

Policy Coherence and Agricultural Transition in Pakistan's Tobacco Economy: Reconciling Leaf Production, Emerging Nicotine Products and the Protection of Children

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ABSTRACT

Tobacco is a smallholder cash crop and a major source of federal revenue in Pakistan, yet its rural economy remains institutionally disconnected from the fiscal and health policies dependent on the crop. This paper examines the requirements for a coherent agricultural transition strategy in Pakistan's tobacco-growing districts, treating emerging nicotine products and child protection as connected but secondary demand-side concerns. A focused narrative policy review integrates farm-level economic studies, household and farm-worker surveys, comparator crop-economics studies, official and press reporting, international governance research, the Framework Convention on Tobacco Control, and evidence on youth nicotine use (demand-side searches to 31 August 2026; supply-side searches to 3 October 2026). Findings indicate that tobacco returns in Khyber Pakhtunkhwa are positive but narrow, reported 2026 buyer demand falls below output, and surveyed grower households frequently experience debt and dependence on contract farming and advance input credit. National child survey evidence also documents electronic cigarette and nicotine pouch use alongside conventional tobacco products. The paper conceptualizes tensions between crop promotion, fiscal dependence, and protection of growers, farm workers, and children; compares tobacco economics with wheat, maize, and sugarcane; maps overlapping institutional mandates; and develops a policy matrix linking problems, evidence, instruments, responsible institutions, expected outcomes, and implementation challenges. Policy coherence requires farmer-centred, district-specific transition strategies integrating credit and contract reform, revenue diversification, safeguards against industry interference, comprehensive nicotine regulation, and shared agricultural and health evidence systems.

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1. INTRODUCTION

Tobacco is an agricultural commodity before it is a consumer product. In producing countries it is a crop that employs farm families, a tax base that finances public budgets and a cause of cancer, cardiovascular and respiratory disease that the health system must treat. The objective of reducing exposure to combustible tobacco, which accounts for most tobacco-attributable illness and death, is therefore not only a health question (World Health Organization, 2026). It engages agriculture, finance, trade and rural development ministries, whose mandates do not always point in the same direction. This paper treats that agricultural and rural-development question as its central problem: whether, and how, Pakistan's tobacco-dependent districts can transition toward more diversified and resilient livelihoods without imposing avoidable losses on the households that currently depend on the crop.

Agricultural transformation, as used in this paper, refers to a specific and interrelated set of changes rather than a single policy lever: crop diversification away from single-commodity dependence; livelihood transition support that sequences new income sources before tobacco income is withdrawn; protection of farm income during the transition period; reform of the contract-farming and advance-credit arrangements that currently tie growers to the crop; development of rural finance that is not conditioned on continued tobacco cultivation; strengthened extension services capable of supporting new crops; development of markets and value chains for alternative produce; and institutional restructuring so that agricultural, fiscal and health mandates are coordinated rather than independent. These eight elements structure the analysis that follows, and the paper returns to each of them in Sections 4 and 5.

The WHO Framework Convention on Tobacco Control (FCTC) recognises the coherence problem directly. Article 5.3 obliges Parties to protect public health policy from commercial and other vested interests of the tobacco industry, Article 17 calls for support for economically viable alternative activities for tobacco workers, growers and sellers, and Article 18 requires due regard to the protection of the environment and the health of persons in relation to tobacco cultivation and manufacture (WHO FCTC Secretariat, 2008; WHO FCTC Secretariat, 2013; World Health Organization, 2003). The United Nations Development Programme has likewise argued that agriculture ministries have a role in tobacco control, including ending tobacco farming subsidies and supporting a transition to alternative livelihoods and food systems (United Nations Development Programme, 2024). Recent governance research indicates that Article 17 remains one of the least implemented obligations of the Convention, and that tobacco boards and supply-chain firms in growing countries maintain formal relationships with government that legitimise industry influence (Lencucha et al., 2024).

Pakistan illustrates the coherence problem clearly. Tobacco is grown on a small share of national cropland but is concentrated in a handful of districts of Khyber Pakhtunkhwa where it anchors household incomes (Pakistan Tobacco Board, n.d.). It generates substantial federal excise revenue, yet current reporting suggests that growers are exposed to a contracting buyer market and to prices below reported production costs (Islam, 2026). At the same time, the nicotine market facing Pakistani children has diversified beyond cigarettes and traditional smokeless tobacco. A national cross-sectional survey conducted between December 2023 and May 2024 included 14,232 children aged 10 to 16 years from school and out-of-school settings and documented reported use, susceptibility and access across several nicotine and tobacco products, including electronic cigarettes and nicotine pouches (Farzeen et al., 2026a).

Two distinct demand-side policy questions are often conflated. The first concerns adults who smoke and may benefit from effective cessation treatment or, in some settings, complete substitution away from cigarettes. The second concerns young people who do not use nicotine and for whom initiation creates avoidable exposure and a risk of dependence (World Health Organization, 2024b; World Health Organization, 2025). This paper treats both as supporting evidence for a third and primary question: whether the agricultural and fiscal policies that sustain the tobacco economy are consistent with the demand-reduction, child-protection and rural-livelihood objectives that agricultural and health policy jointly pursue.

The paper therefore asks four questions, ordered to reflect its agricultural-policy focus. First, what does the evidence show about the structure and economic position of tobacco growing in Pakistan, and how does it compare with realistic alternative crops and livelihoods in the main growing districts? Second, what does farmers' own evidence show about the credit, contracting and institutional arrangements that keep households in the crop, and what would a Pakistan-specific transition strategy require? Third, how do fiscal policy and Pakistan's institutional architecture align, or fail to align, agricultural promotion with revenue design and health objectives? Fourth, and as a connected demand-side question, what does the evidence show about youth use of electronic cigarettes and nicotine pouches, and how should product-inclusive regulation be designed so that it reinforces rather than substitutes for agricultural transition? The paper does not claim that Pakistani leaf supplies electronic cigarettes or nicotine pouches; the coherence argument concerns governance and livelihood policy, not material supply chains.

