



Exploring the Relative Economics of Tobacco and its Major Competing Crops – A Study in the Terai Region of West Bengal

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ABSTRACT

This present study was conducted during the months of January–August, 2023 under the Department of Agricultural Economics, Uttar Banga Krishi Viswavidyalaya, Pundibari, Cooch Behar, India to explore the reasons behind the persistence and rising trend of tobacco cultivation despite the implementation of multiple tobacco control laws in India. By adopting the technique of multi-stage random sampling, the researchers drew 72 samples of farmer respondents in the Cooch Behar district of West Bengal. The study aimed to elucidate a clue to the core question, ‘why did farmers persist in cultivating tobacco despite the enactment of tobacco-related laws and awareness campaigns of its harmful effects?’ Standard statistical/economic tools and concepts were used to address the study’s diverse objectives. Maize and potato were found to be the two most prominent competing crops of tobacco during the *rabi* season. Our study proved the superiority of the two most popular cultivars of tobacco, i.e., Jati and Motihari, over the competing crops in terms of cost of cultivation, net return, cost of production, etc. Return per rupee (in terms of Cost A₁) happens to be 4.76 and 4.70 for Jati and Motihari tobacco, which is substantially higher than that of maize (2.56) and potato (2.70). The study’s outcome indicated that farmers prefer tobacco cultivation due to its greater profitability, established market demand for tobacco products, simplicity and ease of cultivation, and other favorable factors. Also, compared to other crops, tobacco growers experienced fewer instances of market malfunction in the study area.

KEYWORDS: Tobacco, economics, perceived reasons for continuance, market malfunctioning

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1. INTRODUCTION

Tobacco (*Nicotiana tabacum*) cultivation in India traces its roots back to 1605 when it was introduced by the Portuguese (Anonymous, 2014). India gained prominence on the world tobacco map after 1930. Today, tobacco plays a vital role in the national economy by providing livelihoods to 3% of the total population (approximately 45.7 million) directly or indirectly (Anonymous, 2019). India stands out as the sole country producing tobacco in tropical, sub-tropical, and temperate climates (Anonymous, 2020). The 2004 Report on Tobacco Control in India acknowledges the significant contribution of tobacco to the Indian economy in terms of agriculture, industry, and exports (Anonymous, 2004). In terms of foreign exchange earnings, the tobacco industry contributed ₹ 16728 crore to the national exchequer during the fiscal year 2024–25 (Anonymous, 2024). India's tobacco export market extends to over 115 countries worldwide. Globally, India ranked 2nd in the production of tobacco after China, followed by Brazil and Indonesia (Anonymous, 2022a). Over the years, % share of India in global tobacco production has been on the rise—from 10.04% at the beginning of this century (i.e., during 2000–01) to 14.12% during 2024–25 (Anonymous, 2025; Kar et al., 2025). This underscores the economic importance of tobacco as a valuable crop in India. In India, six major tobacco-producing states are Gujarat, Andhra Pradesh, Uttar Pradesh, Karnataka, Bihar and West Bengal; together these states share about 98% of the country's tobacco acreage as well as production. West Bengal, an eastern state in the country, ranks 5th (among the tobacco-producing states) by sharing about 3.59% and 2.71% of tobacco acreage and production, respectively in the country (Anonymous, 2021; Anonymous, 2022b). What sets tobacco apart from other crops is its ability to thrive in poor and marginal soils, making it suitable for cultivation in areas where other crops may struggle (Anonymous, 2014; Reichert et al., 2019; Doro, 2023). Its resilience to adverse weather conditions and disease resistance ensures relatively stable yields (Anonymous, 2016; Kakar et al., 2020; Liu et al., 2024). Additionally, tobacco cultivation offers flexibility in planting time, allowing farmers to adjust to market demands and agricultural practices (Anonymous, 2016; Sahadewo et al., 2020). One of the reasons tobacco remains an attractive crop for many farmers is its remunerative nature (Appau et al., 2019). Compared to other crops, tobacco often offers higher returns on investment (Anonymous, 2017; Magati et al., 2019). This financial aspect has contributed to the continued cultivation of tobacco by farmers who rely on its profitability to sustain their livelihoods and support their families (Makoka et al., 2017; Makoye et al., 2022). This study attempts to understand the relative economics of tobacco in Cooch Behar (situated between 25°57'47"

and 26°36'20" North Latitude and between 88°47'44" and 89°54'35" East Longitude) district of West Bengal. Historically, tobacco cultivation was introduced, patronized, and propagated in the princely state of Cooch Behar long ago (O'Malley, 1909; Hunter, 1876). It happens to be the major tobacco growing district in West Bengal and shares a major bulk (about 90%) of tobacco production over the years (Datta and Ghosh, 2025). The district is not only well known for crops like paddy, maize, potato, pulses, etc., but is also known for commercial crops like tobacco, jute, etc. (Anonymous, 2025). This study aims to examine the overall inducing issues which lead tobacco growers to continue their cropping venture (i.e., tobacco), despite enactment of different prohibitory acts, rules and programs for controlling tobacco consumption by Govt. of India (e.g., National Tobacco Control Programme (2007–08), The Cigarettes and other tobacco products (packaging and labelling) Rules (2020) and its subsequent amendments, etc.)

2. MATERIALS AND METHODS

This study was conducted during the months of January–August in the year 2023 in the Cooch Behar district under the Department of Agricultural Economics, Uttar Banga Krishi Viswavidyalaya, Pundibari, Cooch Behar, West Bengal, India. Both primary and secondary data were used to fulfil the objectives with which it was started. Secondary (time series) data on relevant variables were taken from multiple sources, such as websites, reports, government offices, etc. Primary data were obtained from individuals directly involved in tobacco production and processing. The study tried to underpin the 'pros and cons' of the tobacco economy, and therefore, a total of 72 randomly selected tobacco farmers/producers distributed over 4 villages of two blocks of Cooch Behar district constitute the sample. The primary data were collected with the help of a pre-tested survey questionnaire through the face-to-face interview method. Functional heads of the farming households were the respondents for participating in the household survey. The tabular method of analysis was utilized extensively to accomplish the specified objective(s), mainly due to its inherent ability to depict the true state of the economy in a clear and concise manner. The data was presented in tabulated form and subsequently subjected to statistical analysis using software such as SPSS and STATA, etc. The primary focus of the study was to examine the costs and returns associated with tobacco cultivation compared to its competitive crops. To assess the 'Economics' of tobacco cultivation, the production costs for tobacco were calculated using CACP (Ministry of Agriculture and Farmers Welfare, Government of India) concepts extensively. Farming expenses and performances were judged by following formulas:

- i. Cost A_1 =Paid out cost+interest on working capital at 7% per annum, depreciation and repairs of farm tools and machinery (computed through apportioning method), Land revenues, cesses and other taxes.
- ii. Cost A_2 =Cost A_1 +rent paid for leased in land
- iii. Cost B_1 =Cost A_1 or A_2 +interest on amount of owned capital invested in the business excluding the value to land
- iv. Cost B_2 =Cost B_1 +rental value of owned land less land revenue + rent paid for leased in land
- v. Cost C_1 =Cost A_1 +imputed value of family labour
- vi. Cost C_2 =Cost B_2 +imputed value of family labour
- vii. Cost C_3 =Cost C_2 +10% of Cost C_2
- viii. Return over paid out Cost=Gross income-Paid out cost
- ix. Farm business income=Gross return-Cost A_1
- x. Family labour income=Gross return-Cost B_2
- xi. Net Income=Gross return-Cost C_2
- xii. Return per rupee=Total return (TR)/ Cost A_1 and Total Return (TR)/Cost C_2
- xiii. Cost of production=Total cost (Cost A_1)/Total production (in kg.)

