

DETERMINANTS OF EXTENT OF TOBACCO CULTIVATION AREA IN KUSHTIA DISTRICT

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December, 2017

DETERMINANTS OF EXTENT OF TOBACCO CULTIVATION AREA IN KUSHTIA DISTRICT

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A Thesis

Submitted to the Faculty of Agriculture,

Sher-e-Bangla Agricultural University, Dhaka

In partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

IN

AGRICULTURAL EXTENSION

SEMESTER: JULY- DECEMBER, 2017

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CERTIFICATE

This is to certify that the thesis entitled, **“Determinants of Extent of Tobacco Cultivation Area in Kushtia District”** submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka in partial fulfilment of the requirements for the degree of **Master of Science (MS) in Agricultural Extension**, embodies the result of a piece of bona-fide research work conducted by **MD. ZULFIQUER RAHMAN, Registration no. 16-07562** under my supervision and guidance. No part of this thesis has been submitted for any other degree or diploma.

I further certify that any help or source of information, received during the course of this study has been duly acknowledged by him.

Dated: DECEMBER, 2017

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**Devoted to My
Beloved Parents**

ACKNOWLEDGEMENTS

The author, at the very outset, likes to extend his limitless praise and obligations to Almighty Allah, the Great, Gracious, and Merciful, Whose blessings enabled him to complete this research work successfully. In particular, the author deems it a great pleasure to express his profound thankfulness to his respected parents, who entailed much hardship for prosecuting his studies and receiving proper education. Guidance, help and co-operation have been received from several persons or authority during the tenure of the study. Although it is not possible to mention everyone by name, the author particularly acknowledges some name for their valuable contributions that are mentioned here.

The author deems it a proud privilege to express his deep sense of gratitude, sincere appreciation and immense thanks to his supervisor Associate Professor Dr. Md. Humayun Kabir, Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka, for his continuous guidance, cooperation, constructive criticism and helpful suggestions in carrying out the research work and preparation of this thesis. Without his intense co-operation this work would not have seen the light of the day. The author feels proud to express his deepest respect, sincere appreciation and immense indebtedness to his co-supervisor Prof. Dr. Md. Mahbubul Alam, chairman, Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka, for his scholastic and continuous guidance, constructive criticism and active support from the beginning to the entire period for preparation of this thesis.

The author also expresses his heartfelt thanks to all the teachers of the Department of Agricultural Extension and Information System, SAU, for their valuable teaching, suggestions and encouragement to address different problems faced by the author during the whole study period. The author wishes to express his deep gratitude from the core of heart to the examination committee whose direct or indirect participation have made distinct contributions to complete this piece of research.

A special appreciation is extended to all the respondents, who very kindly spared their valuable time in giving answers to the interview schedule and providing necessary co-operation.

The author finally expresses his immense indebtedness, deepest sense of gratitude and profound thanks to his friends who had been a constant source of blessings, inspiration and encouragement to develop participatory learning environment during the tenure of his higher study.

The Author

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DETERMINANTS OF EXTENT OF TOBACCO CULTIVATION AREA IN KUSHTIA DISTRICT

Md. Zulfiquer Rahman

ABSTRACT

The study was undertaken to assess the extent of area used for tobacco cultivation and to determine some selected characteristics of tobacco farmers that significantly influence farmers' cultivation of tobacco. The selected characteristics were- age, education, farm size, annual income, tobacco cultivation experience, family labor, time spent in tobacco cultivation, profitability, agent contact, input availability, level of pest infestation and market security perception. The study was conducted at three villages of Mirpur upazilla under Kushtia district with the help of an interview schedule from September 12 to October 3, 2018. Twenty five percent (25%) of the farmers were randomly selected from a population of 424 tobacco farmers. Out of the total population, 106 tobacco farmers were selected as the sample of the study. Multiple linear regression was used in order to identify the important factors for tobacco cultivation. An overwhelming majority of 61.32 percent of the respondents had medium tobacco cultivation area followed by 33.02 percent of the respondents had small tobacco cultivation area and only 5.66 percent of the respondents had large tobacco cultivation area. The findings also revealed that age, education, annual income, family labor and agent contact has significant positive contribution on tobacco cultivation. Therefore, to reduce tobacco cultivation area coverage by the farmers, policy should be made through giving emphasize on the significant factors.

CHAPTER I

INTRODUCTION

1.1 General Background

Bangladesh, one of the largest countries, has been consumed a significant portion of tobacco in the world. Tobacco farming is not uncommon phenomenon in Bangladesh and it has been cultivating from the ancient time however nowadays commercial tobacco farming is a matter of debate. Tobacco has been introduced since 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 in Teesta silt in Rangpur area (Sarkar and Haque, 2001). Although Bangladesh Agricultural Research Institute (BARI) has conducted research and development activities of tobacco however 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).

Tobacco is a non-nutritious food and tobacco raw material for any industry is not suitable for the well-being of human. Tobacco products and its associated items such as cigarette, bidi and other uses of tobacco have harmful effects on human health (Motaleb and Irfanullah, 2011). On the other part, the cultivable land of tobacco is still less as only 0.25% as compared to all crop production in Bangladesh. Considerably, there was only 0.22% land of all agricultural production by tobacco in 2009 (FAO, 2010). In the context of tobacco cultivation, Tobacco is mostly dealt as one of the major cash crops which are mostly grown in areas like Rangpur, Chattogram Hill tract region, greater Kushtia (Meherpur, Kushtia, Chuadanga), Jashore and Gazipur. Besides, this is extending to Rajshahi, Jhenaidah, Nilphamari, Lalmonirhat and even in manikgonj and Tangail district.

Employment in tobacco farming accounts for less than 0.5% of agricultural employment in Bangladesh. Bangladesh has become a net exporter in recent years, exporting about one-third of the tobacco grown (Barakat et al., 2012). Export of tobacco leaves from Bangladesh is a relatively new phenomenon, but it is becoming an expanding agricultural export. Starting from

a very low or non-existent base, at more than \$80 million, raw tobacco export is the most important agricultural export after jute in terms of value. On the past, government efforts in the form of increased export incentives and active participation of the tobacco industry with access to foreign markets have contributed to the gradual growth of this sector in recent years. However, the sector has not been without controversy. Since 2008, Government has reversed its policy towards tobacco by withdrawing the cash incentives provided to exporters and imposing duty on export of tobacco leaf (Policy Research Institute of Bangladesh, 2012).

The most important fact that needs to be recognized about tobacco is that it is a non-food crop -- it is not even a raw material for an industry that is necessary for the people of country. What it produces such as cigarette, bidi and other products are harmful and injurious to health. It is also not a 'cash crop' for farmers as the term is commonly understood. It is one of the very few crops in the world entering the world trade entirely as leaf. It is green from the planting time to the harvesting time, with no change in its green color. This is why the company uses the slogan "Sobujer Somaroho" (the abundance of green) in order to deceive since such a green plant has absolutely no ecological and economic value in the local or domestic market. It is a crop that has only one market, i.e. the tobacco companies and their agents and they are interested in the leaves which they grade for quality and therefore decide the price. It has no biomass that feeds back to the soil. The company purchases only the leaves that are grown. The rest of the plant remains on the ground and does more harm to the soil (Farida Akhter, 2011).

It is clear from above discussion that tobacco cultivation has both positive and negative side. However, negative sides are higher than positive. Its production and use thus might raise ethical questions from normative point of view. Tobacco production has been expanded significantly in the country. According to BBS, although the total tobacco acreage has decreased the overall tobacco production has risen by 76% and 134% respectively during the period from 2007-08 to 2014-15 (BBS, 2016).

Kushtia is a district of Khulna division of Bangladesh, is one of the hotspots where tobacco farming is popular. In recent years, a significant amount of cultivable land is being used for tobacco farming in this district. In Kushtia district the production rate of tobacco is highest among the all parts of the country in last 5 years. In Kushtia district 36443 acres land used for

tobacco cultivation in 2015-2016 and the production is 31462 MT which is the biggest comparing to all other districts (Agricultural Year Book, 2016). In this situation farming of non-food crops like tobacco by replacing food-crop land is a threat on our food security. In this area, tobacco farming is also causing threat to health, environment and society.

The researcher was interested to conduct a study on identifying determinants of extent of tobacco cultivation area.

1.2 Statement of the Problem

Tobacco is a non-nutritious food and any tobacco raw material for any industry is not suitable for the well-being of human Tobacco as a ‘crop’ is harmful in many ways. Researchers found that it has direct impact on soil depletion, pollution of soil, water and worst of all is the damage to forest, homestead trees, road side trees etc. Health threats include the large amount of pesticides used on the crop, as well as illnesses relating to the handling of raw tobacco leaves. Continuous exposure to the smell of nicotine emanating from the fields leads to dizziness, nausea and vomiting. Dermal absorption of nicotine while harvesting the wet green leaves leads to an acute illness.

Despite harmful effects of tobacco in soil, health and environment cultivation of tobacco is taken as very normal and common in different areas in Bangladesh. In this context the present study has been undertaken to get answer of the following questions:

- (i) What are the characteristics of the tobacco farmers?
- (ii) To what extent farmers cultivate tobacco instead of other crops?
- (iii) What are the factors that influence farmers for tobacco cultivation?

1.3 Objectives of the Study

The following specific objectives were formulated in order to give proper direction of the study:

1. To describe the selected characteristics of tobacco farmers. The characteristics are-
 - i. Age
 - ii. Education
 - iii. Farm size
 - iv. Annual income
 - v. Tobacco cultivation experience
 - vi. Family labor
 - vii. Time spent in tobacco cultivation
 - viii. Profitability
 - ix. Agent contact
 - x. Input availability
 - xi. Level of pest infestation
 - xii. Market security
2. To assess the extent of area used for tobacco cultivation.
3. To determine the characteristics that significantly influence farmers' cultivation of tobacco.

1.4 Justification of the Study

In Bangladesh overall, from 1990 to 2003, there was a gradual decline in tobacco cultivation. While tobacco cultivation is decreased in most parts of Bangladesh, an increasing trend was observed in certain districts. For example, in 1995–96, Bandarban, a hilly district in southwest Bangladesh, had about 300 acres of land under tobacco cultivation. By 2002–03, this figure had risen to 1810 acres with an increase of 600%. During the same period, another district of Bangladesh, Kushtia, saw an increase in tobacco acreage from about 13 200 acres to more than 20 000 acres. In the northern district of Rangpur, about 48 000 acres of land is devoted to tobacco farming (BBS, 2003). The recent spate of growth in the number of tobacco farmers, albeit localized, is indeed a worrisome phenomenon.

For decades tobacco production has moved from one location to another, not due to the increased interest of farmers but rather due to the loss of soil fertility and destruction of sources

of fuel wood in areas under production and also. Also tobacco cultivation is responsible for some severe health diseases and environmental degradation. In Kushtia district the production rate of tobacco is highest among the all parts of the country in last 5 years. In kushtia district 36443 acres land used in tobacco cultivation in 2015-2016 and the production is 31462 MT which is the biggest comparing to all other districts (Agricultural Year Book, 2016).

In view of the above discussion, a passionate feeling and a felt need was developed to conduct this sort of research about finding reasons behind tobacco cultivation. The researcher was, therefore, interested to undertake this research entitled “DETERMINANTS OF EXTENT OF TOBACCO CULTIVATION AREA IN KUSHTIA DISTRICT”.

1.5 Scope of the Study

The study describe the selected characteristics of tobacco farmers. The study determine to what extent farmers cultivate tobacco. It also assess the extent of area used for tobacco cultivation. The factors that significantly influence farmers’ cultivation of tobacco will be determined by this study. The findings would also be helpful to the extension workers in formulating different strategies suited to different clienteles. It was felt that; these findings of the study would be helpful for policy makers and administrators of the country to formulate an appropriate extension approach in this regard.

1.6 Limitations of the Study

The findings of the study will be applicable to Baruipara and Phulbaria union in Mirpur upazila of Kushtia district in particular. However, the findings may also be applicable to other areas of Bangladesh where the physical, socio-economic and cultural conditions do not differ much with those of the study area. The purpose of the study was to have an understanding about the determinants of tobacco cultivation by the farmers. But considering the time and money the study was conducted with the following limitations:

1. The study was confined to Baruipara and Phulbaria union in Mirpur upazila of Kushtia districts. The characteristics of the farmers are many and varied. Only 13 characteristics were selected for investigation in the study.
2. Population of the study was limited.

3. The study was dependent on the data furnished by the selected farmers during their interview.
4. The facts and figures collected by the investigator applied to the situation prevailing during 13 September to 03 October, 2018.

1.7 Assumptions

An assumption is “the supposition that an apparent fact or principle is true in the light of available evidence” (Good, 1945). The following assumptions were made in conducting the study:

1. The respondents included in the sample were capable of furnishing proper responses to the questions set up in the interview schedule.
2. Views and opinions furnished by the respondents included in the sample were the representative views and opinions of the whole population of the study area.
3. The responses furnished by the respondents were reliable. They expressed the truth about their convictions and awareness.
4. The researcher acted as interviewer and was very well adjusted to the social and cultural environment of the study area. Hence, the respondents furnished their correct opinions without any kind of hesitation.
5. The data collected by the researcher were free from bias and they were normally and independently distributed.
6. The items included in the interview schedule for opinion measurement were adequate to reflect opinion towards alternative agricultural enterprises to replace tobacco cultivation.

1.8 Definition of Terms

Definitions of some important terms used in this study are given below:

Farmers:

Farming may be defined as the occupation of raising crops or livestock from the land. In this study, the term farmer refers to an individual who is engaged in farming directly or indirectly

on lands owned by himself or received from others (by barga, lease, etc.) or partly owned and partly received from others.

Tobacco farmer:

In this research tobacco farmer means, the farmer who cultivates tobacco along with other crops in their field.

Age:

Age of the respondent was defined as the period of time from his birth to the time of interview.

