into force 2September 1990, in accordance with article 49

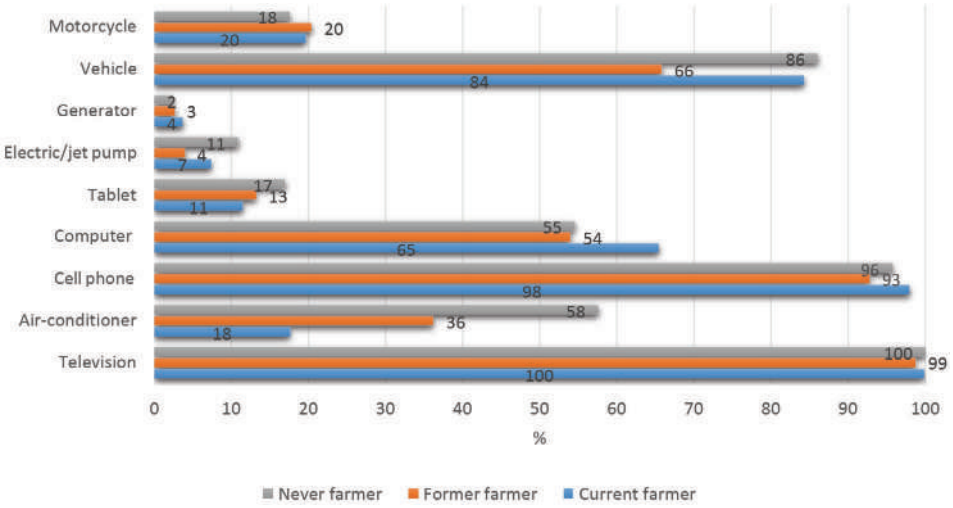
60 State Statistical Office of Republic of North Macedonia Database

61 North Macedonia in numbers, 2022, State Statistical Office Publicationhttps://www.stat.gov.mk/PrikaziPublikacija.aspx?id=27&rbr=854

62 Statistical Yearbook of the Republic of North Macedonia, 2021, https://www.stat.gov.mk/PrikaziPoslednaPublikacija_en.aspx?id=34

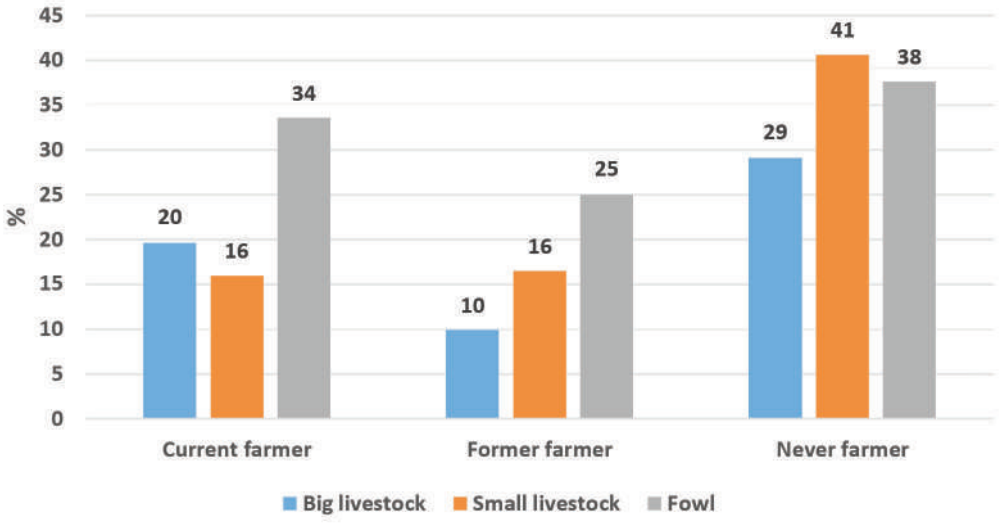
63 Household Consumption in North Macedonia 2017, https://www.stat.gov.mk/PrikaziPublikacija.aspx?id=2&rbr=715

Figure 38. Distribution of farmers according to ownership of household assets (by types of farmers, %)




Agricultural families in North Macedonia, particularly in rural areas, also deal with livestock production along with crop production. Thus, it can be noted that a certain proportion of the farmers are engaged in livestock production, regardless of whether they are current, former, or never tobacco farmers. In parallel with crop production, 34 percent of current farmers raise fowl, while 20 percent raise big livestock and 16 percent raise small livestock (Figure 39). Among never tobacco farmers, the participation of farmers who raise fowl is 38 percent, while 29 percent raise big livestock and 41 percent raise small livestock, which indicates that—while not growing crops—they still take advantage of the rural environment. Livestock production is observed among former tobacco farmers as well. A quarter of former tobacco farmers raise fowl (25 percent), while some of them raise big livestock (10 percent) and small livestock (16 percent).

