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Globalization and Complexity of Environmental Governance in Sustainable Development and Climate Change Policy Diffusion Mechanisms in Developing Countries - The American Response and the Case of Bangladesh

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Abstract: In a highly interconnected world, large groups and communities are working hard to work toward common goals. Various institutional problems have however surfaced for multiple complex reasons, coupled with sectorial policies and ineffectiveness. Therefore, this interconnected-ness has caused significant stagnation in the collective progress, particularly in the field of climate change policies around the world. This paper focuses on policy mandates in global arenas that make their way to individual states around the globe, as with globalization and more public involvement, novel and complex challenges have been created that were never faced before.

Introduction

For whatever reasons, human beings first appeared on earth a long time ago. Throughout the years we have evolved into consumers of goods and services, developing markets for trade and exchange for the subsequent individual and social welfare (Stone 2002). Then, a dilemma appeared - now most famously termed as the tragedy of commons, natural resources owned by all were exploited to the point of depletion by a few. The implication of this gross self-indulgence is not only affecting our collective welfare but reduces the life of the ecosystem that supports us, potentially leading to the eventual demise of our so called economic growth and everything related to it, including the human race. Some suggest the impossibility theorems and its applicability to sustainable development (Daly 1992). After all, the

economy is an open subsystem of the earth's ecosystem, which is a finite system and also, materially closed – meaning economic growth will ultimately engulf the earth's resources, putting an end to nature as we know it, and by extension everything that lives on it, again, including us.

Historically, humans have been insignificant in changing the future of the planet. It all changed during the Industrial Revolution which presented the reigns of control of the earth and her resources to mankind. Industrialization in the history of mankind have given rise to an ingrained practice of wasteful resource utilization with limited focus on the efficient use of all available capital – natural ones included. Hence the need for sustainable development practices ultimately emerging from this notion. But what is climate change, and why is global warming occurring around the planet? Greenhouse gases trap energy from the sun in the earth's atmosphere and heats it up. While this is necessary for life on the planet, higher amounts of emissions and increases in Greenhouse gases are speeding up this warming. The change in temperatures is melting polar ice caps, which is increasing sea levels and displacing human beings from various coastal regions around the world. Hence, the most sensible option is to significantly reduce emissions so that heating could be slowed down. At the same time, adaptation plans for these changes need to be drawn up and enforced. These emissions are mostly given off from industrial plants, locomotives, living things and buildings.

As majority of GHG emissions comes from energy, it is crucial to streamline this sector and bring technological innovation to the systems. Recent energy efficiency and decarbonization of the U.S. economy falls short of the required level for achieving the goal. 80 to 83% of U.S. emissions are to be reduced by 2050 with CO_2 accounting for 80% of all U.S. GHG emissions, which is why carbon emission reduction is especially important. However, ambitious decarbonizing would still fail to yield desired emission reductions, unless the U.S. move to rapidly declining energy intensity levels and remain on the path for an extended period of time (Lester & Finan, 2009). Repeated studies have however, showed that significant

barriers to clean technology developments exits around the world. Firstly, behavioral barriers exist in the form of knowledge gaps, incorrect perception, misinformed constituent opinions, concerns or stewardship. Next, limited action capacity, administrative issues or implementation problems make up the institutional barriers. In addition, there are technical barriers, involving skills, complexity in technological systems integration, management and facilitation. Moreover, political or regulatory barriers also exist in discriminatory or regulatory policies and state monopolies. Finally, the financial problem – especially in incentives, conventional subsidies, risk-management in costs, the reality of inadequate investment returns and high upfront or transactional costs, also serves as a major hurdle to comprehensively addressing this global change (Glemarec, 2011). The questions that now need to be addressed include - what about the overall economy? Will most people support a global effort to slow down or stop global warming if it hurts the economy? Does politics play a role in this, or how the political agenda setting media portrays it? Do people from different social spheres or who belong to different political parties recognize or identify with this problem the same way? It is very important to understand why people support policies, is it always because it will address the pressing issue or is it because of other factors? A lot of factors influence the public's opinion on how best to approach climate change mitigation solutions. These factors are indeed based on their economic well-being, both individual and collective. It also depended on their political affiliation, adding degrees of complexity. In an interconnected and global world, this has major implications on people outside of their countries, especially in developing parts of the globe.

Costs

Since economic implications of climate change solutions were the major roadblocks to their realizations, the cap and trade mechanisms for carbon trading was found to be a cost effective approach to mitigating or reducing emissions. Both market based and regulatory approaches would influence the total cost of the scheme, but these

costs would be distributed throughout the economy for society to bear. GDP-CO_2 relationships are hard to draw internationally as primary verifiable data remains highly variable over time and between nations (Grubb et. al 2006). But it is clearer for national considerations, for instance, the cap and trade provision with the American Clean Energy and Security Act 2009 could potentially lead to a reduced U.S. GDP of 0.25 to 0.75% by 2020, and 1 to 3.5% by 2050 according to the Congressional Budget Office. With adjusted inflation, in 2050, the GDP will be 2.5 times as large as 2009, when the study was conducted.

