



## Research Article

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# Farmer's Response to Tobacco Processing Company in Tobacco Cultivation in Bangladesh

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## Abstract

Several tobacco processing companies patronize tobacco cultivation in Bangladesh. The major objective of the project was to assess farmers' response against the strategies of tobacco companies in the Jhenaidah district of Bangladesh. Farmers' perceptions were taken through focused group discussion. Tobacco companies' activities and strategies were discussed initially. After that, farmers' reactions on companies' strategies in both positive and negative directions were analysed in the context of traditional agriculture of the district. Tobacco companies' sales guarantee at prefixed price motivated farmers to go for contract with tobacco cultivation. Tobacco company provided full revenue at a time which was another point of motivation for tobacco cultivation that was not generally observed in other crops. Though cost of cultivation from tobacco was very high, it provided higher profit in compared with other crops cultivated in the tobacco season. Some crops provided higher profit than tobacco but those were not guaranteed in every season due to high price fluctuation. Companies input support free of cost and at loan but was repaid after harvest attracted many farmers into tobacco. In addition to these company supported incentives, farmers considered the option of using family labor, and unique features of tobacco like high cash crop, safe from disease as motivation for cultivating tobacco. Farmers' negative considerations over tobacco companies were high charge for inputs, subjective grading system of cured tobacco, less address of health safety issues, wide range of hidden and unaccounted cost associated with tobacco cultivation. Non-guaranteed sales and unstable price were main challenges for traditional crops in the district for which tobacco companies' offers become lucrative to cultivate tobacco. As tobacco is the substitute to the food security of the overburden people of Bangladesh, the research suggests making control over tobacco companies by limiting quota on acres of land to be contracted for tobacco and forcing companies to internalize all health and environmental related costs. Farmers' awareness need to be created by assessing and publicizing all the unaccounted cost components associated with tobacco farming. At the same time, it is essential to assure sales of general crops at stable price.

**Keywords:** Contract farmer; Deforestation; Tobacco curing; Tobacco processing company; Sales guarantee

## Introduction

### Background of the study

Tobacco started to replace general crops in Bangladesh in the mid-sixties of the last century. The process was speeded up by the British American Tobacco (BAT) in Teesta silt in the Rangpur area after liberation in 1971. The study of PROGGA [1] showed that tobacco was grown in 70,000 hectares in the last season of 2013. In that year about 38,000 hectares of additional land was used than the year 2012, 108,000 hectares of land was cultivated for tobacco in 2014. The largest tobacco growing areas of the country include Rangpur, Kustia and Chittagong Hill Truck [2]. In addition to converting new land under tobacco, new farmers are also entering tobacco cultivation in each year, though there is skipping tendency too. The shares of tobacco in GDP value and employment have also increased in several years in recent decades.

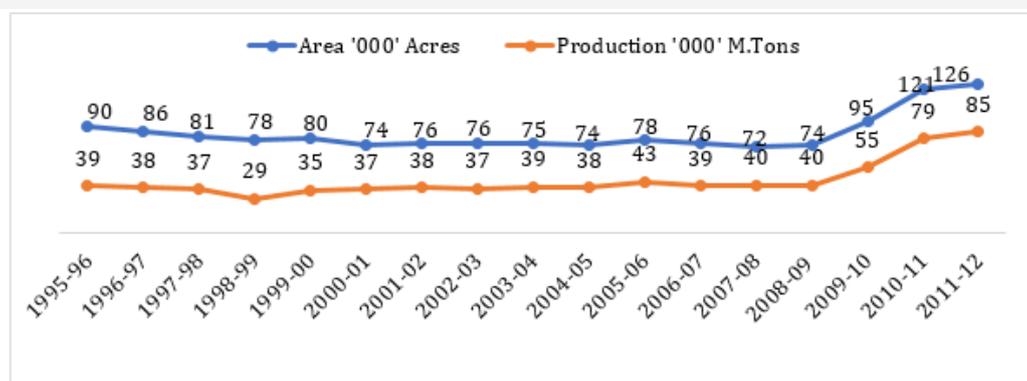
**Table 1:** Growth rate of production and land under tobacco cultivation in Bangladesh.

Year	Area	Production
2002-03	26.84	28.16
2003-04	28.17	33.5
2004-05	26.23	36.85
2005-06	26.27	40.99
2006-07	24.91	36.51
2007-08	26.54	35.96
2008-09	30.13	37.22
2009-10	30.94	43.79
2010-11	41.9	46.79
2011-12	44.26	48.78

**Source:** BBS (2012)

Table 1 shows that the growth rate of both area and production was very high for all years from 2002-03 to 2011-2012. Production growth can be explained by HYV, but area growth is clearly alarming and a threat to food security. The share of GDP value of tobacco manufacturing was 5.44 percent in 1996-97 in all manufacturing while it increased to 6.22 percent in 2004-05.

Chart 1 shows that both tobacco production and land under tobacco production were almost stable from 1995 to 2008. After that both showed an upward jump. Land for tobacco was being retained or increased over time where total agricultural land gradually decreased in Bangladesh



Source: BBS (2012)

Figure 1 : Area and production of tobacco in Bangladesh.

Apart from processed tobacco exports from Bangladesh, domestic tobacco is used as input of bidi, cigarettes, and other semi-processed tobacco products. Many tobacco companies have established semi-processing units near the tobacco growing regions. In the country, bidi manufacturing annual employment amounts to 621,000 labour with 155,000 direct labour and 466,000 indirect labour [3]. Tobacco companies across Asia and Africa get engaged with tobacco farmers for getting assurance about the target amount of tobacco. As a component of the contract, companies provide different inputs and technical support free of cost or at loan. Support normally includes high inputs like seeds, fertilizers, chemicals and other production implements during cultivation and the curing stage. Farmers are contracted to sell a certain amount of tobacco to these companies. In this way companies avoid intermediaries to collect tobacco leaves and thus become able to reduce tobacco procurement costs [4]. Moreover, contract farming allows companies to control tobacco variety, volume, production costs, and creates asymmetric bargaining powers between tobacco firms and farmers [5].

