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How Tobacco Makes Room in Rice Based Cropping Systems of Bangladesh

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Abstract

In spite of hazardous nature, tobacco has a significant position in the cropping system of Bangladesh. The existing status and determinants related to tobacco cultivation in Bangladesh remain inadequately explored. A thorough survey among farmers was conducted in 2021 to assess tobacco cultivation. The total tobacco cultivation area in Bangladesh was documented as 49 thousand hectares, accounting for approximately 0.57% of the overall net cropped area. Tobacco is distributed in 14 cropping patterns and cultivation is concentrated in 45 Upazilas of 15 districts. Farmers consider tobacco farming as a business and as a guaranteed cash crop at a pre-declared price rate. Poor farmers explore the opportunity of family labour employment in tobacco production and processing. Farmers are driven towards engaging in the business by a range of incentives offered by tobacco companies, while the fluctuating market prices of winter vegetables serve as an additional motivator. Many farmers perceive the risks associated with tobacco as being at a negligible level. Minimizing uncertainties of traditional agriculture may turn some farmers from tobacco to traditional crops.

Keywords: Agriculture, Cash crop, Food security, Soil fertility, Sustainability.

INTRODUCTION

Tobacco (*Nicotiana tabacum*), is the common name of several plants in the genus *Nicotiana* of the family Solanaceae that are used for cigarette, cigar, cheroot, bidi, hookah, and chewing purposes. It contains nicotine, an alkaloid organic compound that occurs throughout the tobacco plant and especially in the leaves and constitutes about 5% of the plant by weight. Worldwide, more than 70 species of tobacco are found, but the chief commercial crop is *N. tabacum* and in some countries, the species *N. rustica* is also cultivated (Sarkar and Haque, 2001).

Tobacco is considered a cash crop in Bangladesh and is commonly cultivated in the winter season/rabi season. Although it is a cash crop, the term 'crop' with this remains a question because it has some negative and controversial issues. Apart from the fact that tobacco is not indigenous to Bangladesh its introduction in the biodiverse agrarian systems in this country can also be criticised as introduction of an 'alien invasive species'. They disrupt an agro-ecological system by dominating over other cultivated and uncultivated crops essential for life and livelihood of a community (Ali *et al.*, 2015).

Despite various negative issues and controversies, tobacco has a significant impact on the world economy. The global

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tobacco market in 2010 was estimated at US$760 billion, excluding China(BAT, 2018). The global revenues from tobacco taxes in 2013-2014 was approximately $269 billion.In China, cigarette manufacturing is one of the few profitable state-owned industries. In India, tobacco generates approximately 20 billion Indian Rupees (US$0.45 billion) of income per annum as a result of employment, income, and government revenue (FAO, 2019).

Statista (2018) estimates that in the U.S. alone, the tobacco industry has a market of US$121 billion,despite the fact the CDC reports that US smoking rates are declining steadily. In terms of health expenditures, cigarette smoking contributed to more than $225 billion (or 11.7%) of annual healthcare spending in the U.S. in 2014. Of the 1.22 billion smokers worldwide, 1 billion of them live in developing or transitional economies, and much of the disease burden and premature mortality attributable to tobacco use disproportionately affect the poor. While smoking prevalence has declined in many developed countries, it remains high in others, and is increasing among women and in developing countries. Between one-fifth and two-thirds of men in most populations smoke. Women's smoking rates vary more widely but rarely equal male rates (Amiri, 2021).

There are 132 tobacco-producing countries in the world. Among them, 20 countries are cited with their production, area coverage and yield in Table 1 (FAO, 2019).Worldwide 6096 thousand tonnes of tobacco are produced per year. China is the largest tobacco producer in the world with 2242 thousand tonnes of production volume per year. Brazil comes second with 762 thousand tones of yearly production. India stands for the 3rd position in production though its area coverage is bigger than that of Brazil. In respect of tobacco production, Bangladesh stood in the 14th position whereas it has occupied 15th rank in area coverage of tobacco.

Although the government of Bangladesh earns significant revenue from Tobacco, the increasing trends in its cultivation are a great threat to the country's food security and sustainable crop production systems. It has been introduced in this country in the mid-sixties of the last century into the fields where food crops were grown, and more widely after liberation in 1971 by the British American Tobacco Company (Sarkar and Haque, 2001). Although Bangladesh Agricultural Research Institute (BARI) has conducted research and development activities on tobacco and was abandoned in 1995, tobacco production has mainly been pushed by big multinational companies such as British American Tobacco Company through contract growers (Sarkar and Haque, 2001).

