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ENVIRONMENTAL FISCAL REFORMS IN BANGLADESH

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Development Context

Bangladesh has made tremendous progress with development since independence reflected in rising income, sharp reduction in poverty and improvements with human development. Evidence, however, suggests that along with these positive outcomes there has been a substantial deterioration in the natural environment. Fortunately, there is now a growing recognition of the environmental damage of continuing with the business-as-usual development strategy and the risks it poses to the sustainability of development. In response, the government has adopted a large array of strategies, laws, rules and regulations, and adaptation and mitigation programmes and projects. But the results on the ground suggest that the implementation of these policies has been weak. Inadequate strategic thinking along with financial and institutional constraints has limited the implementation effectiveness of the government's environmental protection strategy.

Addressing the financial and institutional constraints to better environmental management will take time and requires concerted efforts. A review of policies shows that the setting of standards, adopting laws, and defining rules and regulations—also known as command and control policies-- have been the focus of environmental management. Fiscal policy instruments constituting of incentive policies—taxes, subsidies, pricing – and public expenditure programmes-- have been weak or absent. Global experience shows that a combination of command and control policies with incentive policies are more likely to result in better environmental outcomes than the use of only command and control policies.

This paper examines the options for Bangladesh to use fiscal policy instruments to improve the environmental management.

Relevance of Environmental Fiscal Reforms (EFR) for Bangladesh

Environmental fiscal reform (EFR) refers to a range of taxation and pricing measures that raise fiscal revenues for priority programs while furthering environmental goals. EFR presents several advantages for Bangladesh. First, Bangladesh has a very low tax to GDP ratio; EFR can help raise public revenues. Second, the incidence of air and water pollution in Bangladesh is amongst the worst in the world. Environmental taxes and subsidies aimed at reducing air and water pollution can be very helpful in improving the environment. Third, Bangladesh has a track record of heavily subsidizing fuel oil with adverse fiscal and environmental consequences. Proper pricing of energy and publicly provided services that are intimately related to environmental protection can ensure the efficient use of these resources and reduce pollution. Finally, the inadequacy of revenues in Bangladesh is a huge constraint on public funding for critical growth-enhancing programs like infrastructure; for spending on health, education, water supply and social protection to support poverty reduction; and for funding major environmental

improvement programs. EFR revenues can be a major contributor to increasing priority public spending in these areas.

Three types of EFR instruments are relevant for Bangladesh: taxes on extraction of natural resources; prices and user fees for publicly-provided environmentally-related goods and services; and environmental taxes and charges.

Taxes on extraction of natural resources

In Bangladesh, the three main natural resources that are most used for production and consumption are: natural gas, fisheries and forestry resources.

(1) *Natural gas:* Owing to substantial underpricing of natural gas compared to economic cost, natural gas consumption has been highly inefficient and constrained domestic investment in gas extraction. Rapid depletion of natural gas has now led to a severe gas rationing, thereby causing production loses in manufacturing and growing reliance on carbon emitting fuel oil for power production.
(2) *Fisheries:* Regulatory policies for sustainable fishing have largely been ineffective. There is also no use of fiscal policy instruments in the form of auctioning of fishing rights, charges or fees. Additionally, the losses incurred to fishery resources from severe surface water pollution are largely unchecked due to inadequate efforts to control water pollution.
(3) *Forests*: Per capita forest cover fell by an annual average rate of 1.8% between 1990 and 2015. The government's policy response to use public investment for supporting reforestation has not succeeded to reverse the loss of forest cover owing to inadequate funding and continued tree felling.

Prices and user fees for environmentally sensitive public services

Sound management of energy services, water supply, sanitation and waste management has major implications for the environment. Prices of these goods and services are mostly set at below cost of production leading to under-provision, inefficient use, serious environmental damage, and contribute to under-funding of social services.

(1) Energy services: The primary rationale for subsidizing energy is to protect the poor. Research suggests that much of the oil subsidies go to the non-poor, that there are considerable adverse macroeconomic effects of these subsidies and related pricing policy, and the potential damage to the environment can be large.
(2) Pricing policy for municipal water supply: The government's pricing policy strategy is based on the logic that water is an essential commodity and must be subsidized. But even after 45 years of independence, only 12% of the population has access to piped water supply. The pricing policy is not premised on any empirical study that measures either willingness or

ability to pay. Most piped water supply goes to non-poor household and most poor household even in urban areas do not have access to piped water.

(3) *Pricing policy for sanitation services:* Wastewater management is a capital intensive activity. The amount of resources required for installing proper sewerage system for households and ensuring that these are properly collected and treated before disposal is large. A major reason for the poor wastewater management is the lack of resources. Some 43% of urban population and 34% of rural population have access to sanitary or water-sealed toilet facilities. Only Dhaka has some limited access to waste water treatment with coverage limited to 20% of the households.

(4) *Solid waste disposal service:* This is an essential service provided by urban local government institutions (LGIs). Evidence shows that the efficiency of waste collection, defined as the percentage of waste that is actually collected by municipalities and city corporations, varies considerably. Research shows that urban LGIs are heavily constrained by lack of finances.

Environmental taxes

(1) *Taxation of fossil fuel use:* This is the most commonly used environmental taxation globally. OECD countries in particular use this as the most important source of environmental taxation. In Bangladesh, there is a nominal value-added tax (VAT) on fuel products based on the taxation of imported oil. The effective tax rate as a share of average selling price amounts to 12.9% on petrol, 10.2% on diesel, 10.2% on kerosene and 15.7% on fuel oil. The VAT is a common tax levied on most products in Bangladesh. There is no additional excise tax on fuel oil in the form of a tax on carbon to discourage its use.

(2) *Taxation of industrial air pollution:* The government has taken several initiatives to combat industrial air pollution focused on the transport sector and the brick manufacturing. The most important reform is the enactment of the Brick Manufacture and Brick Kiln Installation Act in 2013. Yet implementation is slow. More generally, the rest of the industrial sector is left free to pollute the air including electricity generation, especially those units that run on furnace oil, diesel and coal. Importantly, there is no pollution charge for industrial emission either on output or inputs.

(3) *Taxation of industrial water pollution:* In order to control water pollution, the government has banned the use, production and marketing of polyethylene shopping bags and made it mandatory for industries to set up Effluent Treatment Plants (ETPs) to treat their waste before discharging to water bodies. The Department of Environment (DoE) takes legal action against violators including imposition of penalties. Although there no direct levies on water pollution, the imposition of penalties for water pollution is the first known example of the use of EFR in pollution management in Bangladesh.

Main Priorities for Environmental Fiscal Reforms in Bangladesh

In the current political environment economic pricing of gas and the taxation of fisheries are not feasible options. Barring these, the major EFR options are:

Pricing policies for water, sanitation and solid waste management

Given the estimated large health costs of air and water pollution in Bangladesh (1.4% - 3.75% of GNI), the health benefits of additional investment in piped water supply, hygienic and environmentally safe household sanitation and sound management of solid waste are huge. The public sector alone cannot handle the large service gap and private provision might be needed. Proper pricing policy is essential to mobilize revenues for LGIs and to stimulate private investment. The beneficiary pays principle should be the guiding criteria for setting prices. Presently, all these services are provided by the urban LGIs and 100% of the beneficiaries are the non-poor. Therefore, the long term goal of pricing policy should be recovery of full average cost of service including a reasonable rate of return on invested capital. Subsidised services can be provided to the poor living in urban slums through public spending programs.

Reform of fuel subsidy and pricing policy

In the first phase of the reforms, the adoption of an automatic pricing formula such that it covers all costs of production (import, refining, transport and depreciation) will be the way to go. This pricing policy should be administered by the Bangladesh Energy Regulatory Commission (BERC) without any government intervention. The elimination of fuel oil subsidy through proper pricing policy is a first step in a sequential reform program to reduce carbon emission from the use of fuel oil. This can be combined with the imposition of an excise duty on petrol and diesel that is in addition to the normal applicable VAT. The tax rate can be set in proportion to the carbon content. The tax rate can be increased when oil prices are low (as presently) and reduced when international oil prices go up. A similar approach is used in India.

Taxation of timber extraction

Bangladesh faces major challenges in forestry management, including serious administrative and governance issues. Along with improving forestry governance and intensifying reforestation efforts, there is a good case to consider the imposition of a tax on commercial timber. The wood furniture industry is doing well in Bangladesh and the demand for timber for both furniture and housing is growing. A timber tax can be an important source of government revenue and also support more sustainable timber extraction. The tax should be levied at the factory gate where logs enter for further processing so that all logging, legal or through poaching, are captured in the tax net.

Tax on industrial air pollution

The government policy to manage industrial air pollution through better technology should continue. Immediate efforts should be made to set air pollution standards for major polluting industries starting with Dhaka. Consideration should also be given to the use of pollution charges for heavily polluting industries. A pollution tax set appropriately would provide strong incentive to the polluting industry to adopt clean air technology in order to escape paying the tax. With limited administrative capacity and inadequate industry-specific air pollution measurement capabilities as presently, a tax on inputs might be the pragmatic way to proceed.

Expand the use of industrial water pollution charges

Unlike air pollution, Bangladesh has stronger competence in measuring water pollution resulting from waste water dumping into rivers or other water bodies by industries. Drawing on the positive experience with pollution charges in reducing water pollution from China, Netherlands, Colombia, Malaysia and Philippines, Bangladesh may want to implement a proper water pollution charge in addition to the current policies. These charges can be estimated pragmatically and varied over time to improve effectiveness.

Introduction of household illegal waste dumping charge

A major source of air and water pollution is the dumping of household wastes in water bodies and in neighborhoods. With improved solid waste management services from municipalities and private sector as discussed above, this endemic problem might be reduced. But this needs to be combined with educational campaigns, community initiatives and a charge on illegal waste dumping. A system of pollution charges for illegal disposal of household waste could be a very strong incentive to improve household cooperation and compliance.

Managing the Political Economy of EFR design and implementation

- A phased approach to the introduction of EFR will be the pragmatic way to proceed. This pragmatism should be driven both by considerations of implementation capacity constraints and by the need to secure buy-in of the business and households opposed to EFR. At the present time, oil pricing reform is the highest priority. The implementation of oil pricing reform can happen in a phased manner, with automatic full-cost pricing as a first step. Similarly, the application of the beneficiary pays principle to water, sewerage and sanitation should be done over several years, starting first with full recovery of operating costs and then phased increases over a number of years to achieve full cost recovery including a return on capital.
- The EFR reform implementation should be combined with public expenditure policy reform that allocates more resources to environmental programs and social protection. This

combined approach has much better prospects for political acceptability and better results on the ground than a simple tax or price increase through EFR.

- Importantly, Bangladesh adopted a comprehensive National Social Security Strategy (NSSS) in 2015. Implementation of the NSSS will greatly facilitate the adoption of EFR by addressing equity concerns through the NSSS.
- The opposition to EFR is often based on protection of vested interest with no necessary relationship with equity. A good example of this is the removal of oil subsidies. Evidence shows that the benefits of oil subsidy mostly accrue to the non-poor. On the contrary, by eating up budgetary resources the subsidy policy leads to an under-funding of social protection and poverty programs. An effective public communications campaign can play an important role here.
- International experience suggests that building coalition with stakeholders has immense benefits in terms of improving political acceptability of EFR. The natural coalition partners would be the environmentalist NGOs, enlightened business and trade communities, the intellectuals, the donor community and the media.
- Regarding the adoption of EFR, the most important institution is the Ministry of Finance (MoF). The MoF is well-organised and staffed to manage the adoption of EFR once there is political buy in at the highest level. It also has good partnership with several local research institutions that can support with EFR policy formulation. The main administrative challenge in implementing EFR comes from the weak technical capacity of the MoEF. The Forestry Department (FD) and the Department of Environment (DoE) in the MoEF are inadequately staffed, especially in the area of technical skills, and this is an urgent issue that needs to be addressed. Regarding the implementation of the beneficiary pays principle, the main institution where capacity building is necessary is the urban LGIs that provide water supply, sanitation and waste management services.

Environmental Fiscal Reforms in Bangladesh

A. Development Context

Bangladesh has witnessed a rapid development progress after independence, rising from the ruins of a war-ravaged economy. Per capita income grew from below $100 in 1972 to $1600 in 2017. Poverty incidence fell from around 80% in the early 1970s to around 24% in 2016. Broad-based progress in human development made Bangladesh a positive outlier when compared with countries with similar per capita income. Of special note is the progress in life expectancy that surged from a low of 46 years in 1974 to 72 Years in 2011, achievement of universal primary education, and gender empowerment. From being one of the poorest countries in the world in 1972, today Bangladesh is a lower middle income country under World Bank classification. It now aspires to attain upper middle income country status by 2031 and high income country status by 2041 (Government of Bangladesh 2018).

This envious development progress is no doubt a matter of great satisfaction to the Bangladeshi policy makers, but it has come at a price that is not always well recognized and adequately internalized in policy making in Bangladesh. Evidence suggests that along with these positive outcomes there has been a substantial deterioration in the natural environment (Ahmed 2017a). The importance of paying attention to environmental protection for long-term sustained growth and poverty reduction in developing countries is now well established (World Bank 2012). The relevance of this result has also been researched and illustrated for Bangladesh (Ahmed 2017b).