Diverse factors, including region specific factors are liable for spreading tobacco cultivation. Naher and Chowdhury [6] pointed out that family labour, guaranteed sales and ready cash attract farmers to cultivate tobacco. Akhter [7] found that high profit, cash earning, guarantee of inputs and guarantee of sale, play roles in continuing tobacco cultivation. Tobacco companies move in different regions for mining fertile soils. Van Minh et al. [8] showed that in rural Vietnam the average tobacco farmer gets a greater financial benefit from tobacco cultivation than other crops. Furthermore, the myopic view of the farmers about the immediate gain from tobacco cultivation is blamed for expansion of tobacco culture. There is causality between low education level (not completed primary level) of children and tobacco growing of most of the farmers that grow tobacco [9].

It is proved in scientific research that tobacco consumption causes diverse health problems. Globally about 63 percent of all deaths are caused by non-communicable diseases, among which tobacco products are considered one of the major risk factors. Mortality as well as morbidity is increased by tobacco smoking. Both tobacco production and supply are a cause for increased tobacco consumption. Globally, about 600,000 people die from second-hand smoking exposure each year. Among these deaths, the large majority occur in densely populated underdeveloped countries [10]. In Bangladesh, about 58 percent of men and 29 percent of women consume any sort of tobacco, either smoked or smokeless [11]. A significant number of people from Bangladesh are at great risk of use of tobacco products, especially smoking tobacco. Easily availability of tobacco products in Bangladesh is a liable factor which is linked to tobacco production. Over time, tobacco production is increasing in Bangladesh. The [12] identified tobacco-related illness for Bangladesh.

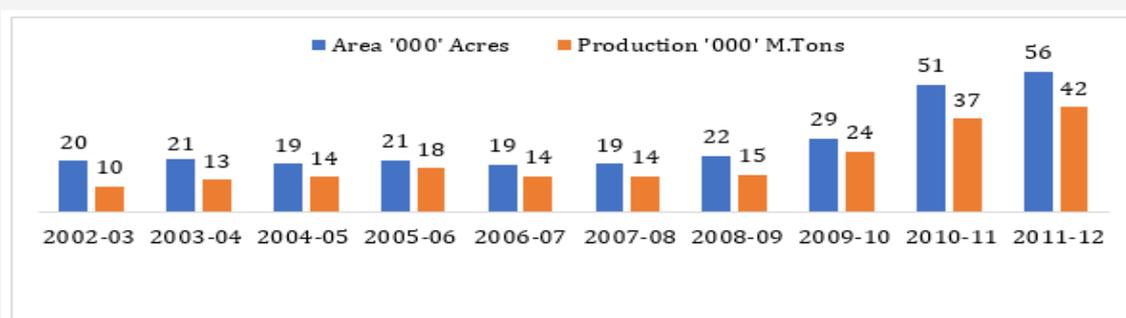
Tobacco cultivation has tremendous social and health bearing which goes often unnoticed. Tobacco farming requires large amounts of wood for a variety of purposes, such as curing, and poles and sticks for barn construction. Tobacco growers cut homestead forests or purchase wood to cure tobacco which creates huge pressure on forest resources [13]. The study of Siddiqui and Rajabu [14] showed that, on average, 4 kg of fuel wood is consumed to obtain 1 kg of cured tobacco. Those who have direct involvement in tobacco cultivation and processing suffer from various health problems. The victims of this health risk include children, pregnant women and older people who participate in tobacco production or live near tobacco-growing fields [15]. Many dimensions of social and environmental costs of tobacco cultivation are grossly unaccounted. For instance, tobacco cultivation puts constraints on other crop farming, adversely affects land fertility and creates external costs on health hazards. Child involvement in tobacco cultivation also leads to increased school drop-out rates.

Many farmers observed a decline in soil fertility for long term tobacco cultivation in the same land which caused lower yield in other crops too. After adding the opportunity cost of family labour, Van Minh H [8] found very minimal profit for one region and negative for another region in Vietnam. There exists some anti-social movement in some regions in Bangladesh where some regions also showed growing interest for tobacco. Sometime farmers partially shifted from tobacco production due to government initiatives to get farmers back into food crop production. Some farmers stopped cultivation completely. At the same time many remained in cultivation but reduced the amount of land for tobacco cultivation. Some farmers continued and some also entered tobacco cultivation. Though Bangladesh is an agrarian economy, it is characterized with many limitations. In that case, farmers try to find crops which have less challenge in the input and output market. It is urgent to examine the reasons why conventional agriculture (mostly crop agriculture) fails to arrest the increased adoption of tobacco culture. As tobacco is a socially undesirable product, there is a need to discourage farmers. In order to prescribe some policies, it is essential to identify the dynamics among traditional crops, tobacco companies and tobacco farmers. Unless tobacco production is reduced, it would be hard to reduce food insecurity and public health risk. Withdrawing poor farmers from tobacco cultivation is not an easy task. In order to minimize tobacco cultivation, the first step would be exploring the tobacco firm-farm linkage. Along with exploring the strategies of tobacco companies, it is equally essential to identify factors that influence farmers to adopt, continue or to quit tobacco in the context of traditional agriculture. It will help to understand how tobacco companies are defining strategies to encourage tobacco cultivation. This research will contribute to policymaking as it is blamed that there is no direct policy to regulate tobacco cultivation in Bangladesh [1]. This research output will give a clear direction for designing a participatory tobacco control policy in Bangladesh.

### Objectives of the research

The research firstly aimed to explore strategies of tobacco companies that support tobacco cultivation. Main research

### Study area



Source: BBS (2012)

Figure 2 : Area and production of tobacco in Kushtia district'.