2. LITERATURE REVIEW AND CONCEPTUAL BACKGROUND

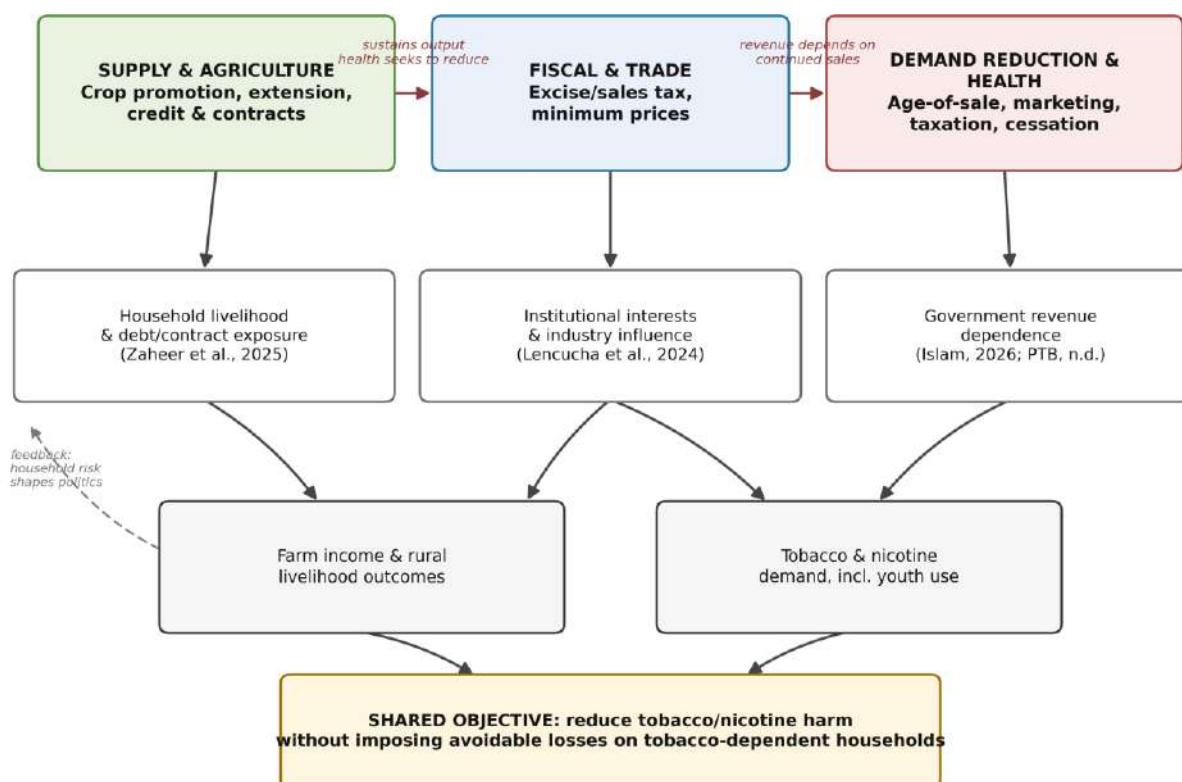
2.1 Policy Coherence and the Tobacco Economy

Policy coherence is used here in its horizontal sense: the extent to which policies of different sectors reinforce, rather than undermine, a shared objective. The shared objective is the reduction of tobacco and nicotine harm without imposing avoidable losses on the rural households that currently depend on the crop. Three policy domains are examined, each with its own instruments, constituencies and objectives (Table 1). The framework identifies where the stated objectives of one domain make the objectives of another harder to achieve, and it asks what institutional arrangements could reduce those tensions (Lencucha et al., 2024; United Nations Development Programme, 2024).

Table 1. Policy Domains and Their Principal Tensions in the Tobacco and Nicotine Economy

Policy domain	Typical instruments	Primary objective	Tension with other domains
Supply and agriculture	Crop promotion, extension, input support, leaf marketing and grower-buyer contracts	Rural income and crop marketability	Sustains production of a product that health policy seeks to reduce; leaves growers exposed if demand contracts
Fiscal and trade	Excise and sales taxes, import and export measures, minimum prices	Public revenue and market stability	Revenue depends on continued sales; price changes may shift use among products rather than reduce it
Demand reduction and health	Age-of-sale rules, marketing controls, packaging, taxation, cessation services, surveillance	Prevention of initiation and reduction of harm	May be weakened where production and revenue interests shape enforcement and institutional mandates

The relationships summarised in Table 1 operate through identifiable mechanisms rather than a direct link between policy domain and outcome. Figure 1 sets out a conceptual model: agricultural, fiscal and health-policy instruments act on three intermediate mechanisms, household livelihood and credit exposure, institutional interests and industry influence, and government revenue dependence, which in turn shape two outcomes of interest, farm income and rural livelihood security on one side and tobacco and nicotine demand (including youth use) on the other. A feedback path is also shown: the livelihood risk that households face can itself shape the political economy of institutional interests, for example by reinforcing the case made by boards and supply-chain firms for continued crop promotion. The model is deliberately simple and is intended to organise the evidence reviewed in Sections 4 and 5 rather than to specify a formal causal or statistical structure.

**Figure 1. Conceptual Model of Policy Coherence in the Tobacco and Nicotine Economy**

Note: The model organizes the evidence in Sections 4 and 5; it is not a formal causal structure.

2.2 Tobacco Production, Governance, and Transition: International Evidence

Cross-national and country studies indicate why the production side of the tobacco economy matters for health policy, and what is known about moving growers toward other livelihoods. An analysis of tobacco and leaf company subsidiaries found that countries hosting more transnational company subsidiaries engaged in growing or manufacturing had significantly higher tobacco industry interference scores and weaker enforcement of advertising bans, while tobacco accounted for a modest share of exports even where manufacturing presence was substantial (Hiscock et al., 2023). A study of 181 countries using 2020 data found that higher dependence on tobacco leaf exports was consistently associated with a lower level of implementation of advertising, promotion and sponsorship bans, although leaf exports were not associated with tax rates, and weaker state capacity was associated with lower taxes

(Hiilamo, 2026). These studies are cross-sectional and cannot establish causation, and neither assesses Pakistan specifically; they indicate an association between the production side of the tobacco economy and the strength of health policy, not a demonstrated causal pathway.

Institutional design is one plausible pathway linking production to policy strength, although the studies just cited do not test it directly. Governance analysis of tobacco-growing countries notes that tobacco boards and government agencies often carry explicit mandates to promote tobacco as an economic commodity, and that seed suppliers, equipment manufacturers, leaf buyers and processors, not only cigarette manufacturers, hold formal relationships with government institutions (Lencucha et al., 2024). The guidelines for Article 5.3 are directed at protecting policy from such interests (WHO FCTC Secretariat, 2008), and the same analysis argues that they must be tailored to growing contexts and combined with Article 17 (Lencucha et al., 2024). Experience with Article 17 itself remains limited (Lencucha et al., 2024).

Evidence on transition is encouraging but context-dependent, and it does not establish that any particular alternative is viable for Pakistani growers. A multi-criteria modelling study of Greek and Spanish tobacco regions showed how transition scenarios can be assessed transparently against farm income, labour demand and environmental outcomes, and noted that tobacco farmers typically need high-margin alternatives and face capital constraints (Kienle et al., 2015). The WHO identifies high-iron beans, sunflower, sweet potato, maize, sorghum and rice as alternatives that can provide incomes comparable to or higher than tobacco in some settings (World Health Organization, 2023), and the UNDP cites Kenya's production of high-iron beans for international markets and Zambia's tobacco control social bond as examples of transition initiatives (United Nations Development Programme, 2024). The FCTC policy recommendations on Articles 17 and 18 call for innovative mechanisms for sustainable alternative livelihoods for growers and workers (WHO FCTC Secretariat, 2013). The Swabi evidence on farmer hesitation (Khoso et al., 2025) and the Pakistan-specific comparator crop evidence assembled in Section 4.2 of this paper show why local, district-level assessment is required before any of these international examples is treated as a template for Pakistan.

2.3 Nicotine Products and Young People: International Evidence

The demand-side literature defines the public health objective that agricultural and fiscal policy must be coherent with; it is summarised briefly here because the agricultural-policy argument is this paper's central concern. Combustion is the principal source of the toxic exposure caused by cigarette smoking, and products that do not burn tobacco can reduce exposure to many combustion-related toxicants without that reduced exposure being equivalent to an absence of harm (National Academies of Sciences, Engineering, and Medicine, 2018). For adults who smoke, WHO recommends behavioural support together with established pharmacotherapies (World Health Organization, 2024c), and a living Cochrane review has found that nicotine electronic cigarettes can increase smoking quit rates compared with nicotine replacement therapy, although long-term safety evidence is less mature than for authorised medicines (Lindson et al., 2025). This adult cessation evidence cannot be transferred directly to children: a young person who has never smoked has no combustion exposure to reduce, and the relevant comparator for a nicotine-naïve adolescent is no nicotine use rather than continued smoking. Evidence on electronic cigarettes and, especially, nicotine pouches is newer and less mature than the decades of evidence on cigarettes (Centers for Disease Control & Prevention, 2025; Travis et al., 2025; Zamarripa et al., 2025).

