Original Research Article

Economics of Women Involvement in Pineapple Production in Moulvibazar District, Bangladesh: Household Income and Decision Making Perspective

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ABSTRACT

Aims: The research was aimed to assess the economic involvement of female workers in pineapple production and their perception of household income and decision-making perspective in some selected areas of Moulvibazar district, Bangladesh.

Study Design: This article is about determining the female workers' contribution to household income and is placed on empirical analysis. It estimated the income and decision-making power of female pineapple workers at the household level.

Place and Duration of Study: The study was carried out in the Sreemangal Upazila of Moulvibazar district of Bangladesh including three villages i.e. Mohajirabad, Doulochora, and Radhanagar as the female participation in pineapple work is comparatively high. The study period was the production period of pineapple from June to September 2020.

Methodology: Simple random sampling was used to choose 200 respondents. Face-to-face interviews with pineapple female workers generated primary data, which was obtained using structured questionnaires. The socio-economic profile of the sampled respondent was determined using descriptive methods. To estimate the female worker's contribution to family income and their perception of household decision-making, the income-expenditure model and 5-point Likert scale were applied.

Results: The outcome of the research appeared that most of the respondents were belong to an active working group and the average age of the sample respondents was approximately 40 years while the average family size was 6.37. The findings of the study showed that 82.5% were married and 56.5% had no formal education and almost 80.5% of sample respondents were only engaged in pineapple production. The sources of annual family income are 35.76% of income come from female members of the households in which 26.64% where comes from only pineapple work sector and the average annual contribution of female pineapple workers in household income was Tk. 2,33,73.00.

Conclusion: It has been concluded that in the study area female workers had a significant role in the participation of household income and also the perception of female workers was largely accepted in the case of household expenditure, buying and selling family wealth, education of children, saving money, and receiving medical treatment.

Keywords: *Economics, Women Involvement, Pineapple Production, Household income, decision making, Moulvibazar district, Bangladesh.*

1. INTRODUCTION

Bangladesh is a developing country, where half of its total population is female. So, their participation in economic activities is important for their family's and country's social and

economic growth. In addition, the participation of the people, especially women, affects the speed of development in any country. Bangladesh is a traditional Muslim society where women have a domestic status. Women have long been stereotyped as obedient daughters, contented wives, and reliant mothers. However, according to a recent labor force study done by the Bangladesh Bureau of Statistics, women's engagement in economic activities is rising tremendously (BBS, 2020). Women's vulnerability is highlighted by a World Bank study in Bangladesh, which illustrates their minor role in family decision-making, restricted access to and command over household resources (health and financial), low amounts of available resources, household work stress, lack of mobility, and insufficient experience and expertise (Sebstad and Cohen, 2000). They play a significant role in animal rearing, seed production, post-harvest handling, fisheries, energy and family management, and natural ecology preservation (Anon, 1995). Rural women are undervalued in development efforts, despite their significant contribution to food production and household well-being (Murshid and Yasmeen, 2004). However, Bangladesh is on the path of removing all types of obstacles to women's development by improving various facilities and at the same time, the participation of females in different working activities is remarkable nowadays. So, research in this field is very crucial to develop new knowledge about female contribution and the actual situation of women empowerment in the recent era. Agriculture is the Bangladeshi economy's single largest producing sector, accounting for 17 percent of total GDP this sector generated 47% of the entire workforce. As a result, agriculture plays a crucial role and is regarded as the most important economic sector (BBS, 2020). The participation of females in pineapple production is on an average of 30% (approximately) but their contribution is not highlighted like as male workers (BBS, 2014).

Pineapple is becoming a major manufacturing product in numerous countries, and global demand for pineapple is rising rapidly. The fruit's scientific binomial name, *Ananas Comosus*, is derived from the word Tupinanas, which means "excellent fruit." It is a very popular fruit in Bangladesh, especially during the rainy season, because of its significant nutritional and economic benefits. It is one of the world's most influential commercial fruit crops. Thailand is the world's top pineapple producer, representing for of worldwide production, after by Brazil and Costa Rica (Baruwa, 2013). After bananas and citrus fruits, pineapple is the world's third most significant tropical fruit (Bartholomew *et al*., 2003).

