

## Assessing Knowledge, Skills and Capacities in Environmental Management: A Study on Bangladesh

Md. Mafizur Rahman<sup>1</sup> & Akhter Hussain<sup>2</sup>

**Abstract:** *In Bangladesh, there is a gap in environmental understanding, one of the most critical issues that make the development process extremely challenging. Therefore, Bangladesh needs adequate knowledge, capacity, and skills in environmental management. This objective warranted an assessment of available capacity and needs for specific knowledge and skills in environmental management. Data and information were collected from primary and secondary sources. The primary level information was collected through in-depth interviews and observation. For secondary information, both published and unpublished literature were studied. In Bangladesh, to address ever-increasing environmental problems, government interventions and policy initiatives, academic programmes, research initiatives, and environmental activism became quite visible in the mid-nineties of the last century. In the academic arena, two types of initiatives became prominent. First, the environmental dimension was added to some of the existing academic disciplines of different public universities to develop knowledge and skills. On the other hand, some public and private universities in Bangladesh introduced new academic programs specifically focusing on the environment. However, in public universities where environmental education has been introduced as an addition or extension to parent disciplines, only a limited number of courses on environmental management have been introduced. This has left aside other pertinent areas of environmental management from the purview of the educational programme. The disciplines that included environmental management in their domains still emphasize on their parent subject areas. Therefore, it is recommended to introduce a comprehensive education programme consisting of environment-related courses with suitable bearings on environmental management.*

**Key Words:** Academic Discipline; Capacity; Climate Change; Environmental Management

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<sup>1</sup> Associate Professor, Department of Public Administration, Jagannath University, Dhaka-1110, Bangladesh

<sup>2</sup> Distinguished Professor, Institute of Bangabandhu War of Liberation Bangladesh Studies National University, Dhaka-1209, Bangladesh

## 1. Introduction

Because of climate change, challenges to Bangladesh's environment and climate have been increasing during the last few decades. In the previous two decades, the Global Climate Risk Index (GCRI) rated Bangladesh as one of the most affected countries in the world by extreme weather events. Koons (2022) claims that Bangladesh is a climate-vulnerable country because of two main reasons: the first is geographical, and the second is economic. In favour of the first reason, Moran *et al.* (2018) already mentioned that more than half of the country's population lives in areas deemed highly vulnerable to climate impacts. Regarding the second reason, it is argued that the economic effects of climate change in Bangladesh are now severe. The country is at risk of a loss of 2.0 percent to 9.0 percent of annual Gross Domestic Product (GDP) by the mid and end of the century due to climate change, but the people living in Bangladesh are not ready to deal with them (IPPC, 2022).

Although Bangladesh has achieved several milestones in the environmental sector in recent years despite the hardship of poverty, resource scarcity, overpopulation, corruption, and natural calamities, the country needs to have increased knowledge, capacity, and skills in the relevant areas. Some universities in Bangladesh have introduced academic programmes leading to master's degrees in the broad area of the environment. It is assumed that these programmes would strengthen the institutional and human resource capacity in environmental governance to support an integrated approach that reconciles pro-poor growth with community-based, sustainable resource, and environmental management in Bangladesh. However, assessing the available capacity and needs for specific knowledge and skills in environmental governance and sustainable human resource management in Bangladesh is imperative.

## 2. Objective of the Study

The broader objective of the study was to conduct a capacity and need assessment on natural resource and environmental management.

The specific objectives of the study were to:

- assess capacity and human resources of the academic and professional organizations in environmental management;
- identify gaps in the knowledge as well at the implementation levels in environmental management; and,
- make recommendations for capacity enhancement in environmental management.