Fortunately, there is now a growing recognition in Bangladesh of the environmental damage of continuing with the business-as-usual development strategy and the risk it poses to the sustainability of development. Environmental activism has increased at the public fora and among policy makers. This activism has gained momentum since the global attention to climate change and the recognition in Bangladesh that the country is especially susceptible to the downside risks presented by the interaction of the climate change with geography and the ongoing environmental degradation. The preparation of the Bangladesh Delta Plan (BDP2100) by the government is a reflection of this concern and acceptance that sustained long-term efforts are needed to address the development risks presented by environmental degradation and climate change (Government of Bangladesh 2017a).

The increasing concern with environmental degradation and the risks of climate change has led the government to adopt a large array of strategies, laws, rules and regulations, and adaptation and mitigation programs and projects (Ahmed 2017a). But the results on the ground suggest that their implementation has been weak. One major problem of the past is the inadequate integration of environmental concerns in the national development strategies and the annual budgets. The Bangladesh Delta Plan and the Perspective Plan 2041 seeks to address this strategic gap. More fundamentally, the financial and institutional constraints have been paramount in limiting the effectiveness of the implementation of the government's environmental protection strategy.

Addressing the financial and institutional constraints to better environmental management will take time and requires concerted efforts. A review of policies shows that the setting of standards, adopting laws, and defining rules and regulations—also known as command and control policies-- have been the main focus of environmental management. Fiscal policy instruments constituting of incentive policies—taxes, subsidies, pricing – and public expenditure programmes-- have been weak or absent. A review of good practice global experience shows that a combination of command and control policies with incentive policies are more likely to result in better environmental outcomes than the use of only command and control policies.

The objective of this paper is to examine the possible options for Bangladesh to use fiscal policy to improve the environmental management through tax, subsidy and pricing policy incentives. Since Bangladesh does not have much experience with the use of fiscal policy instruments for environmental management, the paper reviews international experiences with environmental fiscal reforms (EFR) and relates them to the specific environmental and development context of Bangladesh. The application and relevance of those experiences are examined in the context of the political economy of Bangladesh and implementation capacity constraints.

Since EFR is a new idea in Bangladesh, there is no attempt in this paper to advocate any single instrument and how it might be designed for adoption as a specific reform. Instead, the paper provides the relevant policy options to start a debate and dialogue with the policy makers and the public at large. There is broad interest in both the Ministry of Finance and the General Economics Division of the Planning Commission on the subject as a means to inform their own thinking and analysis of the underlying policy issues. The analysis of the paper and its dissemination will hopefully lay the grounds for adoption of EFR at the highest political level. The analysis of this paper when linked to the development strategies articulated in the Bangladesh Development Plan and the Perspective Plan 2041 can be helpful in informing the political economy debate on policy options at the cabinet level and in the Parliament.

B. Rationale and Potential Role of Environmental Fiscal Reforms for Green Growth

According to OECD: "Environmental fiscal reform" (EFR) refers to a range of taxation and pricing measures which can raise fiscal revenues while furthering environmental goals. This includes taxes on natural resource exploitation or on pollution. EFR can directly address environmental problems that threaten the livelihoods and health of the poor. EFR can also free up economic resources or generate revenues that can help to finance access of the poor to water, sanitation and electricity services" (OECD, 2005). A similar definition is used by the World Bank in its report on environmental fiscal reforms (World Bank 2005). The definition provides some very good rationale for the adoption of EFR in Bangladesh. First, EFR can help raise public revenues. This is especially attractive for Bangladesh that has a very low tax to GDP ratio. Second, the incidence of air and water pollution in Bangladesh is amongst the worst in the world (Ahmed 2017). Environmental taxes and subsidies aimed at reducing air and water pollution can be very helpful in improving the environment. Third, Bangladesh has a track

record of heavily subsidizing fuel oil with adverse fiscal and environmental consequences as well as contributing to inefficient use. Proper pricing of energy and other publicly provided services that are intimately related to environmental protection, such water supply, sanitation and waste management, can ensure the efficient use of these resources and protect the environment. Finally, the inadequacy of resources in Bangladesh is a major constraint on public funding for critical growth-enhancing programs like infrastructure; for spending on health, education, water supply and social protection to support poverty reduction; and for funding major environmental improvement programs like clean air, clean water, slum upgrading and afforestation. The revenues mobilized from EFR can be a major contributor to help augment public spending for these programs.

At the theoretical level, the rationale for environmental taxation was first developed by the British economist Sir Arthur Pigou (1920). He argued that when a private producer is not held accountable for all the costs incurred by the producer because some of the costs are not reflected in the financial cost of production (external diseconomies), there will be an over-production of that good and the external cost will be passed on to the society at large. The over-production results from the fact that private marginal cost is lower than social marginal cost. To ensure that there is efficient production, defined as the point where social marginal cost is equal to social marginal benefit, public policy must impose a tax that is equivalent to the amount of external cost incurred by the society on account of this product. Applied to the case of industrial emission, in the absence of a pollution tax, the industry will produce a larger amount of the polluting industry output thereby causing excessive pollution. A pollution tax estimated in a way that it closes the divergence between the private and social marginal costs of production will ensure the social efficiency of the output and reduce pollution.

This general idea of using taxes and subsidies to eliminate the gap between social and private benefits and costs has caught the imagination of environmental economists and policy makers. Since many of the environmental services like clean air and clean surface water bodies (ponds, lakes, rivers) are in the nature of public goods, private producers and households left to themselves would tend to contribute to excessive pollution of these services. In Bangladesh, air pollution and surface water pollution are mainly caused by irresponsible and unchecked behavior of factories and households undertaking activities that generate CO2 and other gaseous emissions, release various air pollutants through construction activities, and dump solid and liquid wastes into water bodies that pollute them. By imposing a pollution tax, economic agents will get an incentive to control their behavior. This “polluter-pays-principle” along with the “beneficiary-pays-principle”, which requires that a beneficiary must pay the full cost of the good and service consumed, has now become common language underlying the application of good-sense economic principles to the design of sound environmental management policies.

The advocacy of the Pigovian tax for environmental management has, nevertheless, come under sharp criticism. The critics have argued that the implementation of the Pigouvian tax in practice is fraught with difficulties because it assumes that there is full information about the magnitude of the social cost and the social benefit. Since this does not hold in the real world, the introduction of a Pigouvian tax will distort resource allocation that could hurt investment and growth. This is not a valid argument for actual

policy making for three important reasons. First, this criticism assumes we are in the best first world and there is no taxation. Since there is already taxation in practice, the idea that an estimated Pigovian tax will distort resource allocation more than other taxes is misleading. Second, the knowledge of exact magnitude of loses from pollution (social costs) is not essential to design a tax on pollution. There are various ways in which the social cost can be approximated. To the extent that the Pigouvian tax helps reduce environmental damage it can be a better policy instrument than other taxes that do not help the environment. Third, as noted, Bangladesh has a severe public revenue constraint and it tends to heavily underfund environmental programs. Pollution taxes can be an important instrument to mobilize financing for supporting critical public spending including for environmental improvement.

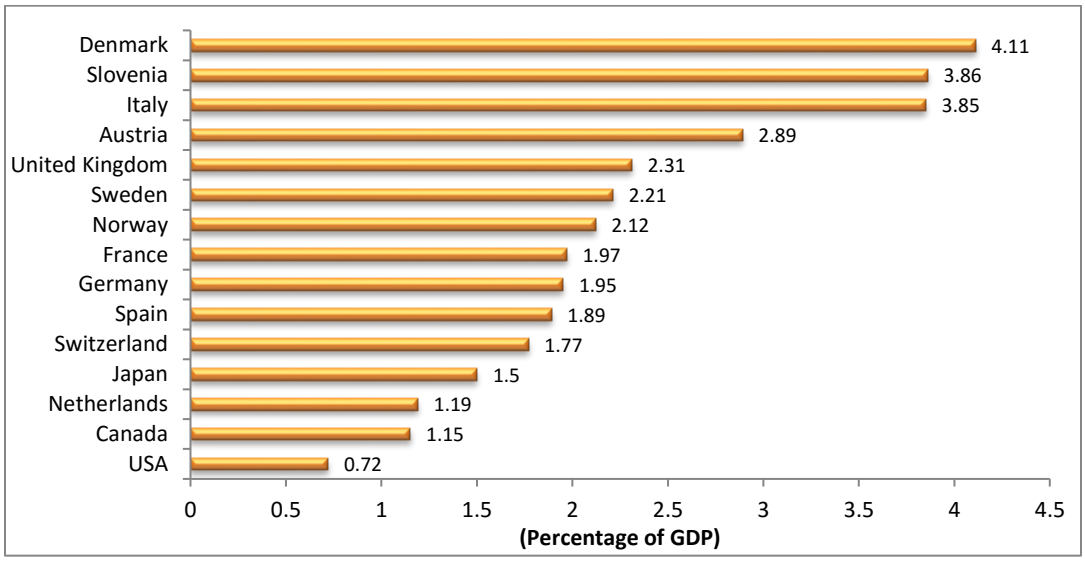
Indeed supporters of the tax have also pointed out the potential for the so-called "double dividend". The idea behind the double dividend hypothesis is that if a revenue-neutral environmental tax is imposed such that it is matched by a revenue-equivalent reduction in other taxes (such as an income or consumption tax), then the country will gain double dividends from this EFR. A Pigovian tax would yield welfare gain by reducing pollution. The welfare gain will increase further by the reduction of tax on income or consumption, which tends to reduce labor supply by distorting incentives to work. This double dividend hypothesis gave credence to the concept of 'revenue-neutral' EFR. While the double dividend hypothesis cannot be the main basis for EFR in Bangladesh owing to the severe shortage of revenues, in a limited sense it can be an added feature of EFR. A review of the current Bangladesh tax structure shows that trade taxes, especially custom duties and para-tariffs like supplementary duties and regulatory duties, continue to play a significant role in revenue mobilization (Ahmed 2015; 2017b). These trade taxes have created a substantial anti-export bias that has hurt export diversification and growth (Ahmed and Sattar 2018). The ability to introduce EFR and secure adequate revenues from this policy can allow Bangladesh to reduce its reliance on distortionary trade taxes that will improve the environment while also boosting exports by lowering the anti-trade bias.

It is important to note that EFR is not a substitute for existing command and control measures. If a pollution tax simply replaces an existing control instrument, then the pollution reduction effects of the tax will not be available. A combination of command and control instruments and EFR is the preferred option. The introduction of pollution tax to reduce the emission of carbon dioxide, also known as a carbon tax, has led to the concept of "carbon pricing" (World Bank 2015). However, a carbon tax is only one way to set a price on carbon. In recent years "cap and trade" option has also emerged as an attractive policy option for setting the carbon price. The idea behind cap and trade is that the government sets a maximum amount of an emission that can be produced. The suggested approach to allocating permits is through auction, which then sets the price on emission. Internal trade between producers is also possible that can further redefine the carbon price. The choice of which instrument to use for carbon pricing depends upon administrative capabilities. In the context of a developing country, a carbon or pollution tax is easier to administer and monitor than cap and trade permits.

C. Implementation of Environmental Fiscal Reforms: The Lessons of International Experience

The most use of environmentally related taxes for improving environmental outcomes has happened in OECD countries. In 2005 some 375 such taxes existed in OECD countries, yielding an estimated 2-2.5% of GDP as revenue (OECD 2006). Some 90% of these revenues came from taxes on gasoline and motor vehicle taxes. Over time, the average revenue yield has come down, falling to 1.56% of GDP in 2014[1]. There are wide variations in the use of environmental taxation within OECD taxation (Figure 1). The latest published OECD data for 2014 suggests that Denmark generates most revenue from environmental taxation (as much as 4.11% of GDP) while USA has the lowest revenue yield from environmental taxation (only 0.72%).

Figure 1: Environmental Taxation in Selected OECD Countries 2014

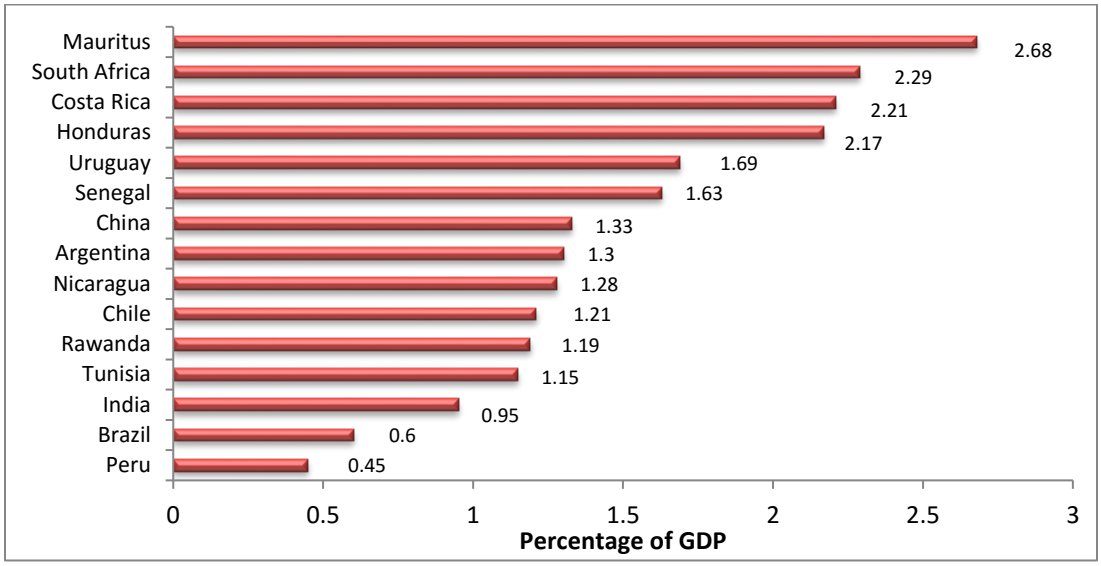


Source: OECD Environmental Taxation Database

Environmental taxation has also caught on in many developing countries including South Africa, China and India. Indeed, South Africa has been an active player in using environmental taxes, raising as much as 2.29% of GDP in 2014 (Figure 2). Overall, Latin American and African countries have been relatively more active than Asian developing countries in using environmental taxation. In developing Asia, China and India, although late comers, have taken the lead. Both countries are also seeking to use environmental taxation along with other instruments for improving environmental outcomes. Since these two countries are amongst the largest emitter of CO2 gases, the use of environmental taxation to reduce CO2 emission is a global win-win.