The study is confined to the Khulna division of Bangladesh. Among the ten districts of Khulna division, tobacco is widely cultivated in Chuandanga, Jhenaidah, Kushtia and in Meherpur

questions were to explore how do tobacco companies implement their strategies and what package they offer to farmers. Second objective of the research was to identify farmers' responses to tobacco companies' strategies. In this case, research questions were to know why some farmers decide to be contracted with tobacco companies and what benefit and cost do they consider. This research question helps in understanding the role of various supports from tobacco companies to arrest the expansion and adoption of tobacco cultivation by farming households. At the same time, it will help to stereotype farmers who want to be engaged in tobacco cultivation and to what extent. And third objective was to explore the context of traditional agriculture and compare those in the context of tobacco and tobacco companies. Research questions posed in this research was to explore why some farmers prefer tobacco cultivation over traditional crop agriculture while others do not do so. This research question helps to understand the strengths and challenges of tobacco over tradition crop cultivation.

### Research Methodology

#### Research context

The study is a field based qualitative research to understand tobacco companies' incentive packages and technical assistance provided towards farmers in different levels of cultivation and curing. At the same time, it explores the response of the farmers and links how their responses are affected by the context of traditional agriculture and farmers' prototype. More specifically it analyzes whether limitations of traditional agriculture also encourage tobacco cultivation. Farming households are the unit of analysis. Data are collected from both tobacco growers and non-tobacco growers. A 'tobacco grower' is a farming household that cultivates tobacco irrespective of whether that cultivates other crops or not. Tobacco growers include both contract and non-contract farmers. On the other hand, a 'non-tobacco grower' is a farming household who does not cultivate tobacco currently but is engaged in another crop cultivation. This category includes farmers from both never and ever tobacco cultivating category.

district. In Jhenaidah district, both the number of farms and areas under tobacco cultivation have increased alarmingly during the last couple of years. Renewed interest in tobacco cultivation has

been observed in Harinakundo, Mohespur, Sailkupa and Sadar upazila of Jhenaidah district. In a similar tone, BBS [16] reported that in Chudanga district, wider adoption of tobacco is observed in Alamdanga upazila followed by Damurhuda, Jibonnagar and Sadar upazila. For instance, during the year 2010-2011, 1695 metric tons of tobacco was produced from 1342 hectares of land in Alamdanga upazila alone. In Kushtia district, increased adoption of tobacco culture is observed in Daulatpur and Mirzapur upazila [2] (Chart 2).

Therefore, it is seen that tobacco is widely grown in Shailkupa upazila (Jhenaidah district), Alamdanga upazila (Chuadanga district), and Daulatpur upazila (Kushtia district). In these three upazilas there are a good number of farmers who have skipped out of tobacco cultivation as well. In fact, these upazilas are rich in producing cereal crops, vegetables, beans and other crops. Tobacco is also cultivated in very few areas of Jessore district. TPCs have their processing and operational units in all mentioned districts except Jessore.

Considering the presence of different TPC and farmers' different level of attachment to tobacco cultivation, the research is confined in the Jhenaidah district of Khulna division. This district also comprises traditional crop growers, new tobacco farmers and tobacco skippers. Based on the same ground, the research is focused on Harinakunda upazila and then Raghunathpur union of the upazila. Considering the extent of presence of both tobacco growers and non-growers, and presence of TPC, Garabaria, Sohagpur, and Srifoltola villages were selected as study sites.

### Sample and data

Reconnaissance surveys were conducted in different tobacco growing areas to get an insight into the phenomenon. Based on the reconnaissance survey in 2018, a draft checklist was prepared and pre-tested. A number of three FGD sessions were also carried out in three villages. A number of twelve participants were incorporated in each FGD session where contract and non-contract tobacco farmers, general crop producers, and tobacco skippers were included. Inclusion criteria were current attachment to direct agriculture and permanent residence of concerned village so that they can have sufficient idea about agriculture market, transportation system, infrastructure, middleman, tobacco company's operation etc. Contract farmers covered member of Abul Khair Tobacco, BAT and Dhaka Tobacco processing companies. Participants covered various age groups, years of attachment to agriculture, crop category, different family settings, different membership category of contract tobacco farmers etc. Participants' perceptions and experiences were narrated in the arrested issues. In some issues, secondary information applied to check validity of the statements. The research focused farmer's perception on tobacco company's strategies in the context of tradition agriculture. As the research focused on the very general issues of the agriculture, it is considered as low risk. That's why researcher didn't seek for ethical approval, but informed consent was taken from FGD participants. All sessions were carried out in respective villages.

## Results and Discussions

### The dealings of tobacco company with farmer

Tobacco companies play an important role to motivate farmers towards tobacco cultivation. Each tobacco company has field staff to visit tobacco farms during cultivation and advice farmers to produce better quality tobacco. The company get in touch with all stages of cultivation, curing, sales and payment.

### Promotion and agreement before cultivation

Tobacco companies appoint field officers to visit farmers two to three months prior to the starting of the cultivation. Officers meet farmers, ask for their plan, discuss about seeds type, incentives, potential prices etc. to be offered from concerned tobacco. Tobacco companies maintain month-wise annual tobacco calendars that include promotion, technical assistance in cultivation, curing, sales, processing and export to sending to final processing units. During June-July, field officers start moving to the farmers. Many field officers are recruited from local areas easing any time communication between them formally or informally.

After the initial discussion with the farmers, companies contract with farmers to ensure targeted amount of tobacco from a particular region. As part of the contract, farmers apply for membership which has different categories based on acres of land to be cultivated for tobacco. Membership starts from one acre and its multiple such as two, three, four acres of land. There are instances of more than ten acres too. Farmers are required to submit a mortgage as contracted farmers can receive inputs at loan. Agreement also assures tobacco to be cultivated and to be sold to the companies. There is no unique standard of mortgage where blank signed bank cheque and land documents are widely observed as security. As legal aspects, farmers are to submit a photograph, a bank cheque of the contracted farmer, and a membership fee, normally BDT 500 irrespective of membership category. The membership matures at an annual basis. When sales and transactions are done, farmers get the mortgaged document back. For an acre of membership, farmer is supposed to sell 12 bells (840 kg) tobacco to the contracted companies. The contract can be cancelled easily in the next year.

