

Annex I

Macroeconomic Impact of Flood in Bangladesh: Assessment and Recommendations¹

1. Introduction and Background

Floods are the source of immense miseries and cause huge damage to assets and livelihood in an agro-based country like Bangladesh. Given the vulnerability of the economy, devastation and frequency of floods in Bangladesh, it is essential to examine the macroeconomic impact of flood in Bangladesh. Thus, the purpose of this note is to review the macroeconomic impact of flood in Bangladesh and to draw lessons regarding the possible role of fiscal and monetary authorities in addressing the adverse effects of flood.

This note is organized as follows. Section-1 provides an introduction and background of floods in Bangladesh. Section-2 through section-5 provide information about macroeconomic impacts of flood, some key features of recent floods, macroeconomic impact of 1998 flood, macroeconomic impact of 2004 flood and finally section-6 contains conclusion and policy recommendations.

2. Macroeconomic Impact of Flood

The macroeconomic impact of flood works through the linkages that exist among the macroeconomic variables. The immediate impact due to flood are loss of human lives, livestock and poultry; damages and destruction of standing crop and vegetation; infrastructure such as housing, school, roads, industries etc. Flood may have negative impact on Gross Domestic Product (GDP), inflation, budget deficit, exports, foreign exchange reserves and on overall balance of payments, which are shown in Table 2.

3. Some Key Features of Recent Floods

In terms of inundated area, duration of flood,

number of persons affected by the flood and the number of human lives lost, the recent flood starting from mid-July 2004 was less severe than the previous two floods of 1988 and 1998. However, the 2004 flood has caused much greater damage to the economy adjacent to major rivers. The flood of July-August 2004, has occurred mainly because of (i) continuous rainfall all over the country causing water level to rise, (ii) inadequate drainage system and (iii) unplanned urbanization that fail to release the rain-water immediately. A comparative picture

Table 1: Some Key Features of Recent Floods

Item	1988	1998	2004
Inundated area (In percent)	61	68	38
Duration of Flood (In days)	23	72	21
Persons affected by flood (In million)	45	31	30
Total deaths (persons)	2335	918	329
Loss of income/assets (In billion US \$)	0.3	2.0	2.2

Sources: 1) A paper on "Macroeconomic Impacts of Flood in Bangladesh" jointly prepared by Dr. Q. M. Ahmed, Dr. M. I. Hossain and Dr. B. H. Khondker of Planning Commission, Bangladesh. 2) Draft Aide Memoire, Joint Asian Development Bank and World Bank Mission, September 12-27, 2004.

of the recent floods can be observed at Table-1.

4. Macroeconomic Impact of 1998 Flood

The immediate and most visible impact of flood is on the economy's output which has direct as well as indirect effects. The direct effect results from the direct loss of output in agriculture, industry as well as service sectors during the

¹ An initial version of this paper was prepared by Dr. Q. M. Ahmed (Member, GED and team leader), Dr. M. I. Hossain and Dr. B. H. Khondker of Planning Commission, Bangladesh. The paper was then substantially revised by Mahfuza Akther, Joint Director (Research) and Dr. Md. Habibur Rahman, Joint Director (Research) with guidance from Dr. Sahabuddin M. Hossain, Adviser to Governor and Mr. Habibullah Bahar, Economic Adviser of Bangladesh Bank. Among other things, this Annex includes Estimates of Asset and Output loss (Table 3) made by the World Bank and the Asian Development Bank, not presented in the original version. The views expressed in this report, however, are of the authors' own and do not necessarily reflect the views of the Bangladesh Bank.

flood period. On the other hand, the indirect effect of flood originates from the damage to capital stock, labour and intermediate materials.

The impact of flood on output creates a ripple effect throughout the economy. For example, the decline in income due to output loss affects Government's revenue through its effects on different sources of revenue. Decreased income exerts a negative impact on income-based taxes. The effect on commodity tax, such as Value Added Tax (VAT) depends on the price of taxable commodities and demand for them. The Government expenditure is likely to increase due to post-flood relief and rehabilitation works. On the other hand, Government's domestic borrowings may increase due to fall in revenue and increase in expenditure. Both the direct and indirect effect on output may have negative impact on output of exportable goods and the volume of exports. The demand for import may increase or decrease during the post flood period due mainly to relief and rehabilitation works, import of new machinery, spare parts, intermediate materials to replace flood damaged machineries and fall in real income in import-intensive export.