Youth nicotine use arises from an interaction between product features, commercial exposure and social context. A systematic review found that retail presence and advertising were frequently associated with higher odds of electronic cigarette use (Askwith et al., 2024); adolescents often judge electronic cigarettes as less harmful than cigarettes, but their understanding of absolute risk is inconsistent (Sharma et al., 2021); sweet and fruit flavours are especially salient to younger users (Meernik et al., 2019; Notley et al., 2022); and marketing exposure was associated with nicotine pouch use among US youth (Feizy et al., 2025; World Health Organization, 2024a). Longitudinal studies consistently find an association between vaping and later cigarette smoking at individual level, but a recent systematic review judged the certainty of causal inference to be very low because of confounding, inconsistency and risk of bias (Begh et al., 2025); dual and poly-product use means that product-specific prevalence estimates overlap and should not be added together. Evidence for non-regulatory prevention is promising but uneven: a systematic review found limited and heterogeneous support for school- and family-based prevention curricula (Mylocopos et al., 2024), and a living Cochrane review of interventions for quitting vaping found low-certainty evidence for some approaches (Butler et al., 2025). Education and cessation support should therefore sit within a broader regulatory strategy rather than substitute for it.

2.4 Research Gap

The literature on tobacco growing, the literature on tobacco industry influence and the literature on youth nicotine use are largely separate, and the literature on agricultural transformation and crop diversification has rarely been brought into contact with any of the three. Studies of Pakistan have described growers' economics, farm workers' health and children's use and access, but the sources reviewed here do not relate these to one another, to the

institutions that govern them, or to the comparative economics of realistic alternative crops. This paper addresses that gap by examining the supply, fiscal and demand sides of Pakistan's tobacco and nicotine economy within a single coherence framework; by comparing tobacco's farm-level economics against wheat, maize and sugarcane evidence from the same province; by mapping the institutions whose mandates intersect; and by including growers' own accounts. In doing so it contributes a Pakistan-specific, agriculturally grounded case to the broader literatures on agricultural transformation, crop substitution, commodity dependence and policy coordination in low- and middle-income countries.

3. METHODOLOGY

3.1 Review Design

A focused narrative policy review was selected because the questions span agricultural economics, public finance, governance and public health, and because the available evidence is heterogeneous in design. The purpose was interpretive synthesis rather than calculation of pooled estimates. The review distinguishes evidence generated for adults who smoke from evidence concerning nicotine-naïve children, and it distinguishes peer-reviewed studies from official and press reporting, which is used only for descriptive indicators and is identified as such throughout.

3.2 Information Sources and Search Approach

Targeted searches of PubMed and Google Scholar for demand-side literature were updated to 31 August 2026. Supply-side and governance searches were updated to 3 October 2026. Searches combined the concept groups below using Boolean AND/OR operators; each group was searched with Pakistan as an additional restricting term, and without it, to check for relevant international evidence.

- Demand-side search string: (“e-cigarette*” OR “electronic cigarette*” OR vaping OR “vape*” OR “nicotine pouch*” OR “oral nicotine”) AND (adolescenc* OR youth OR teen* OR child* OR “young people”) AND (marketing OR advertis* OR flavour* OR flavor* OR access* OR availability OR dependence OR cessation OR prevalence) AND (Pakistan OR “South Asia”)
- Supply-side search string: (“tobacco farming” OR “tobacco growing” OR “tobacco cultivation” OR “tobacco grower*” OR “leaf tobacco”) AND (profitabilit* OR “farm income” OR livelihood* OR “alternative crop*” OR diversification OR “contract farming” OR credit) AND (Pakistan OR “Khyber Pakhtunkhwa”)
- Governance search string: (“tobacco industry” OR “tobacco board*” OR “leaf compan*”) AND (influence OR interference OR “policy coherence” OR governance) AND (“Article 5.3” OR “Article 17” OR “Article 18” OR FCTC)

Official material from the World Health Organization, the WHO FCTC Secretariat, the United Nations Development Programme, the US Centers for Disease Control and Prevention, the National Academies and the Pakistan Tobacco Board was used for treaty text, guidance, product definitions and sector statistics. A recent national press report was used for current market indicators because peer-reviewed data for 2026 were not available. Comparator crop-economics studies for Section 4.2 were identified through supplementary searches of PubMed, Google Scholar and the AGRIS and AgEcon Search repositories, combining crop names (wheat, maize, sugarcane) with Khyber Pakhtunkhwa, district names and terms for profitability, net return, cost of production and allocative efficiency. The review did not use a reference-management tool to log the number of records returned by each search at each stage, and it does not report a PRISMA-style flow of records; this is a limitation of a narrative, non-systematic design and is noted again in Section 5.7.

3.3 Eligibility and Evidence Appraisal

Studies were included if they reported primary or officially compiled data on at least one of: (a) the farm-level economics, extent or governance of tobacco cultivation in Pakistan; (b) Pakistani growers' or farm workers' livelihoods, credit, contracting or occupational conditions; (c) nicotine or tobacco product use, access or marketing among children or adolescents, in Pakistan or in a comparable setting; or (d) cross-national governance evidence linking tobacco production or industry structure to the strength of demand-reduction policy. Sources were excluded if they addressed tobacco or nicotine policy only outside these four categories (for example, cessation pharmacology unrelated to the products in scope), if they were not available in English, or if they were opinion pieces without an underlying empirical, governance or treaty basis. Within categories (a) and (b), priority was given to farm-level economic studies, household and farm-worker surveys, and Pakistan-specific research; within category (c), priority was given to systematic or scoping reviews and national or multi-site observational studies; within category (d), priority was given to multi-country quantitative governance analyses.

Findings were interpreted according to design, sample, outcome definition, comparator and risk of confounding. Because screening and extraction were not performed in duplicate and a formal risk-of-bias instrument was not applied, the review should not be interpreted as a systematic review. Where sources report different values for the same indicator, both are reported and the difference is noted rather than resolved, as in Table 2.

3.4 Verification of Farm-Level Economic Estimates

An apparent inconsistency can arise between the production cost, gross margin and benefit-cost ratio attributed to the principal farm-level tobacco study (Sajjad et al., 2022). This was checked directly against the published source. The study reports four distinct quantities for 2020, all per hectare: a gross return of PKR 321,519; a total cost of production of PKR 275,917; a gross margin of PKR 120,616, defined as gross return less variable cost only; and, separately in its discussion, a net return of PKR 45,602, defined as gross return less total cost, which is also the basis for the reported benefit-cost ratio of 1.17 (PKR 321,519 divided by PKR 275,917). The apparent inconsistency arises only if gross margin (a variable-cost-based measure) and net return (a total-cost-based measure) are not kept distinct; both figures, and the distinction between them, are reported in Table 2 and used consistently in Sections 4 and 5.