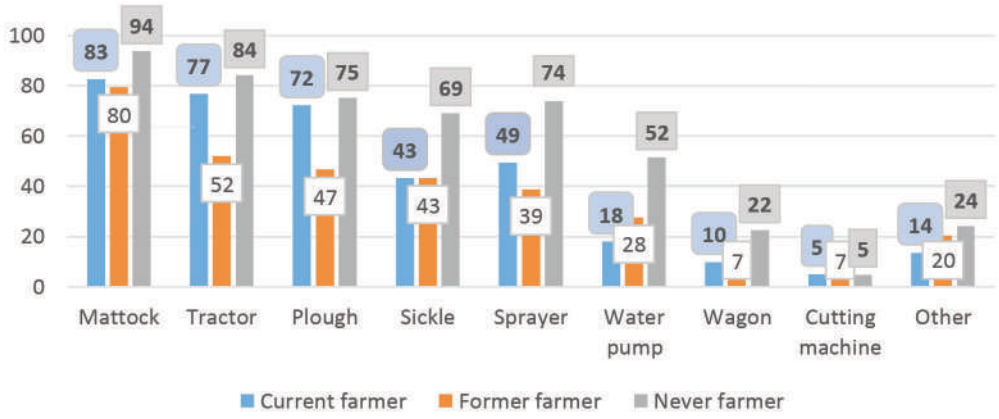
Figure 39. Distribution of farmers having livestock assets (by types of farmers, %)




The possession of agricultural assets is of crucial importance for efficiency and productivity in agricultural production. Farmers who have appropriate machines and tools can more easily and effectively realize the production process, especially land preparation, as well as the maintenance and cultivation of tobacco production and the transportation of products. The survey findings indicate that farmers have the equipment needed for growing tobacco.

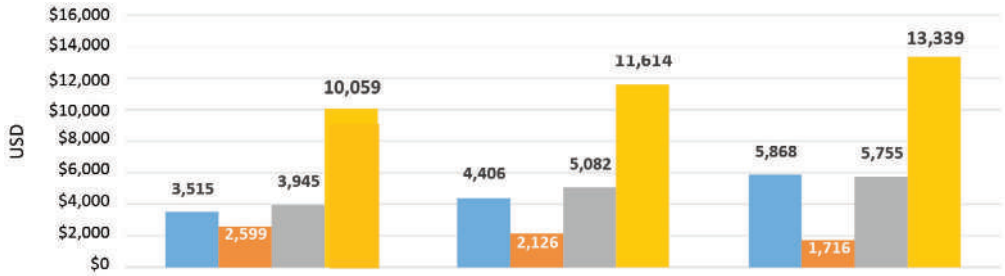
The results of the field research show that a significant share of farmers have the basic tools for work (a mattock and sickle). In addition, 77 percent of current tobacco farmers own a tractor, 72 percent own a plow, and 49 percent own a sprayer, indicating that they have the essential tools for the routine fulfillment of tobacco farming. Most of the people who belong to the category of never farmers also have the basic machines and tools for realizing agricultural production, which implies that part of the machines are used for livestock production (Figure 40).

Figure 40. Distribution of farmers by possession of agricultural assets (by types of farmers, %)




Current tobacco farmers, on average, have the lowest level of accumulated household and agricultural assets compared to former and never tobacco farmers. The analysis of household and agricultural assets among current, former, and never tobacco farmers points to the conclusion that, on average, never farmers have the highest value of accumulated capital (USD13,339), while current farmers have the lowest level of accumulated assets (USD 10,059). It is particularly important to point out that, in terms of types of assets, never farmers have the highest level of agricultural assets (USD 5,755), while current farmers have the lowest agricultural assets in the amount of USD 3,945 (Figure 41).

Figure 41. Average value of assets by types among current, former, and never farmers (USD)




| | Current farmer | Former farmer | Never farmer |
|---|---|---|---|
| Household | 3515 | 4406 | 5868 |
| Livestock | 2599 | 2126 | 1716 |
| Agricultural | 3945 | 5082 | 5755 |
| Total | 10059 | 11614 | 13339 |

## 8.2. Health status

The largest proportion of persons who report illness in the last 30 days is observed among female former tobacco farmers older than age 60 (21 percent) and former tobacco farmers aged 15–20 (21 percent). Figure 42 (Table 6A in the Appendix) presents the proportion of current, former, and never tobacco farmers who report being sick in the last 30 days, by gender and age. The results show that a small share of the respondents confirm they were sick in the previous 30 days.

The highest proportion of people who report sickness in the last 30 days is observed among never tobacco farmers, compared to current and former tobacco farmers. However, there is a significant difference in the degree of sickness among farmers who were ever engaged in tobacco cultivation. Among current tobacco farmers, 4.52 percent of males and 5.74 percent of females report sickness in the last 30 days. Among former tobacco farmers, the proportion of people who report sickness in thelast 30 days is 4.66 percent among males, and 9.14 percent among females. These findings suggest that females who are part of the tobacco cultivation process may be more susceptible to sickness than males. A higher proportion of females who have ever been engaged in tobacco cultivation report illness in the last 30 days, compared to males.

Focusing on people older than age 60, the results show that among current tobacco farmers 11.31 percent of males and 12.69 percent of females report sickness in the last 30 days. This proportion among former tobacco farmers is 7.04 percent for males and 21.15 percent for females. Among children of current farmers, 7.08 percent of females and 4.81 percent of males report sickness in thelast 30 days, while this proportion among children of former tobacco farmers is 5.88 percent for malesand zero for females. A smaller share of children (under 15 years old) who have been engaged in tobacco cultivation, report sickness in the last 30 days compared to children who never worked on tobacco fields.

Green tobacco sickness is characterized by a number of symptoms including diarrhea, headache, vomiting, abdominal pain, and changes in heart rate. Among current tobacco farmers, males aged 36– 60 (7.2 percent) and females aged 36–60 (6.63 percent) report having the most severe symptoms of green tobacco illness, while 4.76 percent of male current farmers and 2.99 percent of female current farmers over the age of 60 have displayed some of the symptoms (Figure 43).

