**Category:** Researcher

**1. Title of the study:** Does graphic health warning label on smokeless tobacco products cares by consumers? A study in Sylhet.

**Name of the applicant:**

**Organization:**

**Contact details:**

**Submitted to:**

BCCP Tobacco Control Grant Program

House # 08, Road # 03, Block- A

Section – 11, Mirpur, Dhaka – 1216, Bangladesh

**2. Proposal abstract:**

The area of tobacco cultivation remains significantly high in Bangladesh, which is the 12th largest tobacco producer in the world. The study finds that tobacco cultivation turns into a losing concern when the opportunity costs of unpaid family labour and other owned resources and the health effects of tobacco cultivation are included. Tobacco cultivation poses a significantly high environmental cost that causes a net loss to society. Nevertheless, the availability of unpaid family labour and the options of advanced credit as well as a buy back guarantee from the tobacco companies attract farmers to engage in and continue tobacco cultivation.

Household survey data of tobacco farmers, based on a two-stage cluster sampling design with a random sampling of households, this study will estimate the financial and economic profitability per hectare of land used for tobacco cultivation. The air quality of tobacco cultivation area will be estimated using air quality device which is setup in tobacco cultivating areas. In order to provide evidence on health and economic impact of the tobacco on cultivators of tobacco cultivated area in Bangladesh, this study aims to examine the relationship between four crops (rice, wheat, jute and tobacco) cultivation and self-reported illness in the study population, as well as to compare profitability between tobacco production and three major crops (rice, wheat and jute). Therefore, the findings of this study may be of use for evidence-based policy making against tobacco cultivation in Bangladesh.

**3. Coverage of geographical/study area**

Tobacco is grown throughout the country; with the largest tobacco growing areas are Bandarban, Kustia, Lalmonirhat, and Manikgonj. The four districts cover an area of about 871800 hectares, mainly Bandarban is hill tracts and other three are level land (https://www.ncbi.nlm.nih.gov/books/NBK304388/).

**4. Background and problem statement:**

The term smokeless tobacco implies use of unburned tobacco in the finished products. A variety of smokeless tobacco products are available, for oral or nasal use. Products intended for oral use are sucked, chewed (dipped), gargled or applied to the gums or teeth, while fine tobacco mixtures are usually inhaled into the nostrils. Smokeless tobacco products that contain areca nut are commonly used in India, other countries in South Asia, and in-migrant populations from these countries (<https://www.ncbi.nlm.nih.gov/books/NBK304388/>). Smokeless tobacco (SLT), a non-combustible form of tobacco, contain nicotine and are highly addictive, is consumed by 350 million people in 133 countries across the globe. As per a recent survey, SLT use accounts to approximately 0.65 million deaths annually, make ST consumption a global public health issue. Consumption of these products has been reported to be associated with many diseases such as cancers (head and neck), neurological disorders, and oral and heart diseases. This can be attributed to the presence of harmful chemicals along with 28 known carcinogens (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6172907/), such as tobacco-specific nitrosamines (TSNA), arsenic, beryllium, cadmium, nickel, chromium, nitrite and nitrate, in varying levels depending on the product (https://pubmed.ncbi.nlm.nih.gov/21109685/). An increased risk of cardiovascular deaths has been reported [11], and its use in pregnancy is associated with stillbirths and low birth weight [12, 13]. The pH of the products also varies widely, with some (e.g. khaini, zarda) listing slaked lime among their ingredients. Raising the pH in this way increases the absorption of nicotine and enhances the experience of using the ST product, increasing the likelihood of dependence. The elevated pH also increases the absorption of carcinogens, leading to higher toxicity and greater risk of harm (<https://pubmed.ncbi.nlm.nih.gov/30627385/>).

In order to enforce the policies on tobacco control in Bangladesh, reliable information on the economic and health effects of tobacco farming is urgently needed. To the best of my knowledge, there remains no research on the health and economic impact of the tobacco on cultivators of tobacco cultivated area in Bangladesh. While all of the studies discussed about the harmful effects of tobacco cultivation on health and environment and regarded it as an important dimension, no attempt has been made to measure, compare or estimate it. Without these estimates, making decision by policymakers is not possible. By estimating five parameters (particulate matter (PM2.5, PM10), carbon dioxides (CO2), volatile organic compounds (VOCs), temperature and humidity), by examining the relationship between four crops (rice, wheat, jute and tobacco) cultivation and self-reported illness in the study population, as well as by comparing profitability between tobacco production and three major crops (rice, wheat and jute), this study will fill the evidence gap of tobacco cultivation. The findings of this study may be of use for evidence-based policy making against tobacco in Bangladesh and elsewhere.

