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Comparative Profitability of Tobacco and Field Tomatoes in Poland, 2023-2025

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Abstract:

Purpose: *The study aims to assess and compare the economic performance and profitability of tobacco (Nicotiana tabacum L.) and field tomato (Solanum lycopersicum L.) cultivation in Poland during 2023-2025. It identifies production, cost, and income determinants for both crops and evaluates their potential role within the framework of sustainable agricultural development and the European Green Deal.*

Design/Methodology/Approach: *The research was conducted using data derived from two national farm accountancy systems: AGROKOSZTY and the Polish FADN, which are partially compatible with each other. The analysis covered eight farms growing tobacco and a group of tomato producing farms. Cost and income accounts were compiled according to the AGROKOSZTY system methodology, distinguishing direct and indirect costs, gross margins, and income both with and without subsidies. Additional data were obtained from Statistics Poland, the Agency for Restructuring and Modernisation of Agriculture, and sectoral organisations. All financial data were converted into euros based on the National Bank of Poland's exchange rates.*

Findings: *Results indicate that in the research years (2023-2025) the production value of field tomatoes (EUR 14,566–19,392/ha) exceeded that of tobacco (EUR 11,293–12,759/ha) by 29–52%. However, tomato cultivation incurred approximately five times higher direct costs (EUR 9,031–9,877/ha) than tobacco (EUR 1,877–1,916/ha). Consequently, from production of tobacco achieved higher and more stable incomes from activity, while tomato profitability declined sharply after 2023. In 2025, costs represented about 90% of the tomato farm gate price, compared with 58% for tobacco. Both crops are labour-intensive, with over 60% of total labour provided by farmers and family members. Income from tobacco cultivation covered family labour costs in all years, while in tomato farms this occurred only in 2023–2024.*

Practical implications: *The findings demonstrate the economic challenges of field tomato cultivation under Polish climatic conditions and its strong dependence on domestic processing demand. The results of research may inform farm-level decision-making and agricultural policy related to crop diversification, subsidy allocation, and sustainable production models.*

Originality/Value: *This study provides the first systematic comparative assessment of the production and income structure of tobacco and field tomatoes in Poland using harmonised AGROKOSZTY–FADN data. It contributes to the discussion on sustainable alternatives to tobacco cultivation and offers evidence-based insights for policymakers and producers.*

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1. Introduction

The common tobacco (*Nicotiana tabacum* L.), similarly to the common tomato (*Solanum lycopersicum* L.), is an annual dicotyledonous species belonging to the Solanaceae family. Both tomatoes and tobacco—progenitors of the currently cultivated varieties—originate from South America, where they were grown by the indigenous populations long before the arrival of Christopher Columbus (Wang and Bennetzen, 2015; Buraczyńska *et al.,* 2002; Bajon and Kobus-Cisowska, 2024; Shukla *et al.,* 2013).

At present, tobacco cultivation is carried out in more than 120 countries worldwide, covering a total area of approximately 4 million hectares (Nakamatte *et al.,* 2024). Optimal conditions for its cultivation occur in the warmer regions of the temperate zone as well as in tropical and subtropical climates (Ali *et al.,* 2023). Global tobacco production in 2022 amounted to approximately 5.8 million tonnes, with China being the largest producer, accounting for more than 2 million tonnes. Other major producers include India, Brazil, Indonesia, and the United States (Fleck, 2024; Nghiem *et al.,* 2024; Trojak-Goluch, 2024).

Within the European Union (EU), tobacco cultivation is concentrated in 11–12 Member States, among which the major producers are Italy, Spain, Poland, Greece, Croatia, France, Hungary, and Bulgaria. These countries together account for approximately 99% of the EU's total tobacco output (European Commission [EC], n.d.[a]). In 2022, tobacco production in the EU amounted to nearly 136 thousand tonnes (Trojak-Goluch, 2024), whereas projections for 2025 indicate a possible decline to around 120 thousand tonnes (AGROPOLSKA, 2024b).