For the comparator crops introduced in Section 4.2, three Khyber Pakhtunkhwa farm-budget studies were selected because each reports a comparable net-return figure (gross revenue less total cost) using a similar farm-budgeting method to Sajjad et al. (2022): wheat in Dera Ismail Khan (Samiullah et al., 2014), maize in Mardan district (Murtaza et al., 2020) and sugarcane in Dera Ismail Khan (Ali et al., 2018). None of these studies was conducted in the same year or season as the tobacco study, only the maize study was conducted in one of the tobacco study's districts (Mardan), none used an identical costing method, and none has been adjusted for inflation between its survey year and 2020. The comparison in Section 4.2 is therefore illustrative of the kind of evidence needed for a transition strategy, and of the order of magnitude involved, rather than a definitive ranking of crop profitability; Section 5.2 sets out the criteria, including local price, credit access and market opportunity, that district-specific feasibility studies would need to apply before any alternative is adopted as policy.

4. RESULTS

4.1 The Supply Side: Tobacco Growing in Pakistan

The Pakistan Tobacco Board reports that tobacco is grown on about 0.23% of the country's irrigated land. Production is geographically concentrated: Khyber Pakhtunkhwa accounts for 27,036 hectares and for 98% of flue-cured Virginia production, with the principal districts being Swabi, Mardan, Charsadda, Buner and Mansehra (Pakistan Tobacco Board, n.d.). A farm-level economic study of 140 tobacco farms in Swabi, Mardan and Charsadda districts of Khyber Pakhtunkhwa, which reported 28,089 hectares under tobacco in 2020 and a provincial share of about 62.85% of national tobacco production across tobacco types, found an average green leaf yield of 20,260 kg per hectare, a gross return of PKR 321,519 per hectare and a total production cost of PKR 275,917 per hectare (Sajjad et al., 2022). Two further figures follow from these two numbers and should be kept distinct. Subtracting variable costs alone from gross return gives a gross margin of PKR 120,616 per hectare, the figure the study reports as its headline margin; subtracting total cost, including fixed costs, gives a net return of PKR 45,602 per hectare and underlies the study's reported benefit-cost ratio of 1.17 (gross return divided by total cost). Both figures indicate that returns are positive but narrow, and the study found that farmers responded to price signals with an output supply elasticity of 0.78 (Sajjad et al., 2022). Table 2 summarises the indicators available from these sources, organised by source so that differences in date, definition and tobacco type are immediately visible rather than merged into a single cell.

Table 2. Selected Indicators of Tobacco Growing in Pakistan, by Source

Indicator	Pakistan Tobacco Board (n.d.)	Press reporting (Islam, 2026)	Farm-level study, 140 farms (Sajjad et al., 2022)
Share of national irrigated land under tobacco	About 0.23%	—	—
Area under tobacco in Khyber Pakhtunkhwa	27,036 ha	26,500 ha across five districts	28,089 ha (2020)
Number of growers	23,964 in KP; about 50,000 nationally	About 45,000 in KP; about 80,000 nationally	—
Flue-cured Virginia production	70–75 million kg/year	—	—
2026 output vs declared buyer demand	—	~140 million kg produced vs 61.63 million kg demand (4th consecutive annual cut)	—
Average green leaf yield	—	—	20,260 kg/ha
Gross return	—	—	PKR 321,519/ha
Total production cost	—	—	PKR 275,917/ha
Gross margin (less variable cost only)	—	—	PKR 120,616/ha
Net return (less total cost)	—	—	PKR 45,602/ha

Indicator	Pakistan Tobacco Board (n.d.)	Press reporting (Islam, 2026)	Farm-level study, 140 farms (Sajjad et al., 2022)
Benefit-cost ratio	—	—	1.17
Farm-gate price of surplus leaf vs estimated production cost	—	PKR 300–500/kg vs ~PKR 750/kg	—
Federal excise duty and sales tax	—	PKR 237.3 billion, excise duty, FY 2023–24	—
Federal excise duty and sales tax, earlier year	More than PKR 124 billion, FY 2019–20 (excise duty and sales tax combined)	—	—

Note: Sources differ in date, definition, tobacco type and geographic scope, so values in different columns are not strictly comparable and should be read as indicative; a dash indicates that the source did not report that indicator. Press figures are descriptive reporting, not peer-reviewed estimates. Gross margin and net return are distinct quantities (see Section 3.4) and should not be treated as alternative estimates of the same measure.

The 2026 market indicators describe a sector under strain. Reporting in September 2026 stated that declared buyer demand had fallen to 61.63 million kg, the fourth consecutive annual cut, while farmers had produced roughly 140 million kg, that surplus leaf was being sold at prices below production cost, and that some growers held signed contracts that remained unfulfilled (Islam, 2026). The causes of the contraction are not established by the sources reviewed here and are not attributed in this paper. The relevant point for agricultural policy is that tobacco growing is already a source of financial risk for smallholders, independently of any health-driven change in demand, and that this risk is the starting point for the transition analysis in Section 4.2.

Environmental and occupational evidence is also relevant to the transformation question. A mixed-methods study in Swabi district, combining a survey of 200 farm workers with qualitative interviews, found that pesticide use, fertiliser use and deforestation predicted ecological degradation, that pesticide and tobacco leaf exposure were associated with worse health, and that workers reported green tobacco sickness, respiratory problems and skin conditions (Khoso et al., 2025). Participants strongly agreed that tobacco farming harms worker health, yet were much more hesitant about whether switching crops would be financially viable (Khoso et al., 2025), a finding that motivates the crop-comparison evidence assembled below. International estimates from the World Health Organization point in the same direction: tobacco growing contributes less than 1% of gross domestic product in most countries, labour requirements can be as much as double those of comparable crops, about 200,000 hectares are cleared for tobacco each year, and an estimated 1.3 million children work on tobacco farms (World Health Organization, 2023). These are global estimates and should not be read as Pakistan-specific figures.

4.2 Comparing Tobacco with Alternative Crops and Livelihoods

A direct, Pakistan-specific comparison between tobacco and realistic alternative crops is needed, since international lists of candidate crops (World Health Organization, 2023) do not by themselves establish local viability. Three Khyber Pakhtunkhwa farm-budget studies were identified that report a net-return figure calculated in a broadly similar way to Sajjad et al. (2022): wheat in Dera Ismail Khan (Samiullah et al., 2014), maize in Mardan district (Murtaza et al., 2020) and sugarcane in Dera Ismail Khan (Ali et al., 2018). Table 3 reports each study's net return as originally published, per acre, together with a hectare-equivalent conversion for comparison with the tobacco figures reported in Table 2.

Table 3. Illustrative Comparison of Net Returns for Tobacco and Three Alternative Crops in Khyber Pakhtunkhwa

Crop	District; survey year	Net return (PKR/acre)	Net return (PKR/ha, converted)	Source
Tobacco	Swabi, Mardan and Charsadda; 2020	≈18,455	45,602	Sajjad et al. (2022)
Wheat	Dera Ismail Khan; 2012	20,599	≈50,901	Samiullah et al. (2014)
Sugarcane	Dera Ismail Khan; 2014–15	33,174	≈81,974	Ali et al. (2018)
Maize	Mardan; 2017	5,294	≈13,081	Murtaza et al. (2020)

Note: Net return is gross revenue less total cost of production, as reported in each source. Hectare conversions use 1 hectare = 2.47105 acres and are the authors' calculations, not figures reported in the original studies. The four studies were conducted in different districts (the tobacco study covers Swabi, Mardan and Charsadda; the maize study was conducted in Mardan), in different years between 2012 and 2020, and using farm-budgeting procedures that are similar but not identical; none of the values has been adjusted for inflation. The comparison should be read as indicative of order of magnitude, not as a precise ranking of crop profitability.