Among all of Bangladesh’s minor crops, the pineapple is a prominent fruit crop. In Bangladesh, fruit production, notable pineapple, is continuously growing. According to a time-series study, pineapple is the fourth most important fruit in Bangladesh based on total growing yield per hectare (Hossain and Abdullah, 2015). Pineapples are commonly grown in Tangail, Chottagram, Rangamati, Dhaka, Bandarban, Sylhet, Khagrachari, Mymensingh, and Moulvibazar, among other districts in Bangladesh (BBS, 2020). The future of pineapple cultivation in Bangladesh is bright because, even though the fruit is grown in roughly 90 countries around the world, pineapples from Bangladesh are much more moist and flavorful than those from other countries. These pineapples are assured to earn a lot of money in terms of exports whether they are properly managed and marketed (Golam, 2014). Pineapple has large amount of moisture, glucose, starch content, ascorbate, and dietary fiber. As a result, pineapple can be used as a food additive to help maintain optimum health (Hemalatha and Anbuselvi, 2013). Pineapple is high in potassium, calcium, carbs, vitamin C, moisture, a variety of nutrients, and dietary fiber that helps in digestion and the repair body weight a well good. A single pineapple provides more than 130 percent of the daily vitamin

needs for humans. Pineapple enhances eyesight, bone strength, dental hygiene, blood flow, and blood pressure regulation, as well as reduces cold and flu problems (Hossain and Abdulla, 2015).

Many studies have been conducted on women's involvement in family income and decision-making aspects from different country perspectives. For example, Saleemi and Kofol (2022) in their study on "Women's participation in household decisions and gender equality in children's education: Evidence from rural households in Pakistan", estimated due to changes in women's involvement in family matters, households' percentage of education expenditures spent on girls has changed which is about 12.6 percentage point higher proportion of expenditure than boys. Similarly, Pandey *et al*. (2021) explored the involvement of women as domestic decision-makers in India, they discovered that women's position in society is an important indication of a region's socio-economic progress. In addition, women's educational attainment and employment position were found to be the most important determinants of their empowerment and participation in decision-making in all aspects of household life. A study by Iji *et al*. (2021) indicated that 97.41% of women in their research did not rely primarily on their partners' earnings. 63.70 percent of women used all of the money they earned to care for their houses. As a result, the study indicated that women who work in small enterprises make a considerable contribution to home income and family happiness. Another similar finding incorporated by Sariyev *et al*. (2020) in Bhutan that was women did not lack considerable engagement in home decision-making, the assessments suggested that the relationship between women's participation in decision-making and dietary habits is non-linear. Furthermore, Awan *et al*. (2015) discovered that women's involvement in the formal and informal labor markets has attained significant national and worldwide significance. Moreover, Ismail *et al*. (2015) in their study in Nigeria found that women's availability to essential economic resources, such as land (as proprietors), limited labor-saving equipment, food-processing appliances, financing, and farming inventions, should be strengthened. Even though rural women play a prominent role in the sector, their contribution to agricultural productivity and rural development in Nigeria is woefully underappreciated.

Therefore, it is clear that female workers contain a significant portion of the total labor force but they get very limited working opportunities and are deprived in different ways. Despite their significant involvement to the household's income and well-being, they have minimal decision-making power. As a result, women's equal involvement in socio-economic operations is restricted due to a lack of ownership and control over production factors, which impedes the process of human advancement (Acharya, 2003).

Very limited studies have been conducted on women's participation in household income and decision-makings in the case of Bangladesh. For example, Roy *et al*. (2017) also measured the contribution of women to their household income, and analyze the pattern of women's participation in the decision-making process Mymensingh Sadar Upazila. According to their research, the average yearly contribution of female earnings is Tk. 42000 per year, or around 43.52 percent of total family earnings and women's decision-making is positively linked to participants' age, schooling, land size, earnings, and profession. A study by Hasan *et al*. (2010) analyzed the effect of pineapple production on pineapple growers' increasing income. Their research looks into the link between respondent's chosen attributes and the higher-income from the unit of area. Moreover, in her study of the effects of

determinants on women's independence and decision-making power inside the household in rural areas, Sultana (2010) found that men have more power in making family decisions simply because they are men; women are normally expected to follow out commands. She further noted that many believe male dominance is a natural state of things, which means that society has made men dominant, and that men must work to support their families, whereas women are completely helpless in practically every sector and are completely reliant on men.