[1] OECD Environmental Taxation Database.

Figure 2: Environmental Taxation in Developing Countries



Source: OECD Environmental Taxation Database

Global experience suggests that the main constraint to the use of environmental taxation relates to political economy. There are three strands of the political economy constraint. First, industries have tended to argue that it raises cost of production and hurts output, investment and employment. Politicians representing these interests are therefore reluctant to use environmental taxation. USA under Donald Trump's Presidency is the best representation of this political power of vested interest. Second, and more legitimate, is the concern about possible adverse effects on the poor. This is a particular worry in developing countries where the incidence of poverty is large and social protection system is not often well developed. Third, there is the fear of political backlash from the consumers who face higher prices of energy, transport and manufacturing owing to environmental taxation.

Several lessons have emerged from the review of experiences with EFR that should inform the debate on the formulation of EFR for Bangladesh.

First, developing countries are often not fully aware of the concept of EFR and how it can be used effectively. This is the situation in Bangladesh and other developing countries. As aptly noted by OECD officials in providing their summary assessment of EFR mission to 5 African countries: "However, the key finding is that EFR instruments are implemented in all countries but that the underlying concept is regularly not well known. The conclusion can be drawn – based on the discussion during the missions to two African ACP countries – that a widespread interest by governmental officials from ministries of finance, environment agencies, etc. in getting additional information concerning EFR instruments and the underlying concept exists." (OECD 2005, pp 25). Country specific research, as done in this paper, and dissemination of lessons of international experience with EFR should be the first step in preparing the grounds for future use of EFR in Bangladesh.

Second, the use of EFR requires the presence of appropriate legal framework and adequate institutional arrangements for the design and implementation of adopted instruments. While the level of readiness can vary by country, some minimum legal and institutional background is essential for adopting EFR.

Third, administrative costs of tax collection should be minimized through a proper design such that the taxpayer does not feel harassed or that the transaction costs are high. This is a very important lesson for Bangladesh. Presently, the National Board of Revenue gets a lot of flak in the matter of collecting income taxes and the value-added tax from the tax payer owing to high transaction costs and harassment faced by the tax payer (2017b). The tax should be simple and easy to collect with low transaction cost.

Fourth, public acceptance of EFR can be built up with an information campaign explaining the rationale for the instrument and the possible benefits for the country as a whole. At the same time, taxes should be used gradually with an initially smaller coverage and low rate. The coverage and rates can grow progressively as experience develops and citizens adapt to the EFR concept.

Fifth, a part of public skepticism for new taxes such as those embedded in EFR is the perception that these are merely new ways of collecting more taxes rather than improving the environment. This problem can be particularly acute for countries like Bangladesh where the environmental outcomes are very unfavorable. Some countries have therefore tended to earmark EFR revenues for improving the environment as a way to get political buy in for EFR. There are well-known problems with earmarking. A better approach is to ensure that the introduction of EFR taxes is combined with improvements in public expenditure management including incrementally higher funding for environment and poverty programs. This is fully consistent with the concept and definition of EFR as noted above.

Sixth, the possible adverse effect on the cost of living for the poor is a genuine concern with any tax or pricing reform and EFR is no exception. However, the beauty of the EFR is that it combines tax with expenditure measures. Some of the expenditure measures should address the poverty implications of higher prices resulting from EFR. The best way of offsetting the adverse effects on the poor are through the adoption of a well-designed social protection system. In countries that do not have an adequate social protection system direct compensation measures might be needed depending on the nature of the product and its relative weight in the consumption basket of the poor.

Finally, the success of EFR partly depends upon a good monitoring and evaluation (M&E) system. Governments typically tend to forget the reasons for the introduction of the EFR and do not review its effectiveness as a source of environmental improvement and revenue mobilization to finance high-priority poverty programs. A good M&E system that monitors pollution control and quality improvements in public spending can be very helpful to inform the public and increase the rates and scope of EFR over time.

D. Current Fiscal Policies for Environmental Management Bangladesh

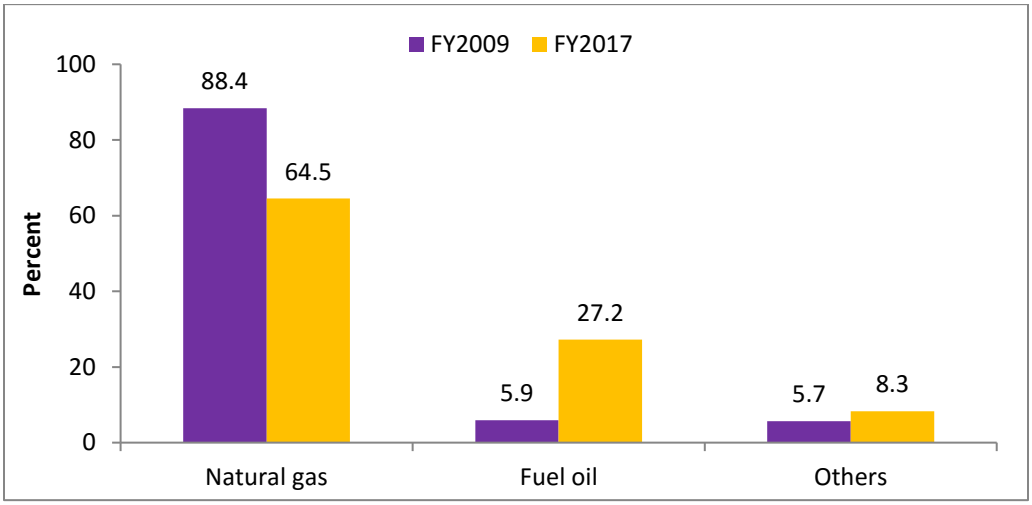
At a broad level there are three types of EFR instruments: Taxes on extraction of natural resources; prices and user fees for publicly-provided environmentally-related goods and services; and environmental taxes and charges. Within these broad categories a large range of specific instruments have been used by countries.

Taxes on extraction of natural resources

In Bangladesh, the three main natural resources that are most used for household consumption and business purposes are natural gas, fisheries and forestry resources.

(a) Natural gas: Extraction and efficient use of natural gas are contentious policy issues in Bangladesh. Natural gas production and distribution are publicly owned activities. The price of natural gas is set much below the true economic cost. As a result, natural gas consumption has been highly inefficient and there is very limited domestic resource mobilization for investment in gas extraction (Gunatilake and Roland-Holst 2016). Rapid depletion of natural gas has now led to a severe rationing of this resource. Gas shortage is a major constraint to the expansion of several areas of industrial production. Although the government continues to give priority to power generation in supplying gas resources, gas shortage has led to a rapid increase in the use of fuel oil for electricity production (Figure 3). The poor pricing policy of natural gas has therefore also contributed to greater air pollution.

Figure 3: Use of Primary Fuel for Electricity Generation



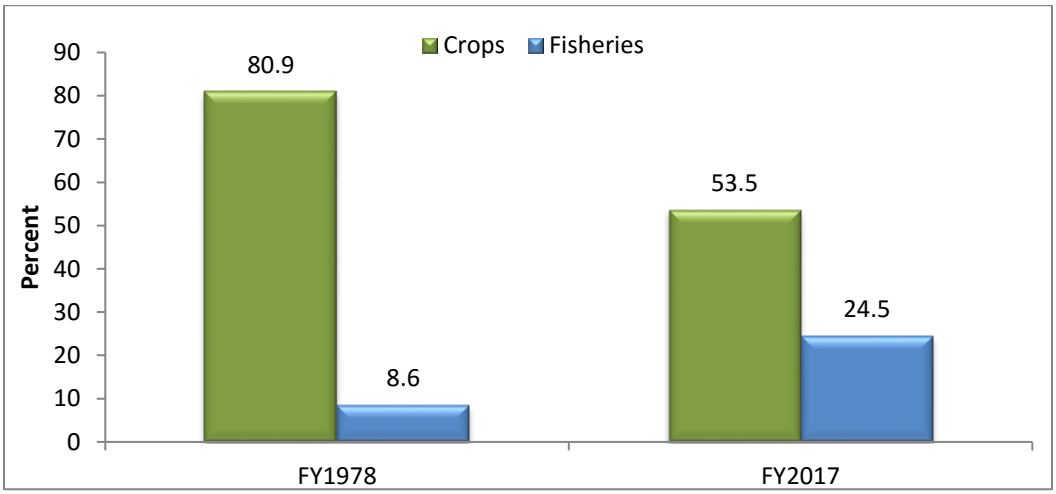
Source: Bangladesh Power Development Board Annual Reports

(b) Fishery Resources: As a land of rivers and with open access to sea, Bangladesh is richly endowed with vast fishery resources. Bangladesh has made solid progress in developing its fishery industry. For example in FY1978, crops accounted for 80% of value-added in agriculture while fisheries yielded only 8.6%. In FY2017 the share of fisheries rose to 30% while the share of crops fell to 55%

(Figure 4). This growing importance of fisheries has played a substantial development role, making fisheries an important source of income, employment, export earnings and poverty reduction.

The fishery industry in Bangladesh is basically a private enterprise. The initial thrust of the industry was towards the exploitation of river fishery, followed by fish cultivation and production in lakes and ponds. Of late, attention is heading towards sea-based marine fishing. There is a separate ministry to support the development of the fishery resources. Much of this effort is to increase production through a range of support policies for private investment in fish cultivation (Shamsuzzaman et. al. 2017). There is growing concern about the unsustainability of capture fishing (Ghose 2014; Shamsuzzaman et. al. 2017). Regulatory policies for sustainable fishing are largely ineffective. There is also no use of fiscal policy instruments in the form of auctioning of fishing rights, charges or fees. Additionally, the losses incurred to fishery resources from severe surface water pollution are largely unchecked due to inadequate efforts to control water pollution (Ghose 2014).

Figure 4: Rising Share of Fisheries in Agriculture Value Added



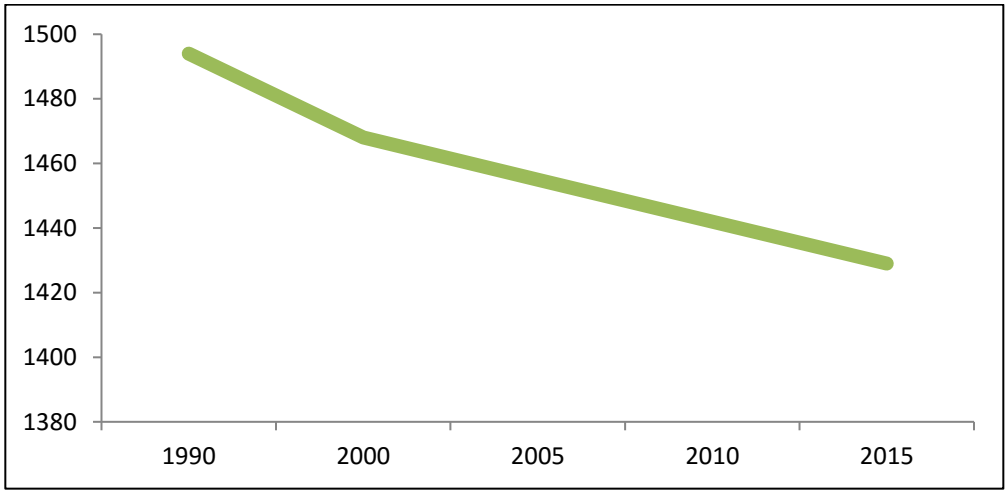
Source: Bangladesh Bureau of Statistics (BBS)

(c) Forestry Resources: Historically Bangladesh has been blessed with a wide ranging forest cover facilitated by weather and soil conditions. In particular it is home to the world's largest mangrove forest, the Sundarbans. Over time, population pressure and poor forest management has taken a huge toll. Roughly 89% of the forest resource is publicly owned and 11% is private forests (village forests/ homesteads). Forests are a valuable natural resource. They provide timber, fuel, ecosystem service as well as carbon storage and delivery of oxygen to the atmosphere. For Bangladesh, which is highly vulnerable to natural disasters, forestry provides a valuable natural cover that protects human lives and wealth. Given the importance of forestry resource, it is imperative to preserve its value as a part of sustainable growth strategy.