Agriculture in Bangladesh is dominated by rice and sustainable intensification of rice-based cropping systems is very important for the country's food security. The average cropping intensity of the country is 200% of which 136% is contributed by rice (Nasim *et al.*, 2017). Rice is grown everywhere and throughout the year. The Winter season is the only time when diversified crops are accommodated in the rice-based cropping systems. In this winter season tobacco also fits itself in different cropping patterns. Tobacco is a non-food and hazardous crop. Despite many objections to its cultivation, the area of its cultivation is increasing in several locations of the country. Still there is no systematic study was conducted on this aspect in Bangladesh, and enough information is not available. Therefore, the study was carried out to investigate the current status of tobacco cultivation in Bangladesh, how it becomes a great threat to food security, and the reason why the area of its cultivation is increasing.

Table 1. World tobacco situation at a glance, 2018-19

Country	Area ('000 ha)	Prodn ('000 ton)	% of world prodn	Yield (ton/ha)	Prodn/ Person (Kg)
China	1004	2242	36.78	2.23	1.61
Brazil	356	762	12.5	2.14	3.64
India	418	750	12.3	1.8	0.56
United States	118	242	3.97	2.05	0.74
Indonesia	203	181	2.97	0.89	0.68
Zimbabwe	101	132	2.17	1.31	8.9
Zambia	66	116	1.9	1.77	6.87
Tanzania	163	107	1.76	0.66	1.97
Pakistan	46	107	1.75	2.3	0.53
Argentina	55	104	1.71	1.9	2.34
Malawi	86	95	1.56	1.11	5.32
Mozambique	79	94	1.54	1.18	3.25
North Korea	60	91	1.5	1.51	3.57
Bangladesh	42	89	1.46	2.1	0.54
Turkey	93	80	1.32	0.86	0.99
Thailand	20	67	1.1	3.43	0.97
Italy	17	59	0.97	3.45	0.98
Laos	6	54	0.89	9.52	7.76
Macedonia	17	26	0.42	1.54	12.31
United Arab Emirates	0.021	0.285	0	13.82	0.03
Other 112 countries	399	413	11.43	1.04	-
The world (132 countries)	3370	6096	100	1.81	0.79

Source: FAO, 2019.

METHODOLOGY

The study was conducted following two steps.

In the first step, a huge task was undertaken from August 2015 to November 2016 to identify the cropping patterns and their area coverage throughout the country. The study was carried out using secondary source of information from the Department of Agricultural Extension (DAE). DAE keeps records of crops in every nook and corner of the country. At the grass root level, in the blocks, Sub Assistant Agriculture Officer (SAAO) collects data from the field. They use the Mauza map to identify the net cropped area (NCA) and the land use for non-agricultural purposes. In the cropped area, major crop growing field and their coverage are also identified. SAAO surveys the possible ways to collect data. They collect the list of farmers and their lands from the manager of each Boro irrigation scheme. They also make a list of farmers for the other major crops like T. Aman, Aus, wheat, jute, etc. and minor crops as well. They collected data by interviewing farmers who cultivate different crops, and use different varieties in respective hectarages. He also uses his judgment by his eye estimation. Finally observing the actual harvest area, judging by his own experience, the individual crop, their varieties and coverage are identified. In these

ways, they keep data of every crop and its coverage in their blocks. Combining block data, union, then upazila, then district data are compiled and kept in the record book of DAE. Thus in each Upazila, season-wise cultivated crops and their coverage are recorded.

DAE also keeps information on cropping patterns (CP). Each crop is cultivated in a specific field in a single, double, triple or quadruple CP. Based on individual crop coverage, the area of a crop in a CP is distributed. Other crops of these CP have to match in their respective coverage. Thus individual CP coverage data were developed.

Data we used in this study were collected from DAE. A semi-structured questionnaire was developed for the data collection on thecrop, CP, their area coverage, etc. for the year 2014. A small team of investigators visited the Deputy Director (DD), DAE office. They collected the secondary information of crops, and their hectarage from each Upazila from the district office. The questionnaires were then distributed to each Upazila to collect information on CPs and their hectarage and other related issues. Upazila Agriculture Office filled up the questionnaires and sent back to the investigators. These data were analyzed to find out the mismatch of data, if any, among the data and any queries regarding them.

