

Contribution of Sugarcane Crop to the National Economy of Bangladesh

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ABSTRACT

A study was conducted to determine GDP contribution of sugarcane in the national economy of Bangladesh during the financial year 2003-2004. For the purpose of GDP calculation of sugarcane, secondary data were collected from BSRI, BSFIC, DAE, BBS, BB and DAM. In the present study to calculate GDP, considering 1995-96 as base year and uses GDP valuation at constant market price of the period 2003-2004. Bangladesh has produced goods and services valuation at constant market price of Tk. 2519680 million in the financial year 2003-2004, where the contribution of agriculture and forestry was at 16.85%. Primarily producers sell their sugarcane to the different users at farmgate price and then the final output (sugar and its by-product, seed, juice, gur, cattle feed and fuel) further value added when it is marketed to the consumer via dealer. The value added price of the goods and services of sugarcane crop was found at constant market price of Tk. 16863.52 million comes as GDP valuation to the national economy. Finally, the contribution of sugarcane crop to the national GDP was worked out at 0.67% out of which highest GDP contribution was earned by gur sector (0.39%) followed by sugar (0.15%), chewing and juice (0.04%), seed (0.03%), cattle feed and fuel (0.03%) and by-product (0.03%) respectively. On the other hand, GDP contribution of sugarcane economy was found highest in the gur production (57.35%) followed by sugar (22.61%), chewing and juice (6.25%), seed (4.95%), cattle feed and fuel (4.61%) and by-product (4.23%).

Key words : Contribution, sugarcane, sugar, gur, value added, GDP, national economy.

INTRODUCTION

Sugarcane is an important cash cum industrial crop of Bangladesh. Every year it occupies on an average 2.3 percent of the countries total cultivable land (BBS, 2004). Sugarcane ranks second among cash crops and third among the major field crops in the country. Bangladesh is producing on an average 6.8 MMT of sugarcane out of which 2.3 MMT are used by sugar mills to produce 0.20 to 0.21 MMT of sugar and 3.10 MMT to produce 0.30 MMT of gur and remaining 1.40 MMT for seed and chewing. Based on per capita consumption of 3 kg sugar and 3.66 kg gur (Total 5.8 kg sugar equivalent), the country's annual sugar and gur requirement are 0.39 and 0.48 MMT (assuming 130 million population) respectively. The country produces 0.15 to 0.21 MMT of white sugar in 15 sugar mills and 0.30 MMT of gur annually. Shortfall of sugar (0.18 to 0.24 MMT) is met from importation. Shortfall in gur (0.18 MMT) cannot be met from importation, because gur is not available in the international market (Kranti Associates, 1996). So there is a scope for increase in production of sugarcane, sugar, gur and its by-product through increasing

yield per unit area which is not only to meet up country's growing demand of sugar and gur but also increase national Gross Domestic Product (GDP). Besides these, sugarcane play an important role to develop infrastructure in rural areas, rural employment, income of the farm families, contribution to national exchequer, foreign exchange saving and value addition to the sugar, gur and as well as by-product industries. Though sugarcane plays a vital role in the economy but the contribution of individual sugarcane crop was not shown separately in the national economy and it is somehow included in agricultural sector as a whole and it is necessary to familiar with sugarcane scientists as well as policy makers. Earlier, World Bank ARMP consultant (Nagy and Alam, 2000) conducted an ex post rate of return analysis to estimate the internal rate of return (IRR) and foreign exchange savings to BSRI released all of sugarcane research and extension investment in Bangladesh. The IRR to the total investment in both sugarcane research and extension was calculated at 16% along with the foreign exchange savings of Tk. 4.0 billion can be considered an acceptable rate of return to sugarcane research and extension investment. The objective of the study was to find out GDP contribution of sugarcane in the national economy.

MATERIALS AND METHODS

The study was conducted considering the cropping year 2003-2004. For the purpose of GDP calculation of sugarcane, secondary data were collected from BSRI (2003), BSFIC (2004), BBS (2004), DAE (2004), DAM (2004) and BB (2005). In the present study to calculate sugarcane GDP, considering 1995-96 as base year and uses GDP of constant market price of the period 2003-2004. Bangladesh has produced goods and services valuation at constant market price of Tk. 2519880 million in the financial year 2003-04 where the contribution of agriculture and forestry was at 16.85% (BB, 2005).