**5. Rationale/justification of the research (maximum 300 words)**

By the evidence of existing literature search, it can be hypothesized that tobacco cultivation affects health, environment and economic condition of tobacco growers household and individuals. More clearly, this study aims to examine the relationship between tobacco cultivation and self-reported illness in the study population, as well as to compare profitability between tobacco production and three major crops (rice, wheat and jute). Findings of the study will help to find out the way to know the socio economic profile of tobacco growers. For measure the air quality to estimate five parameters particulate matter (PM2.5, PM10), carbon dioxides (CO2), volatile organic compounds (VOCs), temperature and humidity. Information on self-reported illness during the last six months among the study populations will be collected using questions about the occurrence of 16 health problems. There are five crops rice, wheat, jute and tobacco where estimate the benefit cost ratio for each crops and identify the most profitable crops among them. The findings will put evidence to make meaningful health, environment and economic information, which may help to develop awareness of health, environment and poverty-related SDGs. With running tobacco control programme, evidence from this study will help to put intervention to the community.

**6. Research question**

1. Is there any impact of tobacco cultivation on health of tobacco grower’s household and individual in tobacco cultivated area?
2. Which crops is economically more profitable rice/wheat/jute or tobacco?

**Overall objective**

To sharpen policy-makers’ understanding of the effect of tobacco cultivation on health and economic condition of tobacco growers household and individual in tobacco cultivated area.

**Specific Objectives**

1. To determine the socio-economic characteristics of the tobacco growers.
2. To investigate the impact of tobacco cultivation on health of related individuals
3. To estimate and compare the air quality parameters for rice, wheat, jute and tobacco cultivated area
4. To analysis and compare the costs, returns and profitability of rice, wheat, jute and tobacco production.
5. To recommend a policy based on the findings

**7. Methodology**

**7.1 Study design:** The proposed study will be mixed. Both qualitative and quantitative data collection techniques will be applied.

**7.2 Study type:** Cross sectional

**7.3 Study population**

The farmers and individuals who are cultivated rice/wheat/jute and/or tobacco, of tobacco cultivated area (Bandarban, Kustia, Lalmonirhat, and Manikgonj) are the study population.

**7.4 Study period:** March 2022 to November 2022

**7.5 Study area**

The study area of this study will be Bandarban, Kustia, Lalmonirhat, and Manikgonj district which are mostly tobacco cultivated area in Bangladesh.

**7.6 Sampling design**

In each selected commune, 120 households were sampled using two-stage cluster sampling technique. The sampling procedure is presented in Figure [1](https://link.springer.com/article/10.1186/1471-2458-9-24#Fig1). The head of household was first interviewed about the family's livelihood (including information cost and return related to cultivation), then all other family members, aged 15–69 years old, were interviewed on the occurrence of illness during the last 6 months.

|  |  |  |
| --- | --- | --- |
| District | Category of HH | Total HHs |
| Bandarban | Tobacco growers= 60 HHs  Others (rice/wheat/jute)=60 HHs | 120 |
| Kustia | 120 |
| Lalmonirhat | 120 |
| Manikgonj | 120 |
| Total | | 480 |

**7.7 Data collection techniques, instrument and measurements**

Semi structured questionnaire will be used for collecting quantitative data and an in-depth open ended questionnaire will be used for qualitative data collection from the respondent.

**7.8 concrete analysis plan**

# Analytical Techniques

**Step-1:** Determine the socio-economic characteristics of the tobacco growers: By using tabulation, mean, percentage and applying chi-square and t-test to calculate the statistics.

**Step-2:** Investigate the impact of tobacco cultivation on health of related individuals: Information on self-reported illness during the last six months among the study populations was collected using questions about the occurrence of 16 health problems.

Multivariate binary logistic regression model will be applied to determine relative risk. When the dependent variable is dichotomous, logistic regression model is widely used not only to identify risk factors but also to predict the probability of success. The simple linear logistic regression model[[1]](#footnote-1) can be expressed as 

Where, the quantity  represent the conditional probability that Y=1 given X and expressed as.

If one consider a collection of p independent variables denoted by the vector X/=(X1, X2, …,Xp) then the multiple logistic regression model is given by the equation as



**Step-3:** Estimate and compare the air quality parameters for rice, wheat, jute and tobacco cultivated area: For measure the air quality to estimate five parameters particulate matter (PM2.5, PM10), carbon dioxides (CO2), volatile organic compounds (VOCs), temperature and humidity. Establish the sub indices for each pollutant (Isi)

Where

Isi = Sub index value of observed pollutant

Cobs = Observed pollutant concentration

Cmin = Minimum concentration of AQI category that contains ≤ Cobs

Cmax = Maximum concentration of AQI category that contains Cobs

Imax = Maximum AQI value corresponding to ≤ Cmax

Imin = Minimum AQI value corresponding to Cmin

The overall AQI: Aggregation can be by simple or weighted average method or summation or multiplication operation or simply a maximum or minimum operator.

