

Why not adopt a green tax framework in budget?

A differential approach of taxing to types of pollutants and production may be taken. For biodegradable pollutants, less tax, but for persistent, non-degradable pollutants, tax rate should be higher. For export-oriented production, too much taxing may lower competitiveness.

MIZAN R. KHAN

GIVEN the physical and socio-economic parameters, Bangladesh can be regarded as a test case of sustainable development (SD). Our per capita cultivable land and forest are among the lowest in the world. About one-third of our population still lives below poverty line. On the other hand, a consistent economic growth of 5-6% a year during the last two decades and the potential for double-digit growth in near future had and will have gigantic impact on the limited natural resources, such as land, water, forest and fisheries. The challenge of increasing food supply is degrading the soil quality. An increasing number of industries is polluting our water in extreme ways, endangering the public health in the most serious manner. Climate change impacts are likely to pull us back.

Thus, both poverty reduction and economic growth will reinforce pressures on efforts towards achieving SD. So, the challenge is huge -- ensuring growth, poverty reduction and environmental sustainability at the same time. Is there

any feasible way to achieve these multifaceted, often conflicting, objectives at the same time? Perhaps there is and a framework is suggested at the end.

Pollution management

Pollution is the externality that results from both market and policy failures. There are two basic approaches to dealing with pollution: prevent it from reaching the environment or clean it up if it does. Pollution prevention, or input pollution control, is a solution at source. It slows or eliminates the production of pollutants, often by switching to less harmful chemicals, or processes. Natural processes cannot break down non-degradable pollutants. Examples include the toxic elements, such as lead and mercury. The best ways to deal with non-degradable/slowly degradable pollutants are to avoid releasing them into the environment, or at least reduce, by the five Rs of resource use: refuse (don't use), reduce, reuse, recycle and redesign.

Pollution cleanup, or output pollution control, involves cleaning up pollutants after they have been produced. However, there are three major problems with

relying primarily on pollution cleanup. First, it is often only a temporary bandage as long as population and consumption levels continue to grow without corresponding improvements in pollution control technology. For example, adding catalytic converters to cars reduces air pollution, but increases in the number of cars and the total distance traveled reduce the effectiveness of this cleanup approach. Second, pollution cleanup often removes a pollutant from one part of the environment only to cause pollution in another. We can collect garbage, but it is then either burned (causing air pollution and leaving toxic ash that must be put somewhere), or dumped into streams, lakes, and oceans (causing soil and groundwater pollution). Third, once pollutants enter and become dispersed in the air and water (and in some cases, the soil) at harmful levels, it usually costs too much to reduce them to acceptable concentrations.

Both pollution prevention and pollution cleanup are needed, but environmentalists and some economists emphasize on prevention because it works better and is cheaper than cleanup. For widely dispersed and difficult-to-identify non-point pollution, hazardous wastes, and slowly degradable and non-degradable pollutants, pollution prevention is the most effective (perhaps the only) approach. As Benjamin Franklin reminded us long ago, "An ounce of prevention is worth a pound of cure."

Both pollution prevention and pollution cleanup can be encouraged either by the carrot approach of using incentives, such as various subsidies and tax write-offs or by the stick approach of regulations and taxes (based on polluter pays principle). Most analysts believe that a combination of both approaches is probably best, because excessive regulation and too much taxation can incite resistance and cause political backlash. Achieving the right balance is difficult, but such efforts dominate the global debate over environmental policy-making and management.

Industrial countries experience

Governments in the industrial countries have applied a number of regulatory, economic and social instruments to influence behaviour of polluting agents, either at production or consumption level. These can generally be categorised as: a) Laws & Regulations, b) Taxes, b) Charges/Fees for use of a specific resource or service, c) Incentives/Subsidy, d) Pollution Trading, and e) Voluntary Agreements. However,

majority of governments in the industrial countries levy green taxes that fit into the following categories: a) tax on energy or electricity, b) tax on disposal of waste (Trash tax) and c) tax on transportation.