According to data from the Food and Agriculture Organization of the United Nations, in 2023 field tomato cultivation was carried out in 167 countries across the world, covering an area of approximately 5.4 million hectares (Food and Agriculture Organization of the United Nations [FAO], n.d.). For many years, the major producers of tomato fruit have been China, India, Turkey, and the United States (Bajon and Kobus-Cisowska, 2024). Tomatoes are cultivated both in highly developed countries, characterised by a high level of agricultural industrialisation, and in developing

countries. This is due to the relatively high profitability of tomato production and the species' broad adaptability to diverse climatic and soil conditions (Górnicki et al., 2017; FAO, n.d.).

Because of their high nutritional value and versatile use in the food industry, tomatoes represent an important component of global crop production. They are particularly valued for their richness in vitamins (including C, E, and B-group), minerals, and bioactive compounds such as lycopene, a carotenoid with strong antioxidant properties (Riahi and Hdider, 2013; Ali *et al.,* 2020; Wu and Yu, 2022). In contrast to tobacco, which serves primarily as an industrial raw material and has no nutritional significance, tomatoes constitute a crop of high dietary and pro-health value, playing a significant role in shaping a sustainable food system.

According to the European Commission (EC, n.d.[b]), tomato production in the European Union decreased from 17.9 million tonnes on average in 2015–2017 to 16.1 million tonnes in 2022–2024, and the share of this crop in the total EU vegetable output declined from 28.8% to 26.6% over the same period. The leading producers remain Italy, Spain, Portugal, Poland, Greece, the Netherlands, and France. Between 2022 and 2024, tomato yields in Italy reached 6.1 million tonnes, a decline of 3.6% compared with 2015-2017.

In the same period, production increased by 5.5% in Portugal and 5.3% in Poland, while declines were recorded in Spain (by 19.9%), Greece (by 27.2%), the Netherlands (by 13.6%), and France (by 13.7%).

Both tobacco and tomato production are important to the economies of many countries. Therefore, the costs and incomes from activity derived from their production are of interest not only to agricultural producers and processors of these products, but also to policymakers.

The observations and policy suggestions presented in the article are consistent with the broader theory of economic interventionism. The study demonstrates that market forces alone may not provide sufficient incentives for stabilising production or securing long-term income streams for growers, especially in the tomato sector, which is strongly dependent on the purchasing strategies of domestic processing plants.

Consequently, targeted public support—ranging from investment in irrigation infrastructure to instruments reducing regulatory uncertainty—could play a crucial role in enhancing the resilience and economic sustainability of both sectors.

Although numerous studies on selected aspects of tobacco and field tomato cultivation are available in the literature, these studies are usually one-sided, focusing either on analyzing the profitability of one of these production directions or on assessing their environmental, technological, or social aspects.

However, there is a lack of integrated and comparative economic analyses that would simultaneously consider the cost structure, level and stability of income, specific production risks, and market conditions for both crops in a single country. Previous publications also lack studies based on harmonized microeconomic data from agricultural accounting systems (AGROKOSZTY and FADN), which would allow for reliable and fully comparable cost and income calculations.

2. Literature Review

In recent years, a consistent decrease in the area under tobacco cultivation has been observed across EU countries. In Poland, this trend (Table 1) is also noticeable (Kozdra, 2018; Mazurek, 2022; Trojak-Goluch, 2024). This phenomenon results primarily from the declining profitability of production, but also from the ongoing reduction in the consumption of tobacco products (EC, n.d.[a]; Mazurek, 2022).

The decrease in tobacco consumption is associated with growing public awareness of its adverse effects on health. Tobacco use is recognised as one of the main risk factors for respiratory and cardiovascular diseases, as well as cancers of the trachea, bronchi, and lungs, among other serious conditions often leading to premature death (World Health Organization, 2025).

Tobacco was introduced to Polish lands at the end of the 16th century, whereas its commercial cultivation began at the turn of the 17th and 18th centuries. However, dynamic development of this branch of agriculture occurred only in the 20th century (Buraczyńska *et al.,* 2002). In the last five years (2020-2024), annual production of tobacco leaves in Poland ranged from 17 to 21 thousand tonnes (Statistics Poland [SP], 2024b, 2025b, 2025c), while forecasts for 2025 indicate a level of around 19 thousand tonnes.