Two sets of data, one collected from DD Office on crop and their coverage in each Upazilaand the other collected through the questionnaire on CP and their coverage from the Upazila Agriculture Office were analyzed. After analysis of the data, usually, there were some mismatches of data and some information that needed further clarification. To purify and finalize this information stakeholder consultation workshops were conducted in 64 districts separately to work on Upazilalevel data. A team of investigators (researchers) visited each district and organized a workshop. In the workshop, DD and district level all concerned officers of DAE and from Upazilalevel UAO, AEO, UAA, SAPPO, SAAOs of respective Upazila attended. In the workshop, if there is a mismatch of data or any other query on data, researchers pointed out it for discussion. Then the data were finalized.Thus the data used for the final analysis were the overviewed data. The CP for the present study with its hectarage means the proportion of areas under different CPs in each Upazila in 2014-15.

Collected data were analyzed using the Micro Soft Excel program. Tally, addition, average and descriptive statistics were used for the presentation of data. Finally, a detailed compilation of cropping patterns of the whole of Bangladesh was completed. From these massive data banks only the tobacco-based cropping patterns are extracted for this article.

In the second step, a socio-economic survey was conducted in 2021 to identify the causes and determinants for the continuous cultivation of tobacco. Five districts that are considered hotspots of tobacco production were selected for the study. The locations of the study were Mirpur and Daulatpur Upazilas of Kushtia district, Gangni Upazila of Meherpur district, Kaunia and Gangachara Upazilas of Rangpur district, Saturia and Sadar Upazilas of Manikganj district, and Lama Upazila of Bandarban district. From each district, 50 farmers were randomly selected. In the samples, all categories viz. company card-holder, non-card-holder, large farmers, medium, small and marginal farmers were included. Landless tobacco growers who cultivate tobacco on leased land were also included in the sample. Therefore, the total number of tobacco growers under interview was 250.

In order to collect desired information, an interview schedule was prepared to keep the

objectives of the research in view. Farmers' opinion-based questions have been included in the schedule along with the selected characteristics of the respondents. It may be recalled that the schedules were pre-tested in an actual field situation before using the same for the final collection of data among 15 respondents (3 from each district) of the study area. Necessary corrections, additions and alterations were made in the interview schedule based on the results of the pre-test. Data were collected personally by the researcher themselves from the sample by using an interview schedule. Data collection was started on 22 May and completed on 30 June 2021 through semi-structured questionnaires. Data obtained from the respondents were transferred to the master sheet and then compiled to facilitate tabulation. The qualitative data were converted into quantitative ones by means of suitable scoring techniques. The analysis was done using SPSS (Statistical Package for Social Science) computer package. Descriptive analyses such as range, frequency count, number and percentage, mean, mode, median, and rank order were used.

RESULTS AND DISCUSSION

Position and distribution of tobacco in cropping systems of Bangladesh

In Bangladesh, 316 major cropping patterns were identified and among them, tobacco was found in14 cropping patterns (Nasim *et al.*, 2017). These cropping patterns were cultivated in about 49 thousand hectares of land which is equivalent to 0.572% of the net cropped area in the country (Table 2). The most dominant CP with tobacco was Tobacco-Jute-T.Aman which alone was covering 31% of the total tobacco area. The second and third dominant cropping patterns were Tobacco-Maize-T.Aman and Tobacco-Aus-T.Aman which had been occupying 15% and 12%, respectively of the country's tobacco area (Table 2).

Table 2. Distribution of tobacco in different cropping systems in Bangladesh, 2014-15

Cropping pattern	Area (ha)	% of total tobacco area	% of NCA in Bangladesh
01. Tobacco-Jute-T.Aman	15200	31.02	0.177
02.Tobacco-Maize-T.Aman	7470	15.24	0.087
03. Tobacco-Aus-T.Aman	6040	12.33	0.071
04. Tobacco-Fallow-T.Aman	5310	10.84	0.062
05. Tobacco-Jute-Fallow	4050	8.26	0.047
06. Tobacco-Aus-Fallow	3180	6.49	0.037
07. Tobacco-Boro-T.Aman	2300	4.69	0.027
08. Tobacco-Sesbania-T.Aman	1620	3.31	0.019
09. Tobacco-Vegetab-Vegetables	1500	3.06	0.018
10. Tobacco-Fallow-Fallow	1045	2.13	0.012
11. Tobacco-Maize-Vegetables	600	1.22	0.007
12. Tobacco-Sesbania	600	1.22	0.007
13. Tobacco-Mungbean-T.Aman	50	0.10	0.001
14. Tobacco-Mungbean-Vegetables	40	0.08	0.000
Total tobacco area	49005	100.00	0.572