Figure 42. Distribution of farmers who report sickness in the last 30 days (by type of farmer, %)

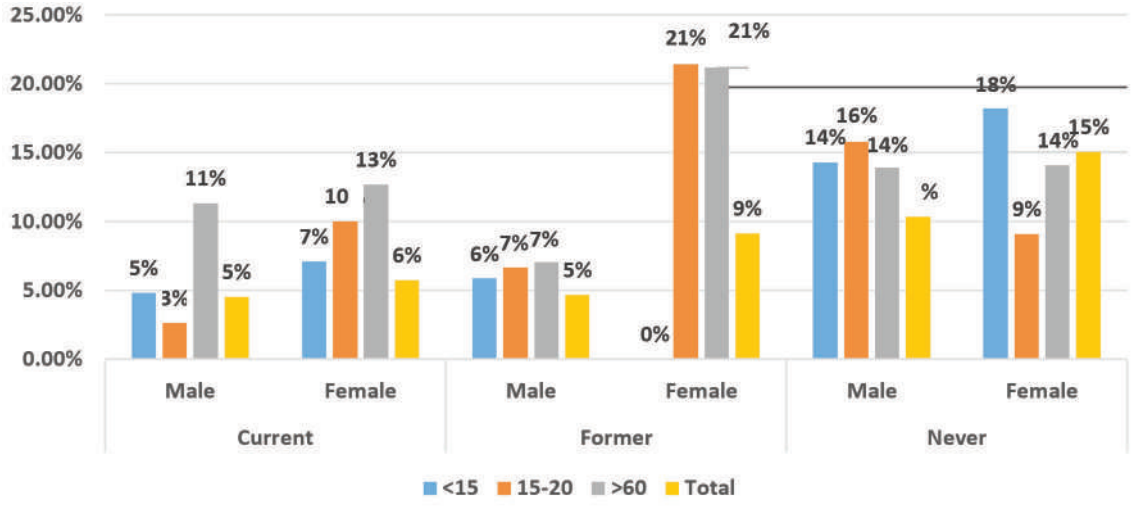
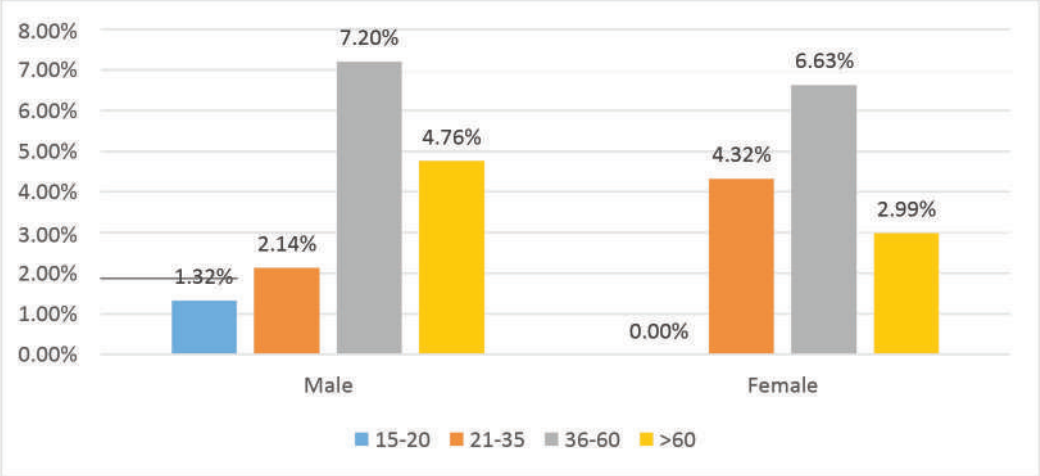


Figure 43. Individuals reporting 1–4 main symptoms of green tobacco sickness (current tobaccofarmers)




Note: Symptoms include diarrhea, headache, vomiting, abdominal pain, dizziness, or fluctuations in heart rate.

# CONCLUSIONS

Tobacco cultivation is not as profitable as the government suggests. Thus, highlighting tobacco **as a highly profitable crop is unfounded. The results of this study indicate** that it would be much better for tobacco farmers, in terms of labor and economic efficiency, to reorient and grow another crop or pursue other economic activities in their local economy (such as wage work or small business).

**Around half of tobacco farmers are not turning a real profit. The opportunity cost for unpaid family labor makes growing tobacco unprofitable.** Revenues of tobacco farmers decrease significantly when opportunity costs are calculated. Household members could better allocate their labor to other tasks that earn money; not doing so results in significant economic loss for these families.

**For the majority of tobacco farmers (around two-thirds), tobacco income represents a large share of total household income**. Current tobacco farmers rely more heavily on agricultural incomethan former and never tobacco farmers. The results suggests that **former tobacco farmers have greatly shifted to other economic activities that are non-agricultural and have developed a more diversified economic profile, likely insulating them from price fluctuations in the tobacco market and perhaps the agricultural market more broadly.**

Tobacco cultivation is the most labor-demanding agricultural activity. This fact is confirmed by statements from tobacco farmers themselves. **Compared to former and never tobacco farmers, the median current tobacco farmer devotes more time to growing crops**.