The above reviews and discussion indicated that there were a large number of studies conducted on women's financial contribution and participation in household decision-making. Only a little research on female laborers' engagement in pineapple production, contribution to the economy, decision-making viewpoint have been undertaken, according to these literature evaluations. So, it is essential to conduct more studies that would be effective in assessing the economic contribution of females in the Moulvibazar district of Bangladesh. The research will help to identify and evaluating the nature and degree of female employees' contributions to home decision-making and family income. Thus, the overall objective was to estimate the female workers' involvement in household income and decision-making perspective in the Moulvibazar district, Bangladesh.

2. MATERIAL AND METHODS

2.1 Selection of the study area and sample

The study was used both descriptive and analytical methods. The study area was selected keeping in mind the objectives. The research was carried out in the Sreemangal Upazila of the Moulvibazar district of Bangladesh including three villages which are Mohajirabad, Doulochora, and Radhanagar as the female participation in pineapple work is comparatively high in these areas and the specific research analysis in this perspective is very scanty in this respective area of Bangladesh. Simple random sampling techniques were employed to choose 200 respondents from the survey area. Primary data were gathered by means of structured questionnaires through face-to-face interviews with pineapple female workers from June to September 2020. Obtained Information and data from questionnaires were coded and analyzed using SPSS software. The following analytical technique was used to estimate female workers' income contribution and household decision-making.

2.2 Analytical techniques

2.2.1 Estimation of female worker’s contribution to family income:

Annual income is defined as a respondent's and his or her family's total earnings from agricultural and non-agricultural (e.g., daily labor, business, corporation, etc.) sources over a year. The yearly salary was expressed in Taka (Rahman, 2013). The following equation was used to calculate income:

$$Y = \sum_{i=1}^{n} Ai + \sum_{i=1}^{n} Bi \cdots\cdots\cdots\cdots\cdots (i)$$

Where,

Y = Annual Income (Tk.)

Ai = Annual total income (male + female) from i^{th} activities

Bi = Annual total income (male + female) from i^{th} other activities

i = 1, 2, 3……..n

2.2.2 Estimation of expenditure:

$$E = Pai \sum_{i=1}^{n} Xi + Pbi \sum_{i=1}^{n} Yi \cdots\cdots\cdots\cdots\cdots (ii)$$

Where,

E = Expenditure

P_{ai} = Per unit price of with agricultural food product consumed (Tk. /Kg.)

X_i =Total amount of the i^{th} food product consumed (Kg.)

P_{bi} = per unit price of i^{th} non-food product consumed (Tk. /year)

Y_i = Total amount of i^{th} non-food product consumed (Kg.)

2.2.3 Dependency ratio:

The dependency ratio is the ratio of the total population to the earning members.

Dependency ratio = Total population/No. of income-earning members …….*(iii)*

2.2.4 Evaluating female perception in household decision-making:

A 5-point Likert Scale was used to assess the workers' perceptions of the household decision-making process. Only the favorable assessment against the 5-point scale was included in the ten statements. On a 5-point scale, each responder was asked to indicate how strongly they agree, disagree, neutralize, disagree, and strongly disagree with each statement. These responses were given weights of 5, 4, 3, 2, and 1 in favor and 1, 2, 3, 4, and 5 in opposition. The total score of the respondents was calculated by adding the weighted responses to each of the ten statements. When women were asked about their opinions on various alternatives, their contribution to income was taken into account. A participant's total score was calculated by adding the weights for responses to all ten statements. The Perception Index (which varied from 10 to 50) was used to determine each respondent's perception score using the following formula (Roy, 2009):

Perception index (PI) = 5×SA + 4×A + 3×N + 2× DA + 1×SDA (in favor)……*(iv)*

Where, total number of respondents (women) expressing their perception for the statement on household decision-making process as: SA = 'strongly agree'; A = 'agree'; N = 'neutral'; DA = 'disagree'; and SDA = 'strongly disagree'.

3. RESULTS AND DISCUSSION

3.1 Socio-economic characteristics of the respondents

The socio-economic information of the female workers is represented in Table 1. It is seen that the average household size of the respondent was 6.37 (whereas 50.8% of members were male and 49.2% were female). In terms of religion, most of the respondents in the study area were Muslim (64.50%) whereas Hindu and Buddhist were 33.0% and 2.5%, respectively. The majority of the female workers (89.0%) were middle age group between

the age group of 21 and 64 which is also considered an active and working group. 56.50% of the respondents were illiterate having no formal education whereas only 10.0% completed their secondary education. In the study area, most of the respondents were getting married in their earlier stage including 82.50% of married workers of which only 10.50% were single. A noticeable number of respondents lived in a nuclear family with their parents due to financial crises which are about 67.0%.