Location-wise distribution of tobacco

Tobacco cultivation is distributed over 45 Upazilas in 15 districts (Figure 1). Therefore, it is clear that about one-fourth number of the districts are affected by tobacco cultivation. More specifically we can see that tobacco production is concentrated in about one-tenth number of Upazilas in the country. Among the 15 districts,Kushtia alone covers 17650 hectares of tobacco which is equivalent to 36% of the total tobacco area. Lalmonirhat district stands for the second position where 11990 hectares of land are covered by tobacco which occupies 24% of the total tobacco cultivation area of the country. These two districts together represent over 60% of the country's tobacco growing land. In consideration of individual Upazila it is distinct that the highest area (9200 ha) coverage of tobacco belongs to Mirpur Upazila of Kushtia district. This single crop accounts for the 39% land of net cropped area in the Upazila and this area is equivalent to about 19% of the total tobacco area.The follower Upazilas are Daulatpur of the same district, Aditmari and PatgarmUpazilas of Lalmonirhat district. They had 7720 ha, 4340 ha and 3120 ha of tobacco which represents about 16%, 9% and 6% share of the total tobacco area in the country, respectively. Therefore, one-half of the country's total tobacco area is concentrated in only these four Upazilas (Table 3).

Table 3. Location-wise distribution of tobacco cultivation in Bangladesh, 2014-15

Upazila	Tobacco area (ha)	% of respective NCA	% of total tobacco area in Bangladesh
01 Mirpur, Kushtia	9200	39.00	18.77
02. Daulatpur, Kushtia	7720	22.55	15.75
03 Aditmari, Lalmonirhat	4340	26.91	8.86
04 Patgram, Lalmonirhat	3120	14.92	6.37
05 Gangni, Meherpur	2700	11.34	5.51
06 Gangachara, Rangpur	2300	11.04	4.69
07 Kaliganj, Lalmonirhat	1820	9.35	3.71
08 Jaldhaka, Nilphamari	1750	7.39	3.57
09 Nilphamari Sadar	1700	5.62	3.47
10 Hatibandha, Lalmonirhat	1490	6.47	3.04
11 Lama, Bandarban	1300	13.66	2.65
12 Damurhuda, Chuadanga	1290	5.61	2.63
13 Lalmonirhat Sadar	1220	6.32	2.49
14 Alikadam, Bandarban	860	17.62	1.75
15 Manikganj Sadar	850	4.94	1.73
16 Naikhangchhari, Bandarban	700	8.74	1.43
17 Bheramara, Kushtia	610	6.74	1.24
18 Chakaria, Coxs bazar	600	2.78	1.22
19 Dighinala, Khagrachhari	600	7.48	1.22
20 Taraganj, Rangpur	600	5.21	1.22
21 Jhenaidah Sadar	500	1.86	1.02
22 Alamdanga, Chuadanga	400	1.34	0.82
23 Ramu, Coxs bazar	400	3.81	0.82
24 Shailkupa, Jhenaidah	350	1.16	0.71
25 Meherpur Sadar	300	1.40	0.61

Upazila	Tobacco area (ha)	% of respective NCA	% of total tobacco area in Bangladesh
26 Kishoreganj, Nilphamari	300	1.98	0.61
27 Baghaichhari, Rangamati	300	3.49	0.61
28 Domar, Nilphamari	250	1.25	0.51
29 Harinakund, Jhenaidah	200	1.36	0.41
30 Thanchi, Bandarban	170	4.55	0.35
31 Sundarganj, Gaibandha	150	0.48	0.31
32 Kushtia Sadar	120	0.52	0.24
33 Ruangchhari, Bandarban	110	3.96	0.22
34 Moheshpur, Jhenaidah	110	0.33	0.22
35 Daulatpur, Manikganj	110	0.77	0.22
36 Bandarban Sadar	80	1.65	0.16
37 Khagrachhari Sadar	80	1.52	0.16
38 Ghior, Manikganj	80	0.77	0.16
39 Matiranga, Khagrachhari	60	0.89	0.12
40 Mithapukur, Rangpur	50	0.11	0.10
41 Chuadnga Sadar	30	0.15	0.06
42 Kaliganj, Jhenaidah	30	0.14	0.06
43 Dimla, Nilphamari	30	0.13	0.06
44 Magura Sadar	20	0.07	0.04
45 Saltha, Faridpur	5	0.04	0.01
Bangladesh	49005	0.57	100.00