Two main groups of light cigarette tobacco—Virginia and Burley—dominate the national production structure. Together, they account for approximately 96% of the total tobacco cultivation area, with the Virginia type representing about 70% of the area cultivated in Poland. The remaining 4% consists of dark cigarette tobacco varieties, including Puławski, Mocny Skroniowski, and Kentucky (Buraczyńska *et al.,* 2002; Trojak-Goluch, 2024).

Table 1. *Basic information on the cultivated area, yields, production, prices and procurement value of tobacco and field tomatoes in Poland in 2019-2025*

Specification	Cultivated area (in fields), thousand ha	Yields, dt/ha	Production, thousand tonnes	Average procurement prices, EUR/dt	Procurement value, million EUR

Years of research	**Tobacco**				
2019	15.0	18.7	28.8	236.39	42.9
2020	9.8	20.8	20.4	233.08	31.2
2021	9.6	21.7	20.7	255.90	31.8
2022	8.0	20.8	16.6	377.40	47.5
2023	8.5	20.5	17.4	494.04	63.5
2024	9.3	20.6	19.2	435.11	52.7
2025	9.0	21.0	18.9	436.24	.
Years of research	**Field tomatoes**				
2019	10.0	240	241	44.76	102.3
2020	6.3	310	195	48.40	79.6
2021	5.9	271	161	49.40	101.3
2022	5.5	310	171	59.56	124.2
2023	5.4	314	170	61.76	140.5
2024	7.0	291	203	50.05	124.2
2025	7.5	305	228	.	.

Note: *[.] - no data.*
Sources: *Statistics Poland, 2024b, 2025b, 2025c. The data for 2025 were estimated by the authors of this study on unpublished data from the Statistics Poland.*

Due to tobacco's high requirements for air temperature, soil moisture, and nutrient content (Buraczyńska et al., 2002; Tang et al., 2020; Zhao et al., 2021), this crop is not cultivated in every voivodeship in Poland (Statistics Poland [SP], 2024a, 2025b). Cultivation constraints also arise from legal regulations.

Information concerning the tobacco species permitted for cultivation in Poland and the regions where their production is allowed is specified in the Regulation of the Minister of Agriculture and Rural Development of March 2012 (Regulation, 2012). In the years 2022–2024, the predominant share of tobacco cultivation area (95–96%) was concentrated in five voivodeships in total (Table 2).

Table 2. *Voivodeships with a relatively large share of tobacco and field tomato cultivation area in 2022-2024*

Specification	Years of research								
	2022			2023			2024		
Voivodeship	A	B	C	A	B	C	A	B	C
	Tobacco								
Lubelskie	**1**	5.27	66.1	**1**	5.62	66.2	**1**	6.13	65.9
Podlaskie	**5**	0.41	5.1	**5**	0.40	4.8	**4**	0.43	4.7
Małopolskie	**3**	0.45	5.6	**3**	0.46	5.4	**3**	0.44	4.8
Podkarpackie	**2**	1.03	12.9	**2**	1.18	13.9	**2**	1.49	16.0

Świętokrzyskie	**4**	0.43	5.4	**4**	0.43	5.1	**5**	0.42	4.5
	Field tomatoes								
Lubelskie	**3**	0.61	11.1	**4**	0.57	10.6	**2**	1.11	15.9
Łódzkie	**4**	0.58	10.4	**3**	0.62	11.5	**4**	0.73	10.4
Mazowieckie	**5**	0.48	8.7	**5**	0.50	9.2	**5**	0.47	6.7
Kujawsko-pomorskie	**2**	1.07	19.3	**2**	0.89	16.4	**3**	1.07	15.3
Wielkopolskie	**1**	1.58	28.5	**1**	2.00	37.0	**1**	2.56	36.7

Note: *A - Voivodeship's position according to the area under cultivation of the plant in question; B - area of cultivation of the plant in question in a given voivodeship, thousand ha; C - share of the area of cultivation of the plant in question in a given voivodeship in the total area of cultivation of this plant in Poland, %.*
Sources: *Prepared based on data from the Statistics Poland; for 2022, unpublished data from the SP and SP, 2024a, 2025b.*

In Poland, the history of field tomato cultivation is relatively short, dating back to the 19th century. Initially regarded as an ornamental plant, the tomato began to be grown in home gardens as a food crop at the turn of the 19th and 20th centuries.