Table 1: Percentage distribution of the respondents by socio-economic characteristics-

Particulars	**Percentage**	**Particulars**	**Percentage**
Average Household Size (No.)	6.37 (Male: 50.8%; Female: 49.2%)		
Age categories		Pineapple work and livestock rearing	7
Below 20 years	10.5	**Marital status**	
21-64 years	89	Single	10.5
Above 65 years	0.5	Married	82.5
Religion		Divorced	3.0
Islam	64.5	Widow	4.0
Hindu	33.0	**Occupational experience**	
Buddhist	2.5	Below 20 years	80.5
Family Type		21 to 40 years	12.5
Joint family	33.0	Above 41 years	7
Nuclear family	67.0	**Annual household income**	
Literacy level		Below 1 Lakh	83.5
No formal education	56.5	1 Lakh to 2 Lakh	11.5
Primary	33.5	Above 2 Lakh	5
Secondary	10.0	**Annual household expenditure**	
Occupation status		<1.5Lakh	42.5
Pineapple work	80.5	1.5 Lakh to 2 Lakh	24
Pineapple work and poultry rearing	12.5	>2.5 Lakh	33.5

Source: Authors estimation, (2021)

Three types of income diversification were found in the study area, where 80.50% of respondents' income comes from work in a pineapple field whereas the other two types are related to poultry and livestock rearing along with pineapple field work. Approximately 83.50% of the respondent's annual income is below 1 lack only where the annual expenditure is below 1.5 lakh which means that their expenditure ratio is greater than their income (Table 1).

3.2 Female workers' contribution and sources of family income

The household income is a measure of the combined incomes of all people sharing a particular household or place of residence. Average annual incomes earned by the households are shown in Table 2. The average total annual incomes of the households were estimated at Tk. 87740.00. 26.64% of total income earns from pineapple work, 18.12% from labor selling, 7.41% from livestock rearing, and 3.97% from poultry rearing. From the results

below, we also found that agricultural labor has a greater contribution to income which is 28.29% and the lowest one is homestead farming which is 1.20%, respectively (Table 2). Roy *et al*. (2017) estimated that the average annual women's contribution to household income was Tk. 42000 per year which was about 43.52% of the total household income. Another similar finding illustrates by Sumy *et al*. (2020) about 52% of women earned BDT 12000-21000 per annum through small ruminant rearing which is relevant to the present study. Sawhill and Guyot (2020) found that middle-class incomes have risen only modestly in recent decades, and most of any gains in their incomes are the result of more women going to work and earning higher wages. The outcomes of this research are also consistent with the summarization drawn by Bertrand *et al.* (2015), and Budig *et al.* (2010) who discovered that contribution of women's in household income in occupied a significant place to ensure economic development.

Table 2: Sources of annual family income of sample households

Sources	**Amount (Tk.)**	**Percent of total annual income**
Agriculture		
Pineapple labor	23373	26.64
Agricultural labor	24824	28.29
Daily labor	15900	18.12
Homestead farming	1055	1.20
Poultry rearing	3482	3.97
Livestock rearing	6498	7.41
Non-farm		
Business	6379	7.27
Housemaid	3469	3.95
Shop worker	2760	3.15
Total	**87740**	**100**

Source: Authors estimation, (2021)

3.2.1 Annual income earned by family members:

According to the findings, women's participation in farm and non-farm activities, as well as numerous house decision-making activities, has a stronger impact. It's also worth noting that women's increased participation in farm and non-farm activities, as well as their fair contribution to family income, contribute to their reputation as competent decision-makers. The overall annual household income, as shown in Table 3, was Tk. 87,740.00. The respondents contributed Tk. 2,33,73.00, with the husband, other men and female family members were contributing Tk. 40,724.00, Tk. 15,637.00, and Tk. 8,006.00, respectively.