Foreign exchange reserves is likely to decrease due to relative movements of exports, imports as well as other factors, like inflow of workers' remittances and foreign capital. The impact of flood on output also has negative effects on price level. The loss of output puts an upward pressure on the prices of those commodities whose production suffered by the flood. The poverty situation may worsen because of increase in price of commodities which reduce purchasing power of the poor people as well as reduction in employment. The impact of 1998 flood (which occurred in FY 1999) on the major macroeconomic indicators is provided at the Table-2 where the actual outcome of FY 1999 and FY 1998 are compared with the estimated

Table 2: Macroeconomic Indicators (FY 98-99)

Item	FY 1998	FY 1999	
	Actual	Estimate	Actual
(Growth in %) GDP	5.2	3.3	4.9
Agriculture ^{1/}	3.2	-1.4	4.7
Manufacturing ^{2/}	8.5	6.3	3.2
Services	5.0	5.5	5.2
Inflation	8.7	8.0	7.1
In billion USD			
Exports (fob)	5.2	5.5	5.3
Imports (fob)	6.8	8.7	7.2
Foreign Exchange Reserves	1.7	1.7	1.5
Workers' Remittances	1.5	-	1.7
(As % of GDP)			
CA Balance	-1.1	-3.1	-0.1
Budget Balance (Including grant)	-2.1	-6.2	-3.2

Sources: 1) Annual Report-2001-02 and 2003-04 of Bangladesh Bank. 2) A paper on "Macroeconomic Impacts of Flood in Bangladesh" jointly prepared by Dr. Q. M. Ahmed, Dr. M. I. Hossain and Dr. B. H. Khondker of Planning Commission, Bangladesh. 1/= Agriculture includes agriculture, forestry and fishery 2/= manufacturing comprises large, medium and small scale manufacturing.

figures of respective years. The actual outcome of the various sector is much better than the conservative estimated figures mainly because of better performance in agriculture sector. It has been observed at Table-2 that:

- Actual growth rate of GDP was 4.9 percent in FY 1999 as compared to post-flood target growth of 3.3 percent due mainly to Government's remedial policies and programs of post-flood reconstruction.
- original projected growth rate for FY 1999 was 6.0 percent.

- Bumper production in agricultural sector during the post flood period helped to achieve the GDP growth of 4.9 percent in FY 1999. It is worthwhile to mention that the agriculture sector recorded a high growth of 4.7 percent
- against estimated negative growth of 1.4 percent in that year.

In manufacturing sector, both the large and small scale manufacturing industries suffered adversely. The manufacturing sector

experienced a growth of 3.2 percent in FY 1999 as compared to the estimated growth of 6.3 percent. In this sector, the small-scale industries experienced relatively higher losses. The growth of small scale manufacturing was 0.7 percent in FY 1999 as compared to 6.8 percent in FY 1998 due mainly to the damage of machineries and production/income losses, while the growth of large and medium scale manufacturing was 4.2 percent in FY 1999 as compared to 9.3 percent in FY 1998.

The service sector grew by 5.2 percent which was lower than the estimated growth rate of 5.5 percent of FY 1999.

In FY 1999, the actual outcomes of some other key macroeconomic indicators for example inflation, budget deficit, current account deficit are found to be better than expected. The inflation rate was 7.1 percent in FY 1999 was less than the 8.7 percent observed for FY 1998 and the post-flood estimates of 8.0 percent. Budget deficit and current account deficit have also been found to be lower than the post-flood estimates.

The information, provided in Table-2, regarding the major macroeconomic impact of the devastating flood of 1998 show that Bangladesh is successful in addressing the shocks due mainly to appropriate fiscal and monetary policies and inflow of foreign resources.

5. Macroeconomic Impact of 2004 Flood

The ultimate impact of flood in a particular fiscal year depends crucially on some key factors like i) loss of income and assets, ii) pace of reconstruction and rehabilitation of infrastructure and iii) overall economic management. The preliminary estimates of assets and output loss (Table-3) and simulated results of macroeconomic impact (Table-4) of 2004 flood are summarised as follows:

On the basis of preliminary estimates of GOB, ADB and WB the total loss (asset and output loss) due to July-August 2004 flood was USD2.2 billion equivalent to Taka 127.3 billion which is

3.8 percent of total GDP. Of this total loss, the asset loss is Taka 76.5 billion (USD 1.3 billion) which is 2.3 percent of GDP and output loss is Taka 50.8 billion (USD 0.9 billion) which is 1.5 percent of GDP.

The highest loss was in the agricultural sector amounting to Tk. 34.1 billion, which is 26.8 percent of the total loss, resulting from the significant reduction of growth in crop and horticulture.