### Input and technical support during cultivation

Tobacco companies provide some inputs free, and at loan. Companies provide seed generally free of cost. Farmers reported that companies provide enough seeds planted during August-September. About one and a half months are required for growing tobacco plants. Farmers then pluck and plant those in other field where harvest occurs in January-February. In the past, farmers were supposed to select seed by themselves. But they faced a challenge to select the right seed where yield affected negatively in many cases. Now companies patronize seed where farmers showed satisfaction as TPC provided seeds are high yielding and manageable to cultivate. In addition to seed, farmers are supposed to receive 200 kg fertilizer of different categories for an acre of land. Abul Khair Tobacco (a concern of Abul Khair Group) provides

four sacks of fertilizer for an acre of contracted land. Farmer can receive 50kg of Diammonium phosphate (DAP), 100kg of Sulfate of Potash (SOP) and 50kg of Phosphorus. Farmers are independent of receiving inputs as higher amount is to be paid for. Large members can receive multiple of inputs as per land size. Farmers receive fertilizer during November-January. There is no exact date of delivery. But field officers notify farmers about delivery a few days before. They receive those in different installments. One farmer in the Sohagpur village informed that he holds a two-acre tobacco card but cultivated tobacco in one acre of land. He received inputs of two acres and used additional inputs in other crops.

Field staffs visit tobacco farms and advice farmers on optimum seed amount, planting time, amount of land required, length between plants, number of plants to be planted in an acre of land, time and hours of irrigation, insecticides doses and time, safety issues and so on. They also suggest additional amount of fertilizer to be used and timing of that. One BAT contract farmer told that a field officer became available every week in the village and became available any day on call. More importantly, when new species are introduced, field officers visit farmers more often to guide farmers accordingly.

### Curing and sales support after harvest

After plucking green leaves farmers cure those. In the Jhenaidah district, tobacco is cured by fire not by sun heat. Tobacco varieties produced in Khulna division (K2 and some other species) is cured by fire. For curing, farmers make a special room called a curing house. Some households have a brick-built curing house, and some make temporary curing houses with jute straw. In either category, curing houses become airtight so heat cannot go out. They decorate green leaves and hang them inside. Curing is the most sensitive phase of the whole tobacco cultivation as just a bit of over-heating can destroy tobacco. Bad smoke and improper heating can destroy tobacco color. In this regard, the company directs farmers about building efficient curing houses, when to heat, when to stop fire, when to tie leaves, when to untie, how to store, how long to wait after firing to get fine color. One contract farmer of Abul Khair Tobacco reported that farmers get meters that can read temperature levels of the curing house. Farmers can get these on loan, but FGD responders reported that many farmers don't use. They argued that the temperature reading meter is not the only way of securing tobacco curing. Moreover, the meter is not free and generally cannot be used in the subsequent year. Meter price and installation cost becomes another consideration. During tobacco curing, field officers randomly visit farmer's home and at least they become available on call. To ease the supervision of the curing process, farmers make curing houses at the homestead. As farmers aim to complete the whole sale before rainy season, all farmers are in a hurry. Farmers generally don't share curing house with others.

As per contract, farmers are to sell tobacco to the companies. There are eight grades of cured tobacco, where announce price of each grade initially. When tobacco is taken in the depot of the TPC, grading officers decide grade of tobacco. From tobacco bell,

a company officer takes samples and decides the grade for that bundle. At the same time company weighs the tobacco and settles payment.

### Farmers' Responses to Tobacco Company Strategies

Farmers have mixed experience on the strategies and offers of the tobacco companies. They consider and compare those in the context of general crops in the tobacco season.

#### Farmers' positive considerations

**Sales guarantee at stable price:** As per contract companies are to purchase 12 bells (840 kg) cured tobacco for an acre of land. Companies purchase fine quality tobacco and not lowers grades. This year the company-provided price was BDT 155 for grade 1, BDT 130 for grade 2, and 120 for grade 3. In Jhenaidah, three companies operate named Dhaka tobacco, BAT and Abul Khaer Tobacco and farmers report that all companies offer the same price of same graded tobacco. The announced price for a particular season remains the same for the whole season. Even a bumper crop does not affect tobacco price like other crops. Some farmers reported that they were not so confirmed about exact price even when they were contracted. But survey finding suggests that farmers are not much concerned about it because they can have a standard guess about price, even earlier than contract. Normally companies increase the price from BDT 3 to BDT 10 per kg in different grades than the previous year which has become a trend. They never experienced decline in price. In FGD, farmers in Sohagpur village reported that they can grow upto 1000 kg tobacco in an acre of land. Farmers experience some lower grade tobacco each year but they become able to sell those to some local companies.

Market mechanism works properly between demand and supply of tobacco. From the demand side, each company decides the amount of tobacco targeted for coming season. Based on expected productivity, companies determine how much land is required to ensure the target amount. Thus, farmers also get assurance of full sale. Magati et al. [17] from Kenyan experience reported that farmers contract with tobacco companies because companies are guaranteed buyer. But in the case of other crops, equilibrium of price is determined on the spot and varies in every single transaction. There is huge uncertainty from both demand and supply as weather, transportation, social occasion and natural calamity affects all aspects.

Some other uncertainties of traditional agriculture force farmers to consider tobacco production. Lack of a fair price is another consideration. In many seasons, farmers experienced banana, pulses, onions, betel leaves, arum etc. as more profitable than tobacco but in some season, prices of those crops showed a very reduced prices also. Some farmers of Sohagpur village reported that garlic experienced huge profit in the last year (2018) than tobacco. By observing that, many farmers cultivated garlic, but the price was low in this year. Thus, some seemingly high profitable crops like garlic, onion, ginger etc. face price fluctuation. Some of these are imported which also shows high fluctuation in price and

quantity. Since there is no certainty of price of these domestic crops, farmers remain confused and consider crops with stable price like tobacco.

**Assurance of full revenue immediate after sale:** Farmers can sell any amount of cured tobacco within contract any day. After adjusting incentives cost, companies provide full payment through cheque. Farmers consider this payment option as forced saving for them and becomes a source of some investment in social functions such as marriage, and in development expenditure such as building a room etc. After receiving tobacco, company asks farmers to come on certain day to receive a cheque. There is no unique standard of fixing the payment date. It can vary from two to fifteen days and vary across companies. FGD responders reported that BAT gives payment to the farmers within 7 days, Dhaka tobacco and Abul Khaer company pays within 15 days. There are instances of early or delayed payment also.