Emissions and Economic Development

Legislations also have deep-rooted public implications, especially in terms of employment. Jobs are a hot topic in current times, and this aspect of climate regulations has received great importance recently, as stringent policies in carbon emission reductions would not benefit labor markets which is slow to adjust to the shift, compared to the output demands. CBO also estimates a possible loss to purchasing power, primarily affecting the middle of the income distribution (Elmendorf, 2009). American public opinion and support on this issue is generally skewed and divided. As an international problem, the issue of climate change cannot be resolved without significant international cooperation and coordination. Moreover, international CO_2 reducing energy policies are largely country specific and dependent on different variables (Dinica, 2002). While the challenge in the US is to balance sectorial energy supply towards secure, affordable and clean technology for economic growth, while simultaneously reducing emissions, in other developed countries like Europe, the economic system can respond to the carbon constrained factors while maintaining the same level of GDP. Also, in Europe's case, cap and trade can be fully utilized to reduce 75% of Kyoto costs when compared to zero usage of carbon trading (Menyah and Wolde-Rufael, 2010) (Capros & Mantzos, 2000).

Another benefit is that carbon markets can lead to enhanced renewable energy technological integration and greater environmental performance, as local solutions

have lower costs and risks and more accommodating energy portfolios. Also implementation at this level is not only just reliable or cost-effective, but more realistic and manageable than national energy policies, hence higher chances of success and addressing the issue (Capros & Mantzos, 2000). But with increased population, income and economic growth, the intensity of emissions relative to activities must also be carefully evaluated. So even though individual energy sources may emit less or no carbon based particles, increases in total energy users due to population growth, lifestyle changes and higher consumption due to improved economic growth, may overall negate it. Adding to the mix is complexity arising from the economic, technical and political difference among conflicting regional, national and local circumstances. Global growth rate for population and per capita income can outpace the rate of decline and intensity, meaning incremental changes affecting the latter cannot achieve sufficient overall decline to reduce emissions over decades. Higher costs of this initiative should be weighed with the dangerous costs of climate change. The two-fold challenge therefore, is also to adopt and implement policies to encourage the development and use of low GHG emitting technologies while maintaining a sufficiently high rate of intensity decline over the long term (Blodgett and Parker, 2007).

Global Action

Global Warming, and an immediate need to mitigate its causes, has therefore become a major political concern everywhere around the world, besides adapting to these changes by being resilient. Although scientists, politicians and policy makers alike have varied views on this issue, many have been trying to find out how to stop it or slow it down, and what might be the most cost effective way of doing so, or even if it is possible or not. On the other hand the industry, academia and the policy makers alike can gauge the awareness of the issue of global warming, their perception of the level of agreement among experts from various fields and especially about the concern about their impacts. With the general growth of both the scientific, industrial and political work across many academic fields, it is hardly

surprising that this interrelated issue of depleted resources and climate change, and its possible solutions, have attracted considerable attention around the world in recent years. It is surprising, however, that there still exists a significant amount of disagreement on the existence of this global issue, and our collective willingness to do something about it. More importantly, besides emission reductions, sustainable development also serves as a key consideration in the global warming discussion (Metz 2002). For this study, a way to simply define sustainable development is attempting to meet the needs of the present without compromising the future generation's ability to meet theirs. How can global policy makers address this issue? Adherents of the public choice theory observe that politicians and bureaucrats who are the manipulators of public behavior act, perhaps surprisingly, not in the benefit of the world or nature, but in their own self-interest. So the power base that controls the people and who are supposed to correct the trends of natural resource overuse by the public have themselves, knowingly or unknowingly, taken part in the exploitation. Coupled with the roles of the corporate elites who have, at times taken precedence even before elected officials, climate scientists are potentially also being paid off by the likes of oil companies to deny climate change entirely.

The resulting nexus is the delay in any cohesive global action with the use of rhetoric. Perhaps it is due to this constant tug of war, that there exists a discrepancy between the economic theories and the environmental policies that are supposed be based on the former (Deitz and van der Straaten, 1992). Seen as two sides of the same coin, theory suggests that the externality situation characterized by market failures can be corrected by imposing charges on the polluting and natural resource depleting parties, but policy work suggests that it is physical regulations that will ultimately lessen the environmental ill-effects. This suggestion of a missing link has a real world example – The United States and the Kyoto Protocol come to mind, where the U.S., one of the largest global polluters and the nation leading the environmental policy and analysis work, decided not to ratify the treaty on the grounds that a cap on emissions would cause the nation to put a ceiling on its economic growth. The effects of their pollutions are felt around the

world, mainly by low-emitting developing countries that are not capable of facing the environmental challenges of the era. As a result, drastic, rapid and dramatic change is needed in the mitigation of global warming, loss of habitat and resulting loss of biodiversity as deforestation and food security is threatened in addition to the depleted water and energy reserves, as will be further pointed out eventually in a country specific assessment in the paper. The U.S. plays an important role. Recently there is a great difference in the collective influence of the large multinational corporations and the local communities. The wealth, ownership and power distribution has been unbalanced that has caused dissidence among people around the world, while military spending has been increasing, even during economic downturns in the absence of any major armed conflict (Wells 2007).

