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Seminar on Environmental Security and Climate Change - Development Challenges for Bangladesh



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on 09 April 2019



**NATIONAL DEFENCE COLLEGE
BANGLADESH**

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Foreword

Environmental Security has been globally acknowledged as an important security issue as it is closely connected with national security, human security, health security, food security etc. Naturally, Bangladesh is a disaster prone country for its unique geographical location. The natural disasters like flood, draught etc. during the last few decades cause extensive economic damage and impair livelihoods. Climate change will pose additional risks to ongoing efforts to achieve sustainable development of Bangladesh. Therefore, managing climate variability and change remains a key development security issue in Bangladesh.

Bangladesh has been listed as one of the top 5 countries in the world in terms of receiving high level of adverse impacts of climate change. The impacts include: temperature rise, sea level rise, surface and ground water salinity, degeneration of fresh water, flood, erosion, prolonged flood and draught, untimely rain, food, environmental and health insecurity etc. Therefore, climate change has severe impacts on life, living, livelihood, environment and overall physical development in all sectors of Bangladesh.

Hence urgent and aggressive measures are required to avoid the severe consequences of climate change. We should develop climate resilient infrastructure, develop climate change risk sensitive agriculture, use surface water and conserve ground water, conserve forest, etc. Moreover, social inequality and vulnerability should be addressed properly. We have to ensure health security too. The Govt. should take initiative of multilateral approach involving the neighbor countries, should emphasize public - private collaboration and co - ordination among different sectors, ensure risk resilient urban planning as well as development planning. Above all, visionary leadership alongwith good governance can ensure effective challenge of addressing climate change and disaster risks and sustainable development planning.

In fact, the devastating effects of climate change have no regard of national boundary. It is something that stands to affect everyone, every country. Therefore, collaboration is needed to address this key environmental threat.

I would like to thank the faculty members and college staff for their tireless effort in organizing the seminar and making it a success. Finally, I appreciate the sincere efforts of the Research and Academic Wing and acknowledge the solemn endeavour of the editorial board to bring out the seminar paper.



Lieutenant General Sheikh Mamun Khaled, SUP, rcds, psc, PhD

Commandant

National Defence College

Editorial

Climate change is the biggest challenge of the 21st Century across the globe. It has very severe and long lasting impacts on human being as well as environment. Almost all countries of the world are affected by the terrible effects of climate change directly or indirectly.

Being geographically vulnerable and a densely populated country, Bangladesh faces innumerable impacts like temperature rise, high sea level, high salinity of ground and surface water, increase of hydro - meteorological hazards which affect directly the life, livelihood, environment and overall development of Bangladesh. Its disastrous long - term after effect is the upcoming environmental migrants. It is established that global climate change risks are going to impact on almost all sectors of Bangladesh economy such as agriculture, food production, industries, livelihoods, housing, health, ecosystems etc. Under these circumstances, resilience and sustainability of these sectors demand an intelligent and delicate management by the govt. in collaboration with different sectors within and outside the community.

In an effort to meet the challenges of climate change, every nation should be united and work in collaboration for implementing solutions. As climate and impacts of climate change both do not follow any national and political boundary, the development plans all over the world will not be the same. It is high time, we understood the potential climate change risks and its impacts on sustainable development and find out the ways to avoid the devastating consequences of climate change.

In fine, I would like to thank all concerned for whom publication of this paper was possible. I hope that this endeavour will satisfy the readers. I promise to continue this effort to bring more diverse and newer topic for the readers in future.



Major General Md Mashud Razzaq, ndc, afwc, psc
Senior Directing Staff (Army)
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Overview of the Seminar

As part of the course curriculum, National Defence College (NDC) arranges a good number of seminars and other individual and group research works for the course members.

The seminar on “Environmental Security and Climate Change - Development Challenges for Bangladesh” was held at NDC on 09 April 2019 as part of the course curriculum of Capstone Course - 2019. The seminar was attended by both in - house participants and guests from different institutions. The in - house participants included NDC Faculty, Staff Officers and Capstone Fellows 2019. The keynote speakers included Dr. Ainun Nishat, Professor Emeritus, BRAC University, and Professor Dr. A Q M Mahbub, Department of Geography and Environment, University of Dhaka. The seminar was conducted in two sessions. In the 1st session, the guest speakers presented their keynote papers on the selected theme and in the 2nd session, an interactive session took place.

The panel of presenters covered two sub - themes, namely: Environmental Security and Its Impact on National Security by Dr. Ainun Nishat and Climate Change and Its Impact on Sustainable Development by Professor Dr. A Q M Mahbub.

Dr. Mashiur Rahman, Adviser to the Hon’ble Prime Minister (Economic Affairs) graced the seminar as the Chief Guest. The seminar was moderated by Additional Secretary Md Mohsin, Fellow of Capstone Course 2019.

The topic of the seminar was very much effective for the present context of Bangladesh. All the keynote speakers upheld important sides of the themes and the discussion contributed a lot to fulfill the aim of the seminar. At the end of the presentation, there was an interactive session where Commandant NDC, Resource Persons, Faculty Members, Staff Officers and all Fellows of Capstone Course 2019 participated and contributed.

Executive Summary

Introduction

On 09 April 2019, National Defence College organized a day - long seminar titled “Environmental Security and Climate Change - Development Challenges for Bangladesh” as part of course curricula of Capstone Course 2019. Adviser to the Honorable Prime Minister (Economic Affairs) Government of the People’s Republic of Bangladesh, Dr. Mashiur Rahman graced the seminar as the Chief Guest.

Conduct of the Seminar

The seminar was conducted in two sessions. In session - 1, Dr. Ainun Nishat, Professor Emeritus, BRAC University and Dr. A Q M Mahbub, Professor, Department of Geography and Environment, University of Dhaka presented their Keynote papers. In session - 2 there was an Interactive session where the participants put forward their valuable questions, comments, ideas opinions and concerns. Colonel (Now Brigadier General) Mohammad Shahriar Zaman, afwc, psc, Director, Research and Academic acted as the master of the ceremony during the seminar.

Findings of the Seminar

Considering the impacts of climate change as the central theme, the speakers presented their individual views from different perspectives.

The major findings are:

Keynote Paper - 1: “Environmental Security and Its impacts on National Security” - Presented by Professor Dr. Ainun Nishat.

Introduction: Every country should integrate environmental concerns in development planning and management. After attaining success in MDGs (2000), Bangladesh is now advancing towards the successful implementation of SDGs (2015) and acting for climate change is one of the SDGs.

Bangladesh played a leading role in setting the target of reducing global temperature to 1.5 degree. 2015 was an important land mark for Bangladesh because 4 important documents such as - Sustainable Development Goals (2015), Paris Agreement on Climate Change (2015) , Addis Ababa Agreement on Finance (2015), Sendai Framework for Disaster Risk reduction (2015) were agreed upon.

MDGs: Some of the most important MDGs and targets successfully met by Bangladesh include: eradicating extreme poverty and hunger, achieving universal primary education, promoting gender equality and empowering women, ensuring environmental sustainability (Integrating the principles of sustainable development into country's policies and program and reverse the loss of environmental resources etc.), developing a global partnership for development etc.

SDGs: Bangladesh is in leading position in implementing SDGs. Among the 17 SDGs, Bangladesh has significant improvement in: SDG - 1: Poverty, SDG - 2: Hunger, SDG - 3: Healthy lives, SDG - 5: Achieve gender equality and empower all women and girls, SDG - 6 : Ensure availability and sustainable management of water and sanitation for all, SDG - 13 : Take urgent action to combat climate change and its impacts etc.

Bangladesh is lagging behind in SDG - 4: Ensure inclusive and equitable quality education, SDG - 7: Energy, SDG - 8: Sustainable economic growth, SDG - 9: Infrastructure (we need to build resilient infrastructure), SDG - 10: Reduce inequality within and among countries etc.

Bangladesh should pay immediate attention to the followings - SDG - 11: Make cities and human settlements inclusive, safe, resilient and sustainable, SDG - 12: Sustainable consumption , SDG - 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development, SDG - 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss, SDG - 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development.

We can divide the Issues Related to CC Impact from 3 levels:

- Global Issues which are created at the global level are Climate Change and Climate Variability, desertification process, loss of biodiversity, Ozone layer depletion etc.
- Regional Issues for which Bangladesh is not responsible but her sustainable development would be affected. For example - water regulation in upper reaches, deforestation in upper watershed, cross - boundary pollution, threat of oil spillage, over fishing in the bay etc.
- National Issues for which Bangladesh is solely responsible are - Population and bearing capacity, food security, water security, energy security, health security and security for livelihood, sustainable agriculture, depletion of forest resources, disappearance of wetland and fisheries, loss of biodiversity and medicinal plants, rapid urbanization, degradation of natural resources base, etc.

The Security Implications: CC is a phenomena that has multifarious security implications across the globe. Some major global concerns are - threat of food shortage, threat of migration; livelihood security, increase in intensity and frequency of natural disasters , loss of biodiversity and ecosystem; threat to health security, effect on the process of sustainable development.

Bangladesh Context: Bangladesh is lagging behind regarding the Sustainability Indicators like land degradation , loss of wetland , degradation of forests, loss of biodiversity, pollution, ground water contamination, climate change and vulnerability, unplanned urbanization etc. Bangladesh is recognized globally as one of the most vulnerable (possibly the most vulnerable country) to adverse impacts of Climate Change.

Conclusion: Though it is difficult for us to perceive small changes in the temperature, seemingly small changes can have immense consequences. The effects of climate change will make life difficult for people in various ways. Hence the process of development must not be compromised. Every country should incorporate environmental concerns in the development process and the process must be environmentally sustainable, socially acceptable and

economically feasible. Also, technically implementable and sound, institutionally manageable and financially viable. The development process must ensure that all activities are 'compliant', 'transparent', 'inclusive' and based on 'partnership' (public - private - community partnership).