According to FAO data, the area under forest cover in Bangladesh has been falling significantly (Figure 5) owing to rising population and competing demand for land. In per capita terms, Bangladesh has

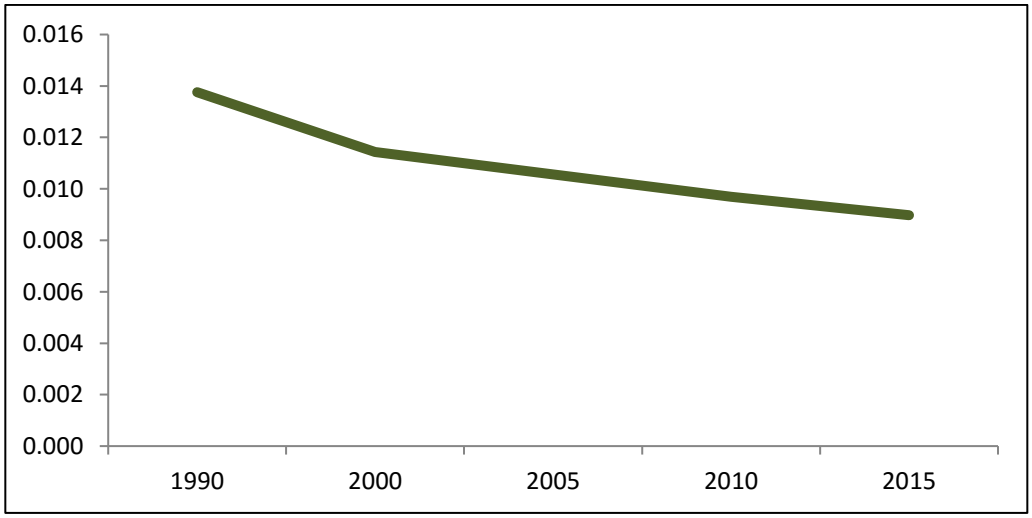
merely 0.009 ha forest cover per person, which is among the lowest in the world. Per capita forest cover fell by an annual average rate of 1.8% between 1990 and 2015 (Figure 6). This result of declining forest coverage is accepted and verified by the government's Forest Department in its draft investment plan for forest resources (Government of Bangladesh 2016). The draft paper provides two estimates of forest area under forest cover: (1) reduction in forest area from 1.65 million hectare (Mha) in 1990 to 1.40 Mha in 2014; and (2) decline from 1.49 Mha in 1990 to 1.43 Mha in 2015. This later data is the one reported by the FAO and used in Figure 5. The paper further notes that areas under mangroves, Sal, hill and bamboo have all declined. The most rapid fall has been for the bamboo forests followed by the hill forests. The decline in bamboo forests has been especially alarming between 2005 and 2015, suggesting a near elimination of bamboo forest cover.

Figure 5: Area under Forest (000 ha)



Source: Food and Agricultural Organization (FAO)

Figure 6: Per Capita Forest Cover (Ha)



Source: Estimated based on FAO data

Even more concerning is the loss of forest quality and productivity. Evidence from remote sensing data reported in various studies suggests that forest density has declined instead of improving. Thus, the share of dense forest fell from 51.3 % in 1975 to 46.2% in 2014 (Government of Bangladesh 2017b). The toll has been particularly hard on the forests of the Chittagong Hill Tracts. The Reinkhyong reserve forest, the Kassalong reserve forest and the Sangu and Matamuhuri reserves have all faced serious losses. In the Sunderban mangrove forest, in addition to depletion from illegal encroachment, a serious problem is the top-dying of several species of trees. Already 40% of the Sunderban forest is affected by top dying, which is killing the famous Sundri tree from the top down wards.

Several factors have caused this alarming situation. The most important reason is poverty. A large number of the rural poor are dependent upon forestry resources for livelihood as well as for fuel. A second cause is greed. Illegal poaching for the production of timber through connivance of local forest officers is a major contributor to deforestation. A third factor is land scarcity. Population density in Bangladesh has been increasing in almost geometrical progression. The per capita availability of land is getting scarce by the day. Prices of land are rising progressively all over Bangladesh. Competing demand for land for habitation, fisheries, animal husbandry, road infrastructure, schooling, hospitals and industrialization have made both forest and agricultural lands increasingly difficult to protect. The degradation of the Sunderban is caused partly by deforestation and illegal poaching but also by the pollution of the mangrove water through seepage of sea water salinity and the oil spillage from ships.

Since much of the forest resources are under public ownership, the main policy focus of the government's forestry management has been: (a) declaration of several forest reserve areas; (b) and afforestation efforts through the annual development programs. The reforestation efforts have also involved local communities in co-management approach. Half of the income from entry fee of protected areas is being allocated for livelihood improvement of local communities and landscape development. But there is no use of tax or incentive policies to ensure sustainable tree felling for timber or to systematically stimulate private investments in forest regeneration.

Overall these efforts have been very limited in relation to the tasks to increase forest cover and promote sustainable use of forest resources. Importantly, the conversion of forest land to other competing uses has continued. Unsustainable felling of trees for timber and firewood has continued unabated. Additionally, the absence of an effective monitoring and evaluation of forestry sector developments using a quantitative framework is a serious limitation. Accurate and up-to-date data on forest cover, types of forest resources, annual losses and regeneration, loss of bio-diversity and preservation are not available that is a major constraint on sound forestry management. A serious rethinking is needed to arrest the further degradation of forest resources in Bangladesh that is essential to ensure the sustainability of long-term development.

Prices and user fees for environmentally sensitive public services

There is a large range of public goods and services that has major implications for environmental outcomes for Bangladesh. The most important ones are: energy services, water supply, sanitation and waste management. Proper pricing of these goods and services has a determining influence on service availability, efficiency of resource use and environmental impact. In general, prices of all these goods and services are mostly set at below cost of production leading to under-provision, inefficient use and serious environmental damage. Underpricing has also contributed to large budgetary subsidies that have limited public spending on health, education and social protection (Ahmed, et. al. 2016) while also limiting the availability of many environmentally sensitive essential goods and services like clean air and water.

(i) Energy services: With the exception of few oil products, all energy services are provided under public monopoly. These include electricity, natural gas, coal and fuel oil. Electricity, natural gas and coal are produced domestically, although recently import of electricity has become an important element of energy policy. Crude oil is imported and refined oil is partly imported and partly produced domestically. While there is good potential for producing coal, this is not presently done owing to political considerations emerging from serious NGO objections relating to resettlement. Policy attention is now focused on coal imports.

As noted, natural gas price is set much below economic cost. Historically, electricity prices were also heavily subsidized in both financial and economic terms. The financial subsidy emerged partly from selling electricity at an average price that was lower than the average cost of production and also from large transmission and distribution (T&D) losses. In recent years, faced with unsustainable financial loses, the T&D losses have been sharply reduced and pricing policy for electricity has improved. As a result, the financial losses of electricity sector have been reduced and the budgetary subsidy has fallen. However, a hefty dose of economic subsidy still prevails from the underpricing of natural gas, diesel and furnace oil.

Fuel oil is mostly subsidized and has been a major budget buster in recent years (Ahmed et. al, 2016). For example in FY2013, total oil subsidy amounted to a whopping 1.3% of GDP that exceeded the budget of the health sector by 50% and was almost equal to 70% of the public spending on education (Table 1). The decline of international oil prices since 2015 has given some temporary respite. The average domestic oil prices in 2015 and 2016 were considerably above international oil prices leading to a surplus for the Bangladesh Petroleum Corporation (BPC) and the budget subsidy was eliminated. This was a positive policy move in the sense that the government did not pass on the global oil price decline despite noticeable public pressure. This shows that when the government wants to implement a policy that it feels is right, it can withstand political opposition. Within fuel oil, prices are set differently for different products. Historically, octane and petrol prices were set above cost of production but diesel and kerosene were subsidized (Table 1).

Table 1: Recent Trends in Domestic Oil Pricing (taka/liter)

	Petrol	Octane	Diesel	Kerosene	Furnace Oil	Average cost	Subsidy (% of GDP)
Jan 2006	56	58	33	33	...	38	0.05 (FY2006)
Jul 2008	87	90	55	55	30	56	
Jan 2009	74	77	44	44	...	56	0.1 (FY2009)
May 2011	76	79	46	46	42	57	0.4 (FY2011)
Sep 2011	80	84	51	51	50	76	
Dec 2011	86	89	56	56	55	76	
Jan 2012	91	94	61	61	60	76	0.9 (FY2012)
Jan 2013	96	99	68	68	60	75	1.3(FY2013)
April 2016	86	89	65	65	42	50	0 (FY2016)
July 2017	86	89	65	65	42	65	0 (FY2017)

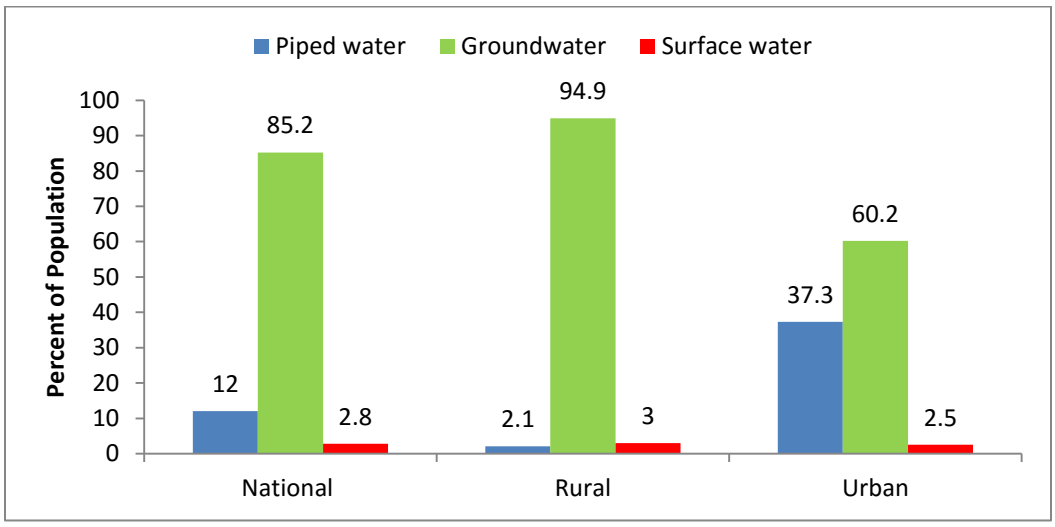
Source: Ministry of Energy and Petroleum and Ministry of Finance

It is important to emphasize that the FY2015- FY2017 surpluses on domestic oil operations were not due to better pricing policy but because of lower international oil prices. International oil prices have started climbing since 2017. As a result, the average gap between domestic and international prices has narrowed and the surplus on the domestic oil account fell substantially in FY2017. Importantly, prices in 2018 are approaching close to the break-even level with the threat of oil subsidy looming large if the present international oil price trend continues.

The primary rationale for subsidizing energy is to protect the consumers. The government feels that energy products are sensitive products and higher prices tend to hurt the poor through direct expenditure effects on energy products and indirectly through cost-push inflationary effects. This populist belief is so well ingrained in policy making that there is no effort to look at the evidence of who really benefits from energy subsidy, and what is the opportunity cost of this subsidy in terms of adverse macroeconomic and environmental effects. Recent research suggests that much of the oil subsidies go to the non-poor, that there are considerable adverse macroeconomic effects of these subsidies and related pricing policy, and the potential damage to the environment can be large (Ahmed, et. al 2016).

(ii) Pricing policy for municipal water supply: The availability of piped water supply is very limited. Most recent available data suggests that the access of the population to piped water supply at the national level was a mere 12% in 2016 (BBS 2017). Piped water supply is mostly available to areas that are covered by urban local government institutions (LGIs) (city corporations or municipalities). Hence, some 37.3% of the urban population has access to piped water supply as compared with only 2% for rural areas. There is substantial variation in water supply by cities. For example, the coverage is 87% for the capital city Dhaka whereas it is only 22% for a small town like Sherpur (Jahan 2016). Similarly, water is often only available intermittently, with only 2 hours in some of the small towns. Owing to poor O&M practices, water losses are substantial ranging from 21% to 30%. A part of these water loses reflect water theft from illegal connections (Jahan 2016).

Figure 7: Access to Drinking Water by Source (Percentage)



BBS, HIES 2016

A major factor for this poor state of affairs is the low capability of the public water bodies to handle the large unmet demand and improve service quality. This in turn to a large extent is owing to poor pricing policy that constrains the finances of the public water supply entities. The lack of private water provision is partly due to absence of adequate legal and regulatory framework; but it is also due to inappropriate pricing policies. The pricing policy challenge is illustrated in Tables 2-3.