Even in the case of single yield traditional crops, in most cases, farmers don't receive their full income at one time. Many crops are consumed at home, partly or fully. Farmers sell a good portion immediately after harvest, even at a low price in order to meet loans and other obligations. Farmers hold some portions to sell later when prices are expected to go up. In most cases, other products are sold in credit. There are no contractual buyers in the case of traditional crops to whom farmers can sell. For these reasons, farmers don't get a total amount at one time. In case of general crops, there is no such agreement between buyer and seller; credit sale is frequently observed, and there is no specific time limit to get money back. Sometimes credit sales become non-recoverable too. Many farmers reported that they cannot save a large amount from small payments and face problems in tackling high money requiring issues like building a new room in the house, expenditure of a marriage, purchase an irrigation pump etc. So, getting a large amount of money at a time is another motivating factor for tobacco cultivation.

Some crops provide yield at a time like paddy, wheat, jute etc. but many crops provide repeated yields like chili, tomato, brinjal etc. The nearest market for Garabaria village is Charatola where only Monday is the main trading day of the week. Farmers the village reported that middlemen controls price of the marketing chain, sucking the blood of farmers. Many farmers remain unaware of product prices of other market due to information gaps. Even when some farmers are informed about higher prices in a nearby market, many small farmers are forced to sell in the local market as they cannot carry small amount to other market because of transportation and labor overhead cost. Many famers' crop remains relatively both immature and over matured as they target Monday.

With transportation overhead, many consider Haldani bazar as well where Friday is the main trading day. From this market, vegetables and crops are ultimately transported to different districts. When there is bad weather like severe rain, farmers often fail to transport products to market. Local transportation also becomes a problem for them. Even many farmers of Srifoltola village

must cross a small canal to reach the main road and then to move to Charatola or Haldani bazaar. On other days of the week, farmers can bring products to the market but sell to local clients in piecemeal. In these cases, per unit transport cost also gets increased. All farmers in the Sohagpur village reported that they are habituated to sell both in cash and credit. In case of small sales earning, they spend almost fully to purchase other grocery and other needed products for households, even on the same day. Thus, they cannot gather a handsome savings.

**Higher profit from tobacco:** Compared with other crops, though tobacco cultivation cost is much higher than other crops, tobacco provides higher profit. One farmer responded that he enjoyed BDT 70,000 as profit from an acre of land even after paying land rent. However, he mostly used family labor. If the curing goes well and farmers can produce a maximum amount of 'Grade 1' tobacco, profits also increase. Another farmer reported that per decimal profit for tobacco is about BDT 450 which is the highest for any crop he cultivated in the last season. Hassan et al. [18] found that in Rongpur region tobacco was the most profitable crop. Per acre profit from wheat becomes about BDT 15,000. Rice is not considered so profitable in any season but farmers cultivate those at least for domestic consumption. Price of wheat as well as rice remains relatively stable where profits from those remain very low. That's why farmers target some high profit-making crops to maintain the family expenditure well.

**Input and technical support from company:** Though tobacco is the most expensive crop to cultivate in the tobacco season, farmers cultivate tobacco for high profit. To cultivate tobacco in one acre, more than BDT 50,000 is required, on average. The cost of cultivation of an acre of land for wheat and garlic is about BDT 18,000 and BDT 32,000 respectively. Company's free inputs become important consideration. In addition to the company supplied 200kg of fertilizer, a farmer uses 12 sacks (600 kg) of additional fertilizer (total 800 kg per acre, on average). If land rent is considered, then the cost of cultivation becomes even higher. Even though tobacco companies charge higher price for 200 kg of fertilizer, farmers prefer this support. Primarily it reduces monetary burden during cultivation. Moreover, price is adjusted after harvest which is generally not the case of other loans from NGO and banks. Contract tobacco farmers get technical support from the field officers during cultivation and curing free of cost. Even when new tobacco species are launched, farmers don't get worried as they expect to get solutions from the tobacco companies' field officers.

But in case of other traditional crops, farmers showed their resentment about not getting proper services from government agriculture officers. When farmers go to the upazila agriculture, many officers are not found. Moreover, in the available cases, they get the treatment without any direct observance of the problems. As agriculture office is located only in the upazila headquarters, farmers of remote villages don't feel incentivized to go to the agriculture office. In most cases, farmers try to get technical solutions from local agricultural input sellers who are not expert.

In traditional agriculture, farmers try for new varieties for which they need to be trained properly and get technical solutions from time to time. Traditional farmers' next most important problem is a lack of crop specific training from any organization.

### Other factors affecting tobacco cultivation

Along with company provided facilities, there are other reasons for which farmers get interested to cultivate tobacco.

**Employment of family labour:** Tobacco cultivation requires huge labour for which other members including children and women get involved in the curing phase. They are employed to tie green leaves, to add firewood and to release cured tobacco from the curing house. Family members help to store the tobacco at home, to make bundles for sale etc. To avoid payment for hired labor cost, family labour use become commonly followed alternate in the Jhenaidah district. In the rural area of the Jhenaidah district, an amount of BDT 350 to 400 is required for a hired laborer who works normally 6 to seven hours in a day. Sometimes Labourers are required for only a few hours in a day. In such cases, it becomes monetary burden to hire Labourers as they demand full payment. In contrast, family Labourers have more flexible working hours. Even when farmers are involved in other jobs, they can work in their own tobacco field in the early morning, late afternoon or at their convenience.