An increasing number of businesses have found that pollution prevention pays. But about 99% of environmental spending in the industrial countries is devoted to pollution cleanup and about 1% only to pollution prevention, a situation that environmental scientists and some economists believe must be reversed at the earliest.

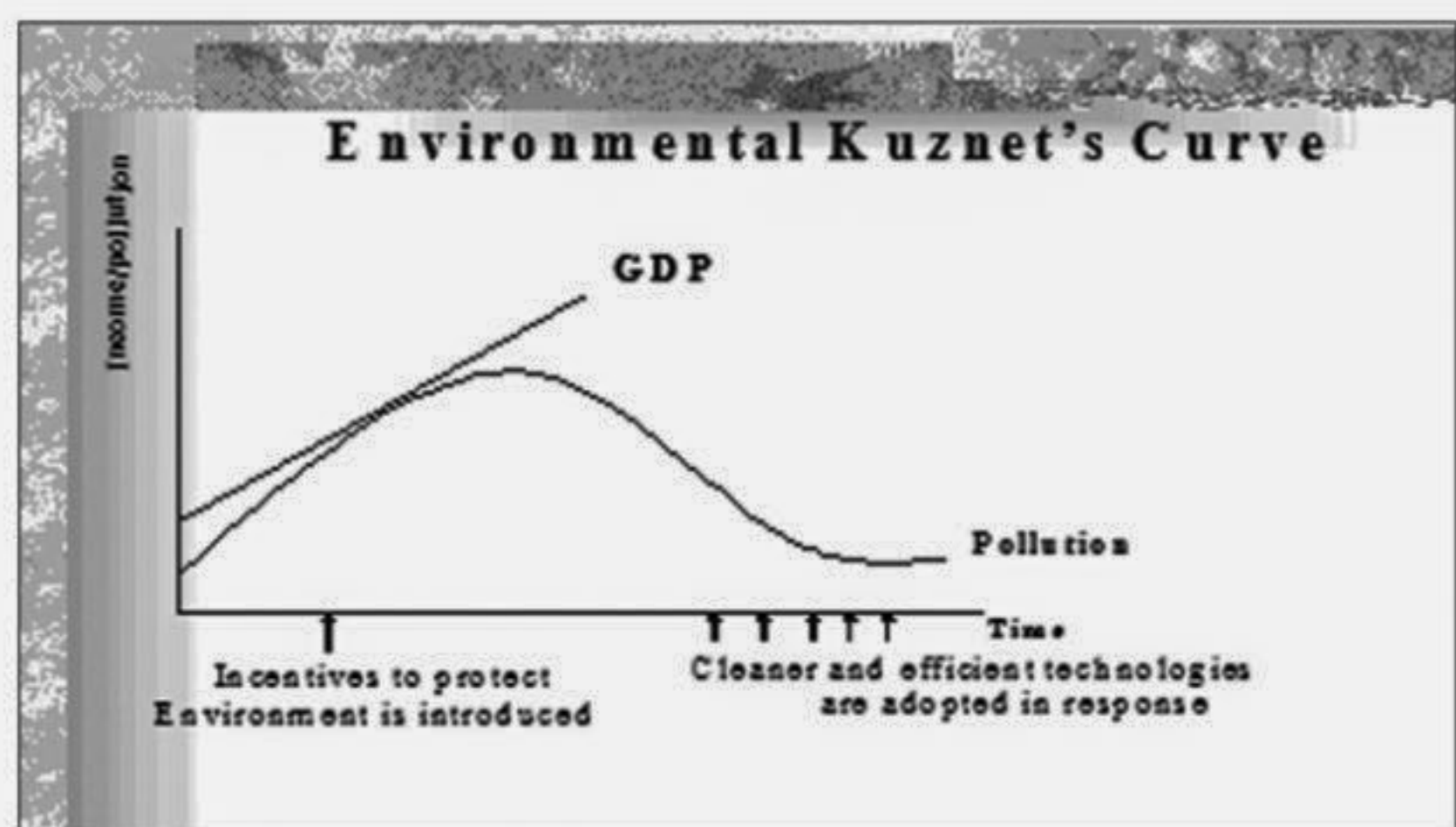
Among the developing countries, China is a pioneer in taxing energy and she offers corporate income tax allowance for reducing energy consumption. China also imposes tax on disposal of household and commercial wastes.