Table 2: Average Operating Cost and Average Revenue from Water Supply

Population Size (in thousands)	Type of Urban Local Body	Nos.	Average Revenue (Taka per cubic metre)	Average Cost (Taka per cubic metre)	Average Cost Recovery (Revenue/Cost)
Less than 100	Municipality	21	06.38	5.66	1.23
100 to 299	Municipality	10	07.15	5.03	1.31
300 to 999	City Corporation	05	16.60	4.43	1.16
1000 and more	City Corporation	02	13.70	8.51	1.60
Total		38	08.12	05.48	1.26

Source: Jahan 2016

Tariff for water supply varies considerably between cities. Although tariff for water should ideally cover operation and maintenance cost of the system as well as capital cost, in many cities and towns even the operation and maintenance cost is not recovered. Water is provided in many urban areas at very low rates and in most cases the rates are not revised regularly to reflect the prevailing cost. Table 2 shows average revenue, average operating cost and average cost recovery (revenue-cost ratio) by municipalities and city corporations of different population sizes. The two large city corporations (Dhaka and

Chittagong) tend to perform better than other water entities in generating a reasonable surplus over operating costs. This better financing flexibility allows them to improve O&M and expands service coverage. But even these corporations rely on the government budget support to meet capital expenditures for expansion and for debt servicing.

The average figure for other corporations and municipalities hides the large variations in operating cost recovery among individual entities. Table 3 presents the distribution of a sample of 38 urban local bodies (ULBs) by cost recovery. Some 11 ULBs in the sample have revenue cost ratio less than 1.00, which indicates that nearly 30% of the ULBs do not generate enough revenue to cover even operating costs. Cost recovery rate for 4 city corporations and 4 Paurashavas exceed 1.50 or more than 150% of the operating cost. However, this constitutes only 22% of the sampled ULBs.

Table 3: Distribution of by Urban Local Bodies by Operating Cost Recovery

Population Size (thousand)	Type of Urban Local Body	Nos.	Cost Recovery (Revenue/Cost)		
			Less than 1.00	1.00 to 1.50	More than 1.50
Less than 100	Municipality	21	06 (28.6%)	12 (57.1%)	03 (14.3%)
100 to 299	Municipality	10	03 (30.0%)	06 (60.0%)	01 (10.0%)
300 to 999	City Corporation/ WASA	05	02 (40.0%)	01 (20.0%)	02 (40.0%)
1000 and more	City Corporation/ WASA	02	00 (0.0%)	00 (0.0%)	02 (100%)
Total		38	11 (28.9%)	19 (50.0%)	8 (21.1%)

Source: Jahan 2016

The government's pricing policy strategy is based on the logic that water is an essential commodity and must be subsidized. But this rationale assumes that the government has unlimited budget resources to provide adequate piped water supply to all residents. Yet, the facts show that even after 45 years of independence, only 12% of the population has access to piped water supply. The pricing policy is not premised on any empirical study that measures either willingness or ability to pay. Most piped water supply goes to non-poor household and most poor household even in urban areas do not have access to piped water.

In Bangladesh official reporting the concept of "safe water" is replaced by "improved water supply". This definition includes piped water as well as access to ground water extracted through hand-pumps and power-pumps. Under this broader definition, the percentage of population that has access to improved water supply surges to 97% for both urban and rural areas (Figure 7). Although access to ground water is better than the use of the heavily polluted surface water for drinking purposes, a major issue is the poor quality of ground water owing to arsenic poisoning, salinity in coastal areas, unsafe

contents of bacteria and dissolved iron. An additional problem is that the unregulated extraction of ground water has contributed to a progressive fall in the ground water level. So, continued long-term reliance on ground water extraction poses both a health risk and a sustainability challenge.

There is also health concerns related to the use of piped water for drinking purposes owing to inadequate quality control due to inadequacy of resources, especially in smaller towns. The two large city corporations of Dhaka and Chittagong perform better on this count compared to water provided by other LGIs. Overall, the supply of safe water is a huge environmental challenge in Bangladesh with serious health consequences.

(iii) *Pricing policy for sanitation services:* Bangladesh has made significant progress in improving sanitation system since the 1990s. As a result, 97% of urban population and 96% of rural population have access to latrine facilities (BBS 2017). However, there is huge variation in quality and related sanitary standards. Only 43% of urban population and 34% of rural population have access to sanitary or water-sealed toilet facilities.

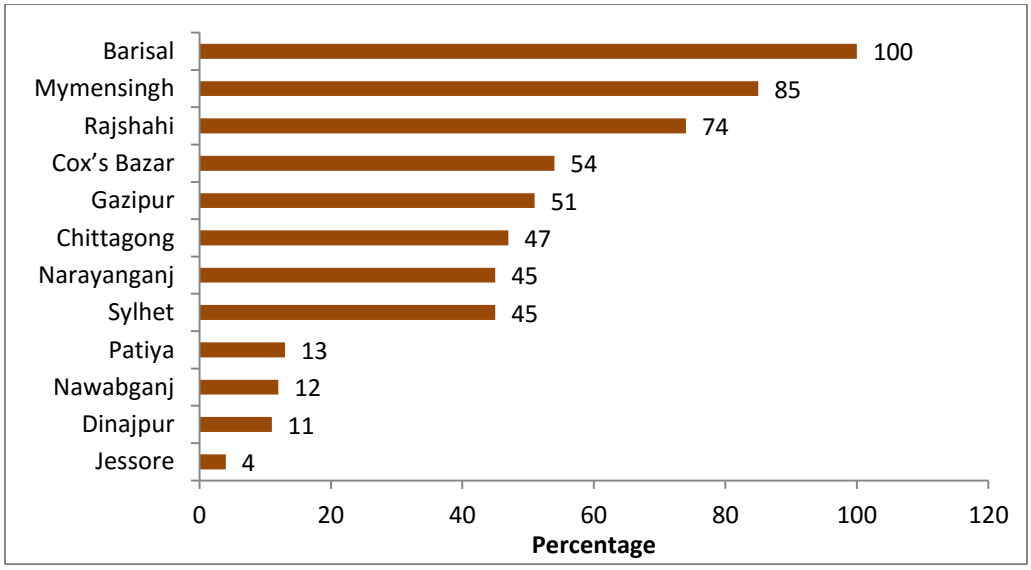
An even bigger challenge is disposal of wastewater. In Bangladesh, the dominant sanitation technology currently used by households is the onsite system that consists of a toilet and a storage infrastructure such as lined or unlined pit or septic tank. The collected sewerage is discharged directly into open drains, water-bodies (canals, lakes, rivers etc.) or undesignated places that result in pollution and health hazards (Jahan 2016). Only Dhaka city has a sewerage system but the coverage is partial. Only 20% of the waste water is covered by a sewerage network and a treatment plant, while the rest is connected to storm drainage system or other types of drains or water bodies. In most cases, collected sludge is released randomly or dumped into open drains or water-bodies which contaminate surface water (Jahan 2016).

A major reason for poor wastewater management is the lack of resources. Wastewater management is a capital intensive activity. The amount of resources required for installing proper sewerage system for households and ensuring that these are properly collected and treated before disposal is large. Even the most resourceful public utility, Dhaka Water and Sewerage Authority (DWASA), cannot afford to extend the services beyond the 20% of its customers. One important reason for the lack of resources is poor pricing policy for sanitation services. DWASA charges a nominal fee for the sewerage service it provides but this is far below the cost of service.

(iv) Solid waste disposal service: This is an essential service provided by urban LGIs. There is limited small scale private waste collection in selected areas, managed by citizen's group. Proper waste collection and disposal are both big challenges. Evidence shows that the efficiency of waste collection, defined as the percentage of waste generated that is actually collected by municipalities and city corporations, varies considerably. It ranges from a high of 100% for Barisal to a low of only 4% for Jessore (Figure 8). Proper disposal of collected waste in a way that is environmentally safe is also a major challenge. LGIs usually dump solid wastes in landfills, which creates serious health hazards as is illustrated by a recent study of solid waste disposal in Pabna (Shaha 2013). Households and private

enterprises that do not have access to LGI services dump solid wastes in nearby vacant land or in water bodies. On the whole solid waste management is a huge environmental challenge in Bangladesh.

Figure 8: Urban Waste Collection Efficiency

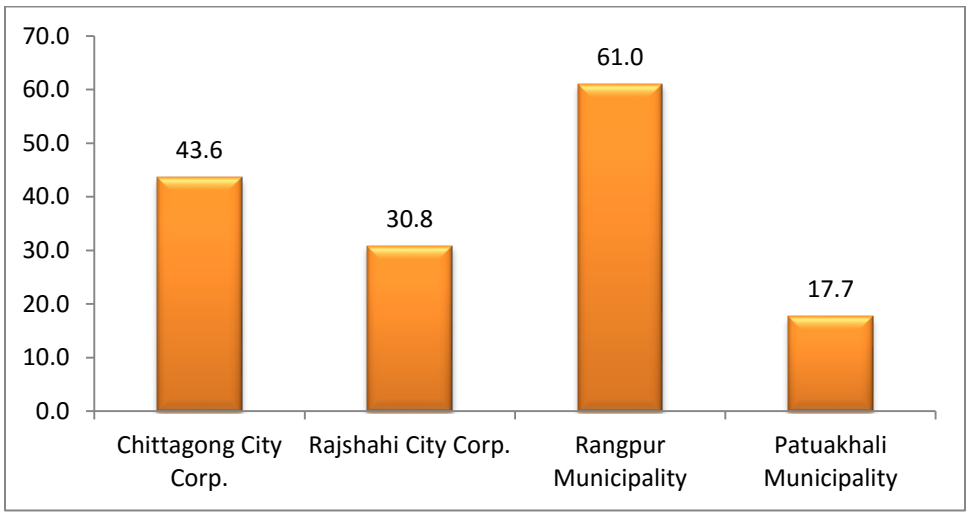


Source: Jahan 2016

Solid waste management by urban LGIs is financed from the resources of these bodies. Research shows that urban LGIs are heavily constrained by lack of finances (Ahmed 2017b). Some cost recovery happens through a waste management cost recovery component of property taxes. The average operating cost recovery ranges from a high of 61% for Rangpur municipality to a low of 18% for Patuakhali municipality (Figure 9). This cost recovery is based on existing waste management practices of LGIs that are environmentally unsafe. If the true cost of an environmentally safe waste disposal system was to be considered, the cost recovery will be very small.

Solid waste management like waste water management is fairly capital intensive, especially if waste disposal has to be done properly to avoid environmental and health damage. Efforts to increase coverage to 100% of the urban population and to increase efficiency of waste collection and proper disposal to 100% will require huge investments. The mobilization of these resources will require a full application of the beneficiary pays principle and other regulatory measures to enhance capabilities of LGIs, to encourage private supply of waste management services, and to ensure household compliance with proper waste disposal.

Figure 9: Operating Cost Recovery in Solid Waste Management



Source: Jahan 2016

Environmental taxes

The health costs of air and water pollution are substantial. The estimated cost ranges from a low of 1.2% GNI to a high of 3.5% GNI (World Bank 2006). Even the cost estimate at the low-end exceeds the annual health sector budget by 70%. So policies that help reduce water and air pollution has high health benefits. There are three major areas where environmental taxation could help reduce air and water pollution in Bangladesh: taxation of fossil fuel; taxation of industrial air pollution and taxation of industrial water pollution. The taxation of industrial air and water pollution gains particular significance in the absence of adequate effluent prevention steps taken by the industrial sector.

(1) Taxation of fossil fuel use: This is the most commonly used environmental taxation globally. OECD countries in particular use this as the most important source of environmental taxation. In Bangladesh, there is a nominal value-added tax (VAT) on fuel products based on the taxation of imported oil. The effective tax rate as a share of average selling price amounts to 12.9% on petrol, 10.2% on diesel, 10.2% on kerosene and 15.7% on fuel oil. The VAT is a common tax levied on most products in Bangladesh. There is no additional excise tax on fuel oil in the form of a tax on carbon to discourage its use. As noted earlier, historically even with VAT the average fuel oil prices on diesel, furnace oil and kerosene have been substantially lower than international prices resulting in large budget subsidies. It is only recently that the decline in global oil prices has caused domestic prices for all petroleum products to exceed international prices.

(2) Taxation of industrial air pollution: The government has taken several initiatives to combat industrial air pollution focussed on the transport sector and the brick manufacturing. The 1997 Environmental Conservation Rules were amended to require the use of catalytic converter and diesel particulate filter for petrol and diesel driven vehicles respectively. A ban on two-stroke engine based three wheelers was imposed in Dhaka city and vehicle age restrictions were also imposed to reduce

carbon emission. The most important initiative is the enactment of the Brick Manufacture and Brick Kiln Installation Act in 2013. Under this policy, the heavily polluting traditional brick kilns are being phased out (Box 1). This is an important initiative and a good indication of the government's commitment to improve air quality. Yet implementation is slow. More generally, the rest of the industrial sector is left free to pollute the air including electricity generation, especially those units that run on furnace oil, diesel and coal. Importantly, there is no pollution charge for industrial emission either directly on output or through polluting inputs.