Socio-economic background of tobacco growers

The socio-economic characteristics and background of tobacco farmers influence their production to a great extent (Hassan*et al.*, 2001). In order to get a vivid picture of the socio-economic status of tobacco farmers, this paper includes age, education level, family size, main occupation status, types of farmers based on farm size, farming experience, tenurial status, and status of using communication devices.

Age

The socio-economic characteristics of the respondents surveyed on the selected tobacco farmer in the study area are presented in Figure 2. The results revealed that among 250 respondents, the age of the major (51%) tobacco farmers ranged from 36 to 55 years. About 27% of the respondent farmers were in the age group up to 35 years. Only 22% of farmers were in the age group above 55 years. It, therefore, indicated that a normal trend is prevalent here. Neither an attraction nor a negative attitude is extremely touching to a special age group.

Family size

It is observed from Figure 2 that, the majority (49%) of respondents have medium family size (4-6 members) followed by 32% of tobacco farmers having small family(1-3 members) and only 18% of the family belongs to a large family(more than 6 members). Since tobacco is a labor-intensive non-food crop, it is very helpful for tobacco farmers if the family size is larger.

Types of farmers

In the study area, as shown in Figure 2, the Majority of tobacco growers (53%) were from small land size groups (farm size 51-250 decimals). The second largest group

(24%) came from medium farmers. Landless (0-5 decimals) and marginal farmers (6-50 decimals) are also significant participants (17%) in tobacco cultivation. Only 5% of them are large farmers (farm size >500 decimals).

Educational status

Illiterate farmers or less educated farmers are generally more pursued in tobacco cultivation. Among the respondents, the maximum number of farmers (75%) are from the illiterate and primary education group. Eighteen percent of farmers had been having secondary education (Figure 2). Only 7% of farmers got a Higher secondary education level. It implies that more educated farmers have less tendency toward the production of tobacco in general.

Main occupation status

On the issue of main occupation status,only farming is the main source of earning for the majority (59%) of respondents in the study area.It is also observed that 30% and 8% of the tobacco growers earn mainly from business and service, respectively (Figure 2).

Tenurial status

The highest numbers of the respondents (42%) are those who grow tobacco in their own land. The second highest number of tobacco growers (40%) are hybrid model land owner (Fig. 1). They grow tobacco in their own land and in addition, they produce more tobacco in leased land as a profitable business item. The rest 18% are a tenant who grows tobacco in others' land received on the basis of a lease or mortgage system. Among the tenant group there are two subgroups. The first subgroup is composed of landless people. The second subgroup of people are the opportunist tobacco growers (6.8%). They have their own land, however, they do not grow tobacco in their land. They select more fertile and more suitable land from other people on the basis of lease or mortgage.