Large-scale production developed during the interwar period, especially in the territories of Wielkopolska and Mazowsze. In the 1960s and 1970s, tomato production intensified owing to the introduction of new, disease-resistant cultivars better adapted to Polish climatic conditions (Bajon and Kobus-Cisowska, 2024).

In the following decades, tomatoes gained increasing importance in the processing industry, particularly in the production of concentrates, juices, and purées. After the economic transformation of the 1990s, the importance of commercial varieties intended for the fresh market and export increased. As a result, Poland is currently one of the leading tomato producers in Central and Eastern Europe (Chudzik, 2007).

In comparative terms, field tomato cultivation in Poland is characterised by much higher production value and greater development potential than tobacco cultivation. While tobacco production in Poland has been steadily declining since the beginning of the 21st century due to decreasing profitability and demand (Kozdra, 2018; Mazurek, 2022; Trojak-Goluch, 2024), the area under tomato cultivation has remained relatively stable, with growth largely determined by the demand from domestic processing plants.

Furthermore, tomato cultivation aligns with the principles of sustainable agricultural development, promoting the production of nutritionally valuable food with a lower environmental footprint. Unlike tobacco, whose use generates significant environmental and public health burdens, tomato production can serve as a more environmentally friendly alternative, particularly in the context of the European Green Deal and the Farm to Fork Strategy.

3. Research Methodology

The numerical data used in this study were collected within two research systems: the AGROKOSZTY system and the Polish FADN system, which are partially compatible with each other. Both are operated by the Institute of Agricultural and Food Economics – National Research Institute (IERiGŻ-PIB) in Warsaw, Poland. A substantial part of the source data necessary for preparing the presented cost and income calculations for tobacco and field tomato cultivation (see Diagram 1 for the calculation model) was gathered directly in Polish private farms by agricultural advisors from regional agricultural advisory centres.

However, for the preparation of these calculations (which are largely estimations), unpublished and published data from Statistics Poland were also used. Additional numerical data were obtained from the National Association of Juice Producers, from producer organisations specialising in tomato cultivation, and from the National Association of the Tobacco Industry.

In the case of tobacco, actual data were collected in 2024 from eight farms, including yields, selling prices of tobacco leaves, and direct production costs (such as the costs of seed material, fertilisers, plant protection products, growth regulators, and other direct expenses, including temporary hired labour for specialised tasks). These data enabled the compilation of an account for 2024 up to the first income category, namely gross margin (Augustyńska and Bębenista, 2020).

The calculation of subsequent income categories was made possible through data drawn from the Polish FADN system on indirect costs incurred in farms (both actual and estimated). Actual indirect costs included, among others, expenditures on electricity, fuel, heating, hired labour, interest on loans, rental fees for land and buildings, and agricultural taxes. Estimated indirect costs covered depreciation of buildings, structures, machinery, and equipment.

Diagram 1. *Costs and incomes statement template for crop production activities*

I	Total production value
II	– Total direct costs
III	**= Gross margin**
IV	– Total indirect costs
V	**= Income from activity without subsidies**
VI	+ Total subsidies
VII	**= Income from activity (including subsidies)**

Source: *Authors' own study based on the AGROKOSZTY system methodology.*

The accounts reflecting production and economic results of tobacco cultivation in 2023 and 2025 are estimates derived from actual 2024 data. In contrast, the cost and income accounts for field tomato cultivation required a different approach due to the absence of recent direct data collection within the AGROKOSZTY system.