Box 1: Promoting 'GREEN' Brick

Brick making is one of the largest sources of greenhouse gas emissions in Bangladesh. It is estimated that the brick sector burns 6 million tons of carbon dioxide annually. Traditional brick kilns are not only less efficient in terms of coal usage but also pose health threats to workers and the neighbouring population. With more than 6356 kilns in the country, brick making is part of the informal small enterprise sector with little incentive to go green. In 2010, UNDP launched the Brick Kiln Efficiency Improvement Project to incorporate eco-friendly means of production. Known as Hybrid Hoffman Kiln (HHK), these kilns are more efficient. An HHK requires only 13-14 tons of coal to produce a hundred thousand bricks as opposed to between 22 and 24 tons used by traditional kilns. As of December 2012, five HHKs were commercially operational with a total reduction of 16 kilotons of carbon dioxide emission and six thousand tons of coal. The ADB also provided $50 million loan to install more energy efficient kilns. The Government's commitment to combating pollution from brick kilns is portrayed in the Brick Making and Kiln Establishment Act 2013. The Department of Environment has banned traditional kilns and ordered their shutdown by June 2014. However, it has been observed that most brick kilns are yet to be converted to efficient technologies, mostly due to a lack of skilled manpower. Brick makers have said that they need at least one more year to train adequate manpower for the improved technology. The Department of Environment has decided to extend the timeframe to adopt efficient technology for those with valid environment clearance certificates. The 2013 Act also prohibits establishment of brick fields in residential, protected, commercial and agricultural areas, and also in forests, sanctuaries, wetlands and Ecological Critical Areas (ECAs), and imposes heavy fines and prison sentences for violators.

(3) *Taxation of industrial water pollution**:*** Dumping of industrial waste water into rivers is a major environmental hazard, along with dumping of untreated sewage and household waste into lakes and ponds, present a major environmental and health challenge to Bangladesh. Urban area is heavily industrialized with most of the industries located in Dhaka, Narayanganj, Gazipur, Narsingdi, Chittagong, Comilla and Khulna. Buriganga and Turag River are the two major rivers of Dhaka. They are most susceptible to water pollution from industries relating to tannery, fabric dying and chemical processing, fabric washing, garments, plastic products etc. located on the banks of these two rivers. In many places sewerage lines also end up in these rivers carrying sewage and municipal solid waste. Pollution problems are similarly serious for rivers surrounding other industrial cities (Ahmed 2017b).

In order to control water pollution, the government banned the use, production and marketing of polyethylene shopping bags in 2002 and has made it mandatory for industries to set up Effluent Treatment Plants (ETPs) to treat their waste before discharging to water bodies. As of June 2015, some 1156 industries have established ETPs. Enforcement is going on to bring the industries that are generating waste water under compliance. The Department of Environment (DoE) takes legal action including case filing in environment courts, operates mobile courts, and imposes penalty for pollution under the Environmental Conservation Act, 1995 (Revised in 2010). Up to December, 2015 enforcement

actions have been taken against 2,112 institutions, with penalty earnings of Taka 1.3 billion. Some 29 industries were sealed and gas and electricity lines of 20 industries were disconnected. The DoE also filed cases in environment court against 602 institutions due to environment pollution. Similarly, enforcement of the ban against the use of polythene bags has been progressively strengthened.

The rivers surrounding Dhaka have been declared as Ecologically Critical Areas (ECA) to restore riverine ecosystems. Liquid waste generating industries are now required to install effluent treatment plants which are subject to strict enforcement measures. The tannery industries operating in Hazaribagh have been relocated to the tannery industrial estate at Horindhora of Savar which will dispose the liquid wastes through a common ETP (Box 2).

Box 2: Building the Tannery Estate – Relocation and Cleaner Technology

Over the past decade, the lucrative leather industry of Bangladesh has seen exports grow by an average of $41 million per year. However, leather exports come at a heavy cost – environmental impacts and health hazards. Outdated and inefficient tanneries in Hazaribagh, which houses 90-95 percent of all tanneries in Bangladesh, are among the worst polluters. It is estimated that 22000 cubic meters of untreated effluent, including chromium, is dumped daily into the Buriganga River. The pollution from the tanneries not only leads to poor water quality but also directly impact the health of 8000-12000 workers. Locals of surrounding areas are also victims of this industry, with skin and respiratory ailments being common.

In an attempt to mitigate this problem, the Government under the 6th FYP decided to relocate existing tanneries from Hazaribagh to Savar, building a Tannery Estate in the process. The Tannery Estate will include modern tanneries on 200 acres that will be less taxing on the environment, with a view to attract more foreign investment. It also includes a common Effluent Treatment Plant and Waste Dumping Yard, which will be completed next year. The Government intends to shut down tanneries in Hazaribagh if they do not relocate in time. During the 7th FYP period, the Government will ensure that all tanneries have an environmental clearance certificate for industrial units. Tanneries that discharge a comparatively large amount of effluent, or discharge effluent with high concentration of comparatively hazardous materials will be monitored and fined if their pollution levels surpass national standards. Stronger penalties for hazardous working conditions will be implemented. Through the Government's active role in regulating tanneries, it is expected that the damages to the environment will be substantially diminished.

These important measures to reduce river water pollution are indicative of the government's seriousness to tackle this massive water pollution problem in a comprehensive manner. The imposition of penalties for water pollution is the first known example of the use of EFR in pollution management in Bangladesh. It also suggests that the prospect for using EFR for controlling water pollution is promising and can be implemented more widely and systematically including the extension of this to household waste disposal.

E. Main Priorities for Environmental Fiscal Reforms in Bangladesh

The brief review of the current use of EFR in Bangladesh suggests that this concept is still not a part of the main stream fiscal policy management. The government has adopted a number of public expenditure programs to improve the environment including investments in reforestation, promoting the expansion

of fisheries production, helping the growth of solar housing system, supporting rural water supply and sanitation programs and slum upgrading projects. On the taxation side, there is an ongoing effort to impose penalties on the dumping of industrial waste in the rivers. There is also a motor vehicle tax. But that tax is collected more as a road user charge than an environmental improvement tax. On the other hand pricing policies for energy subsidize fossil fuel consumption and serve as a negative carbon tax. It also militates against the incentives to adopt clean energy. Pricing policies for water, sanitation and waste management sharply constrain the availability of these services in and contribute to serious health hazards. There is no taxation of forestry product to promote sustainable extraction. There is no taxation of industrial air pollution.

In the current political environment there is little hope that the issue of gas pricing will be taken up by the government. Past efforts that not yield fruit and the government believes the rationing of natural gas to priority users rather than through pricing reform is the politically correct approach. Similarly, the political feasibility for bringing the fishery industry in the EFR net is very low. As against these political constraints, there are better prospects for introducing a range of other EFR measures through proper analysis and dialogue. The important instruments include:

(a) Improve the pricing policies for water, sanitation and solid waste management.
(b) Reform fuel pricing policy with a view to eliminating subsidy and moving towards a market price.
(c) Introduce a carbon tax on petrol and diesel.
(d) Introduce a tax on timber.
(e) Impose a tax on industrial air pollution.
(f) Introduce an industrial water pollution charge.
(g) Institute an urban household illegal waste dumping charge.

Pricing policies for water, sanitation and solid waste management

Given the large health costs of air and water pollution, the health benefits of additional investment in piped water supply, hygienic and environmentally safe household sanitation and sound management of solid waste are huge. The service gaps are large. The public sector alone cannot handle it and private provision might be needed. For both, proper pricing policy is essential. By and large, the beneficiary pays principle should be the guiding criteria for setting prices. Presently, all these services are provided by the urban LGIs and nearly 100% of the beneficiaries are the non-poor. Equity justification for subsidy is not relevant. So, the long term goal of pricing policy should be the recovery of full average cost of service including a reasonable rate of return on invested capital. An independent regulatory commission should be set up to regulate prices and monitor service quality.

Subsidized / no-cost services can continue to be provided to the poor living in urban slums through public spending programs. Over time, effort must be made to improve service and ensure that the benefits actually accrue to the poor. For example, an often observed problem is that local musclemen

capture most of the benefits of free access to standpipe water through illegal charges imposed on users. Municipalities that service these standpipes should monitor their use through formation of self-regulating community-based water user association (WUA). Since women are the main users, they should be in-charge of these WUAs.

Reform of fuel subsidy and pricing policy

Successful and durable reforms require a proper mechanism for setting energy prices. Many countries have implemented reforms only to see subsidies reappear when international oil prices increase. Establishing a proper oil pricing system is important to ensure the sustainability of reforms. The reform of oil subsidy and pricing policy was analyzed in detail in a previous study (Ahmed et. al 2016). A summary of the main points are presented here.

GIZ (2015) suggests a set of four principles to guide the development of a sustainable oil pricing policy: pricing principles; price regulation principles; transparency principles; and enforcement principles.

a) *Pricing principles:* These comprise of three elements: cost coverage; applying fuel taxes; and internalizing the external effects of the transport sector. The idea behind cost coverage is that prices should at least cover all costs of production (import, refining, transport and depreciation. The next consideration in price setting is the use of taxes (i.e. value added taxes, excise duties) to develop the transport sector (cost recovery of road infrastructure including maintenance) or more broadly to generate revenues for the government. A third consideration is to internalize the external costs from use of fossil fuel (i.e. the tax on carbon emission). Most countries are moving towards this broad-based pricing policy.

b) *Price regulations principles:* This principle advocates that price adjustments must reflect the changes in cost of production, exchange rate changes and general inflation. The rationale for this principle is to avoid subsidy by allowing full pass through of all factors that affect the cost of production.

c) *Transparency principles:* The idea here is that stakeholders have full information about how prices are set. Information about the main components of pricing (costs and taxes), how prices are set, who sets the prices, the frequency of price changes and the reason for changes must be communicated to the general public through a website and mass media so that there is common understanding for the oil price behavior.

d) *Enforcement principles*: The proper implementation of defined pricing principles requires that they are properly monitored, supervised and enforced. Enforcement must also pay attention to issues of smuggling, black-markets, adulteration and quality assurance for oil products as per specification.

The current Bangladesh oil pricing system does not meet any of the above principles, suggesting that a thorough overhaul of the pricing system is needed. Two policy questions emerge: Should government

continue to regulate oil prices by instituting an automatic pricing formula or should it deregulate the prices and leave pricing to the market? This is a political economy choice. For example, India and Philippines have completely deregulated oil prices, except for kerosene in the case of India. The advantage of a market-based pricing is the complete de-politicization of oil pricing. However, this requires adequate competition in the domestic oil market and proper administrative and regulatory capacities to monitor the performance of the oil companies and prevent cartelization.

Since Bangladesh does not yet have a competitive oil market, full deregulation of oil prices may be pre-mature at this time. So, in the first phase of the reforms the adoption of an automatic pricing formula that reflects the above principles may be the way to go along with deregulation of the oil market to allow private sector participation in all areas of the oil industry. This pricing policy should be administered by the Bangladesh Energy Regulatory Commission (BERC) without any government intervention. This requires that the BERC should be strengthened with greater autonomy and quality staffing to do its assigned job with proper competence. BERC will also be responsible to provide all necessary information to the public at large to meet fully the transparency criteria for oil pricing. The government's main role will be to decide the taxation policy for oil as appropriate.

Over the longer term, subsidy reforms for petroleum products should aim to fully liberalize pricing. More liberalized regimes—where prices are determined by private sector suppliers and move freely with international prices—tend to be more robust to the reintroduction of subsidies than automatic pricing mechanisms. Under a liberalized regime, the role of the government is to develop prudential regulations to ensure that fuel markets are competitive and there is free entry and exit from the sector. Successful implementation of an automatic pricing mechanism can facilitate the transition to a liberalized pricing regime by getting the public used to frequent changes in domestic oil prices. It can also build up the confidence of private suppliers that the government will not return to subsidized pricing.

Introduction of a carbon tax on fuel oil

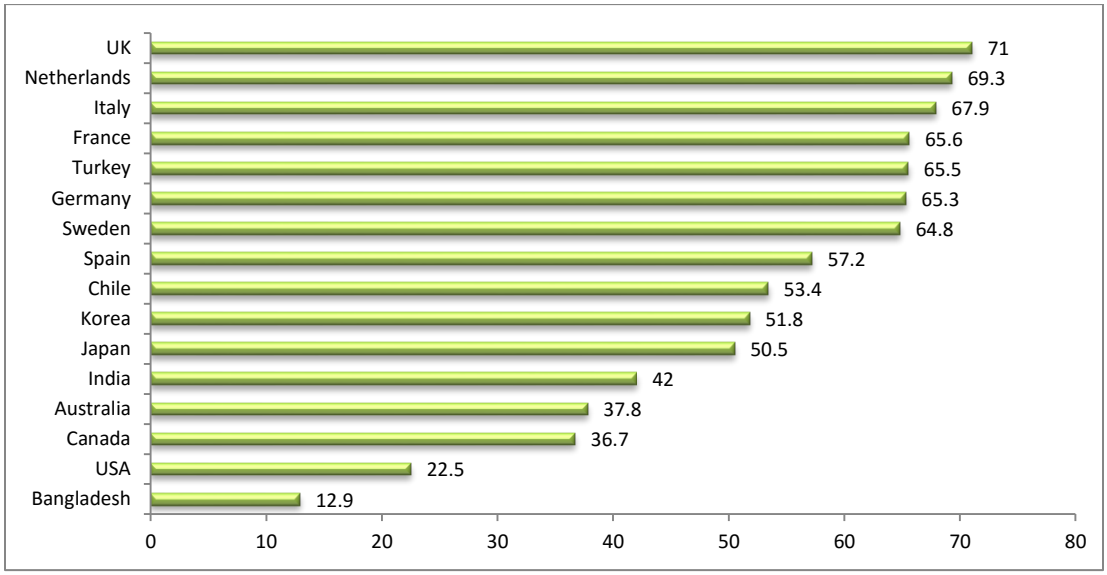
The elimination of fuel oil subsidy through proper pricing policy is a first step towards reducing carbon emission from the use of fuel oil in Bangladesh. Since use of fossil fuels is a major source of carbon emission, a number of countries have adopted a carbon tax. Simply defined a carbon tax is a tax that is levied on the carbon content of fuels. As of 2015, some 16 countries had introduced a carbon tax including two developing countries (India and Mexico) and 2 other developing countries are in the process of implementing a carbon tax (South Africa and Chile) (World Bank 2015). A proper carbon tax should be levied on all fossil fuel and at the upstream stage (the point where the possession of the carbon fuel passes the producer).