The transport & infrastructure and the housing were the other largest sectors and the amount of their total losses stood at Tk. 30.3 billion and Tk. 27.0 billion which are 23.8 percent and 21.2 percent of total loss respectively.

On the basis of two sets of desired simulated outcome of macroeconomic impact, a good performance of agriculture sector (3.2 percent growth) based on satisfactory distribution of some key agricultural inputs like seeds, fertilizer, credit, etc. is expected.

- In particular expansion of poultry output will help maintain the high growth rate of agriculture.
- Fishing sector may experience high growth due to higher breed and growth of fish released from ponds to open water.

According to Government's Medium Term Macroeconomic Framework (MTMF) estimates, the growth of GDP is projected to 6 percent² for FY 05 which needs downward revision due to 2004 flood damages. Expected growth rate of GDP is 5-5.3 percent.

Impact on budget and current account deficit is also expected to be somewhat limited due mainly to reprioritization of Government expenditure, prudent management of revenue and expenditure components of budget.

- The possibility of a very sharp rise in general price level is also expected to be under control due to assumed sobering impact on food price

² The WB and IMF projected an overall GDP growth of around 5 percent for FY 05.

and hence general price level.

The estimates generated in scenario-1 and scenario-2 assumed that agriculture may register an increase of 3.2 percent in FY 05 as compared to 2.7 percent in FY 04. The overall growth for manufacturing sector is estimated to be 6.0 percent and 5.4 percent in scenario-1 and scenario-2 respectively as the suffering of

- small, medium and cottage industries due mainly to production loss and depletion of capacity.

Against the growth rate of 5.3 percent under scenario-1 relatively lower growth of 5.0 percent for FY 05 is estimated in the second scenario due mainly to assumed higher losses in manufacturing sector.

6. Conclusion and Policy Recommendations

The pre-flood positive trend in the major macroeconomic indicators, such as a comfortable foreign exchange reserves position (USD 2.7 billion), a modest inflation rate, budget deficit and a favorable outlook for agriculture growth as well as turnaround in industrial growth provide a good signal regarding the post flood economic situation. The loss of man-day caused by the deaths or diseases affected by the flood 2004 was less severe than the 1988 and 1998 floods due mainly to relatively short duration of flood and lower percentage of inundated area.

The policy responses to disastrous floods can be framed into two phases: first- policies to reduce the impact of floods and second- policies to bring the economy back on track during the post-flood period. Policies to accelerate the post-flood adjustment, as recommended in the original paper, are given below:

Reconstruction and rehabilitation of infrastructure damaged by the floods must get priority and special emphasis must be in place for faster implementation of those projects and

- programmes. A special cell may be established in the Planning Commission for quick disposal of infrastructure-related project and programmes.

Table 3: Preliminary Estimates of Assets and Output Loss due to July-August 2004 Flood

Item	Asset Loss(1)	Output Loss (*) (2)	Sub Total (1+2)	In % of Total
Housing	27.0		27.0	21.2
Transport & Infrastructure	20.0	10.3	30.3	23.8
BWDB's FCD/I Schemes	4.3		4.3	3.4
Water Supply, Sanitation and Urban municipalities	4.9		4.9	3.8
Educational Institutions	4.1		4.1	3.2
Agriculture, Livestock & Fisheries	10.1	24.0	34.1	26.8
Industry	3.8	5.5	9.3	7.3
Wholesale & Retail Trade		11.0	11.0	8.6
Power	1.6		1.6	1.3
Others	0.7	0.002	0.7	0.6
Total Loss (In billion Tk.)	76.5	50.8	127.3	100
Total Loss (In billion US \$)	1.3	0.9	2.2	
Percent of GDP (FY 04)	2.3	1.5	3.8	

Sources: Draft Aide Memoire, Joint Asian Development Bank and World Bank Mission, September 12-27, 2004.

(*) Output loss estimates are partial.

Table 4: Simulated Results of Macroeconomic Impact

Item	FY 04	FY 05	
		Scenario 1	Scenario 2
Growth In %			
GDP	5.5	5.3	5.0
Agriculture	2.7	3.2	3.2
Manufacturing	7.4	6.0	5.4
Services	5.7	5.8	5.5
Inflation	5.8	6.0	6.5
In billion USD			
Exports	7.6	7.2	7.1
Imports	9.8	10.6	10.4
Reserves	2.7	3.3	3.3
As % of GDP			
CA Balance	0.3	1.1	1.1
Budget Balance	-3.4	-4.5	-4.7

Source: 1) A paper on "Macroeconomic Impacts of Flood in Bangladesh" jointly prepared by Dr. Q. M. Ahmed, Dr. M. I. Hossain and DR. B. H. Khondker of Planning Commission, Bangladesh. 2) Annual Report, Bangladesh Bank.