In our study, no respondent farmer leased in their land. Therefore, Cost A_1 = Cost A_2 , as rent paid for leased- in land was zero. Further, interest on amount of owned fixed capital was also zero as no fixed assets were used by the tobacco grower farmers for cultivating tobacco. In the study, interest on amount of working capital had been incorporated in case of calculation of Cost A_1 . Therefore, interest on amount of owned capital was zero and Cost B_1 =Cost A_1/A_2 . So, we can infer that Cost A_1 =Cost A_2 =Cost B_1 in case of our study.

Student's t-test was utilised to examine variations between different groups regarding distinct parameters. In this study, Student's t-test was conducted to compare the economic performances of two major tobacco cultivars. The 't' value was calculated using a specific formula, which is:

$$t = \frac{|\bar{X}_1 - \bar{X}_2|}{S \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \text{ with } (n_1 + n_2 - 2) \text{ d.f.}$$

Where,

X_1 =First sample variables

X_2 =Second sample variables

$\bar{X}_1$ =Mean of first sample

$\bar{X}_2$ =Mean of the second sample

S =Pooled standard deviation = $\sqrt{\frac{\sum (X_1 - \bar{X}_1)^2 + (X_2 - \bar{X}_2)^2}{(n_1 + n_2 - 2)}}$

To find out the extent of influence of the factors/reasons, Garrett's ranking technique was adopted. The order of merit as given by the sample respondents was changed into %

position by using the following formula:

$$\% \text{ at position} = (100(R_{ij} - 0.5)) / N_j$$

Where, R_{ij} is the rank given for the i^{th} factor by j^{th} respondent, N_j number of factors ranked by the j^{th} respondent.

3. RESULTS AND DISCUSSION

Globally, tobacco production and marketing expanded worldwide, with major shares taken by China, Brazil, India, the United States, Indonesia, Turkey and some other countries (Anonymous, 2022). The tobacco economy in India was on the rise since 1990–91, as evident from its increasing decadal trend, both in terms of percentage share of global tobacco acreage and production (Table 1). This highlighted the importance and the significant presence of this sector in the Indian agricultural industry and its progression despite several tobacco control programme due to the related health hazards (Teja, 2016; Shaikh et al., 2022).

Cropping pattern could be inferred as the arrangement and combination of different crops cultivated in a particular area, taking into consideration factors such as climate, soil conditions, water availability, market demand, and farming practices (Rukhsana et al., 2021; Mahlayeye et al., 2022). With a rich agricultural heritage and varying climatic conditions, India showcases a multitude of cropping patterns such as mixed cropping, crop rotation, intercropping, multiple cropping, and sole cropping (Sati, 2024a; Sati, 2024b; Sekhar et al., 2024). Farming households in our study sites followed multiple cropping, in general. Multiple cropping, defined as harvesting more than once a year, is a widespread land management strategy in tropical and subtropical agriculture (Yin et al., 2024; Choudhary et al., 2026). It was a way of intensifying agricultural production and diversifying the crop mix for economic and environmental benefits (Waha et al., 2020; Fan et al., 2025). Different/multiple crops were grown on the same land/plot in changing agricultural seasons, i.e., *kharif* (rainy), winter (*rabi*), and pre-*kharif* (summer) in the region. On average, the net cultivable area (NCA) in the Cooch Behar district covered around 248.14 thousand hectares (Anonymous, 2023). Principal crops such as paddy (*kharif* and summer paddy), wheat, maize, jute, potato, tobacco and pulses comprised over 80% of Cooch Behar district's gross cropped area (GCA) in a typical agricultural year. Of these, major winter (*rabi*) season crops were potato, mustard, maize, tobacco, pulses, and wheat, along with some winter vegetables; together, these crops covered more than two-thirds of gross cropped area in the district during the *rabi* season (Table 2).

Tobacco acreage covered around 13 thousand ha in the Cooch Behar district during 2022–23, which happened to

Table 1: Status of India in the global tobacco economy

Year	Tobacco acreage (mha)			Tobacco production (mt)		
	World	India	% to global acreage	World	India	% to global output
1990-91	4.64	0.41	8.83	7.13	0.55	7.71
1995-96	4.15	0.39	9.39	6.28	0.57	9.07
2000-01	4.17	0.26	6.23	6.57	0.66	10.04
2005-06	3.98	0.37	9.29	6.42	0.58	9.03
2010-11	3.95	0.44	11.13	6.83	0.60	8.78
2015-16	3.69	0.47	12.73	7.21	0.73	10.12
2020-21	3.17	0.36	11.35	5.95	0.76	12.77
2024-25	3.22	0.41	12.73	6.09	0.86	14.12

Source: Anonymous, 2025

Table 2: Major *rabi* crops in Cooch Behar during the triennium ending year 2022–23

Crop	Acreage ('000 ha)	% Share to net cultivable area*	Rank
Maize	38.36	15.45	I
Potato	35.33	14.23	II
Mustard	33.36	13.44	III
Tobacco	12.50	5.03	IV
Pulses	10.36	4.17	V
Wheat	5.40	2.17	VI

*Net cultivable area of Cooch Behar is 248.14 thousand ha; Anonymous, 2023

be about 5.03% of the total arable land during the *rabi* season (Table 2), and it ranked 4th in acreage allocation among *rabi* crops. In the opinion of the tobacco growers, potato and maize were the two most desired options for

them to replace tobacco, if needed. Hence, these crops were considered the nearest (possible) competing crops for tobacco cultivation in the Cooch Behar district. In the last three decades (1990–91 to 2022–23), acreage under potato increased 6.19 times compared to tobacco's 1.69 times in Cooch Behar. Acreage under maize had been picking up since 2009–10 in the district, and there had been 4.83 times increase in maize acreage compared to 1.15 times increase during the preceding ten years (2009–10 to 2022–23), as depicted in Figures 1 to 4.