Globalization and Complexity

So the question remains- Can we, as members of society, collective embark on a quest to find a solution to this global crisis? The participatory model in society can be seen as a hindrance to the overall goal (Küpçü 2005). Analysts do in fact debate that state sovereignty is the main driver of world affairs and no matter how much we try to define the global governance of the 'World Government', progress has been limited. Some things like peace and security, trade and health require policies at the global level which is why anchor institutions like the WTO, WHO, IMF and UNEP exist, but in an individualistic observation, it is clear that some if not a majority of the nations are at odds over economic and environmental goals which is why this multilateral system is currently under threat (Ivanova 2010 and Simms 2005). Moreover, democracies around the world, where the majority of the earth's population currently live, regardless of their actual operational definition are ineffective in finding a solution for this eminent problem. Some common examples are the extreme minority representation of almost all 'green parties' around the world's political stages (Hayward 1995). Larger democracies and economies like the United States have failed to partake or ratify important treaties on the environment even though they pioneered environmental legislations in the 1970s.

Market based incentives might work, but corporations are seen as poor custodians of our future as they are driven mainly by profits. NGOs, research institutions and members of the academia are constrained within own their frameworks and are at times excluded from global decision making.

With the current significance of the environmental problems, political responses to these issues determine the planet's future, and the effects of the environment also shape political processes. There has also been a rise in authoritarian regimes, albeit, environmental in nature that seems to be more adapted to answering the calls of challenge we are currently facing. Without the concern of re-election, authoritarian governments successfully address issues that democracies such as the U.S. are not prepared to collectively face (Beeson 2010). This is mainly because as government attempts to regulate and influence public behavior, especially regarding the environment, civil liberty might be affected. China's prominence and the fact that it was very likely reach the Copenhagen emissions limit by 2050 is due to the fact that China's authoritarian rule could enforce extremely personal laws such as the 'One Child Policy' in the 1970's that would be unimaginable in most democratic states. However, demerits of such governments do exist. Repeated negligence and exclusion of social actors and susceptibility to centralized eco-elites can in fact cause policy implementation problems in nearly all stages. More and more governments are institutionalizing projects and programs that integrate environmental objectives in non-environmental policy work such as Environmental Impact Assessments (EIA) and both vertical and horizontal Environmental Policy Integration (EPI) features. However, once again the implementation is lacking where it is needed the most-developing countries (Lafferty and Hovden 2003, Eseland and Jimenez 1992).

Developing Nations

The developing countries are themselves having trouble making and implementing laws and policies. Implementation is the core component of all global governance initiatives with the actual policy mechanisms being more important. Due to their

stringent budgetary conditions, the cross-national mechanism through which international agendas are reaching the domestic level for action is largely based on regulations, although it would make more sense to impose a price-based intervention as monitoring costs for emissions and the abatement enforcements can be expensive which is why indirect taxes or subsidies might be preferred where solutions should be low-cost and easy to implement.

The trends of globalization have unveiled greater influence of privatized environmental governance on the global scale (Falkner 2003). The essence of global environmental management with economic and social implications have therefore started to shift away from state capacity thereby empowering the civil society which saw the rise of activity organizations and interest groups gaining power as non-state actors, where different actors are capable of having differential access to decision making (Hessing et al 2005). This will have a profound effect on international relations as the trend predicts an inevitable and likely shift from states towards firms, heralding a new dynamic of interaction between the public and private sectors (Jörgens, 2012). The main reason for this is the neoliberal notion of 'free trade' efforts where trade barriers have been sought be removed completely and this is seen in various countries where the governments have resorted to replacing environmental regulations with standards such as the ISO series for example (Clapp 1998).

Policies are at times made considering public support. Although no two major world problems affect a certain group the same way (e.g. world hunger, health insurance) global warming and its effects on humans have a multidimensional effect on the world citizens. At times their knowledge and opinions are shaped by people around them, media and a host of other issues. This makes them support or reject policy recommendations, especially if it has direct implication on their lives. Lower energy consumption or stricter emissions standards are a few examples of climate change mitigation schemes, but adhering to these principles means a probable change in the way of life for most people. So to what degree would they agree to change their

lifestyle for the global good? Do they act in their own self-interest or to provide wellbeing to people in rural communities who are greatly affected by climate changes caused predominantly due to emissions from larger industrial nations such as the US? Do they operate in an ecofriendly manner by choosing to reduce their carbon footprint, because they are legitimately worried about the state of the planet or because it is a way to save money? And most importantly do, they care about other impoverished nations, who, while not contributing to the emissions, suffer more than the guilty parties comprised mostly of developing nations, with the U.S. and Canada being the highest (Figure 1 and 2). These are all questions that surface from an overall review of this paper's topic of discussion.