The government has already revisited the components of the Annual Development Programme (ADP) of 2004-05 to reallocate resources from low priority activities to urgent rehabilitation works. Moreover the government has curtailed current expenditures to meet the twin objectives of mobilizing additional resources for rehabilitation works and containing the budget deficit.

Imposing a blanket moratorium on all domestically financed new projects may not be advisable. Rather a periodic review of projects may be made and new projects may be undertaken keeping the objectives of poverty reduction, reconstruction and rehabilitation of infrastructure and human resources development. Some projects included in the ADP of FY 05 in line with the objectives of I-PRSP may have to be protected.

The overall growth performance of the economy in FY 05 will depend crucially on the performance of crop and other sub-sectors of agriculture. In order to recoup the crop production losses through higher production in the post flood period, the strategy will be to ensure the availability of critical inputs such as, seeds, fertilizer, agricultural credit, power, diesel and equipment.

Like past floods, floods in 2004 occurred shortly before the lean season in the rural economy thus further exacerbating the economic condition of the poor and the vulnerable in the disaster-stricken areas. Work and wages in the rural areas become generally scarce and low respectively in the lean seasons and floods further squeeze the opportunities of income and livelihood for the poor in the flood-hit areas. The relief and rehabilitations measures by both the government and NGOs in the flood affected areas will have to sharpen their focus in respect of target groups as well as duration.

The poor people who are at the threshold of the poverty lines are usually the prime victims

of internal and external shocks. Therefore, these groups should be supported through a expanded provision of safety net programmes targeted to them. The currently envisaged food and cash support out of government resources may not be enough to cater to the need of the vulnerable groups of the flood-affected areas. There is thus the need to reallocate resources to safety net programmes through re-prioritization of projects and programmes.

- Moreover, if additional resources are available at low cost (grant and loan with low interest rate), the government may increase the current ADP size. These may help boost most needed aggregate demand.
- Along with public investment activities and consistent with the overall inflation target, cautious but moderately expansionary monetary policy may be pursued.
- The greater flow of credit obtained through a cautious expansionary monetary policy should ideally be distributed to farmers; owners of medium, small and cottage industries; and exporters.
- In the public sector, construction of all structures and facilities on floodplains should be controlled to mitigate damage done to capital stocks. A guide line for private sector in this regard may also be provided.

An in-house capacity within the government for undertaking rapid assessment of macroeconomic losses caused by natural calamities including floods should be created.

Annex II

Impact of Recent Oil Price Hike on the Bangladesh Economy¹

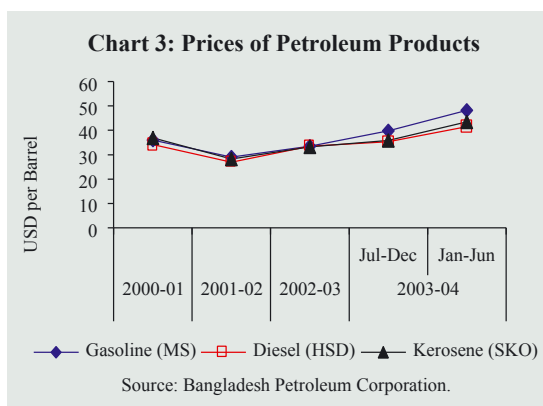
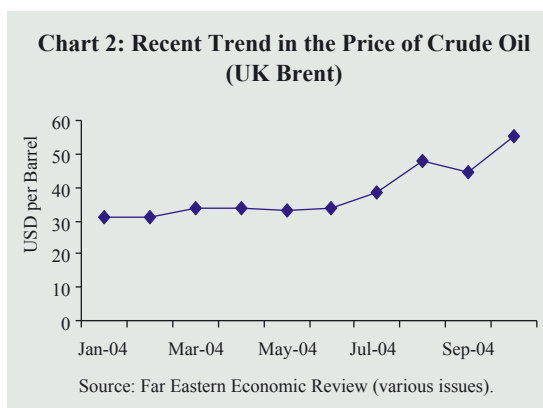
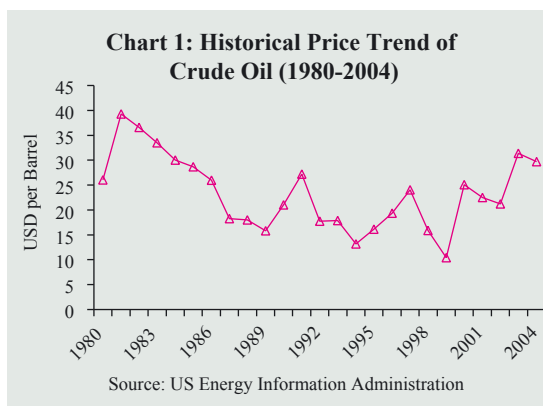
1. Introduction