Keynote Paper - 2: "Climate Change and Its Impact on Sustainable Development" - Presented by Professor Dr. A Q M Mahbub.

Objective: Understanding the potential Climate Change risks on sustainable development and finding out the ways to overcome the Climate change risks to make development sustainable.

Bangladesh with Respect to Climate Change Impacts

As Climate and the impacts of climate change do not follow any national or political boundary, the adverse impacts of CC on the development plan all over the world will not be the same.

Bangladesh is listed as one of the top 5 countries in the world in terms of receiving high levels of adverse impacts of CC for its unique geographical location (being a deltaic low - lying riverine country), huge population (170 million) and super high density (over 1200 person per skm).

Observed Climate Change Impacts on Bangladesh

- Bangladesh has evidenced temperature extremes in the recent past.
- The potential Sea Level Rise impact facing Bangladesh includes land loss (due to permanent inundation in some of the coastal region).
- Both surface and ground water (fresh water) resources are declining very fast in recent decades due to penetration of saline water.
- Erratic rainfall, increased frequency of severe and prolonged floods, draughts and cyclones are recorded in recent years resulting in production loss (crop, fish, livestock, etc.).

- There is an increase in water logging and drainage congestion affecting the infrastructure.
- There is intensity of health risks as well as increase in food, livelihood, environmental insecurity.
- Climate Change is going to induce IDPs (Internal Displaced Persons). “By 2030, one out of 7 Bangladeshis will be an environmental migrant as against one out of 45 globally”
- Climate Change is increasing vulnerable people and places in rural as well as urban areas.

Suggestions to Combat Climate Change Risks to Achieve Sustainable Development

- Introducing energy efficient technology/ low carbon culture
- Designing Climate Change risk resilient physical infrastructure/urban planning
- Developing medium sized and regional cities instead of mega cities
- Conserving forests and wetlands
- Using surface water as much as possible and conserve ground water
- Introducing rain harvesting
- Ensuring health security

Conclusion

Climate Change risk resilience and sustainable development depend on proper management of our ecosystem, development of physical infrastructure, mainstreaming Climate Change risks into our education system. Visionary leadership along with good governance and above all collective effort can ensure effective addressing the challenges of Climate Change risks and sustainable development.

Opening Address of Commandant, NDC

Lieutenant General Sheikh Mamun Khaled, SUP, rcds, psc, PhD

Bismillahir Rahmanir Rahim

Honorable Adviser of Economic Affairs to Honorable Prime Minister, Dr. Mashiur Rahman,

Respected Fellows of Capstone Course 2019,

Esteemed Faculty Members of NDC,

Distinguished Guests,

Ladies and Gentlemen,

Assalamu Alaikum and Very Good Morning.

I am honored and privileged to welcome you at the Seminar of Capstone Course 2019 on ‘Environmental Security and Climate Change - Development Challenges for Bangladesh’.

Bangladesh is aspiring to become a middle income country by 2021. The Honorable Prime Minister of the Peoples’ Republic of Bangladesh declared her ‘Vision 2041’ to take Bangladesh at par with advanced countries. Keeping one of the Goals of ‘Vision 2041’, i.e. acting for climate change, we organized this seminar on this national concern.

In 1994, Robert D. Kaplan cautioned that ‘the political and strategic impact of surging populations, spreading disease, deforestation and soil erosion, water depletion, air pollution, and possibly rising sea levels in critical, overcrowded regions like the Nile Delta and Bangladesh will prompt mass migrations and incite group conflict. In addition to traditional security threats, the world community, after the Cold War, has confronted with new types of problems such as human rights violation, economic crisis, environmental degradation, resource depletion, drug trafficking, epidemics, crimes and social injustices.

The impact of climate change in Bangladesh is an extremely significant issue as Bangladesh stands amongst the most vulnerable nations to the impacts

of global climate change in the coming decades. Bangladesh is watered by a total of 57 trans - boundary rivers coming down through its territory - 54 from neighboring India and 3 from Myanmar. The landmass of our country is situated at the bottom of the mighty Ganges - Brahmaputra - Meghna river - system. About one quarter of our country's land lies at less than 7 feet above mean sea level.

Environmental security is treated as 'Non - traditional Security' (NTS). We know that the rise of the sea level, unmanaged floods, drought and climate - induced disasters resulted in resource scarcity. This led to the race for resource, which in turn, caused security complexity and conflict. Today's seminar is aimed to address the complex situation of environmental insecurity and conflict in Bangladesh with some policy recommendations to manage the conflict and promote environmental peace - building and ecological sustainability.

Bangladesh would need to prepare for long - term adaptation strategy and it is necessary to identify all present vulnerabilities and future opportunities, adjusting priorities and trade policies in the agricultural sector while promoting training and education throughout the masses in all possible spheres.

Before I conclude, I would like to express my thankfulness and gratitude to Dr. Ainun Nishat and Dr. A Q M Mahbub for accepting our invitation to deliver keynote speech at this seminar. I am also honored and grateful to the Adviser to Honorable Prime Minister on Economic Affairs, Dr. Mashiur Rahman, for accepting our invitation to grace this seminar as Chief Guest and share his knowledge with us. I thank all distinguished guests for their generous presence at this seminar and especially the esteemed fellows of Capstone Course 2019 for participating in the seminar.

Thank you.

Long live Bangladesh.

Speech of Chief Guest

Dr. Mashiur Rahman

Adviser to the Hon'ble Prime Minister (Economic Affairs)

Let me offer my regards to all of you.

And I thank the organizers for inviting me to this distinguished gathering.

The keynote speakers have spoken on the subjects with erudition. The chief guest does not have much to add new. I noted a few points when I was listening them and the participants. There is a lot to learn. I will limit myself to a few observations reflecting my understanding or perception of the issues.

Professor Nishat quoted from the Constitution to emphasize the obligations of the government in regard to environment. It is important that we observe how the constitution is structured in order to interpret the nature of obligations or enforceability of rights and policies.

There are two parts in the constitution that separately deal with rights and policies. Part Two deals with polices of the government. It is written there that policies cannot be enforced through judicial intervention or the courts of law.

A former Chief Justice Kamal explained that policies require resources, planning, skill, professional knowledge, and so on. And at any point of time the government may not have all of these available in adequate quantities. It is a question of what is feasible for the government to do at a point of time deploying its resources - physical, financial and human - and implementation capability.

Part Three deals with fundamental rights which can be enforced through court. The fundamental human rights got currency from time of the French Revolution and have expanded and deepened since I can sue you for infringing my rights and so can you if I infringe on yours. Individual rights are protected from infringement by the government also.

There is an important connection between fundamental rights and public policy. Right to life is the most critical. But it does not make sense if law does not prevent others to take away my life or organize police force to protect me. Rights thus create correlative negative obligations on other individuals and on the government obligations to make laws and institutions to enforce those laws. The second part of government obligation is positive.

Life means more than living just as a biological unit. A human being should have the capacities that make life worth living - say education, adequate food and nutrition, good health etc. The principles of policy address those issues, requiring the government to create conditions and institutions so that human beings can acquire those capabilities.

Professor Mahbub said that we do not have enough resources to build embankment long and strong enough to protect us from storms. I had spent almost all my time in service dealing with government finance. My feeling is that there is no government in the world which has enough financial resources at a point of time to do all that it is expected to do or wants to do - it has to get its priorities right. So, it is not that we could not allocate a little more resources to embankment; more likely that the government's priorities were different from Dr. Mahbub's.

We have here honorable parliament member from Khulna 6. I do not think you can get a better understanding of the experience of the local people than a conversation with him. He is member from Aila affected area (which occurred before his membership). I also sought nomination from there but he was party's preference based on his stronger appeal to voters.

There is a union parishad in that area - Dashkin Betkashi (South Betkashi) - which is disconnected from the main land. A road about six kilometer - long can connect the union at a cost of about Tk. 100 - 150 crores. The World Bank's assistance for post - Aila reconstruction left out that short road. And so it remains. The government can borrow a relatively small amount to relieve those of their miseries.

The area - Paikgachha and Koira upazila grows large quantities of fish that is mostly exported. The socially and politically powerful people engage in forcefully occupying each other's gher (large water bodies for fish cultivation). In the absence of well - established property rights, actual production is less than the potential.

There is some dissatisfaction about GDP or meaning of growth, of development etc. Not that the economists agree on the importance of each term, but they do accept that the terms have meaning in the context of discussion. President Sarkozy of France - also for a while took up the rotating chair of the European Commission - had set up a Commission on Estimation of Economic Growth. Stiglitz was chairman and Amartya Sen was a member, both Nobel laureates in Economics. Sen is an iconic name in Bangladesh.

The Sarkozy Commission reached the conclusion that GDP is inadequate to measure the multiple dimensions of development. But this is one measure which indicates more clearly than any other measure where you are on the growth pole. Along with that you need other measures also e.g. human development index, human health index, human education index, happiness index. There are so many aspects of our existence - our life - and we need different metrics for different aspects of our life.

Professor Nishat talked about bi - lateral negotiation on river with India. He emphasized that Bangladesh team should comprise people who are knowledgeable and experienced in the art of negotiations. Dr. Nishat had participated in many negotiations, including at multilateral level, involving complex technical issues. His views on the competence of Bangladesh team demands serious consideration. However, it should be noted that the government always puts together the best people it can muster; indifferent assignment of officials to ministries / departments sometimes make choice of persons a problem.