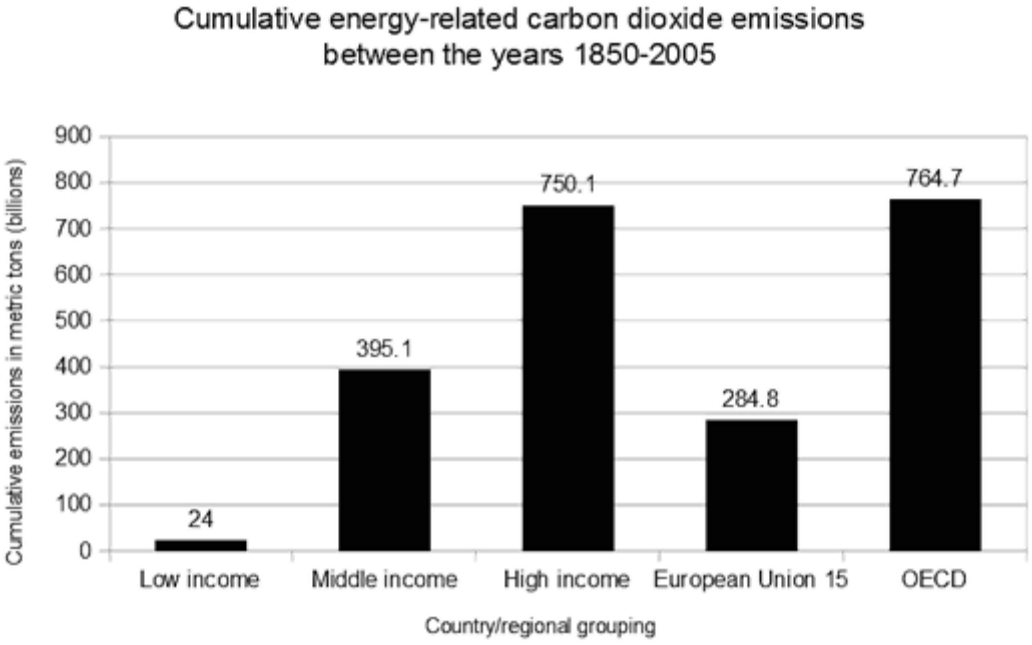

Figure 1: CO_2 emissions among regions

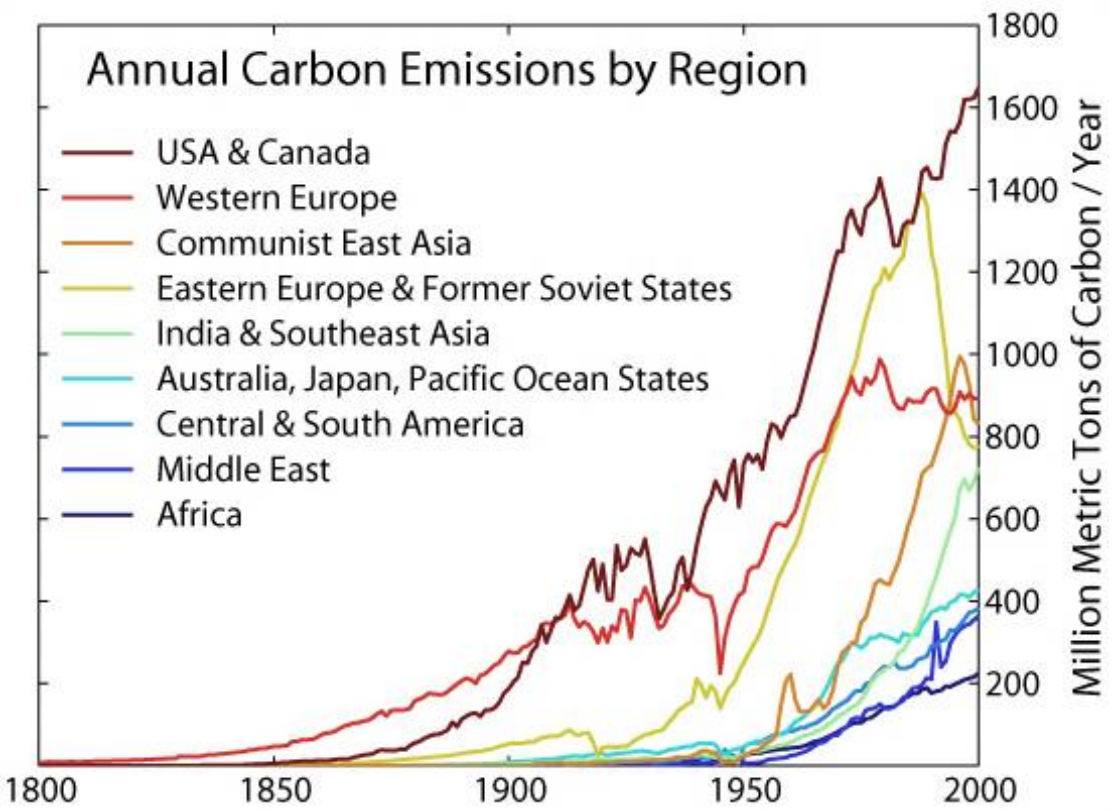

Figure 2: CO_2 emissions by countries and areas

Bangladesh

One of the most affected nations due to global climate change, Bangladesh, also one of the poorest nations on the planet, is suffering from monumental problems in the environmental sector. With acute shortage of energy, gas and water, in addition to widespread pollution of air and water, the country is currently experiencing huge inefficiencies and loss of national productivity in addition to loss of life and property each year. Although the major stakeholders hold varied perspectives on the above issue, their key position is consistent with each other but at odds with that of the public sector. In any case, the current paper ultimately researches the conclusion that the national framework would need to be evolved into a more efficient and prompt model by diversifying operations and services. Bangladesh is the most vulnerable nation due to global climate change in the world according to German

Watch's Global Climate Risk Index (CRI) of 2011. This is based on the analysis of impacts of major climate events that occurred around the world in the twenty year period since 1990. The reasons are complex and extremely intertwined (Van den Bergh 2004).

Located at the bottom of the mighty GBM river system (Ganges, Brahmaputra and the Meghna) there are a total of 57 trans-boundary rivers coming down to it; 54 from neighboring India and 3 from Myanmar. The country which has no control of the water flow and volume drains to the Bay of Bengal over 90% of the total run-off generated annually. Coupled with the high level of widespread poverty and increasing population density, limited adaptive capacity and poorly funded, ineffective local governance has made the region one the most adversely affected on the planet. There are an estimated one thousand people in ever square kilometer with the national population increasing by 2 million people each year. Almost half the population is in poverty (Purchasing Power Parity of $1.25 per person a day). Hence neither do these people have the ability to respond to a natural disaster nor can the government help them. This is one of the main concerns regarding the country around the globe. Even as the weakest contributors to global emissions, they are the most affected by the effects of climate change, but surprisingly climate policy is not a major topic in political discourse in these least developed countries. (Huq, S., et al 2004)

Major Concerns

In the urban sector, Bangladesh is at a very crucial point, where the current state is highly volatile. By 2020, the size of Dhaka City, the capital of Bangladesh is projected to double, becoming the most populated city in the world. One of the main issues, energy is affecting not only the current lifestyle and basic comfort but also the national growth and productivity, keeping the nation underprivileged in economic terms. In addition, water is rapidly declining. The contaminated supply is causing diarrhea and cholera and causing deaths in rural areas outlining the cities. The ground water table has been lowered to dangerous levels causing a void to