An increase in the prices of oil leads to a transfer of income from the oil importing to the oil exporting countries through a shift in the terms of trade and is likely to have a net negative impact on world economic growth. In general oil price increase has an adverse macroeconomic impact on oil importing country affecting country's balance of payments, budgetary position, inflation and growth with the magnitudes determined by the extent of price increase and importance of oil in the consumption and imports of the country. Bangladesh being a net oil importing country is subject to direct as well as indirect negative impact of oil price increase resulting from decline in global growth and demand. The note briefly reviews the recent oil price hike and its macroeconomic impact on the Bangladesh economy.

2. Historical Trends and Recent Developments in the Prices of Crude Oil & Petroleum Products

Historically, the global economy has always experienced sharp slowdowns after rapid increase in oil prices. An oil price hike could be the result of various economic and political events, such as production cut resulting from cut in OPEC quota, regional conflict, spurt in demand and other factors like weather. Chart 1 shows historical movement in the price of oil. In real terms, however, oil price has not yet exceeded the level reached in early 1980's. However, recent trends indicate a steady rise in the nominal price of crude oil (UK Brent) during January-October 2004 hitting an all time high at USD 55 per barrel (Chart 2).

In line with the rise in crude oil prices, the prices of petroleum products also show an increasing trend during the period FY 02-FY 04 with a downturn observed during FY 01 (Chart 3).



¹ This annex is prepared by a team consisting of Dr. Md. Habibur Rahman, Joint Director (Research) and team leader, Md. Amir Hossain, Deputy Director (Statistics) and Md. Salim Al Mamun, Assistant Director (Research). The team is deeply indebted to Dr. Fakhruddin Ahmed, the Governor of Bangladesh Bank, for his overall guidance in designing the study. The team is also grateful to Dr. Sahabuddin M. Hossain, Adviser to the Governor and Mr. Habibullah Bahar, Economic Adviser of Bangladesh Bank for their detailed guidance, helpful suggestions and comments. The views expressed in this report are of the team's own and do not necessarily reflect the views of the Bangladesh Bank.

However, it appears that the product prices are subject to considerably less fluctuation than crude oil price.

3. Underlying Causes of Recent Oil Price Hike

Rapid expansion of the global economy has led to an unprecedented growth in the demand for oil playing a pivotal role in recent oil price hike. The main causes of the recent increasing trends in the prices of petroleum products include fears of OPEC supply cuts, concerns over tight US-energy stock, political tensions in the oil producing nations and middle-east crisis including Iraq war coincided with the growing demand for petroleum products from Asia particularly from China and India.

4. Sensitivity of Cost to Price and Volume Changes

Recently, the price of crude oil (UK Brent) stood nearly at USD 55 per barrel, which is around USD 25 higher than the average price of FY03. If this increase in the oil price persists and the consumption of oil in Bangladesh increases by 5 percent, the incremental amount of cost due to oil price hikes would be USD 689 million in FY05 (see lower part of Table-1). As a result, current account, overall balance of payments and international reserves position will face a decline by USD 689 million in FY05.

5. Impact on Balance of Payments

An oil-price increase changes the balance of trade and exchange rates between countries. Net oil-importing countries normally experience deterioration in their balance of payments through a shift in the terms of trade and a sharp depreciation in their domestic currencies. As a result, imports become more expensive and exports less valuable, leading to a drop in the international reserve position. Without a change in central bank and government policies, the demand for dollar-denominated international reserve assets grows and thus the domestic currency of the oil importing country tends to depreciate.

The external sector of Bangladesh's economy witnessed a healthy performance in FY04 registering a significant growth in both exports and imports. Continued growth in exports helped to keep the surplus in the current account of the

Table-1: Sensitivity of Incremental Cost (in million USD) to Volume and Price Changes

		Change in Volume⇒		
Movement in Price ↓		Static	-5%	-10%
Increase in Price per Barrel	USD (31.8+05)	135	128	121
	USD (31.8+10)	270	256	243
	USD (31.8+15)	404	384	364
	USD (31.8+20)	539	512	485
	USD (31.8+25)	674	659	606
	USD (31.8+30)	809	789	728

		Change in Volume⇒		
Movement in Price ↓		Static	5%	10%
Increase in Price per Barrel	USD (31.8+05)	135	141	148
	USD (31.8+10)	270	283	296
	USD (31.8+15)	404	424	445
	USD (31.8+20)	539	566	593
	USD (31.8+25)	674	689	741
	USD (31.8+30)	809	829	889

Note: Baseline volume and price (weighted average) are 26.95 million barrel and USD 31.8 per barrel respectively in FY03.