This study was conducted in a traditionally 'tobacco' area where more than 50% farmers had experience of tobacco cultivation for beyond 20 years (Table 3). We obtained tobacco producers with experience of a minimum of 4 years and a maximum of 40 years in our study sites. Compared to tobacco, experience for both maize and potato was relatively less; about 67% of sample farmers had maize cultivating experience within 5 years, and about 50% had experience of potato cultivation for about 10 years (Table

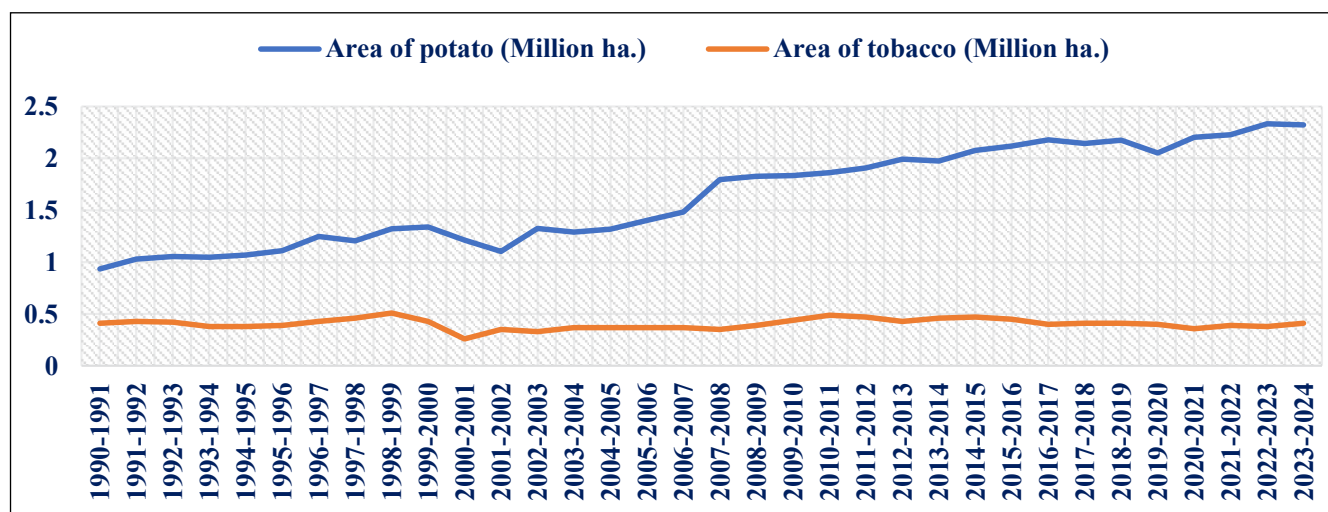


Figure 1: Tobacco and potato acreage in India

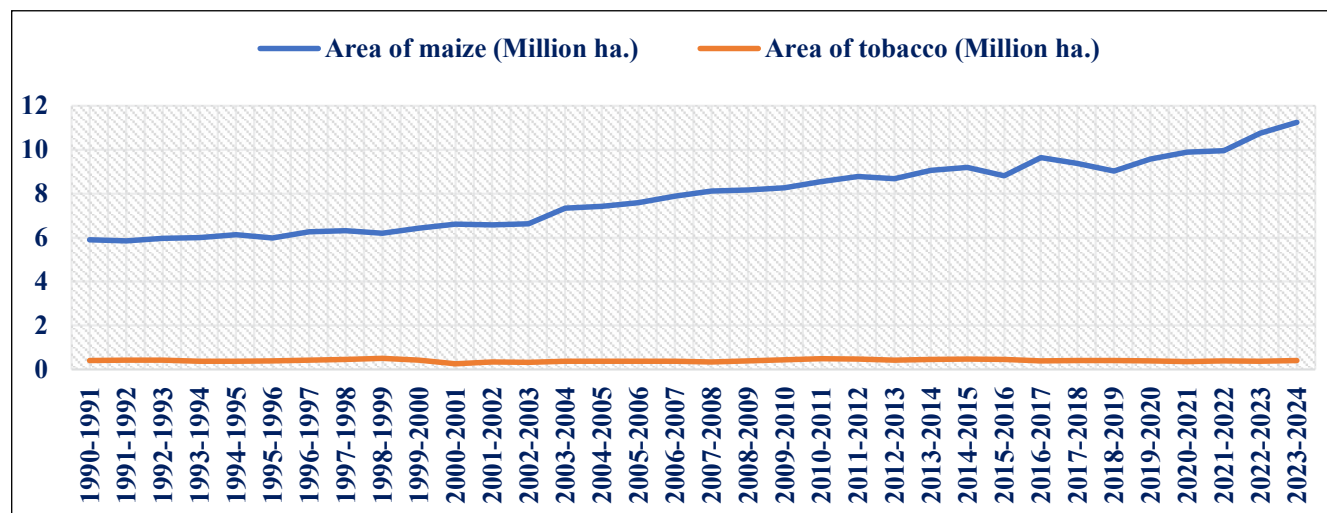


Figure 2: Tobacco and maize acreage in India

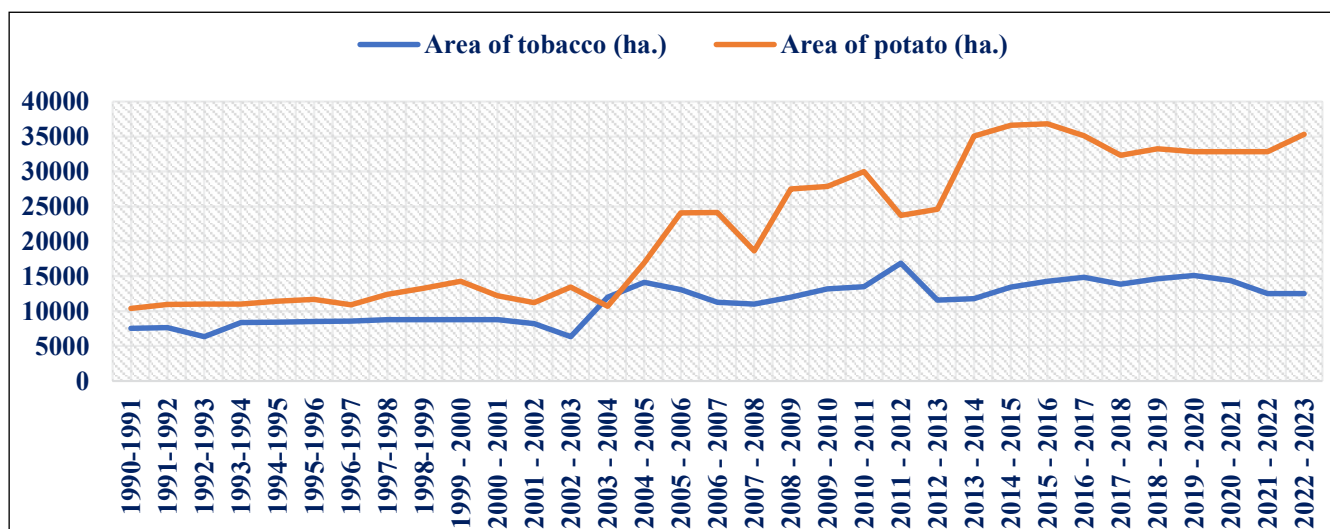


Figure 3: Tobacco and potato acreage in Cooch Behar

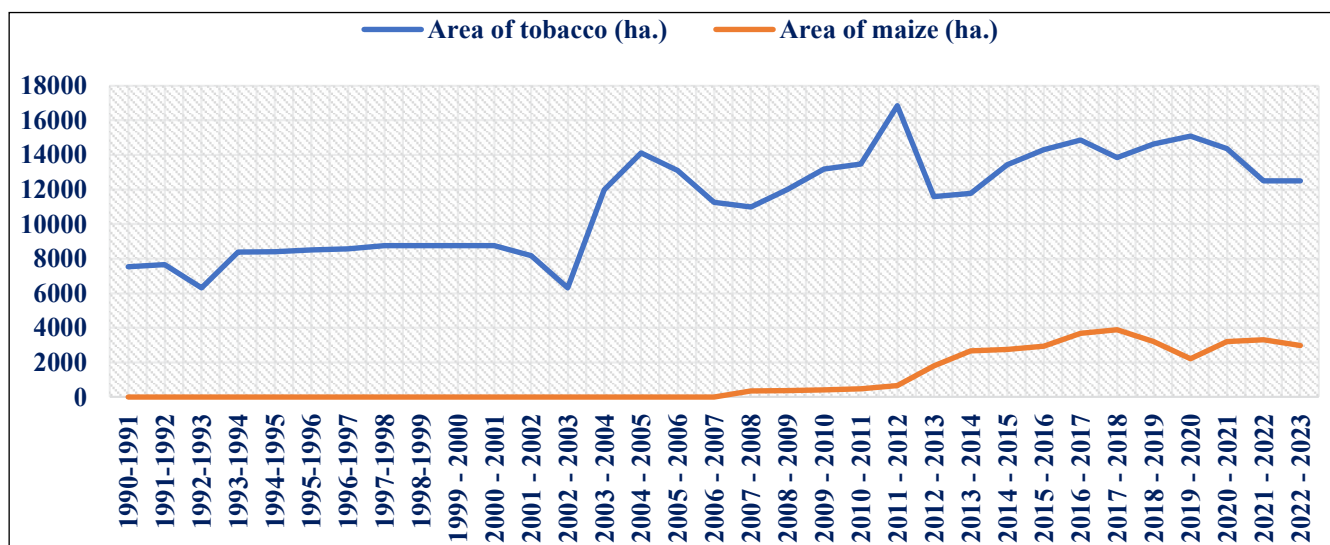


Figure 4: Tobacco and maize acreage in Cooch Behar

3). About 16.67% of tobacco farmers undertook solely tobacco, another 16.67% cultivated maize alongside tobacco, and the greater part (67%) undertook potato cultivation alongside tobacco. Two cultivars of tobacco, namely, Jati and Motihari, were most popular in our study area, and the tobacco producers cultivated either of these cultivars; about 8% of them cultivated both Jati and Motihari. Traditionally, these two tobacco cultivars were grown in the period of November–February, whereas their competing crop, maize

was also cultivated during the same window and potato was grown during November–April/May. Acreage allocation pattern revealed that, on average, about 27.58% of net cultivable area was allocated for Jati (tobacco), which was about 20.68% each for Motihari (tobacco) and potato, and about 7% for maize. These crop plots were fully irrigated, and the source of the irrigation was a Shallow Tube Well (STW), which was mostly electrically operated.

In the subsequent sections, we tried to explore the relative economics of tobacco cultivation (both Jati tobacco and Motihari tobacco) along with its major competing crops, maize, and potato. The cost of cultivation had been computed at per hectare basis for all the mentioned crops, following CACP cost concepts. The calculation of cultivation expenses was based on various items of expenditure related to the respective farming process.