An alternative EFR instrument to carbon tax is the use of emission trading systems (ETS) whereby the government fixes the total volume of emission for each type of polluting industry and allocates these pollution rights to industries through an auction system. Conceptually the two instruments are equivalent. A carbon tax sets a price and the volume of pollution emerges as an outcome. An ETS sets the total quantity of carbon emission and lets the market set the price of carbon through an auction and

internal trading. Both instruments are used in several OECD and a number of developing countries are in the process of adopting ETS schemes (World Bank 2016). As of 2015 ETS schemes are valued at $34 billion and carbon tax schemes at $14 billion (World Bank 2016). Global experience shows that while some countries have adopted either a carbon tax or an ETS, some countries have used both. The choice of instrument is based on a number of factors including administrative capabilities, pollution measurement and monitoring readiness and political economy considerations. The limitations of developing countries in the first two areas suggest a preference for pollution taxes on inputs.

Although only a limited number of countries have introduced a proper carbon tax or adopted an ETS scheme because of political opposition to the potential cost-cascading effects of a full-blown carbon tax, most oil importing countries impose a tax on gasoline over and above the normal VAT or sales tax. This is a special levy in the form of an excise tax that is usually set in relation to the carbon content of the liquid fuel. The cost cascading effects are moderated by either levying the tax at the gas pump only or by exempting sensitive sectors. Thus, a gasoline tax (petrol and diesel) at the pump gate raises the cost of transport but does not directly affect electricity and manufacturing production. Also, in this case other primary fuels such as natural gas, furnace oil, kerosene and coal are outside the tax net. While gasoline taxes are often conceived as a road user charge earmarked for road maintenance (as in the USA), these taxes are increasingly being used as an environmental tax to reduce consumption of fuel oil in transport. It is not surprising therefore that tax rates are very high in OECD countries except USA, including countries that have not introduced a carbon tax. The UK for example imposes a tax rate of about 71% on gasoline as compared with only 23% in USA (Figure 10). India's tax rate of 42% exceeds rates in Australia, Canada and USA showing its growing commitment to reducing carbon emission.

Figure 10: Tax Rate on Premium Gasoline (percent of selling price)



Source: OECD Database; Ministry of Finance (India); Ministry of Energy and Mineral Resources (Bangladesh)

The gasoline tax can also be conceived as a part of a longer term plan to introduce a proper carbon tax at a later stage. This is how it has progressed in some countries that have introduced a carbon tax. For example, in India the carbon tax emerged first in 2010 as a tax on domestic coal but was later broadened to include petrol and then diesel. So, essentially, the carbon tax in India emerged over a 5 year period in different stages. The tax rates have also been adjusted gradually.

This pragmatic approach is best suited to the current political economy environment of Bangladesh. The pricing reform for natural gas is off the table and the government will not accept taxation of fuel oil or coal for electricity generation to avoid electricity cost escalation. Similarly, the government will oppose the taxation of kerosene to avoid pass through effects on the poor. Consequently, the taxation of petrol and diesel presents the most promising option for introducing a carbon tax. The elimination of fuel oil subsidy at the pump gate through proper pricing policy is a first step in a sequential program to reducing carbon emission from the use of fuel oil. This reform can be combined with the imposition of an excise duty on petrol and diesel that is in addition to the normal applicable VAT. The tax rate can be set in proportion to the carbon content of petrol and diesel, whereby the carbon content of diesel (kg/liter) is about 14% higher than for petrol. The initial rate of the carbon tax can be determined based on expected carbon reduction, the amount of resources mobilized and the level of political comfort. The tax rate can also be varied in relation to international prices. Thus, the tax rate can be increased when oil prices are low (as presently) and reduced when international oil prices go up. A similar approach is used in India.

Bangladesh is way behind in the adoption of clean energy technology, partly due to oil subsidies. The elimination of gasoline subsidy and introduction of a carbon tax on gasoline use will not only reduce carbon emission and raise revenues, they will also provide incentives for the adoption of clean energy technology.

Taxation of timber extraction

Bangladesh faces major challenges in forestry management, including serious administrative and governance issues. As a first step, the forestry governance has to improve including the development of a proper management information system (MIS) for the forestry sector that should be regularly updated. The governance improvement and development of MIS for forestry sector are top priority for arresting the progressive reduction in Bangladesh's forest cover and establishing a sustainable forestry. These are especially important to reduce corruption and illegal tree felling. The reforestation effort must also continue with stronger focus on private investment in forestry. Social forestry development with community involvement and support from public sector could be further strengthened.

Along with these efforts and in the context of an improved forestry management and better MIS, there is a good case to consider the imposition of a tax on commercial timber. The wood furniture industry is doing well in Bangladesh and the demand for timber for both furniture and housing industry is growing. A timber tax can be an important source of government revenue and also support more sustainable timber extraction. The tax should be levied at the factory gate where logs enter for further processing so that all logging, legal or through poaching, are captured in the tax net.

Tax on industrial air pollution

The present focus of government policy to manage industrial air pollution through the adoption of better technology (i.e. the brick kiln technology initiative) should continue. Efforts should also be made to institute proper monitoring of air pollution for major industries. Along with setting air pollution standards for industries, consideration should also be given to the use of pollution charges for heavily polluting industries. The use of pollution taxes are not an alternative to setting air pollution standards and policies for adoption of better technology. But they are complementary and should tend to reinforce each other. For example a pollution tax set appropriately would provide strong incentive to the polluting industry to adopt clean air technology in order to escape paying the tax. The pollution tax can be imposed directly on output based on estimated emission. This is sometimes called an "emission charge or levy or a fee" because this requires knowledge about the amount of emission, the setting of minimum permissible emission standard, and ability to monitor compliance in order to collect the penalty. Alternatively, it can be imposed on the main inputs that contribute to the emission of the air pollutant. Important examples include tax on fossil fuel and tax on chemicals (such as sulphur oxide). This tax on inputs does not require full knowledge of the amount of emission by the industrial units and monitoring of compliance with standards.

The best known developing country experience with an output-based pollution tax or an emission charge is in China (Box 3). Despite numerous shortcomings, the levy system caused a reduction in industrial area and water pollution. The Chinese experience shows that a pragmatic approach to the use of output-based pollution taxes is possible with some degrees of experimentation with the setting of pollution charges provided there is strong monitoring. However, it does require some minimum degree of technical competence in measuring pollution and setting standards. Another complicating factor is the complexity of monitoring multiple pollutants and the large number of enterprises that may be involved.

Box 3: China Pollution Levy System

In 1982 China initiated a large-scale pollution charge system on industrial air and water pollution known as the "pollution levy". Empirical studies of the effectiveness of the Chinese Pollution Levy System suggests that it has played a positive role in reducing air and water pollution despite several weaknesses in terms of measurement of pollution and uneven application (Wang 2002; Wang and Wheeler 2005). The impact on reduction of water pollution was particularly strong. The evidence showed that the higher the pollution charge and stronger the implementation monitoring, the more effective was the levy in reducing pollution. China uses the proceeds from the pollution levy to subsidize the use of clean technology and to finance the administration of these levies.

With limited administrative capacity and inadequate industry-specific air pollution measurement capabilities as presently in Bangladesh, a tax on inputs might be the more pragmatic way to proceed. The government should identify the industries other than brick kilns that generate the most amount of air

pollution, identify the key inputs that contribute to this pollution and impose taxes on these inputs to curb their use and adopt cleaner technology. The main objective here is to reduce air pollution rather than collect revenues. But to be effective, the tax rate needs to be significantly large to provide incentives to reduce the use of polluting inputs and to adopt clean technology.

Expand the use of industrial water pollution charges

Unlike air pollution, Bangladesh has stronger knowledge and competence in measuring water pollution resulting from waste water dumping into rivers or other water bodies by industries. The two most well-known water polluters are the leather industry and the garment industry. The government's efforts to address the water pollution challenge from leather industry through relocation and installation of a common effluent treatment plant are admirable. Similarly, the legal requirement for all industries to install effluent treatment systems for waste water is also commendable. But as experience shows compliance is uneven and government has to resort to financial penalties and factory closures to strengthen compliance. Drawing on the positive experience with pollution charges in reducing water pollution from China, Netherlands, Colombia, Malaysia and Philippines, Bangladesh may want to implement a proper water pollution charge in addition to the current policies. These charges can be estimated pragmatically and varied over time to improve effectiveness. But they have to be monitored and implemented evenly. In this regard, Bangladesh can learn from the long history of China regarding the implementation of the water pollution charge.

Introduction of household illegal waste dumping charge

A major source of air and water pollution is the dumping of household wastes in water bodies and in neighborhoods. With improved solid waste management services from municipalities and private sector as discussed above, this endemic problem might be reduced. But this needs to be combined with educational campaigns, community initiatives and a charge on illegal waste dumping. Without incentives an appeal to citizen's civic sense alone will not work. On the other hand a system of pollution charges for illegal disposal of household waste could be a very strong incentive to improve household cooperation and compliance. This could start as a pilot scheme in the rich urban neighborhoods where the installation of security cameras would assist compliance with such charges.

F. Use of EFR Revenues

The proper use of revenues mobilized through EFR is highly contentious. At the theoretical level, EFR is just another source of revenue and should accrue to the national or local government budgets to fund the budget programs approved by the national government or the local government. At the political economy level, proponents (policy makers and environmentalists) have often argued that the case for EFR can be strengthened by earmarking some or all EFR revenues for supporting environmental programs. The problems with earmarking are well known and economists and financial management specialists generally tend to oppose earmarking. These include: loss of budget flexibility; uncertainty of revenues; inefficient use of earmarked resources; inability to get rid of ear-marked spending items, etc.

Even so, the 2005 World Bank Report on EFR jointly produced with staff from DFID, IMF, GTZ, DGIS and OECD supports some earmarking of EFR resources: "Despite these concerns there may be a case to partially earmark some of the revenue generated through EFR. For example, in countries where environmental agencies are under resourced, the problems associated with earmarking may be worth accepting in order to establish a reliable flow of adequate funding for environmental monitoring and enforcement activities. Not only might this provide incentives to enforce environmental standards and collect taxes or charges, it may also help with public acceptability. In some cases, as illustrated by the discussions surrounding the German Ecological Tax Reform process, the majority of people may want to see the revenue raised from environmentally related taxes at least partially used for environmental purposes" (page 27, World Bank 2005).

Earmarking of EFR revenues is a common practice in OECD countries. As noted in a recent OECD report: "the revenues of about 1/3 of the 375 or so environmentally related taxes are earmarked for a particular purpose" (pp 171, OECD 2006). EFR taxes that tend to be earmarked in OECD countries typically relate to energy taxes, motor vehicle taxes and waste related taxes. Thus, taxes on gasoline and motor vehicles are normally earmarked for road maintenance and development, while waste-related taxes are earmarked for operation of waste collection or for cleanup of contaminated sites. Several EFR charges are used for subsidies for environmental improvement programs. One positive example of this is the earmarking of revenues from water pollution related charges in Netherlands for facilitating the adoption of technologies for reduction of water pollution (OECD 2006). China similarly uses the proceeds from the pollution levy to support the adoption of clean water technology. Another commonly used ear-marking program is to recycle proceeds from a timber tax to subsidize new forest plantations. As an alternative practice, some countries exempt an enterprise from the tax on timber if the logging is combined with reforestation.

In order to suggest an appropriate strategy for the use of EFR resources for Bangladesh, distinction should be made regarding the use of revenues from user charges and the use of revenues from environmental taxes. Regarding revenues from user charges (water supply, sanitation and waste management) the paper suggests a move towards full cost recovery with a view to increasing the quantity and quality of these services and also to encourage private supply. The resources by definition are earmarked for service improvements. Regarding EFR tax revenues, the suggested approach is not to proceed with specific earmarking programs but to combine EFR with broad based improvements in public expenditures that ensure an increase in the percentage of budget that goes for environmental improvements and social protection. Presently, both items are grossly under-funded. Total spending on environmental programs including water management is only 1% of GDP (Ahmed 2017a). Spending on social protection excluding civil service pensions is also only 1.6% of GDP (Ahmed 2015). Spending on these items must go up in order to provide a strong justification for the use of EFR.