Some traditional cultural factor works in Bangladesh. Children and women generally don't work out in the fields but works in their own crop field. Otañez and Glantz [19] identified use of child labor in tobacco production. Even many unemployed male adults don't work in others' fields as paid labourers. In the absence of tobacco cultivation, those unemployed or underemployed family labourers generally work in others field as paid labourer. Tobacco curing continues for several weeks and requires tremendous effort over days and nights. Due to its sensitivity, farmers aim to look after curing phase themselves. As curing is done at home, many households don't feel comfortable to allow outside labourers to reside in their home for a few days. In traditional rural Muslim society, privacy is a concerning issue. Food, accommodation, and hired labour payment become other considerations for not employing hired labor. FGD findings support that when both family and hired labourers are used, in most cases the amount of total work hours from family members is larger by far than that of hired labourers. Though family labour is also used in other sorts of agriculture, the amount of labour used in tobacco cultivation is much higher than in any other agriculture. In another sense, it is an option of selling family labour in one's own field.

**Demonstration effect:** Tobacco cultivation is widely influenced by household neighbor's and land neighbors. It was reported that tobacco gets concentrated in the tobacco surrounding land rather than in scattered plots. One plot's crop selection also affects nearby plot's crop selection. Unique crops in nearby land can help to manage tillage, irrigation, pesticide use and other activities efficiently. When field officers come in a field, other farmers including non-contract farmers get technical support also free of

cost. A farmer can take help from the other farmers too. Farmers of Srifoltola village reported that tobacco producers use excessive amount of pesticides compared with other agro-products. Then insects move to surroundings other crops that follow a different pesticides schedule. But farmers try to match pesticide use with the tobacco which becomes difficult.

Neighbours' cultivation practices also influence farming behaviour. Some FGD participants in Srifoltola village informed that non-contract farmers can sell tobacco to the tobacco companies via other contract farmers. Rashid Sheikh said that "I started tobacco as my neighbors were cultivating for years and doing some development expenditure at the end of tobacco season". Tobacco farmers can get help from neighbours in receiving inputs from the depot. Abul Khair's depot is situated in Jhinbaria which is about 10 km distance from Garabaria village. BAT's depot is situated in Vennatola which is 10 km distance from Garabaria village. Farmers of these two companies collect inputs and sell tobacco within Jhenaidah district. But in the case of Dhaka Tobacco, the selling spot is located in Kushtia district, but field officers develop different convenient mechanisms for receiving inputs, generally from local areas. With the assistance of the field officers, one farmer can receive input of others. But at the time of tobacco sale and payment farmer need to be present bodily. Sometimes farmers enjoy economies of scale in purchasing firewood as well as transporting cured tobacco to companies.

**Unique features of tobacco:** Tobacco generally shows a very high sales-production ratio as no crop is kept for household consumption. Producers can sell about 100 percent of the produced tobacco. Card holding members get assurance of sale to tobacco companies. Farmers can sell the lower grades tobacco to other local producers of jarda, gul and bidi. Betel leaf consumption is very high in Bangladesh. People chew it with betel nut and different processed tobacco. It is very common in the region that non-contract farmers can sell tobacco to TPC via another contract farmers' card. This percentage is by far lower in case of other crops. Many crops experience high household consumption, gift to relatives, damaged after production by bad weather, lack of storage facilities, etc. As agriculture provides cattle food, rural people enjoy advantages in rearing cattles. In most cases, they fix cattle in the field to feed on grass. But the loosening of cattle's rope pin is common which allows cattle eating and destroying different crops. There are many instances where crops were totally damaged by cattle attack of only a few minutes. But cattle don't eat tobacco leaves, which is an important consideration for farmers. Tobacco has a high tolerance on insect attack. Being a winter crop, it is also safe from monsoon, which causes problems in many crops. Moreover, farmers don't mind using excessive fertilizer and excessive pesticides unlike with other vegetables and crops.

### Farmers' Negative Considerations

#### High cost of fertilizer

Generally, farmers don't pay for seeds and for technical solutions from the TPC but other inputs are provided at loan are

adjusted when farmers receive sales earnings from companies. All participants in the FGD sessions conducted in Garabaria village complained that all companies charge a higher price for fertilizer than the current market price. Though receiving inputs are optional, experiences suggest that almost all contract farmers receive those at alone due to their poor economic condition. One contract farmer of Srifoltola village reported that he is to pay BDT 6,000 for contracted 4 sacks of fertilizer (200 kg) which comprises a mix of DAP, SOP and Phosphate. Since larger leaves have high demand and are considered for higher grade, farmers often use excessive fertilizer so that leaf size increases. One farmer told that he paid BDT 6,000 for fertilizer again actual market price of BDT 4,875. Tobacco farmers of Garabaria reported that they don't mind paying a higher amount, but the amount becomes higher for only 2/3 months delays.

### Poor tobacco grading system

There is no technical test of tobacco grading, instead, company officers determine grade by their experience and judgement. One farmer in Garabaria told that he took three bundles of the finest tobacco to a company out of which, grading manager treated one bundle as grade 1, and two bundles as grade 2. He bargained and the manager then treated another bundle as grade 1. This seems to be a win for the farmer, but he was completely dissatisfied because the remaining bundle (treated as grade 2) was also the finest quality in his opinion. He believed that that could certainly have been considered as grade 1. In most cases farmers have little say over the company decided grade. One farmer mentioned that muscle power, political power, relationship with company, influence of the field officer, membership size of the farmer etc. also sometime makes a difference in deciding grades. Some influential farmers purchase tobacco from non-contract farmers and sell those to the company in their own name. Farmers have resentment towards the tobacco price they get from companies. Though companies increase tobacco price each year, the rate of increment is lower than the increment of cost of cultivation. Companies set the prices and farmers are the price takers as there is no organized association of the tobacco growers.