From Table 4, it was evident that there were significant ($*p<0.05$) differences in the expenditure pattern between the tobacco cultivars (i.e., Jati and Motihari) as well as between each of these cultivars and their major competing crops, i.e., maize and potato. The total paid-out cost was the sum of all actual expenses incurred in cash and kind during cultivation, and based on the provided information, the overall per ha. paid out costs were ₹ 36,441, ₹ 39,570, ₹ 45,536, ₹ 67,123 for Jati (tobacco), Motihari (tobacco), maize and potato, respectively. Component-wise, labour wage payment happened to be the major cost item, contributing about 50% of the total paid out cost in all the cropping ventures; maize and potato seemed to be much labour intensive than tobacco (either of the cultivars). Expenditure towards manures and fertilisers was the next largest contributing cost component in tobacco and maize, which happened to be the cost of seed in potato. The relative share of the cost of fertiliser was higher in tobacco than in maize or potatoes. Several previous studies on the economics of tobacco, like the studies conducted by Hussain et al. (2020), Sahadewo et al. (2020), Rana et al. (2021) and others, also showed that the biggest cost share in case of tobacco production is in its labour component which sometimes also required a huge family labour and this might not be sustainable in the long run for some farming groups or communities. While the major alternative crops of tobacco remained more labour-intensive, tobacco stayed as the preferred option. The relative share of cost items in the cost structure of tobacco cultivation in our study was also in resonance with these findings, indicating that efficiency gains alone could not address sustainability concerns.

Additionally, we tried to understand the cost structure by identifying different Farm Management cost (i.e., CACP) concepts like Cost A₁, Cost A₂, Cost B₁, Cost B₂, Cost C₁, Cost C₂, Cost C₃, etc., and were presented in Table 4. While the paid-out cost structure gave us an understanding

Table 3: General farming features of the studied tobacco producers

Sl. No.	Major farming feature	Sub-feature in farming	Quantity/ value	% to total
1.	Total land area (ha)	-	0.29	-
2.	Net cultivable area (ha)	-	0.21	72.00
3.	Producers under category (nos.)	Sole tobacco Producers	12	16.66
		Tobacco+maize producers	12	16.66
		Tobacco+potato producers	48	66.66
4.	Average acreage allocation (ha)	Tobacco (var. Jati)	0.08	27.58
		Tobacco (var. Motihari)	0.06	20.68
		Maize (<i>rabi</i>)	0.02	6.98
		Potato	0.06	20.68
5.	Experience in crop cultivation	Tobacco (Nos. of farmers)		
		Upto 10 years	20	27.78
		10–20 years	15	20.83
		More than 20 years	37	51.39
		Maize (Nos. of farmers)		
		Upto 5 years	08	66.67
		5–10 years	03	25.00
		More than 10 years	01	8.33
		Potato (Nos. of farmers)		
		Upto 5 years	09	18.75
		5–10 years	15	31.25
		More than 10 years	24	50.00

Source: Authors' analysis

Table 4: Cost of cultivation (ha^{-1})