### **3. Approach and Methodology**

This study adopted a qualitative research approach; however, data and information were collected from both primary and secondary sources. The primary level information was collected through in-depth interviews and observation. In-depth interviews were conducted with the help of pre-designed checklists, and conscious efforts were made to keep them as informal as possible and to keep the areas of questions open. In addition, both published and unpublished literature were studied to collect data and information from secondary sources, which included books, journals, and relevant literature on broad areas of environmental governance. On the other hand, observation visits to different institutions and offices were undertaken to acquire first-hand information. All concerned academics, researchers, practitioners, policymakers, activists, etc., took an active interest and enthusiastically cooperated and participated in the research effort.

As the study intended to assess the capacity and needs of specific knowledge and skills in environmental governance and sustainable human resource management in the country, a number of educational institutions, both public and private, were selected for in-depth investigation. The public sector academic institutions included in the investigation were: the University of Dhaka, Jahangirnagar University, Jagannath University, Rajshahi University, Chittagong University, and Shahjalal University of Science and Technology. In addition, several private academic institutions, namely North-South University, Independent University, and Stamford University, were also selected for the study. The selected institutions were visited, and faculty members of the said institutions were interviewed to identify potentials, constraints, especially gaps concerning the knowledge base, curriculum, and infrastructural facilities of these institutions in offering environmental education. In addition, content analysis of the courses offered by these institutions in the environment was also conducted to determine their relevance and appropriateness. The educational background of the faculty members and their areas of interest were also studied to assess the in-house availability of teaching capability under the multidimensional perspective that environment as a discipline warrant. Inquiries were also made about the existing infrastructural facilities, including the laboratory facility and their capacity to cater to the needs of the discipline and the number of students.

For soliciting informed opinions and experience on environmental problems, their different dimensions, existing knowledge, skills, and competencies, particularly of the graduates who have studied environment as an academic discipline and the institutions that are offering educational programs on the environment, a good number of institutions both

government and non-government, research institutions and key informants representing various sectors and institutions were contacted and interviewed. Some of these were the Ministry of Environment, Forest and Climate Change, Bangladesh Garments Manufacturers and Exporters Association (BGMEA), Bangladesh Leather Technology Institute, Bangladesh Environmental Lawyers' Association (BELA), Centre for Natural Resources Studies (CNRS) and CEGIS, etc. Besides, some environmental graduates who passed out recently and working with institutions were interviewed to seek their opinion on the challenges that they face in real-life work situations and how their earlier acquired education, knowledge, and skills are assisting them in addressing those whether there has been any gap in their learning and how these could have been overcome.

#### **4. Findings and Discussions**

##### ***4.1 Major Environmental Issues in Bangladesh***

Bangladesh is known for its largely low-lying floodplain. However, the physical characteristics of the land, geographic location, the multiplicity of rivers, and the monsoon climate render the country highly vulnerable to climate-induced natural disasters (Islam, 2016). Besides, the other characteristics are seasonal extremes of water availability, i.e., flood and drought. These natural phenomena, extreme climatic events, and unplanned economic activities are significant constraints in achieving sustainable socio-economic development (IPPC, 2022).

In the current study, an effort was made to identify major environmental concerns and problems that Bangladesh confronts and needs to address to ensure sustainable growth and development. As mentioned in the methodological note, different stakeholders having environmental concerns were consulted, and in the process, some major environmental issues in Bangladesh were identified. These are environmental pollution due to rapid industrialization and urbanization; natural hazards (cyclones and tornados, river bank erosion, and flood); climate change (rise in sea level, flood, and draught); deforestation, desertification; soil degradation; increase in salinity; groundwater contamination; and conservation of biodiversity.

##### ***4.2 Environmental Management in Bangladesh***

###### *Institutions*

The concern of the government for environmental management culminated in 1989 with the creation of the Ministry of Environment and Forests and the Department of

Environment (Khan, 2017). However, in 2018, the government renamed the ‘Ministry of Environment and Forests’ as the ‘Ministry of Environment, Forests and Climate Change’ (Rahman and Huang, 2019). Ministry of Environment, Forests and Climate Change (MoEFCC) aims to increase the adaptation and mitigation capacity of the country to build resilience against climate change impact and climate change-induced disasters and to ensure a sustainable environment for the present and future generations of the country. Under the MoEFCC, there are agencies like the Department of Environment (DoE), Bangladesh Forest Department, Bangladesh Forest Industries Development Corporation (BFIDC), Bangladesh Forest Research Institute (BFRI), Bangladesh National Herbarium (BNH), and Bangladesh Climate Change Trust (BCCT) (Rahman, 2021).