Education:

Education referred to the number of years of schooling completed by a respondent.

Farm size:

It refers to the farm area on which a farmer is used to do his farming either possessed by him or taken up by barga and lease from other during the year under investigation.

Family annual income:

It defined as the total earnings of an individual and the members of his family both from agriculture and other sources (business, service and other sources).

Tobacco cultivation experience:

In this research tobacco cultivation experience of a respondent refers to the period of time they cultivate tobacco. The experience was measured in terms of years from his/her first adoption of innovation to the time of interview.

Family labor:

Family members who give labor support in cultivation of any crops.

Profitability:

Profitability serves as a measurement of efficiency, and a guide to further improvement. It can be defined as the capacity to generate profit from all the aspects of a business; illustrating how proficient the management is in yielding revenue by employing available resources.

Agent contact:

Agent contact refers to the communication of farmers with tobacco companies' personnel and works through which farmers are exposed to various agriculture information and create a scope for getting some technical support and incentives.

Input availability

Input availability refers to the condition of present situation in any area whether various types of agricultural input materials are easy to find or not to execute specific agricultural practices with a minimum effort.

Perception:

A fundamental component in understanding why people behave the way they do is perception. Perception is the way where stimuli are selected and grouped by a person so that they can be meaningfully interpreted. It is the person's view of reality (Altman et al. 1995).

Market security:

Marketable securities are liquid financial instruments that can be quickly converted into cash at a reasonable price. The liquidity of marketable securities comes from the fact that the maturities tend to be less than one year, and that the rates at which they can be bought or sold have little effect on prices.

Population:

A population is a complete set of items that share at least one property in common that is the subject of a statistical analysis.

Sample:

A data sample is a set of data collected and/or selected from a statistical population by a defined procedure.

CHAPTER II

REVIEW OF LITERATURE

Review of related literature helps a researcher to carry out the research program successfully. It provides a scope for reviewing the stock of knowledge and information relevant to proposed research. This knowledge and information give a guideline in designing the future research problem and validating the new findings. With this end in view, literature and research of major past works in connection with the present study, were searched in the libraries and institutes. Therefore, attempt has been made in the present Chapter to review some pertinent reviews. The reviews are presented based on the major objectives of the study. Information collected from different sources are arranged into following four sections:

Section I: Tobacco cultivation scenario in Bangladesh

Section II: Studies relating to the characteristics of tobacco farmers

Section III: Studies relating to relationships between selected characteristics of the farmers and tobacco cultivation

Section IV: Conceptual Framework of the study

2.1 Tobacco Cultivation Scenario in Bangladesh

Akhter (2011) stated that tobacco farming has been introduced since mid-sixties of the last century in this country into the fields where food crops were grown. Its production expanded widely after liberation of 1971 at Teesta silt in Rangpur area. Tobacco is grown in agricultural land, but actually it is not an agricultural crop. In the context of Bangladesh, agriculture means where farmers are involved in the decision for choosing the crops and its consumption and marketing. Where tobacco is a non-food plant and basic raw material for products such as cigarette, bidi and other smokeless tobacco that is proved to be harmful for health, environment and society.

Barkat *et al.* (2012) stated that tobacco is being dealt as one of the major cash crops which are grown throughout the country, with the largest tobacco growing areas including Rangpur, Lalmonirhat, Kushtia, and Chittagong Hill.

Another study of Barkat *et al.* (2008) stated that tobacco cultivation can be basically termed as ‘Contract farming’, because in majority of the cases the cultivation of tobacco is contracted with a large business organization or multinational company. Tobacco has been cultivating in the country since its independence in 1971. There are different kinds of tobacco in Bangladesh: a) Cigarette-tobacco, b) Bidi-tobacco, c) Hukka-tobacco, and d) Churut-tobacco. The dependent population, like- women and children are working effectively in tobacco cultivation. The tobacco produced in CHT and Meherpur is of highest variety, Kushtia the next, and Rangpur is the lowest. Out of these six districts, the tobacco companies, especially BATB provides more facilities in CHT districts. In Kushtia, tobacco is cultivated along with rice in some areas, to make it more profitable.

Dev and Sujon (2003) stated that in recent years, adoption of highly profitable tobacco cultivation by local people has given a new dimension in the changing trend of Jhum cultivation. In Bandarban, the tendency to undertake tobacco cultivation in lieu of jhum cultivation by the indigenous community appeared to be significantly high compared with the other hill district (Rangamati and Khagrachhari).

Motaleb and Infanullah (2011) stated that British American Tobacco Bangladesh Company Limited (BATB) has been operating as a major sponsor of contract farming in tobacco cultivation since its beginning. This crop has a regional dominance in the north western, mid-western, mid-south and south eastern part of the country.

According to BBS (2003), in Bangladesh overall, from 1990 to 2003, there was a gradual decline in tobacco cultivation. Despite the overall decline, there are indications of increases in production in various local areas. For example, in 1995–96, Bandarban, a hilly district in southwest Bangladesh, had about 300 acres of land under tobacco cultivation. By 2002– 03, this figure had risen to 1810 acres – an increase of 600%. During the same period, another district of Bangladesh, Kushtia, saw an increase in tobacco acreage from about 13 200 acres to more than 20 000 acres. In the northern district of Rangpur, about 48 000 acres of land is

devoted to tobacco farming. The recent spate of growth in the number of tobacco farmers, albeit localized, is indeed a worrisome phenomenon.

Elsewhere BBS (2016) reports that a significant increase of tobacco production in the country. According to BBS statistics, tobacco farming areas and its production has risen by 76% and 134% respectively during the period from 2007-08 to 2014-15.

In another report, Agricultural Yearbook of Bangladesh (2016) shows that in Bangladesh, although the tobacco acreage has decreased from 123986 acre in 2013-2016 to 114786 acres in 2014-2015 with a slight increase in the production from 84992 MT to 94221 MT, tobacco cultivation has been increasing day by day in certain parts of the country. The south-eastern hilly region of Bangladesh, the Chattogram Hill Tracts is one of those regions. In Rangamati district of 625 acres of land was under tobacco cultivation in 2013-2014, but only 2 years later this figure has increased by more than 2 times (1381 acre in 2015-2016). Again, in Kushtia district the production rate of tobacco is highest among the all parts of the country in last 5 years. In kushtia district 36443 acres land used in tobacco cultivation in 2015-2016 and the production is 31462 MT which is the biggest comparing to all other districts.

Naher & Efroymson (2007) stated that tobacco does not occupy an important position in the agricultural economy of Bangladesh, accounting for only about 0.4% of total agricultural land. However, this still amounts to more than 75 000 acres of land under tobacco cultivation. Tobacco cultivation is spreading so rapidly in some areas that farmers have abandoned growing vegetables in their backyard and have begun to grow tobacco instead. Tobacco is a powerful economic temptation to farmers, who have previously grown food crops such as rice, wheat, maize, pulses, oilseeds, fruits and vegetables, on a subsistence basis. Not only does land usage under tobacco directly compete with other crops such and fruits and vegetables, but the tedious farming process leaves no time for growing other food crops.

2.2 Characteristics of Tobacco Farmers

Literature review of some characteristics of tobacco farmer conducted by various researchers are given below:

2.2.1 Age

Hassan *et al.* (2015) found that young farmers are mostly engaged in Tobacco cultivation. The majority percentage of 44.6% farmers are young (20-35 years), 33% of farmers are middle aged (35-50 years) and 21.5% of farmers are old aged (above 50).

Rahman and Parvin (2017) conducted a study on tobacco farmer and revealed that among 100 respondents, age of the major (32% and 28%) tobacco farmers ranged from 31 to 50 years. In general, most of the respondents fell within the most economically active age of 31 to 50 years. Only 2 % of the farmers fell within the age range of below 20 years, and 16% of farmers are within 21 to 30 years age range. It is therefore indicated that few youths of this area engaged in tobacco farming profession. Being tobacco farming is a laborious job; few old farmers (55%) are tobacco cultivator.

Younus (2001) stated that the respondents appear to be normally distributed with the majority of the respondents being the 20-34 age group. More than one third of the respondents in each of the survey sites belong to this age group. A quarter of the respondents appear to be in their teenage years. Age structure of around 10 to 15 percent of the respondents is 50 years and above.

Hossain and Rahman (2013) conducted a study about tobacco cultivation and stated that among 262 respondents on an average 66 percent of the respondent's age less than 45 years. It is also observed that 8 percent of the respondent has age less than 25 years and about 11 percent of the respondent has age more than 55 years.

Reddy (1985) revealed that 59.00 percent of the farmers were middle aged followed by young 34.00 percent and only 7.00 percent of the farmers were old.

Geist *et al.* (2009) revealed that 19% of the farmers belong to the age below 40, 31% were in the range of 40-49, 20% farmers in between the range of 50-60 and 30% of the farmers belong to the group of above 60.

Bhavya (2014) observed that majority of the farmers were under middle age (52.02 %) followed by old age (36.36 %) and young age (11.62 %) categories, in case of tobacco growers.

2.2.2 Education

Geist *et al.* (2009) stated that 36% of the farmers have formal education below class 6 while 28% have in the range of class 6-9 and 34% of the farmer completed education in the range of 9 to above.

Hossain and Rahman (2013) revealed that educated people are more aware about the harmful effects of it. But their study shows that not only illiterate people but also educated people are related to grow tobacco. Around 47 percent of the respondents were reported as illiterate. Respondents with educational attainment up to SSC are about 45 percent. Around 8 percent of the respondent have educational qualification H.S.C.

Younus (2001) reported that around 44 percent of the respondents were reported as illiterate (for both male and female). The rate has dropped to 20 to 26 percent (see Table 4.3). In contrast, respondents with educational attainment up to SSC and above has markedly increased from 13 percent to as high 40 percent for male and 30 percent for female. If respondents with educational attainments grade six and above is narrowly defined as literate then more than 60 percent of male and 57 percent of female respondents are considered to be literate.

Rahman and Parvin (2017) stated that illiterate farmers or less educated farmers are generally more pursued in tobacco cultivation. Among the respondents, the maximum farmers (37 %) are illiterate while primary of 35% and secondary of 8% respondents. Farmers having SSC or above level education are 10.8 % only.

Hassan et al. (2015) found that maximum farmers (49.2 %) are illiterate while primary (27.7) and secondary have (12.3%). Farmers having higher secondary education are (10.8 %).

Bhavya (2014) observed that 20.2% of tobacco farmers were illiterate while 8.59% were completed primary school also 47.98% of tobacco farmers completed high school and 23.2% completed higher secondary.

Reddy (1985) reported that 8% tobacco farmer had received primary education, 35% had received high school education, while 21% received pre-university and graduation, respectively.

2.2.3 Farm size

Rahman and Parvin (2017) reported that 40% respondents are medium farmers (farm size 34-99 decimals) followed by 34% of respondents are large farmers (1 or more than 1acre farm size). Only 26% of them are small farmers (farm size 1-33 decimals).

Nahar and Chowdhury (2002) found that the category of farmers who are mostly taking up tobacco cultivation, it was basically the marginal 44% and, to a lesser extent, the small farmers 25% while medium farmers 16% and the lowest large farmers were 15%.

Hassan et al. (2015) revealed that tobacco farmers were classified into three categories due to their farm size. Maximum Tobacco farmers are belonging to medium farm (43.1 %) while 33.8% were in the group of small farmers and 23.1% of the farmers belong the group of large farmers.

Singh et al. (1982) studied economics of bidi tobacco production in Belgaum district of Karnataka. The study revealed that tobacco is an important cash crop of the region and occupied 37 per cent of the gross cropped area on sample farms. The study also revealed that average cost per hectare was Rs. 5961.96 on sample farms. It was found highest (Rs. 6407.28) on large farms and the lowest (Rs. 5334.89) on small farms.

Bhavya (2014) observed that among the tobacco growing farmers 34.3 per cent had a land holding of 1-4 acres, 37.4 per cent had 4-8 acres and 28.3 per cent had a land holding of more than 9 acres only in case of tobacco growing farmers. Where as in case of non-tobacco growers 75 per cent had a land holding of 1-4 acres, remaining 24.3 per cent had 4-9 acres and none of the respondents had a land holding more than 9 acres. The average size of land holding for tobacco farmers is 7.66 acres which is 2 times more than average land holding of non-tobacco growers (3.10 acres).

Beach et al. (2008) stated that average farm size is around 293 acres, while average area of tobacco grown is about 56 acres over the whole sample period. Out of 535 tobacco farmers continuing to have tobacco related income who remained enrolled in their study, 71 (13%) increased their acreage by 10% or more between 1995 and 2003. There were 209 growers (39%), on the other hand, who decreased acreage grown by more than 44% (the percentage reduction in total flue cured tobacco quota) between 1995 and 2003.

Abay et al. (2004) stated that average farm size is 3.24 ha and most farms were smaller than 2.5 ha. Considering the average farm size in Turkey is 5.9 ha tobacco farming is operated on much smaller farms. The smallest farm size (<2.5 ha) belongs to the Northwestern Region, and the largest average land size (10+ ha) is in the Eastern-Southeastern Region, where large areas of land are owned by traditional landowners.

2.2.4 Annual income

According to Economic Research Service of United States (2003) the net farm income averaged \$3,800 per year for Tennessee tobacco farmers while Kentucky tobacco farms averaged \$13,100 in net farm income.

Bhavya (2014) showed that tobacco growers get more income from agriculture per farm (Rs. 2, 29,719) out of which 93 per cent i.e., Rs. 2, 14,288 is from tobacco production. Whereas non-tobacco grower's income from agriculture is Rs. 22,918 which is 10 times less than tobacco grower's income and even non-farm income per farm is more for tobacco growers was Rs. 76,333 than non-tobacco growers Rs. 60,083 (Fig. 4.4), the per acre income for tobacco growers was Rs. 29,989.50 and non-tobacco farmers was Rs. 10,913.33.