### No measure to tackle adverse health effects

Tobacco curing is hazardous for health. As curing house is located at the homestead, all the family members are affected by the harmful gases. They inhale and smell harmful gases when they hang green leaves inside the curing house, fire the oven and releases dried leaves. Normally someone has to add fire and check leaves continuously for day and night to add firewood, to check temperature level, to observe leaf condition, to tie and untie leaves and then to preserve those at home before selling. To complete a shift of burning, farmers need to fire about 72 hours (3 days) continuously. If someone skips overnight heating, then more days are required for drying a shift. After firing, additional days are also required in the curing house to get fine color which is an important factor for tobacco to be considered for higher grade. After releasing cured tobacco from the curing house, farmers immediately prepare

for another shift. Depending on the amount of tobacco leaves, total required curing days vary from household to household, but it may last for up to two months for big farmers. As cured leaves are stored at home even in the sleeping room, all family members are affected for inhaling noxious gases. When tobacco growing family members go out, people can identify them by the smell of tobacco from their clothes and by their exhausted appearance. Apart from inhalation of noxious gases very thin, light and small tobacco dust easily gets mixed with food stuffs. Even when family members don't participate in tobacco curing, they also become victims. One farmer of Srifoltola village reported that he experienced food poisoning from accidentally mixing tobacco dust particles in the food cooked for the daily meal at homestead. Cured tobacco is released from curing house either at night or in the very early morning to avoid the sun's heat. Because of variation of heat level tobacco might get ruined, they continuously check heat level and cannot sleep well at night. No safety masks or other protective equipment are provided by any TPC. Though some field officers ask farmers to adopt protective measures, rarely farmers do so by their own accord. It is unfortunate that TPC doesn't provide any safety equipment for the curer let alone for the other family members. There is almost no instance of using gloves and masks, or sunglasses by the farmers themselves. Sometimes they cover their nose and mouth with old clothes.

Tobacco cultivation exerts both short term and long effect on mental health [20]. Surveyed households reported that members get sick from various diseases. Frequent use of pesticide in the tobacco field causes pesticide poisoning [21]. Tobacco related diseases such as: Green Tobacco Sickness (GTS) including dizziness, nausea, acute cough, chronic cough, respiratory problems, pesticide poisoning etc. were reported in higher proportion in tobacco cultivating households. Riquinho and Hennington [20] found that respiratory disorder, symptoms of mental disorders, pesticide poisoning musculoskeletal injury and other diseases were associated with tobacco cultivation and processing. It reduces stamina and working hour and working days. While attending patients, family members' working hours or wages also get lost. Families need doctor fees, medicine costs and associated transportation costs when consulted by a doctor. Thus, households incur health costs which include both wage loss for illness and morbidity.

### Unnoticed and unaccounted cost of tobacco cultivation

Many farmers consider for short-term profit but overlook many cost components like unpaid family labour. Farmers don't not consider labor opportunity cost like wage earnings from other work, leisure cost etc. Among different shifts of tobacco, farmers experience bad curing in some shifts. There are instances of complete destroyal of tobacco. If it happens even after some years it can become a ruinous burden for farmers. About 50 maunds of firewood are required to cure tobacco from one acre of land. Some farmers of Srifoltola villages also reported 70 maunds for curing tobacco from same size of land. When they use home supplied firewood they usually don't measure, neither they consider as cost.

Since all these costs accrue because of tobacco farming, should be deducted from profit of tobacco farming to calculate real gain. They cut many trees or purchase firewood for curing which is an environmental concern. Thus, tobacco augments deforestation [19,22]. In Malawi tobacco expansion has been occurred at the expense of replace of forestry [23]. There are similar examples in many countries also. In terms of tobacco driven deforestation, Bangladesh ranks number three in the world [24]. If those were added to give a financial value, the profit from tobacco cultivation may be seen as minimal. Tobacco crop per year is very high. From seed plant to sale, about eight months are required. Though land is not occupied in tobacco curing phase, but farmers' mental and physical attachment to tobacco continues.

After three to four years of continuous tobacco cultivation, farmers observe some tobacco roots (locally called gara) in the soil. Another farmer reported that they can cultivate upto five years before tobacco roots are observed. This tobacco plant residue remaining in the field gradually degrades the soil quality [7]. After observing these roots in the soil, production falls for both tobacco and other crops. Tsadilas et al. [25] found that soil pH was reduced by 0.5 units after four years of tobacco cultivation. To nullify the effect farmers, stop cultivation for a season. This is another cost component which is not generally addressed. FGD responders reported that farmers are to use additional than the previous year to retain production level. In per bigha (33 decimal) tobacco cultivation, roughly they use 5 kg more fertilizer than in the past season, and this is becoming a trend. So, this gives a sense of the reduction of fertility. In a field experience Farmers reported that they use so much fertilizer that tobacco cultivating land requires less fertilizer in post tobacco season (kharif I), than the land in which tobacco was not cultivated in the rabi season.

About two months is required for tobacco curing and other processing activities. School-going children also get involved in curing activities. As most adults remain involved in curing, the children's workload increases in components also. Curing activities done at night disrupts sleep. For harmful gases, dizziness, nausea and weakness are mostly observed among small children. So, they cannot study properly as well. Many skip for school for dizziness, GTS and for excessive workload.

The study found that there is less movement of relatives to and from tobacco cultivating households especially during tobacco curing stages which last about two months. Moreover, family members' business for curing don't allow them to have leisure and gossiping time with relatives. Many relatives don't like the bad smells and gases accrued from the curing process and from cured tobacco stored for sell. Relatives staying overnight in many cases are lodged in tobacco storing rooms. All clothes gain a bad flavor which remains even when members go out and people can easily identify them. Relatives also consider health issues. Tobacco households also cannot visit their relatives during curing time. Many reported that many families hesitate to give marriage of daughter with tobacco cultivating households for excessive workloads.

Some tobacco growers have skipped from tobacco cultivation by considering some of these cost aspects. One respondent in Sohagpur village told that he gets too tired from a few hours work for the last two years. He used to cultivate tobacco for six years. From last year he has stopped tobacco because of his illness. He is neither interested to continue tobacco with hired laborer's. Many farmers strive to cultivate many HYV crops. In many of those cases, crop years have been reduced. If managed well, non-tobacco land can produce up to five seasonal crops and vegetables. Many farmers aim to be early reapers of seasonal vegetables and get high prices.