**Children's help in the harvesting of tobacco is 2.3 times more common compared to children'shelp in harvesting other crops. Fortunately, children are not engaged in activities related to pesticide/herbicide application.**

**Input costs for growing tobacco are typically very high, particularly compared to most other crops. Tobacco cultivation typically requires significantly more pesticide than other crop activities.** Pesticides are related to persistent health challenges for farmers and damage the environment through contamination of groundwater and watersheds.

**Tobacco farmers show signs of green tobacco sickness, a form of acute nicotine poisoning**. Females who are part of the tobacco cultivation process appear more likely to show symptoms of this disease than males.

**Most farmers struggle financially, living with an average monthly income below the average net monthly wage and below the value of the minimum household consumer basket**. The average monthly net wage paid in June 2021 in North Macedonia was MKD 28,744 (USD 469), while in the agriculture, forestry and fisheries sector it was MKD 23,117 (USD 377).

**Pensions and remittances are one of the most important components for maintaining an adequate level of income and standard of living for tobacco farmers' families.**

**Poverty rates among tobacco farmers are slightly higher than the nationwide poverty rate. Current tobacco farmers have the highest incidence of poverty when considering per capita income.**

**Former and never tobacco farmers on average are better off economically than current tobacco farmers. In addition, current tobacco farmers, on average, have the lowest level of accumulated household and agricultural assets, compared to former and never tobacco farmers.**

Despite strong evidence of poor prospects for profitable tobacco farming, around 20,000 tobacco farmers continue to cultivate tobacco leaf in North Macedonia. **The number one reason lies in the subsidies they get from the government. More than three quarters (77 percent) of tobacco farmers state that if the subsidies are taken away, they would stop growing tobacco**. In addition, 86.5 percent of the tobacco farmers state they grow tobacco because they are accustomed to growing tobacco. **The long tradition of farming this crop in North Macedonia, the advanced age of mosttobacco farmers, and the government subsidies are what keep many farmers in tobaccocultivation.**

In addition, **former tobacco farmers report switching to other crops for a variety of reasons, citing the low price of tobacco as the primary reason, followed by unfair grading and more attractive alternatives**. These findings suggest potential intervention points and shifting possibilities.

**Therefore, the Government of North Macedonia should develop evidence-based strategies to help tobacco farmers reorient to alternative crops and other more lucrative livelihoods.**

# RECOMMENDATIONS

To improve the situation of tobacco farmers and generally of all farmers in the country, and to enhance the development of the agricultural sector, this report suggests the following recommendations:

- **The government should create comprehensive evidence - based policies to incentivize farmers to transition away from tobacco farming.** Switching to nontobacco crops is likely to result in better livelihoods for many farmers. The government must identify potential crops and the necessary conditions and actions (such as soil conservation and irrigation) such that shifting away from tobacco will be an attractive and viable option for current tobacco farmers.
- **Agriculture subsidies must emphasize long-term investment in the sector that contributes more broadly to increased productivity and efficiency.** The government should aim to increase domestic agricultural production, especially of wheat, corn, and barley, but also of other agricultural products that will increase domestic food security capacity. It is likely that a thriving grain sector will also lead to a more content rural society because farmers will have higher income, possibly more food security and better health. The world export market for food crops is also looking very promising, with high demand and insufficient supply forecasts for the foreseeable future.
- **The government should create educational programs to help farmers learn to grow alternative crops that bring higher income and are suitable for local conditions.** The education program should inform farmers about possible access to loans and help them acquire skills and access to new, advanced farming technology that will increase the quality and quantity of the crops they cultivate.
- **The government can establish financial and nonfinancial incentives to encourage cultivation of nontobacco crops.** For example, this could be done by increasing low-interest credit programs and allocation of state agricultural land. **To improve productivity of alternative farming activities, the government**

**should increase their investments in improvement of the quality of soil and improvement of irrigations systems to increasetheir output.** The goal is to increase the arable land for other strategic crops. In this way, thetotal annual domestic production of strategic crops in the country will increase and dependence on imports of these crops will be reduced.

- The government should provide **education on the opportunity costs related to cultivation of different crops. Many tobacco farmers are not aware of how much time they devote to their own crop cultivation.** Better explanation of these costs may encourage farmers to move to opportunities that are more lucrative and efficient.
- **Connecting farmers to processing factories to establish long-term relationships for non-tobacco crop growing would help farmers to transition and engender prosperity and security for those families.** These relationships will provide farmers with access to available markets, which is cited as one of the top reasons why tobacco farmers continue to farm tobacco.

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# APPENDIX

**Table A1.** Tobacco cultivation in North Macedonia in 2021, by regions (in perentages)

| North Macedonia | 2021 |
|---|---|
| Vardar region | 6.8 |
| Eastern region | 1.6 |
| Southwest region | 0.5 |
| Southeast region | 28.6 |
| Pelagonian region | 59.3 |
| Polog region | 0% |
| Northeast region | 0.7 |
| Skopje region | 2.4 |

**Box A1.** Ethical considerations regarding the survey

**Ethical considerations**

- Ethical standards for research involving human beings and especially children (or collecting data regarding children of any age), reflected in the following principles, will be also adhered to. Theprocedure will be consistently applied throughout the research process.
- Rating Agency states that there is no conflict of interest or any potential ethical issue.
- The quantitative research will cover specific groups of people, 18+ years of age. Data collection for minors is not expected.

Informed consent – all participants will be informed about the research, its objective and their part in the process. It will be clearly stated that their participation would cause no harm, but also no **immediate benefit for them.** Respondents will be asked to express verbal consent to participate in the research and will be explained that they could withdraw from the process at any time.