Kibwage *et al.* (2009) revealed that the main income source of the respondents was farming (76.4%), followed by retail business (16.5%), formal sector employment (5.5%) and the informal sector employment (1.65%). It is also evident that most (82.8%) of the tobacco growing households depended on farming. Annual income of tobacco farmers in Kenya is 100,040 ksh.

Cai et al. (2012) stated that 22.5% of the farmers had low income below than \$150 USD while 57.4% of the farmers had medium income between \$150-600 USD and 20.1% of the farmers had high income greater than \$600 USD.

Motaleb & Irfanullah stated that the average annual income of the surveyed households was about US\$ 2,100 (in 2009). Almost all the surveyed farmers currently also practicing jhum cultivation said that the present crop production was not sufficient to support their family needs. Hence, on average they had to spend US\$ 900/household/year in buying extra food.

Around 40% of the surveyed households at present do not produce any food on their own, and spend on average US\$ 1,480/household/year from the earning of tobacco cultivation to purchase food.

2.2.5 Tobacco cultivation experience

Hassan *et al.* (2015) stated that the 44.6% of tobacco farmers had high farming experience above 20 years while 38.5% of tobacco farmers had medium farming experience between 10-20 years and 16.9% of tobacco farmers had low farming experience between 1-10 years.

Nahar and Chowdhury (2002) revealed the growing importance of tobacco at the micro level. While 39% of the farmers have been growing this crop as an ancestral occupation (>20 years), about 24% have been engaged in this tradition for the last 11-20 years. Another 36% of the farmers have taken to this crop in the last 10 years, of which 24% have joined in the last 5 years. Thus, a clear trend of an increasing number of farmers getting into the production of this crop is discernible. This is particularly true for Kushtia.

Rahman & Parvin (2017) revealed that the farming experience of respondents. 32% of the farmers have been farming tobacco for between 11 - 15 years, while nearly 23 percent farmed for between 6 to 10 years. For between 16-20 years, 18% farmers and for more than 20 years, 14% farmers have been farming. Only 12% farmers have experience of only below 5 years. This could be inferred that, most of the farmers are well experienced and known about various impact of tobacco cultivation.

In another research Ali *et al.* (2015) showed that the number of tobacco growers experience between the ranges of 0-5 years was 52% and 5-10 years was 28% which higher than other ranges of those with 10-15 years was 14% and above 15years experience was 6%, respectively. That statistics indicates that the number of new tobacco growers is increasing with the flow of time.

Abay *et al.* (2004) stated that, average experience in tobacco production for some selected regions of Turkey was about 25 years. Experience in tobacco production shows the same characteristics as experience in farming in general. The Black Sea had the maximum

experience in tobacco production of more than 35 years, while the minimum level belonged to the Eastern-Southeastern Region. Farmers with less than 10 years of experience, which was considered to be just long enough to accumulate enough professional experience, constituted about 13%.

2.2.6 Family labor

Suvarna & Thomas (2003) revealed that most of the household members in Karnataka, India help in tobacco farming. They performed different kinds of work related to tobacco cultivation and processing. The whole range of jobs associated with tobacco, like planting, weeding, making and maintaining beds, picking tobacco leaves, tying leaves, and removing leaves after drying and grading. Family members used to work in tobacco cultivation fields and barns during each tobacco season.

Abay et al. (2004) stated that in the Black Sea and Northwestern Regions of Turkey, tobacco is produced by the intensive use of family labor and so producers prefer to own their land rather than resort to sharecropping or rental. More than 60% of the farms allocated more than 50% of their farming land to tobacco farming. The figure for the Eastern-Southeastern Region was the biggest, at 75%. This indicates that the farmers along with their family were significantly specialized in tobacco farming.

Kibwage et al. (2009) showed that tobacco farmers' family members assist them in the tobacco booming business. The household members mostly assist tobacco farmers in farm preparation, planting, weeding, pruning, thinning, application of agrochemicals, harvesting and curing.

Ali et al. (2015) revealed that tobacco farmers sending their children in the tobacco field as a labor to earn cash money. The land owners use child labor because it is cheap. A lot of respondents said that, during the tobacco processing and tobacco field child labor face different health problem.

Rahman & Parvin (2017) found that most of the members of the family including children, females work in the various stages of tobacco farming in the study area. It was observed that, majority (49%) of respondents have medium family (4-6 members) followed by 33% of

tobacco farmers having small family (1-3 members) and only 18% family belongs to large family (more than 6 members). Since tobacco is a labor-intensive non-crop, it is very helpful for tobacco farmers if family size is larger.

Nahar & Chowdhury (2002) stated that Most farmers do not feel the pinch of the high labor costs involved in tobacco farming as they use their own ‘free’ household labor in the process. The ‘free’ labor is mostly supplied by women and children of the household. About 47% of the total economic cost of labor is attributable to household labor. In Rangpur, more than 52% of the total labor cost comes for ‘free’. This is in consonance with the region’s low literacy level and high incidence of poverty which forces as many household hands as possible to toil in the fields.

Nahar & Efroymson (2007) showed that more than 50% of the labor required was provided from the farmer’s household itself. If the imputed value of this “free” labor is considered, tobacco loses much of its profit margin, as the high labor cost reduces the net return to labor. The survey also revealed that most farmers are aware of this, saying that tobacco yields little for the farmer who has no household labor.

2.2.7 Profitability

Nahar & Chowdhury (2002) conducted a study on tobacco cultivation and stated that Tobacco has the reputation of being a very profitable crop with few ‘equally lucrative’ substitutes. Among the various reasons cited by the farmers for cultivating tobacco, the profitability aspect was overwhelmingly dominant. Eighty-five percent of the respondent considered this a very profitable crop.

Deb & Sujon (2003) revealed that farmers residing in Nayenpur village of Kushtia district, of whom only eight are registered farmers. The remaining farmers must use their own money to buy seed, fertilizer, pesticides, and other inputs. The unregistered farmers sell their tobacco to brokers on the open market; the brokers then sell the tobacco to the various companies. While registered farmers received Tk. 60 (US\$1.04) per kilogram from the companies, the unregistered farmers receive only 20-30 Tk. (\$0.35-0.52), and sometimes as little as Tk. 5 (\$0.09) per kilogram, which is insufficient to meet their production costs.

Rahman (1972) conducted a study on cost of production of major varieties of tobacco in Rangpur district. He observed that the total cost per acre of producing Virginia tobacco was Tk. 3293.41 and the average profit per acre was Tk. 714.83. He also observed that the average yield per acre of Virginia tobacco was 337.80.

Islam (1982) conducted a study on Virginia tobacco production in selected areas of Daulatpur thana of Kushtia district. He estimated that average yield per acre of tobacco was 110292 pounds. Net cost per acre was Tk. 5266.50 and net return per acre was Tk. 4286.17.

Prodhan (1998) conducted the existing tobacco marketing system, costs margins and marketing constraints. He showed the production and processing cost per hectare of tobacco at Rangpur and Kushtia was Tk. 21587.00 and 31312.00 and the net return of farmers was Tk. 2713.00 and Tk. 5080.00 per hectare.

Hossain (1998) studied tobacco marketing in the two important tobacco growing areas of Rangpur and Kushtia district of Bangladesh. He showed that the production and processing cost per hectare of tobacco of Rangpur and Kushtia were Tk. 2158.00 and Tk. 31312.00 respectively. The net return per acre was Tk. 2713.00 in Rangpur while it was Tk. 5080.00 for Kushtia district.

Mahmud (1999) conducted a socioeconomic study on tobacco production in some selected area of Rangpur district where he showed that tobacco growing was a profitable business, but the Virginia variety was more profitable than the Motihari. The total costs of tobacco production per hectare were Tk. 34260 and Tk. 35106 for Virginia and Motihari variety respectively. The net returns of tobacco production were Tk. 9690 and Tk. 5914 per hectare in the study area.

Alekhin-SN, et al (1990) studied economic analysis of tobacco production in different regions of the USSR and found an estimated economic efficiency of 223.7%. However, the latter figure was finally 20-25% lower due to a loss of raw material and reduced commercial value of the final product caused by low processing quality.

Policy Research Institute of Bangladesh (2012) conducted a research about tobacco cultivation and its impact and revealed that out of the five major crops-rice, jute, wheat, tobacco, and pulses-tobacco has the highest return per decimal. Compared to rice, the return from tobacco

is about 18.6% higher. Compared with the other cash crop jute, the return from tobacco is estimated to be about 33% higher on average. When compared with the return from the most preferred alternative crop of the tobacco farmers, which is wheat, the rate of return per unit of cultivated land is much more than double. The average profit earned per kilogram is also the highest for tobacco by a significant margin compared with the other four competing crops.

2.2.8 Agent contact

Nahar and Chowdhury (2002) conducted a study of tackling the tobacco dilemma and found that the companies provide the farmers with inputs such as seeds, fertilizers, pesticides, and also technical assistance. Seeds are normally provided free of cost while the cost of fertilizers and pesticides are recovered during the purchase of the produce. Depending on the consumers' preferences and market demand, the farmers are informed of the exact grade and quantity of the leaf desired by the companies which would be procured from them at a pre-determined price. The company extension workers then provide technical support to these growers to ensure the quality.

Rahman and Parvin (2017) stated that the most of tobacco farmers (54%) get various types of support from the company through their agent. Generally, the tobacco Company supports the contracted farmers through advice, easy loan, free seeds, fertilizers, pesticides, and guarantee of buying tobacco leaves at about higher price level. Besides, the company also supports the contracted tobacco farmers technically. Rest of the respondents does not get any support from the company, they are non- contract tobacco farmers.

Naher and Efroymsen (2007) stated in their case study that tobacco companies try to draw farmers into growing tobacco by attracting them with different facilities and perks. Once the farmers become registered with the companies, the companies' extension workers teach them the entire procedure for yielding a good tobacco harvest.

Dasilva (2005) stated that contract farming requires constant adjustment to suit the nature of the agents involved and the prevailing economic environment. Uncertainty for both parties, resulting from asymmetric information and other transaction costs, may cause poor performance of contracts. An understanding and interaction between two parties can make the

contract exchange efficient by building trust. The contractual exchange can be made more efficient if there is an understanding or interactions which lessen distrust between the two parties.

Policy Research Institute of Bangladesh (2012) conducted a research about tobacco cultivation and its impact and stated that companies provide free seeds and extension services as and when required. The amount of seeds provided is determined by the tobacco company. Company representatives will advise on farming techniques and farmers are legally bound to take their advice. Tobacco companies provide farmers with 98.6% of extension services that are related to their welfare; moreover about 5.7% of farmers receive extension services from the government agencies. More than half of the government extension services are dedicated to rice (62.3%) and nearly more than two-third (80%) of NGO's extension services also go for rice. Mass education accounts for around 22% of the extension services for jute production.

2.2.9 Input availability

Farida Akhter (2011) in an UNIBIG research of tobacco cultivation revealed that tobacco cultivation requires huge amount of fertilizers, pesticides, seed, irrigation water and labor. The seed of particular variety of tobacco is provided by the company, of course at a price. So, tobacco growers do not keep any seed by themselves. They are always dependent on the company for the supply of seeds. At different stages of tobacco cultivation, fertilizers and pesticides as well as irrigation water is needed. According to company credit form, the required inputs are fertilizer such as Urea, TSP/DAP, SOP sakaricide, pesticides/fungicide such as Bovistin, ridomil etc.

Mollah (2010) conducted an economic study on tobacco cultivation and stated that the tobacco growers receive fertilizers through the company card from the companies themselves. The study also found that the tobacco farmers used more chemical fertilizers, insecticides/pesticides and irrigation water in their crop fields. They did not follow the recommended doses of chemical fertilizers and used excessive doses of Urea, TSP, MoP, SoP, DAP and ZnSo₄ to get higher yield. But the observed yield per hectare of tobacco was lower than the yield of previous season at each of the locations.

Abay *et al.* (2004) conducted an input efficiency study on tobacco cultivation and stated that the efficiency scores obtained from the study area strongly point to excessive use of farm inputs. In fact, none of the regions produces tobacco efficiently. The inefficient use of farm inputs by tobacco farmers can be explained, at least in part, by the government's farm input subsidy policies. These subsidies were meant to encourage the use of modern farming techniques and input use, particularly fertilizers, but they are often ineffective, causing a waste of resources.

Naher and Efroymsen (2007) stated in their case study that tobacco companies provide the farmers with free seeds, follow-up extension services and packages that include fertilizers and pesticides. The entire process of tobacco cultivation is input intensive, which makes it an expensive crop to grow. The high cost of cultivating this crop implies that farmers often have to access loans or credit from external sources.

Bhavya (2014) conducted a study on socio economic and environmental impact on tobacco cultivation and revealed the information on level of satisfaction of farmers for the different services and inputs provided by a marketing firm. Farmers are having 100 per cent satisfaction for the services provided as tray technology, towards the behavior, friendliness and helpfulness of marketing firm personnel who are in direct contact with the farmers and for the social responsibility the firm is having towards a society are satisfied by the market intervention.

2.2.10 Level of pest infestation

Ryan (2001) stated in his book Post-harvest tobacco infestation control that tobacco is vulnerable to many insect pests while growing in the field. Two insects, the cigarette beetle (*Lasioderma serriocorne*) and the tobacco moth (*Ephestia elutella*), feed on cured tobacco leaves, whether air-cured burley, sun-cured oriental, flue-cured or tobacco by products. Worldwide yearly loss of stored tobacco is estimated conservatively at 1%: some \$300 million.

Chamberlin (1958) conducted a study on tobacco pest control and stated that the green peach aphid occurs on tobacco in nearly all countries throughout the world where tobacco is grown. Heavy infestation of aphids can severely stunt the growth of young tobacco plants in the field. As the initial distribution of aphids in a field is likely to be irregular, an uneven crop can result

from early attacks. Other types of injury in tobacco are also produce by disease transmitted aphids.