For this reason, the tomato accounts for 2023–2025 were developed using an estimation procedure based primarily on data from farms participating in the Polish FADN system in 2023, supplemented with market information and updated input price indices.

In the first stage, FADN data on the structure and level of direct costs, labour input, and the use of fertilizers, plant protection products, and certified seed material served as the reference point for reconstructing the cost calculation model. These values were subsequently updated using indices of changes in input prices (including fertilizers, plant protection products, energy, and fuels), obtained from Statistics Poland, the Institute of Agricultural and Food Economics, and interviews with representatives of purchasing centres and producer organisations.

Tomato selling prices were determined using market data and direct interviews with fruit and vegetable purchasing centres, while yields were estimated by aligning regional yield data from Statistics Poland with the structural characteristics of farms recorded in the FADN database and adjusting for production intensity.

Indirect costs were calculated on the basis of average values observed in horticultural farms of similar production profiles in the FADN system, maintaining the typical proportion between direct and indirect costs in this type of activity. Information on subsidy levels for both crops was obtained from the Agency for Restructuring and Modernisation of Agriculture (ARMA), including basic income support, redistributive payments, and crop-specific subsidies.

Although the adopted procedure allows for the reconstruction of realistic economic accounts, it introduces a degree of uncertainty arising from the extrapolation of FADN data, the reconstruction of input and output prices, yield imputation, and the averaging of indirect costs.

The combined potential estimation error may be in the range of 20–30%, which is acceptable for trend-based analyses but requires explicit consideration in the interpretation of results. The study also presents selected indicators of economic efficiency for tobacco and tomato cultivation. The results are presented mainly in tabular form, except for the structure of direct costs, which is shown graphically.

All monetary values were originally expressed in Polish zlotys (PLN) but were converted into euros (EUR) for this analysis according to exchange rates published by the National Bank of Poland (NBP, 2025). For prices, production values, costs, and incomes in 2023 and 2024, annual average PLN/EUR exchange rates were applied, while for 2025 the average rate for January–September was used.

For subsidies, the exchange rate from 30 September of each year, published by the European Central Bank, was adopted (Agency for Restructuring and Modernisation of Agriculture, 2023; AgroProfil, 2025).

The results of the study are not representative of all Polish private farms cultivating tobacco or field tomatoes. Nonetheless, they allow for an assessment of trends in production and economic performance of these crops. These changes are influenced by numerous macro- and microeconomic factors and may serve as a reference point for analysing the economic condition of farms at the microeconomic level.

The primary objective of the study was to assess and compare the profitability of tobacco and field tomato cultivation in Poland during 2023–2025. Furthermore, the research identified the main internal production factors that dominated the structure of direct costs and significantly influenced the economic results obtained.

4. Research Results and Discussion

During the study period, the cultivated area of both crops in the selected farms showed relatively small fluctuations. Since 2020, the area under field tomato cultivation in Poland has remained relatively stable (SP, 2025b), although a slight upward trend was observed in 2024–2025 (Table 1).

Unpublished estimates by Statistics Poland indicate that in 2025 the tomato cultivation area amounted to approximately 7.5 thousand hectares, compared to 5.4 thousand hectares in 2023 and 6.3 thousand hectares in 2020.

Between 2020 and 2025, the share of field tomato cultivation in total open-field vegetable area ranged from 3.5% to 4.6%, while the share in total harvest volume increased from 4.4% in 2023 to 5.6% in 2025.

The tobacco cultivation area ranged between 5.7 and 6.2 ha, while the area under tomatoes gradually expanded—from 5.4 ha in 2023 to 7.5 ha in 2025. The relatively small plot sizes shown in Table 3 justify the conclusion that both crops are often cultivated in small private farms (Czubiński, 2022; Spasova Mijovic *et al.,* 2023).

In the analyzed farms, tobacco yields between 2023 and 2025 were relatively stable, averaging 26–27 dt/ha, whereas tomato yields were several times higher, ranging from 291 to 314 dt/ha, with greater year-to-year variability.