The Department of Environment (DoE) is an implementing agency of the MoEFCC. The DoE is responsible for a number of functions and activities, such as planning and development, compliance and enforcement, environmental awareness, laboratory analysis and environmental clearances, and environmental impact assessment (EIA) processing. In addition, the DoE is responsible for enforcing environmental laws and regulations, notably waste management and pollution control (Ahmed, 2019). Forest Department manages and conserves forest resources, along with biodiversity conservation. The Department also enforces laws and regulations for managing forest resources and wildlife (Rahman, 2016). Bangladesh National Herbarium explores and prepares an inventory of plant resources in the country (Rahman, 2020). Bangladesh Forest Research Institute is mandated to carry out forest resources-related research, disseminate the findings, and publish. Bangladesh Forest Industries Development Corporation is the leading Public sector corporation in the rubber and wood products industry. Bangladesh Rubber Board identifies lands for rubber cultivation. Besides, it is responsible for producing, marketing, and exporting rubber (Rahman, 2016). Bangladesh Climate Change Trust collects and distributes funds for enhancing resilience against climate change, together with climate adaptation and mitigation (Rahman and Huang, 2019).

### *Policy Initiatives*

The policy framework for the environment sector in Bangladesh consists of policies, guidelines, and action plans and is supplemented by the national capacity assessment exercises (Khan, 2009). The National Environment Policy 1992 was the first environmental policy in Bangladesh, revised in 2013 and 2018. Since then, more than twenty-five different acts, policies, guidelines, and regulations have been instituted that regulate the environmental footprint of industries and development activities (World

Bank, 2018). Some major legislation are: the Environment Conservation Act 1995, the Environment Court Act 2010, the Forest Act 1927, the Wildlife (Conservation and Security) Act 2012, the Brick Manufacturing and Brick Kilns Establishment (Control) Act 2013, and the Bangladesh Biodiversity Act 2017. In addition, the successive five-year plans also emphasized the environmental objectives of the government as well as its need for environmental sustainability.

The National Adaptation Programme of Action (NAPA), The Bangladesh Climate Change Strategy and Action Plan (BCCSAP), etc., are the initiatives to address the climate change issue in Bangladesh. These are top-down interventions through various sectors, Ministries, and agencies (Rahman and Huang, 2019).

#### ***4.3 Emergence of Environmental Management as an academic discipline of study***

‘Environment’ as an academic discipline of study is relatively recent in Bangladesh. However, two types of initiatives have become prominent over the last two decades, especially in the academic arena. *First*, the environmental dimension was added to some of the existing academic disciplines of different public universities to develop knowledge and skills. *Second*, new academic programs specifically focusing on the environment alone were introduced in some public as well as private universities in Bangladesh. As a result, these institutions have contributed to producing human resources with appropriate knowledge and skills in environmental management.

But it is worth mentioning that environment as the sum totals of different relevant disciplines are interrelated or have a bearing on one another. In that context, different academic disciplines that have an intimate and or close relationship with the environment as disciplines of study have been there or taught at various educational institutions in Bangladesh for quite some time, for example, Geography, Geology, Zoology, Fisheries, Botany, and Soil Science to name some of them. The Department of Geography at the University of Dhaka was established in 1947-48 (Ismail, 2016). From the beginning, the theoretical courses at the Honours and Masters levels incorporated different branches of Physical and Human Geography. Later, with increasing emphasis on ‘environment’, some changes were made in the course curriculum, integrating environment within Physical and Human Geography. From 1996 onwards, the Department was known as the Department of Geography and Environment. Similarly, the Soil Science Department under the same University also renamed it incorporating environment. In some other public universities in Bangladesh similar trend has also been observed in renaming existing academic disciplines by adding environment to them. Here it should be

mentioned that in all these departments, various courses on the environment have also been introduced along with the existing courses of the parent departments.