Patel *et al.* (1971) conducted a study on tobacco pest and stated that Tobacco is attacked by several pests; mole crickets and earthworms in nursery beds, leaf eating caterpillars, Gujarat hairy caterpillar, stem borer, capsule borer and whiteflies in transplanted crops and cigarette beetles in stored tobacco. Infestation with one larva per plant however gave a nonsignificant reduction in yield. Numbers of tobacco plants infested in different fields vary and it would be possible to estimate the correct losses by obtaining the percentage of plants damaged in any field.

Blanc et al. (2002) conducted a study on control pest in tobacco and revealed that among the insect species causing infestations and serious damages to stored commodities, the cigarette beetle, *Lasioderma serricorne* (F.) and the tobacco moth, *Ephestia elutella* (Hübner) are the major pests of both raw and manufactured tobacco. Economic damage caused by insect pests include weight loss due to direct feeding, and quality reduction by contamination with excreta, dead insects and waste products. Moreover, insects may facilitate product deterioration due to contamination with molds, which can grow well in the moist and warm microhabitat of the infested product. It is estimated that insects account for 10 to 30% of the losses recorded in stored grains and pulses.

2.2.11 Market security

Farida Akhter (2011) conducted an UNIBIG research of tobacco cultivation and revealed that there are several reasons including cash earning, perceived high profit, guarantee of inputs and market and also the involvement of farmers through Company Card plays a coercive role for continuing tobacco cultivation. The attractions that draw farmers to tobacco production are lump sum cash income at a time, input and credit advance from the companies and ensured market through procurement of tobacco leaves by the companies.

Barkat *et al.* (2008) conducted a study on economy of tobacco cultivation and revealed that the farmers are usually obligated to sell tobacco leaf to the company at a set price. The tobacco cultivators are calculating the benefits of tobacco cultivation in three ways- (i) facility to work

in own field, (ii) getting fertilizer for the field, and (iii) having guaranty to sell dried tobacco leaf without any hazard of storage and damage.

Policy Research Institute of Bangladesh (2012) conducted a research about tobacco cultivation and its impact and stated that Farmers have gathered rich experience in cultivating tobacco. Tobacco now holds a Well-developed and formalized markets. Relatively stable demand for tobacco in the world market. • Tobacco export, which became the most important agro export after jute, may even disappear from Bangladesh's export basket if this policy is continued for long. The varieties of tobacco which are exported from Bangladesh are different from the traditionally cultivated tobacco and these are not generally used in producing tobacco products for the domestic market.

Naher and Efroymson (2007) stated in their case study that the perception of profitability is based on the fact that tobacco has a guaranteed market and that on disposal of the product, the farmer receives the entire money for his produce at once. As with most other agricultural commodities, the market for tobacco is imperfect. Only contract growers have an assured market, since they sell directly to the companies. Tobacco farmers do not have much of a problem in disposing of their harvest. Whatever be the supply, there seems to be a market for it.

Ali et al. (2015) conducted on a study on tobacco impact and revealed that high benefit from tobacco than food producing crops is the most important factor of tobacco farming. High demand from Tobacco Company, market facilities and opportunity of sudden loan are also important factors in this connection. Besides these cash earning, perceived high profit, guarantee of inputs on market and involvement of tobacco farmers through company facility play important role for containing tobacco farming. 26% respondents said that, high benefit is the main causes of tobacco farming. And correspondingly, 17% respondent said that, ready cash and 13% respondent said high demand in market are the factors behind tobacco farming.

Rahman & Parvin (2017) conducted a study on ethics and economics of tobacco cultivation and stated that major causes of tobacco farming are more profitability than other crops, having much money at a time, having easier market access, uncertain market price of other crops, ancestral occupation, having incentives (in loan, seeds, fertilizers, pesticides etc.) and technical supports from the company, Land is less suitable for other crops, having guarantee of selling

tobacco leaves at fair price, encouraging from the tobacco company, and neighboring land factors.

Hassan *et al.* (2015) conducted a study on profitability of tobacco cultivation and revealed that medium farmers cultivate more land but net profit is highest for large farmers because large farmer sell tobacco in the market rather than home. Therefore, it can be said that net profit largely depends on marketing. Farmers get higher price at market than selling Tobacco at Home.

Kibwage *et al.* (2009) conducted a comparative study on tobacco and non-tobacco farmers and found that farmers generally engaged in tobacco production mainly because it had ready market and for more income to pay school fees, groceries, accessories and other household essentials.

Nahar & Chowdhury (2002) conducted a study on tobacco cultivation and stated that the attraction to tobacco is the fact that it provides a guaranteed market and ready cash. Unlike other competing food crops, this crop is non-perishable and can be easily stored. Therefore, the tobacco farmer can lay his hands on hard ready cash the moment his produce is disposed of unlike most other crops which yield returns as and when the output is ready for sale. This acts as a major centripetal force for the farmers, particularly the marginal and small farmers to grow this crop.

2.2.12 Tobacco cultivation area

According to the Agricultural Year Book (2016), in Bangladesh, although the tobacco acreage has decreased from 123986 acre in 2013-2016 to 114786 acres in 2014-2015 with a slight increase in the production as tobacco cultivation has been increasing day by day in certain parts of the country. The south-eastern hilly region of Bangladesh, the Chattogram Hill Tracts is one of those regions. In Rangamati district of 625 acres of land was under tobacco cultivation in 2013-2014, but only 2 years later this figure has increased by more than 2 times (1381 acre in 2015-2016). Again, in Kushtia district the production rate of tobacco is highest among the all parts of the country in last 5 years. In kushtia district 36443 acres land used in tobacco

cultivation in 2015-2016 and the production is 31462 MT which is the biggest comparing to all other districts.

Naher & Efroymsen (2007) conducted a study on tobacco cultivation and stated that tobacco does not occupy an important position in the agricultural economy of Bangladesh, accounting for only about 0.4% of total agricultural land. However, this still amounts to more than 75 000 acres of land under tobacco cultivation.

Motaleb & Irfanullah (2011) conducted a study on tobacco cultivation and revealed that local people of Bandarban in some area had changed their traditional cropping pattern over the last decade. Six out of 10 families are now practicing jhum cultivation for crop production but 10 years back all used to do it. Before 2000, the average area for jhum cultivation was 1.5 ha/household, which is now reduced to 0.6 ha/household. On the other hand, nine out of 10 families are now fully dependent upon tobacco cultivation. Almost all of them have no land for tobacco cultivation, thus rent land from local landlords, neighbor and close relatives. On an average 1.5 ha/household are rented for tobacco cultivation.

Abay *et al.* (2004) conducted an input efficiency study on tobacco cultivation in Turkey and stated that More than 60% of the farms allocated more than 50% of their farming land to tobacco farming. Eastern-Southeastern Region was the biggest, at 75%. This indicates that the farmers were significantly specialized in tobacco farming. It is well known that hilly lands are more suitable for tobacco production. Almost none of the tobacco land, 1%, was hilly. Moreover, even land which was not suitable for tobacco production had surprisingly the biggest share, at 52.7%. This may be one of the probable reasons for inefficiency in tobacco production. Approximately 90% of tobacco was produced in non-base lands. Base lands were allocated to tobacco particularly in the North Western and Black Sea Regions, with shares of 30% and 27.5% respectively, while the other regions had less than 12%.

2.3 Relationships between Selected Characteristics of the Farmers and Tobacco Cultivation

Literature review of some findings on relationships between selected characteristics of the farmers and tobacco cultivation are given below

2.3.1 Age and tobacco cultivation

Bhavya (2014) conducted a study on socio economic and environmental impact on tobacco cultivation and found that there is a significant positive relationship between farmers age and tobacco cultivation. Similar findings are also obtained by Iqbal (1963), Shetty (1968), Norris & Batie (1987), Hossain (1991) Altman et al. (1996), Dimara & Skuras (1998), Soheli (1998), Abay (2004) and Beach et al. (2008) in their respective findings. They all found that majority of the farmers are middle aged. The reason may be that middle-aged farmers are enthusiastic and have more work efficiency than the older or younger ones. Old farmers mostly cultivate tobacco as their ancestors used to do and do not have the tendency to change their agricultural practices.

Elsewhere, in different study area Hossain and Rahman (2013), Karagiannis & Sarris (2005), Obwona (2006) found that there is no significant relationship between age and tobacco cultivation. Those findings revealed that cultivation of tobacco is related with some other factors.

2.3.2 Education and tobacco cultivation

Rahman & Parvin (2017), Hassan et al. (2015) found that there is no significant relationship between farmers' education and tobacco cultivation. But they related a factor that Illiterate farmers or less educated farmers are generally more pursued in tobacco cultivation. Similar findings found by Bhavya (2014), Mazikana (2018), Chitongo (2017), Halili (1999), Soheli (1998), Hossain & Rahman (2013), Abay (2004) in their respective studies.

On the other hand, Chronicle (2013) published an article about tobacco cultivation and stated that there is a significant positive relationship between education and tobacco cultivation. It shows that a farmer who is very educated is likely to get richer and allows them to grasp any new technological equipment needed in farming with tobacco cultivation.

But Altman et al., (1996, 1998), Beach et al., (2008), Chikkala (2015), Geist et al. (2009) found that education had a significant negative relationship with tobacco cultivation. They found that

illiterate farmers tend to be more active in cultivating tobacco as they were not much conscious about the consequences of tobacco cultivation.

2.3.3 Farm size and tobacco cultivation

Hossain & Rahman (2013), Bhavya (2014) found that there is a significant positive relationship with the area under cultivation and tobacco cultivation. More land causes more cultivation of tobacco. Similar findings obtained by Chikkala (2015), Altman et al. (1998), Dimara & Skuras (1998), Beach et al. (2008) and Norris (1987) in their respective study.

Karagiannis & Sarris (2005), Nahar & Chowdhury (2002), Geist et al. (2009) and Rahman & Parvin (2017) stated that there is no significant relationship between farm size and cultivation of tobacco.

On the other hand, Obwana (2006) revealed that there is a negative relationship stand between farm size and cultivation of tobacco. Because A hired workforce that is dispersed over a large area is costlier to monitor and its output more difficult to measure (e.g., fertilizing or seeding), giving workers an incentive to shirk. Hence, the negative impact on technical efficiency of hired workforce.

2.3.4 Annual income and tobacco cultivation

Naher and Efroymson (2007) stated in their case study that the principal reason behind farmers choosing to grow tobacco was that it is considered to be more profitable than other crops due to its guaranteed market and that the farmer receives his entire money for his produce at once. Hence, a positive relationship found between annual income and tobacco cultivation by Altman et al., (1998), Beach, *et al.* (2008), Snell *et al.* (2009), Strader & Alston (2009), Khan (1993), Singh (1991), Kaur (1988), Karim *et al.*, (1987), Haque (1995), Baadgoankar (1984) and Rogers *et al.* (1962). Similar findings were obtained by Norris (1987), Sohel (1998), Chitongo (2017) and Mazikana (2018).

Hossain and Rahman (2013), Abay (2004) and Obwona (2006) did not found any significant relationship between annual income and tobacco cultivation in their respective studies.

2.3.5 Experience and tobacco cultivation

Beach et al. (2008), Chitongo (2017) and Nahar & Chowdhury (2002) found a significant positive relationship between tobacco cultivation experience with tobacco cultivation acreage. Similar findings also obtained by Hassan et al. (2015), Rahman & Parvin (2017), Ali et al. (2015), Abay et al. (2004), Mendieta & Velandia (2010), Sohel (1998), Hossain (1991), Shetty (1968) and Iqbal (1963) in their respective studies.

Bhavya (2014), Anwar (1971) found that the experience of neither the youth nor the adults was related with the cultivation of tobacco. Similar findings were obtained by Baadgoankar (1984) in Uttar Kannada district of Karanataka state in India.

2.3.6 Family labor and tobacco cultivation

Bhavya (2014), Abay et al. (2004) conducted different study on efficiency of tobacco cultivation and found that family labor had a significant positive relationship with tobacco cultivation. Similar findings were obtained by Naher & Efroymson (2007), Karagiannis & Sarris (2005), Ziogas et al. (1992), Rahman & Parvin (2017), Hassan et al. (2015), Kibwage et al. (2009), Obwona (2006) in their respective studies. Such findings were supported by Ali et al. (2015), Dimara & Skuras (1998), Chikkala (2015).

Norris & Batie (1987) found that there is no significant relationship between Family member and tobacco cultivation. Hence, Beach et al. (2008) found that though tobacco cultivation related with the marital status of farmer but it had no significant relationship with children and other family members. Chitongo (2017) supported that findings.

2.3.7 Profitability and tobacco cultivation

Chitongo (2017), Mazikana (2018), Bhavya (2014) found a significant positive relationship between net profit and tobacco cultivation in their respective studies. They found that tobacco cultivation brought more profit than other alternatives. Similar findings obtained by Beach et

al. (2008), Norris & Batie (1987), Geist et al. (2009), Obwona (2006), Hassan et al. (2015), Rahman & Parvin (2017), Ali et al. (2015), Chikkala (2015), Hossain & Rahman (2013) in their respective studies.

Kibwage et al. (2009), Molla (2010), Jha & Chaloupka (2000), Karagiannis & Sarris (2005) stated that there is no relationship between profitability and tobacco cultivation. They stated that profitability of tobacco is overestimated, and that there are various profitable and realistic alternatives to tobacco production. Those findings were supported by Naher & Chowdhury (2002), Naher & Efroymson (2007) and Akhter (2011).

2.3.8 Agent contact and tobacco cultivation

Mazikana (2018), Chitongo (2017), Bhavya (2014) found that agent contact of different tobacco companies had a positive relationship with tobacco cultivation. Similar findings were acquired by Ali et al. ((2015), Rahman & Parvin (2017), Hassan et al. (2015), Naher & Chowdhury (2002), Beach et al. (2008) in respective studies. Those findings were supported by Naher & Efroymson (2007) and Akhter (2011).