According to FAO (2025a; 2025b), the average global yield of tobacco leaves is 20–25 dt/ha, while that of fresh field tomatoes is 450–650 dt/ha.

Thus, tobacco yields in Poland were close to global averages, whereas tomato yields were significantly below the world level. The relatively lower tomato productivity results primarily from less favorable climatic conditions in Poland compared to southern European countries such as Italy.

As noted by Peña *et al.* (2022), yield levels and production volume are key determinants of a crop's economic profitability.

Table 3. *Production, costs and income from growing tobacco and field tomatoes in Poland in 2023-2025*

Specification	Unit of measure	**Tobacco**			**Field tomatoes**		
		Years of research					
		2023	2024	2025	2023	2024	2025
Crop area	ha	5.70	6.24	6.04	5.40	7.00	7.50
Yield	dt/ha	26.42	26.55	27.07	314	291	305
Product selling price	EUR/dt	482.93	425.33	426.37	61.76	50.05	48.34
		Per 1 ha of crops					
Total production value	**EUR**	**12759**	**11293**	**11542**	**19392**	**14566**	**14744**
Total direct costs	EUR	1877	1893	1916	9031	9458	9877
Gross margin	**EUR**	**10882**	**9400**	**9626**	**10361**	**5108**	**4867**
Total indirect costs	EUR	4500	4498	4727	3302	3316	3430
Income from activity without subsidies	**EUR**	**6382**	**4902**	**4899**	**7059**	**1792**	**1437**
Total subsidies	EUR	1906	1716	1576	590	643	647
Income from activity (including subsidies)	**EUR**	**8288**	**6618**	**6475**	**7649**	**2435**	**2084**
TOTAL COSTS	***EUR***	***6377***	***6391***	***6643***	***12333***	***12774***	***13307***
Total labour input	**hr**	**394**			**450**		
including: own labour input	h	247			302		

Note: *The total subsidies include basic income support and redistributive payment and - depending on the plant in question - tobacco subsidies or tomato subsidies.*
Source: *Prepared on the basis of data collected in the AGROKOSZTY system and the Polish FSDN system as well as own calculations.*

Significant differences were also observed in the selling prices of the analyzed products. Between 2023 and 2025, the price of 1 decitonne (dt) of tobacco leaves ranged from EUR 425 to 483, whereas producers received only EUR 48 to 62 per 1 dt of tomatoes. This disparity stems from differing market conditions and the specific nature of the raw materials, as the prices of agricultural products depend not only on product quality and demand levels but also on varietal characteristics, production seasonality, and international market trends (Spasova Mijovic *et al.,* 2023; Dağ and Gül, 2024).

Based on the conducted analyses, it was found that despite the lower unit price, the production value of field tomatoes, ranging from EUR 14,566 to 19,392 per hectare, was approximately 29–52% higher than that of tobacco (EUR 11,293–12,759 per hectare). However, it should be emphasized that tomato cultivation generated approximately five times higher direct costs (EUR 9,031–9,877 per hectare) compared to tobacco (EUR 1,877–1,916 per hectare). As a result, the gross margin from tomato cultivation, which in 2023 was only 5% lower than that of tobacco, decreased in 2024 and 2025 by 46% and 49%, respectively.

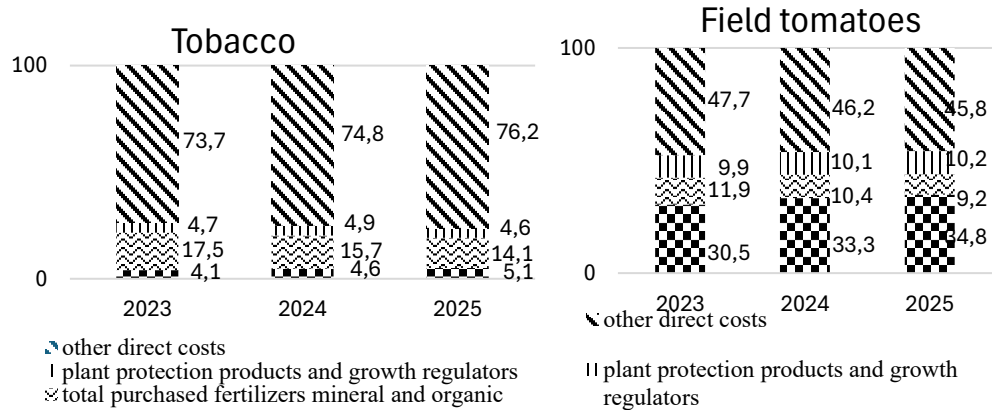
In contrast, the gross margin for tobacco remained relatively stable throughout the analyzed period, while in the case of tomatoes, a distinct downward trend was observed.