In 2010, the Prime Minister visited Delhi and issued the Joint Communiqué. In 2011, Prime Minister Manmohan Singh came to Bangladesh and signed the Framework Agreement for Cooperation for Development. We sometimes feel that our opponents are smarter at negotiations than we are. That is not

always true. The Framework Agreement had been drafted by Bangladeshi's. The Indian side did not change the document at all. So here is an example that we do have people who can deliver but they may not be employed for the jobs for which they have been trained or for which they have skill.

Now what happened to this bi - lateral Agreement?

Prof. Nishat referred to basin wise management which is incorporated in the Agreement. Also there is emphasis on hydropower. India has now joined Bangladesh in dredging part of a river which they use for transit to Assam and North Eastern states. That is an improvement.

On hydropower, India's informal offer was generous and open - ended. India's position was: Bangladesh could take equity or could buy from the hydro - electricity projects that India from now on would plan. The responsibility for decision initially was given to Water Resource Ministry that Nishat, I think, prefers. But the Foreign Ministry overturned that decision and gave the authority to Power Division.

Ministry of Energy and Power mixed up short term and long term cost. For taking equity, the investor puts up his/ her share of the money initially; the investment cost is recovered through price during project's life. Given the power market conditions, the price may be so set that the investment is recovered within a short time. Power tariff at consumer level is kept low in Bangladesh by considerable amount of subsidy. The hydro - power company can go on the capital market; the share is most likely to sell at premium given that hydro - power generation cost is lower than fossil - fuel generation.

Equity participation in hydropower would deliver a critical bonus: Bangladesh would be a (full) partner in management of the rivers on which the structures would be located; separate agreements on each river could be dispensed with (perhaps). It was worth an attempt to secure that advantage.

So I might have been somewhat shy about cooperation on rivers, having failed to sign the agreed text on Teesta. Ministry of Foreign Affairs might have unwillingly helped avoid the embarrassment!

Most hydropower potential is concentrated in Arunachal and some in other North - Eastern states. Development of hydropower in Arunachal and other north - eastern states is not economically viable unless it can be evacuated across Bangladesh. If you evacuate it through the Shiliguri chicken neck, the cost is too high. And then there is a minimum quantity that hydropower must be generated - I guess three / four thousand megawatts is the minimum.

The major user of hydropower is India. If it goes through Bangladesh, it can tap into the evacuation line. In addition, Bangladesh can charge a fee for the right of way. So Bangladesh does not lose; as to investment at the early stage, it is incorporated in the price that will be paid over time. So it was a question of paying now or paying over 10 - 15 years, and new methods of financing.

Let me turn to environment and sustainable development. For a fairly long time, I have been trying to understand the meaning of sustainability and how to ensure sustainability. The concern started sometime in the 1950s - or even earlier. World economy had been growing since the Industrial Revolution, and accelerated after the second world war. This growth was dependent on exhaustible natural resources, particularly fossil fuel. So, there was a question: Can supply of fossil fuel continue on the same scale and sustain growth?

The Club of Rome published in the early 1970s *Limits to Growth*, making the doomsday prediction that we cannot sustain this level of use of resources, which will be exhausted someday, causing collapse of the civilization. Civilization dependent on fossil - fuel energy! The book came out about the time that the world experienced shortage of food and fuel price spiked engendered by OPEC manipulating its oligopoly control. The basic point that they tried to make was succinctly summed up in the journal *Science* by Nathan Keyfitz, professor of mathematical demography at Harvard University: The profligate life style of the middle class is unsustainable and must be given up.

The basic or the most widely used definition of sustainability is that given by the Brundtland Commission. You use resources such that future generations are not deprived of what they need. We do not know exactly what they will need. Our forefathers did not know what we need. But they at least assumed that my life will not be less comfortable and less secure than theirs. At the family level

they would help the dependents acquire human capital and also save something to leave me an inheritance. Now extend this to a collective entity - say nation or economy - and what the current generation accumulates and leaves is human capital and physical assets for succeeding generations.

How much will the subsequent generation need? A common-sense presumption is not less than what we have now and not knowing how much resources are there in stock in the world. There has to be some conservation and resource should be used efficiently. Professor Nishat referred to IRR, BCR etc. which economics employs to ensure efficiency i.e. output from resource use adds value. Absence of conscientious economic test results in value destruction.

The earliest economic explanation of growth was offered by Robert Solo, a professor at MIT and Nobel Laureate in economics (1954). Given a constant technology which uses the same inputs, diminishing return would follow. Even if the proportions of input could be varied, there was no escape from diminishing return. New technology was the driver of growth. Innovation of technology was not explained by economics, however.

Paul Roemer, who shared the Nobel Prize this year with Nordhaus, focused attention on knowledge. He recognized that while material objectives diminish (in quantity & productivity), knowledge does not - on the contrary it grows. Knowledge, which generates technology, sustains growth. Roemer commands interest also because he resigned from office of chief economist of the World Bank to protest that the Bank's assessment of the risk or vulnerability of developing countries shows prejudice. This happened shortly before he got the award. He resigned from the position of chief economist of the World Bank shortly before getting the Nobel Prize.

Nordhaus' research was how human activities impact environment. He contributed to the understanding of how human activity adversely affects environment, calculation of the environmental deterioration and how to fix up the price for the damage. You pay for causing pollution - there could be some penalty for causing environmental damage too - so that you are restrained. It is a market-based solution to the problem of negative externalities.

Growth depends on transformation of one form of asset into another form which has greater value. Kenneth Arrow along with other economists and environmentalists have put forth the concepts of genuine investment and of comprehensive wealth. Genuine investment measures resource depletion caused by or associated with investment e.g. depletion of fossil fuel in generating electricity; genuine investment is net of depletion.

Comprehensive wealth takes into consideration total wealth which exists in different forms; the additional value generated by transformation of one form of wealth into another accounts for development. For instance, a technical college set up on pasture land causes loss of that land which is valuable for livestock industry. Apparently, technical graduates can contribute more to development. But there could be cases where the alternatives are close match. It is imperative that those cases are checked more closely in order to avoid wrong choice.

Thank you all for your patience.

Joy Bangla

Joy Bangabandhu

Session - 1



Session Chair: Md. Mohsin
Additional Secretary
Capstone Fellow - 2019

Keynote Speakers



Keynote Paper - 1: Environmental Security and its Impact on National Security

By - Dr. Ainun Nishat



Keynote Paper - 2: Climate Change and its Impact on Sustainable Development

By - Dr. A Q M Mahbub

KEYNOTE PAPER - 1

ENVIRONMENTAL SECURITY AND ITS IMPACT ON NATIONAL SECURITY

Dr. Ainun Nishat

Professor Emiretus, BRAC University

Introduction

We are in development process. We are now producing so much Green House Gases that the climate is going to change. As of today the global temperature has gone up by only 1 degree. If this process goes along, the world will warm up to 6 degree by the end of the century. So the global temperature rise is still in its infancy - 1 degree. The world's promise is to keep it well below 2 degree and then pull it back to 1.5 degree.

So why should we worry with 1.5? It is difficult for us to perceive small changes in the temperature. But the plants and animals can perceive that affect flowering pattern. The flowering pattern is related to food security. And the global concern is food security and that is the problem with environmental degradation.

Brief History of Sustainable Development

Historically, conservation of nature has been encouraged and practiced by all societies. There are several land mark studies and several global efforts that finally led to the process of global agenda on sustainable development which must be incorporated in national development.

Sustainable Development Goals (SDGs) finalized in September 2015 are the epitome of the current process. The SDGs are part of a history of multilateral efforts to shift the world onto a sustainable and resilient pathway.

Some Land Mark Studies Related to Sustainable Development

- Thomas Robert Malthus:
- “Origin of Species” by Charles Darwin
- Rachael Carsons - The Silent spring
- “Tragedy of Commons” is another landmark document (Hardin 1968).
- Stockholm Declaration
- Agenda 21 (1992)
- Millennium Development Goals (MDGs) (2000)
- “The Future We Want” (2012) based on evaluation of success of Agenda 21

Four major documents were agreed upon in 2015:

- Sustainable Development Goals (2015)
- Paris Agreement on Climate Change (2015)
- Addis Ababa Agreement on Finance (2015)
- Sendai Framework for Disaster Risk Reduction (2015)

What are the SDGs and Why

The SDGs aim to provide a global framework for cooperation to address the three dimensions of sustainable development within an ethical framework based on:

- The right to development for every country,
- Human rights and social inclusion,
- Convergence of living standards across countries, and
- Shared responsibilities and opportunities

The SDGs are goals built on the successes of MDGs. Some of the MDGs and Targets are:

Goal 1: Eradicate extreme poverty and hunger

Target 1.2 Achieve full and productive employment and decent work for all, including women and young people

Goal 2: Achieve universal primary education

Target 2. Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary Schooling.

Goal 3 : Promote gender equality and empower women

Goal 4: Reduce child mortality

Goal 5 : Improve maternal health

Target 5.2 Achieve universal access to reproductive health

Goal 6 : Combat HIV/AIDS, malaria, and other diseases

Goal 7: Ensure environmental sustainability

Target 7.1: Integrate the principles of sustainable development into country policies and program and reverse the loss of environmental resources.

Target 7.2 Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss

Target 7.3: Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation.

Target 7.4: Have achieved, by 2020, a significant improvement in the lives of at least 100 million slum dwellers.

Goal 8: Develop a global partnership for development

Bangladesh is successful in implementing SDGs. There are 17 SDGs namely:

SDG - 1: Poverty

SDG - 2: Hunger

SDG - 3: Healthy lives

SDG - 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

SDG - 5: Achieve gender equality and empower all women and girls

SDG - 6: Ensure availability and sustainable management of water and sanitation for all.

(Being implemented globally and Bangladesh is giving leadership in this).