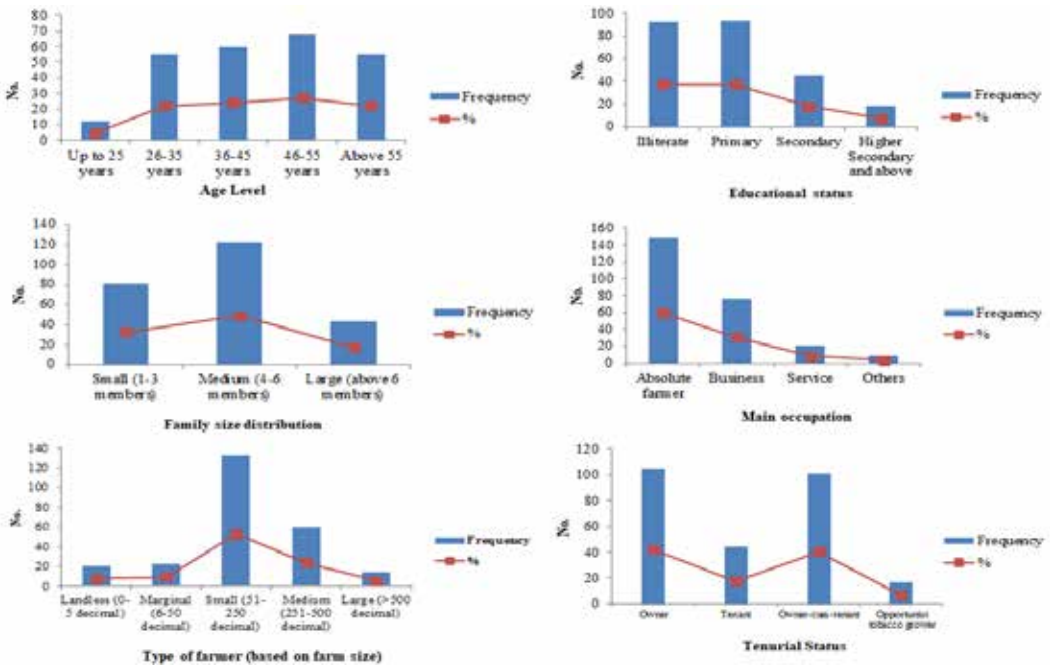

Fig. 1. Socio-economic characteristics of respondent tobacco farmers (N= 250)

Attachment of new farmers in tobacco cultivation

During the interview, a considerable point was recorded. That was about the experience of agricultural practices versus the duration of tobacco cultivation. Among the 250 farmers, 121 farmers had started their tobacco from their earliest time of agricultural farming. The rest 129 farmers started tobacco cultivation in the later stage. Descriptive statistics of these two series of 250 farmers have arranged for at a glance comparison (Table 4). Minimum value, average, mode and median all were bigger in agricultural farming experience than those of tobacco cultivation experience. This analysis detects that new farmers are coming to tobacco farming in the attraction of various advantages. In different studies, it was reported that tobacco extension workers from the multinational company go door to door for convincing the farmers with attractive proposals to join their tobacco stream (Motaleb and Irfanullah, 2011; Hossain and Rahman, 2013; Hassan*et al.*, 2001).

Table 4. Farmers' experiences in agriculture farming and tobacco cultivation

Experience (Years)	Minimum	Average	Mode	Median	Maximum
Agriculture farming	3	25.41	20	22.50	60
Tobacco cultivation	1	20.12	10	18.00	60
Difference (gap)	2	5.29	10	3.50	0

Ownership of tobacco farm and its cropping

In the previous section of this article, it was recorded that there is a good number of opportunist farmers. They are land-holders, however, they do not grow tobacco in their own land. They consider tobacco production as a profitable business so they grow it in others' land received based on lease or mortgage. The other group is landless people and they are obviously opportunists and they are bound to explore better land for better production of tobacco. They generally do not grow tobacco in consecutive years. They always try to select the land for the monoculture of tobacco. The second most important option for them is to keep the land fallow just before tobacco. For this reason, they try to select that land which is under flood water in kharif-II season. In the present study, the cropping status of own land and leased land is arranged to compare the cropping intensity (Fig. 2).

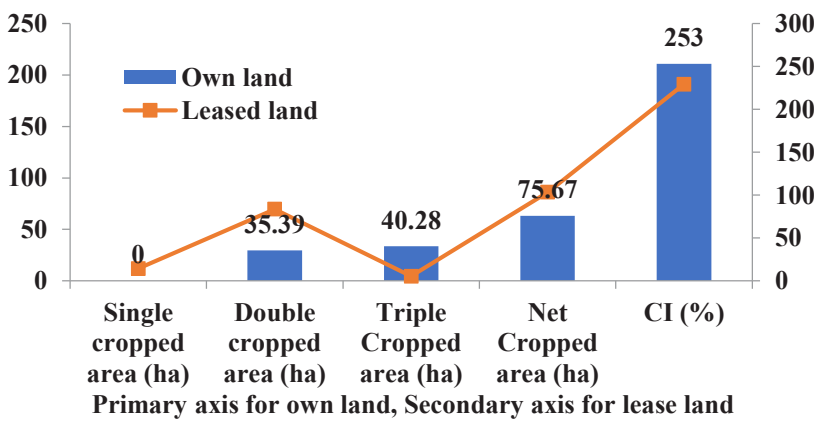

Fig. 2. Cropping intensity of tobacco growing farms in own land and leased land

In the list of own land, there was no single cropped area whereas a considerable area (11.94 ha) of leased land was under single cropped area. In the final calculation, cropping intensity was recorded 253% for own land and 191% for leased land (Fig. 3). Hence, it is proved that soil fertility is a crucial factor that is seriously considered by the farmers for tobacco cultivation. In several studies, there were some evidences and/or assumptions about soil fertility degradation (Akhter, 2018; Mollah, 2010).