- More closely, the Informed Consent will provide information regarding:

- The nature and purpose of the activity, including contact details for further information

Information regarding voluntary and negotiable nature of the process and any payment or compensation

- Protection of privacy in data collection and storage

- *Any follow-up to the programme or project – for follow up surveys recruitment methodology*

- Relevant dissemination processes

- *Any approval and consent for future anonymised use of data*

- Confidentiality and anonymity – all participants in the research will be informed that their privacy will be protected, that data collected in the research will be published in aggregated form only, and that identity of children and adults will not be disclosed under any circumstances;
- Data collection will be carried out using softer for CAPI technique. Collected data will be securely stored on Rating Agency servers. After the analysis is done, the data will be transferred to the Client for future storing, and erased from the servers permanently if needed.
- No payment or compensation will be used for participating in the surveys.

Considering the specific circumstances imposed by the COVID-19 pandemic, the proposed methodology of the surveys takes into account the applicable government measures introduced to prevent virus transmission and valid at the time of conducting the data collection.

Since the beginning of the pandemic we have prepared a protocol for Face to Face fieldwork that isobligatory for all interviewers working on the field.

COVID 19 protocol for face-to-face interviews

Rating Agency will strictly adhere to and apply all COVID 19 protocols and protection measures as prescribed by the Government of North Macedonia in conducting the fieldwork and face-to-face interviews.

Considering the specific circumstances imposed by the COVID-19 pandemic, the proposed survey **methodology** takes into account the applicable government measures introduced to prevent/containvirus transmission and valid at the time of conducting the data collection.

That is why since the beginning of the pandemic we have prepared a protocol for Face-to-Face fieldwork that is obligatory for and signed from all interviewers working on the field.

## **Box A2.** Protocol for fieldwork

Protocol for fieldwork

This protocol includes all of the steps being taken by the agency, which are designed to act as a measure of protection within the research process. These steps also actively refer back to national measures and government guidance.

All field interviewers are obligated to adhere to the field survey measures in conditions of the new situation with the virus COVID-19, which includes:

Mandatory measures to be taken for face-to-face data collection during COVID-19

*Before data collection

Check movement restrictions and obtain required clearance to move between areas ifpossible/if needed

- Ensure everyone in the team are up to date on the most recent information and measures tobe followed (Make sure everyone in the team (team leaders, enumerators, drivers, logisticians etc.) are up to date on the most recent information from the WHO and national health authority in NorthMacedonia and adhere to their guidelines
- Procure relevant supplies to staff protection and sanitation
- Plan data collection efficiently to ensure all required measures, precautions are followed
- Inform everyone involved in data collection of the following protocol and clarify that this applies both during and outside of data collection activities:

- Check your temperature every morning and evening
- Team leaders to ask if enumerators have been in contact with anyone with confirmed or suspected case of COVID-19 on a daily basis
- Wash hands thoroughly and regularly (ideally every 1 to 2 hours and definitely in between each interview conducted) with soap and water or alcohol-based hand rub
- Do not touch your (or anyone else's) face – particularly eyes, nose and mouth.
- Don't have any physical contact with other people. That includes no greetings such ashandshakes, cheek kissing, hugs, etc.
- Sanitize all data collection items prior to each interview (pens, phone, tablets, notebooks, ID cards, etc.)

**** During data collection***

- Remind teams of the general guidance and protocols on a daily basis
- Approach respondent(s) for interviews/discussions in line with the required measures
- Inform the respondent(s) of the COVID-19 measures (based on existing guidelines and messagingin the country) in a clear manner, prior to starting the interview or discussion
- Maintain the recommended distance (at least 1.5 meter) when approaching respondents

- Avoid physical contact (handshaking, hugging, etc.) to greet respondents. As this may be perceived as culturally inappropriate, clearly explain why you are doing this
- Conduct the interviews/discussions following the required measures
- Conduct the interview/ discussion outside (if possible)
- Maintain at least 1.5-meter distance from other people throughout, specifically the respondents
- Don't touch anything in or around the households' / interview sites that you are visiting
- Avoid contact with elderly or people with chronic diseases if possible
- Ensure measures are being followed within the team throughout as well (i.e. not just between enumerators and respondents during the interview or discussion process)
- Don't pass on things to other people, e.g. bottles, pens, phones, leaflets, visibility material etc. If you do so, wash your hands and wipe off the item carefully with disinfectant gel
- Don't drink or eat from the same containers and do not use utilities from another person.
- Ensure all staff returning from data collection (enumerators, drivers, etc.) thoroughly wash their hands with soap (at least 20 seconds)
- Ensure enumerators are reporting to line managers as outlined in the protocols
- Enumerators should report to team leaders any health symptoms such as a high temperature (above 37.0), or any other mild symptoms such as tiredness, dry cough (common symptoms), shortness of breath, aches and pains, sore throat, or runny nose (other symptoms). If any staff is experiencing symptoms they should self-quarantine for at least 14 days/ until recovered and testedif the enumerator has been in contact with COVID-19 positive person.
- Enumerators should confirm location and report of any interaction with an int viewee thatexhibited symptoms of fever, cough or shortness of breath
- Ensure enumerators submit the data collected and clean devices (after the fieldwork ends) on a daily basis
- Mandatory wearing of mask and gloves
- Maintain a distance of 1.5 to 2 meters from the respondent while interviewing
- It is prohibited to enter homes - conduct surveys exclusively in front of the door or in the yard.
- Mandatory wearing of the signed authorization and tag with the name and su name of theinterviewer