SDG - 7: Energy

SDG - 8: Sustainable economic growth, full and productive employment and decent work for all

SDG - 9: Infrastructure

SDG - 10: Reduce inequality within and among countries

SDG - 11: Make cities and human settlements inclusive, safe, resilient and sustainable (Bangladesh should pay attention to this. Because today 20/30% people are living in the urban area. But may be at the end of the century the whole trend will reverse). Regarding urbanization we are not thinking enough.

SDG - 12: Sustainable consumption

SDG - 13: Take urgent action to combat climate change and its impacts

(Climate Change is one of the SDG Goals).

SDG - 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development (We call it Blue Economy and Bangladesh is alert of it).

SDG - 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss (Where security issues come).

SDG - 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

SDG - 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development

Issues Related to CC Impact

We may divide the issues from 3 blocks:

Global Issues: Problems created at the global level but we are suffering

- Climate Change and Climate Variability
 - Intense rainfalls as well as Erratic rainfall pattern
 - Higher incidence of storm and surges
 - Increase in floods as well as droughts
 - Sea level rise and increase in salinity
- Desertification process
- Loss of Biodiversity
- Ozone layer depletion

- **Regional Issues:** Bangladesh did not do anything but suffering and our sustainable development would be affected.
 - Water regulation in upper reaches
 - Deforestation in upper watershed.
 - Cross - boundary pollution
 - Threat of oil spillage
 - Over Fishing in the bay

- **National Issues:** We cannot blame anyone for this:
 - Population and bearing capacity
 - Food security, water security, energy security, health security and security for livelihood
 - Sustainable Agriculture (We must look together - Land, Water, Soil, Fish, Livestock and Crop etc.)
 - Depletion of Forest resources

- Disappearance of Wetland and Fisheries
- Loss of Biodiversity and medicinal plants
- Rapid Urbanization
- Degradation of natural resources base

Sustainability Indicators

Status in Bangladesh

- Land Degradation and loss of soil quality
- Loss of Wetland
- Degradation of Forests and Loss of Forest Lands
- Loss of Biodiversity
- Pollution
- Ground water contamination with arsenic
- Climate change and vulnerability
- Unplanned urbanization

If we look into these indicators for the issues we will find that unfortunately all these are negative.

Some Facts

- The earth is warming
- The climate has always changed - but never this rapidly in human history.
- Present day's warming is due to emissions from fossil fuels,
- The arctic is melting,
- Sea levels are rising (SLR);
- The oceans are becoming more acidic,
- Weather events are becoming more intense and erratic;
- Seemingly small changes in temperature have immense consequences
- Climate change presents national security threats

The effects of climate change will make life difficult for people in various ways. We must prepare from now.

Major Global Concerns

- Threat of Food shortage
- Threat of migration; Livelihood security
- Increase in intensity and frequency of natural disasters will be on increase,
- Loss of biodiversity and ecosystem; many species will disappear
- Health security threatened
- Process of sustainable development affected
- Coping capacity of LDCs, SIDS and countries in Africa is not adequate

Climate Induced Hazards

Bangladesh is recognized globally as one of the most vulnerable (possibly the most vulnerable country) to adverse impacts of Climate Change.

Bangladesh is experiencing the increased frequencies and intensities of natural disasters. For example - Erratic rainfall (untimely rainfall, short duration heavy rainfall), Floods, Drought - like phenomenon, Cyclones and Tornadoes, Sea Level Rise, Salinity intrusion, Tidal surges, River bank erosion, Coastal erosion, Lightening, Health hazards, Impact on ecosystem and flowering pattern etc.

What we expect from Global Community

- Green House Gas emission cut as per expert projections
- Legally binding climate change deal to keep temperature below 2.0°C (preferably 1.5 °C) above pre - industrial level.
- Support to adaptation to food security, livelihood security, health security, water security while supporting to achieve energy security.
- Fast - start finance as well as promised long term finance (new and additional).

Conclusion

The process of development must not be compromised. The process must be environmentally sustainable, socially acceptable and economically feasible, technically implementable and sound, institutionally manageable and financially viable. The development process must ensure that all activities are 'compliant', 'transparent', 'inclusive' and based on 'partnership'. All activities must be Measurable, Reportable and Verifiable (MRV). All developing countries of the World is paying serious attention to the SDGs. Bangladesh is 'championing SDG - 6.

Let us ensure equity within generation and with future generations - try to ensure environmental security for the country.

KEYNOTE PAPER - 2

CLIMATE CHANGE AND ITS IMPACT ON SUSTAINABLE DEVELOPMENT: BANGLADESH PERSPECTIVES

Dr. AQM Mahbub

Professor, Department of Geography & Environment, University of Dhaka

Background

Damages of ecosystems done by various developmental activities at micro, meso and macro levels are seen in many places of the world. In addition, global climate change (CC) impacts noticed during the last couple of decades are also blaming to ruin our ecosystems to a significant level. The adverse impacts of natural disasters are also found to harm micro level ecosystem in many disaster prone countries, including Bangladesh. Scientists also noted that the frequency and intensity of natural hazards are rising with increasing CC impacts. Very often, potential CC impacts and effect of natural disasters on our invaluable ecosystems are not adequately addressed before designing the development plans. Given the above situations, a vast number of physical and non - physical development schemes can't sustain for longer period and the unsustainability of development often causing a great deal of suffering of the people, damaging vital ecosystems and wasting a colossal amount of resources and invaluable time. The main objective of this paper presented at a seminar organized by NDC in April 9, 2019 is to understand the potential CC risks or impacts on sustainability of development and thereby to find out the ways to overcome the CC risks on development schemes as well as making development sustainable.

Generally speaking, in any kind of development plan whether structural or non - structural, the planners usually give emphasis to meet the needs of the present or near future at best and they often address various physical or anthropogenic factors mostly at micro level or local/country level. The effects of regional and global level factors (i.e. meso and macro levels) on micro level development schemes are not sufficiently addressed due to lack of adequate knowledge to address the global and regional level factors on local

level development schemes and unavailability of appropriate data on meso and macro level. Given these situations many local level development schemes, particularly those are significantly influenced by meso or macro factors, can't sustain for longer period. Sometimes planners avoid those factors (i.e. meso and macro factors) with a view to cut down the additional costs and time of plans. To avoid this situation, modern days planning authority gives emphasis on sustainability of development by addressing regional and global level factors in addition to local or micro level issues. The impacts of CC and natural disasters on development plans should, therefore, be addressed adequately to get the benefit of plans for longer period.

Many local or micro level factors (physical or social) originated locally can be consulted by development planners but CC factors by virtue of their nature are very complex and can't be addressed fully at local level. First of all, climate and the impacts CC both don't follow any national or political boundary. The adverse impacts of CC on development plans all over the world will not be same. For example, the excessive emission of carbon dioxide (Co₂) causing CC impacts done mainly by the world industrialized nations (mostly G20 countries) but the adverse impacts of CC can be found far away from G20 countries. To reduce the CC impacts Co₂ emission should be reduced by the G20 nations unless the impacts of CC on development plans and ecosystems can't be fully and fruitfully addressed. It should be noted here that the emission of Co₂ acts locally and the impacts of CC caused by excessive Co₂ emission acts globally. For example, per capita emission of Co₂ in Bangladesh is very negligible (less than 0.4 ton) but due to very high rate of Co₂ emission done by G20 nations, Bangladesh has already listed one of the top 5 countries in the world in terms of receiving high level of adverse impacts of climate change.

The goal of sustainable development is to achieve a better and more sustainable future for all citizens (present and future generations). It addresses all kind of potential challenges like climate change, environmental degradation and natural hazard/disaster induces risks and economic, social and political challenges or risks arising from within and outside the community/nation. The rationale for integration of development with CC and disaster risks are - (i) development means wellbeing of society, economy, and environment, (ii) CC and disasters both challenge development gains, goals and durability, (iii) development must

be resilient to assure expected well - being of a society or nation, and (iv) mainstreaming CC and disaster risks, is thus a necessity towards development risk reduction.

Background of Bangladesh with Respect to CC Impacts: Due to her unique geographical background and huge population (170 million) with super high density (over 1200 persons per km²), Bangladesh, unlike many countries in the world, has exposed to a wide range of CC impacts. A list of these impacts can be like - temperature rise, sea level rise, penetration of saline water inside the land, reduced fresh - water availability, increase in frequency and intensity of hydro - meteorological hazards (e.g. cyclone, flood, erosion, drought etc.), prolonged floods/water logging and droughts, increase drainage congestion and water logging, intensify health risks, increase food, livelihood and environmental insecurity and increase CC and natural hazards induced IDPs (internal displaced persons) i.e. migrants. It has been estimated that by 2030, one out of 7 Bangladeshis will be an environmental migrant i.e. IDP as against one out of 45 people globally. This assumption obviously indicates the severity of CC impacts on life, living, livelihood, environment and overall physical development in almost all sectors of Bangladesh.

Observed CC Impacts on Bangladesh: Climate change impacts on Bangladesh is not a myth, rather it is a well established fact. Some research findings and observations in support to this statement are as follows - Bangladesh has evidenced temperature extremes in the recent past; recorded erratic behavior of rainfall and increased frequency of severe floods and frequency of cyclone; both surface and ground water salinity intrusion has increased; upsurge natural disaster and CC induced IDPs (migrants) and vulnerable population; and vulnerability of people and places are both increased in rural regions and in big urban settlements.

CC Induced Sea Level Rise (SLR) Impacts: Experts believe that due to a deltaic and low - lying riverine country, Bangladesh is going to face a very compound impact of SLR. The bunch of impacts arising from SLR will be - land loss due to permanent inundation in some parts of the coastal region; intrusion of saline water (both surface and ground); reduce fresh water wetlands, biodiversity and mangrove forest areas; production loss (crop, fish, livestock, timber, salt etc.); disrupt ports and tourism activities; intensify

flood water and water logging (both horizontal/areal and duration); increase impact of tidal surge and storm surge; loss of livelihoods: increase health risks; increase involuntary migration (IDPs); and needs massive repairing/reconstruction works and raising or heightening settlements, roads, rails and embankments/polders etc. SLR associate with CC impacts is also going to have a profound adverse effect on our socio - political and overall economic conditions, especially the poor communities.