Local variation of leasing value for tobacco cultivation

The highest average leasing value for tobacco cultivation is estimated as 84 thousand Bangladeshi taka per hectare followed by 77 thousand in Manikganj. This value was calculated at 75 thousand taka per hectare in Bandarban and 70 thousand in Meherpur. The least value was observed in rangpur and that was 25 thousand taka per hectare.

Ownership of tobacco farm and production economics

Production economics of tobacco is also highly affected by land ownership. The tenant farmers fix their target to get a maximum harvest of tobacco. So, their investment of capital and inputs was always higher than farmers who cultivate their own land. Use of urea, phosphate and potash fertilizer and total production cost of tenant farmers all were higher at a 1% level of significance than the respective values of own land farmers. Similarly, tobacco yield, gross return, and gross margin all were significantly higher at the 1% level than counter values under the cultivation of own land (Table 5).

Table 5. Input and output of tobacco cultivation in own land and leased land, 2021

Ownership category	Own land	Leased land	Difference
Use of fertilizer (kg/ha)			
Urea	244	315	71**
Phosphate fertilizer	213	297	84**
Potash fertilizer	111	167	56**
Yield (kg/ha)	2964	3567	603**
Production cost (‘000 tk/ha)	189.46	207.25	17.79**
Gross Return (‘000 tk/ha)	299.36	360.27	60.91**
Gross Margin (‘000 tk/ha)	109.90	153.02	43.12**

**Significant at 1% level by paired t-test.

Consciousness and ethical issues

The idea of ethics in tobacco farming differs from person to person. A tobacco farmer would consider not only personal cost-benefit but also social cost-benefit of it. He or she should consider the resulting short-run and long-run negative impact on public health, society and the environment. The nature of ethics would include awareness about tobacco causing individual health and public health hazards, the decline of soil fertility, environmental pollution, etc. and deciding on tobacco farming. To investigate whether farmers are known about the harms of tobacco farming and what is their comments about the validity of tobacco farming from an ethical ground, a summary of the opinion of the respondents about tobacco farming and its ethical related issues are described in Table 5. The majority of tobacco growers (57%) themselves are habituated to smoking and also in the use of *gul/jorda* (78%). It is shown in the findings that 43% of tobacco farmers in the study area say that it is harmful

to health whereas 10% of them are not aware at all. Around 41% realize that tobacco cultivation pollutes the environment and 38% of respondents say that it leads to declining soil fertility gradually. Here it is implied that a significant number of farmers are not aware of tobacco-related environmental hazards and fertility decline. Successive queries about the negative impact, tobacco farmers are asked whether tobacco farming is unethical or not. In response of this question majority (57%) of them claim that tobacco farming is unethical (Table 6). A considerable number of farmers have no ethical concerns about tobacco farming. One-half of the respondents believe that tobacco is harmful for children.

Table 6. Opinion and perception of respondents about tobacco cultivation and some of the controversial issues, 2021

Opinions and awareness of the respondents	Yes	No	Not concern	Total
Smoker	141 (57%)	109 (44%)	-	250
User of Gul/Jarda	196 (78%)	54 (22%)	-	250
Tobacco production is harmful for health	107 (43%)	117 (47%)	26 (10%)	250
Tobacco cultivation pollutes environment	103 (41%)	122 (49%)	25 (10%)	250
Tobacco cultivation decreases soil fertility	94 (38%)	126 (50%)	20 (8%)	250
Tobacco cultivation is unethical	57 (23%)	99 (40%)	94 (38%)	250
Farmers should stop their tobacco cultivation	52(21%)	125 (50%)	73 (29%)	250
Harmful for children	125 (50%)	56 (22%)	69 (28%)	250