Gross Domestic Product (GDP) Calculation

Generally, Gross Domestic Product (GDP) means total valuation of goods and services produced annually in a country. According to the W.H. Branson, there are two sides for GDP calculation. The income side of the accounts measures the factor incomes that earned by US workers in produced goods and services in the economy. On the product side, the flow of goods and services currently produced by workers is measured by expenditures of these goods and services by consumers, business and government (Branson, 1979). For calculating sugarcane GDP, we accounted the farm gate price of total production, value added price of sugarcane seed, sugar and its by-product, gur and juice production. It also contributes to the rural farm employment as well as countries national economy.

Value Addition and Final Output of Sugarcane Crop

Sugarcane producers of Bangladesh usually dispose their canes to millers, planters, juice extractors and gur manufacturers. These sugarcane added value to the final output in the form of sugar and its by-product, seeds, juice and gur. Further value is added when the final output is marketed to the consumers via dealers (distributors, wholesalers, retailers). Primarily producers sell their sugarcane to the different users at farmgate price and then their produced final output (sugar and its by-product, seeds, juice and gur)

further value added when it is marketed to the consumer via dealer (Figure 1). The value added price of the goods and services again converted as constant market price for GDP calculation.

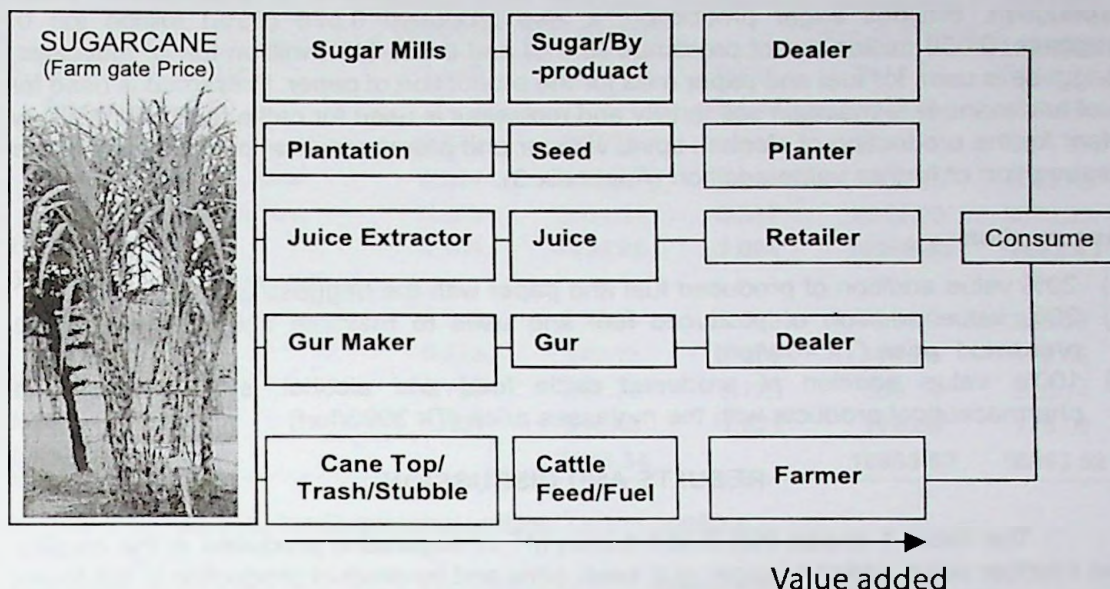


Figure 1. Value added and final output of sugarcane

Base Information for Calculating Sugarcane GDP (2003-2004)

Some base information are needed to calculate GDP contribution of sugarcane like as total GDP valuation in the year 2003-2004, contribution of agriculture in national GDP, total sugarcane cropped area, total sugarcane production, sugarcane crushing in the mills, sugar production, sugarcane use for gur production, sugarcane use for plantation as seed and sugarcane use for chewing and juice (Appendix 1).

Calculation of GDP Valuation of Sugarcane Top, Trash and Stubble and By-product of Sugar

According to C. N. Babu (1979) per 100 ton of sugarcane produces additional 25 ton of Top, trash and stubble. In the 2003-2004 financial year Bangladesh has produced 1.621 million tons of cattle feed and fuel from 6.484 million tons of sugarcane where contribution of top, trash and stubble were 32%, 23% and 45% respectively (Appendix 2).

Assumption

- 1) Tk 400/ ton of Top, trash and stubble
- 2) 20% value addition of produced cattle food and fuel with farm gate price.