**Table A2.** Logistic regression analysis of willingness to switch to alternative crops

| | Delta-method | | z | P>\|z\| | 95% CI | |
|---|---|---|---|---|---|---|
| | dy/dx | Std. err. | | | | |
| Household labor hours, log | -0.097 | 0.160 | -0.60 | 0.546 | -0.410 | 0.217 |
| Head of household age | -0.002 | 0.003 | -0.59 | 0.555 | -0.001 | 0.004 |
| Household size | -0.020 | 0.030 | -0.65 | 0.515 | -0.080 | 0.040 |
| Years of education, household head | 0.049 | 0.021 | 2.29 | 0.022** | 0.007 | 0.091 |
| Household profit per ha, log | -0.026 | 0.093 | -.028 | 0.780 | -0.207 | 0.156 |
| Agricultural farming sales, log | 0.004 | 0.152 | 0.03 | 0.979 | -0.295 | 0.303 |
| Total cultivated land in ha | 0.077 | 0.049 | 1.56 | 0.119 | -0.020 | 0.173 |
| Total land for tobacco in ha | -0.027 | 0.051 | -0.54 | 0.592 | -0.126 | 0.072 |
| Wage income, log | -0.164 | 0.124 | -1.32 | 0.186 | -0.407 | 0.079 |
| Total assets, log | -0.072 | 0.051 | -1.4 | 0.158 | -0.173 | 0.028 |

Note: *, **, and *** indicate significance at 0.1, 0.05 and 0.01 **respectively**

To examine tobacco farmers' willingness to switch to alternative crops, a binary logistic regression analysis was performed. The regression model is specified as follows:

$$P\ (willing)_i = \beta_0 + \beta_1 tobacco_i + \boldsymbol{x}\boldsymbol{y_i} + u_i$$

where  indicates household. The dependent variable is binary with two alternatives, (1) the farmer is willing to switch and (0) the farmer is not willing to switch. The  vector incudes household characteristics such as log of household labor hours, head of household age, household size, years of education of the household head, log of household profit per hectare, log of agricultural farming sales, total cultivated land in hectares, total land for tobacco in hectares, log of wage from paid work, and log of total assets.

From all included variables, only the variable regarding the years of education of the household headis statistically significant (p=0.022). If the years of education of the household head increase by one year, the probability of switching from tobacco to alternative crops increases by 4.9 percentage points. All other variables remain insignificant. This indicates that farmers who are better educated can look to switch to more profitable crops with less consequences for their health.

**Table A3.** Household and agricultural assets, by farmer type (percentage and current value)

| Assets | Current farmer (N=489) | | Former farmer (N=152) | | Never farmer (N=165) | |
|---|---|---|---|---|---|---|
| | percent of farmers having it | Current value (USD) | percent of farmers having it | Current value (USD) | percent of farmers having it | Current value (USD) |
| **Household** | | | | | | |
| Television | 99.80 | 148.98 | 98.68 | 113.22 | 100.00 | 155.15 |
| Air conditioner | 17.59 | 312.13 | 36.18 | 145.45 | 57.58 | 194.80 |
| Cell phone | 97.96 | 95.96 | 92.76 | 114.15 | 95.76 | 102.47 |
| Computer | 65.44 | 152.96 | 53.95 | 116.36 | 54.55 | 149.49 |
| Tablet | 11.45 | 9.09 | 13.16 | 18.18 | 16.97 | 72.73 |
| Electric/jet pump | 7.36 | 41.82 | 3.95 | 54.55 | 10.91 | n/a |
| Generator | 3.68 | n/a | 2.63 | n/a | 2.42 | 863.64 |
| Vehicle | 84.25 | 2,380.45 | 65.79 | 3,459.71 | 86.06 | 3,836.69 |
| Motorcycle | 19.63 | 373.20 | 20.39 | 384.42 | 17.58 | 493.18 |
| **Livestock** | | | | | | |
| Big livestock | 19.63 | 841.35 | 9.87 | 400.00 | 29.09 | 601.40 |
| Small livestock | 15.95 | 1,640.11 | 16.45 | 1,513.64 | 40.61 | 929.18 |
| Fowl | 33.54 | 117.20 | 25.00 | 212.00 | 37.58 | 184.95 |
| **Agricultural** | | | | | | |
| Wagon | 9.82 | n/a | 6.58 | n/a | 22.42 | 72.73 |
| Plough | 72.19 | 350.84 | 46.71 | 375.00 | 75.15 | 374.16 |
| Tractor | 76.89 | 3,012.40 | 51.97 | 3,830.84 | 84.24 | 4,330.91 |
| Water pump | 18.00 | 72.73 | 27.63 | 93.95 | 51.52 | 272.73 |
| Cutting machine | 5.11 | 145.45 | 7.24 | n/a | 4.85 | 318.18 |
| Sprayer | 49.49 | 349.49 | 38.82 | 184.09 | 73.94 | 386.36 |
| Mattock | 82.82 | 8.07 | 79.61 | 1.82 | 93.94 | n/a |
| Sickle | 43.35 | 6.36 | 43.42 | 3.64 | 69.09 | n/a |
| Other | 13.50 | n/a | 20.39 | 592.73 | 24.24 | n/a |