Experiences of development in the industrial countries have corroborated what is now called the Environmental Kuznet's Curve: an inverted U-shaped curve showing that at the initial stage of economic growth, environmental degradation and pollution levels go up; then after a certain level of income is achieved, say \$4000-5000 per capita, it goes down, thanks to investments in natural resource sector and cleaner or cleaner technology.

This might have happened at a time, when those countries could freely exploit their former colonies or import materials from them at cut-rate prices. The result obviously is the overuse of the limited global ecological space by one-fifth of the world population. When most of the developing world still depends on natural resources for their economic growth, can they afford to have a policy of growth first and then environmental cleanup? Perhaps not, and a simultaneous achievement of both the goals by the countries of the world is the global challenge today.

Suggestion for greening the tax framework

Experience in Bangladesh shows regulatory instruments are not functioning as expected, because of lack of effective enforcement, for many different reasons. But economic instruments -- fiscal or financial -- are more effective, as is evident in other countries. So, Bangladesh may initiate a package of tax reform, to internalise green taxing. The slogan of greening the tax framework should be: "tax bads, not goods." The idea is to shift the tax burden from value added by labour and capital (something we want more of, i.e., income/profit) to "that to which value is added" -- namely the input/raw materials and its associated depletion and pollution (something we



want less of).

So, imposing on businesses, what is sometimes called 'sin' tax, on environment-harming activities, and promoting environment-friendly behavior through subsidy or tax write-offs may be more effective ways to ensure environmental sustainability and equity. Similar approach may be taken towards consumers/citizens as well. However, this approach should be revenue-neutral, in the sense that those who already pay tax based on slabs set by the government should not be further burdened. This will allow government's revenue generation, without added cost to citizens and businesses, and this approach will promote environmental sustainability as well, directly needed in Bangladesh.

On the other hand, the government must pursue a strong drive to bring the large segment of non-tax payers within the system, as is known that only about 11% of our budget comes from the tax revenue. This is way below, compared even to many other developing countries. So, a culture of tax payment by the larger society should be instilled in every tax payable agent.

In like manner, to meet the criteria of sustainability, depletion of non-renewable resources, such as natural gas should require comparable development of renewable substitutes for those resources. Economist Hicks or Nobel laureate Solow has emphasised the importance of replacing depleted natural capital by an amount of human-made capital, sufficient to maintain the aggregate social capital non-declining for ensuring sustainability and inter-generational equity. Therefore, a natural capital depletion tax in the form of user-fee (advocated by J.M. Keynes too) would be an efficient instrument to compensate

for the depletion of natural gas. This revenue can be put into a newly-established Renewable Energy Fund (REF), aimed at promoting different renewable energy technologies and also human resource development for the purpose. Some time ago, this writer, together with Dr. Mostain Billah, have done a calculation that around \$200 million can be generated a year through imposing a user fee (through the application of Hotelling rent) on extraction of our limited natural gas reserves. The proposed REF out of revenues from gas will promote both intra- and inter-generational equity, as about two-thirds of our population does not have access to electricity, generated mostly by a rapidly depleting resource -- natural gas. But the limited, rapidly depleting gas reserves belong to each and every citizen of Bangladesh.

The creation of a new green tax framework is challenging. Realistic environmental objectives in Bangladesh context must be weighed against economic and social considerations. Also, a differential approach of taxing to types of pollutants and production may be taken. For biodegradable pollutants, less tax, but for persistent, non-degradable pollutants, tax rate should be higher. For export-oriented production, too much taxing may lower competitiveness. So, this needs to be taken into consideration.