Impacts of CC on Water Resource and Hydrological Cycle: Water resource is the most vital key to ensure sustainable development in many sectors in Bangladesh. Climate change is going to affect this vital resource very severely. Bangladesh has been blessed with enormous amount of fresh water but unfortunately over 90% of it comes from our 5 neighbouring countries and over 80% of this fresh water move to Bay of Bengal as runoff. The availability of fresh water has been declining very fast in recent decades and it will continue to reduce further. Given this situation, we should pay our all efforts to ensure the supply of this key resource from outside of Bangladesh and improve the storing capacity of this vital hydro resource. Some urgent measures to safeguard the quality, supply and flow of freshwater are - ensure optimum use and stop misuse of water; introduce system approach to use and distribute water (use water meter, push/sensor tape etc.); strengthen hydro - diplomacy with India and other neighbouring countries; introduce smart irrigation system and give preference to use surface water; preserve groundwater and develop techniques for artificial recharging of ground water; conserve wetlands and ban wetland filling immediately; develop barrage on big rivers to store surface water and enrich groundwater; update building codes by incorporating rainwater harvesting system in cities/coastal region; stop polluting of water at any cost; and recycle used water and develop visionary ideas/techniques to introduce water smart agriculture.

Built Energy Smart City: To combat carbon emission and control air pollution, use of energy efficient technology and low carbon culture should be introduced in all cities. In this regard following actions or steps can be taken - (i) provide technology and encourage city dwellers, institutions, industry owners and other entrepreneurs to use solar energy and clean fuel; (ii) city's big energy users such as airport, transport terminals, secretariat buildings, mega shopping

malls, universities, high rise buildings etc. should be design smartly to make them water and energy efficient, disaster, environment and CC risks resilient; (iii) to avoid high casualty and damage, density of people and buildings should be controlled strictly in each city and avoid construction and development of mega primate city instead give emphasis to develop medium sized towns and give incentives to develop regional cities.

A Glimpse into the Future to Combat CC Risks: To achieve sustainable development goals by addressing CC risks in Bangladesh, the following suggestions can be bear in mind - (i) develop climate resilient physical infrastructure (roads, rails, embankments/polders, housing/shelter, emergency services etc.); (ii) develop CC risks sensitive agriculture, livelihoods, land uses, water management; (iii) dredging rivers, introduce rain harvesting, conserve wetlands and ground water; (iv) conserve forests and create green belt in the coastal region; (v) properly address social vulnerabilities and inequalities (poverty, inequality, gender disparity, ethnic disparity); (vi) ensure health security/services; and (vii) considering huge size and high density of inhabitants, high land value and rapid growth of urban population, introduce CC and disaster risks resilient urban planning as well as development planning.

Concluding Remarks: It has already stated that global CC risks are going to impact adversely on almost all sectors of Bangladesh economy such as agriculture, food production/security, industries, livelihoods, costly built physical infrastructure including housing, living environment/habitat or ecosystems and health/hygiene of the citizens. Furthermore, considering the massive population size and rural agrarian background of the people, climate change may affect significantly the complex, diverse and sensitive ecosystems that are foundations of the country's food production, food security and source of livelihoods of vast number of rural people. Given these situations, resilience and sustainability of these sectors against CC risks undoubtedly depends on an intelligent but delicate management of our ecosystems, sustainable development of physical infrastructure including housing and settlements, regional hydro politics, global climate/carbon politics and mainstreaming CC risks into our education system. Visionary leadership along with good governance can ensure effective challenges of addressing climate change and disaster risks and sustainable development planning.

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Summary of the Interactive Session

A Seminar on “Environmental Security and Climate Change - Development Challenges for Bangladesh” was held at National Defence College (NDC) on 09 April 2019 . The subject is timely and pertinent which demands thorough study and discussion for adopting appropriate measures to mitigate challenges of climate change and ensure environmental security for the sustainable development of Bangladesh . The objective of the seminar was to help government in its planning, policy making and implementation of those policies to mitigate the challenges regarding climate change. The seminar discussion presented the impacts of climate change on sustainable development of Bangladesh and came up with better solution and prudent approach to face the future challenges with a hope to contribute for building a better world for us as well as the future nation.

During the interactive session, some important questions as well as comments came up to the panel of keynote speakers which are appended below:

Question - 1: Additional Secretary Md. Alamgir

In the context of Development and sustainable development, would the present pattern of fossil fuel based economic growth, unsustainable consumption and increasing income inequality and rapid urbanization have a detrimental effect in our environment and sustainable development?

Answer : Dr. Ainun Nishat

Professor Nishat pointed that consumption pattern and the wastage holds an important position in the 17 goals of SDG. Therefore, both consumption pattern and lifestyle should be changed. Likewise the emission of Carbon di Oxide is to be reduced in the western world.

He also cited, in 1990, until the discussion on climate change started, 70% Carbon - di - Oxide was emitted by USA which the world needed to change. But the world is hopeful as 23 states and 90 cities of USA are following the approach of the Paris Agreement.

In 1960, the amount of Carbon - di - Oxide was 280 parts per million which was very small yet significant, that turns today into 408/409 and it may rise to 600. The world's promise is not to increase emission over 450 and then decrease it up to 350 which is established by the scientists of the western world. The production of our electricity or growth of infrastructure is going up in such a tremendous way that shows our scientists are working very hard. Recently there is a major breakthrough in Canada where Carbon di Oxide is processed and turned into powdered Calcium Carbonate which can be stored under ground. Afterwards, it can be used in aeroplane engine as light petroleum product by a reverse process. As clean development mechanism, it can be started as miniature plant to catch carbon dioxide in every city/house through small plants..

Then he mentioned the world's commitment that is to control climate change and make it a legally binding document which is to be done within this year. In this case the liability of USA will be more because of their polluter presence incidence.. In fact, Global negotiation is very complex. Luckily all 195 countries of the world except a few, agreed but the biggest challenge is who is to take the lead.

Question - 2: Ridma Khan, Director , BWCCI

One of the key ways that Bangladesh can handle Sustainable Development is to engage the private sector into it. So what are the policies that the government should adopt to bring our private sector, our business firms in line with the triple bottom line? If we look at the European Union that we have European Union trading, I think, the diversion trading scheme which is one of the best example of market solution in declining with pollution, on the other hand we have America and Australia who have been delaying in adopting any policies, so is there any way that we can actually bring everyone or bring all the countries within the same policies that the European Union has adopted and which one should Bangladesh follow?

Answer: Dr. Ainun Nishat

Professor Dr. Nishat pointed out that when Rules of Business or Operation would be developed , it would be enforceable. He cited the example of

Kyoto Protocol as a legally binding document which has MRV(Measurable, Reportable, Verifiable) process. According to Kyoto protocol, the developed countries known as Annex - 1 Country 1992, (the then members of OECD) should reduce venous gas up to 5.2%. In this process, there was market mechanism. They could do business with other in the clean development mechanism and those who will not comply and will not reduce to 5.2% would be punished and there was a judicial body for compliance committee. So it can be legally binded within 1 to 2 years. If it is done, all the countries of the world will have to prepare rules/regulations/act/law. Incidentally, Bangladesh has law/act which is most modern and updated but we don't have enforcement.

In Bangladesh, Private Sectors are opportunists unlikely the other countries such as India. Chamber of commerce of India acts as a responsible organization to rationalize the taxes to help the economy of the country grow. In this regard, he cited example of CDM which financed Metro rail in India. Side by side he gave example of Waste Management System in Karwan Bazar by an NGO.

In answer to a question about the pollution of brick fields , he gave example of the biggest Brick Field in Bangladesh without any pollution. The govt. has set up an institute like BIFFL from which soft loan can be granted to conduct different mitigation projects. Government has money for ETP up to 5%, so we have to be compliant here. According to 1995 act, we have to treat factory waste and affluents within the factory premises/ boundary like Bata which is supposed to be one of the most polluting industries but there is ETP inside it recycling water.They are compliant; the expenditure is high but they are transferring the cost to the consumer. That is why bata shoes are costly. Likewise we can follow this practice of the international companies in our national arena also. So, many people think that there will be no competitive edge being environmentally sustainable /compliant. Some claim that their business will lose competitive edge which is not correct. The global demand is in favor of compliance of the private sector in a sustainable way. He refered of CSR fund of private sector as well as internal governance mechanism which should come in support of the country.

Question - 3: Captain Mohammad Faizul Hoque, BN, Director Welfare,
Navy Headquarters

We are concerned that the climate change is taking place and the global temperature is rising. My question is, have we really studied the statistics that if temperature increases to 2.5 degree, our crop production will be reduced by 50%. Why is it worrying us if this temperature rise will not take place all on a sudden whereas it will be gradual . In that case the temperature resilient crop will be coming. Previously we did not have crop sustaining salty water which is growing now. Scientists have also discovered such kind of rice. We are living in Arctic areas as well as in Tropical regions. As people are resilient, so are crops, we have really done that kind of study. So are we getting too much frightened?

Answer: Dr. Ainun Nishat

In the present context, temperature is rising alarmingly. The sea level was as high as the middle of the Himalayas around 200 crore years ago. Now, nobody cares for the 2/3 degree increase of heat in a million years. But if it happens in 90 years, there is no time to adopt. Presently scientists are working hard and consequently invented 5 types of flood tolerant seeds. But this climate change will create uncertainty of natural disaster.