create, which might collapse with earthquakes that are frequently taking place in Dhaka. With over 450 mcm of pollutants, (where 70 mcm is considered 'highly polluted' by World Health Organization) air pollution in the city of Dhaka was noted as the highest in all the cities in the world. The same city also has the highest population growth on the planet, meaning more people are suffering per unit area than anywhere in the world. Effectively, bricks kilns are providing homes for these population growth statistics that are coming to Dhaka and the kilns are producing the pollutants, resulting in a truly viscous circle. The kilns also take up 0.24 billion trees a year, causing deforestation and soil erosion. This significantly reduces the soil's fertility to address the hunger issue, as well as makes it unfit to absorb water during the regional, annual floods which claims many lives each year. According to National Geographic, Bangladesh is also most affected nation due to climate change in the world (Braun 2010).

Transportation

The most common issue that people in Bangladesh, especially in urban Dhaka face is the massive traffic mismanagement, besides the shortage of energy and gas, and water scarcity. Perhaps one of the most talked about issue in Bangladesh is therefore, the traffic flow and transportation plans. Frequent traffic jams waste valuable fuel and time and makes travel very unpleasant and difficult. Furthermore, this renders the existing public transport system very inefficient and most importantly adds unbearable and unsafe levels of noise and hazardous air pollution to an already unregulated country. The noise levels and pollution cause stress in most people and lead to many life threatening medical conditions such as cardiovascular diseases and blood pressure related ailments. Traffic congestion changes during the day, and planning for trips is becoming impossible. Not only do commuters lose valuable time stuck in traffic, they have to leave early in hopes of making up for or altogether avoid a traffic jam. Conversely they have to wait for others trapped in the congestion, which greatly affects the daily productivity. This is something that affects everyone irrespective of their social or economic status.

The current infrastructure also poses great social problems, especially for the elderly and youth. With the constriction of cars and other vehicles, old and young people lack independence and means that their escorts also waste valuable time. Walking constitutes a major mode of travel among the low-income majority. However, this majority of pedestrians are consistently ignored in the planning of transport. As a result of the unplanned and overwhelming traffic situation, people started using bicycles, which have become efficient transport systems but risk their lives on the dangerous streets. Almost 80% of all traffic fatalities in the city of Dhaka alone involve pedestrians being hit by a fuel based vehicle. Private cars, a mere 4% of the total vehicles in the country, represent vehicles which take around 70% of the road space. Although, the change to Compressed Natural Gas (CNG) cars saved over 4000 premature deaths in 2009, their cheap price has spiked the total numbers of cars on the streets. This can lead to a potential decrease in the amount of natural gas available for other national purposes. Bangladesh banned earlier auto-rickshaws, or 'scooters' as they were called, because of their emissions and replaced them with CNG driven ones and literally painted them 'green'.