**Table A4.** Child agricultural labor (<15 years old)

| Task related to tobacco cultivation | Total cases – help of children | |
|---|---|---|
| | Household | Hired |
| Nursery | 29 | 0 |
| Land preparation | 5 | 0 |
| Transplanting | 30 | 0 |
| Pesticide/herbicide application | 2 | 0 |
| Field tending | 5 | 0 |
| Harvest | 32 | 0 |
| Post-harvest (including curing) | 7 | 0 |
| Selling and marketing | 3 | 0 |

| Task related to cultivation of nontobacco crops | Total cases – help of children | |
|---|---|---|
| | Household | Hired |
| Nursery | 8 | 0 |
| Land preparation | 0 | 0 |
| Transplanting | 12 | 0 |
| Pesticide/herbicide application | 1 | 0 |
| Field tending | 2 | 0 |
| Harvest | 14 | 0 |
| Post-harvest (including curing) | 2 | 0 |
| Selling and marketing | 1 | 0 |

**Table A5.** Household and agricultural assets, by farmer type (percentage and current value)

| Assets | Current farmer (N=489) | | Former farmer (N=152) | | Never farmer (N=165) | |
|---|---|---|---|---|---|---|
| | percent of farmers having it | Current value (USD) | percent of farmers having it | Current value (USD) | percent of farmers having it | Current value (USD) |
| **Household** | | | | | | |
| Television | 99.80 | 148.98 | 98.68 | 113.22 | 100.00 | 155.15 |
| Air-conditioner | 17.59 | 312.13 | 36.18 | 145.45 | 57.58 | 194.80 |
| Cell phone | 97.96 | 95.96 | 92.76 | 114.15 | 95.76 | 102.47 |
| Computer | 65.44 | 152.96 | 53.95 | 116.36 | 54.55 | 149.49 |
| Tablet | 11.45 | 9.09 | 13.16 | 18.18 | 16.97 | 72.73 |
| Electric/jet pump | 7.36 | 41.82 | 3.95 | 54.55 | 10.91 | n/a |
| Generator | 3.68 | n/a | 2.63 | n/a | 2.42 | 863.64 |
| Vehicle | 84.25 | 2,380.45 | 65.79 | 3,459.71 | 86.06 | 3,836.69 |
| Motorcycle | 19.63 | 373.20 | 20.39 | 384.42 | 17.58 | 493.18 |
| **Livestock** | | | | | | |
| Big livestock | 19.63 | 841.35 | 9.87 | 400.00 | 29.09 | 601.40 |
| Small livestock | 15.95 | 1,640.11 | 16.45 | 1,513.64 | 40.61 | 929.18 |
| Fowl | 33.54 | 117.20 | 25.00 | 212.00 | 37.58 | 184.95 |
| **Agricultural** | | | | | | |
| Wagon | 9.82 | n/a | 6.58 | n/a | 22.42 | 72.73 |
| Plough | 72.19 | 350.84 | 46.71 | 375.00 | 75.15 | 374.16 |
| Tractor | 76.89 | 3,012.40 | 51.97 | 3,830.84 | 84.24 | 4,330.91 |
| Water pump | 18.00 | 72.73 | 27.63 | 93.95 | 51.52 | 272.73 |
| Cutting machine | 5.11 | 145.45 | 7.24 | n/a | 4.85 | 318.18 |
| Sprayer | 49.49 | 349.49 | 38.82 | 184.09 | 73.94 | 386.36 |
| Mattock | 82.82 | 8.07 | 79.61 | 1.82 | 93.94 | n/a |
| Sickle | 43.35 | 6.36 | 43.42 | 3.64 | 69.09 | n/a |
| Other | 13.50 | n/a | 20.39 | 592.73 | 24.24 | n/a |

**Table A6.** Reported sickness in last 30 days by gender and age, by farmer type

| Age | Current | | Former | | Never | |
|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female |
| <15 | 4.81% | 7.08% | 5.88% | 0.00% | 14.29% | 18.18% |
| 15-20 | 2.63% | 10.00% | 6.67% | 21.43% | 15.79% | 9.09% |
| 21-35 | 2.56% | 1.08% | 4.76% | 0.00% | 6.52% | 12.82% |
| 36-60 | 2.88% | 4.42% | 2.20% | 4.49% | 7.62% | 16.96% |
| >60 | 11.31% | 12.69% | 7.04% | 21.15% | 13.75% | 14.06% |
| Total | 4.52% | 5.74% | 4.66% | 9.14% | 10.33% | 15.06% |

**Table A7.** Log regression of green tobacco sickness symptoms using the method: ML - binary logit(Newton-Raphson/Marquardt steps)

| VARIABLES | IF GREEN TOBACCO SICKNESS SYMPTOM:2-4 |
|---|---|
| | |
| If tobacco farmer | 2.809954*** |
| | (0.866650) |
| Age | -0.030956** |
| | (0.012502) |
| Days worked on tobacco farming | 0.072430* |
| | 0.000212 |
| Cost of pesticide for tobacco | 0.000678 |
| | 0.000686 |
| | |
| Observations | 407 households after adjustment |

Note: Robust standard errors in parentheses, ***p<0.01, **p<0.05, ***p<0.1**

Table A7 reports the results of a log regression, predicting individuals reporting major symptoms of green tobacco sickness (GTS). Tobacco farming is the largest predictor of having major symptoms of green tobacco sickness. The dependent variable is if respondents report 2 to 4 GTS symptoms in the last 30 days. Working from existing literature that examines GTS, factors used include tobacco farming, age of the household head, cost of pesticide (as a proxy for magnitude of pesticide use, because exposure to these chemicals can cause symptoms similar to GTS), and the number of days **worked per year. Results show the best** predictor of GTS symptoms is whether a respondent was evera tobacco farmer.