Bangladesh has been turned into a food importing country from an exporting one. There is advancement in flood tolerance /drought/ salinity tolerance to some extent. If we study the bio - diversity of the echo system, we will see that there is a relationship between the micro climate of a place and a crop. When the micro climate is changed, that crop will not grow resulting zero productivity. This is not good for food security in Bangladesh. They can tolerate salinity but to what extent?

The world has only one goal - Paris agreement. All the countries signed and the foreign secretary of the USA came to ratify on behalf of USA with his granddaughter saying that he has signed that for the future of his granddaughter. It is said that it will happen in 2070 - 80 so why worrying now. He answered that we vaccinated our child within 6 months of his/her birth to prevent various diseases in 5/10/15 years. This is also the same precautionary measure.

But it is the narrow nationalism of some countries that resist them from signing for which Senior Bush did not sign Kyoto protocol. But recently they are moving towards energy efficiency. But some narrow nationalism works here. In Australia, anti - climate change govt comes and lose power. Again govt. in support of climate change comes and loses too. In fact, there people cannot figure out what to do.

In Germany, Angela Merkel will lose in the election. She is one of the champions of Kyoto protocol and climate change negotiation. Bangladesh took part in a dialogue called Cardigna Dialogue on how to shape climate change. They all will lose in the election for migrants issue. That is why the migrant issue is identified as a security threat. So, global politics is very positive, but the problem is regarding liability.

Question - 4: Lt Gen ATM Zahirul Alam, rcds, psc (retd), Former Commandant of National Defence College

I think and most of us here will agree with me that, decay of the water system or degradation of the water system of Bangladesh is the number one environmental security challenge for Bangladesh. I think for long and many reasons we have been sleeping on this issue. Of late Bangladesh has produced the Delta Plan and I am sure this aspect has been addressed to some extent in the Delta Plan of Bangladesh. However, the decay or degeneration of the water system of Bangladesh is not of our making alone. This has been so because of the withdrawal of water by the upper riverine countries. In this context, it is highly suggestive that, Bangladesh should immediately take a multilateral initiative involving India, Nepal, Bhutan, and China to address this issue through a long term multi action plan. What do you think of this one? What will be your response to this proposition?

Answer: Dr. Ainun Nishat

Dr. Ainun Nishat addressed the sovereignty issue as somehow problematic. There are two international conventions. One is familiar in Bangladesh as NGOs talk about it. The second one is much better though not familiar, 1997 UN Convention on Non - Navigational uses of International Water Course, Nohalanga, having no institutional mechanism. Negotiation went on for a long time and passed instantaneously. There is another one -EC Convention on International Rivers and lakes. This is much better an act for Bangladesh and we should be a signatory of this. We have altogether 54 rivers , 4 of them are related to 3 or more countries and the rest are bilateral. When water passes through two independent countries or two provinces of a federal type of govt, it becomes an international river. If we notice the inter - state dispute in India (telenguna vs Andhra - water of Kavery, tamilnadu vs Karnataka - water of Krishna etc.)we will find their political process where bilateralism is the corner instrument, nothing multilateral.

Bangladesh formulated three contracts/treaties at the time of giving the facility of Mongla Port to Nepal namely Bangladesh - Nepal, Bangladesh - India and India - Nepal. Recently, the BBIN sub regional approach is going on in light of SAARC. India has agreed to go to the first multilateral approach in the BBIN Movement. Now we have to justify our thinking process.

The prime minister of Bhutan agreed to invest 1 million Dollar on Manas which has come to Bangladesh through Brahmaputra. Bhutan wants Bangladesh to participate in it. I think that is a groundbreaking/revolutionary decision. We will be a partner in that dam, its design, its operation, everything, and will know what is going on as well as will get some electricity from it as an equity partner. Bhutan will not need that much electricity amounting 1150 MW. India will also be the equity partner and would like to take that electricity to central India. Arunachal has 1,000 MW equity partner. India wants water flow of Brahmaputra which increases in winter. We agreed to evacuate electricity through Bangladesh; we are building the line of electricity. In our country, we are facing lack of coordination and management in our river work. He opined that the coming project with Bhutan should be supervised by river basin management. But we are not sure which ministry is functioning the issue.

Though in September 22, 1991, article II of the framework for long term cooperation between India and Bangladesh, it is agreed that management of the rivers of this region is based on basin wide and basin wise planning which is in fact in black and white only.

He agreed with the multilateral approach of Lt Gen Zahir and for that the rivers immensely need to make those lively navigation. Along with it, we have to conserve rain water. Then he emphasized on inter level, inter - ministerial coordination among the ministries and implementing agencies. Finally he highlighted on looking into the institutional mechanism and go for compliance, transparency, accountability and private public community partnership.

Question - 5: Professor Dr. Anwar Hossain

Professor Anwar congratulated and thanked all the keynote speakers and mentioned that the most urbanized civilizations of the world like the Indus, the Pompey have been destroyed because of natural calamities. Here it is to be noted that, all the ancient civilization flourished beside the river banks which shows that this inter relation between nature and human beings is going on since time immemorial. Arnet Toynbee has a theory of “Challenge and Response” based on this view. From this perspective, we are well acquainted with this challenge. At present, the challenge depends on how we can respond to it. Here another point is notable. We have achieved enormous growth but according to Economics it does not predict development. We need development but it must be sustainable. As a whole we are in urgent need of planning which means thinking ahead. Now my question is when and how this planning would come into reality in our country.

Answer: Dr. AQM Mahbub

Dr. AQM Mahbub identified the following matters to be addressed to our consultants:

- Climate change issue
- Disaster issue

- Local geographical settings - climate, topography, hydrography etc,
- Social sector

He said that development will be hampered unless development reaches everyone. In 1997, When Hong Kong was handed over to china, the Hong Kong residents were divided into three groups. One group went to Britain. One spread their business all over the world, because of the fear that Communists and Federal Govt. will control them if they go to China. The rest one who stayed there seemed to have done well. And a group of people who had gone to New Zealand, were very welcomed and inspired to invest by the Govt. At that time the public protested the foreigners to invest money. If that happened then there would be rich and poor discrimination. Their philosophy was so long they are poor it does not matter as they wanted to live together.

Question - 6: Sadia Tasnim, Student of BUP

I am from the Faculty of Environmental Science, Bangladesh University of Professionals. We know water is life, we are dependent on water. But we are only talking about surface water pollution; we are not focusing on ground water. Our ground water is also polluting. So, is there any way to purify this ground water and any policy to reduce ground water pollution?

Answer: Dr. AQM Mahbub

Dr. AQM Mahbub addressed the issue and said that in North Bengal, 60% ponds, canals and rivers are declining because of uplifting of ground water. We are producing bumper crop at the cost of future. There will be time when we will find no water. There prevails technology to recharge ground water artificially. And secondly, something can be done artificially but that is costly, cumbersome as well as time consuming. If ground water is ever polluted, as we know through arsenic, we have not yet thought of it let alone develop. But that will be a very difficult and delicate task. What we have to do, is to use surface water. In this case he cited that - In Singapore, all the water is supplied from Malaysia. The water in India's Mumbai city goes from the north, then why should we take the ground water in Dhaka city. As the water of the Buriganga has become fully polluted, We can use surface water of Dhaleshwari

and Meghna. Recycling will not be cost effective. We must use it because there will be a gradual ground water depression in Dhaka city. If there is any earthquake, that will be serious. For this we have to preserve ground water and use surface water as much as possible. We should not use it for irrigation or smart irrigation.

He mentioned that Cumilla BARD and Scientists are formulating the simple technology which has already been implemented in other countries. In the northern part, ground water is being uplifted and used in everything. Moreover, ponds, canals are drying up. The entire vegetation is being affected for the water level being lowered.

Question - 7: Lt Gen ATM Zahirul Alam, rcds, psc (retd), Former Commandant of NDC

I am going to ask two questions. First of all, there is something called economic geography or development geography and you correctly raised the question of inequality in Bangladesh, I do not understand the wisdom of increasing Dhaka demography wise, already Dhaka is over populated, almost two crore people live here. But we have mega urbanization project like Purbachol, Dhansiri and above all the government projects. As if we want to bring all people of Bangladesh to Dhaka. I think it is time to stop all this around Dhaka and shift it to other areas, we should identify some growth and development centers like Rangpur ,Rajshahi, Bogra could be one. Chattogram of course is a development center, but it has stopped developing, So why are we bringing all the people to Dhaka, which is already densely populated, non - sustainable.

Secondly, because of climate change, sooner or later we are going to face global warming which will occur may not be in 50 years but in 100 years. We have to relocate lots of people from Bangladesh. Relocation to India and Myanmar is natural but it is not going to happen. Already there are obstruction from India and with the current relationship that we have with Myanmar . Then this is a global problem, so Bangladesh along with the Island counties should immediately take initiative in the global forum to find out future places for relocating our climate migrants. Alaska, Greenland, Siberia and lot of lands in Canada may be the potential areas for these climate migrants. More and more

areas will become livable and I think Bangladesh along with Island Counties should raise the issue in the global forum, so that we have a destination for our climate migrants in future.

Answer: Dr. AQM Mahbub

Dr. AQM Mahbub highlighted the issue of climate migration and replied that according to the Geneva Convention, the definition of ‘refugee’ is limited to convention on war, civil war. But the Western and G - 20 nations are not interested in recognizing climate migrants or environment migration as they themselves are responsible for creating them. We cannot change the definition as well, we are pushing and there are lots of pressure from the third world countries, but what we have to do is to develop our education sector because the survival, sustainability of Bangladesh depends on our education, quality education and skilled manpower,

Secondly, we have no quality education here, but while developing quality education, skill manpower, we have to keep in mind, the job pyramid, as, the competition at the bottom and middle section of the pyramid is very high in many jobs. We have to train people at those middle or lower ranks. We don’t have demands of engineers, plumbers, carpenters. We have demands of gardener, agriculture workers.