Geist et al. (2009) did not found any relationship between agent contact and tobacco cultivation. Similar findings also gathered by Dimara and Skuras (1998), Kibwage (2009), Karagiannis & Sarris (2005).

2.3.9 Input availability and tobacco cultivation

Hossain & Rahman (2013), Akhter (2011), Naher & Efroymson (2007), Abay *et al.* (2004) found that there was a significant relationship between input availability and tobacco cultivation. As tobacco farmers get input facility from several companies, the cultivation of tobacco was easier than others. Similar findings were obtained by Ali *et al.* (2015), Rahman & Parvin (2017), Karagiannis & Sarris (2005), Hassan et al. (2015), Kibwage et al. (2009), Naher & Chowdhury (2002), Obwona (2006), Chitongo (2017) in respective studies.

Molla (2010), Geist et al. (2009) found that input availability did not lead to tobacco cultivation as input was also available for alternative crops. Motaleb & Irfanullah (2011), Dimara & Skuras (1998) found similar findings in respective studies.

2.3.10 Market security and tobacco cultivation

Rahman & Parvin (2017), Mazikana (2018), Bhavya (2014), Chikkala (2015) found that there is a strong positive relationship between market security and tobacco cultivation. Similar findings obtained by Akhter (2011), Hossain & Rahman (2013), Altman et al. (1996), Naher & Efroymson (2007), Ali et al. (2015), Hassan et al. (2015), Motaleb & Irfanullah (2011), Naher & Chowdhury (2002), Obwona (2006), Beach et al. (2008), Geist et al (2009), Molla (2010) in respective their studies.

The market security of tobacco mostly influence farmer towards cultivation no matter the fair price is obtained or not. Thus, lead to a farmer to encourage growing tobacco rather than other alternative crops.

2.4 The Conceptual Framework of the Study

In scientific research, selection and measurement of variables establishment is an essential task. The hypothesis of a research properly contains at least two important elements i.e. "a dependent variable" and "an independent variable." A dependent variable is that factor which appears, disappears or varies as the researcher introduces, removes or varies the independent variables (Townsend, 1953). Independent variables are that factor which is manipulated by the researcher in his attempt to ascertain its relationship to an observed phenomenon. A simple conceptual framework for the study is created on the groundwork of review of literature, which is illustrated in Figure 2.1. It was expected that the selected independent and the dependent variables were interrelated.

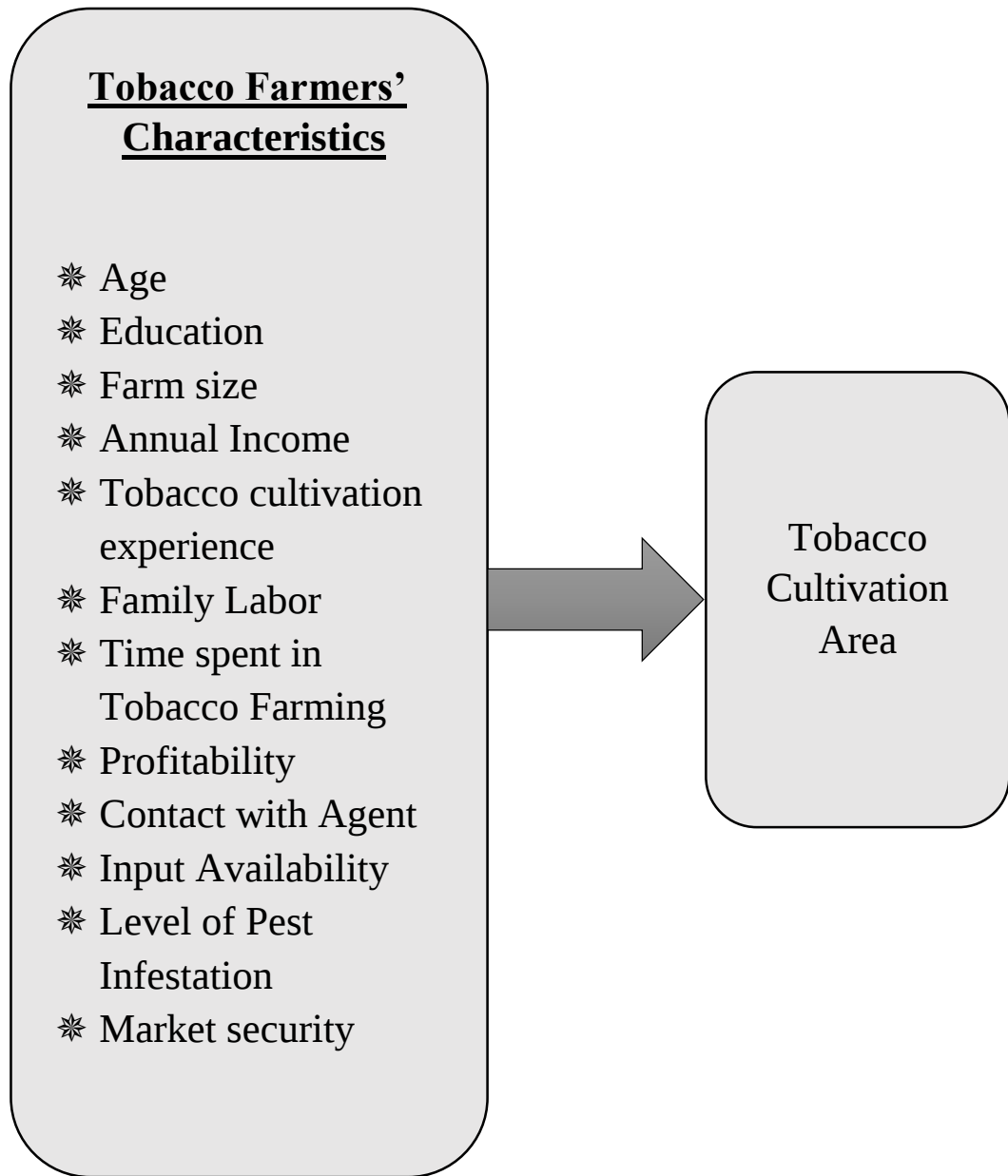


Fig. 2.1 The conceptual framework of the study

CHAPTER III

METHODOLOGY

Methodology plays an important role in a scientific research. A researcher should be careful in formulating methods and procedures in conducting research. Methodology should be such as would enable the researcher to collect valid data and reliable information and to analyze that information to arrive at correct decisions. The methods and procedures followed in this study are described in this Chapter and presented in the following sections and sub-sections.

3.1 Locale of the Study

Three villages namely Kabarbaria and chuniapara of Baruipara Union and Kistopur of Phulbaria union under Mirpur upazila of Kushtia district were selected as the study area. These two unions were divided by Kushtia-Meherpur highway. The site is located at about 16 km west of Kushtia sadar. Agriculture was the major occupation in the study area and the area had well accessibility through road and water ways. For clarity of understanding, a map of Kushtia district showing Mirpur Upazila and a separate map of Mirpur Upazila showing the study area have been furnished in Fig. 3.1 and 3.2, respectively.

3.2 Population and Sample Size of the Study

Among the families of the study area, agriculture was the major occupation. Few were service holders and businessmen. Those three villages there had 424 Tobacco farmers who constituted the population for this study. Twenty five percent (25%) of the farmer were selected for sample.

Thus, 106 farmers constituted the sample for this study. Proportionate random sampling was followed to determine the number of farmers from three villages. Simple random sampling was followed to select sample for interview. However, a reserve list of 10 farmers was also prepared. Farmers in the reserve list were used only when a respondent in the original list was not available.



Fig 3.1 Map of Kushtia district showing Mirpur Upazila

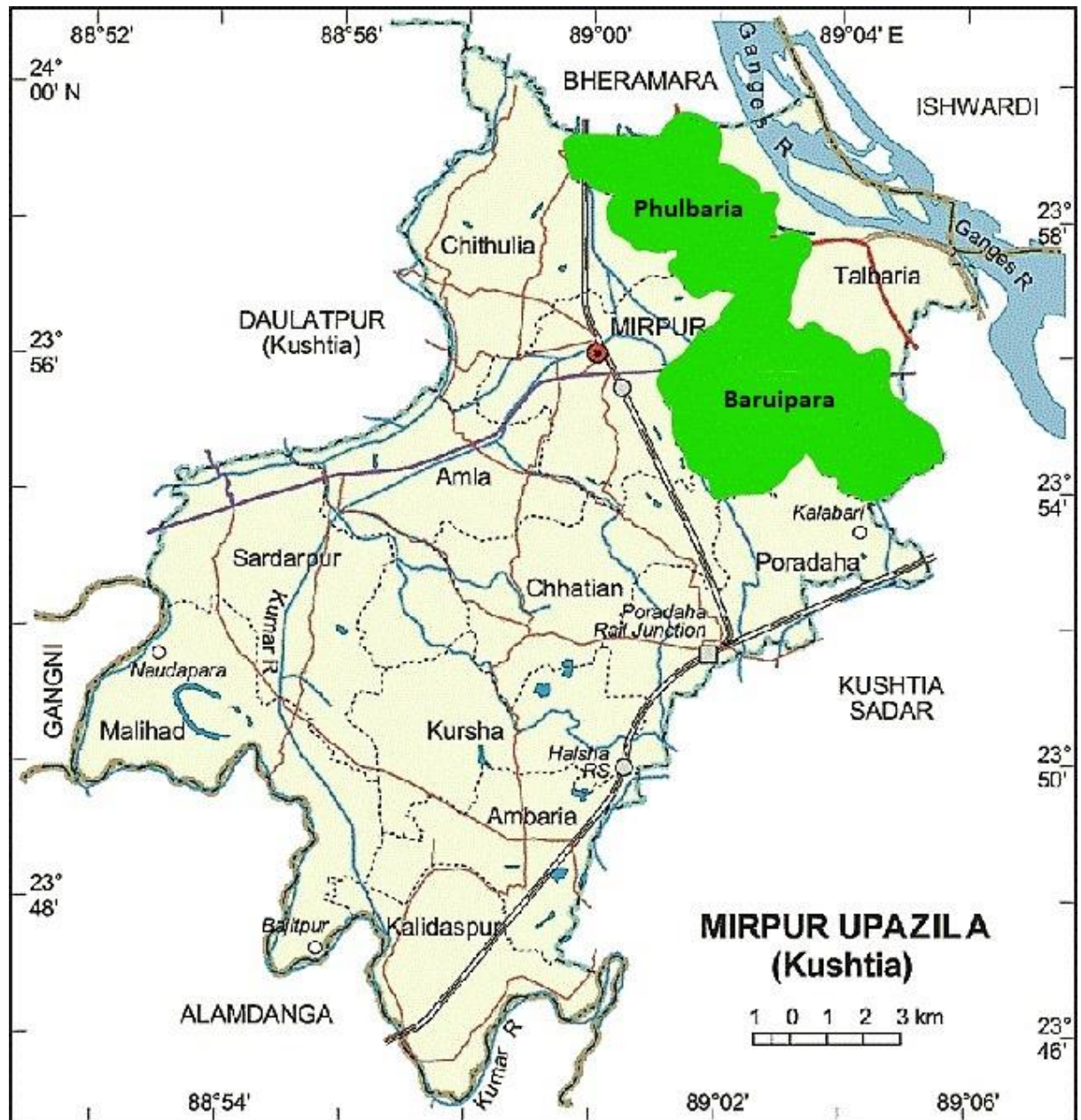


Fig 3.2 Map of Mirpur Upazila showing the study area

The distribution of the population and sample farmers and those in the reserved list from the selected village is shown in Table 3.1

Table 3.1 Distribution of the farm family heads included in the population, sample and reserve list

Name of village	Population of the tobacco farmers	Number of tobacco farmers included in the sample	Number of farmers included in the reserve list
Kabarbaria	53	13	1
Chuniapara	168	42	4
Kistopur	203	51	5
Total	424	106	10

3.3 Instrument for Collection of Data

In order to collect desired information, an interview schedule was prepared keeping the objectives of the research in view. Farmers opinion-based question 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 actual field situation before using the same for final collection of data among 12 respondents of the study area. Necessary correction, additions and alterations were made in the interview schedule on the basis of results of pre-test. The interview schedule was then cyclostyled in its final form. An English version of the interview schedule has been shown in Appendix-A.

3.4 Collection of Data

Data were collected personally by the researcher himself from the sample by using interview schedule. Data collection was started on September 12 and completed on October 3, 2018. Very good co-operation was obtained from the field extension workers and the local leaders. No serious difficulty was faced by the researcher during the collection of data. Data obtained from the respondents were transferred to the master sheet and then compiled to facilitate

tabulation. The qualitative data were converted into quantitative one by means of suitable scoring techniques.

3.5 Variables of the Study

The hypothesis of a research contains generally two variables, an independent variable and a dependent variable. An independent variable is that factor which manipulated by the experimenter in his attempt to determine its relationship to an observed phenomenon. A dependent variable is that factor which disappears or varies as the experimenter introduces, removes or varies the independent variables.

In this study 13 selected characteristics of the farmers constituted the independent variables. These were: age, education, farm size, annual income, tobacco cultivation experience, family labor, time spent in tobacco cultivation, profitability, agent contact, input availability, pest infestation and market security.

Tobacco cultivation area was the dependent variable in this study. Farmers cultivating area of tobacco was set to be analyzed with the above stated independent variables. Thus, lead researcher to get admitted himself into a statistical analysis comparing with independent and dependent variables.

3.6 Measurement of Variables

3.6.1 Age

The age of a respondent was measured in terms of actual completed years from his/her birth to the time of interview. A score of one was assigned for each year of age. This variable can be located on item no. 1 in Appendix-A.