It was due to the vast supplies of natural gas in Bangladesh, that the government had since encouraged the development of four-stroke compressed natural gas (CNG)-powered engines rather than the older two stroke engine petrol-running models. Two-stroke engines had been identified as one of the leading sources of air pollution in Dhaka. Thus, since January 2003, traditional auto rickshaws were banned from the capital; only the new CNG-powered models were permitted to operate within the city limits. All CNGs are painted green to signify that the vehicles are eco-friendly and that each one has a meter built in as standard. However the policy makers could not foresee that the meters were not utilized in fixing fares, or the absolute havoc gets created outside of CNG pumps during peak times of the day. This lack of vision and conflict of interest was also observed in other policy areas, especially during the discussion of the Tipaimukhi Dam. This international partnership had to be very carefully assessed before finalization as,

although it would help in the regional flooding situation in certain parts of Bangladesh during the monsoon, it would result in a loss of crop productivity in the north-east as well as being disastrous for the local biodiversity, causing permanent damage to the riverine ecosystem. As a low-lying region, the people lives are mostly in constant danger, especially in the coastal area of the Bay of Bengal (McGranahan 2007)

Many government and public transport agencies drafted policies, undertook projects and implemented programs to solve these problems of traffic congestion. For example, the Dhaka Integrated Transport Studies conducted by the Ministry of Planning in 1991-1994 found that not only did the uncoordinated activities of Dhaka City Corporation (DCC), Rajdhani Unnayan Kartripakkha (RAJUK) and Bangladesh Road Transport Authority (BRTA) not yield the desired effects or alleviate the problems but also that there was no single organization responsible for improving the transport and traffic problems of the city. With financial assistance from the World Bank, in 1998, Bangladesh Government created the Dhaka Transport Coordination Board. An urban transport plan was commissioned and launched in 2008. It laid out a comprehensive transport plan for the Greater Dhaka City and its adjoining areas, such as Tongi, Gazipur, Savar, Narayanganj, Keraniganj, Narshingdi and Manikganj. The plan looked at 15 Key Policy issues including safety, pedestrian preferences, public transport, non-motorized transport, travel demand management, mass transit systems, etc. Almost 70 different policy recommendations were produced under these 15 issue areas. 10 comprehensive transportation strategies were then evaluated, using various scenarios. Furthermore, the plan included provisions for 54 new roads in and around the city, 3 part elevated expressways and a circular waterways program. But again no progress took place whatsoever in the specific timeline. In fact, allegations of corruption and lack of bureaucratic transparency has resulted in more complications like the World Bank pulling out of the Padma Bridge funding

situation, where the ruling party resolved to addressing issues not with verifiable solutions, but with political rhetoric (Sunny 2011).

Water

Water scarcity will be a major issue in the near future, not just for Bangladesh but the entire planet. The International Water Management Institute (IWMI) recently concluded that almost twice as much water as consumed presently will be required to support the world's population. Most speculate that the planet will be bombarded with regional droughts in some areas, and with unlivable flooding in others. Both of which are equally disastrous. The problem is not constrained to agricultural water. The availability of clean water is rapidly diminishing with increasing global and national population. Around 80 per cent of the ocean population is too polluted to drink due to land based activities, while a great portion of lakes and water bodies are too polluted to allow fishing, swimming or support aquatic life. Global warming and subsequent melting of icecaps have raised the seal-level, which, coupled with deforestations, make room for the growing world population has cased various organism ecosystems and biodiversity to be lost each day. Bangladesh and other regional countries are therefore entering a water constrained world in this era. (Barker 1999)

In such low income countries, water and sanitation are major issues as already stated in this paper. The poor majority lack access to clean water and safe sanitation while others use fresh water to flood urban toilets which adds raw sewage typically dumped directly into the rivers. Bangladesh is famous for its flooding (and rivers), and although in principle it affects the entire nation, it is the rural poor again who lose their limited property and even their lives. In the urban side, due to the rise in population, the cities are growing at alarming rates, meaning more and more structures are being built, resulting in deforestations and a lack of greeneries that had the ability to sequester plentiful and harmful carbon from the earth's atmosphere. Moreover, these buildings which are at times unsafe, unhealthy and unplanned are built on land grabbed illegally. RAJUK and DCC have been for

long designated as the custodians for ensuring Dhaka city's environment. But the political framework has left the job completely undone. The Detailed Area Map promised to save Dhaka from unplanned land use and while the committee found around 3000 acres of flood-flow zones which needed to be relocated in addition to other 3000 industries and scores of projects, no steps were taken whatsoever. This is also why the surface water sources which would have provided water to the decreasing supply from Dhaka Water and Sewage Authority (DWASA) is in itself disappearing due to these rapid constructions (Sunny 2011).