The observed variation in profitability levels resulted primarily from the rising costs of production inputs, including fertilizers, pesticides, and energy carriers, a phenomenon already highlighted by Berbeć and Madej (2012). The structure of direct costs for both crops indicates that the largest share was attributed to so-called other direct costs, which include expenditures on energy used for drying tobacco leaves or ventilating tomato storage facilities, as well as wages for seasonal labor related to harvesting and product preparation for sale. The high share of labor costs in the total production cost structure is also confirmed by Hassan *et al.* (2015) and Peña *et al.* (2022).

Another significant component of production costs was fertilization, both mineral and organic, confirming earlier findings on the high share of fertilizer costs in tobacco production (Hassan et al., 2015; Spasova Mijovic et al., 2023). In the case of tomatoes, an important cost factor was also the use of certified seed material, whose role is emphasized by Boyaci et al. (2024) and Bajon and Kobus-Cisowska (2024), who indicate that adequate fertilization levels and seed quality are crucial determinants of high yields and fruit quality.

Indirect production costs also showed an upward trend, with this increase being more pronounced and systematic for tomatoes. During 2023–2025, the indirect costs of tobacco production amounted to EUR 4,498–4,727 per hectare, compared with EUR 3,302–3,430 per hectare for tomatoes, representing a 35–38% difference. Despite higher unit costs, the total production costs of tomatoes, even excluding unpaid family labor, were approximately twice as high as those of tobacco.

Figure 1. *The structure of direct production costs incurred for growing tobacco and field tomatoes in Poland in 2023-2025*



Source: *Own study.*

The analysis of income from activity without subsidies revealed a consistent decline in its level for both crops. In 2023, the income from 1 hectare of open-field tomatoes amounted to EUR 7059, exceeding that obtained from tobacco cultivation by 11%.

However, this relationship reversed in 2024–2025, when the income from tobacco production was 2.7 and 3.4 times higher, respectively. After including subsidies – which accounted for a stable share of 23–26% of total income in the case of tobacco, the situation was balanced only in 2023. In subsequent years, tomato production became increasingly dependent on subsidies, whose share in total income rose from less than 8% in 2023 to over 31% in 2025.

The results of economic efficiency indicators showed that, when expressed per 1 dt of product, tobacco demonstrated greater income stability and a more favorable cost-to-revenue ratio. In 2025, costs accounted for approximately 90% of the selling price of tomatoes, while for tobacco this ratio was significantly more advantageous.

Table 4. *Economic efficiency indicators of growing tobacco and field tomatoes in Poland in 2023-2025*

Specification	Unit of measure	**Tobacco**			**Field tomatoes**		
		Years of research					
		2023	2024	2025	2023	2024	2025
Total direct costs per 1 dt of product	EUR	71,04	71,30	70,79	28,76	32,50	32,38
Total direct costs per PLN 1 of gross margin	EUR	0,17	0,20	0,20	0,87	1,85	2,03
Total costs per 1 dt of product	EUR	241,41	240,72	245,40	39,28	43,90	43,63
The ratio of unit costs (total) to the product's selling price		0,50	0,57	0,58	0,64	0,88	0,90
Income from activity without subsidies per 1 dt of product	EUR	241,56	184,63	180,99	22,48	6,16	4,71
Income from activity (including subsidies) per 1 dt of product	EUR	313,69	249,27	239,21	24,36	8,37	6,83
Income from activity (incl. subs.) per 1 h of own labour input	EUR	33,55	26,79	26,22	25,33	8,06	6,90
The share of subsidies in income from activity	%	23,0	25,9	24,3	7,7	26,4	31,1