However, the North South University was the first institution that, for the first time, introduced specifically environmental education in the country. The Department of Environmental Studies (DES) as an academic program was established in the Spring of 1994. Later, upon approval from the University Grants Commission (UGC), the name of DES was changed to the Department of Environmental Science and Management (DESM). The syllabus also has been changed to reflect the changing curricula in the field over the last decade. The Environmental program is designed to impart knowledge and skills among students in all major environmental areas. The program uses a curriculum that incorporates issues related to soil, air, and water pollution, environmental health, integrated management of natural resources, environmental economics, impact assessment, gender issues, sustainable development, corporate environmental management, and global environmental issues and politics. The program also offers practical environmental chemistry, microbiology, and GIS training.

Khulna University was the pioneer among public universities in establishing Environmental Science Department in 1997. The main components of the discipline are a 4-year undergraduate (Bachelor of Science in Environmental Science), an 18-month postgraduate (Master of Science in Environmental Science), and a Ph.D. Program (Ph.D. in Environmental Science). In the same year, environment as an academic discipline was also introduced at the Independent University. In later years, other public and private universities in Bangladesh, such as the Independent University, Jahangirnagar University, Jagannath University, Shahjalal University of Science & Technology, Stamford University, and Chittagong University (Institute of Forestry & Environmental Sciences) introduced the discipline. The University of Dhaka has established a new 'Earth and Environment Sciences' faculty to offer educational programs in the broad areas of the environment.

#### *Course contents*

It has been gathered that the educational institutions in Bangladesh offer varied courses in the broad areas of environmental management. The courses include Principles/Introduction to Environmental Science, Climate Change, Environmental Impact Assessment (EIA), Waste Management, Water Resources Management, Environmental Planning and Management, Environmental Law, Sustainable Development, Biodiversity and Conservation, Environmental Economics, Environmental

Health, etc. But investigation revealed that the universities which have established altogether new departments in environment offer more environmental courses (e.g., North-South University, Khulna University, Jahangirnagar University, Independent University) than those where the environment has been added as an additional dimension to the existing departments or academic disciplines (for example, Geography and Soil Science departments of the University of Dhaka). In the latter case, some form of specific subject preference or biasness has also been observed in the courses generally offered to the students. The specific subject biasness was noticed particularly in the broad disciplines of geography, chemistry, soil, and geological sciences (Dhaka University, Rajshahi University, and Jahangirnagar Universities). The faculty members of different universities, both public and private, interviewed also agreed to the above observation. They mentioned that the reasons for such biasness were dependence on the existing faculty members. The latter were drawn into environmental programs offered by these institutions with their already acquired educational background, expertise, and subject preferences.

The other observation that needs to be mentioned here is the overwhelming predominance of theoretical learning compared to practical and field-based learning in the students studying environment as an academic discipline. This limitation results in very limited exposure of the students to practical or real-life environmental problems and issues. As such, minimal skills are also developed among the students to apply and test various available tools and techniques to solve environmental problems that are quite common in Bangladesh. The interviewees, especially the faculty members of universities, mentioned some reasons for the predominance of theoretical or classroom-based learning, e.g., resource constraints on the part of the educational institutions and, in some cases, lack or limited experience of the teaching faculty in imparting practical and problem-based education.

#### *Employment Opportunity*

Over the years, employment opportunities for environmental management graduates have considerably increased in Bangladesh (Mondal *et al.*, 2010). The above statement has been endorsed by academics, government and NGO officials, and persons representing various industries on several occasions during the study. It was also learned that different public sector organizations/corporations and developmental projects funded by bilateral and multi-lateral agencies under the MoEFCC, the Ministry of Fisheries and Livestock, are the leading employers of environmental graduates. In addition, it was reported that



the MoEFCC had initiated a move to provide preference to environmental graduates in future recruitments of the ministry.