By-product of Sugar

In the financial year 2003-2004, the country produced 6.484 million tons of sugarcane of which 1.643 million tons of sugarcane was used for 0.119 million ton sugar production. Besides sugar production, it also produced 0.575 (35%) million ton of baggase, 0.058 million ton of pressmud (3.5%) and 0.066 (4%) million ton of molasses. Baggase is used for fuel and paper mills for the production of paper. Pressmud is used for fuel and manure to maintain soil fertility and molasses is used for cattle feed and distillery plant for the production of alcohol, spirit, vinegar and pharmaceutical products with some assumption of further value addition (Appendix 3).

Assumption

- 1) 20% value addition of produced fuel and paper with the baggase price (Tk 400/ton)
- 2) 20% value addition of produced fuel and uses to maintain soil fertility with the pressmud price (Tk 400/ton)
- 3) 100% value addition of produced cattle feed and alcohol, spirit, vinegar and pharmaceutical products with the molasses price (Tk 3098/ton)

RESULTS AND DISCUSSION

The Table 1 shows that 6.484 million MT of sugarcane produced in the country and it further value added to sugar, gur, seed, juice and by-product production in the financial year 2003-2004. GDP valuation of sugarcane was calculated at Tk.16863.52 million, among them GDP earned from gur sub sector was the highest at Tk. 9672.23 million followed by Tk. 3812.67 million in sugar, Tk. 1053.65 million in chewing and juice, Tk. 834.1 million in seed and Tk. 712.78 million in by-product (baggase, molasses and pressmud) respectively. It also produced 1.621 million MT of cane top, trash and stubble for the valuation of Tk.778.09 million which was consumed by the farmers as fuel and cattle feed. The farm gate price of the crop is Tk. 9003.34 million but the value added constant market price stands to Tk. 16863.52 million which was regarded as GDP valuation of sugarcane in the respective year. Thus, the following method to be used for find out contribution of sugarcane crop to the national GDP.

Table 1. GDP Valuation (Taka) of Sugarcane in the Financial Year 2003-04.

Sugarcane	Quantity of Sugarcane for different uses (Million MT)	Total Farm gate Price of Sugarcane (Tk. in million)	Production (Million MT)	Value Added Constant Market Price (Tk. in million)	GDP Valuation at Constant Market Price (Tk. in million)
A. Supply to the Mills	1.643	1936.85	0.119	3812.67	3812.67
By-product	-	-	0.699	712.78	712.78
Plantation as seed	0.648	799.35	0.648	834.10	834.10
Use for Chewing, Juice	0.324	434.43	0.211	1053.65	1053.65
Use for Gur Production	3.869	5184.31	0.387	9672.23	9672.23
Total	6.484	8354.94	2.064	16085.43	16085.43
B. Use for Cattle feed and Fuel					
Sugarcane Top	0.519	207.49	0.519	248.99	248.99
Trash	0.373	149.13	0.373	178.96	178.96
Stubble	0.729	291.78	0.729	350.14	350.14
Total	1.621	648.40	1.621	778.09	778.09
Total (A+B)		9003.34		16863.52	16863.52

i) Total GDP amount for Sugarcane (million Tk.) = 16863.52

ii) Contribution of Sugarcane to National GDP = $\frac{\text{Sugarcane GDP}}{\text{National GDP}} \times 100$
= $16863.52 \div 2519680 \times 100 = 0.67\%$

Finally, the contribution of sugarcane crop to the national GDP was worked out at 0.67%. Among them highest GDP contribution earned by gur sector (0.39%) followed by sugar (0.15%), chewing and juice (0.04%), seed (0.03%), cattle feed and fuel (0.03%) and by-product (0.03%) respectively in the national economy. On the other hand, GDP contribution to sugarcane economy was also found highest in the gur sector (57.35%) followed by sugar (22.61%), chewing and juice (6.25%), seed (4.95%), cattle feed and fuel (4.61%) and by-product (4.23%) respectively (Table 2).

Table 2. GDP Contribution to sugar and its by-product, seed, juice and gur in the Financial Year 2003-2004 of Sugarcane and National Economy.