Table-2: Balance of Payments and Imports of Oil (In million USD)

Particulars	FY03	FY04	FY05 (Projected)
Trade Balance	-2,215	-2,319	-3,144
Export f.o.b. (including EPZ)	6,492	7,521	8,123
Of which: RMG	4,912	5,686	6,250
Import f.o.b. (including EPZ)	-8,707	-9,840	-11,267
Import (c.i.f.)	-9,658	-10,903	-12,394
Of which: Crude Petroleum	-267	-252	-273
POL	-620	-770	-675
Current Account Balance	176	176	-539
Overall Balance	815	171	412
Memorandum Items			
Gross Official Reserves	2,470	2,705	3,200
Export Growth	9.5	15.9	8.0
Import Growth (c.i.f.)	13.1	12.9	13.7
Growth in Import of Crude Petroleum	10.3	-2.6	5.0
Growth in Import of POL	28.9	3.7	5.0
Share of Crude Oil Import to Total Import (%)	2.8	2.4	2.2
Share of Refined Oil Import to Total Import (%)	6.4	5.9	5.4
Share of Oil Import to Total Import (%)	9.2	8.3	7.7

Source: Statistics Department, Bangladesh Bank.

crude as well as POL may contribute marginally to that current account deficit in FY 05 (Table-2).

6. Impact on Budget: Current Pricing Policy and Estimates of Tax/Subsidy

Currently Bangladesh is practicing administered (fixed) pricing policy. It has been shown that the profit margin in gasoline (MS) over import/border prices is estimated at 24.0 percent and the rate of losses in diesel and kerosene are 18.2 percent and 19.1 percent respectively over import/border prices in FY 04² (Table-3).

Tax(-)/subsidy(+) in percent GDP for gasoline, diesel and kerosene are -0.04, 0.24 and 0.06 respectively. Since there is no budgetary subsidy provided for this purpose, net loss known as economic subsidy on gasoline (MS), diesel (HSD), and kerosene (SKO) amounted to Tk. 8.7 billion (USD 148.3 million), which is around 0.3 percent of GDP in FY 04. Note that this figure does not include the losses on JET fuel, lubricant and crude oil because of international price hike and refinery inefficiency of crude oil in Bangladesh. If the current administered pricing policy continues with the projected increased price and demand for oil, an extra burden of economic subsidy amounted to USD 689 million will be added in FY 05.

7. Possible Impact on Inflation

Food prices in the international market showing an increasing trend in recent times that contributed significantly to the current upward movement in inflation in Bangladesh. Having a little weight (around 4 percent) of petroleum products in national CPI and because of administered pricing policy for petroleum products, recent oil price hike may not produce any significant direct impact on inflation in Bangladesh. Assuming that the increase in the international market price of oil fully passes on to the price of domestic market, it has been shown that incremental contribution to inflation due to increase in the crude and refined oil prices are estimated at around 0.8 and 0.9 percent respectively during FY 04. Besides, the incremental contributions to inflation due to increase in the

Table-3: Estimates of Economic Subsidy in FY 04

Particulars	Gasoline (MS)	Diesel (HSD)	Kerosene (SKO)
Current Retail Market Price (Tk. per liter)	33.0	20.0	20.0
Retail Import/B order Price (Tk. per liter)	26.6	24.5	24.7
Estimation of Subsidy			
Rate of Tax(-)/Economic Subsidy(+) in percent of Import/B order Price	-24.0	18.2	19.1
Import/B order Price in percent of Retail Price	80.7	122.3	123.7
Volume of Sales (in millions of liter)	201.8	1,799.4	425.9
Value of Sales at Current Price (in billion Tk.)	6.7	36.0	8.5
Value of Sales at Import/ Border Price (in billion Tk.)	5.4	44.0	10.5
Tax(-)/Economic Subsidy(+) (in billion Tk.)	-1.3	8.0	2.0
Memorandum Item			
Tax(-)/Economic Subsidy(+) in percent of GDP	-0.04	0.24	0.06

Sources: Bangladesh Petroleum Corporation (BPC), Annual Report 2002-03 of Bangladesh Bank and Hossain, Shahabuddin M (2003): IMF Working Paper (WP/03/42).