Read cautiously, Table 3 complicates a simple diversification narrative. Sugarcane and wheat, in the districts and years studied, show higher net returns per hectare than tobacco's 2020 return. Maize, by contrast, shows a substantially lower net return in the Mardan data, consistent with farm workers' own hesitation about the financial viability of switching crops (Khoso et al., 2025). This indicates that "alternative crop" is not a single category with uniformly better economics than tobacco: the choice of alternative, and the price, water, labour and market conditions in the specific district and season, determine whether a switch would improve or worsen farm income. Only one of the three comparator studies (maize, Mardan) was conducted in a core tobacco district, and none was conducted in the same period as the tobacco study, and none asked farmers who currently grow tobacco whether they would adopt the comparator crop; the comparison therefore motivates district-specific feasibility studies rather than substituting for them.

Beyond net return alone, a transition assessment needs to consider labour demand, water requirement, capital requirement, price risk, market access and income stability. The sources reviewed here allow only a qualitative, evidence-flagged summary of these dimensions for the five principal tobacco-growing districts (Table 4); several cells are necessarily marked as requiring district-level study, because no source identified in this review reports comparator farm-budget data for Swabi, Charsadda, Buner or Mansehra specifically, and because labour, water and market-access conditions vary within as well as between districts.

Table 4. Qualitative Transition Considerations for the Five Principal Tobacco-Growing Districts

District	Candidate alternatives with some local evidence	Labour and capital considerations	Evidence gap
Swabi	No district-specific farm-budget comparator identified; WHO candidate-crop list (maize, vegetables) as a starting point only	Khoso et al. (2025) document high labour and occupational exposure in tobacco; comparative labour data for alternatives not identified	Needs a local farm-budget and labour-demand study before any crop is recommended
Mardan	Maize (Murtaza et al., 2020) has local data but shows markedly lower net return than tobacco in the years studied	Maize requires less specialised curing infrastructure than tobacco but the 2017 study data show low profitability without hybrid seed and input support	Needs testing of higher-value horticultural or hybrid-input options with local price and market-access data
Charsadda	No district-specific farm-budget comparator identified in this review; district is part of the wheat-growing zone studied elsewhere in the province	Not established in the sources reviewed	Needs a local farm-budget study for wheat, vegetables or other candidate crops
Buner	No district-specific farm-budget comparator identified in this review	Not established in the sources reviewed	Needs a local farm-budget and market-access study; Buner's terrain and irrigation access differ from the plains districts and should not be assumed comparable
Mansehra	No district-specific farm-budget comparator identified in this review	Not established in the sources reviewed	Needs a local farm-budget study; Mansehra's higher elevation and rainfall regime likely support a different candidate-crop set than Swabi, Mardan or Charsadda

Note: This table reports what the sources identified in this review do and do not establish; it is not a recommendation to adopt any specific crop in any specific district. Where no district-specific comparator was identified, this reflects the scope of the present review and should not be read as evidence that no relevant local data exist.

Two conclusions follow for the transition strategy developed in Section 5.2. First, a transition strategy cannot rely on a single candidate crop applied uniformly across the five districts: the limited Pakistan-specific evidence available already shows a wide range of comparative outcomes, from sugarcane's apparently favourable return in Dera Ismail Khan to maize's apparently unfavourable return in Mardan. Second, four of the five principal districts, Swabi, Charsadda, Buner and Mansehra, have no farm-budget comparator identified in this review at all, which is itself a policy-relevant finding: it indicates where district-specific economic feasibility studies should be commissioned before, rather than after, any transition programme is designed for those districts.

4.3 Farmers' Perspectives, Credit, and Contract Farming

Sector statistics describe growing from the outside. Farmers' own accounts show how the crop is experienced and why it persists. A questionnaire survey of 300 farming households in Mardan district found that nearly 65% carried debt from previous seasons and 71.3% needed additional loans for household expenses. Some 92% relied on contract farming and 87.3% on advance credit (Zaheer et al., 2025). For 67% of respondents, access to credit and inputs, rather than profitability, was the reason for growing tobacco, and more years in tobacco farming were associated with lower

livelihood satisfaction ($r = -0.421$) and with perceived decline in soil fertility (Zaheer et al., 2025). The authors of that study interpret this pattern as a tobacco poverty trap, in which the crop provides immediate liquidity while eroding longer-term resilience (Zaheer et al., 2025); this is the study's own interpretation of its survey data, and it is reported here as such rather than as an independently established causal finding.

This evidence deserves more direct attention as an agricultural-policy finding than farm economics alone can provide, because it identifies the mechanism that keeps households growing tobacco even when margins are narrow. The 92% contract-farming rate and 87.3% advance-credit rate (Zaheer et al., 2025) indicate that most surveyed growers access inputs, and sometimes subsistence credit, through the same buyer relationship that purchases their leaf, a form of tied credit common in contract-farming arrangements for other cash crops in South Asia. Where a buyer supplies both the loan and the market for the harvest, a grower who wished to switch crops would need to repay or renegotiate that debt without the income the next tobacco harvest would have provided, and would simultaneously need to identify a new source of seasonal credit and a new buyer, two frictions that a transition strategy focused only on crop choice would not address. The 67% of respondents who cited credit and input access, rather than profitability, as their reason for growing tobacco (Zaheer et al., 2025) corroborates this reading: the decision to grow tobacco is, for a majority of these households, a financing decision as much as a cropping decision. Current reporting records growers holding signed contracts that remain unfulfilled and payment arrears from previous seasons (Islam, 2026), which indicates that the contract relationship does not reliably protect growers even on its own terms.

The Swabi study points the same way on health and ambivalence about change. Farm workers strongly agreed that tobacco farming harms worker health (mean 4.8 of 5), but agreement that switching crops is financially viable was much lower (3.3 of 5) (Khoso et al., 2025). The farm-level economic analysis adds that growers respond to price signals, with positive but inelastic output supply (Sajjad et al., 2022), so price and contract terms matter more to their decisions than agronomic preference alone.

Three implications follow. First, farmers' decisions appear to be shaped by credit, input and contracting arrangements as much as by the returns from the crop, so transition support that addresses only crop choice would miss the mechanism that keeps households in tobacco; credit and contract reform is therefore a precondition for, not merely a complement to, crop diversification. Second, farmers are not a homogeneous constituency that opposes health policy: the evidence shows awareness of harm alongside uncertainty about alternatives. Third, because the comparator-crop evidence in Section 4.2 shows that alternative crops are not uniformly more profitable than tobacco, credit and contracting reform that is not paired with a financially viable alternative risks leaving growers without either source of liquidity. These studies are cross-sectional, self-reported and drawn from two districts, and none asked farmers about electronic cigarettes or nicotine pouches, so they describe growers' livelihood conditions rather than their views of the wider nicotine market.