The scarcity of water will have a direct impact on the future of the nation's existence. Already struggling with supplying clean water to the urban inhabitants, Bangladesh will face severe water shortages in the coming years which will have a disastrous effect on its majority agrarian populace as well as on the urban population. The present demand in Dhaka is around 2500 mcm (million cubic meters) while the supplied quantity is well under 2000 mcm. In a few decades the demand is forecasted to rise to around 5000 while the supply will be almost still the same, perhaps crossing 2000 mcm. A few decades ago, the majority of Dhaka's surface was covered with water bodies. Recent boom in the urban population has left these water bodies to be filled up to make way for construction. The remaining water has been polluted due to land based human activities. DCC collects around 70% of the 4000 tons of city solid wastes, while the remaining 30% (some of which even clinical wastes) get dissolved in the wetlands, canals and other water bodies. WASA can only treat a minority of available sewage. The city is currently depended primarily on ground water. More dangerously, the ground water table is declining. Recent earthquake trends is also worrisome as Dhaka, with its unplanned buildings with cramped population would suffer monumental losses. The hazardous attribute of the city planning also slows down the ground recharge as the area is greatly lacking open spaces. The most direct method is to conserve the use of water and taking a serious stance against land grabbing of water bodies and manage the current surface water treatment plants more effectively. But again, as was noted in

the traffic situation, the agencies and departments within the government ministries have continuously ignored the problem or failed to come up with solutions which helped to alleviate these problems. Projects are supervised under international organizations and developed nations should work closely with global partners to ensure successful outcomes.

Energy

By 2010, the maximum power generation in Bangladesh was at 4699 MW and paled against the national demand. Again, due to inaction from the various governments, deteriorating infrastructure, international production sharing disagreements and distributive systems losses of almost 14%, the power sector needs to accelerate to lead the economic development of the nation. Perhaps the key reason is the lack of available feedstock – as there is an eminent shortage of gas, but inefficiency also plays a role. Although demand side management has been improved, steps should still be taken to rationalize any tariffs that continue to affect the financial viability of utilities or foreign investment possibilities in the national energy sector. Besides, as expected, there exists significant bureaucratic hurdles and any major contracts with transnational oil companies are considerably highly partisan. The energy situation has direct implications on the economic growth of the nation although the per capita electricity consumption does not cause per capita GDP (Mozumdar 2007).

However there have been certain breakthroughs in recent years. There has been a 7% growth in electricity since the 1990s serving 12 million customers alone over a transmission line of over 8000 km, and a distribution line of just under 3,00,000 km. But still only about half of the population has access to electricity and the 130-140 kWh yearly per capita generation is among one of the lowest in the world. Although the government has plans for further generation, the goals are very ambitious. By the year 2016, the government plans to generate over 6000 MW of power through public generation and over 7000 MW through private generation. By 2021, they plan to provide 20,000 MW power to its people. There have been 1132 MW of electricity that was connected to the grid from 21 new power plants in late 2010

while around 3000 MW more from 33 more plants are expected. For these goals to be reached extensive financial and infrastructure mobilization is necessary as 2200 km of transmission line and 50,000 km of distribution line will have to constructed for power distribution. Not only is the infrastructure development a challenge, the feedstock needed for energy production is also running low as mentioned earlier. Given the nation's track record in various other sectors, comprehensive enhancement of the energy sector is not improbable, but likely impossible in the time frame set up by Vision 2021 to 'digitalize' the nation (Bhuiyan 2010).

Currently, 79 natural gas wells are present in the 23 operational gas fields which produce over 2000 millions of cubic feet per day (mm-cfd). It is well short of over 2500 mm-cfd that is demanded, a number which is growing by around 7% each year. In fact, more than three-quarters of the nation's commercial energy demand is being met by natural gas. This influential sector caters for around 40% of the power plant feedstock, 17% of industries, 15% captive power, 11% for domestic and household usage, another 11% for fertilizers, 5% in compressed natural gas (CNG) activities and 1% for commercial and agricultural uses. CNG is substituting more that USD 0.8 billion worth of foreign exchange annually and is also used in most vehicles on the road. In addition to CNG, Liquefied Petroleum Gas (LPG) is also demanded at around 0.1 million tons. The nation furthermore demands 3.5 million tons of oil imports in addition to almost 2 million tons of diesel to feed oil-based power plants being planned and built all around the country. The additional petroleum and coal imports are causing a disruption in the GDP by as much as 2% annually, which is extremely worrisome in a low income poor country like Bangladesh. The new purchases are affecting improvement initiatives in other sectors causing reduced export earnings (ready-made garments etc.) and curtailing employment opportunities. This massive failure in the energy sector is again mostly attributed to prolonged negligence, inappropriate implementation, inefficiency and lack of planning. To make matters worse, natural gas reserves are expected to expire by 2020. The only coal mine of the country is in the development stage, the reserve of

which is also expected to dry up anywhere from 75 to 80 years after the start of their operations. So even if the transmission and distribution line can be constructed and enhanced, the energy sector would still need to work on other areas to provide uninterrupted supply as promised. Again, this goal is highly ambitious and unlikely to come to fruition (Sunny 2011).