Item of expenditure		Cost of cultivation (₹ ha^{-1})			
		Tobacco (var Jati)	Tobacco (var. Motihari)	Maize	Potato
Land preparation	Machinery	3889.86	4078.04	1740.33	4871.60
	Human Labour	183.57	561.65	6961.33	370.37
Planting/Seeding	Material	2641.61	3042.62	4800.00	15360.00
	Human Labour	3409.09	4074.74	3522.10	3703.70
Manuring	Organic/FYM	4186.19	2940.28	3667.13	2351.90
	Chemical	8934.44	9824.52	9111.88	9427.20
	Human Labour	2954.55	3835.45	3107.73	5172.80
Weeding	Human Labour	3531.61	3879.50	2900.55	3679.00
Irrigation	Machinery/Fuel	3187.21	3522.77	2544.20	8382.70
Plant protection	Human Labour	-	-	841.16	3630.90
Interculture operation	Human Labour	-	-	3232.04	7580.20
Harvesting+Post-harvesting	Human Labour	3522.73	3810.43	3107.73	2592.60
Paid out cost		36440.86	39570.00	45536.18	67122.97
Interest on working capital		637.71	692.47	796.88	1174.65
Cost A_1 /Cost A_2 /Cost B_1		37078.57	40262.47	46333.06	68297.62
Imputed rental value of owned land		15000.00	15000.00	15000.00	15000.00
Cost B_2		52078.57	55262.47	61333.06	83297.62
Cost of family labour		15375.87	16431.10	19433.70	23481.48
Cost C_1		52454.44	56693.57	65766.76	91779.10
Cost C_2		67454.44	71693.57	80766.76	106778.62
Cost C_3		74199.88	78862.93	88843.44	117456.48

1US\$= 82.85 INR (Average monthly value of August, 2023)

of total variable cost (TVC) for respective crops, these cost concepts helped us to throw additional insight into it from differential perspectives. For example, we got an idea about the total cost of cultivation, inclusive of family labour cost (if any), by identifying Cost Cs. Cost A_1 was calculated by assuming 7% rate of banking interest on working capital for a period of 4 months, on average. The cost of family labour was calculated by adding up the costs (imputed on the basis of the prevailing market wage rate of hired labour in the study sites) associated with employing family members in the cultivation process. In agricultural activities, family labour often played a significant role in contributing to various farming tasks, such as planting, harvesting, weeding, and other field operations. While family labour might not be directly compensated in cash, imputing its cost provides a more accurate assessment of the total expenses involved in cultivation. Cost C_3 , which was to take account of the farmer's managerial input, was obtained by multiplying Cost C_2 by a 1.10 factor. Per hectare Cost C_1 became ₹ 52,454, ₹

56,694, ₹ 65,767, and ₹ 91,779 for Jati (tobacco), Motihari (tobacco), maize and potato, respectively. Among these crops, the share of family labour was relatively less (40%) in potato and more in tobacco (47%). That is, though tobacco was relatively less labour-intensive, manpower utilisation from within the family was much higher in this cropping venture. This result was also corroborated by Kuboja et al. (2013), Makoka et al. (2016), Panchal et al. (2021), and others, who also clearly indicated the relative merit of tobacco production in terms of its manpower utilization and labour involvement. These reiterated that although tobacco farming generated higher gross revenue than the alternative cropping systems and required overall labour, it relied more heavily on the family labour component and inputs.

Now, we wanted to enumerate the relative 'performance' of tobaccos and their competing crops in the *rabi* season, which was depicted in Tables 5 and 6. A glance through these tables showed the superiority of tobacco over the others. All these farm outputs were 'commercial' in nature. While

Table 5: Physical (production) performance of tobacco *vis-à-vis* competing crops

Sl. No.	Crop	Variety	Yield (kg ha ⁻¹)		Gross value (₹ ha ⁻¹)
			Raw leaf	Dry leaf	
1.	Tobacco	var. Jati	1155.94	462.38	173443.36
		var. Motihari	2759.81	1103.92	189189.81
2.	Maize	-	Corn yield (kg ha ⁻¹)		118691.00
			5295.58		
3.	Potato	-	Tuber yield (kg ha ⁻¹)		184430.00
			20173.00		

(Source: Authors' analysis)

Table 6: Economic performance of tobacco *vis-à-vis* competing crops

Sl. No.	Economic traits	Quantity/value (ha ⁻¹)			
		Tobacco (var. Jati)	Tobacco (var. Motihari)	Maize	Potato
1.	Return over paid out Cost (₹ ha ⁻¹)	137002.50	149619.81	73154.82	117307.03
2.	Farm business income (₹ ha ⁻¹)	136364.79	148927.34	72357.94	116132.38
3.	Family labour income (₹ ha ⁻¹)	121364.79	133927.34	57357.94	101132.38
4.	Net Income (₹ ha ⁻¹)	105988.92	117496.24	37924.24	77651.38
5.	Return per rupee (Based on Cost A ₁)	4.76	4.70	2.56	2.70
6.	Return per rupee (Based on Cost C ₂)	2.57	2.64	1.47	1.73
7.	Cost (Cost A ₁) of production: (₹ kg ⁻¹)	32.08	14.59	8.75	3.39

(Source: Authors' analysis)

both potato and maize were sold in their raw form, tobacco leaves were dried before being brought to the market. The average selling price (₹ 375.11 kg⁻¹) of Jati cultivars was greater than that of Motihari (₹ 171.38 kg⁻¹). A hectare of tobacco (Motihari cultivar) field gave net earnings (over paid out cost) of ₹ 1,49,620 comparing to ₹ 1,17,307 from potato and ₹ 73,155 from maize, utilizing equivalent acreage (Table 6). Within tobacco, Motihari tobacco brought a higher net return than that of Jati tobacco (₹ 1,37,002). From return per rupee expenditure (Cost A₁ perspective), there was little difference between Jati (4.76) and Motihari (4.70) tobacco, and both of these were better than maize (2.56) and potato (2.70). Some studies conducted in other countries or regions, too, pointed out the relative economic merits of tobacco cultivation (Rana et al., 2021; Lencucha et al., 2022; Nakamatte et al., 2025, and others). These studies showed that the farmers' continued preference for tobacco was due to several factors which might be considered as internal economies of this production systems, and in the absence of external advantages, farmers might not want to shift towards alternative cropping systems. The tobacco cultivation persisted and was based on this nuance of internal economies and external diseconomies of scale. We saw the same trend when considering from the Cost C₂ perspective. However, the cost of production was relatively higher for

Jati tobacco (₹ 32.08 kg⁻¹) than that of potato (₹ 3.39 kg⁻¹) or maize (₹ 8.75 kg⁻¹) and Motihari tobacco (₹ 14.59 kg⁻¹). Lastly, we tried to understand the reason for the continuance of tobacco growers (maybe generation after generation) even in the face of various restrictions implemented by the government. Several studies previously tried to explore the factors behind the cultivation of tobacco (Appau et al., 2020; Joardar et al., 2022; Roy et al., 2024; Song et al., 2025) and some dismal themes across these emerged too. While Appau et al. (2020) and Joardar et al. (2022) depicted tobacco farming as a structurally embedded livelihood strategy, and Roy et al. (2024) and Song et al. (2025) only suggested supports for transition and diversification policies, very few studies were able to effectively identify the motives and reasons behind the continued preference and dominance of this crop over its alternative crops. By delineating the nuances of the interplay of the economic factors and motives behind the continued existence of tobacco, even replacing other crops, our study stood out in the literature by showcasing this very important aspect. It showed that even the arrival of new crop options (potato, maize, etc.) was not able to deter farmers from undertaking tobacco cultivation. Garrett's ranking technique was used to figure out the extent of influence of the factors/reasons. The sample respondents were asked to rank the given possible

reasons from 1 to 6, giving 1 to the highest possible reason and 6 to the least possible reason.