Table-4: Possible Impact on Inflation

Particulars	FY 03	FY 04	FY 05 ^P
Rate of Change in the Prices of Oil Products			
Crude Oil	21.4	17.4	20.0
Refined Oil	22.3	20.1	20.0
Average Price	21.9	18.9	20.0
Inflation Rate ^{1/} (CPI based)	4.4	5.8	6.5
Weight ^{2/} of Fuel & Lighting in CPI = 100	7.6	7.6	7.6
Of which Share ^{3/} of Petroleum Products 40%	3.0	3.0	3.0
Share of Petroleum Products in Current CPI	4.1	4.4	4.6
Contribution (in %) of Oil Price Hike in CPI Inflation			
Crude Oil	0.9	0.8	0.9
Of which Rural (70.89%)	3.1	4.1	4.6
Urban (29.11%)	1.3	1.7	1.9
Refined Oil	0.9	0.9	0.9
Of which Rural (70.89%)	2.9	3.1	3.3
Urban (29.11%)	1.2	1.3	1.3
Average Price	0.9	0.8	0.9
Of which Rural (70.89%)	0.6	0.5	0.7
Urban (29.11%)	0.3	0.2	0.3
Probable Rate of Inflation without Oil Price Hike ^{4/}	3.5	5.0	5.6

Sources: Bangladesh Petroleum Corporation (BPC), Bangladesh Bureau of Statistics (BBS) and Annual Report 2002-03 of Bangladesh Bank.

Notes: P = Projected; 1/ Period (yearly) average; 2/ Bangladesh Bureau of Statistics (BBS); 3/ BB Staff's estimates and 4/ Using average price of oil products.

² In estimating the economic tax/subsidy, the team has used a framework proposed by Hossain, Shahabuddin M. (2003): IMF Working Paper (WP/03/42).

average prices of oil are estimated at around 0.9 and 0.8 percent in FY 03 and FY 04 respectively. Therefore, the rates of inflation without oil price hike are estimated to 3.5 and 5.0 percent as compared to actual inflation of 4.4 and 5.8 percent during FY 03 and FY 04 respectively (Table-4). If the assumption of one to one relationship between international and domestic oil prices is relaxed and the possibility of substitution effect is considered, the real effect on inflation in Bangladesh would be far less than the above estimates.

An attempt has been made to calculate projected incremental contribution to inflation due to different magnitude of increases in the oil prices. Again, if the assumption of one to one relationship between international and domestic oil prices is imposed and the possibility of substitution is ignored, it could be observed that a USD 20 per barrel increase in the prices of crude and refined oil may contribute respectively 3.0 and 2.6 percent increase to the actual inflation in Bangladesh (Table-5). In practice, however, the prices of oil products in Bangladesh remained mostly fixed during each fiscal year regardless the prices in the international market and also there is some process of using alternative of petroleum products, such as natural gas. As a result, the direct impact of oil price hike on inflation in Bangladesh would be far less than the estimated amount shown. Nonetheless, the indirect impact of oil price hike on inflation in Bangladesh would be substantial and significant.

8. Possible Impact on Gross Domestic Product

Higher oil prices cause inflation, push interest rates up, increase input costs and reduce investment and output in net oil-importing countries. These effects are greater the more sudden and the more pronounced the price increase and are magnified by the impact of higher prices on consumer and business confidence due to increased inflation and production cost including transportation cost. Sharply higher oil prices affect an economy in two ways-a direct impact on the cost side as income is transferred to oil exporting countries through higher import payments and an indirect impact via overseas economies as the income of trading partner contracts.

Table-5: Projected Contribution to Inflation due to increase in the Prices of Oil

Price Increase	Crude	Refined	Average
\$5	0.8	0.7	0.7
\$10	1.5	1.3	1.4
\$15	2.3	2.0	2.1
\$20	3.0	2.6	2.8
\$25	3.8	3.3	3.4
\$30	4.5	3.9	4.1

Note : The baseline prices of crude, refined and average (weighted) were USD29.0, 33.4 and 31.8 respectively as recorded in FY 03.

investment, employment and income of the concerned economy.