Table 3: Annual incomes earned by the family members

Family members	**Amount (Tk.)**
Respondents	23373
Husbands	40724
Other male members	15637
Other female members	8006
Total annual household income	87740

Source: Authors estimation, (2021)

3.2.2 Consumption pattern and yearly expenditure of households:

Household final consumption expenditure covers all purchases made by residents' households to meet their everyday needs: food, clothing, housing services (rent), energy, and transport, spending on health, leisure, and miscellaneous services. The findings of the study indicated that the distribution of expenditure on food and non-food categories that the expenditure was divided into nine categories of which were food, education, clothes, medical expenses, cattle rearing, poultry rearing, mobile expense, business expense, and house repairing expenses. The total annual average expenditure made by the households was estimated at Tk. 98088.20 in which expenditure on food items was highest including Tk. 62654.40 (63.88%) and the lowest one was house repairing cost Tk. 992.00 (1.01%) (Table 4). The research finding disclosed that poor people expend most of their incomes to fulfill their basic needs. If their income ever increases, they save it for future emergencies and a better future for their children.

Table 4: Annual household expenditure of different food and non-food items of the respondents

Items	Amount (Tk./Years)	Percent of total expenditure
Food	62654.4	63.88
Education	7152	7.29
Clothing	1021.5	1.04
Medicare	4734	4.83
Cattle rearing	15762	16.07
Poultry rearing	1203.6	1.23
Mobile expense	2596.2	2.64
Business expense	1972.5	2.01
House repairing cost	992	1.01
Total	98088.2	100

Source: Authors estimation, (2021)

3.2.3 Dependency ratio:

The dependency ratio compares the number of dependents aged zero to fourteen and over 65 to the total population aged 15 to 64. It expresses how many family members are financially reliant on the earnings of other members of the family.

Table 5: Dependency ratio of sample households

No. of households	200
No. of family members	1273
Average family members per household	6.35
Earning members	673
Average earning member per household	3.37
Dependency ratio	1.89

Source: Authors estimation, (2021)

From the above Table 5, the number of households is 200, while the total number of family members is 1273 and the average number of family members per household is 6.37 which is derived from dividing the total family member by the total number of households. The average earning member per household is 3.37 which is derived from dividing the total earning members by the total number of households.

3.3 Evaluating female perception in household decision-making:

A 5-point Likert scale technique was used to assess female perceptions of household income and decision-making, with ten statements added to measure perceptions (Table 6).

Table 6: Female perception in household decision-making

Sl. No.	Statements	Strongly agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly disagree (1)	Total
1	Household expenditure	99	55	46	0	0	200
2	Purchase and selling of family wealth	84	76	10	30	0	200
3	Family planning	34	66	62	38	0	200
4	Education of children	63	57	61	19	0	200
5	Saving of money	71	61	31	22	15	200
6	Mortgage of family property	23	29	14	24	110	200
7	Receiving credit	72	32	33	49	14	200
8	Involvement in other earning activities	33	95	13	41	18	200
9	Marriage of son/daughter	47	35	48	19	51	200
10	Taking medical treatment	76	45	24	16	39	200

Source: Authors estimation, (2021)

After computing each respondent's total score, a basis for selecting elements for the final scale had to be established. This research was carried out using the Likert scale analysis and discriminative power (DP) analysis methods.

Table 7: Computation of Discriminating Power (DP)

Items	Group	No. in group	Scale value					Weighted total (Q_1)	Weighted mean (Q_3)	DP = (Q_3- Q_1)
			5	4	3	2	1			
1.	High (top 25%) (Q_1)	50	19	15	16	0	0	203	4.06	0.22
	Low (bottom 25%) (Q_3)	50	26	12	12	0	0	214	4.28	

2.	High (top 25%) (Q_1)	50	12	36	0	2	0	208	4.16	0.84
	Low (bottom 25%) (Q_3)	50	50	0	0	0	0	250	5.00	
3.	High (top 25%) (Q_1)	50	12	0	3	18	17	122	2.44	1.12
	Low (bottom 25%) (Q_3)	50	2	24	24	0	0	178	3.56	
4.	High (top 25%) (Q_1)	50	20	19	5	6	0	203	4.06	0.44
	Low (bottom 25%) (Q_3)	50	25	25	0	0	0	225	4.50	
5.	High (top 25%) (Q_1)	50	4	15	12	4	15	139	2.78	1.72
	Low (bottom 25%) (Q_3)	50	25	25	0	0	0	225	4.50	
6.	High (top 25%) (Q_1)	50	0	0	0	0	50	250	5.00	-0.66
	Low (bottom 25%) (Q_3)	50	23	21	6	0	0	217	4.34	
7.	High (top 25%) (Q_1)	50	13	4	12	19	2	157	3.14	1.8
	Low (bottom 25%) (Q_3)	50	47	3	0	0	0	247	4.94	
8.	High (top 25%) (Q_1)	50	0	27	13	4	6	161	3.22	1.44
	Low (bottom 25%) (Q_3)	50	33	17	0	0	0	233	4.66	
9.	High (top 25%) (Q_1)	50	2	0	21	5	22	105	2.10	2.38
	Low (bottom 25%) (Q_3)	50	24	26	0	0	0	224	4.48	
10.	High (top 25%) (Q_1)	50	23	0	0	0	27	142	2.84	1.4
	Low (bottom 25%) (Q_3)	50	20	22	8	0	0	212	4.24	