Increased spending on capacity building for the development, administration and monitoring of EFR instruments and their effectiveness is in any case a pre-requisite for implementing EFR. Additionally, pubic spending to support the adoption of clean technology, development of clean energy and

reforestation are high priority items with or without the adoption of EFR. The implementation of EFR when combined with these and other environmental improvement programs can strongly improve the political acceptability of EFR. Regarding increased spending for social protection, this is again a high priority for Bangladesh in view of the continued large incidence of poverty and the substantial vulnerability of the poor to environmental degradation and climate change. With the adoption of EFR, increased spending on social protection is absolutely necessary to offset any adverse effects of the price increases on the poor.

Managing the Political Economy of EFR

As global experience suggests, successful implementation of EFR will require careful attention to the political economy of reforms. A good understanding of these concerns is necessary in order to identify proper mitigating measures. As in any reform, there are winners and losers. In the case of EFR, the main losers are the business houses that will have to accommodate the polluter pays principle with higher costs of production and the household beneficiaries of subsidies that will now have to adhere to the beneficiary pays principle and pay full cost of services provided. While these principles are sound from an economic and social perspective, the losers tend to have strong political voice that could undermine EFR unless properly managed. In addition, there is a genuine equity concern emerging from the possible adverse effects of price increases on the poor resulting from the adoption of EFR.

In Bangladesh, in addition to inadequate knowledge of EFR, the above political economy factors have contributed to the absence of the use of fiscal policy for environmental management. As against those constraints, the EFR analysis of this paper and the severe resource constraint on the budget can be important motivating factors for the Ministry of Finance to champion the case for EFR. A growing economy, low international commodity prices, especially for petroleum products, low domestic inflation and a stable government are also major positive factors to support the adoption of EFR in 2019 after national elections.

The analysis of political economy constraints and possible mitigating measures can benefit from the lessons of international experience with how these issues were handled in other countries. While the specific political economy concern and its strength can vary by each country situation, some broad lessons emerge.

- A major advocacy campaign is needed to explain to the public at large the risks of environmental damage and why strong public policy action is needed including the adoption of EFR to address those risks. Along with good research based on facts, partnership with the media is necessary to spread the message. There are poignant stories and examples of how environmental damage hurts the poor in Bangladesh and adversely affects long-term growth. The media sometimes presents stories of environmental degradation from water pollution and afforestation, but a comprehensive campaign under the leadership of the government and linked to the adoption of EFR will be essential.

- A phased approach to the introduction of EFR will be the pragmatic way to proceed. This pragmatism should be driven both by considerations of implementation capacity constraints and by the need to secure buy-in of the business and households opposed to EFR. The international oil market is calm and oil prices are moderate. Bangladesh current oil prices exceed international oil prices by a substantial margin. This is an ideal environment to reform oil pricing and switch from a controlled oil market to a deregulated oil market that allows private entry and competition in the sale of all oil products. This competition will improve efficiency, bring in greater investment, create jobs and keep market prices at or below current levels. As a first step the government should adopt an automatic pass through of all cost increases for fuel oil. A carbon tax can be imposed on petrol, diesel and fuel oil. This reform can then be strengthened over the next 2-3 years with an expansion of the scope of the carbon tax to other oil products and a full deregulation of oil prices. The application of the beneficiary pays principle to water, sewerage and sanitation should be done over several years, starting first with full recovery of operating costs and then phased increases over a number of years to achieve full cost recovery including a return on capital. Similarly, the tax on industrial air and waste water pollution should be initially set at a modest level and gradually increased based on impact assessment on pollution control and incentive to adopt clean technology.

- As noted above, the EFR implementation should be combined with public expenditure policy reform that allocates more resources to environmental programs and social protection. This combined approach has much better prospects for political acceptability and results on the ground than a simple tax or price increase through EFR. All individual expenditure items must be done on merit with full application of the underlying project selection process. Important areas of public spending that will improve social acceptability of EFR include spending on health, education, water supply, sanitation, public mass transit, green space for public recreation and cleaning of water bodies.

- The equity aspects of each EFR must be analyzed and addressed appropriately. This is understandably the most difficult political economy challenge. However, the opposition to EFR that increases prices is often based on protection of vested interest with no necessary relationship with equity. Sometimes, political opposition stems from populism rather than a genuine concern to protect the interest of the poor. In the case of Bangladesh, a very good example of this is the removal of oil subsidies. Evidence shows that the benefits of oil subsidy mostly accrue to the non-poor (Ahmed, et. al. 2016). On the contrary, by eating up budgetary resources the subsidy policy leads to an under-funding of social protection and poverty programs. Similarly, the benefits of subsidy on water, sanitation and waste disposal go to the non-poor. The poor do not have any access to piped water supply (except through standpipes in slum areas) or modern sanitation facilities from urban LGIs. So, the full application of the beneficiary pays principle makes good economic and social sense. When combined with better service owing to improved O&M practices and higher investments, the household acceptability of this reform will

automatically improve. Water and air pollution taxes similarly are unlikely to hurt the poor much.

- Although the direct effects of the proposed EFR many not the regressive, international experience suggests that the general equilibrium effects of some of the instruments could be regressive because of the pass through effects of the affected goods or services as an input in some other production process. The most often cited example is the increase in diesel prices on transport services. Other examples come from increase in the cost of production of some manufacturing goods (e.g. textiles) that may hurt the budget of the poor households disproportionately more. These are empirical issues that need to be properly analyzed. Even if they turn out to be regressive, the results do not necessarily militate against the adoption of the EFR. What they would suggest is the need for corrective measures to offset the possible adverse impact on the poor. This is precisely the argument for combining EFR with higher spending on social protection schemes. Income transfer to the poor household through a well-designed social protection program is the best approach to addressing any adverse effect of the adoption of EFR. Bangladesh is committed to strengthening its social protection programs. It has already developed a far-reaching and comprehensive National Social Security Strategy (NSSS). The government needs to accelerate its implementation along with the adoption of EFR. Additionally, public spending on low-cost green technologies including solar-housing, clean stoves and solar irrigation pumps will benefit the rural poor and help offset any adverse effects from carbon taxation of oil products.

- International experience suggests that building coalition with stakeholders has immense benefits in terms of improving political acceptability of EFR. The government's success in putting its footprint in the global climate change fora is a good example of this. Under the government's leadership the environmental NGO community played a major role in pushing the Bangladesh climate change agenda in international climate change discussions. For EFR, the natural coalition partners would be the environmentalist NGOs, enlightened business and trade communities, the intellectuals, the donor community and the media. There is already evidence of growing concern outside the government about the growing health and poverty risks of environmental degradation. With strong government leadership, the EFR agenda can be developed successfully with active support from these non-government players.

Administrative Reforms for Implementing EFR

Bangladesh has a long history of environmental activism right from the early days of independence. Consequently, it has a fairly comprehensive list of environmental laws, rules and regulations (Ahmed 2017). The main public institution responsible for environmental coordination and management is the Ministry of Environment and Forestry (MoEF). The MoEF has developed standards for air and water quality monitoring. This capacity is stronger for measuring and monitoring industrial water pollution than industrial air pollution. Overall, however, the technical capacity of MoEF to measure

environmental outcomes is limited by several factors including very low budgetary resources (Ahmed 2017).

So far as the adoption of EFR is concerned, the most important institution is the Ministry of Finance (MoF). Although the MoEF is charged with the coordination of environmental policies and management, all fiscal policy instruments including the setting of prices of public utilities and energy prices are controlled and managed by the MoF. The MoF by far is the most competent ministry in Bangladesh in terms of capacity and quality of staffing as well as having a good understanding of the development issues and challenges moving forward. The MoF and the General Economics Division (GED) of the Planning Commission complement each other in defining national strategies and policies for long-term development through the perspective and medium-term developments, and shaping the policies for implementation in the context of the annual budgets.

The MoF is pretty well organized and staffed to manage the adoption of EFR once there is political buy in at the highest level. Capacity for specific EFR policy development is however somewhat limited. The current practice in the MoF is to get technical assistance on specific policy development from local policy research institutions like the Bangladesh Institute of Development Studies (BIDS), the Policy Research Institute (PRI) and the Institute for Inclusive Finance and Development (InM). Partnership with PRI is particularly strong and there has been active collaboration on several areas of policy making including tax mobilization, tariff reforms and debt management. Further technical assistance for the development of specific EFR instruments can be easily mobilized. Over the longer term, MoF needs to develop capacity to monitor the implementation of fiscal policy reforms including EFR.

The main administrative challenge in implementing EFR comes from the weak technical capacity of the MoEF. The two major administrative departments of MoEF are the Forestry Department (FD) and the Department of Environment (DoE). Both are inadequately staffed, especially in the area of technical skills, owing to lack of adequate resources. There are several donor support initiatives to strengthen capacity but without a long-term political commitment to strengthen the MoEF through adequate budget for upgrading internal capacity and for supporting long-term environmental programs related to forestry development and air and water pollution control, the proper adoption of EFR in a comprehensive manner will be a challenge.

In the short-term there are several immediate capacity building priorities for MoEF that can be adopted to facilitate the implementation of EFR.

First, there is an urgent need to develop and maintain proper management information system for FD and DoE. The absence of reliable updated data on such basic variables as area under forest cover, type of forests, forest density, estimated yearly tree felling, estimated new plantation etc. are a serious constraint to forestry management. There are similar problems relating to the adequacy of air and water pollution data. With strong leadership from the Environment Minister, it should be possible to launch this initiative with donor support.

Second, the DoE needs to upgrade its capability to measure and monitor air pollution for large industrial units that are potentially large polluters in major cities. This can start as a pilot program in Dhaka and then gradually extended to other large industrial cities. Bangladesh can learn from the experience of other countries and seek technical assistance from donors. The database thus generated should be computerized and updated to facilitate implementation of pollution reduction measures including the adoption of pollution charges.

Third, steps will have to be taken to tackle all governance problems relating to forestry management and implementation of environmental standards and compliance. The corruption problem in forestry management is particularly endemic and has to be tackled with an iron hand otherwise, it will simply be impossible to implement any forestry related EFR such as a tax on timber or subsidies for reforestation. The availability of an updated MIS will help for cross checking purposes but that must be combined with administrative investigation and monitoring. Stiff penalties must be imposed on both FD staff engaged in any illegal activities and the private sector beneficiary.

Strengthening Local Government Institutions

Regarding implementation of the beneficiary pays principle, the main institution where capacity building is necessary is the urban LGIs that provide water supply, sanitation and waste management services. These are severely capacity constrained owing to the absence of administrative and fiscal decentralization (Ahmed 2017b). A full resolution of this will require a strong political willingness to get decentralization underway. Until such time as this happens intermediate steps can be taken to build capacity in the context of the provision of these three critical services that have major consequences for environmental improvement.

Within urban LGIs, large city corporations such as Dhaka and Chittagong tend to have better capacity than other city corporations and municipalities (Paurashavas). Large cities also have separate water and sewerage authorities (WASAs) that are dedicated to providing water and sewerage services only. The most prominent is the Dhaka WASA; other 4 WASAs belong to Chittagong, Narayanganj, Khulna and Rajshahi. On balance, the WASAs tend to provide better service and have better cost recovery than LGIs who do not have WASAs.

One important administrative reform would be to establish WASAs in all 7 Divisional cities. The three missing ones are for Barisal, Rangpur and Sylhet. This should be an immediate priority for implementation.

Second, some minimum financial accounting and reporting standards will need to be introduced that allows a good estimate of the unit cost of service provided including capital cost. This is essential in order to implement full cost recovery policy.

Third, a computerized MIS system should be developed for urban LGIs providing water and sanitation services that provides basic information on the number of customers, amount of water produced and

supplied, number of hours of water available, the age and quality of water and sanitation infrastructure, amount of revenues collected, missing water in terms of revenues, etc. This MIS should be updated on an annual basis.

Fourth, the capabilities of the Local Government and Rural Development (LGRD) Ministry that provides oversight to LGIs will need to be strengthened to provide better guidance, supervision and monitoring of LGIs. The Ministry of LGRD is also a very important player to facilitate reforms in terms of fiscal decentralization. There are some ongoing efforts to improve the fiscal transfer system through a series of Local Government Support Projects (LGSP) financed by the World Bank. The LGRD Ministry could take advantage of this ongoing project to improve the technical capabilities of LGIs in cost accounting, financial management and the MIS system. This should be complemented with efforts to increase stronger resource mobilization. The full application of the beneficiary pays principle to the provision of basic services will be a major step in this direction. The other important step will be to strengthen the property tax system.

Establishing Independent Public Utility Regulatory Agencies

Proper pricing of energy and other services of public utilities requires independent regulatory agencies. The implementation of EFR will benefit from establishing and or strengthening two important regulatory agencies. First concerns the setting up of energy prices. The second relates to pricing policies for water, sanitation and waste management. In 2003 the government set up the Bangladesh Energy Regulatory Commission (BERC) to regulate the energy industry, facilitate private sector participation in the energy sector and set prices. However, BERC lacks autonomy and is guided by the government in its policy decisions. The conversion of BERC into a fully autonomous and capable institution will be very important for setting oil prices, for deregulating oil market to allow private sector entry and competition, and subsequent oil price deregulation.

The other important institutional reform will be the establishment of the Water and Sanitation Regulatory Agency (WASRA) that will be charged with regulating public and private utilities engaged with supply water and sanitation services and setting prices. This will also depoliticize the setting of proper prices for water and sanitation services and facilitate private sector participation.

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