In IAQI it is by maximum operator method IAQI = Max(Isi1, Isi2, Isi3, ... ... ...)

Because it is free for ambiguity. Hence a health based index cannot be combined or weighted.

**Step-4:** Analysis and compare the costs, returns and profitability of rice, wheat, jute and tobacco production: Per hectare profitability production from the view point of individual farmers was estimated in terms of gross return, gross margin, net return and benefit cost ratio (undiscounted).

**Gross return**

Gross return was calculated by multiplying the total volume of output of an enterprise by the average price in the harvesting seasons [19]. To estimate GR, following equation was used.

GRi= ∑QiPi

Where,

GRi = Gross return from ith product (Tk/ha); Qi = Quantity of the ith product (kg/ha);

Pi =Average price of the ith product (Tk/kg); i = 1, 2, 3,………….,n.

**Gross margin**

Gross margin has given a calculation of the difference between total return and variable costs.

That is,

GM = TR-VC

Where, GM = Gross margin, TR = Total return, VC = Variable cost

**Net return**

Net return analysis considered fixed costs, cost of land rent, interest on operating capital etc. Net return was estimated by deducting all cost (variable and fixed) from gross return. To determine the net return of production the following equation was used in the study:

Π = PyY- ∑ PxiXi -TFC

Where, Π= Net return (Tk/kg); Py= per unit price of the product (Tk/kg), Y= Quantity of the production per hectare (kg), Pxi= per unit price of ith input per hectare (kg), Xi= Quantity of the ith input per hectare (kg), TFC= Total fixed cost (Tk), i=1, 2, 3,…………, n.(number of inputs).

Cost and return analysis were done based on both variable and total cost basis in the study. A simple tabular analysis was calculated to get the objectives of the study. To assess the profitability of the pond fish production the following profit equation was developed:

Π= Gross return-(Variable cost + Fixed cost)

Here, Π = Profit per hectare

Gross return = Total production ×per unit price

**Variable costs include:** i. Cost of human labour, ii. Cost of fertilizer, iii. Cost of irrigation, iv. Cost of insecticide, v. Cost of mechanical power

**Fixed cost includes:** Land use cost and Interest on operating capital.

**Benefit Cost Ratio (BCR)**

The BCR (Benefit Cost Ratio) is a relative measure, which is used to compare benefit per unit of cost. The BCR is calculated as a ratio of gross returns and gross costs. The formula for calculation BCR (undiscounted) is given below:

**Functional analysis**

Functional analysis was implemented to identify the individual effect of input use and other related factors of production with the help of Cobb-Douglas production function model. The model was used in the following form:

Y = aX1b1X2b2X3b3X4b4 X5b5 eui

Cobb-Douglas production function can be estimated in the alternative form by using OLS (Ordinary Least Square) method, in a log linear form.

LnY = lna + b1lnx1 + b2lnx2 + b3lnx3 + b4lnx4 + b5lnx5 + Ui

Where, Y= Gross return, Tk/ha; X1= Human labour cost, Tk/ha; X2= Fertilizer cost, Tk/ha; X3= Insecticide cost, Tk/ha; X4= Mechanical cost, Tk/ha; X5=Irrigation cost, Tk/ha; ln= Natural logarithm; Ui= Disturbance term, a= intercept, bi= Co-efficient of the relevant variables, i= 1,2,3……………..n

**7.9 Data analysis**

All collected data will be checked and verified thoroughly to reduce the inconsistency. The data will be coded, categorized, cleaned, and entered into computer. Quality of data will always ensure. Collected data will then transfer to master table as per the specific objectives and key variables. Analysis of data will be done by SPSS, STATA or R-programming in the computer. Descriptive statistics like frequency distribution, mean, median, mode, range, standard deviation etc. will be calculated first. For inferential statistics, different test and regression model will be applied. All the analysis, statistical significance will be considered at 5% level of significance and 95% confidence Interval.

**7.10. Ethical consideration**

Prior to doing data collection ethical clearance will be obtained from Sher-e-Bangla Agricultural University. Informed written consent will be taken from participants.

**8. Implications of the proposed research for tobacco control policy in Bangladesh**

In the tobacco cultivated area, most of the farmers are illiterate and living very miserable life without having modern facilities. So, their knowledge of social awareness, particularly on tobacco production may not be sufficient enough to prevent them from the adverse effect of this cultivation. By exploring the prevalence and adverse effect of tobacco cultivation, this study will increase the awareness of the tobacco growers against the negative impacts of tobacco cultivation and will encourage them to quit this practice. The result of the study will help the policymaker to take measures to prevent tobacco cultivation and to encourage them to stop this practice.

**9. Proposed personnel plan**

To conduct this study, other than the principal investigator the following personnel will be recruited

1. Field supervisor – 2 persons
2. Data collector – 10 persons
3. Data entry operator – 1 person
4. Data analyst – 1 person

**Principal Investigator:** Principal Investigator will regulate all the activities of the research. He will write the research proposal, will co-ordinate all official responsibilities, plan- conduct and monitor all research activities, will recruit all research-related personnel, will record all income and expenditures sources, will work with the mentor, and will ultimately submit the final research report.

**Field Supervisor:** Field supervisors must have at least graduation. They will guide and supervise the data collector, monitor the data collection process and quality of data, collect, preserve and submit the completed research questionnaire to the principal investigator.

**Data collector:** Data enumerator will be experienced and work in relevant projects and atleast the university level students. All of the enumerators will visit the study area and will collect data from respondents through questionnaire by direct interview and also in FGD, KII. They will collect data under the supervision of the field supervisor.

**Data Entry Operator:** He/she will be appointed and responsible for the entry of the collected data and checking the consistency of the data

**Data Analyst:** He/she will responsible for the analysis of the data as per the objectives of this research.

**Staff Schedule:** The principal investigator will work under the supervision of a Mentor throughout the period. The field supervisor and data collector will be appointed for two months. Data collection activities will take place over two month’s period. Data entry operator will be appointed for a month for entering, checking and editing all research data in the computer system and a data analyst for one month for analysis the data according to the objectives.

**10. Work plan**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Tasks | March | April | May | June | July | August | Septem  ber | Octo.  ber | Novem  ber |
| Protocol development, instrument development, Manpower recruitment |  |  |  |  |  |  |  |  |  |
| Field manual development |  |  |  |  |  |  |  |  |  |
| Training, pre-testing,  debriefing and finalization  of research instrument |  |  |  |  |  |  |  |  |  |
| Data collection |  |  |  |  |  |  |  |  |  |
| Data process cleaning and preparation of entry |  |  |  |  |  |  |  |  |  |
| Data entry |  |  |  |  |  |  |  |  |  |
| Data analysis |  |  |  |  |  |  |  |  |  |
| Report writing |  |  |  |  |  |  |  |  |  |
| Draft, dissemination,  workshop, feedback,  finalization, printing,  binding, submission |  |  |  |  |  |  |  |  |  |

**11. Budget**

**Bangladesh Center for Communication Programs (BCCP)**

**Financial estimate**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| SL  NO | Particulars | Name of  Unit | Unit rate | No. of  unit | Total taka |
| **01** | **Personal cost** | | | | |
| Principal Investigator | Month | 20000 | 8 | 160000.00 |
| Data analyst | Month | 18500 | 2 | 37000.00 |
| Data entry operator | Month | 16500 | 4 | 66000.00 |
| Sub total |  |  |  | 263000.00 |
| **02** | **Field Activity Cost** | | | | |
| Allowance for Field supervisors | Month | 19000 | 4 | 76000.00 |
| Allowance for Data enumerator | Month | 12000 | 12 | 144000.00 |
| 3 days Orientation for data collectors (2 days for data collection + 1 day for data entry) | Day | 4000 | 3 | 12000.00 |
| Travel expenses related to data  collection + data entry | Day | 400 | 60 | 24000.00 |
| Other cost related to data collection (local data collection costs) |  |  |  | 17000.00 |
| Sub Total |  |  |  | 273000.00 |
| **03** | **Travel and transportation Cost** | | | | |
| Inter district transport cost | Trip | 5500 | 10 | 55000.00 |
| Local conveyance | Month | 2400 | 9 | 21600.00 |
| Sub-Total |  |  |  | 76600.00 |
| **04** | **Professional Service** | | | | |
| Honorarium for mentor |  |  |  | 50000.00 |
| Sub-Total |  |  |  | 50,000.00 |
| **05** | **General operating cost** | | | | |
| Stationeries | Month | 3200 | 9 | 28800.00 |
| Communication exp | Month | 1000 | 9 | 9000.00 |
| Printing & Photocopy expenses | Month | 3000 | 9 | 27000.00 |
| Courier & postage expenses | Month | 580 | 9 | 5220.00 |
| Purchase health sanitizers and other  protective equipment | Month | 1000 | 9 | 9000.00 |
| Sub-Total |  |  |  | 79020.00 |
| Total | |  |  |  | 741620.00 |
| VAT (15%) | |  |  |  | 111243.00 |
| Grand Total | | | | | 8,52,863.00 |

**(USD 10,000=BDT8, 59,957.90 at Dated: 24-02-2022)**

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