Factors pushing the farmers toward tobacco cultivation

The preference for farming tobacco is not merely an independent factor rather it is interlinked with many social, economic and individual factors. The study uncovers some of the causes that lead to the preference for tobacco farming. The most dominant cause of tobacco farming is its profitability over other crops. The other factors are mainly: having much money at a time, the opportunity of family labour employment, assurance of selling tobacco at a pre-declared fixed price, and so on (Fig. 4). A previous study also listed some determining factors which are responsible for the non-stop cultivation of tobacco. In the poor family, it is a business which is mainly based on family labors. Women and school going children are engaged in tobacco field operation, harvesting, curing and all other activities. Therefore, more family labor support leads a farmer to cultivate more tobacco. The findings are similar to the several studies(Bhavya, 2014; Abay*et al.*, 2004; Naher and Efroymson, 2007; Karagiannis and Sarris, 2005; Rahmanand Parvin, 2017; Hassan*et al.*, 2001; Kibwage*et al.*, 2009; Obwona, 2006; Ali*et al.*, 2015; Chikkala, 2015).

The factors shown in figure 4 are the determinants of the preference of tobacco cultivation. Among these factors, most of them are linked with the socio-economic consideration of the farmers. Here one factor is a very strong decider that is the short life cycle of the plant. In addition, it passes its seedling stage up to 50 days in the seedbed. As a result, its duration in the main field is again shorter than its total life span. In Bangladesh, cropping systems are extremely dominated by rice. In Kharif-II season (wet season) Aman rice is the only option. Tobacco can easily be transplanted after the harvest of Aman rice. If the Aman harvest is late, tobacco can also be transplanted in the

rice field in a standing crop in a relay cropping system. These are the diversified ways through which tobacco is pushing itself in the cropping system without disturbing the preceding crop.

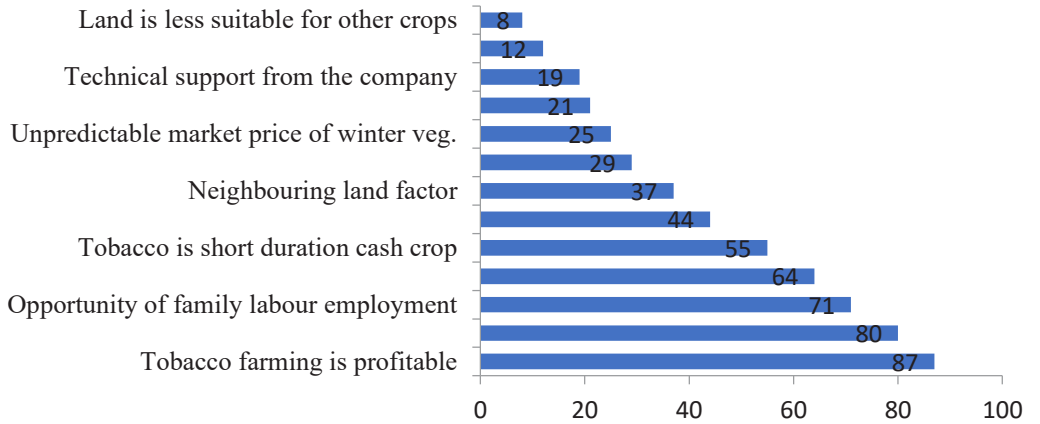

Fig. 4. Determinants of the farmers' preference for tobacco cultivation

CONCLUSIONS AND RECOMMENDATION

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. 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.

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.

Tobacco is not only a national concern, it is an international issue. It is a big trade in the world market. The governments of the countries are collecting huge revenue. National and international policy makers are also consuming tobacco without any hesitation. Therefore, it is a serious dilemma that might not touch the goal bar. However, the policy makers and researchers should make some avenues and alternatives so that unwilling poor farmers can get relief from unfair circle of tobacco. Some guidelines may be introduced as follows:

1. Conception of tobacco elimination should be discarded. Eradication of an item is a tough job and it may not be possible. Strong management policy should be adopted to keep it under a thresh-hold level.
2. Tobacco research should be empowered for ultra-high yielding varieties, so that vertical expansion will meet the demand and tobacco area will be reduced.
3. Scientific safety measures (as best as possible) should be ensured for tobacco growers and labourers.
4. Social awareness should be developed and some awareness

program should be arranged for the propagation of bad impact of tobacco.

5. The consciousness of the farmers about the negative impact of tobacco and its validity from ethical ground needs to be increased.
6. Necessary steps to be taken to ensure fair and stable price of food crops and minimizes the risk of damaging crops.
7. Initiatives to be taken to spread out the idea about ethical legitimacy of tobacco farming through educational institutions, religious institutions (i.e. Mosque, temple) and local Union council.

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