It was found that all the farmers put economic incentive (i.e., profitability) as the major force for sticking with tobacco cultivation, which was evidenced in our analysis, too, in Table 7. Around one-third of the respondents also believed that 'ready-made' or established market potential and 'simple and easy' cultivating technique were the other two major reasons for their continuance. Also, perceived less disease and pest incidence (the farmers did not even consider applying protection chemicals in the tobacco field), less cost of cultivation and less requirement of irrigation water were the other reasons mentioned by the respondents.

Table 7: Reasons for continuance with tobacco farming

Reasons	% position	Garrett's score	Rank
High profitability	8.33	77	I
Good marketing system	25.00	63	II
Easy to cultivate	41.66	54	III
Less disease and pest incident	58.33	46	IV
Less cultivation cost	75.00	37	V
Less irrigation	91.66	23	VI

Through delineating the comparative economics of tobacco and its competing crops at the farmers' level, this study tried to understand the reason behind the continuance of tobacco cultivation despite the enactment of several prohibitory laws on tobacco by the Government of India. With a sustained rise in tobacco acreage and production, the country remained the 2nd largest tobacco producer in the world. The farming folk found greater economic incentive in tobacco cultivation as the return per rupee investment is 4.76 and 4.70 for Jati and Motihari tobacco cultivars, respectively, which were substantially greater than its competing *rabi* crops like maize and potato. Among two popular tobacco cultivars, Jati was the most preferred one, chiefly because of its better economic performance. Farming folk, in general, preferred to stick with tobacco cultivation because of relatively higher profitability, ready-made market (high demand) of tobacco products, relatively simple and easy cultivating techniques, and others. Also, market malfunctioning happened to be relatively less due to the farm gate selling of tobacco output mostly. Therefore, there could be no direct comprehensive measure on a complex issue like tobacco production at the policy level in the country. There was a need for a balanced and pragmatic policy that accepts the high profitability of tobacco while slowly encouraging farmers to diversify into other high-value crops like winter vegetables, floriculture, etc., which could compete with the remunerative production

of tobacco at the farm level. Better price support, assured markets and extension services for those high-value crops were important to reduce farmers' reliance on tobacco. Farmers' aggregation and collectivisation into new-generation cooperatives like FPCs could also exert a great impact in this aspect (Das and Singh, 2024a; Das and Singh, 2024b). Promoting high-value alternative crops, value addition, and agro-processing could increase farm income while ensuring farmers' livelihood security along with public health goals in the traditional tobacco-growing areas of the Terai zone of West Bengal.

4. CONCLUSION

This study analysed the comparative economics of tobacco and competing crops to elucidate the persistent tobacco cultivation despite the enactment of restrictive acts in India. Tobacco cultivation was preferred for its greater returns per rupee (4.76 for Jati and 4.70 for Motihari) than maize and potato. Tobacco cultivation was sustained also by guaranteed farm-gate markets, easier practices and family labour involvement.

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6. REFERENCE

- Anonymous, 2004. Report on tobacco control in India. Government of India, New Delhi. Retrieved September 13, 2025, from https://extranet.who.int/fctcapps/sites/default/files/2023-04/India_Annex-3_Report-on-Tobacco-Control-in-India_2004.pdf.
- Anonymous, 2014. Good agricultural practices for tobacco production. Rome: FAO. Retrieved August 12, 2023, from <https://www.fao.org/land-water/databases-and-software/crop-information/tobacco/en/>.
- Anonymous, 2014. Tobacco cultivation in India: History and development. Rajahmundry, India: Indian Council of Agricultural Research. Retrieved April 28, 2023, from <https://www.indiascienceandtechnology.gov.in/organisations/ministry-and-departments/icar-central-tobacco-research-institute>.
- Anonymous, 2016. Tobacco production technologies in India. ICAR–Central Tobacco Research Institute, Rajahmundry. Retrieved March 09, 2023, from <https://nirca.org.in/>.
- Anonymous, 2017. Economics of tobacco cultivation in India. ICAR–Central Tobacco Research Institute, Rajahmundry. Retrieved March 15, 2023, from <https://nirca.org.in/>.
- Anonymous, 2019. Status paper on the tobacco sector