For quite some time, the government has been supporting private sector-led economic growth in Bangladesh. As a result, the sector has remarkably grown and developed in the last couple of years (Sawada *et al.*, 2018). The private sector includes industries, e.g., garments, textiles, leather, prawn, shrimp culture and processing, pharmaceuticals, and chemical industries, and other service sector organizations and agencies, e.g., oil and gas exploration and distribution companies. During interviews, concerned persons representing these private sector enterprises and agencies mentioned that they now need to recruit environmental management graduates in increasing numbers to address some of the environmental problems (industrial effluent treatment and management and waste management) that are associated with the production processes of the industries. In addition, international environmental standard compliance is another aspect that is increasingly becoming an important factor that an export-oriented industry is bound to take into consideration. This reality in the private sector creates employment opportunities for environmental management graduates. Besides, Non-governmental organizations (NGOs), both national and international, environmental research and activist organizations also offer employment opportunities to environmental management graduates.

#### ***4.4 Existing knowledge and skills levels in environmental management***

It has been discussed earlier that, in Bangladesh, environmental issues started receiving the attention of different quarters in the 80s of the last century. It gained further momentum in the 90s by establishing government ministry and other relevant agencies (Khan, 2017). Some existing academic disciplines included environment-related subjects in their curriculum in the academic arena. Others established new academic departments for studying environmental management as a specific academic discipline.

Over the last twenty years, a good number of students have graduated from these institutions with specialization in the area of environment. It has been gathered that these graduates work in different capacities with various organizations, including government agencies or departments, research organizations, industries, national and international Non-Governmental organizations, etc. It is perceived that over the years, as a result of the above adequate pool of knowledge and skills in environmental management has been developed in the country that can address Bangladesh's environmental problems and constraints. As such, the present study tried to assess and identify any gap in knowledge

and competency in the area of environmental management in the country. For this purpose, discussion sessions and interviews with relevant stakeholders were undertaken. From those exercises, it revealed there are gaps in both the areas of knowledge and competency in environmental management. These are discussed below.

### *Knowledge Gap*

Knowledge may be termed as expertise and skills acquired by a person through experience or education; the theoretical or practical understanding of a subject (Tallapalli, 2018), what is known in a particular field or total; facts and information or awareness or familiarity gained by experience of a fact or situation. The term is also used to mean the confident understanding of a subject with the ability to use it for a specific purpose if appropriate. In line with the definitions stated above, stakeholders identified the following gaps in knowledge of environmental management.

*(a). Limited knowledge about different aspects and dimensions of environmental management:* The study reveals that environmental education has been introduced as an addition or extension to the parent disciplines in many cases, especially concerning public universities. However, in those cases, only a limited number of courses on environmental management have been introduced. This has resulted in imparting knowledge only in some limited domains, leaving other pertinent areas of environmental management out of the purview of the educational program.

*(b). Absence of holistic/global environmental management vision:* It has been observed that the disciplines that included environmental management in their domains still maintain an over-emphasis on their parent subject areas. As a result, environmental management receives limited focus, which hinders the development of a holistic or global environmental management vision.

*(c). Education with limited exposure to real-life situations:* In overwhelming cases, the present NREM education is theory and classroom-based. The course curriculum offers little and, in many cases, no opportunity for the students to go out of the classroom and see what actually happens outside. They cannot relate their knowledge and understanding to real-life problems

*(d). Little awareness about the latest developments and new knowledge in environmental management:* Regular updating and introduction of new courses are essential to equip students with new knowledge and information that are being developed on a continuous basis in different parts of the world. But our investigation suggests that course contents

are not revised or updated on a regular basis. At the same time, new courses are not introduced when needed to impart new knowledge and information to the students. As a result, students are not acquainted with or aware of the latest developments and new knowledge, tools, and approaches in environmental management.