4.4 Fiscal Structure and Revenue Dependence

Tobacco taxation generates revenue that is visible to finance authorities, whereas the costs of tobacco-related disease and of grower insecurity are borne elsewhere. A qualitative policy analysis of Pakistan's tobacco taxation and pricing policy against the WHO FCTC Article 6 guidelines found that the policy does not meet the Convention's benchmarks for a uniform tax level, a simple tax structure or a 70% excise share of the retail price, and that Pakistan has no dedicated tobacco excise department and no documented short- or long-term strategy for using tobacco taxation as a public health tool (Masud et al., 2023). The same analysis notes that the Federal Board of Revenue's own published documents do not treat tobacco taxation as a tobacco-control instrument (Masud et al., 2023), which is itself an indicator of the separation between fiscal and health-policy functions described in Table 1.

The scale of the revenue involved can be placed against total federal tax collection using two official sources. Press reporting, corroborated by the Pakistan Tobacco Board, states that federal excise duty collected on cigarettes was PKR 237.3 billion in FY 2023-24 (Islam, 2026; Pakistan Tobacco Board, n.d.). The Federal Board of Revenue's own Revenue Division Year Book reports total federal tax collection of PKR 9,299.1 billion for the same fiscal year (Federal Board of Revenue, 2024). On this basis, cigarette excise duty represented approximately 2.6% of total federal tax revenue in FY 2023-24, a calculation made by the present authors from these two sources rather than a figure stated in either source directly. This is a modest share of total federal revenue, even though it represents a large absolute sum and, on the Board's own description, a significant component of the case made for the crop's economic importance (Pakistan Tobacco Board, n.d.). Revenue and grower welfare are governed by different instruments and different institutions, which is a typical condition for incoherence.

This distinction matters for the fiscal argument developed further in Section 5.3: the revenue the Board and the press report is collected on tobacco consumption and is not a measure of the value added by growing the crop, nor is it conditioned on, or shared with, the growers who bear the production risk documented in Sections 4.1 to 4.3. A coherent fiscal approach should report both quantities, consumption revenue and the economic contribution of cultivation, rather than treating the larger of the two as a justification for inaction on the other.

4.5 Institutional Mandates and Overlaps

The policy-coherence problem identified in Table 1 is administered, in Pakistan, through at least five distinct institutional mandates that the sources reviewed here describe only separately. The Pakistan Tobacco Board operates under the federal government and reports the crop's area, production and revenue contribution as part of its remit to support the sector (Pakistan Tobacco Board, n.d.). Federal tobacco taxation is administered by the Federal Board of Revenue, which Masud et al. (2023) found has no dedicated tobacco excise department and does not frame tobacco taxation as a tobacco-control instrument in its own published material. Health-policy functions, including tobacco-control policy linked to Pakistan's obligations under the FCTC, sit with federal health authorities and, where referenced in the tobacco-taxation policy analysis, a tobacco control cell distinct from the Board and from the revenue authority (Masud et al., 2023). Agriculture is a devolved subject following Pakistan's 18th Constitutional Amendment, so extension services, crop-diversification programmes and agricultural credit policy for the tobacco-growing districts fall substantially to the Khyber Pakhtunkhwa provincial agriculture department, a further institutional layer not examined directly by any source identified in this review. Finally, the FCTC's own guidance assigns a potential coordinating role to agriculture ministries specifically, including ending tobacco-production subsidies and supporting livelihood transition (United Nations Development Programme, 2024), a role that none of the Pakistani institutions just described is reported to perform.

Two features of this arrangement are consistent with the governance mechanism described in Section 2.2. First, the institution with the most direct mandate over growers' economic circumstances, the Pakistan Tobacco Board, has a promotional rather than a health-protective purpose, which is the pattern Lencucha et al. (2024) describe across tobacco-growing countries generally. Second, no source identified in this review describes a standing mechanism that brings the Board, the Federal Board of Revenue, federal health authorities and the Khyber Pakhtunkhwa agriculture department together around a shared transition objective; each institution's evidence base, reported in Sections 4.1, 4.3 and 4.4 respectively, was produced independently. This is the specific institutional gap that the coherence mechanism proposed in Section 5.1 and Table 6 is designed to close.

4.6 Youth Nicotine Use and the Retail Environment in Pakistan

This connected demand-side evidence is reported briefly because it supports rather than dominates the agricultural-policy argument; it remains necessary because it defines the demand-reduction objective that Sections 5.4 and 5.5 ask agricultural and fiscal policy to be coherent with. The national survey by Farzeen and colleagues is the strongest current estimate for Pakistani children aged 10 to 16 years. Overall use of any nicotine or tobacco product was reported by 9.1% of boys and 7.1% of girls, and use was similar among school-going and out-of-school participants, an important finding because school-only surveys may miss vulnerable groups (Farzeen et al., 2026a). Reported electronic cigarette use was 4.3% among boys and 3.2% among girls, and nicotine pouch use was 3.4% and 2.7% (Table 5); these proportions appeared higher than reported cigarette smoking, but the study did not test statistical differences between products. More than half of participants reported access to tobacco shops near school and 43.1% near home, and one third indicated that they could buy products easily (Farzeen et al., 2026a).

Table 5. Reported Nicotine and Tobacco Product Use among Children Aged 10 to 16 Years in Pakistan

Reported indicator	Boys	Girls
Any nicotine or tobacco product use	9.1%	7.1%
Electronic cigarette use	4.3%	3.2%
Nicotine pouch use	3.4%	2.7%
Cigarette smoking	2.1%	0.7%
Smokeless tobacco use	2.7%	2.0%

Source: Farzeen et al. (2026a). Values are percentages reported separately for boys and girls. Product categories are not mutually exclusive. The authors did not test differences between products, so apparent rank order should not be interpreted as a statistically confirmed difference.

A survey of 711 tobacco-selling points of sale across nine districts found nicotine pouches in eight districts and all four provinces. Products were present in 7.9% of outlets, with wider availability in urban settings, and display advertising was observed in 12.3% of the subsample assessed for promotion (Farzeen et al., 2026b). Qualitative research with 113 adolescents from all four provinces and Islamabad found exposure through shops, peers and social media, a perception that retailers would not refuse a purchase, and divided perceptions of harm, with some participants treating confectionery-like packaging and the absence of warnings as signals of safety (Khan et al., 2026). Earlier studies found that 6.2% of 500 medical students in Sindh reported electronic cigarette use, strongly associated with other tobacco use (Iqbal et al., 2018), and focus groups with 132 adults in Islamabad, Lahore and Karachi identified social acceptability, flavours, perceived stress relief and expectations of lower harm as influences on vaping (Qureshi & Mumtaz, 2024). The adult and student data are not estimates for children. Taken together, the Pakistan

studies describe use, access and appeal, but none can establish whether prevalence is rising, how many users are dependent or whether one product leads to another. The evidence justifies preventive action and better monitoring, not a claim of a proven increase over time.