Furthermore, an oil price hike generates excess demand for international reserves producing downward pressure on exchange rates, as import become more expensive and export become less valuable. As the income of trading partner contracts due to oil price hike, the amount of net

Table-6: Possible Impact on Gross Domestic Product (GDP)

Particulars	FY 01	FY 02	FY 03	FY 04 ^P
Real GDP Growth ^{1/}	5.4	4.4	5.3	5.5
Deviation from Baseline Growth for a \$5 per Barrel Permanent Increase in the Oil Price				
Real GDP Loss @	0.2	0.2	0.2	0.2
Real GDP ^{1/} (in billion Tk. and 1996 constant market price)	2,157.4	2,252.6	2,371.0	2,502.0
Real GDP Loss (in billion Tk.)	4.3	4.5	4.7	5.0
Real GDP (in billion Tk.) without 0.2% loss	2,161.7	2,257.1	2,375.7	2,507.0

Notes: ^{1/} Bangladesh Bank Annual Report; P= Provisional and@ = IMF Staff Paper (December 8, 2000) prepared by Research Department, IMF.

export for an oil importing country slumps further. Therefore, net impact on GDP due to an oil price surge would definitely be negative for an oil importing country like Bangladesh.

Bangladesh, as a net importer of oil, may be affected adversely due to high oil price in the international market. According to an estimate of the International Monetary Fund (Robinson et al. 2000), the real GDP loss for the developing countries is 0.2 percent due to a \$5 per barrel permanent increase in the oil price during the period FY01-FY04. Applying the same estimate for Bangladesh, it has been shown that real GDP losses stood at around Tk. 5.0 billion each year during the last few years. The amount of real GDP in Bangladesh without oil price hike, therefore, would be Tk. 2375.7 billion and Tk. 2507.0 billion as against actually achieved real GDP of Tk. 2371.0 billion and Tk. 2502.0 billion during FY 03 and FY 04 respectively (Table-6).

9. Lessons from Other Oil Importing Countries

The adverse economic impact of higher oil prices on oil-importing developing countries is generally more pronounced than for developed countries. It has been noted in a review of the International Energy Agency's (IEA) that the oil-importing developing countries are more vulnerable to oil price hikes because of their limited capability of switching quickly to alternative fuels, the price of which increase more slowly than those of oil products. The review also pointed out that an increase in the oil import bill tends to destabilize the trade balance and drives up inflation more in developing countries, where institutions responsible for economic management and investor confidence are more fragile. The deterioration in developing countries' terms of trade is often magnified by sharp currency devaluation, as capital flows slump.

Macroeconomic impact of oil shocks varies from country to country due to cross-country variations in socioeconomic infrastructures. Key overall policy lessons as noted by Robinson et al. (2000), however, are:

- In view of avoiding adverse inflationary consequences, monetary policy should not accommodate second-round impacts of oil price shocks.

- Greater flexibility of markets - in particular labor markets - can reduce the costs of an oil price hike on actively.

Exceptionally low oil prices may also produce undesirable results as it lead to reduced investment in oil exploration, refining capacity, and distribution systems, as well as energy-saving technology - potentially increasing subsequent price volatility and uncertainty if supplies of oil and refined products do not keep pace with rising demand.

10. Possible Policy Options

The above analysis indicates that an oil price increase has substantial negative impact on the balance of payments, fiscal, inflationary and growth outcome of Bangladesh. Adjustment measures/policies undertaken by the government and the private sector can mitigate the adverse macroeconomic impact. The policy options have tradeoffs. While contractionary monetary and fiscal policy may be necessary, overly contractionary policies to contain inflationary pressures could exacerbate the adverse income and unemployment effects. On the other hand, expansionary monetary and fiscal policies may simply delay the fall in real income necessitated by the increase in oil prices, stoke up inflationary pressures and worsen the impact of higher prices in the long run.

The estimates presented in the note indicate that although there is no budgetary subsidy for oil marketing, a net loss of about Tk. 8.7 billion (around 0.3 percent of GDP) incurred by the government as economic subsidy for keeping administered pricing policy for gasoline, diesel, and kerosene in FY04. At the same time, government is earning some tax revenues imposing relatively high tax margin on these oil products. In view of minimizing the adverse effect of oil price hike, therefore, following policy options may be considered:

Steps may be taken to partially pass on the rise in international prices of oil and oil products to the domestic market instead of maintaining perfectly administered (fixed) pricing policy. This will have one time inflationary impact but will improve the fiscal position of the government.

While adjusting prices, government may follow a suitable combination of tax reduction and price adjustment.

Follow a coordinated and somewhat tighter monetary policy while adjusting the prices to mitigate the inflationary consequences in future.

Allow exchange rate to depreciate somewhat to partly mitigate the adverse BOP impact.

To avoid large exchange rate adjustment, government can resort to additional foreign borrowing at concessional terms.

Encourage the use of petroleum substitutes (e.g., gas and in some cases coal) through appropriate tax-subsidy policies and market based instruments.

Encourage efficient use of petroleum fuels (e.g. by commissioning gas fired power generation) and discourage misuse of it.

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