#### *Competency Gap*

Competence is the ability to perform some tasks. Therefore, it is a logical expectation that education in any particular field should also develop the ability to perform at least subject-related tasks. Bangladesh faces a number of problems in environmental management. But it revealed that environmental graduates have limited ability to solve or address environmental problems and issues. There is limited skill in applying tools and approaches for problem-solving. In Bangladesh, in overwhelming cases, the delivery of education in environmental management, like most other disciplines, is generally descriptive. Problem-based teaching is quite rare or very limited. As a result, students are not exposed to issue base cases in environments that relate to real-life situations or problems. As such, they develop a limited ability to perform tasks.

#### ***4.5 Institutional Limitations/Constraints***

Institutions play an important role in developing knowledge bases and competencies. Therefore, the present study tried to gather information on opportunities and constraints associated with the educational institutions involved in capacity building and skills development in Bangladesh. Some of the constraints that have been identified in the course of the study are presented below.

*(a). Limited or narrow focus:* Here, it may be mentioned that the environment is the aggregate of conditions that affect the existence or development of life and nature. This entails that it is to be looked into from dimensions like physical, zoological, and natural, as well as socio-political and economic perspectives, to name a few. The current inquiry revealed that environmental management is not yet perceived from a multidimensional and holistic perspective in Bangladesh. In environmental programs offered by many institutions, particular subject bias has been noticed. Such biasness leads to partial or limited learning in environmental management that has an impact on the knowledge and competency levels of the learners.

*(b). Segregated/Compartmental approach:* It was gathered from the alumni and the faculty members that the teaching also sometimes suffers from a segregated or compartmental approach. It is a well-known fact that environmental management is a

multi-disciplinary discipline; it has to draw resources from other related disciplines. However, it was reported that in most cases, courses are taught without establishing relevance and/or interrelationship with environmental management. Such practice develops narrow or compartmentalized understanding without having wider relevance to the broader subject concerned with environmental management.

*(c) Capacity constraints of the faculty members:* As environmental management is a relatively new academic discipline in the country, the teaching faculties were mainly drawn from related disciplines. On the other hand, faculty members were overwhelmingly drawn from the parent disciplines when the environment was added to the existing academic disciplines. But it needs to be mentioned here that in both cases, many of the said faculty members did not have any formal education, training, or experience in environmental management. It is believed that with time the situation may have improved. However, such a fact definitely indicates the existence of capacity constraints on the part of the faculty members in environmental management.

*(d) Inadequate infrastructure facility:* Adequate and appropriate infrastructural facilities facilitate smooth and proper learning. For example, laboratory facilities are essential for proper education and training in environmental management. The concerned stakeholders, during interview sessions, informed that, in most cases, laboratory facilities are quite adequate compared to what they ought to be. The other aspect mentioned was that even whatever infrastructural facilities are, there need to cater to the needs of more students than were planned for. Such a situation constrains or hinders the learning process.

Minimal access to information was the other important constraint in this area that was mentioned by the faculty members of all most all universities that were covered under the study. They pointed out that library facilities in terms of space and resources (books, journals, and online access to different information sources) are so limited that these do not provide any opportunity for the students and the faculty to acquire updated knowledge and information on environmental management.

*(e) Limited scope/opportunity for knowledge generation/sharing:* Knowledge generation is another integral part of educational institutions. It may be mentioned that knowledge could be generated through research and scientific investigation. However, our investigation in this area shows a very limited scope or opportunity to undertake research initiatives, particularly in public universities, for the shortage of resources and laboratory facilities. In this respect, as reported by various respondents, private universities are also

no better than their public counterparts. Knowledge sharing requires collaboration and networking with other educational and research institutions. However, our investigation reveals that there is no collaboration and networking with concerned institutions in overwhelming cases.