Commodity	GDP Valuation at Constant Market Price (Tk. in million)	GDP Contribution to Sugarcane Economy (%)	GDP Contribution to National Economy (%)
Sugar	3812.67	22.61	0.15
By-Product	712.78	4.23	0.03
Seed	834.10	4.95	0.03
Chewing, Juice	1053.65	6.25	0.04
Gur	9672.23	57.35	0.39
Cattle feed/ Fuel	778.09	4.61	0.03
Total	16863.52	100.00	0.67

Contribution of agricultural GDP (including forestry) in 1999-2000 was Tk. 384250 million (18.75%) and in 2003-2004 was Tk. 434500 million (16.85%) (BB, 2005). It indicated that the contribution of agricultural GDP in terms of percentage is decreased but increased in valuation. This is because of GDP contribution of other sectors like industry, manufacture, service etc. is increasing at faster rate. In the financial year 1999-2000 GDP valuation of sugarcane was Tk. 15216.90 million (Rahman *et al.*, 2003) which was 0.74% of national GDP but in 2003-2004 financial year, GDP valuation of sugarcane was Tk. 16863.52 million which was 0.67% of national GDP. It is also indicated that though the contribution of sugarcane GDP in terms of percentage is decreased but increased in valuation. Though GDP contribution of sugarcane crop (0.67%) is less than 1%, still a significant figure in comparison to our huge national economy. GDP contribution may vary with the variation of area, yield, weather and price of sugarcane crop. Sugarcane production can be increased by better crop management, application of modern technology, new extension policy towards sugarcane price incentives to the sugarcane farmers and to invest a significant amount for sugarcane research. The increased amount of sugarcane production will also produce more sugar and gur for addition of GDP valuation of national economy.

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APPENDICES

Appendix 1. Base information for calculating sugarcane GDP (2003-2004).

Particulars	Indicators
A. General Information:	
a) Total GDP valuation at constant market price in the year 2003-04 (million Tk.)	2519680
b) Contribution of Agriculture in National GDP	16.85% including Forestry
c) Total Sugarcane Cropped Area (Ha)	163,497
d) Total Sugarcane Production (MT)	6,484,000
e) Sugarcane Crushing in the Mills (MT)	1,642,510
f) Sugarcane use for Gur Production (MT)	3,869,890
g) Sugarcane use for Plantation as Seed (MT)	648,400
h) Sugarcane use for Chewing and Juice (MT)	324,200
i) Total Sugar Production (MT)	119,146 (7.26%)*
j) Total Gur Production (MT)	386,989 (10%)*
B. Cattle Feed/Fuel Production:	
a) Total Sugarcane Top Production (MT)	518,720
b) Total Sugarcane Trash Production (MT)	372,830
c) Total Sugarcane Stubble Production (MT)	729,450
C. Farm gate Price of Sugarcane:	
a) Supply to the Mills Tk./ (MT)	1179
b) Plantation as Seed Tk./ (MT)	1233
c) Use for Chewing and Juice Tk./ (MT)	1340
d) Sale to the Gur Maker Tk./ (MT)	1206
e) Price of Cane Top, Trash, Stubble Tk./ (MT)	400

Source: BSFIC (2004), DAE (2004), BBS (2004), BB (2005) and DAM (2004)

* Recovery %

Appendix 2. Break up of sugarcane top, trash and stubble production and value added market price at constant market rate in the financial year 2003-2004.

Sugarcane Top, trash and stubble	Production (million MT)	Farm gate Price (million Tk.)	Production of Cattle feed and fuel (MMT)	Value Added Price (million Tk.)	GDP Valuation at Constant Market Price (million Tk.)
Top	0.519	207.49	0.519	248.99	248.99
Trash	0.373	149.13	0.373	178.96	178.96
Stubble	0.729	291.78	0.729	350.14	350.14
Total	1.621	648.40	1.621	778.09	778.09

Appendix 3. Break up of by-product (baggage, pressmud and molasses) of sugar and value added market price at constant market rate in the financial year 2003-2004.

By- product of Sugar	Production (million MT)	Farm gate Price (million Tk.)	Value Added Price (million Tk.)	GDP Valuation at Constant Market Price (million Tk.)
Baggase	0.575	230.00	276.00	276.00
Pressmud	0.058	23.20	27.84	27.84
Molasses	0.066	204.47	408.94	408.94
Total	0.699	457.67	712.78	712.78

Appendix 4. GLOSSARY

ARMP :	Agricultural Research Management Project
BB :	Bangladesh Bank
BBS :	Bangladesh Bureau of Statistics
BSFIC :	Bangladesh Sugar and Food Industries Corporation
BSRI :	Bangladesh Sugarcane Research Institute
DAE :	Department of Agricultural Extension
DAM :	Department of Agricultural Marketing
GDP :	Gross Domestic Products
Gur :	Another name Jaggery may be defined as the product obtained on concentrating the sweet juice of sugarcane/palm trees with or without prior purification of juices into a solid/semi solid state.
IRR :	Internal Rate of Return
MMT :	Million Metric Ton
MT :	Metric Ton
Tk. :	Taka (Bangladesh currency) 1 US\$ = 67 Tk.