Several organizations including the CPD have already put forward concrete, itemized proposal for tax or incentives for pollution management. It is argued that looking through the lens of this suggested framework will make it easy for application of fiscal and financial instruments to specific activities, inputs and products.

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Pollution ignored.

Global warming and priorities of plant breeding

In stress conditions plant activates mechanism of acclimation and adaptation. Adaptation is related to heritable modifications. Acclimation is defined as the generation of non-inheritable modifications that reflect the physiological change of the plant to cope with abiotic stress.

MD. ABDUR RAHIM

GLOBAL warming is an increase of average air temperature of the Earth's surface and oceans' temperature. The most important challenge for sustainable agriculture is climate uncertainty, more specifically global warming. According to Gallup Polls, over a third of the world's population is unaware of global warming, with people in developing countries less aware than those in developed countries. Anticipated changes in global climate leading to more frequent extreme conditions will need adaptations of agricultural crops in order to sustain agricultural production.

This anthropogenic climate change first came to the consideration of the policy makers after the assessment of the Intergovernmental Panel on Climate Change (IPCC) in 1990. According to IPCC global air temperature increased $0.74 \pm 0.18^\circ\text{C}$ ($1.33 \pm 0.32^\circ\text{F}$) between the start and the end of the 20th century. The main causes for global warming is due to increasing concentrations of greenhouse gases,

resulting from anthropogenic activity, particularly burning of fossil fuel and unexpected deforestation.

The consequence of the global warming is increasing the average air and ocean temperatures, leading to gross melting of snow and ice, and rising global sea level. Increased air temperature directly as well as indirectly affect the agricultural production. In the last decade, severe drought and heat have led to significant crop yield losses in the world including Bangladesh. Furthermore, the magnitude of sea level rising is another vulnerability of Bangladesh.

The coastal areas get frequently inundated with saline sea water during high tidal period and are not completely protected against salt water intrusion. The drought, heat and salinity affect crop yield at almost all the crop growth stages, with the flowering stage being the most vulnerable. The response of plants to water deficiency and salt toxicity involve both short-term physiological responses as well as long-term structural and morphological changes in crops.

The northern part such as Greater Rangpur, Dinajpur and Barind Tract of Rajshahi are the drought prone areas of Bangladesh. The limited irrigation of these areas reduces cropping intensity than the other part of the country where irrigation allows two or three rice crops annually. On the other hand, most of the salinity prone parts are Khulna, Satkhira, Bagerhat, Pirozpur, Jhalakathi, Barisal, Patuakhali, Chittagong, Cox's Bazar, Noakhali, Borguna and Bhola.

The coastal area of Bangladesh constitutes 20% to 30% of the agricultural land. Among the coastal areas, the Sundarbans (mangrove forest) covers about 4,500 km². The rest of the coastal area is agricultural land. The farmers of these areas are severely affected with salinity problem and they need salt tolerant crop varieties. Study justifies planning of plant breeding for global warming to develop drought and salinity tolerant crops in the future.

In stress conditions plant activates mechanism of acclimation and adaptation. Adaptation is related to heritable modifications. Molecular control mechanisms for abiotic stress (drought and/or salinity) tolerance are based on the regulation of stress-related genes. Acclimation is defined as the generation of non-inheritable modifications that reflect the physiological change of the plant to cope with abiotic stress.

However, conventional Plant Breeding has relied upon repeated recombination of adapted material to search for relatively small improvements. Introduction of new genes from unadapted material to the high yielding gene pool has mostly been inefficient, particularly for complex traits like drought and/or salinity stress tolerance. In this case, marker assisted selection (MAS) and quantitative trait loci (QTL) may be more effective tool for improvement of drought and salinity tolerance in agricultural crops.

Finally, it can be said that we should utilise molecular biology tools and conventional breeding simultaneously for the genetic improvement of abiotic stress tolerance. Therefore, government should patronise such research and ensure proper fundings.