Source: Authors estimation, (2021)

The present study explored that the female decision was taken in case of expenditure which is indicating a highly satisfying factor. From Table 7, it can be seen that the weighted total and weighted mean for the high (25 percent) were 203 and 4.06, respectively. For low (25 percent) weighted total and weighted mean were 214 and 4.28, respectively. After

calculation, it was depicted that the DP value was 0.22 meaning that in this statement female shows very less variation. In the case of purchasing and selling family wealth, education of children, saving of money, receiving credit, involvement in other earning activities of family members, and taking medical treatment female decision was considered and shows very low variation in decision making including 0.84, 0.44, 1.72, 1.8, 1.44 and 1.4 discriminative power, respectively. However, in the case of family planning, mortgage of property, and marriage of children female was given less priority in taking a decision and the value of discriminative power is 1.12, -0.66, and 2.38, respectively (Table 7). Roy *et al*. (2017) in their study found that women played an important role in deciding on post-harvest activities, managing manufacturing operations, marketing grains, keeping chickens, goats, and livestock, and procuring agricultural supplies, among other things. Another similar finding Sariyev *et al*. (2020) evaluated is that females are not completely excluded from home decision-making. Females' opinions are given slightly greater weight than men' in a few decision-making sectors, such as crops grown, food purchases, harvest utilization, and use of crop production money. Mahmud *et al*. (2017) also examined how non-farm sector growth has aided female labor force participation and educational attainment, as well as how women's decision-making roles in the home have improved through time. Furthermore, microcredit involvement is linked to females playing a larger role in household decision-making, especially in non-farm activities. Lassi *et al*. (2021) estimated that in Pakistan, over half of the women are not empowered and do not contribute to family decision-making. It was also discovered that women's living area, wealth index, schooling, and access to mainstream media are all linked to their empowerment. Our findings are supported by the other relevant studies of Widman (2012) and World Bank (2008), which included that bargaining and decision-making power of women's depends on their economic conditions and property rights.

4.0 SUMMARY AND CONCLUSION

Females are a very important part of any country's economic development. Without the involvement of women, proper development cannot be taken apart. Females are worked as fuel to speed up the wheel of development. Nowadays, women are working shoulder to shoulder with men and their participation is appreciated all over the world not only in developed countries but also in developing countries too. Instead of having different obstacles the participation of females in the study area is acknowledgeable and this satisfied the overall objective to examine the economics of women's involvement in pineapple production and their household decision-making perspective. The findings of the study revealed that most of the respondents belong to the active age group, family members were 6-10, most of the respondents were belong to the nuclear family, most of them engaged with pineapple work, and some engaged in rearing poultry and livestock and the involvement in the family earning was more than 40%. Females were also taking part in household decision-making perspectives. Female was given priority in case of household expenditure, purchase and selling of family wealth, education of children, saving of money, receiving credit, and taking medical treatment. So, in this context different non-government and government organizations should take some steps to ensure a fair wage rate, ensure proper medical treatment and provide training facilities in case of ensuring better performance of female workers in pineapple production.

ETHICAL APPROVAL

This article is original and incorporates unpublished content. The corresponding author certifies that all authors have read and accepted the article and that there are no ethical concerns.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors

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ACRONYMS, ABBREVIATONS

BBS : Bangladesh Bureau of Statistics
et al.: *Et al*ia (L.) and others
Etc. : Etcetei.e. : That is
Tk. : Taka (Bangladeshi Currency)
% : Percentage
BDT: Bangladeshi currency in Taka