## **5. Conclusion and Recommendations**

In Bangladesh, recently, environmental management has come to the center stage of the discourse on development. However, in no time, environmental concern gained prominence due to its bearing on the lives and livelihoods of the large majority of the people in this country. Moreover, in recent years, it has caught the imagination of various stakeholders due to phenomena like large-scale environmental degradation and climate change resulting in frequent occurrences of natural disasters of great magnitudes, causing massive destruction to lives and properties and ultimately thwarting the development process.

Environmental studies at the university level started during the mid-nineties. The pioneering role was played by one of the private universities. However, in some cases, public universities also came forward by adding an environment to their existing educational programs. Some also established independent academic disciplines in environmental management.

The present study made an effort to assess the present state of environmental education in Bangladesh to identify whether there is any gap or gaps, especially in the area of knowledge and skills. Through this process, some gaps in various areas have been identified. In light of the above findings and observations, the following recommendations are made to bridge those gaps and build capacity in environmental management in Bangladesh.

### *(a) Introduction of a multi-disciplinary education program on environmental management*

The current inquiry revealed that environmental management is not yet perceived from a multidimensional and holistic perspective in Bangladesh. Particular subject bias has been noticed in environmental programs offered by many institutions. In others, only a limited number of courses are offered. Biasness and limited coverage lead to partial or limited learning in environmental management, creating a limited knowledge base and competency level for the learners. Given the above, it is recommended that a multi-disciplinary education program on environmental management should be introduced. The

multi-disciplinary program should have a curriculum that will include environment-related subjects as well as subjects that have relevance and bearings on environment management.

*(b) Introduction of problem-based environmental management education*

Scopes of problem-based education and learning are rare or very limited. As a result, students are not exposed to issue-based cases relevant to real-life situations or problems. As a result, they develop a limited ability to perform tasks. As such, it is recommended that problem-based environmental management education should be introduced. The curriculum should be designed to ensure an appropriate mix of theoretical and practical exercises so that the students can spend reasonable time dealing with real-life environmental problems and apply and test classroom learning in those situations.

*(c) Creation of appropriate infrastructure facilities*

It revealed that, in most cases, laboratory facilities are quite inadequate compared to what is required. The other aspect is even whatever infrastructural facilities are there, including the laboratory, need to cater to the needs of a larger number of students than originally planned. Such constraint hinders especially the practical learning process. This requires the creation of appropriate infrastructure facilities, including well-equipped laboratories with the provision of access to all students. Furthermore, limited access to information hinders the students and the faculty from acquiring updated knowledge and information on environmental management. Therefore, it is recommended that library facilities in terms of space and resources, including books, journals, and online access to different information sources, should be made available to them.

*(d) Capacity enhancement training programs for the faculty members*

As environmental management is a relatively new academic discipline in the country, the teaching faculties were mainly drawn from related disciplines. On the other hand, faculty members were overwhelmingly drawn from the parent disciplines when the environment was added to the existing academic disciplines. But it needs to be mentioned here that in both cases, many of the said faculty members did not have any formal education, training, or experience in environmental management. Therefore, it is perceived that with time and experience, their capacity may have improved. However, such facts definitely indicate the existence of capacity constraints on the part of the faculty members in environmental management. Thus, it is suggested that capacity enhancement education and training programs should be undertaken for the existing environmental management faculty members.

*(e) Allocation of adequate financial resources to research and building laboratory facilities*

Knowledge generation is an integral part of educational institutions. Here it may be mentioned that knowledge could be generated through research and scientific investigations. However, it is revealed that there is a minimal scope or opportunity to undertake research initiatives, particularly in universities, for the shortage of resources and laboratory facilities. Therefore, it is recommended that adequate financial resources be allocated to research and building well-equipped laboratory facilities.

*(f) Network building for knowledge sharing and skill enhancement*

Knowledge sharing requires collaboration and networking with other educational and research institutions. However, investigations reveal that there is no collaboration and networking with institutions relevant to environmental management in overwhelming cases. It is, therefore, recommended that networks should be established with other educational, research, and activist organizations for knowledge sharing and skill enhancement.

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