- **Box A3. New governmental measures for agricultural subsidies**

National plan for food security and intervention plan[64]

The Ministry of Agriculture prepared the National Plan for Food Security based on several meetingswith economic and social partners, farmers, the scientific community, and sub sectoral groups.

As positive steps in the direction of increasing the importance and support of other crops such as wheat, corn, barley, and sunflower, the measures introduced by the Ministry of Agriculture in 2022 are listed**. It is essential that the financial support for these crops (20 percent of the total crop subsidies for 2022 and 11 percent of total agricultural subsidies for 2022) increases significantly while developing the strategic importance of these crops and thus providing a motive for diverting farmers to the cultivation of wheat, corn, barley, and sunflower**.

The National Plan contains measures aimed at sustainable and increased production of strategic agricultural products. The intervention fund for farmers is an integral part of the National Plan. **It is crucial that the financial measures of the National Plan are directed specifically towards wheat, corn, barley, and sunflower farmers**. **The National Plan is introducing new additional subsidies for wheat, corn, barley, and sunflower farmers**. This is done in order to provide additional support to farmers so that they have lower costs, sustainable production, and a stable foodmarket for basic agricultural and food products.

At the same time, **the model of payment of subsidies has also changed in the interest of farmers, in accordance with European regulations, as an early advance payment** is now envisaged, whenthe financial resources are most needed by farmers.

The direct payment program for the first time in 2022 complies with the European Union policies, through the introduction of a pilot measure in fruit growing for a linear subsidy and advance payment of subsidies at the beginning of the season for the fruit-growing sector. **This measure is based on the European "decoupling" measure, which implies a linear payment for arable agricultural areas independent of the crop.**

The measures are:

- A new support measure for the purchase of artificial fertilizers for areas sown with wheat and corn at USD 66, if a minimum of 200 kilograms of fertilizer per hectare is used. Namely, this is additional support for the purchase of artificial fertilizers for wheat. This means the governmentsubsidizes about 40 percent of the costs of purchasing artificial fertilizer for wheat areas. It is crucial that payments will be made on a weekly basis.
- In order to increase the production and yields of wheat, additional support is envisaged. All farmers who achieve a minimum yield of 4,000 kilograms of wheat per hectare will receive an additional subsidy of USD 96 per hectare. With these changes, it provides additional motivation for increased wheat yield: about 6,000 wheat producers who have more than one hectare have the opportunity to receive about USD 96 per hectare if they have a yield of more than 4,000 kilograms. The measure would cover 6,000 producers with more than 22,000 hectares of wheat.
- An additional subsidy of USD 96 per hectare for all farmers who have one or more hectares of barley, corn, rye, oats, and sunflower.
- A new measure of USD 41 per hectare for the cost of purchasing artificial fertilizers is given to barley producers, for a minimum of 200 kilograms of fertilizer used per hectare.

- New intervention subsidy of USD 42 for sunflower per hectare for the cost of purchasing artificialfertilizers, for a minimum of 100 kilograms of fertilizer used per hectare.
- A new intervention subsidy of USD 6 per hectare for the purchase of liquid foliar fertilizers, for a minimum of 6 liters of liquid fertilizer used per hectare for wheat, barley, corn, and sunflower. Acondition for applying for this intervention measure is that farmers in the 2021/2022 production year have areas sown with wheat, barley, corn, and sunflower and have procured artificial fertilizers to feed the crops in the period from December 1, 2021, to May 31, 2022.
- Measure for financial support for produced and delivered milk, which provides milk producers with additional support per liter for produced and delivered cow's milk at processing facilities registered in the Register of purchasers of agricultural products in the period from January 2022to April 2022.
- Intervention measure for wine to support the placement and export of wine and intervention measure for the production of planting material. With this measure, producers of vines and fruit seedlings intended for export are supported.
- Intervention measures to support autumn sowing, through which the Ministry provides support for agricultural holdings to use certified seed material and fertilization in order to obtain greaterdomestic production of wheat.
- Increased support for marked heads of sheep from USD 16 to USD 20 per head of sheep.
- Increased support for laying hens slaughtered in registered slaughter facilities, from USD 1.2 to USD 2 per hen slaughtered.
- **Additional financial support of USD 0.5 per for rice barley from** the 2021 harvest sold in registeredfacilities for purchase. The measure will be valid for delivered rice as of June 30, 2022.
- **A very important additional measure for stimulating farmers to grow wheat, corn, barley, sunflower, rye, rice, oilseed rape, fodder pea, and triticale, is the allocation of state agricultural land—almost 6,000 hectares—to farmers for the production of these strategic crops**. The goal is to increase the arable land with strategic crops of wheat, corn, barley, and sunflower, by securing and allocating additional agricultural arable land for the farmers. In this way, the total annual domestic production of strategic crops in the country will increase and the dependence on imports of these crops will be reduced. **This measure additionally strengthens the motivation for other farmers to reorient and to start cultivating exclusively wheat, corn, barley, sunflower, rye, rice, oilseed rape, fodder pea, and triticale.**

***These year's measures are specifically** created to prevent the abuse of subsidies, something that was perceived as a weak point in the subsidies system. The aim is that the subsidies end up in the hands of real farmers.