The National Renewable Energy Policy of the Ministry of Power (2008) planned to meet 5% of energy demands by renewable energy sources by the year 2015 and 10% of the demands in 2020. The policy panned to coordinate these efforts by making the "Sustainable Energy Development Agency" but that governing body was never made, even in four years since its promise. This plan was at odds with other milestones such as that of the Bangladesh Atomic Energy Commission's plan of increasing nuclear power by around 30% by 2030, while increasing renewable energy contributions by a mere 6%. How can one government ministry (Ministry of Power) give conflicting milestones to its policies and agency objectives? The major contributor of renewable energy in the country, the Kaptai Dam was built by the provincial government of East Pakistan, much to the discredit of the current government. Private sector is mostly responsible for the remaining growth in the renewable energy sector; mainly in photovoltaic and solar set ups in both urban and rural areas of the country as the nation has a good potential for harnessing renewable energy sources such as solar, biomass, wind, and mini-hydropower (Alam 2010).

Financial Mechanisms

The common excuse for the public sector in all these major issues is the continuous lack of funding necessary to execute plans. This is simply not true, as various countries have already pledged to provide funding for adaptation and mitigation in developing nations, such as Bangladesh. The accord committed up to $30 billion of immediate short term funding over the 2010-2012 period from developed to developing countries to support their action in climate change mitigation, which is mainly implicated in the national energy, water and transportation sectors,

amongst others. This funding is available for developing nations to build their capacity to reduce emissions and responds to impacts of climate variability. Furthermore, this funding will be balanced between mitigation and infrastructure adaptation in various sectors including forestry, science, technology and capacity building and no one needs this more than Bangladesh as societies move toward adaptive measures (Adger 2003).

Moreover, the COP 15 Copenhagen Accord also pledged $100 million of public and private finance by 2020, mostly to developing nations. The advisory group comprises of high level officials, researchers, professionals and academics, and they constantly study ways to fund this global initiative. Moreover, foreign aid in the order of billions of dollars is sometimes left unused by the Bangladeshi government. Questions still remain as to why nothing has been done in all these years. Why is the so-called 'Digital Bangladesh' era not here yet, even when the government used this very catch-phrase to claim victory in the 2008 elections, and is not even held accountable for not meeting any of the goals set in their manifesto of Vision 2021 in almost the whole five-year term of the government? The environmental policy is not the only governance with lackluster execution, nearly all policy sectors of the country suffer from negligence, inefficiencies, incompetence and an extreme lack of vision, transparency and accountability on top of corruption.

Conclusion

Current globalization trends have yielded a multifaceted web of influence that can at times manifests itself into inequalities of growth, prosperity, and in terms of accountability in varying social, cultural, and economic contexts around the world. Most recently, the economical, technological and environmental considerations for the production and usage of clean energy especially, have evolved into a global debate on the roles of the involved stakeholders, which encompasses various fields. In addition, water has also become an important consideration. It is therefore necessary to identify these key stakeholders and untangle this complex knot of

issues to understand the multi-layered relationships among the individuals, local and national governments, non-governmental and non-profit organizations, global corporations, and the world market; and how they affect the economics and politics of global change and sustainability, and the overall adversity of the environment around us, and how to best frame and address the inequalities between nations or regions.

Unfortunately, given the past record of every successive regimes and the bureaucratic system the government works in, the policy itself is not the problem, the assessments, execution, monitoring and the entire governance is problematic. In other words, no matter how effective the drafted policies are, if the current state of the public sector continues as it is the country will plunge into a dilapidated state from which it might not be able to recover. To the nation's advantage is the fact that most of the infrastructure is very basic and major plans could pave its way to a low-carbon, green economy, a fact which is harder for developed or industrial nations to do as they have to significantly 'de-carbonize' their infrastructure to reach the LCE goals. But with more time, Bangladesh is moving away from this crucial point towards one of mismanaged and wasteful vision.

The most direct approaches to governance should first focus on making widespread changes to the current organizational practices of the entire public sector by decentralizing and privatizing their operations to bring in efficiencies and by involving all relevant stakeholders such as the industry leaders, academia, foreign NGO's and think tanks and local leaders and truly listen to their recommendations and needs and not just for publicity or formality purposes, as is the case currently. Most of the problems can easily be solved, if the institutions overseeing the policy governance were non-partisan, and worked for the national wellbeing and not for successive political parties who are occupying the major echelons of administration and continuously misusing power to the point of rampant corruption. The role of developed nations such as the U.S. is minimal when compared to the duties of the national players in the developing worlds.

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