5. DISCUSSION

5.1 Where Pakistan's Policies Pull in Different Directions

Read together, the evidence identifies seven points of incoherence, arising from the evidence assembled in Section 4. First, the crop is promoted and measured through its revenue contribution (Pakistan Tobacco Board, n.d.), while the health objective is to reduce use. Second, growers carry market risk that neither agricultural nor fiscal policy appears to absorb: reported buyer demand is below reported output, surplus leaf is reportedly sold below production cost, and excise revenue is not linked to grower support (Islam, 2026). Third, household debt, advance credit and contract dependence keep many growers in the crop, and the comparator-crop evidence in Section 4.2 shows that an alternative is not automatically more profitable (Zaheer et al., 2025). Fourth, farm workers face environmental and occupational harms that sit within the scope of FCTC Article 18 but outside the usual remit of tobacco control (Khosro et al., 2025; WHO FCTC Secretariat, 2013). Fifth, the emerging nicotine products that children report using (Farzeen et al., 2026a) arrive in an institutional setting where supply-chain firms and tobacco boards already have formal relationships with government (Lencucha et al., 2024), and where international evidence links production-side interests to weaker enforcement of marketing restrictions (Hiilamo, 2026; Hiscock et al., 2023). Sixth, Pakistan's own tobacco-taxation policy does not treat taxation as a tobacco-control instrument and has no dedicated administrative capacity for it (Masud et al., 2023), even though the revenue it raises is cited as part of the crop's justification (Pakistan Tobacco Board, n.d.). Seventh, no institution identified in Section 4.5 holds a standing, cross-sectoral mandate to coordinate the Board, the revenue authority, federal health authorities and the provincial agriculture department around a shared transition objective. Table 6 sets out these tensions as a policy matrix that assigns a responsible institution, an expected outcome and an implementation challenge to each proposed response, providing a more actionable and accountable set of recommendations than a descriptive table of gaps and responses alone.

Table 6. Policy Matrix: Coherence Gaps, Instruments, Responsible Institutions, and Implementation Challenges

Problem	Key evidence	Policy instrument	Responsible institution	Expected outcome (3–5 yr)	Implementation challenge
Crop promoted via revenue narrative versus demand-reduction goal	Board revenue framing (PTB, n.d.); excise data (Islam, 2026)	Report revenue alongside grower-risk and health-cost indicators; design fiscal measures independent of rising volumes	Federal Board of Revenue; Pakistan Tobacco Board; Ministry of Finance	Public reporting that shows net fiscal and social position, not revenue alone	Requires cross-institutional data sharing not currently in place (Section 4.5)
Growers exposed to contracting demand and unfulfilled contracts	Output above buyer demand; arrears (Islam, 2026); narrow margins (Sajjad et al., 2022)	Transparent contracting and price-reporting rules; district-level income-risk monitoring	Pakistan Tobacco Board; KP provincial agriculture department	Fewer unfulfilled contracts; published district price series	No current legal requirement for contract disclosure identified in sources reviewed
Credit and contract dependence limits ability to diversify	65% debt, 92% contract farming, 87.3% advance credit (Zaheer et al., 2025)	Non-tobacco-linked rural credit lines; enforceable payment terms; input-supply alternatives	State Bank of Pakistan / rural finance institutions; KP agriculture department	Rising share of growers with non-buyer credit access	Tied credit is currently the main financing channel; building alternatives takes time and capital
No tested, district-specific transition plan for growers and workers	Comparator-crop evidence (Table 3); hesitation on switching (Khoso et al., 2025); modelling approaches (Kienle et al., 2015)	District-level feasibility pilots before any mandated change; farmer participation in design	KP agriculture department; agricultural research institutes; growers' representatives	At least one tested alternative per district with verified farm-budget data	Four of five districts have no farm-budget comparator identified in this review (Table 4)
Industry influence across the supply chain	Production presence and leaf dependence linked to weaker policy (Hiilamo, 2026; Hiscock et al., 2023); boards with promotion mandates (Lencucha et al., 2024)	Apply Article 5.3 safeguards to leaf buyers, processors and boards; separate promotion and health-policy functions	Cabinet Division; Ministry of National Health Services, Regulations and Coordination	Documented separation of promotional and regulatory functions	Requires institutional restructuring, not only a disclosure rule
Tobacco taxation not used as a dedicated control instrument	No tobacco excise department; FED framed outside tobacco control (Masud et al., 2023)	Establish a dedicated tobacco-tax administration function; publish a multi-year tax-structure plan	Federal Board of Revenue	Simplified, more uniform tax structure closer to FCTC Article 6 benchmarks	Revenue-forecasting risk if excise design changes volume assumptions
Uncovered nicotine products and weak retail controls	Pouches widely available and advertised (Farzeen et al., 2026b); easy access reported by children (Farzeen et al., 2026a)	Extend age-of-sale rules, licensing, marketing and packaging controls explicitly to electronic cigarettes and nicotine pouches	Ministry of National Health Services, Regulations and Coordination; provincial health departments	Measured reduction in near-school retail access	Enforcement capacity at point-of-sale level is not documented in sources reviewed

Note: “Responsible institution” identifies the institution with the most direct existing mandate over each instrument, based on the sources reviewed; it is a starting point for assigning accountability, not a finding that the named institution has agreed to act. Expected outcomes are the authors’ proposed monitoring targets, not projections derived from a quantitative model.

5.2 A Farmer-Centred, District-Specific Transition Strategy

A coherent strategy cannot treat tobacco growers solely as a constituency to be managed, and it cannot assume that any single alternative crop is viable across all five growing districts. The farm-level evidence shows narrow tobacco margins (Sajjad et al., 2022), reported market contraction (Islam, 2026), occupational harm (Khoso et al., 2025) and debt and contract dependence (Zaheer et al., 2025), which together imply that many growers may already have an interest in lower-risk livelihoods. The comparator-crop evidence in Section 4.2 shows why the transition cannot be assumed to be straightforward: sugarcane and wheat returns exceeded tobacco’s in the districts and years studied, but maize’s did not, and four of the five core districts have no local comparator at all. Farmers should take part in designing the transition, because their accounts identify the credit and contract mechanisms that policy must change (Khoso et al., 2025; Zaheer et al., 2025).

Transition support should therefore be sequenced, evidence-led and explicitly district-specific. For Mardan, the existing maize evidence (Murtaza et al., 2020) suggests that maize alone is unlikely to match current tobacco returns without accompanying investment in hybrid seed access, irrigation and output markets; a feasibility study should test whether such investment closes the gap before maize is promoted as a tobacco substitute there. For Swabi, Charsadda, Buner and Mansehra, no district-specific comparator was identified in this review, so the first step is commissioning local farm-budget and market-access studies, using the WHO list of candidate crops as a starting point rather than a

prescription (World Health Organization, 2023), before any public commitment to a particular crop. In every district, the economic feasibility criteria should explicitly cover expected farm income relative to tobacco, production cost, labour and water requirements, access to credit on terms not tied to a single buyer, and realistic market access for the harvested crop. Support should cover inputs, credit, including relief from advance-credit dependence (Zaheer et al., 2025), extension, marketing and contracting arrangements, consistent with the guidance on Articles 17 and 18 (WHO FCTC Secretariat, 2013) and the role proposed for agriculture ministries (United Nations Development Programme, 2024).

5.3 Fiscal Design and the Revenue Question

Revenue dependence is the strongest argument against change, and it deserves a direct answer. Excise revenue depends on sales, but the evidence reviewed does not show that tobacco-growing countries gain a macroeconomic advantage from production: the WHO reports that tobacco growing contributes less than 1% of gross domestic product in most countries (World Health Organization, 2023), and cross-national analysis found that tobacco accounts for a modest share of exports even where manufacturing presence is substantial (Hiscock et al., 2023). The Pakistani revenue figures reported by the Board and the press (Islam, 2026; Pakistan Tobacco Board, n.d.), and set against total federal tax collection in Section 4.4 (Federal Board of Revenue, 2024), are excise and sales tax receipts collected on consumption, not a measure of the value added by growing. Masud et al. (2023) add that Pakistan's existing taxation policy does not treat this revenue stream as a control instrument at all, which means the fiscal case for the status quo currently rests on the scale of collection rather than on an articulated tax-design strategy. A coherent fiscal approach should therefore distinguish revenue collected on consumption from the economic contribution of the crop, report both, establish the dedicated tax-administration function that Masud et al. (2023) find absent, and evaluate price and tax changes across the whole nicotine market for effects on youth affordability, substitution among products, illicit supply and equity.