Source: *Prepared on the basis of data collected in the AGROKOSZTY system and the Polish FSDN system as well as own calculations.*

Both tobacco and open-field tomatoes are labor-intensive crops, as confirmed by the results of this study and previous research (Ali et al., 2023; Spasova Mijovic et al., 2023; Kareska, 2024). More than 60% of total labor input consisted of the work performed by farmers and their family members. The average cost of family labor, estimated by IAFE-NRI (SP, 2025a) and converted into euros, amounted to EUR

1750/ha for tobacco and EUR 2139/ha for tomatoes. This means that income from activities fully covered the cost of family labor in the case of tobacco throughout the study period, whereas for tomatoes this was observed only in 2023–2024.

5. Conclusions, Proposals, Recommendations

Based on the conducted research, it was found that tobacco cultivation in Poland is currently characterised by a significantly lower production value than the production of open-field tomatoes. However, due to the considerably lower total production costs incurred per hectare, the income from activities generated from tobacco cultivation remains higher than that obtained from tomato production.

An important finding of the study is the greater income stability observed in tobacco leaf production, whereas tomato production in Poland is strongly dependent on external factors such as weather conditions, fluctuations in farm-gate prices, and—above all—the demand and purchasing decisions of domestic processing plants, which directly influence both the scale and profitability of production in a given season.

This dependence on the processing industry continues to shape the economic condition of the sector. At the same time, in view of the ongoing climate warming, it may be assumed that, aside from the increasing frequency of extreme weather anomalies, the conditions for achieving higher tomato yields could become generally more favourable in the coming years, potentially improving the economic performance of this crop.

With regard to the tobacco sector, recent reports indicate that it is currently undergoing a breakthrough phase in Poland, and the outcome of this process may substantially affect the future trajectory of the entire industry (AGROPOLSKA, 2024a). Maintaining the pace of investment and the development of innovative tobacco products—such as heated tobacco or e-cigarettes—at levels similar to those observed in recent years may contribute to strengthening the sector's economic importance and securing stable incomes for agricultural producers.

According to Trojak-Goluch (2024), the sector remains economically significant, yet its future will depend to a large extent on regulatory and fiscal decisions. A slowdown in investment dynamics, combined with the planned increase in fiscal burdens within the European Union, particularly in the area of excise taxation, may reduce the competitiveness and profitability of tobacco cultivation, intensifying the challenges already highlighted in sectoral analyses.

The findings of this study carry important implications for agricultural policy. Given the distinct production characteristics and income risk profiles of the two crops, support instruments should be differentiated to better reflect the structural conditions of each sector. In the case of tomatoes—which exhibit strong sensitivity to both agro-climatic variability and changes in processing demand—greater emphasis on risk

mitigation tools and on support for investments in irrigation, protective infrastructure, and technologies stabilising yields would contribute to reducing income volatility.

Strengthening the domestic processing base, which has a decisive influence on production scale and farm profitability, may also enhance sectoral stability. In regions where tobacco continues to play an important socioeconomic role, diversification strategies aligned with current EU objectives could support producers in adapting to changing market and regulatory conditions, especially if the sector experiences increased fiscal pressure.

At the farm level, both crops require careful cost management due to their high labour intensity, although the scale of direct costs is substantially higher in the case of tomatoes. The adoption of practices that stabilise yields and reduce vulnerability to climatic and market fluctuations—such as improved irrigation, better planning of production cycles, and the use of high-quality plant material—may contribute to improving the profitability of tomato cultivation.

Closer cooperation between producers and processing plants, including more stable contracting arrangements, would help mitigate the uncertainty surrounding farm-gate prices and raw material demand. For tobacco, maintaining economic viability will depend on efficient organisation of production, stable access to markets, and the ability of the sector to adjust to evolving regulatory frameworks.

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