Thirdly, we should send our entrepreneurs to other countries to make them expert by practice..

Question - 8: Nurus Safa Chowdhury, Additional Secretary (retd)

(He thanked professor Anwar for raising the topic of Indus Civilization.) He pointed that the green part of our country is 5% while sustainable is 16% which is 25% in Belgium. He explained about carbon trading, why we are the less polluter, list emitter and we are comfortably blessed in terms of carbon trading. So, the question is how far we can go for carbon trading, without antagonizing our future development and industrialization process?

Greenery brings rain , rain brings the trees and it's a cyclic process. At the University of Chittagong, Dr. Abdul Aziz Khan initiated the green project . Why are these green projects not taken all over Bangladesh ? If Belgium can achieve 25% forestry then why not we? So how carbon trading continues to be in a better position for us?

Answer: Dr. AQM Mahbub

Dr. AQM Mahbub gave importance on System Approach citing example of push tap instead of normal tap. He also argued of importing half glasses instead of big glasses as more tax is imposed on big glasses. He highlighted that if we can start this system approach, people will start it automatically. But we cannot do this without the help of law.

NDC Participants (Faculty and Staff)

Ser	Rank and Name	Appointment
1	Lieutenant General Sheikh Mamun Khaled, SUP, rcds, psc, PhD	Commandant
2	Rear Admiral Muhammad Anwarul Islam, NGP, ndc, afwc, psc, BN	Senior Directing Staff (Navy)
3	Major General Md Mashud Razzaq, ndc, afwc, psc	Senior Directing Staff (Army)
4	Air Vice Marshal Shaikh Abdul Hannan, BUP, nswc, fawc, psc, GD (P)	Senior Directing Staff (Air)
5	Major General Md Moshfequr Rahman, SGP, SUP, ndc, psc	Senior Directing Staff (Army)
6	Brigadier General Md Amin Akbar, OSP, SPP, awc, psc	Senior Directing Staff (Army)
7	Brigadier General Monirul Islam Akhand, ndc, psc	College Secretary
8	Joint Secretary (Now Additional Secretary) Md Mofazzal Hossain, ndc	Senior Directing Staff (Civil)
9	Brigadier General Abu Sayeed Mohammad Ali, ndu, afwc, psc	Chief Instructor
10	Brigadier General Md Shamim Kamal, ndu, afwc, psc, M Phil	Directing Staff (Army)
11	Commodore Syed Misbahuddin Ahmed, (C), NUP, ndc, afwc, psc	Directing Staff (Navy)
12	Group Captain (Now Air Commodore) M Mustafizur Rahman, GUP, afwc, psc, GD(P)	Directing Staff (Air)
13	Brigadier General Md Hakimuzzaman, SGP, afwc, psc, Engrs	Directing Staff (Army)
14	Brigadier General Syed Sabbir Ahmed, afwc, psc	Directing Staff (Army)

Ser	Rank and Name	Appointment
15	Colonel (Now Brigadier General) Md Nishatul Islam Khan, afwc, psc	Directing Staff (Army)
16	Colonel Md Imrul Mabud, SUP, afwc, psc	Directing Staff (Army)
17	Colonel Salahuddin Khaled	Colonel Administration
18	Colonel (Now Brigadier General) Mohammad Shahriar Zaman, afwc, psc, G, Arty	Director (Research & Academic)
19	Lieutenant Colonel Syed Jamil Ahsan, afwc, psc	General Staff Officer-1 (Training)
20	Lieutenant Colonel Md Kamrul Islam, BGBM, psc, Arty	General Staff Officer-1 (Administration)
21	Lieutenant Colonel Nizam Uddin Ahmed, afwc, psc, Engrs	Senior Research Fellow-1
22	Lieutenant Colonel A S M Badiul Alam, afwc, psc, G+, Arty	Senior Research Fellow-2
23	Major Md Akhlaq - Uz - Zaman, EB	General Staff Officer-2 (Coordination)
24	Major Md Shakhawat Ali, Arty	General Staff Officer-2 (Planning & Coordination)
25	Major Ahmed Ashequl Arefin, Inf	General Staff Officer-2 (Administration)
26	Major Md Asrafuddowla, psc, ASC	Mechanical Transport Officer
27	Major Md Monowarul Karim, GL, Inf	General Staff Officer-2 (Accounts)
28	Major Afsana Rahman, psc, Sigs	General Staff Officer-2 (Network Administration)
29	Major Lasker Jewel Rana, Inf	General Staff Officer-2 (Coordination), AFWC Wing
30	Major Saquib Ibne Rashid, AC	Quarter Master

Ser	Rank and Name	Appointment
31	Lieutenant Commander Israth Zahan, (ND), BN	General Staff Officer-2 (Training Support)
32	Squadron Leader Mohammed Iqram Hossain, Edn, BAF	General Staff Officer-2 (Protocol)
33	Senior Assistant Secretary Syeda Nurmahal Ashrafi	Research Coordinator
34	Captain Md Rafiur Rahman, EB	(Coord) SDS (Army-2)
35	Captain Noor Mohammad Nofaer, Sigs	ADC to Comdt
36	Flight Lieutenant Rafat Zahin Ahmed, Admin, BAF	General Staff Officer-3 (AFWC Wing)
37	Lecturer (English) Farhana Binte Aziz	Research Fellow
38	Md Nazrul Islam	Assistant Director (Library)

NDC Participants (Capstone Fellows - 2019)

Ser	Fellow Name	Name of Organization
1	Bodruddoza Md. Farhad Hussain	Member of Parliament (243 Brahmanbaria - 1)
2	Md. Mashiur Rahman Ranga	Member of Parliament (19 Rangpur - 1)
3	Ayesha Ferdaus	Member of Parliament (273 Noakhali - 6)
4	Mustafa Lutfullah	Member of Parliament (105 Satkhira - 1)
5	Ashim Kumar Ukil	Member of Parliament (159 Netrokona - 3)
6	Md. Akhteruzzaman	Member of Parliament (104 Khulna - 6)
7	Rear Admiral M Shafiqul Azam, NUP, ndc, psc	Assistant Chief of Naval Staff (M) Naval Headquarters
8	Major General Md Enayet Ullah, BSP, ndu, psc	Commandant, DSCSC, Mirpur Cantonment
9	Air Vice Marshal Muhammad Mafidur Rahman, BSP, BUP, ndu, afwc, psc, GD (P)	Air Officer Commanding, BAF Base Zahurul Haque, Chattogram
10	Md. Mohsin	Additional Secretary Ministry of Disaster Management and Relief
11	Muhammad Maududur Rashid Safdar	Director General (Additional Secretary) Bangladesh Rural Development Board
12	Md Alamgir	Managing Director (Additional Secretary) Hotel International Ltd and Pan Pacific Sonargaon

Ser	Fellow Name	Name of Organization
13	Sultana Afroz	Additional Secretary Economic Relations Division, Ministry of Finance
14	Md. Mohsin Hossain, ndc	Addl IGP Bangladesh Railway Police Headquarters
15	Ms. Mahtab Zabin	Managing Director, Probashi Kallyan Bank
16	Dr. Sultan Mahmud Bhuiyan	Director, Strategic Planning & Quality Assurance Division, University Grants Commission
17	Dr. A M A M Zonaed Siddiki	Professor Department of Pathology and Parasitology, Chattogram Veterinary and Animal Sciences University
18	Md. Emdadul Haque	Professor, Department of Statistics, University of Chattogram
19	Md. Bazlur Rahman	District and Sessions Judge, Pabna
20	M L B Mesbah Uddin Ahmed	District and Sessions Judge (Women and Children Repression Prevention Tribunal), Gazipur
21	Dr. Md. Jalaluddin Iqbal	Professor, Department of Pharmacology Sir Salimullah Medical College (SSMC)
22	Md. Iqbal Karim	Chief Engineer, Company Affairs Bangladesh Power Development Board (BPDB)

Ser	Fellow Name	Name of Organization
23	M Shoeb Chowdhury	Chairman Editorial Board, The Asian Age
24	Md. Abu Jafar Surjo	Editor, The Daily Sangbad Pratidin
25	Ms. Sultana Jahan, CIP	Vice - Chairman, Labib Group
26	Hafez Harun - Or - Roshid	Director, FBCCI Proprietor, Samia Trading and Tearot Transport
27	Eazaz Mohammed	Director, Orchard Group
28	Ms. Ridma Khan	Board of Director Bangladesh Women Chamber of Commerce & Industry (BWCCI) And Director Ambon Properties Limited
29	Ms. Ulfat Jahan Moon	Board of Director Bangladesh Women Chamber of Commerce & Industry (BWCCI) & Chairman, East West Nursing College
30	Ms. Farida Yesmin	Executive Director Disabled Rehabilitation & Research Association (DRRA)
31	Ms. Sharmin Khan	Deputy Country Director Handicap International Federation
32	Faruque Hassan	Honorary Consul of Greece to Bangladesh
33	Abul Hossain	Honorary Consul of Uganda to Bangladesh
34	Mohammad Ershad Hussain Rana	Chairman and CEO of Dawn Group

NDC Participants (Course Members of National Defence Course - 2019)