3.6.2 Education

Education was measured in terms of years of schooling completed by an individual in educational institutions. The education score was computed for each respondent by giving one score for each year of successful schooling completed. The person who could sign only and

who did not read and write was given a score of zero (0). This variable can be located on item no. 2 in Appendix-A.

3.6.3 Farm size

The term refers to the cultivated area either owned by the farmers, or cultivated on barga, lease or other means including homestead area. Farm size of a respondent was measured in hectares by using the following formula:

$$\text{Farm size} = A1 + A2 + A3 + A4 + 1/2 (A5 + A6)$$

Where,

A1 = Own home and homestead area

A2 = Own cultivated area

A3= Own land given to others on lease system

A4 = Cultivated area taken on lease from others

A5 = Cultivated area given to others on barga systems

A6 = Cultivated area taken from others on barga.

The data were first recorded in terms of local measurement unit i.e. bigha or katha and then converted into hectare. This variable can be located on item no. 3 in Appendix-A.

3.6.4 Family annual income

The term annual income has been used to refer to the total earning of the respondent from agriculture and non-agricultural sources during a year. Annual income of the respondent was measured on the basis of his total yearly income from agricultural and non-agricultural sources in Taka. The income sources from agriculture included crops, fisheries and animal rearing. Non-agricultural sources of income included business, service, daily labor and other income sources of the respondents or other members of his family. A score of 1 was assigned for one

thousand Taka of income of a respondent. This variable can be located on item no. 4 in Appendix-A.

3.6.5 Tobacco cultivation experience

Experience of a respondent refers to the period of time of a respondent cultivate tobacco. The experience was measured in terms of years on the basis of verbal response of the farmers. A score of one (1) was assigned for each year of one's experience. This variable can be located on item no. 5 in Appendix-A.

3.6.6 Family labor

Family labor refers to the total number of family member of respondent's family give labor support in tobacco cultivation. A score of one (1) was assigned for each member of one's family. This variable can be located on item no. 6 in Appendix-A.

3.6.7 Time spent in tobacco farming

Time spent in tobacco farming refers to the number of hours given by a respondent to cultivate tobacco in a week throughout a season. A score of one (1) was assigned for each hour they give to cultivate tobacco in a week. This variable can be located on item no. 7 in Appendix-A.

3.6.8 Profitability

Profitability refers to the ratio of income from tobacco and total cost of producing tobacco. Income from selling tobacco to companies are divided by the total cost of producing that tobacco was considered as profitability. In others sense, it can be termed as benefit cost ratio. This variable can be located on item no. 8 in Appendix-A.

$$\text{Profit} = \frac{\text{Benefit}}{\text{cost}}$$

3.6.9 Contact with agent

Contact with agent refers to how many times a respondent contacted with tobacco companies' personnel. The agent contact measured by the number of meeting of a respondent with companies' agent within a season. A score of one (1) was assigned for each number of meeting within a season. This variable is presented in item no. 9 in Appendix-A.

3.6.10 Input Availability

Input availability refers to the condition of the study area whether various types of agricultural input materials (i.e. seed, pesticide, fertilizer etc.) are available or not for tobacco cultivation. A respondent was asked to choose one answer among four options of availability for each availability, namely: Not available, less available, moderately available and highly available. These four options for each availability were defined specially to each availability considering the situation, rationality and result of pretest. Score was assigned for all input availability in the following manner:

Input availability	Scoring system
Not available	0
Less available	1
Moderately available	2
Highly available	3

This variable can be located on item no. 10 in Appendix-A.

3.6.11 Level of pest infestation

Level of pest infestation refers to the land condition of a respondent that in which way their crop field is infected by various types of insects and diseases. A respondent was asked to choose one answer among four options of pest infestation for each infestation, namely: Very

low, low, medium and high. These four options for each infestation were defined specially to each infestation considering the situation, rationality and result of pretest. Score was assigned for all pest infestation in the following manner:

Level of pest infestation	Scoring system
Very low	1
Low	2
Medium	3
High	4

This variable can be located on item no. 11 in Appendix-A.

3.6.12 Market security

Market security refers to the liquid financial instruments that can be quickly converted into cash at a reasonable price. The guarantee of selling tobacco leaf in local market is measured by the opinion of farmers on the verbal response basis. A respondent was asked to choose one answer among three options of market security for each security, namely: Low, medium and high. These three options for each security were defined specially to each security considering the situation, rationality and result of pretest. Score was assigned for all market security in the following manner:

Market security	Scoring system
Low	1
Medium	2
High	3

This variable can be located on item no. 12 in Appendix-A.

3.6.13 Tobacco cultivation area

Tobacco cultivation area refers to the area that was cultivated by a tobacco farmer in a season. Tobacco cultivated area was measured by the amount of area which was under cultivation of tobacco by a farmer in two recent consecutive year. The mean value of those two years was taken as score. This portion can be found on no.14 in Appendix-A.

$$\text{Tobacco cultivation area} = \frac{\text{Area used in 2016} + \text{Area used in 2017}}{2}$$

This variable can be located on item no. 13 in Appendix-A.

3.7 Compilation of Data

The researcher compiled data from the interview schedules. Qualitative data were converted into quantitative data by means of suitable scoring wherever necessary. Local units were converted into standard units. The responses to the questions in the interview schedule were transferred to a master sheet to facilitate tabulation. Tabulation and cross tabulation were done on the basis of categories developed by the researcher himself.

3.8 Statements of the hypothesis

The research hypotheses were put forward to test the relationship between each of the 12 selected characteristics of the farmers and their Tobacco cultivation area.

3.8.1 Research hypothesis

The tobacco cultivation area by the farmers is related with each of their age, education, farm size, annual income, tobacco cultivation experience, family labor, time spent in tobacco cultivation, profitability, agent contact, input availability, pest infestation and market security.

3.8.2 Null hypothesis

For statistical testing of the research hypothesis they were converted into null form. The null hypotheses were as follows:

There was no relationship between the farmer's tobacco cultivation area and each of their age, education, farm size, annual income, tobacco cultivation experience, family labor, time spent in tobacco cultivation, profitability, agent contact, input availability, pest infestation and market security.

3.9 Data Processing and Analysis

The analysis was done using SPSS (Statistical Package for Social Science) computer package. Descriptive analysis such as range, frequency count, number and percentage, mean, standard deviation and rank order were used. Multiple linear regression was used in order to identify the important factors for tobacco cultivation. Throughout the study, five percent (0.05) level of probability was used as a basis of rejecting a null hypothesis. The regression equation are as follows-

$$Y_i = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + b_9x_9 + b_{10}x_{10} + b_{11}x_{11} + b_{12}x_{12} + e$$

Where,

Y_i = Dependent variable

a = constant

$x_1, x_2, x_3 \dots \dots x_{12}$ = Independent variables

$b_1, b_2, b_3 \dots \dots b_{12}$ = Co-efficient of the correspondents' independent variable

e = Random error

CHAPTER IV

RESULTS AND DISCUSSION

The Chapter deals with the results obtained after the analysis of data and interpretation of the results by using required statistical tools with an overall objective of knowing the determinants of tobacco cultivation. This chapter is divided into three sections. First section deals about description on the selected characteristics of the respondents. Second section deals with tobacco cultivation area of the farmers and third section deals with the relationship between selected characteristics of the farmers and tobacco cultivation area.

4.1 Selected characteristics of the respondents

This section deals with the description of selected characteristics of the respondents which were assumed to be associated with tobacco cultivation. Twelve characteristics of the respondents which constituted as independent variables were selected to describe and to find out their contribution on tobacco cultivation area. Those are age, education, farm size, annual income, tobacco cultivation experience, family labor, time spent in tobacco cultivation, profitability, agent contact, level of pest infestation, input availability and market security. Some descriptive statistics such as range, mean, standard deviation along with measuring unit of characteristics of the farmers have been presented in Table 4.1.

Table 4.1 Salient features of selected characteristics of the respondents

Selected characteristics	Measuring unit	Range		Mean	SD
		Possible	Observed		
Age	Year	Unknown	20-60	39.04	7.14
Education	Year of schooling	Unknown	0-12	2.8	2.84
Farm size	Hectare	Unknown	0.21-2.81	0.64	0.46
Annual income	000'tk	Unknown	97-493	246.51	78.43
Tobacco cultivation experience	Years	Unknown	3-40	20.92	7.34
Family labor	Number	Unknown	2-11	4.08	1.75
Time spent in tobacco cultivation	Hours/week	Unknown	21-63	54.81	10.43
Profitability	Score	Unknown	1.20-2.70	1.73	0.23
Agent contact	Score	Unknown	0-70	34.61	19.60
Input availability	Score	0-3	2-3	2.94	0.23
Level of pest infestation	Score	1-4	1-4	2.46	0.79
Market security	Score	1-3	2-3	2.91	0.29

4.1.1 Age

According to the procedure described earlier in chapter 3, age of the farmer was measured. Findings exposed that score of the range of age of the farmers had 20-60 with a mean of 39.04 and standard deviation of 7.14. Based on their age, farmers were classified into three categories which is enlightened in Table 4.2.

Table 4.2 Distribution of the respondents according to their age

Categories	Number	Percent (%)
Young (up to 35)	31	29.2
Middle (36-50)	68	64.2
Old (more than 50)	7	6.6
Total	106	100

The Table 4.1 indicated the information on age grouping of the tobacco farmers. It was observed that majority of the farmers were under middle age (64.2%) followed by young age (29.2%) and old age (6.6%) categories.

Reddy (1985), Hossain and Rahman (2013) and Bhavya (2014) also found that most of the tobacco farmers were middle aged.

The probable reason for majority of the farmers being under middle age category might be due to the fact that most of the young people are being migrated to nearly by townships opted for better livelihood options in urban area. Another reason may be that middle aged farmers are enthusiastic and have more work efficiency than the older or younger ones. Individuals in middle age group have physical vigor and also more responsibility towards family than the younger ones as it is known that tobacco farming is a laborious work.

4.1.2 Education

The education score of the respondents ranged from 0-12 with an average of 2.81 and standard deviation of 2.84. Respondents were classified into five categories based on their information regarding the educational status which is presented in Table 4.3.

Table 4.3 Distribution of the respondents according to their education

Categories	Number	Percent (%)
Illiterate (0)	2	1.9
Can sign only (0.5)	45	42.4
Primary education (1-5)	47	44.4
Secondary education(6-10)	10	9.4
Above secondary(>10)	2	1.9
Total	106	100

Data conferred in Table 4.3 indicated that the highest proportion (44.4%) of the farmers acquired primary level education, followed by 42.4 percent who could sign only, 9.4 percent

having secondary level of education, 1.9 percent having higher secondary education and again 1.9 percent having no education.

Geist *et al.* (2009) and Bhavya (2014) also found that most of the farmers have only primary education.

Findings revealed that 44.3 percent of the farmers belongs to the group of can sign only and illiterate. So, it can be assumed that lack of proper education lead the farmers towards tobacco cultivation as they are not conscious about the harmful effects of tobacco. Only few of the tobacco growing farmers are studied up to secondary and higher secondary, hence majority of the farmers were able to gather less knowledge about effects of tobacco cultivation on soil, environment and health.

4.1.3 Farm size

Farm size of the respondents was measured by discussion presented in chapter 3. Farm size score of the farmers ranged from 0.20-2.81 hectares with a mean of 0.64 hectares and standard deviation of 0.46. Farmers were classified into four categories based on their farm size which tabulated in Table 4.4.

Table 4.4 Distribution of the respondents according to their farm size

Categories	Number	Percent (%)
Marginal (up to 0.2 ha)	1	0.9
Small (0.21-1.0 ha)	90	84.9
Medium (1.01-3.0 ha)	15	14.2
Total	106	100

Data conferred in Table 4.4 indicated that the highest proportion (84.9 percent) of the respondents had small farm size, 14.2 percent had medium farm size and only 0.9 percent had marginal farm size. The majority (84.9 percent) of the farmers had small farm size ranging 0.21-1.0 hectare.

Abay *et al.* also found that most of the farmers were belong to the group of small farmer.

The probable reasons for the small farm size in tobacco growers could be nuclear type of family because of which the ancestral lands were fragmented into smaller and smaller due to increase in family size over the year. Also small farmers are interested to cultivate tobacco because they could get hard cash by selling tobacco leaves which is more profitable than cultivating other food crops within a small area.

4.1.4 Annual income

Annual income of the respondents measured according to the procedure described in chapter 3. The annual income of the tobacco farmers ranged from 97 to 493 thousand taka with an average of 246.51 thousand taka and standard deviation of 78.43. In the context of annual income, based on observed range farmers are classified into three categories such as low, medium and high. The categories along with their number and percentage are shown in Table 4.5.

Table 4.5 Distribution of the farmers according to their annual income

Categories	Number	Percent (%)
Low (up to 200)	30	28.3
Medium (201-400)	71	67
High(above 400)	5	4.7
Total	106	100

Data conferred in Table 4.5 indicated that the highest proportion of 67 percent of the respondents had medium income, followed by 28.3 percent had low income and finally only 4.7 percent of the respondents had high income.

Cai *et al.* also found that most of the tobacco farmers had medium income.

Data revealed that two third of the respondents (67percent) had medium income compared to low and high income. Lowest percentage of the respondents (4.7 percent) had high income. So, it can be said that economic condition of the tobacco farmers' is considerably better.

4.1.5 Tobacco cultivation experience

Tobacco cultivation experience of the respondents measured by the procedure discussed in chapter 3. Tobacco cultivation experience of the farmers ranged from 3-40 years with an average of 20.92 years and standard deviation of 7.34. Respondents were classified into three categories based on observed range. The categories along with their percentile distribution have been stated in Table 4.6.