## Policy Recommendations

### Minimizing limitations of traditional agriculture

It is evident that tobacco has displaced food production especially in fertile land in Bangladesh. The fertile region of Kushtia, the second largest tobacco-producing district in Bangladesh, was once a food-surplus region. Now tobacco occupies fertile lands in the district. This trend is also taking place in other districts including the CHT. Bangladesh is struggling to attain food sufficiency for more than 160 million people in an area of 147,570 square kilometers. If more land is devoted to non-food production, this would be a threat to food security because Tobacco producing community faces loss of local food production [26]. Bangladesh is losing 1 percent of arable land every year, in part due to erratic rains and land degradation (UNWFP, 2011). There is pressure from urbanization and other pressure on cultivable land. Many tobacco producing countries also face problems of food scarcity. Moreover, 12 out of the top 25 tobacco leaf producing countries had higher levels of malnutrition in their populations between 2011 and 2013 ASH [27]. At the same time, we observe the decline of tobacco from developed countries. The steepest decline has been experienced by the United States of America, from 20 percent of world tobacco output to 8 percent between 1970 and 2000, followed by the European Union, whose share of production fell from 14 percent to 7 percent [28]. To gain renewed interest in traditional agriculture and bring back from tobacco, limitations of traditional agriculture are to be minimized in many respects. Proving technical assistance and crop specific training, price and sales guarantee are mentionable. Government has an existing organization named UAO to guide farmers. Government should ensure that officers remain at the office during office hours, the number of officers is adequate, and officers arrange training for farmers regularly and get in touch with the farmers. Agriculture officers are to be trained about recent crops and practices. Government field officers are also supposed to visit crop field in applicable cases. Farmers' awareness is essential so that they don't depend on local medicine sellers to get treatment. For assuring farmer's sale at stable price, there are provision of government purchase but that mostly targets some non-perishable crops like rice, wheat etc. But there is no such step in the case of perishable products. In this case, government can pursue the same for other perishable crops especially which is produced in the tobacco season. Sales assurance at a stable price will convert many farmers from tobacco to general crops. Crop insurance for traditional crops in the tobacco season can be a solution.

## Publicizing the health costs and assessing real gain of tobacco farming

Tobacco cultivation cause many health problems. But most tobacco-growing farmers reported that neither government nor any other organization has advocated them to stop tobacco cultivation. Initiative should be taken to increase awareness by alerting famers on short and long-run health costs. Tobacco companies sometimes inform farmers, but main focus goes on the effects of smoking. So, health and or agriculture ministry need to initiate mechanisms to inform farmers. Media broadcasting can have a positive effect. It also requires scientific research to determine what sorts of gases are produced when green tobacco leaves are burnt and to what extent these are injurious to health.

Tobacco has both short-run and long-run encouraging and unpleasant aspects. Family Laboure's remain and unaccounted. Farmers don't calculate the opportunity cost of labor and preference. Further research is needed for long run gain from tobacco by assessing unaccounted and unobserved cost components like unpaid family labor, opportunity cost of leisure, land degradation, cost of keeping land uncultivated for tobacco, health cost of pesticide and tobacco curing etc. There are cost on child health and education and women health. Many don't consider cost of home supplied firewood. Cutting many trees for fuel is another area of concern. Thus, all tangible and intangible benefits and costs area to assessed holistically for assessing real gain from tobacco.

### Imposing control over tobacco companies

Many countries of the world reduced tobacco production through different government actions. The shifting of tobacco production from developed to developing countries, especially Brazil, has been favored by a decrease in government subsidies [29]. Tobacco is not patronized by the government of Bangladesh nor does it prohibit farmers in the region to cultivate. Firstly, government initially can limit acres that tobacco companies can contract for tobacco cultivation. In the presence of tobacco cultivation, government can impose some other control on tobacco companies. Schmitt et al. [30] suggested adopting effective intervention to address need of tobacco harvesters to minimize risk. For example, tobacco Companies must have to internalize health and environmental damage which will also increase cost of tobacco procurement and thus reduce tobacco cultivation. No companies need to provide safety equipment's at the curing stage and for spraying insecticides. Since tobacco cultivating households incur health burdens in the form of medical cost, workday loss etc., companies must internalize these in the business model like financial incentives for health burden. As tobacco is called a 'forest killer' [31], for environmental safety alternative to existing curing approaches are to be considered. In this regard, [32] found that tobacco cultivation led deforestation and loss of biodiversity in Tanzania. Riquinho and Hennington [20] also highlighted deforestation issue. Many African countries are facing similar problems at present too. Many farmers reported tobacco about discriminatory practices for tobacco grading. Government can

impose technical grading to safeguard the interests of the tobacco growers. In case of incentives, government should dictate where companies charge excessive price for inputs offered at loan.

### Conclusion

Farmers feel an interest towards tobacco due to short run profit. They can get a large amount of cash in one go. Apart from profit, many farmers are continuing tobacco with dissatisfaction especially for huge labour hours and health pains. Farmers are gradually becoming conscious about health issues as well. Households with high income put weight to labor hours, health issues, and leisure and thus getting out of tobacco. On the other hand, finding no other alternatives, many landless, marginal and poor farmers are entering into tobacco. Minimizing problems and uncertainties of traditional agriculture may turn some farmers from tobacco to traditional crops. It is a matter of hope that chronological limitations of typical agriculture have been decreasing. HYV has increased production in many crops. Businessmen have started to transport goods to other markets even in remote locations. Due to increased population (more than 160 million in Bangladesh), demand for agricultural goods has been increasing. One farmer of Sohagpur village reported that many farmers manage four to five crops in a piece of land in a year. This has been possible for shorter crop years as some vegetables can be matured in one and a half months and even less. Some NGOs support and patronize different crops and seeds at different times though not in a consistent manner. But until the market of traditional crops is ensured, there is less likelihood that farmers skip tobacco cultivation. In the study area, it was observed that there is no direct policy to regulate tobacco. As there are many long-run cost and negative externalities occurred for tobacco cultivation, there must be a policy balance between imposing control over tobacco companies and minimizing challenges of traditional agriculture.

### Acknowledgement

This research was funded by the Foundation for a Smoke-Free World (FSFW), managed by Knowledge Action Change (KAC) under 'Tobacco Harm Reduction (THR) Scholarship Program 2018.

### Conflict of Interest

No conflict of interest.

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