Ser	Rank	Name	Country
Allied Course Members			
1	Colonel	Zhou Ming Jun	China
2	Brigadier General	Ayman Ibrahim Salem Zaied	Egypt
3	Brigadier	Mandeep Pal Singh Gill	India
4	Commodore	Rajiv Ashok	India
5	Air Commodore	Rajat Mohan, VM, F(P)	India
6	Colonel	Heru Setio Paripurnawan	Indonesia
7	Staff Colonel	Ibrahim Saad Al - Saadan	KSA
8	Staff Brigadier	Faleh Mabruk S. Al - Juhani	KSA
9	Staff Colonel	Sultan Bin Ayed Alenazi	KSA
10	Staff Brigadier (Pilot)	Mufadi Qadeim Al - enazi	KSA
11	Colonel	Mishial Y Y E Alsafran	Kuwait
12	Colonel	Meshal Y E T Alebraheem	Kuwait
13	Brigadier General	Mohd Kahar Bin Mohd Kassim	Malaysia
14	Colonel	Joseph Coulibaly	Mali
15	Brigadier General	Sudarshan Silwal	Nepal
16	Colonel	Kimba Tahirou	Niger
17	Colonel	AM Grema	Nigeria
18	Colonel	Musa Abubakar Sadiq	Nigeria
19	Colonel	Chima Abraham Ekeator	Nigeria
20	Colonel	SM Uba	Nigeria
21	Colonel	Risku Ezra Hedima	Nigeria
22	Group Captain	Nosiru Babatunde Folaji	Nigeria
23	Captain	Chikaji Aminu Isah	Nigeria
24	Group Captain	Sunday Usman Bello	Nigeria
25	Group Captain	Musabah Bin Khalfan Al Harassi	Oman
26	Group Captain	Syed Hashmat Iqbal, fawc, psa	Pakistan
27	Brigadier	A K G K U Gnanaratne, psc	Sri Lanka
28	Commodore	Neville Amara Ubayasiri	Sri Lanka
29	Air Commodore	A J Amerasinghe	Sri Lanka
30	Captain (N)	Frank Jothamu Mwasikolile	Tanzania
31	Lieutenant Colonel	Allan Hinton	UK

Ser	Rank	Name
Bangladesh Army		
32	Brigadier General	Zakir Ahmed, psc
33	Brigadier General	Mohammad Ayub Chowdhury, PBGMS, psc
34	Brigadier General	Md Jahangir Harun, SGP, afwc, psc
35	Brigadier General	Ohidul Alam Chowdhury, SPP, psc
36	Brigadier General	Md Ahsanul Kabir, afwc, psc
37	Brigadier General	Abu Hena Mohammad Sadrul Alam, psc
38	Brigadier General	Bashir Ahmed, psc
39	Brigadier General	Md Anisur Rahman, afwc, psc
40	Brigadier General	Mohammad Adil Choudhury, psc
41	Brigadier General	Md Selim Mahmud, afwc, psc
42	Brigadier General	I K M Mostahsenul Baki, afwc, psc
43	Brigadier General	M Nuruzzaman Chowdhury, psc
44	Brigadier General	Md Mizanur Rahman, psc
45	Brigadier General	Abdullah - Al - Mamun, psc
46	Brigadier General	Abdullah Al Mamun, SPP, psc, G
47	Brigadier General	Md Mahbub - ul Alam, afwc, psc
48	Brigadier General	Md Naheed Asgar, afwc, psc
49	Brigadier General	Mohammad Al Masum, PBGM, psc
50	Brigadier General	Tamjidul Haque Chowdhury, afwc, psc
51	Brigadier General	Md Abu Bakar Siddique Khan, afwc, psc, G+
52	Brigadier General	Md Masudur Rahman, psc
53	Brigadier General	Md Nasim Parvez, afwc, psc
54	Brigadier General	A N M Manzoorul Hauqe Mazumder, afwc, psc, G
55	Brigadier General	Md Kaisar Hasan Malik, psc
56	Brigadier General	Md Sadequzzaman, afwc, psc
57	Brigadier General	J M Emdadul Islam, afwc, psc
58	Brigadier General	Ali Reza Mohammad Ashaduzzaman, psc
59	Brigadier General	Bashir Ahmed, psc, G+
60	Brigadier General	Muhammad Ali Talukder, afwc, psc
Bangladesh Navy		
61	Commodore	Golam Sadeq, (G), NGP, ncc, psc, BN
62	Commodore	Mir Ershad Ali, (G), NPP, psc, BN

63	Commodore	Abu Sayed Mohammad Afzalul Haque, (TAS), NPP, psc, BN
64	Captain	Mohammad Nazrul Islam, (S), NPP, psc, BN
65	Captain	Mohammad Arshad Kabir, (L), psc, BN
Bangladesh Air Force		
66	Air Commodore	Javed Tanveer Khan, afwc, acsc, psc, GD (P)
67	Air Commodore	Syed Sayeedur Rahman, BUP, afwc, psc, GD (P)
68	Air Commodore	A F M Shamimul Islam, afwc, psc, GD (P)
69	Group Captain	Sk Abul Kashem, psc, Admin
70	Group Captain	Md Aminul Haque, psc, Engg
Bangladesh Civil Service		
71	Joint Secretary	Md. Oliullah
72	Additional Secretary	Sheikh Shoebul Alam
73	Additional Secretary	Md Kamrul Hasan
74	Joint Secretary	Khan Md Nurul Amin
75	Joint Secretary	Nusrat Jabeen Banu
76	Joint Secretary	Muhammad Wahiduzzaman
77	Joint Secretary	Muhammad Hiruzzaman
78	Joint Secretary	G S M Jafarullah
79	Joint Secretary	Sanjida Sobhan
80	Joint Secretary	Ishrat Chowdhury
81	Joint Secretary	Md Momtaz Uddin
82	Joint Secretary	Abdul Latif Khan
83	Deputy Inspector General	AKM Shahidur Rahman, PPM
84	Deputy Inspector General	Md. Abdullah - Al - Mahmud, BPM
85	Director General	Mr. Mohammad Sarwar Mahmood

Seminar on “Environmental Security and Climate Change - Development Challenges for Bangladesh” on 09 April 2019

Ser	Rank and Name	Appointment	Organization
1	Dr. Mashiur Rahman	Adviser to Hon’ble Prime Minister	Prime Minister Office
2	Dr. Ainun Nishat	Professor, C3ER	BRAC University
3	Dr. A Q M Mahbub	Professor of Geography & Environment	Dhaka University
4	Lieutenant General A T M Zahirul Alam, rcds, psc (Retd)	Former Comdt	NDC
5	Commodore K M Ahmed, (G), ncc, psc, BN	Former Faculty	NDC
6	Professor Nazrul Islam	Honorary Chairman	Center for Urban Studies
7	Colonel Md Shariful Islam		Armed Forces Division
8	Brigadier General Mir Mushfiqur Rahman	Director Military Operations	Army Headquarters
9	Colonel Md Shawkat Osman, afwc, psc	Col Staff, MT Dte	Army Headquarters
10	Commodore Ashraful Hoq Chowdhury	Director, Blue Economy	Naval Headquarters
11	Captain Md Fazlar Rahman, BN	Director (Signals)	Naval Headquarters
12	Captain Mohammed Faizul Hoque, BN	Director (Welfare)	Naval Headquarters
13	Group Captain Hasan Zubei	Director of Personnel	Air Headquarters

Ser	Rank and Name	Appointment	Organization
14	Group Captain Md Mostaque Helalur Rahaman	Director of Finance	Air Headquarters
15	Group Captain Syed Fakruddin Masud	Director of Works	Air Headquarters
16	Commodore M Anamul Haque		DGFI
17	Brigadier General Zakir Hossain	Director	NSI
18	Captain Mosayed, (Tas), afwc, psc, BN	Director (Personal)	Bangladesh Coast Guard
19	Joint Secretary Abul Kalam Khan		Ministry of Defence
20	Joint Secretary A K M Tipu Sultan		Ministry of Disaster Management & Relief
21	Joint Secretary Rashada Akhter		Ministry of Finance
22	Joint Secretary Sanjoy Kumar Bhowmik		Ministry of Environment, Forest & Climate Change
23	Dr. Md Shahjahan Ali Khandaker	Joint Chief	Ministry of Planning
24	Md Rakibul Hasan Mukul	Conservator of Forests	Forest Department
25	Ummey Habiba	Deputy Conservator of Forests	Forest Department
26	Md Ariful Hoque Belal	Asst Chief Conservator of Forests	Forest Department
27	Colonel Sayeed Anowar Mahamood		DSCSC

Ser	Rank and Name	Appointment	Organization
28	Colonel Molla Md Zubaer, te	Senior Instructor	MIST
29	Group Captain Md Mahbubul Alam	Senior Instructor	MIST
30	Sufia Khanom	Senior Research Fellow	BIISS
31	Alamgir Kabir	Lecturer, Dept of Environmental Science	BUP
32	Amit Hasan Fahim	Student	BUP
33	Shamim Ahmed Mridha	Student	BUP
34	Md Fojlur Rahman Abir	Student	BUP
35	Md Samiul Islam Sifat	Student	BUP
36	Sadia Jahan Rothi	Student	BUP
37	Tahsin Tabassum	Student	BUP
38	Sadia Tasnim	Student	BUP
39	Mr. Shahadat Hossain	Research Officer	ISPR
40	Enamul Haque		ISPR

Moderator/Coordinators

1.	Major General Md Mashud Razzaq, ndc, afwc, psc	Senior Directing Staff (Army)	Chief Coordinator
2.	Additional Secretary Md. Mohsin	Capstone Fellow - 2019	Moderator
3.	Colonel (Now Brigadier General) Muhammad Shahriar Zaman, afwc, psc	Director, Research and Academic	Coordinator
4.	Lieutenant Colonel A S M Badiul Alam, afwc, psc, G+, Arty	Senior Research Fellow	Associate Coordinator
5.	Lecturer Farhana Binte Aziz	Research Fellow	Assistant Coordinator
6.	Md Nazrul Islam	Assistant Director (Library)	Assistant Coordinator



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