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Earthquake devastation: Lessons from Haiti and Chile

From the recent earthquakes in Chile and Haiti, we could find a very good instance of how natural and social factors contributed to increasing or reducing the devastation. Chile is better prepared with strict building codes, robust emergency response and a long history of handling seismic catastrophes. Haiti has no building code and no previous practical experience of handling quake devastation.



Haiti earthquake devastation.

MD. BILLAL HOSSAIN

WHAT are the reasons that increase the volume of damage in an earthquake? Is it possible to reduce this intensity of damages? Is it only the degree of magnitude (Richter scale) that determines the intensity of damages in an earthquake? These are queries from the people who have not usually have much idea about the seismology or plate tectonics. In fact most people when they hear any news regarding earthquake immediately look for reports on Richter scale magnitude of earthquake. But if we look at the recent earthquakes in Chile and Haiti, the Richter scale magnitude appears as not the major factor that contributed to the damages. Chile earthquake was far stronger (8.8 magnitude) than the Haiti earthquake (7.0 magnitude) yet the death toll and other damages in Haiti happened to be higher than Chile. What was the reason behind?

To get an idea we have to understand

first the factors that determine the potentiality of hazard in an earthquake. This potentiality largely depends on some natural and social factors. Natural factors are, Geology, Peak Ground Acceleration (how hard the earth shakes in a given geographic area), Active Faults (fault that has moved recently), distance of the fault from the epicentre, its proximity to habitats, distance of the underground point from where the quake originates (focus or hypocenter) from inhabitants, and time when it happens. Social factors are economy of a country, compliance of building codes, per capita number of seismologists and earthquake engineers, evacuation plan, presence of integrated management system and previous experience of handling earthquake catastrophe.

From the recent earthquakes in Chile and Haiti, we could find a very good instance of how natural and social factors contributed to increasing or reducing the devastation. Chile has a better economy and is better prepared with strict building codes, robust emergency response and a

long history of handling seismic catastrophes. Frequent seismic actions are common in Chile. The country experienced the strongest earthquake on record in 1960, and recent quake was the nation's third of over 8.7 magnitude. In contrast Haiti having very weak economy, there is no building code and they don't have previous practical experience of handling quake devastation because the last major earthquake that hit Haiti's capital Port-au-Prince was 250 years ago.

In Chile there are thousands of earthquake resistant housing structures but in Haiti only a few structures are earthquake resistant. Consequently they paid a lot. Haitian government reported that an estimated 230,000 people had died, 300,000 had been injured and 1,000,000 made homeless making it one of the worst natural disasters in modern history.

Chile's quake was centered offshore, an estimated 21 miles (34 kilometers) underground in a relatively unpopulated area while Haiti's quake struck closer to the surface -- about 8 miles (13 kilometers) -- and right on the edge of Port-au-Prince. This proximity of epicentre to the surface amplified the vibrations and caused far more damage to densely packed urban areas near the Haitian capital.

Apart from Chile there is also a best example of Japan, how they minimized the fear of earthquake hazard. Tectonically Japan is located on the Pacific seismic and volcanic rim and lies over four tectonic plates which made the country very prone to earthquake. But the country progressively minimized the risk of earthquake devastation which is a good learning example for others. According to Global Earthquake Safety Initiatives (GESI) per capita risk casualties to school children is very minimal in Japan compared to other countries. For example, whereas the possibility of casualties is 400 in Kathmandu, 80 in San Salvador, it is only 3 in Tokyo and 1 in Kobe.

A Purdue University geophysicist Eric Calais studying the Haiti earthquake said, "Earthquakes don't kill -- they don't create damage -- if there's nothing to damage". Though among the natural disasters earthquake is one of the worst that can't be predicted and might cause massive devastation in a few seconds and humans have no power of control it, but they can minimize the intensity of damage. In this context Haiti and Chile earthquakes are good learning examples for us to develop, review and update our own earthquake preparedness to save the lives and properties of our people.

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