- in India. Ministry of Commerce and Industry, Government of India, Guntur. Retrieved August 13, 2025, from <https://tobaccoboard.com/indexeng.php>.
- Anonymous, 2020. Indian tobacco industry: An overview. Ministry of Commerce and Industry, Government of India, Guntur. Retrieved August 11, 2025, from <https://tobaccoboard.com/indexeng.php>.
- Anonymous, 2021. Indian tobacco statistics. Ministry of Commerce and Industry, Government of India, Guntur. Retrieved April 13, 2025, from https://tobaccoboard.com/tbdata/publicationsfiles/Annual_Report_E_2021-22.pdf.
- Anonymous, 2022. Indian tobacco industry: Export performance and global presence. Ministry of Commerce and Industry, Government of India, Guntur. Retrieved April 23, 2025, from <https://tobaccoboard.com/tbdata/publicationsfiles/AR-2022-23%28English%29.pdf>.
- Anonymous, 2022a. FAOSTAT statistical database: Tobacco production by country. Rome: FAO. Retrieved August 10, 2023, from <https://www.fao.org/faostat/en/#data/QCL>.
- Anonymous, 2022b. FAOSTAT: Tobacco production statistics. Rome: FAO. Retrieved August 25, 2023, from <https://www.fao.org/faostat/en/#data/QCL>.
- Anonymous, 2023. Coochbehar District at a Glance. State Agricultural Technologists' Service Association (SATSA), West Bengal. Retrieved August 14, 2023, from chrome-extension://efaidnbmnnnibpcajpcgclclefindmkaj/https://satsawb.org/DOCS/GOs/9~Misc/Cochbehar_District_at_a_Glance.pdf.
- Anonymous, 2024. Export–import data bank: Tobacco and tobacco products (FY 2023–24). Ministry of Commerce and Industry, Government of India, Kolkata. Retrieved February 11, 2023, from <https://www.commerce.gov.in/trade-statistics/export-import-data-bank-annual/>.
- Anonymous, 2025. Krishi Vigyan Kendra, Cooch Behar, Uttar Banga Krishi Viswavidyalaya, 2025. District profile: Cooch Behar agriculture overview. Retrieved December 24, 2025, from <https://coochbeharkvk.ubkv.ac.in/district-profile/>.
- Anonymous, 2025. Tobacco production – UN FAO [Dataset]. Our World in Data. Retrieved December 30, 2025, from <https://ourworldindata.org/grapher/tobacco-production> (data adapted from FAOSTAT)
- Anonymous. (2025). Tobacco Statistics and Growth. Retrieved November 23, 2025, from <https://www.indiastat.com/>.
- Appau, A., Drope, J., Goma, F., Magati, P., Labonte, R., Makoka, D., Lencucha, R., 2020. Explaining why farmers grow tobacco: evidence from Malawi, Kenya, and Zambia. *Nicotine and Tobacco Research* 22(12), 2238–2245. DOI: 10.1093/ntr/ntz173.
- Appau, A., Drope, J., Witoelar, F., Chavez, J.J., Lencucha, R., 2019. Why do farmers grow tobacco? A qualitative exploration of farmers' perspectives in Indonesia and the Philippines. *International Journal of Environmental Research and Public Health* 16(13), 2330. <https://doi.org/10.3390/ijerph16132330>.
- Choudhary, S., Rajpoot, S.K., Tripathi, A., Choudhary, M., Radha, L., Sen, M., 2026. Diversified cropping Systems for improving the crop productivity and soil health of dryland ecosystems. *Land Degradation and Development* 37(2), 419–437. <https://doi.org/10.1002/ldr.70140>.
- Das, J., Gayen, A., Saha, S., Bhattacharya, S.K., 2017. Modelling of alternative crops' suitability to tobacco based on the analytical Hierarchy Process in Dinhat subdivision of Koch Bihar district, West Bengal. *Modeling Earth Systems and Environment* 3, 1571–1587. https://doi.org/10.1007/s40808-017-0392-y?urlappend=%3Futm_source%3Dresearchgate.net%26utm_medium%3Darticle.
- Das, S., Singh, R., 2024. Benefits of new generation farmers' collectives: case reflection from an eastern state of India. *Development in Practice* 34(6), 736–756. <https://doi.org/10.1080/09614524.2024.2345733>.
- Das, S., Singh, R., 2024. Financial performance of new generation cooperatives in india: assessment of selected farmer-producer companies in Alipurduar district of West Bengal. *Indian Journal of Economics and Development* 20(2), 336–346. <https://doi.org/10.35716/IJED-23226>.
- Datta, S., Ghosh, A., 2025. Tobacco cultivation trends in West Bengal: District-wise analysis of area and production (1990–2021). *Economic Affairs* 70(1), 65–73. <https://doi.org/10.46898/EA/70.1/0065-0073>.
- Debnath, T., Sarkar, T., 2019. Developments in tobacco in the princely state of cooch behar. *Karatoya: NBU Journal of History* 12, 151–164. https://www.researchgate.net/publication/352197214_.
- Doro, E., 2023. Plunder for profit: A socio-environmental history of tobacco farming in southern Rhodesia and Zimbabwe (Vol. 162). Cambridge University Press. Retrieved September 13, 2025, from https://books.google.co.in/books?hl=en&lr=&id=kHa3EAAAQBAJ&oi=fnd&pg=PR9&ots=q6gwdjgfza&sig=D2NxxQqhDVchfHJnbPU4tvx4Wjw&redir_esc=y#v=onepage&q&f=false.
- Fan, H., Miao, R., Guo, C., Bao, X., He, W., Sun, Y., Zhao, C., 2025. Research on the effect of diversified cropping on crop quality: A review. *Agriculture* 15(5),

456. <https://doi.org/10.3390/agriculture15050456>.
- Hunter, W.W., 1876. A statistical account of Bengal: Vol. X. Districts of Darjeeling, Jalpaiguri, and Cooch Behar. London: Trübner and Co. Available from: https://books.google.co.in/books?hl=en&lr=andid=0xeQ_18dEJwC&doi=fndandpg=PA227&ddq=Hunter,+W.W.,+1876.+A+statistical+account+of+Bengal:+Vol.+X.+Districts+of+Darjeeling,+Jalpaiguri,+and+Cooch+Behar.+London:+Tr%C3%BCbner+and+Co&dots=8I-8c-7s8a&sig=bPUlblshDdfnIInf6hc17WGoShsandredir_esc=y#v=onepage&qandf=false.
- Hussain, A.G., Rouf, A.S.S., Shimul, S.N., Nargis, N., Kessaram, T.M., Huq, S.M., Drope, J., 2020. The economic cost of tobacco farming in Bangladesh. *International Journal of Environmental Research and Public Health* 17(24), 9447. <https://doi.org/10.3390/ijerph17249447>.
- Joardar, J.C., Fathema, K., Basu, S., 2022. Effect of tobacco cultivation on soil fertility and farmers' profitability in the socio-economic perspective of Bangladesh. <https://doi.org/10.21203/rs.3.rs-1388464/v1>.
- Kakar, K.U., Nawaz, Z., Cui, Z., Ahemd, N., Ren, X., 2020. Molecular breeding approaches for the production of disease-resilient, commercially important tobacco. *Briefings in Functional Genomics* 19(1), 10–25. doi: 10.1093/bfpg/elz038.
- Kar, S., Das, S., Das, K.K., 2025. How does the Indian Tobacco Industry Respond to Prohibitory acts? An insight. *Economic Affairs* 70(01), 01–09. DOI: 10.46852/0424-2513.1.2025.10.
- Kuboj, N.M., Temu, A.E., 2013. A comparative economic analysis of tobacco and groundnut farming in Urambo District, Tabora Region, Tanzania. Available from: https://www.torita.or.tz/uploads/publications/en-1595316150-Kuboj_A%20Comparative%20economic%20analysis%20of%20tobacco%20and%20groundnut%20farming%20in%20Tabora.pdf.
- Lencucha, R., Drope, J., Magati, P., Sahadewo, G.A., 2022. Tobacco farming: overcoming an understated impediment to comprehensive tobacco control. *Tobacco Control* 31(2), 308–312. <https://doi.org/10.1136/tobaccocontrol-2021-056564>.
- Liu, M., Liu, X., Song, Y., Hu, Y., Yang, C., Li, J., Wang, L., 2024. Tobacco production under global climate change: combined effects of heat and drought stress and coping strategies. *Frontiers in Plant Science* 15, 1489993. Available from: <https://www.frontiersin.org/journals/plant-science/articles/10.3389/fpls.2024.1489993/full#cite>.
- Magati, P., Lencucha, R., Li, Q., Drope, J., Labonte, R., Appau, A.B., Zulu, R., 2019. Costs, contracts and the narrative of prosperity: an economic analysis of smallholder tobacco farming livelihoods in Kenya. *Tobacco control* 28(3), 268–273. <https://doi.org/10.1136/tobaccocontrol-2017-054213>.
- Mahlayeye, M., Darvishzadeh, R., Nelson, A., 2022. Cropping patterns of annual crops: A remote sensing review. *Remote Sensing* 14(10), 2404. <https://doi.org/10.3390/rs14102404>.
- Makoka, D., Drope, J., Appau, A., Labonte, R., Li, Q., Goma, F., Lencucha, R., 2017. Costs, revenues, and profits: an economic analysis of smallholder tobacco farmer livelihoods in Malawi. *Tobacco Control* 26(6), 634–640. <https://doi.org/10.1136/tobaccocontrol-2016-053022>.
- Makoka, D., Drope, J., Appau, A., Lencucha, R., 2016. Farm-level economics of tobacco production in Malawi. Lilongwe: Centre for Agricultural Research and Development and Atlanta: American Cancer Society. Available from: <https://www.cancer.org/content/dam/cancer-org/research/economic-and-healthy-policy/farm-level-economics-of-tobacco-production-in-malawi-full-report.pdf>.
- Makoye, E.B., Larsen, M.N., Kuzilwa, J.A., 2022. Tobacco Farming and the Reconfiguration of Co-operatives in Tanzania. *Journal of Southern African Studies* 48(2), 273–291. DOI: 10.1080/03057070.2022.2053418.
- Mirkarimi, S.R., Ardakani, Z., Rostamian, R., 2021. Economic and environmental assessment of tobacco production in Northern Iran. *Industrial Crops and Products*, 161, 113171. Available from: https://www.researchgate.net/publication/346969933_.
- Nakamatte, I., Ilukor, J., Bonabana, J., 2025. Economic feasibility and impacts of replacing tobacco with alternative crops in smallholder cropping systems: evidence from Uganda. *Agrekon* 64(1), 50–71. DOI: 10.1080/03031853.2024.2441129.
- O'Malley, L.S.S., 1909. Bengal district gazetteers: Cooch Behar. Calcutta: Bengal Secretariat Book Depot. Available from: <http://dSPACE.bpatc.gov.bd:8080/bitstream/handle/1200/214/bengal%20district%20gazetteers%20%20rajshahi--final.pdf?sequence=1&disAllowed=y>.
- Panchal, J.P., Gediya, K.M., Padhiyar, G.M., Patel, J.N., 2021. Agronomic and economic evaluation of alternative cropping systems for bidi tobacco (*Nicotiana tabacum*) in middle Gujarat conditions. *Indian Journal of Agronomy* 66(4), 462–465. <https://doi.org/10.59797/ija.v66i4.2874>.
- Rana, J., Kamruzzaman, M., Sharna, S. C., Rana, S., 2021. Growth and efficiency analysis of tobacco production in Bangladesh: a non-parametric approach. *SN Business & Economics* 1(12), 170. <https://doi.org/10.1007/s43546-021-00172-4>.