Table 4.6 Distribution of the respondents based on their tobacco cultivation experience

Categories	Number	Percent (%)
Low (up to 13)	14	13.21
Medium (14-26)	67	63.21
High (above 26)	25	23.58
Total	106	100

Data presented in Table 4.6 implied that 63.21 percent of the respondents had medium tobacco cultivation experience, followed by 23.58 percent of the respondents had high tobacco cultivation experience and 13.21 percent of the respondents had low tobacco cultivation experience.

From the above data we observed that most of the tobacco farmers are highly experienced and cultivate tobacco for many years. The probable reasons behind their experience on tobacco cultivation could be their traditional practice because of which they cultivate tobacco as their ancestral farming genre and they used to live in with it.

4.1.6 Family Labor

Family labor of the respondents were measured by stated procedure discussed in chapter 3. The family labor of the respondents ranged from 2-11 persons with an average of 4.08 and standard deviation of 1.74. Respondents were classified into three categories according to the observed range. The categories along with their number and percentage shown in Table 4.7.

Table 4.7 Distribution of the respondents according to their family labor

Categories	Number	Percent (%)
Low (< 4)	44	41.5
Medium (4-7)	59	55.7
High (> 7)	3	2.8
Total	106	100

Data conferred in Table 4.7 showed that 55.7 percent of the respondents use medium family labor, 41.5 percent of the respondents use low family labor and 2.8 percent of the respondent use high family labor.

Rahman and Parvin (2017) also found that, majority percent of the respondents had medium family labor.

The highest proportion of the respondent (55.7) belongs to the group of medium category. Most of the tobacco farmers use family labor as it has no labor cost and the net outcome of tobacco cultivation would be efficient for them. So most of the cases they tried to involve family members to get labor support in tobacco cultivation.

4.1.7 Time spent in tobacco farming

Time spent in tobacco farming was measured by the procedure stated previously in chapter 3. Time spent in tobacco farming by the respondents ranged from 21 to 63 hours per week with an average of 53.29 and standard deviation of 8.39. Based on observed range respondents were classified into three categories. The categories along with their percentile have been tabulated in Table 4.8.

Table 4.8 Distribution of farmers based on their time spent in tobacco farming

Categories	Number	Percent (%)
Low (up to 21)	1	0.94
Medium (22-42)	25	23.59
Much (above 42)	80	75.47
Total	106	100

Data presented in the Table 4.8 indicated that highest proportion of 75.47 percent of the respondents spent much time followed by 23.59 percent of the respondents spent medium time and only 0.94 percent of the respondents spent low time in tobacco cultivation.

Stated data revealed that tobacco is a pretty much time spending crop. Most of the farmers spent 6-9 hour per day for working in the period of tobacco cultivation at their field. Hence, tobacco cultivation is laborious and farmers need to spend enough time at tobacco field for growing tobacco leaves.

4.1.8 Profitability

Profitability was measured by the procedure mentioned earlier in the chapter 3. Profitability of tobacco cultivation ranged from 1.20 to 2.70 with an average of 1.73 and standard deviation of 0.23. Based on benefit cost ratio value respondents were classified into three categories according to profitability which is presented in Table 4.9.

Table 4.9 distribution of tobacco farmers based on their profitability

Categories	Number	Percent (%)
Low (<1.50)	19	17.93
Medium (1.51- 2.0)	80	75.47
High (>2.00)	7	6.60
Total	106	100

Data conferred in the Table 4.9 reported that highest proportion of 75.47 percent of the respondent had medium profitability, followed by 17.93 percent of the respondent had low profitability and finally 6.60 percent of the respondent had high profitability by the tobacco cultivation.

Data stated above exposed that most of the farmer get medium to low profit although they believe that tobacco farming is more profitable. Though tobacco has a high demand in market and the selling rate is high but the net cost of tobacco production is also high because of high labor and input cost. So, they did not cut a good figure of profitability in most of the cases.

4.1.9 Agent contact

Agent contact of the respondents were measured by the procedure stated earlier in the chapter 3. Agent contact of the respondents ranged from 0 to 70 with an average 34.61 and standard deviation of 19.60. Respondents were classified into four categories on the basis of observed range. The categories of the respondents along with their percentage according to their contact with tobacco companies' agent have been presented in Table 4.10.

Table 4.10 Distribution of the respondents based on their agent contact

Categories	Number	Percent (%)
No contact (0)	19	17.93
Low (1-23)	4	3.77
Medium (24-46)	53	50
High (above 46)	30	28.30
Total	106	100

Data conferred in Table 4.10 indicated that 50 percent of the respondents had medium agent contact, 28.30 percent of the respondents had high contact, 17.93 percent of the respondents had no contact and 3.77 percent of the respondents had low agent contact.

Data stated above exposed that most of the tobacco farmers (50 percent) had medium contact with agents followed by 28.30 percent of farmers had high contacts with tobacco companies' agent. But only 17.93 percent of the respondents had no contact with tobacco companies' agents. So, it is clear that agent contact plays a vital role for giving technical support to tobacco farmers which lead farmers to cultivate tobacco.

4.1.10 Input availability

Input availability were measured by the procedure mentioned earlier in chapter 3. On the basis of possible range farmers were classified into three categories according to the input availability which is shown in Table 4.11.

Table 4.11 Distribution of farmers based on input availability of tobacco cultivation

Categories	Number	Percent (%)
Not available (0)	0	0
Less available (1)	0	0
Moderately available (2)	6	5.7
Highly available (3)	100	94.3
Total	106	100

Data presented in Table 4.11 indicated that majority of the respondents (94.3 percent) agreed with the consequence of high availability of input materials for tobacco cultivation. Thus only 5.7 percent had moderately available input materials.

Inputs for tobacco cultivation such as seeds, fertilizer, and pesticide etc. might be highly available in the study area. Farmers were not having any trouble to find input essentials in order to cultivate tobacco and curing of leaves.

4.1.11 Pest infestation

Level of pest infestation were measured by the procedure discussed earlier in the chapter 3. Farmers were classified into four categories based on possible range according to the level of pest infestation which is shown in Table 4.12.

Table 4.12 Distribution of Farmers based on level of pest infestation

Categories	Number	Percent (%)
Very low (1)	13	12.3
Low (2)	38	35.8
Medium (3)	48	45.3
High (4)	7	6.6
Total	106	100

Data conferred in Table 4.12 indicated that 45.3 percent of the respondents informed that level of pest infestation was medium, 35.8 percent had low, 12.3 percent had very low and finally 6.6 percent had high level of pest infestation in their tobacco field.

4.1.12 Market security

Market security of tobacco by the respondents were measured by the procedure stated previously in chapter 3. Based on the possible range respondents were classified into three categories according to their expressing score of market security which is tabulated in Table 4.13.

Table 4.13 Distribution of the farmers based on market security

Categories	Number	Percent (%)
Low (1)	0	0
Medium (2)	10	9.4
High (3)	96	90.6
Total	106	100

Data stated in Table 4.13 indicated that highest proportion of the respondent with 90.6 percent revealed market security of tobacco was high followed by only 9.4 percent told that tobacco had a medium market security. There was no one found who stated that tobacco had a low market security.

Hassan *et al.* (2015), Kibwage *et al.* (2009), Rahman and Parvin *at al.* (2017), Ali *et al.* (2015) also found the similar findings that most of the respondents told that tobacco has a high market security.

So, it is clear that tobacco has a high market security and this consequence lead the farmers towards tobacco cultivation.

4.2 Tobacco Cultivation Area of the Farmers

Tobacco cultivation area were measured by the procedure mentioned earlier in the chapter 3. The tobacco cultivation area were ranged from 0.20 to 0.87 hectares with an average of 0.42 hectares and standard deviation of 0.11. Based on observed range respondents were classified into three categories according to the tobacco cultivation area which is stated in Table 4.14.

Table 4.14 Distribution of the respondents according to their tobacco cultivation area

Categories	Number	Percent (%)
Small (<0.40)	35	33.02
Medium (0.40-0.60)	65	61.32
Large (>0.60)	6	5.66
Total	106	100

Data conferred in Table 4.14 revealed that 61.32 percent of the respondents had medium tobacco cultivation area followed by 33.02 percent of the respondents had small tobacco cultivation area and only 5.66 percent of the respondents had large tobacco cultivation area.

According to the stated data it was observed that an overwhelming majority of the respondents were belong to small to medium (94.34 percent) group of tobacco cultivation area. So, most of the farmers had few hectares of land to grow tobacco but they could not manage to expand their cultivation area though tobacco cultivation is profitable according to their perception.

4.3 Relationship between Selected Characteristics of the Farmers and Tobacco Cultivation Area

The intention of this section to explore the relationships among the 12 selected characteristics of the tobacco farmers and their tobacco cultivation area. The selected characteristics were: age, education, farm size, annual income, tobacco cultivation experience, family labor, time spent in tobacco cultivation, profitability, agent contact, input availability, level of pest infestation and market security. Each of these characteristics comprised as an independent

variable while tobacco cultivation area was the dependent variable of the study. To examine relationship multiple linear regression was reckoned.

The relationship between the variables have been discussed just after the regression model of this section. Throughout the study, five percent (0.05) and one percent (0.01) level of significance was considered for rejecting any null hypothesis. Multiple regression co-efficient values significant at 0.05 level by one asterisk (*) and at 0.01 level by two asterisks (**). Out of 12 relationships, 5 were statistically significant. A summary of regression result has been presented in Table (4.15).

Table 4.15 Multiple regression co-efficient of independent variables related to farmers' tobacco cultivation area

Dependent variables	Independent variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	R ²	Adj. R ²	F	P
		B	Std. Error	Beta						
Tobacco cultivation area	Age	.005	.002	.324	3.045	.003**	.614	.546	12.34	.000
	Education	.010	.004	.252	2.781	.007**				
	Farm size	-.040	.023	-.162	-1.752	.083 ^{NS}				
	Annual income	.001	.000	.490	5.234	.000**				
	Experience	.002	.001	.106	1.105	.272 ^{NS}				
	Family labor	.013	.005	.196	2.383	.019*				
	Time farm	.001	.001	.100	1.505	.136 ^{NS}				
	Profitability	.045	.035	.092	1.277	.205 ^{NS}				
	Agent contact	.002	.001	.284	3.064	.003**				
	Input availability	-.043	.045	-.089	-.957	.341 ^{NS}				
	Pest infestation	.012	.011	.083	1.124	.264 ^{NS}				
	Market security	.006	.036	.015	.155	.877 ^{NS}				

NS = Not significant

* Significant at 0.05 level of probability

** Significant at 0.01 level of probability

The data shown in Table 4.15 test final null hypothesis. The selected characteristics (farm size, tobacco cultivation experience, time spent in tobacco farming, profitability, input availability, pest infestation and market security) of farmers has no contribution in tobacco cultivation area. To find out which factors directly contribute to the tobacco cultivation area, multiple linear regression analysis was executed. Table 4.15 conferred that age, education, annual income, and agent contact were the most important contributing factors (significant at 1% level of significance). Family labor was also an important contributing factor (significant at 5% level of significance) while farm size, tobacco cultivation experience, time spent in tobacco farming, profitability, input availability, level of pest infestation and market security had no significant contribution on farmers' tobacco cultivation area.

About 61.4% ($R^2 = 0.614$) of the variation in the respondents' tobacco cultivation area can be incumbent on their age, education, annual income, family labor and agent contact which generating this as an excellent model. The F value indicates that the model is significant ($p < 0.000$).

Nevertheless, each variable may explain some the variance in respondents' tobacco cultivation area simply by chance. Although the addition of extraneous predictors in the model penalized by the adjusted R-square value (0.546), it still indicate that variance in respondents' tobacco cultivation area can be incumbent on the predictor variables rather than by chance, and that both are suitable models (Table 4.15).

4.3.1 Contribution of age of the participants on tobacco cultivation area

The contribution of age of the participants for tobacco cultivation was measured by testing the following null hypothesis;

“There is no contribution of respondents' age on tobacco cultivation”.

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

- a. The contribution of the age was significant at 1% level ($p=0.003$).
- b. So, the null hypothesis could be rejected.
- c. The b-value of age was 0.324. So, it can be stated that as increased by one unit age, farmers' tobacco cultivation increased by 0.324 units. Considering the effects of all other predictors are held constant.

Based on the above finding, it can be said that farmers' have higher age increased the tobacco cultivation. This implies that with the increase of age of the farmers will increase the tobacco cultivation. It may be because of most of the old aged farmers are not so much conscious about the harmful effects of tobacco cultivation as well as they are having lack of knowledge on soil, health and environmental problems. So, they do not really care about problems occurred by tobacco cultivation which leads them to cultivate tobacco in more area.

4.3.2 Contribution of education of the respondents on tobacco cultivation area

For the multiple regression, the contribution of education of the respondents for tobacco cultivation was measured by testing the following null hypothesis;

“There is no contribution of respondents' education on tobacco cultivation”.

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

- a. The contribution of the education was significant at 1% level (0.007).
- b. So, the null hypothesis could be rejected.
- c. The b-value of education was (0.252). So, it can be stated that as education increased by one unit, farmers' tobacco cultivation increased by 0.252 units. Considering the effects of all other predictors are held constant.

Multiple regression showed that education of the respondents brings a positive contribution to the tobacco cultivation. This implies that with the increase of education of the farmers will also

increase their tobacco cultivation area. Education empowered one to get information through reading or listening and it has an effect on their income. It may be because of a farmer who is very educated is likely to get richer and improve their social livelihood status. That's why despite, knowing the harmful effects of tobacco cultivation educated farmers increase tobacco cultivation for getting higher income.

4.3.3 Contribution of annual income of the respondents on tobacco cultivation area

For the multiple regression, the contribution of annual income of the respondents for tobacco cultivation was measured by the testing the following null hypothesis;

“There is no contribution of respondents’ annual income on tobacco cultivation”.