5.4 Governance Safeguards

Because production-side interests are associated with weaker policy in cross-national analyses (Hiilamo, 2026; Hiscock et al., 2023), safeguards should extend beyond cigarette manufacturers and beyond health ministries narrowly defined. Practical measures include disclosure of contacts between government bodies and leaf buyers, processors and suppliers; separation of crop-promotion mandates from health-policy decision making, addressing the institutional overlap documented in Section 4.5; and disclosure of funding, protocols and conflicts of interest for research used in policy (Lencucha et al., 2024; WHO FCTC Secretariat, 2008). These measures also apply to claims about emerging products, because WHO has documented industry tactics that frame nicotine products as lifestyle goods and target young people (World Health Organization, 2024a).

5.5 Protecting Children within a Coherent Portfolio

The demand-side evidence supports measures that do not conflict with a transition strategy and are required in any case: product-inclusive age-of-sale rules and retailer obligations covering electronic cigarettes and nicotine pouches; licensing and inspection of points of sale, including restrictions near schools; controls on paid, influencer and indirect digital promotion defined by effect rather than by a fixed list of formats; clear nicotine content, prominent health warnings and restrictions on child-oriented imagery, given the qualitative evidence that packaging without warnings can be read as reassurance (Khan et al., 2026); and confidential, non-stigmatising cessation pathways for young people who are already dependent (Butler et al., 2025). Surveys should include out-of-school children, since use was similar in and out of school (Farzeen et al., 2026a), and the next cycle should add frequency, nicotine strength, dependence symptoms, source of purchase and concurrent use.

5.6 Contribution to the Agricultural Transformation Literature

This paper's principal contribution is to the literature on agricultural transformation, crop substitution and commodity dependence in low- and middle-income countries, rather than to tobacco control narrowly defined. It extends that literature in three ways. First, it provides a Pakistan-specific empirical test of a pattern documented mainly in cross-national and governance research elsewhere (Hiilamo, 2026; Hiscock et al., 2023; Lencucha et al., 2024): that single-commodity dependence in a smallholder export-linked crop is associated with institutional arrangements that resist diversification, independently of the crop's own profitability. Second, by placing real district-level comparator-crop data (Section 4.2) alongside household credit and contracting evidence (Section 4.3), it shows concretely why a diversification policy premised on relative crop profitability alone would be incomplete: the binding constraint for many households is financing structure, not agronomic choice, a finding consistent with broader rural-livelihood-resilience research on tied credit in cash-crop economies. Third, it demonstrates a replicable method, explicit conceptual modelling (Figure 1), cross-source verification of farm-level estimates (Section 3.4), and an institution-by-institution policy matrix (Table 6), that could be applied to other single-commodity agricultural transitions where fiscal, agricultural and social objectives are currently governed separately.

5.7 Limitations

The review is narrative rather than systematic. Searches and selection were not duplicated, no formal risk-of-bias tool was applied to every source, a reference-management log of search results was not kept, and relevant studies may have been missed. Several supply-side indicators come from an official promotional source and from press reporting, differ between sources and cannot be reconciled with the data available (Table 2). The farm-level economic study covers three districts of Khyber Pakhtunkhwa (Swabi, Mardan and Charsadda) and 140 farms (Sajjad et al., 2022), the occupational study covers one district (Khosro et al., 2025), the household survey one district (Zaheer et al., 2025), and the comparator-crop studies in Section 4.2 cover two districts, only one of which (Mardan) is a core tobacco-growing district, in three different survey years; the farmer evidence is self-reported. The governance studies are cross-national and cross-sectional and do not analyse Pakistan (Hiilamo, 2026; Hiscock et al., 2023). The institutional mapping in Section 4.5 is constructed from the mandates described in the sources reviewed, principally Masud et al. (2023) and the Pakistan Tobacco Board's own material; it has not been verified against each institution's current organisational charter and should be treated as a starting point for a more detailed institutional review rather than a definitive map. The review did not identify a published national programme of crop transition or linked surveillance of growers and young people, which may reflect the search scope rather than an absence of activity. The youth evidence is concentrated in cross-sectional and qualitative designs, and product markets change quickly. These limitations justify cautious wording, not inaction.

6. CONCLUSION AND POLICY IMPLICATIONS

This paper's central argument is agricultural: Pakistan's tobacco-growing districts need a transition strategy built on verified, district-specific economic evidence and on reform of the credit and contracting arrangements that currently tie growers to the crop, and that strategy must be coordinated with the fiscal and health policies that depend on the same crop rather than designed after them. Pakistan's tobacco economy is currently governed through at least five separate institutional mandates, the Pakistan Tobacco Board, the Federal Board of Revenue, federal health authorities, a tobacco control cell and the Khyber Pakhtunkhwa provincial agriculture department, none of which is reported to coordinate with the others around a shared transition objective. The evidence reviewed shows narrow and heterogeneous farm margins once tobacco is compared with realistic alternative crops, a reported mismatch between output and buyer demand, debt and contract dependence that shapes cropping decisions as much as profitability does, a tobacco-taxation policy that is not itself administered as a health instrument, and reported use of electronic cigarettes and nicotine pouches among children aged 10 to 16 years. It does not show a national trend, a causal progression between products, or the viability of any specific alternative crop in any specific Pakistani district.

Seven implications follow, ordered from the agricultural-policy core of the paper to its connected demand-side component.

- Commission district-specific economic feasibility studies for Swabi, Charsadda, Buner and Mansehra, where no farm-budget comparator was identified in this review, and test whether investment in inputs and market access can close the gap identified for maize in Mardan, before any crop is promoted as a tobacco substitute.
- Reform the credit and contracting arrangements that tie growers to the crop by developing non-tobacco-linked rural credit lines and enforceable contract payment terms, treating this as a precondition for diversification rather than a parallel measure.
- Establish a standing cross-sectoral mechanism that includes the Pakistan Tobacco Board, the Federal Board of Revenue, federal health authorities and the Khyber Pakhtunkhwa agriculture department, with clear responsibility for coordinating agricultural transition, revenue design and demand reduction.
- Report tobacco revenue alongside grower risk and health costs, establish the dedicated tobacco-tax administration function that current policy analysis finds absent, and design fiscal measures that do not depend on rising tobacco volumes.
- Apply Article 5.3 safeguards across the supply chain, including leaf buyers, processors and boards, and separate crop-promotion mandates from health-policy decision making.
- Regulate electronic cigarettes and nicotine pouches explicitly within a product-inclusive framework with enforceable retail, marketing and packaging controls.
- Build a shared evidence base with repeated national youth surveys using stable definitions, together with farm-gate, market and credit indicators, and evaluate each measure for intended and unintended effects.

The defensible objective is not to claim that every nicotine product carries the same risk, nor that growers should bear the cost of health policy, nor that any single alternative crop is a ready substitute for tobacco in every district. It is to reduce the burden of combustible tobacco, prevent a new cohort of children from becoming dependent on

nicotine, and ensure that rural livelihoods are protected by verified, coordinated planning rather than left to market contraction or to institutions that do not currently speak to one another.

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