- Reichert, J.M., Pellegrini, A., Rodrigues, M.F., 2019. Tobacco growth, yield, and quality are affected by soil constraints on steep lands. *Industrial Crops and Products* 128, 512–526. <https://doi.org/10.1016/j.indcrop.2018.11.037>.
- Roy, A., Naz, S., Mostafa, M.G., 2024. Tobacco farming and its socio-economic determinants in Kushtia district of Bangladesh. *Journal of Sustainability and Environmental Management* 3(1), 9–18. <https://doi.org/10.3126/josem.v3i1.65224>.
- Rukhsana, 2021. Levels of agricultural development and estimated growth and pattern of area, production, and yield of major crops in selected regions of Uttar Pradesh. *Agriculture, Food and Nutrition Security: A study of availability and sustainability in India*, 105–142. https://doi.org/10.1007/978-3-030-69333-6_6?urlappend=%3Futm_source%3Dresearchgate.net%26utm_medium%3Darticle.
- Sahadewo, G.A., Drope, J., Li, Q., Witoelar, F., Lencucha, R., 2020. In-and-out of tobacco farming: shifting behavior of tobacco farmers in Indonesia. *International Journal of Environmental Research and Public Health* 17(24), 9416. <https://doi.org/10.3390/ijerph17249416>.
- Sahadewo, G.A., 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: University of Illinois at Chicago. Available from: <https://www.economicsforhealth.org/files/research/654/indonesia-economics-of-tobacco-farming.pdf>.
- Sati, V.P., 2024a. Cropping patterns and change. In *farming systems and sustainable agriculture in the Himalaya*, 23–38. Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-64687-4?urlappend=%3Futm_source%3Dresearchgate.net%26utm_medium%3Darticle.
- Sati, V.P., 2024b. Farming systems and sustainable agriculture. In *farming systems and sustainable agriculture in the Himalaya*, 49–62. Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-64687-4?urlappend=%3Futm_source%3Dresearchgate.net%26utm_medium%3Darticle.
- Sekhar, M., Rastogi, M.C.M.R., Saikanth, D.R.K., Rout, S., Kumar, S., Patel, A.K., 2024. Exploring traditional agricultural techniques integrated with modern farming for a sustainable future: A review. *Journal of Scientific Research and Reports* 30(3), 185–198. <https://doi.org/10.9734/jsrr/2024/v30i31871>.
- Shaikh, R., Janssen, F., Vogt, T., 2022. The progression of the tobacco epidemic in India on the national and regional level, 1998–2016. *BMC Public Health* 22(1), 317. Retrieved March 22, 2023. Available from: <https://link.springer.com/content/pdf/10.1186/s12889-021-12261-y.pdf>.
- Song, J., Wu, J., Li, X., Ning, Q., Liu, W., Liu, Z., Zi, D., 2025. Tobacco cultivation in Yunnan: an integrated analysis of economic trends and diversification. *Frontiers in Sustainable Food Systems* 9, 1622916.
- Teja, I.K., Rajeswari, S., Devi, I.B., Reddy, B.R., 2016. Economics of tobacco and its alternative crops in Nellore and Prakasam districts of Andhra Pradesh. *International Journal of Research in Applied, Natural and Social Sciences* 4(10), 115–122. Retrieved April 11, 2023. Available from: https://www.researchgate.net/profile/Krishna-Indurupalli/publication/324703756_.
- Waha, K., Dietrich, J.P., Portmann, F.T., Siebert, S., Thornton, P.K., Bondeau, A., Herrero, M., 2020. Multiple cropping systems of the world and the potential for increasing cropping intensity. *Global Environmental Change*, 64, 102131. <https://doi.org/10.1016/j.gloenvcha.2020.102131>.
- Yin, X., Song, Z., Shi, S., Bai, Z., Jiang, Y., Zheng, A., Chen, F., 2024. Developments and prospects of multiple cropping in China. *Farming System* 2(2), 100083. <https://doi.org/10.1016/j.farsys.2024.100083>.