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

- a. The contribution of the annual income was significant at 1% level (0.000).
- b. So, the null hypothesis could be rejected.
- c. The b-value of annual income was (0.490). So, it can be stated that as annual income increased by one unit, farmers’ tobacco cultivation increased by 0.490 units. Considering the effects of all other predictors are held constant.

Multiple regression showed that annual income of the farmers tremendously has a positive contribution for tobacco cultivation. This implies that with the increase of annual income will also increase the tobacco cultivation area of the farmers. It may be because of with the earning more income by tobacco leads farmers to cultivate tobacco on more lands. Although most of the farmers were well known about the harmful effects of tobacco cultivation, they only care about the profits and income they can manage.

4.3.4 Contribution of agent contact of the respondents on tobacco cultivation area

For the multiple regression, the contribution of agent contact of the respondents for tobacco cultivation was measured by the testing the following hypothesis;

“There is no contribution of respondents’ agent contact on tobacco cultivation”.

The following observations were made on the basis of the value of the concerned variable of the study under consideration.

- a. The contribution of the agent contact was significant at 1% level (0.003).
- b. So, the null hypothesis could be rejected.
- c. The b-value of agent contact was (0.284). So, it can be stated that as agent contact increased by one unit, tobacco cultivation increased by 0.284 units. Considering the effects of all other predictors are held constant.

Multiple regression showed that agent contact of the farmers has a positive contribution for tobacco cultivation. This implies that with the increase of agent contact will also increase farmers’ tobacco cultivation area. It may be because of tobacco companies’ agents have a strong influence on farmers as they provide essential technical supports regarding tobacco cultivation. Also companies’ agents maintain more contacts with large tobacco farmers providing them with seeds, fertilizers, insecticides and financial supports which directly motivate farmers to cultivate more tobacco.

4.3.5 Contribution of family labor of the respondents on tobacco cultivation area

For the multiple regression, the contribution of family labor of the respondents for tobacco cultivation was measured by the testing the following null hypothesis;

“There is no contribution of respondents’ family labor on tobacco cultivation”.

The following observation were made on the basis of the value of the concerned variable of the study under consideration.

- a. The contribution of the family labor was significant at 5% level (0.019).
- b. So, the null hypothesis could be rejected.

- c. The b-value of family labor was (0.196). So, it can be stated that as family labor increased by one unit, farmers' cultivation of tobacco increased by 0.196 units. Considering the effects of all other predictors are held constant.

The analysis showed that family labor of the farmers brings a positive contribution to the tobacco cultivation. This implies that with the increase of family labor of the farmers will also increase the tobacco cultivation. It may be because of tobacco cultivation is a laborious work to do and family labor can give a huge support with no labor cost. Also during the curing of tobacco leaves family labor often works all day long without any cost which is efficient for any tobacco farmer. Therefore, more family labor support leads a farmer to cultivate more tobacco.

CHAPTER V

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This Chapter represents summary of findings, conclusions and recommendations of the study.

5.1 Summary of the findings

Data were collected from 106 randomly selected respondents of three selected villages of Baruipara and Kistopur union under Mirpur upazilla of Kushtia district. Data were collected by using interview schedule from the farmers during September 12 to October 3, 2018. Multiple linear regression analysis was used to explore relationship between the concerned variables. The major findings of the study are summarized below:

5.1.1 Selected individual characteristics of the respondents

Age

Age of the respondents ranged from 20 to 60 with a mean of 39.04 and standard deviation of 7.14. Majority of the farmers 64.2% were middle aged, 29.2% were young and 6.6% were old aged.

Education

The level of education score of the respondents ranged from 0 to 12 with a mean of 2.81 and standard deviation of 2.84. The majority 44.4% of the farmers had primary education, 42.4% farmers can sign only, 9.4% had secondary education, 1.9% had higher secondary and only 1.9% farmers were illiterate.

Farm size

Farm size of the respondents ranged from 0.20 to 2.81 hectors with a mean of 0.64 and standard deviation of 0.46. Highest proportion 84.9% had small farm size, 14.2% had medium, and only 0.90% were marginal farmers.

Annual income

Annual income of the respondents ranged from 97 to 493 thousand taka with a mean of 246.51 thousand taka and standard deviation of 78.43. The majority 67% of the farmers had medium income, 28.3% had low income and only 4.7% had high annual income.

Tobacco cultivation experience

Tobacco cultivation experience of the respondents ranged from 3 to 40 years with a mean of 20.92 and standard deviation of 7.34. The majority 63.21% of the farmers had medium experience, 23.58% had high experience and 13.21% of the farmers had low tobacco cultivation experience.

Family labor

The family labor of the respondents ranged from 2 to 11 persons with a mean of 4.08 and standard deviation of 1.74. The highest proportion 55.7% of the farmers use medium family labor compared to 41.5% use low family labor and 2.8% of the farmers use high family labor.

Time spent in tobacco farming

Time spent in tobacco farming of the respondents ranged from 21 to 63 hours per week with an average of 53.29 and standard deviation of 8.39. The majority 75.47% of the farmers spent high time compared to 23.59% of the farmers spent medium time and only 0.94% of the farmers spent low time in tobacco cultivation.

Profitability

Profitability of tobacco cultivation by the respondents ranged from 1.20 to 2.70 with a mean 1.73 and standard deviation of 0.23. The majority 75.47% of the respondents had medium profitability, 17.93% had low profit and only 6.60% of the respondents had high profitability.

Agent contact

Agent contact of the respondents ranged from 0 to 70 times per season with an average 34.61 and standard deviation of 19.60. The majority 50% of the respondents had medium agent contact, 28.30% had high agent contact, 17.93% had no agent contact and only 3.77% of the respondents had low agent contact.

Input availability

Input availability score was set ranged from 0-3 score basis. Majority 94.3% of the respondents informed that input materials for tobacco cultivation was highly available and only 5.7% told that input was moderately available.

Level of pest infestation

Level of pest infestation score was set ranged from 1-4 score basis. The majority 45.3% of the respondents had medium pest infestation, 35.8% had low infestation, 12.3% had very low infestation and only 6.6% of the respondents had high level of pest infestation.

Market security

Market security of tobacco score set ranged from 1-3 score basis. Highest proportion 90.6% of the respondents agreed that tobacco has a high market security and only 9.4% told that tobacco has a medium market security.

Tobacco cultivation area

Tobacco cultivation area of the respondents ranged from 0.20 to 0.87 hectares of land with a mean 0.42 and standard deviation of 0.11. The majority 61.32% of the respondents had medium tobacco cultivation area, 33.02% had small tobacco cultivation area and only 5.66% of the respondents had large tobacco cultivation area.

5.1.2 Contribution of respondents' personal characteristics on tobacco cultivation area

There is a significant contribution of respondents' age, education, annual income, Family labor and agent contact on tobacco cultivation. Of these, age, education, annual income and agent contact were the most important contributing factor (significant at 1% level of significance) while family labor was also contribute (significant at 5% level of significance). Farm size was also a contributing factors (significant at the 10% level of significance).

Sixty one percent (61.4%) value of R^2 ($R^2 = 0.614$) of the variation in the respondents' tobacco cultivation area can be endorsed on their age, education, annual income, family labor and agent

contact which generating this as an excellent model. The F value indicates that the model is significant ($p < 0.000$).

5.2 Conclusions

“A conclusion presents the statements based on major findings of the study and these statements mostly confirm to the objectives of the research in the shortest form. It presents the direct answers of the research objectives, or it relates to the hypothesis” (Labon and Schefter, 1990).

Findings of this study and the rational interpretation of other pertinent facts driven the researcher to draw the following conclusions:

1. Regarding area coverage by tobacco cultivation, two third of the farmers are in medium to large group. Therefore, initiative is necessary to bring most of the farmers under small group category.
2. Age had a positive and significant contribution on their tobacco cultivation. Therefore, it may be concluded that higher the age of the farmers more the cultivation of tobacco. Therefore, it may be concluded that older farmers are more interested than the younger regarding increasing area under tobacco cultivation.
3. Education had a positive and significant contribution on their tobacco cultivation area. Therefore, it may be concluded that more the level of education of the farmers more the cultivation of tobacco. It may be because of educated farmers want to improve their livelihood by earning much money as they believe that tobacco cultivation brings hard cash within a short period of time.
4. Annual family income of the farmers had a positive and significant contribution on their tobacco cultivation area. Therefore, it may be concluded that more level of annual income of the farmers more the cultivation of tobacco. It may be because of more cultivation of tobacco brings more income of farmers.

5. Family labor of the tobacco farmers had a positive and significant contribution on tobacco cultivation. Therefore, it may be concluded that more the family member of tobacco farmer more the cultivation of tobacco. It may be because of tobacco production is a laborious work to do and family labor give some better hand to do it so.
6. Agent contact by tobacco companies with the farmers had a positive and significant contribution on the tobacco cultivation. Therefore, It may be concluded that more the agent contact lead to more cultivation of tobacco. It may be because of agents from tobacco companies give some technical support and incentives to tobacco farmers for growing tobacco thus lead to more tobacco cultivation.

5.3 Recommendations

5.3.1 Recommendations for policy implications

Following recommendations are made on the basis of understanding, surveillance and conclusion drawn from the findings of the study:

1. DAE personnel should take initiative to motivate more the older farmers to reduce their land use for tobacco cultivation.
2. As a large number of farmers had poor opportunity for education, arrangement should be made by the concerned authority to run more non-formal practical education and training to the farmers. This will help to expand their knowledge, skill, general abilities and outlook which enable them to judge the harmful effects of tobacco cultivation.
3. The government may develop strategies to support tobacco farmers to diversify or to switch to more profitable crops as an alternative of tobacco to improve the farmers' livelihood.

4. Family labor plays a vital role in tobacco cultivation. Farmers often try to involve family members to produce tobacco. This consequence has a direct health impact on family members including women and child. So, policy should be implemented to exclude women and child labor for tobacco cultivation and tobacco leaves curing.
5. The government should take initiative to increase tax on tobacco products.

5.3.2 Recommendations for further study

A small and limited research work cannot convey unique and universal information associated with determinants of tobacco cultivation. Further studies should be performed on related matters. On the basis of scope and limits of the contemporary study and observations prepared by the researcher, the subsequent recommendations are made for further study:

1. The study was conducted in only Kabarbaria, Chuniapara and Kistopur villages of Baruipara and Phulbaria union of Mirpur upazilla of Kushtia district in Bangladesh. Similar studies should be conducted in other places to get a clear picture of the whole country which will be helpful for effective policy formulation.
2. Relationship of only twelve characteristics of the farmers were studied in this research, but there are so many characteristics which can influence the tobacco cultivation. Considering other important characteristics similar research should be conducted in future to explore relationship of other characteristics of the tobacco farmers in a more holistic view.
3. Tobacco farming imposes a great threat to health security of women and child. So, further study should be conducted in future by putting health security as an independent variable.
4. Since this study could not give conclusive results about the contribution of social demography to tobacco cultivation and previous research has shown that there are diametrically opposed views about the subject, more research needs to be undertaken

to determine the circumstances under which social demography can contribute to tobacco cultivation.

5. In the present study farm size, tobacco cultivation experience, time spent in tobacco cultivation, profitability, input availability, level of pest infestation and market security had no significant contribution on tobacco cultivation. In this connection, further verification is necessary.

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APPENDIX A

ENGLISH VERSION OF THE INTERVIEW SCHEDULE

DEPARTMENT OF AGRICULTURAL EXTENSION AND INFORMATION SYSTEM
SHER-E- BANGLA AGRICULTURAL UNIVERSITY
SHER-E- BANGLA NAGAR, DHAKA-1207.

INTERVIEW SCHEDULE FOR A RESEARCH STUDY ENTITLED **DETERMINANTS OF EXTENT OF TOBACCO CULTIVATION AREA IN KUSHTIA DISTRICT**

Serial No:

Respondent Name:

Village:

Union: Upazilla: District:

Please answer the following questions:

1. Age

What is your present age? Years

2. Education

Please mention your educational status

- a) Can't read and write:
- b) Can't read and write but can sign only:
- c) I have passed class:

3. Farm size

Please mention your farm size from the following:

Sl. No.	Types of land	Local unit	Hectare
1	Home and Homestead area		
2	Own land under own cultivation		
3	Own land given to others on lease system		
4	Land taken as lease system from others		
5	Own land given to others on barga		
6	Cultivated area taken from other on barga system		
	Total		

4. Annual income

Please mention the annual income of your family last year

Sl. No.	Sources of income	Total annual income (Taka)
1	Tobacco	
2	Rice	
3	Pulse crop	
4	Mustard	
5	Beetle leaf	
6	Vegetables	
7	Livestock/ Fisheries	
8.	Service	
9.	business	
10.	Day labor	
11.	Others	
	Total	

5. Tobacco cultivation experience

How long are you engaged in tobacco farming? _____ years

7. Family Labor

How many members of your family give labor support in tobacco cultivation?

a) Male:

b) Female:

Total:

8. Time spent in tobacco farming

How much time do you spend in tobacco cultivation? _____ hr/week

9. Profitability

Please mention the profitability of tobacco cultivation,

Benefit

Profit= _____ = _____ =

Cost

10. Contact with agent

How many times did you contact with the agent last season? _____ times/season

11. Input availability

What extent available of tobacco cultivation inputs?

- a) Not available b) Less available c) Moderately available d) Highly available

12. Level of pest infestation

What extent pest affect tobacco cultivation?

- a) Very low b) Low c) Medium d) High

13. Market security

Please mention the level of market security of selling tobacco -

- a) Low b) Medium c) High

14. Tobacco cultivation area

How much area you cultivated tobacco in 2016? _____ local unit
= _____ hectare

How much area you cultivated tobacco in 2017? _____ local unit
= _____ hectare

Tobacco cultivation area =
$$\frac{\text{Area used in 2016} + \text{Area used in 2017}}{2}$$
 =

Thank you for your kind co-operation,

Signature of the interviewer
Date: