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Content

A Study on Training Needs of the Entry-level Officers of Bangladesh Civil Service (Administration) Cadre in Achieving 'Vision 2041'

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Abstract

In this research, training needs are assessed to highlight areas of competencies i.e. knowledge and skills that entry-level officers of BCS (Admin) cadre have to acquire through up-to-date training in attaining 'Vision 2041' of Bangladesh. This research draws some insights into training needs to update curriculum to make them competent for performing their functions to build a developed nation. This study applied multiple methods in collecting data and information such as focus group discussion (FGD), questionnaire survey, literature survey, the charter of duties of civil servants at the ministry, district and (Upazila) to analyse the roles and responsibilities of officials. This study suggests redesigning training framework and updating the existing curriculumn to fill up competency gap based on the goals and targets of the government considering cross-cutting issues of the contemporary world. The curriculum of Law and Administration Training Course (LAC) of Bangladesh Civil Service Administration Academy (BCSAA) needs to focus more on Innovation and Change Management, Digital Public Service Management, Development Studies and Challenges of the fast transforming knowledge economy to make the course functional, need-based, and result-oriented.

1.0 Introduction

The present government of Bangladesh has set 'Vision 2041', in continuation of its ongoing 'Vision 2021' and strives to transform Bangladesh into a developed and prosperous Nation dreamt by our beloved the Father of the Nation Bangabandhu Sheikh MujiburRahman. This has been stipulated in the Second Perspective Plan of Bangladesh 2021-2041 (GED, 2020). This current trend of the country has been reinforced by the effects of rapid scientific and technological advancement that has brought about fundamental changes in the daily lives of human being and their thinking process regarding their rights, opportunities and choices. Against this backdrop, the expectation of

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the people regarding efficiency and transparency of the state particularly of the civil service has been raised to a great extent. Nowadays right to information and free flow of information—driven by digitalization, automation and Information technology paved the way for people and non-state actors to have access to decision-making process of a state. The Transformation of the civil service system has been brought about to the value system. Thus service providers are more accountable to citizen and as a result, citizen are considered as customer.

Roles and responsibilities of an officer BCS (Admin) cadre cover a huge area of services including maintenance of law & order, land management, development administration, poverty reduction, public welfare, monitoring and coordination of development plans and programmes, crisis management such as natural disaster management like corona virus pandemic, fire, earthquake, flood, cyclone, etc. These multi-dimensional responsibilities require sound knowledge about the contemporary issues of innovation, change management, responsive new public management, sustainable development, challenges of knowledge-based society, and the issues of transforming the nation into a developed one.

2.0 New Perspectives

Recently, the government has merged BCS (Economic) Cadre into BCS (Administration) Cadre. Main area of BCS (Economic) Cadre relates to development planning. Planning Commission of Bangladesh facilitates the government in preparing national development vision, economic policies, strategies, goals and objectives, plans, programmes, projects for economic development. Each Ministry/Division has set up in their organisational structure for planning and development which is involved in planning process. With the merger of this Cadre, planning network would be expanded up to all administrative structure. Officers who belonged to BCS (Economic) Cadre would be posted administrative set up at district and Upazila. Course contents relating to planning and development are now relevant to all officers of BCS (Administration) Cadre. In this circumstance, it is required to accommodate issues of planning and development with more focus on Law and Administration Course (LAC).

3.0 Research Questions

Bangladesh has made landmark progress in recent years and becomes a role model of development. Bangladesh has already attained low middle-income country status in terms of per capita income (PCY) and is eyeing to emerge as a developed nation by 2041. The civil servants of Bangladesh have been playing a key role in translating the political

'vision' of the government into reality. The newly recruited entry-level officers of Bangladesh Civil Service will work for the government for more than 25 years. It is indeed essential to design a training curriculum to prepare them for the future. Thus, it is necessary to assess the extent to which the present curriculum of LAC of BCSAA meet the needs of the entry-level officers of BCS (Admin) Cadre to be competent to deal with the development challenges.

4.0 Objectives of the Study

The objectives of the study are to-

Identify the areas of training needs for improvement of competencies- knowledge, skills and abilities of the entry level officers of BCS (Admin) Cadre to perform their roles and responsibilities more professionally and effectively in the digital era and knowledge-basedsociety.

- Establish interrelationship between organizational mandates and roles of individual employee for accomplishment oftasks
- Facilitate BCSAA to update the curriculum of LATC by reviewing existing curriculum and assessing current training needs taking into consideration the development trend and emerging issues to achieve 'Vision2041'.
- Develop a general framework for designing curriculum for the entry-level officers of BCS (Admin) Cadre.

5.0 Key Arguments

Entrepreneurial management has been the main focus of new public management (NPM), in which economy use of resources, efficiency of service provider, effectiveness of the use of public resources and service delivery, ensuring governance and creating conditions for effective functions of market forces have redefined the role of public servants. Moreover, the advancement of science and the use of ICT in public service delivery, macroeconomic growth and development, institutionalization of democratic governance, access to information, free flow of information, have brought about a fundamental change in roles and responsibilities of officers especially those who are involved in the field administration. However, no in-depth study has been done to assess the needs for training in improving competencies of these officers. Thus, identifying training needs in the changed context is essential to make them capable of dealing with the challenges of 'Vision 2041'.

6.0 Scope of the Study and Limitations

The study covers the roles and responsibilities of entry-level officers from new perspectives of technological advancement, extended roles due to merger of BCS (Economic) cadre with BCS (Admin) cadre. The limitations of the study are:

a) This study focuses on the training needs only, other issues are not addressed in this study.

b) Participants of FGD and respondents of questionnaire survey might have given their views based on their own experiences, working conditions leading to varieties of opinions and ambiguity.

c) The respondents might have biasness of their own experience which may not be relevant to all cases.

The research team addressed these by clarifying the research issues and the respondent's biasness has been minimized. However, the scope of generalization of findings of this study is limited.

7.0 Importance of TNA and Competency Development

Training Needs Assessment (TNA) is the method of determining if a training need exists and, if it does, what training is required to fill the gap (Gupta, 2007). Training is an integral part of public administration and essential for effective service delivery (Azizuddin 2003) and continuous training is needed to keep pace with fast changing context of public service delivery (Rashid, 2008). A well-designed training programme contributes to a public organization's performance by ensuring that employees have competencies they need to meet the demands of their current and future jobs (Jacobson et al. 2002). Training is to be need and task based (Muslim, 1994). Be it a public or other sectors, each individual role will have a set of competencies needed to perform the job effectively. Thus, it is necessary to have an understanding of the role to develop a suitable competency framework (NASC, 2018). It is needed to make training more task oriented and competency based in public sector organizations for responsive public service delivery. Training needs assessment (TNA) is the first step of designing an appropriate training programme (Gupta, 2007). TNA is the process of identification of level of knowledge, skills, competency (KSC) and abilities of employees and identification of the gap between the existing level of KSC and required level of KSC to achieve goals and objectives of the organization.

Training can reduce, if not eliminate, the gap, by equipping the participants with knowledge and skills and by encouraging them to build and enhance their capabilities

(Gupta, 2007). Training is integrated with the training and human resource development policy (Tuladhar, 2009) which facilitates the achievement of the vision, mission, goals and objectives of the organization. Policy issues related to TNA include developing competency framework for the targeted employees, training and HRD strategies, linking training evaluation and feedback (Vocovik, etal. 2008) with further improvement of training programmes, regular follow-up study on the courses and building training capacity of the training institutes. Among those policy issues, the competency framework is related to TNA and curriculum development.

A competency is a cluster of related knowledge, skills, abilities, and characteristics that are related to the performance of a significant aspect of the practice of a profession. A competency model is a collection of competencies that are relevant to the performance in a particular job, job family, or functional area (HRPA, 2014). Competencies are tailored to organizational goals and strategies (CDF of Servia Civil Service, 2017). Competency management can be considered one of the central themes in modern public service development. It is seen as a strategic and integrated approach to leadership development. Competency frameworks designed to improve and make clear the capabilities and skills of public servants. Competencies provide a critical mechanism for integration of human resource practices which is considered essential to a strategic approach (Jarvelt & Weisson, nd). It is the standard level of knowledge, skills, and capabilities which are integrated in HRD policy of the organization. The people in the organisation need a full set of capabilities and competencies and organizations need them to the highest standards (Clayton, 2018). Thus, achieving that standard level of specific competencies by developing knowledge, skills, and capabilities is the main focus of training intervention.

TNA is a comprehensive process comprising of identification of training needs in relation to organisational vision, goals and objectives (Miller & Osinski, 2002), its analysis, its validation and its evaluation in terms of job performance. Every organization spends money on implementing effective training programmes to maximize the value of their existing human capital. Human development training programmes have been an integralpar to encouraging the employees to be a competent and skilled labour force that is knowledgeable and able to perform assigned tasks based on their training needs (Mazhisham, et al. 2019). TNA analyzes both individuals and organizations, because individuals are employed according to the needs of an organization. Individual's need can be seen as to be more knowledgeable, skilled, proactive, efficient and well-equipped so that he/she can contribute effectively to goals of the organization. Training Needs Assessment refers to the organizational process of collecting and analyzing data that supports decision making about when training is the best option (or not) to improve individuals performance, define who should be trained, and exactly what content should be taught (Clarke, 2003 quoted in Ferreira & Abbad, 2012).

TNA is an on-going process of collecting data to determine what training needs exist (Brown, 2002), what are required level of competency for effective service delivery, what are the gaps between existing and required level of knowledge, skills and attitude of employees so that training can be developed to facilitate the organization to accomplish its objectives. Organizations can be best served by well-rounded, creative and forward-thinking staff and group members.

Conducting needs assessment is fundamental to the success of a training programme. Often, organizations develop and implement training without conducting a needs analysis. These organizations run the risk of overdoing training, doing too little training, or missing the point completely (Brown, 2002).

A comprehensive and in-depth study of training needs assessment (TNA) in public sector is almost non-existent in literature (Jacobson et al. 2002). Especially training need assessment for the entry level officers of civil service is very crucial to make public service delivery efficient, effective, and compatible with the fast changing context of knowledge, science and technology. So far our knowledge goes no in-depth and comprehensive study of TNA for the officers of FTC conducted by Bangladesh Public Administration Training Centre (BCSAA) and Law and Administration Course (LAC) of BCSAA is available.

8.0 Overview of LAC

Regional Public Administration Training Centre (RPATC) conducted Law and Administration Course (LAC) from 1984 to 1987. During this period LAC was for two months only and contents covered magistracy related Acts, Rules and Regulations only. BCSAA came into beingin October 1987. Since then BCSAA has been pursuing training courses for the entry level officers of BCS (Administration) Cadre. The first law and AdministrationTraining Course of BCSAA was for three months from 21 Oct 1987 to 20 Jan 1988. Major modules were major Acts such as CrPC, Penal Code, Evidence Act, PRB, Acts relating to land administration, rules and regulation. Over the period of decades, the contents of LAC have been changed. Initially the main focus of the training course was on magistracy and judiciary until the separation of judiciary from administration. After the separation, major changes took place in the contents, new modules such as Public Administration and Management, Development Administration, e-governance, Innovation added to existing courses. These changes were made based on the changed role of the officers of BCS (Administration) Cadre.

Those changes were made mainly on the basis of faculty-consensus. This kind of change is generally done in preparatory meeting of the course. In preparatory meeting, feedback

and suggestions taken from participants of immediate past course have been placed and discussed in faculty meeting and changes in contents are adopted.

9.0 Designing the Process of TNA

This study applied a pluralistic approach using multi-methods to collect and analyse qualitative and quantitative data including qualitative and quantitative approaches for assessment of needs. Qualitative approach includes interviews, focus group discussion, analysis of rules, Acts and policies, discussion with the supervising officer, entry-level officers, researchers to share ideas, experience. With regard to quantitative approach the survey method applied to gather first-hand information through structured and guided questionnaire. Primary data for this research has been collected through opinion survey of entry-level officer, officers who have participated LAC or FTC and their supervisors working at Upazilas, Districts, Training needs analysis is the first stage in the training programme and involves a series of steps (Bansal, 2017; Gupta, 2007). Stages followed in TNA studies depends on the context e.g. Gupta (20007) applies five stages– Identifying problems & Needs, designing need assessment, collecting data, analysing data, and proving feedback while Bansal and Tripathi (2017) applies four stages namely– identifying competencies for job, identifying competencies individuals held, identifying competency gap and outlining the training requirements, while Shatorupa (2016) analysed in seven stages. The study team reviewed TNA studies and has adopted *seven stages for analysing TNA of the entry-level of ficers. **Step1**defines the jobs specification at three stages-organization, tasks and person, competency requirements and needs; **Step 2** identifies the study area; **Step 3** designs the total research methods- sampling and data collection process; **Step 4** analyses the results and derives findings through triangulation; **Step 5** draws inferences; **Step 6** identifies the areas of training needs for intervention, and finally **Step 7** develops a framework for redesigning LAC (adopted from Gupta, 2007; Hassan et al.2015).

Research design of this study includes job specification, respondent selection, data collection and data analysis. Job specification is generally carried out in three phases such as Organisation Analysis, Task Analysis, and Person Analysis (three tier approach by McGhee and Thayer, 1961; quotedin Bansal and Tripathy, 2017); Shafeek, 2018; HR-Survey. Com; Sokolowski 2016; Miller & Osinski, 2002; Zafar Sha torupa, 2016; Pradhan & Pradhan, 2016). The study team analysed goals, objectives, duties and responsibilities at ministry, district and upazila level, analysed tasks and entry-levelofficers.

10. DataAnalysis

Entry-level officers of BCS (Admin) Cadre work at the lowest administrative layer at Upazila, at mid-level in District and Division and at central level in the Ministry. Their roles and responsibilities and job criterion are diversified. Thus, in order to identify their training needs, the study team has reviewed the charter of duties of officers at Upazila, District and Ministries. These are analysed at organisation level, task level and person level.

10.1 Secondary Data Organization Analysis

The organizational analysis is done at three-level administrative hierarchies at Ministry, District and Upazila levels.

Areas of Job Activities in Ministries

Process of accomplishment of businesses of the government has been defined in the Rules of Business 1996 (revised up to April 2017) and businesses of the Government of Bangladesh are allocated among ministries in Schedule I of the Rules of Business. Job areas include Policy Analysis; Preparing draft Rules, Regulations, Acts, Policies, Strategies; Development Planning; Development Administration; ICT Application in everyday accomplishment of tasks; Implementation and monitoring of decisions of the Cabinet, Cabinet Committees, and other decisions of the government, Annual Performance Agreement (APA), Integrity Strategies, Right to Information Act, Citizen Charter etc.; Administration of Department, Directorate, field offices under the Ministry; Coordination among relevant Ministries; Human Resource Management;

Executive Functions at District and Upazila

Executive functions of Deputy Commissioner (DC) and Upazila Nirbahi Officer (UNO) cover a vast diversified areas. Broad areas includes implementation of decisions, policies, plans, programmes of the government at local levels including general administration, land management, resource mobilisation, educational management, conducting mobile court to maintain law and order, ensuring public interest by protecting consumer's rights to control food adulteration, drug control etc. In addition to these regular activities they need to manage and coordinate crisis such as corona virus pandemic, cyclone, flood, other natural calamities, market price of essential goods, fire, accidents etc.

Managerial and Coordinating Role

Officers of BCS (Administration Cadre) working in field administration have to play managerial and coordinating role in development administration, public service management, management of educational institutions such as schools, colleges, madrasahs, maktabs and other religious and philanthropic organizations and institutions, resource mobilization, managing crisis such as natural disaster e.g. flood, cyclone, river erosion, earthquake, pandemic like corona virus (COVID-19), coordinate among public sector departments, agencies, NGOs, private sector organizations, voluntary organisations, trade unions, associations, civil society, political organisations, at all administrative tiers from Upazila to Ministry.

Task Analysis

Entry-level officers are required to provide secretarial supports to the senior officials for decision for example desk officer initiates file explaining the issues with relevant rules, regulations and legal provisions, prepare proposals in files and place it to the next senior for decision or onward passing to the next senior for decision. This decision making process starts with the desk officers and ends at the top of the organization. Although a desk officer initiate a file and decision is made by the senior, the desk officer has to explain all relevant rules, regulations, legal provisions and finally give a proposal for decision. Thus a desk officer must have in-depth and comprehensive knowledge on the issue of decision. Hence, a desk officer needs to know relevant rule, regulations, laws, process, procedure so that appropriate decision can bemade.

Person Analysis

Officers of BCS general cadre including BCS (Admin) cadre are recruited through competitive examination of aspirant candidates of diversified academic background with various orientations. Some of newly recruited officers are outstanding in Economics, while some are in English, literature, Culture, in any subject of Sciences, Social Sciences, Humanities, Businesses, Law etc. They are quite new to official process, procedure, rules, and regulations. Thus, Law and Administration Training Course needs to bring them in a common platform to cover all broad areas of roles and responsibilities of public administration at district and Upazila.

Primary Data

Focus Group Discussion

The FGD was guided by a checklist designed to collect information from officers of BCS (Admin) Cadre having experiences of working in Ministries, Districts and Upazila.

The participants of FGD viewed that organisational vision, mission, goals and objectives are linked with the national and ministerial vision, mission, goals and objectives. Officers working at the grass roots level must have comprehensive knowledge of vision, goals and objectives of the organization, administrative ministry and also the national vision, goals, objectives, policies and strategies, office management, process, procedure, rules and regulations, digital management (ICT, artificial intelligence etc.) to accomplish their tasks professionally to achieve national vision of 2041.

The participants of the FGD viewed that a competency framework covering Knowledge on national and organizational vision, goals and objectives, Skills covering digital technology, virtual management, Executive Capability of dealing with the critical issues of translating policies, plans and programmes in to reality, Managerial Efficiency for effective moblisation of resources and Interpersonal Efficacy to ensure effective public relations is needed.

10.2 Analysis of Data of Questionnaire Survey

Three sets of questionnaires were distributed all targeted respondents working in the field administration such as supervising officers, participants of LAC and newly recruited officers.

Analysis of Tasks of Entry-level Officers

Table1: Frequency Distribution of Tasks, of Entry-level Officers of BCS (Admin) Cadre

		Degree of Importance					
.	**Tasks/duties/responsibilities/activities**	Everyday	Frequently	Occasionally	Rarely	Not atall	Total
		5	4	3	2	1	
1	See dak file	xviii	ix	iv	0	0	31
2	See rules, regulation, manual relating to file management,	iv	vi	x	i	0	21
3	Public service management	ix	viii	iv			21
4	Managing public service discipline	x	vii	ii			19
5	Tasks relating to treasury management,	ii	v	iii	v	ii	17
6	Tasks relating to public money recovery,	ii	ii		i	i	06
7	Issues relating to land management	ii	ix	xii	ii	i	20
8	Magistracy, conducting mobile court	iii	ix	xii	iv	v	31
9	Deal with Acts, Rules and Regulations relevant to public services	iv	ix	ix	vi	iii	31
10	Maintenance of records and public documents etc.	i	ii	xvii	ii		22
11	Promote innovative ideas and implementation of innovative ideas	ii	vii	vii	i	ii	19
12	Coordinating development activities of govt. departments	iii	v	iv	iii	i	16
13	Coordinating govt. departments, NGOs	i	ii	i		ii	06
14	Maintenance of law and order	iii	i	iii	i		07
15	Management of schools/colleges/madrasah as a member of GB	ii	i	ii	iii		08
16	Disaster management (Storm, fire, flood, river erosion etc.)	ii	ii	xv			19
17	Relief operation	ii	i	xii	i		16
18	Oversee market price of essential goods	ii	ii				04
19	Crisis management (food, fertilizer, natural disaster etc.)	iii	xi	xvii			31
20	Issuing license	ii	i	v			08
21	Provide information to the client according to RTI Act	iii	vii	x	i		27
22	Implement citizen charter	vi	xiv	xii			31
	Tasks/duties mentioned by the respondents	0	0	0	0	0	0

Analysis of Tasks: Only 31 respondents including entry-level officers, participants of LAC and supervising officers provided their views on tasks. Most of the respondents ranked knowledge of rules and regulations, office management, administrative rules and procedure, land management, mobile court, crisis management, development administration and public service related tasks at the top. Less preferred tasks are related to issuing license, public money recovery and development administration, planning, moderately preferred.

10.3 Knowledge, Skills and Abilities

In order to assess the knowledge, Skills and Ability (KSA) gaps, the supervising officers were requested to give views on existing and required KSA of entry-level officers. Following table discusses data output on KSA.

List of Capacities to	Degree of Importance					
	Most Important	Important	ImportantModerately	Least Important	Not Important	Total
	5	4	3	2	1	
Identify clients' need and deliver services according to their needs	6	2				8
Simplify the service delivery process	5	I	2			8
Identify and manage organizational resources	2	4	2			8
Prepare and implement innovation Project	0	2	5	1		8
Lead working team effectively and manage change accordingly	0	2	4	I	1	8
Use digital device in service delivery	4	2	1	I		8
Manage on-line service delivery in an effective manner	6	2	0	0		8
Prepare, manage and implement ICT Project	2	1	3		2	8
Provide information to the client according to RTI Act 2009.	1	4	2	I		8
Any other capacities you suggest please mention below	0	0	0	0	0	0
Total Respondents						**8**

Table 2: Skills Analysis

Analysis of Skill Gaps

The most important areas of skills required to improve as identified by the supervising officers of entry-level officers are skills to identify client's needs, deliver services according to their needs, simplify the service delivery process, use digital device in delivering public services, manage online services and other areas, which are moderately preferred by the respondents.

Your Present level of Knowledge					Officer's Required Knowledge on	Degree of Importance				
No	ImportantLittle	Moderate	Very Good	Excellent		Most Important	Important	ImportantModerately	Least Important	NotImportant
1	2	3	4	5		5	4	3	2	1
i	iv	iii			citizen charter	iv	ii	i		
i	iv	iii			service process simplification		iv	iv		
ii	v		ii		basic elements of qualitative improvement of service delivery	v	ii	i		
iii	iii	ii			service delivery outlet	ii	iii	iii		
iv	ii	ii			organizational resource management	ii	iv	ii		
ii	iv	i	i		basic factors of reviewing progress of implementation annual actionplan	ii	iii	iii		
i	iii	iii	i		innovation techniques	iii	iii	ii		
ii	iii	iii			team building	i	iv	iii		
iv	ii	ii			inter-departmental communication & coordination	ii	iv		ii	
iv	ii	i	i		Local Area Network (LAN)		ii	iv	i	i
v	i	i	i		web portal management		i	iv	i	i
	i	v	ii		essentials of e-file management (exchanging files and documents electronically)	v	iii			
iv	iii	i			the process of transferring organizational service delivery to e-service delivery	v	ii	i		
ii	iii	i	ii		roles and responsibilities of officer under RTI Act 2009	iii	iii	ii		
iii	ii	ii		i	basic Concept of e-Governance Interoperability Framework (e-GIF)	i	iv	ii	i	
					Total Respondents 16					

Table 3: Knowledge Analysis

Analysis

Areas of knowledge required to be improved as identified by the supervising officers of entry- level officer are basic elements of citizen charter, qualitative improvement of service delivery, organizational resource management, implementation of plans, inter-departmental communication and coordination, e-file management, right to information and e-governance; other areas are considered less important.

11.0 Findings: Derived from Data

Multiple sources of data and information were collected to assess the competence level and are as of learning needs of the entry-level officers. Through the process of triangulation the study team has derived findings. Findings are summarized below.

11.1 Competency Framework

The competency assessment matrix shows the structured and analytical process whereby various dimensions of competencies within the broader socio-economic and service delivery environment are evaluated for entry-level officers. On the basis of views of FGD participants and analysis of organization, tasks and persons of a competency development framework has been developed and shown in Matrix 1below.

Areas of Competency	**Desired Capacity**	**Existing Capacity**	**Capacity Gaps are Estimated**	**Strategies to develop**
Knowledge	Desired level of knowledge is measured	Existing level of knowledge is measured	Knowledge gaps are estimated	Training contents are designed to include task related areas of knowledge
Skills	Desired level of Skills is measured	Existing level of capacities is measured	Skills gaps are estimated	Skill development practices are given more weightage in training programme
Abilities	Desired abilities are identified	Existing abilities are identified	Ability gaps are identified	Issues of abilities are addressed
Executive Capability	Desired level of knowledge is measured	Existing level of capacities is measured	Executive capacity gaps areestimated	Field attachment focusing on execution of tasks included in the trainingcourse
Managerial Effectiveness	Desired level of managerial effectiveness is measured	Existing level of capacities is measured	capacity gaps areassessed	Effective managerial functions are included in thetraining
Interpersonal Efficacy	Desired level of interpersonal efficacy is measured	Existing level of efficacies is measured	Interpersonal efficacy gaps areestimated	Socialisation issues are included in the training course

Matrix 1: Competency Framework for the Entry-level Officers of BCS (Administration) Cadre

Overlapping Modules

Since the entry-level officers undergo either for FTC or LAC, the study team reviewed the curriculum of these two courses to identify if there is any overlapping or repetitions. The study finds that 192 session hours are overlapped.

Areas of Training Needs

On the basis of analysis of national vision (Vision 2041), goals and objectives, charter of duties of officers at Upazila, district and ministries, views obtained from FGD and questionnaire survey, relevant reports, journal articles, tasks to be accomplished at upzila, district and ministries, background of the newly recruited entry-level officers of BCS (Administration) Cadre, the study team has identified the following broad areas of learning needs-

- Bangabandhu, the Architect of Liberation War and Modern Bangladesh Bangladesh Studies: History, Culture and Development Vision 2041
- District Administration and Upazila Administration (Roles and Responsibilities of Deputy Commissioner and Upazila Nirbahi Officer)
- Leadership in Public Service Management and Development Administration Maintenance of Law and Order,
- Constitution and relevant Laws (Relevant Sections of CrPC, Penal Code, Evidence Act, Civil Laws, PRB) and other minor Acts)
- Executive Magistracy, Mobile Court and Public Interest Land Administration and Management
- Development, Welfare Administration, Coordination, Public Relation;
- Planning and Development (Development Models, National Vision, Goals and Objectives, Plans, Programmes, Strategies, Policies)
- Macroeconomic Management including Knowledge Economy, Trade and Commerce Project Management
- Procurement Management
- Innovation, ICT and Change Management (Including Artificial Intelligence, Digital Public Service Management)
- Administrative Rules and Procedure (Digital Office Management and Online Public Service Delivery)
- Crisis Management, Relief and Rehabilitation (Man-made and natural disaster), Etiquettes, Manners, Creative Skills and Public Relations
- Health, Physical Education and Sports

General Recommendations

Study on TNA of newly recruited entry-level officers of BCS (Administration) Cadre should be carried out regularly to maintain 'the state of the art' in the training programme. Considering the dynamics of public service management an in-depth study is needed to develop a competency framework. A central Curriculum Development Committee (CDC) may be formed that represents the stakeholder-regulatory ministry e.g.Ministry of Public Administration, Cabinet Division and relevant training institutes, researchers, academicians. FTC and cadre-based training need to be centrally coordinated and linked to minimize repetitions.

13.0 Curriculum Designing Framework

An integrated curriculum development is recommended for reviewing LATC regularly.

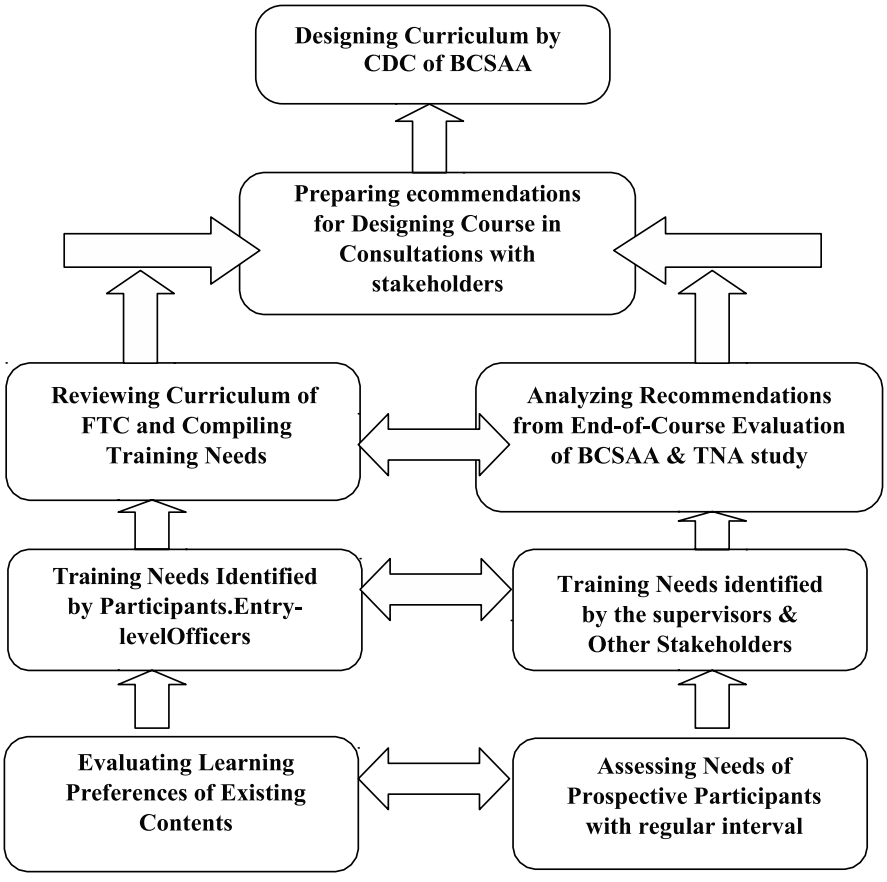

***Fig: 4.1**: Framework for Designing Training Curriculum*

14.0 Conclusion

In this digital age, physical presence of a person to get service is being replaced by virtual process. Present corona virus pandemic is the glaring example of virtual service delivery and service management. People are locked down in their houses, everyday activities, although in a limited scale are done, life is not stopped, most of the office works are accomplished online, the world is changed. Adaptability with this change is essential for survival. Training and continuous process of learning about technology and the way of life paves the way for moving forward.

Entry-level officers are the foundation block of Bangladesh Civil Service (Admin) Cadre. They will serve the nation for the next two to three decades. During the next decades, there will be a rapid transformation of public service management based on knowledge, science, and technology. Role of public servant will be more challenging especially in achieving our 'Vision 2041'. Therefore, a functional, need-based, task oriented training is imperative to build a responsive workforce for the government.

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Strategies for Integrating Disaster Risk Reduction and Climate Change Adaptation in Bangladesh.

Dr. Shafiqul Islam, PhD*

Abstract

Climate Change is widely acknowledged for increasing the scale and intensity of disasters. A growing body of literature stresses the necessity to link Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) to make more efficient use of scarce resources and avoid overlapping efforts. However, in reality, integrating interventions for DRR and CCA remains a challenge because these two concepts incepted and sourced from, and are articulated in, distinctive researchers and practitioners. Little study has yet identified the strategies for effective integration of DRR and CCA. This study has identified the strategies for integrating DRR and CCA in Bangladesh. Key strategies include: i) managing more funds and ensuring better funding mechanisms; ii) better governance framework; iii) coordination and collaboration; iv) innovation and adaptation; v) integrating and updating policies; vi) integrating DRR-CCA in development work; vii) involving the community and listening to local voices; viii) a new platform for integrating DRR and CCA; ix) political will and leadership; x) prevailing harmony in power relations; xi) research, information and knowledge sharing; xii) sharing risks and insurance.These strategies are underpinned by the political economy- the nexus of influencing actors relevant to DRR and CCA. This study thus recommends the needs for an in-depth political economy analysisto identify re-oriented institutional arrangements, efficient governance frameworks, improved policies, and mechanisms for effective coordination among influencing actors to assist effective integration of DRR and CCA.

Keywords: Disaster Risk Reduction, Climate Change Adaptation,Integration, Challenges and strategies, Bangladesh.

Introduction

Disaster Risk Reduction (DRR) approach strives for reducing disaster risk through systematic and comprehensive efforts to address the causal factors of disasters (UNISDR, 2016). In contrast, Climate Change Adaptation (CCA) approach strives for adjustment to climate change stimuli or their effects, to reduce adverse impacts or exploit beneficial opportunities (IPCC, 2014). Consequently, actions and interventions from both approaches are intrinsically linked because climate change is one of the most critical factors affecting disaster risk. Literature discussed how increasing frequency and severity of climate-related extreme events can lead to devastating physical,

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environmental and socioeconomic impacts disrupting development objectives (IPCC, 2014). Examples include increased severity of floods with record-breaking water levels in some low-lying countries such as Bangladesh and Maldives (Huq, 2017), and other countries with coastal regions (Vitousek et al., 2017).

Historically, in many countries, climate change and disaster risk specialists have often operated in isolation from one another (Schipper et al., 2016, IPCC, 2012, Mitchell et al., 2010). Literature focused on similarities, differences, and the rationale for effective integration (Thomalla et al., 2009, Birkmann and von Teichman, 2010, Mercer, 2010). Other literature discussed the potential integration with development (Schipper and Pelling, 2006, Kelman and Gaillard, 2010), governance (Howes et al., 2014), and mainstreaming across many sectors . A growing number of actions that aim to develop mechanisms for effective integration of DRR and CCA (Birkmann and von Teichman, 2010, Mercer, 2010), and propose how integration could take place in developing or developed countries (Djalante and Thomalla, 2012, Setiadi et al., 2010)

Notwithstanding, integrating DRR and CCA remains a challenge in practice, little study has yet identified the strategies for effective integration of DRR and CCA. Consequently, the primary objective of this study is to identify the strategies for the integration of DRR and CCA in Bangladesh by exploring from the existing literature and opinions of the stakeholders of DRR and CCA (38 in-depth interviews) in Bangladesh. The study aims to answer two interrelated questions:

a) What are the main arguments for integrating DRR and CCA stated in the literature?
b) What are the strategies for the effective integration of DRR and CCA in Bangladesh?

Literature review on DRR and CCA integration: the oretical concept and global progress

The practical barriers to effectively linking DRR, and CCA are categorised by Birkmann and von Teichman (2010) into the following three key areas: (a) scales, (b) knowledge, and (c) norms. Thus, integrating DRR and CCA more effectively requires further improvements combining across the different scales and reducing the mismatches on which the DRR, and CCA communities primarily focus. Other key challenges to effective integration of DRR and CCA found in the literature include- lack of capacities of actors and institutions (Bhatt et al., 2015), policy gaps (Howes et al., 2014, Ireland, 2010, Mercer, 2010), governance failure (IFRC, 2013, Johnston, 2014), lack of

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collaborations and coordination (Schipper, 2009b, Setiadi et al., 2010, Begum et al., 2014); and funding mechanisms (Solecki et al., 2011, Mitchell et al., 2010).

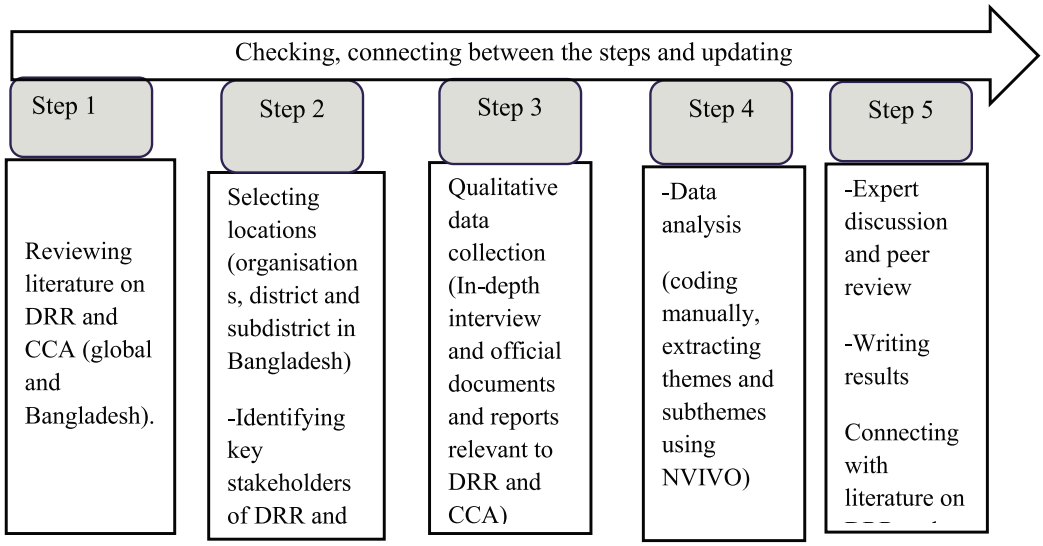
It can be concluded that limited literature has studied how the barriars in integrating DRR and CCA can be addressed in different country and contexts. In one of the few papers to address this topic, Ruiz-Rivera and Lucatello (2017) demonstrated the interplay of actors and institutions surrounding DRR and CCA, and their influence in integration, in Mexico. Other case studies are clearly necessary for understanding the nature, extent and conseequences of interplay in different contexts. Djalante and Thomalla (2012) also discussed on which potential and actual actors should be involved in in the process of DRR and CCA integration; and de Leon and Pittock (2016) showed the progress of DRR and CCA policy integration in the Philippines. More local level case studies are required to assess and evaluate the potential strategies for successful integration of DRR and CCA in different contexts.

Literature surrounding DRR and CCA integration in Bangladesh is limited. Literatures are either concentrated on DRR-related studies, where necessity of CCA is mentioned (Shaw et al., 2013b, Habiba et al., 2012, Kabir et al., 2018), or focused on CCA related studies, where necessity of DRR is discussed (Shaw et al., 2013a, Bahauddin et al., 2016, Vij et al., 2018). The studies focusing progress of integration in Bangladesh and challenges in integration are not found much. However, Shaw et al. (2012) has discussed the issues of DRR-CCA integration from Asian perspective, where Bangladesh-issue was also discussed. Similarly, Rahman et al. (2019) has showed a case of CCA (afforestation) in the rural area of Bangladesh, where DRR was considered. In the same vein, Ayers et al. (2014) discussed mainstreaming CCA in development activities. Therefore, it is necessary to explore the experience of DRR-CCA integration in Bangladesh and to identify the challenges in integration in Bangladesh in order to set the strategies for effective integration.

Now, how the progress of integration can be achieved? Significant progress in integrating DRR and CCA has happened, when Hyogo Framework 2005 and Sendai framework 2015 have included CCA, and United Nations Framework Convention ion on Climate Change (UNFCCC) has emphasized this (UNISDR, 2005, IPCC, 2014). IPCC reports also discussed the necessity of inclusion of DRR (IPCC, 2012). Internationally the UNISDR, UNFCCC, and IPCC are engaged in linking DRR and CCA, and country-level organisationssuch as DRR and CCA related ministries and institutions are also engaged in linking these two issues through policies and practices (Schipper, 2009a). The progress of linking is actively implemented by government, non-government, international funding institutions across the global, regional, national and local levels (Mitchell et al., 2010). The linking points and elements to integrate DRR

and CCA are international agreements, National level efforts, funding mechanisms, knowledge sharing, and practices (Street et al., 2018, UNFCCC, 2007, UNISDR, 2015).

Considering these linking points and elements, studying and exploring the country and context level of DRR and CCA integration is necessary, however, to what extent Bangladesh has progressed along this path and what strategies DRR-CCA practitioner should take, are yet to be explored, which is the main focus of this study.



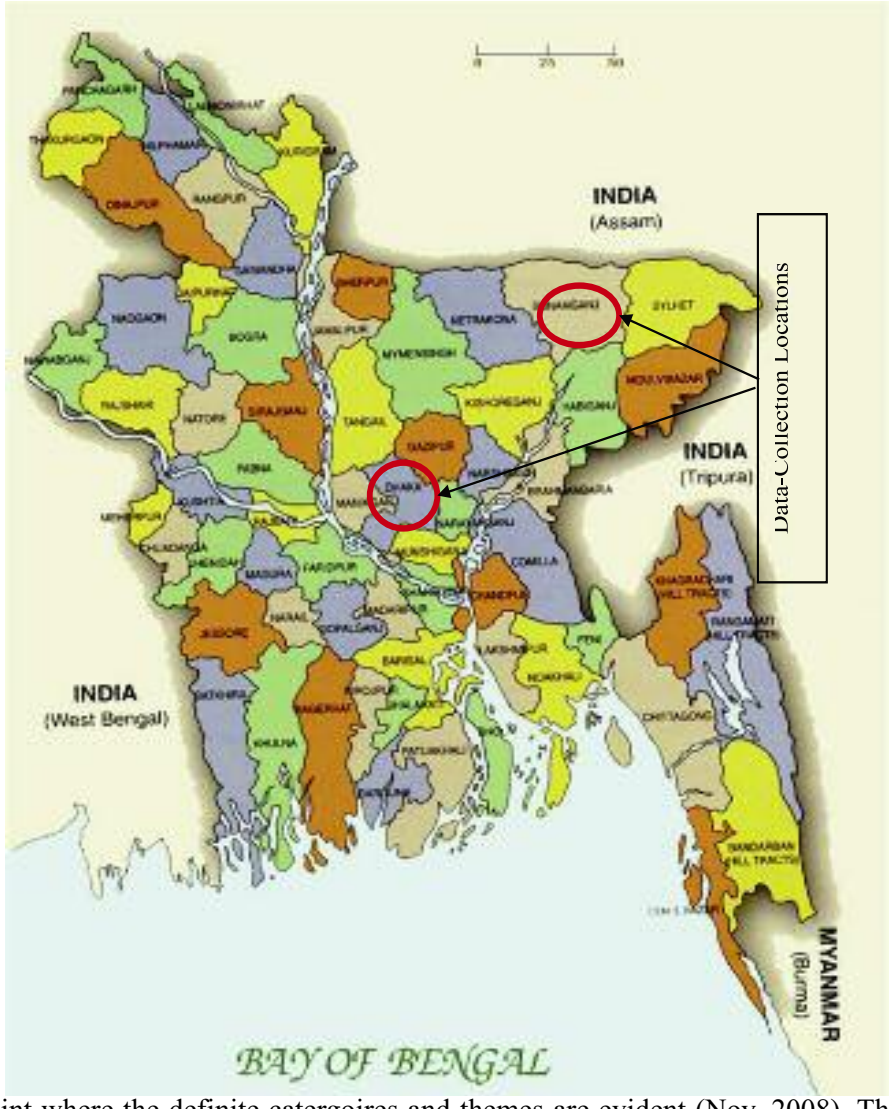
Research Methodology

This study follows a case study design (Creswell, 2014). The following qualitative data were used to identify the strategies for DRR and CCA integration in Bangladesh: a) 38 semi-structured in-depth interviews (Table-3), and b) data synthesised from literature.

Figure 1: *Methodological flowchart for this study.*

Figure-1 shows the methodological steps followed in this study. The study selected the participants, those have DRR and CCA-related insights and experiences purposively using a snowball-sampling method (Noy, 2008). Interviews started with key points of DRR-CCA stakeholders (MoDMR and MoEF), and from their refernces, the interviews continued until the new themes are emerging and the data saturation was reached (Crowe et al., 2011). A total of 38 in-depth interviews (IDIs) were conducted to understand the DRR, CCA and their integration efforts from the perception, experiences, and opinions

of stakeholders. The number of in-depth interviews became 38 because the efforts were to cover all relevant stakeholders of DRR-CCA at national and local levels, and to reach



the point where the definite catergoires and themes are evident (Noy, 2008). The study was conducted in Dhaka, the Sunamganj districts, and the Shalla subdistricts in Bangladesh. Sunamganj district is one of the most disaster-prone districts in Bangladesh, and Shalla is one of most disaster-prone, remote, and vulnerable Upazila of Sunamganj District (Bangladesh Bureau of Statistics, 2015). (Figure-2).

Participants	Ministry (Top-level)	Ministry (Mid-level)	Local (district, and subdistrict)	**Total**
Decision makers, and government officials	06	08	05	19
Political leaders, and public representatives				06
Community leaders				03
International organisations' staff				04
Academics, and consultants				04
Journalists				02
Total				**38**

Figure 2: Study Area and location

Table 3: *Distribution of in-depth interviews (IDIs) participants.*

IDI data collection took place from April 2016 to April 2018. The study started data collection with interview guides prepared both in English and Bengali. It was pretested and updated appropriately. Stakeholders were assured that they would remain anonymous. The duration of most of the interviews between 30 minutes, and one hour. We recorded digitally and taken notes simultaneously during the interview. This study received ethical approval granted by the Griffith University Human Research Ethics Committee (2017/446). Prior consent was taken before each interview.

The study used a qualitative thematic method to analyse the IDI transcripts. By reading and reading the transcript, familiarisation with the data was achieved. Then the transcript was coded to achieve intercoder reliability. Researchers developed a code list and identified DRR and CCA related themes (Braun and Clarke, 2006). These themes were explored by reiterated reading into the literature and interview-transcripts to form a comprehensive picture of the participants' experience, perceptions, and knowledge (Braun and Clarke, 2013). We tried to categorise and subcategorize the themes focusing on our research question. Emergent themes were noted as per the back and forth process of qualitative data analysis, and finalized the results and findings linking with the literature (Creswell, 2014). Data were managed by using NVIVO software 11 version.

Bangladesh setting

Institutions and Policies Surrounding DRR and CCA in Bangladesh

By following the guidelines of the Hyogo Framework 2005 and the Sendai Framework 2015, DRR policies and strategies are clearly stated within national development policies in Bangladesh (Shamsuddoha et al., 2013). For accelerating DRR and CCA, the government has enacted several acts, circulated several policies, activated many agencies and formed some committees (Table 4). These initiatives demonstrate the sincere commitments of the government towards combating the adverse effects of climate change (Transparency International Bangladesh, 2017).

The National Plan for Disaster Management outlines the systemic and institutional mechanisms under which DRR and emergency response management are to be achieved in Bangladesh. It outlines its disaster management vision, strategic goals, and conceptual framework (Government of Bangladesh, 2014). The government of Bangladesh (GoB) has undertaken several important steps during the last few years for building up institutional arrangements from the national to the union levels (the last tier of local government) for effective and systematic disaster management, facilitating mitigation of the suffering of disaster victims.

Legislation, policies, and guidelines		**Ministries, agencies, and committees**	
DRR	CCA	DRR	CCA
-Disaster Management Act 2012 -National Disaster Management Policy 2015 -Food For Work Program Policy 2014 -Cyclone/Flood Shelter Construction & Management Policy 2011 -Standing Orders on Disasters 2010 -EGPP Implementation Guidelines 2013 -Test Relief Guidelines 2013 -National Plan for Disaster Management 2010-2015	-The Climate Change Trust Fund Act 2010) -National Adaptation Program of Action (NAPA)2005 -Bangladesh Climate Change Strategy and Action Plan 2009 -Bangladesh Environment, Forestry and Climate Change Country Investment Plan 2017 -Climate Budget Report 2018-19 -National Sustainable Development Strategy 2013	-National Disaster Management Council (NDMC) -Interministerial Disaster Management Coordination Committee - The Ministry of Disaster Management and Relief -National Disaster Management Advisory Committee -National Platform for Disaster Risk Reduction -Department of Disaster Management -District Disaster Management Committee -Subdistrict Disaster Management Committee -Municipal Disaster Management Committee	-National Environment Committee -National Steering Committee on Climate Change -National Committee for Climate Change -The Ministry of Environment and Forest -Department of Environment -Department of Forest -Climate Change Unit -Trustee Board of BCCTF -Ad-hoc working group on long term cooperation action under UNFCCC -Climate Change Focal Points in all Ministries -Climate Change wing under Foreign Ministry of Bangladesh (for negotiation)

Table 4: Legislation, policies, agencies, and committees surrounding DRR and CCA in Bangladesh (prepared by the author)

Figures 3 and 4 show that the DRR- and CCA-related organisations in Bangladesh work separately. Although the MoDMR and the MoEF are responsible for DRR and CCA respectively, both ministries deal with climate-induced disaster risks (Shamsuddoha et al., 2013). However, the National Disaster Management Council (NDMC), National Environment Committee (NEC) and Climate Change Unit (CCU) primarily guide all relevant organisations for linking DRR and CCA (Shaw, Mallick, & Islam, 2013b).

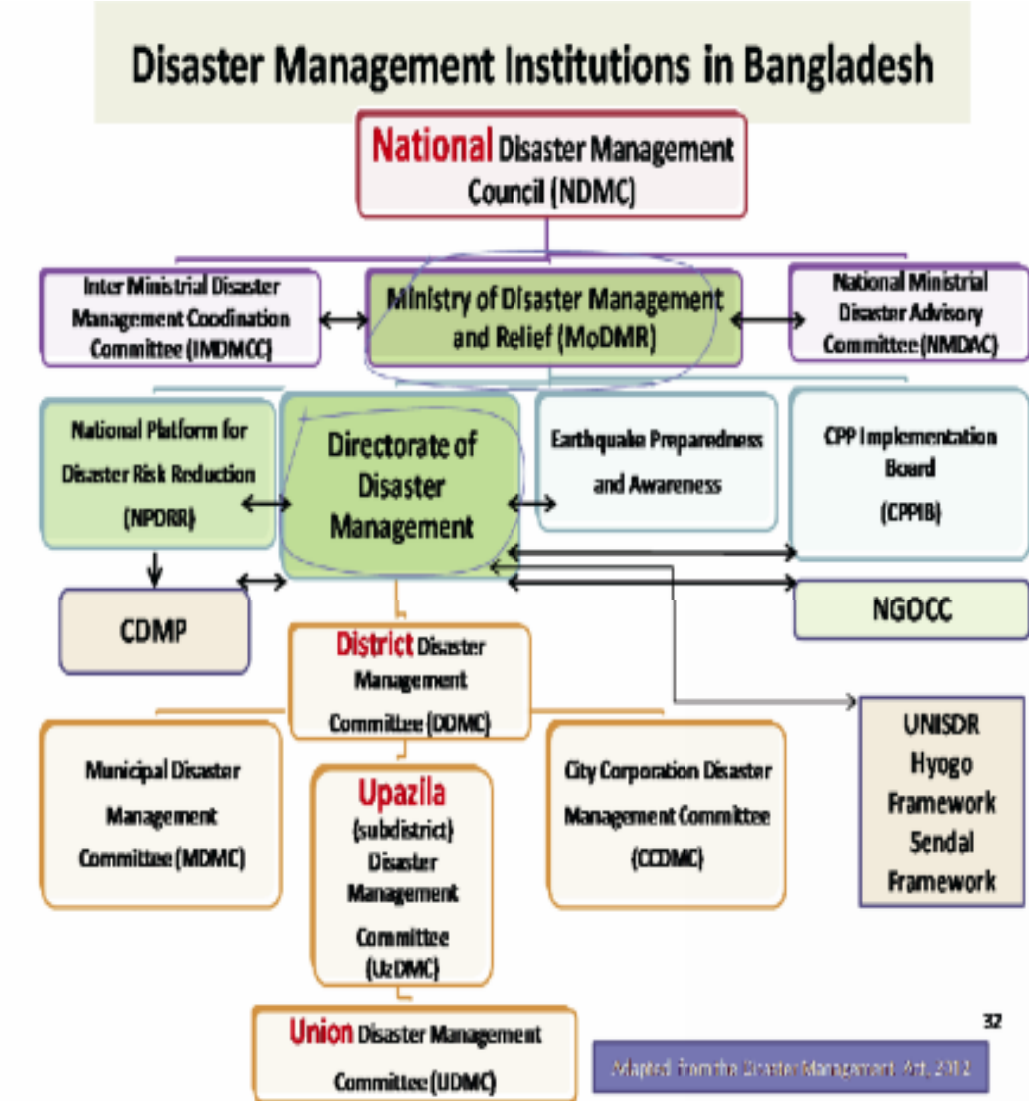


Figure 3: Organisations relevant to DRR in Bangladesh
(drawn by authors based on Shaw et al., 2013b; GoB, 2014; IIED, 2014; Tashmin, 2016).

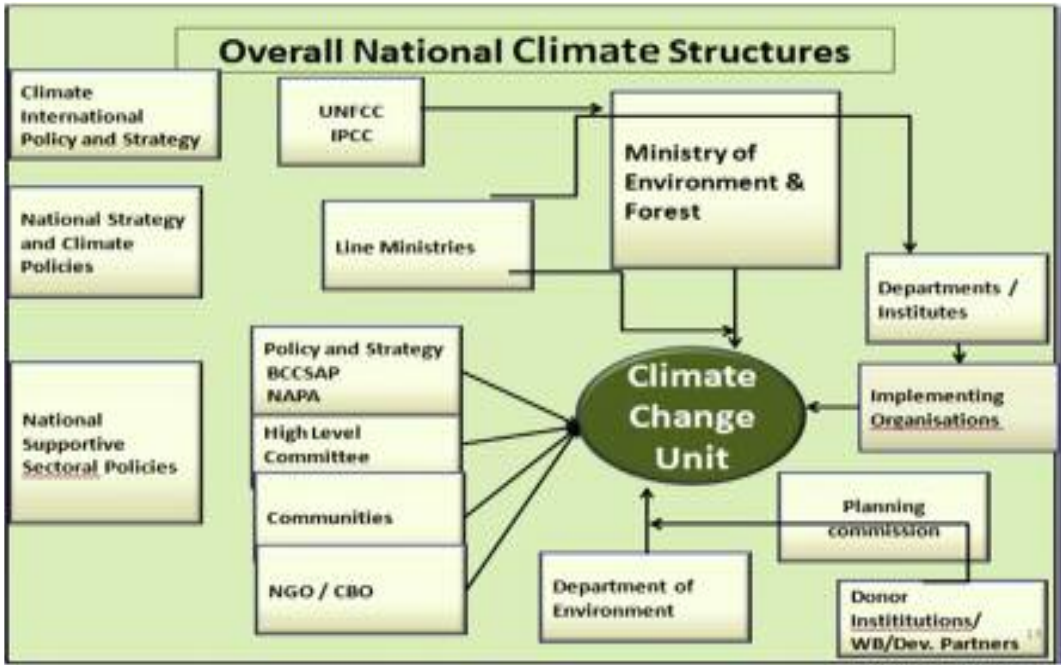


Figure 4: Institutions relevant to CCA in Bangladesh

(Drawn by the author based on UNDP, 2011; Shamsuddoha et al., 2013; Shaw et al., 2013).

The GoB is facing challenges with its limited resources to use domestic and international funds for climate change more efficiently (S. M. Rahman & Ahmad, 2016). This is when a range of ministries work closely to plan how and where the money is spent. Although it is not easy, a collaboration between ministries is needed here for budget management addressing DRR and CCA for planning, spending, and better monitoring, efficiency, and transparency (Tashmin, 2016), the latter three of which, in particular, it has yet to attain. Close links among the institutions of DRR and CCA are missing (IIED, 2014). Integrating DRR and CCA is necessary for reducing overlapping of the efforts and efficient use of resources in Bangladesh. Therefore, this study is focused to identify the strategies for integration of DRR and CCA.

Strategies Recommended for Integrating the Efforts of DRR- and CCA in Bangladesh

Based on the practical challenges in integrating the efforts of DRR and CCA, a range of strategies is derived from this analysis. Figure 5 shows the 12 key strategies for integrating DRR and CCA, explored from the IDIs. These key strategies are themes

derived from more than 100 subthemes. These subthemes are derived from more than 306 codes from transcripts of 38 IDI's. Key strategies include: i) managing more funds and ensuring better funding mechanisms; ii) better governance framework; iii) coordination and collaboration; iv) innovation and adaptation; v) integrating and updating policies; vi) integrating DRR-CCA in development work; vii) involving the community and listening to local voices; viii) a new platform for integrating DRR and CCA; ix) political will and leadership; x) prevailing harmony in power relations; xi) research, information and knowledge sharing; xii) sharing risks and insurance.

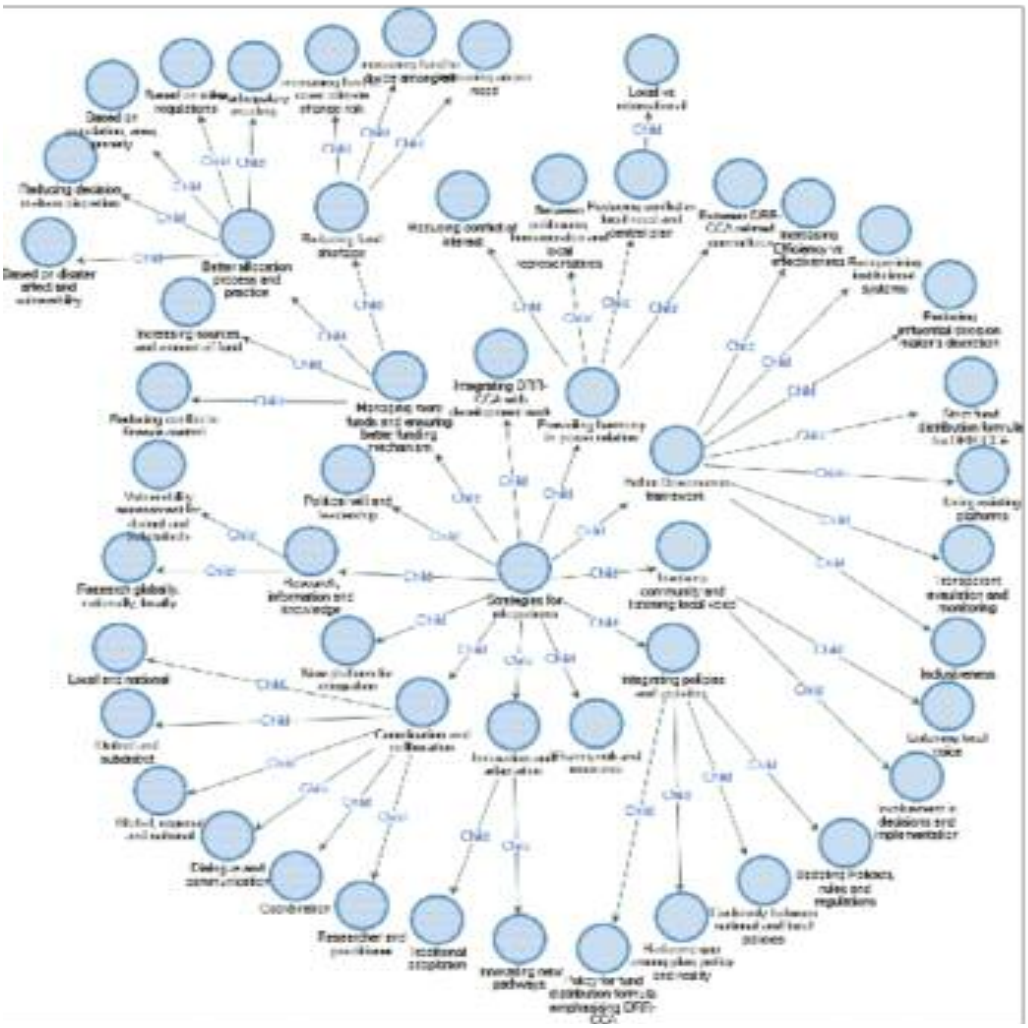


Figure 5: Key strategies for integrating the efforts of DRR and CCA (derived from IDIs using NVIVO software)

Figure 6 shows the highest code references found in each category of strategies extracted from the IDIs. However, if a strategy-theme has more coding references, this does not necessarily mean that it is the most effective or important strategies to address challenges. A strategy holding fewer coding references could be quite a important one, in reality. Therefore, all of these strategies are discussed in the light of the literature and quotes from some of the IDIs which reflect the situation in Bangladesh.

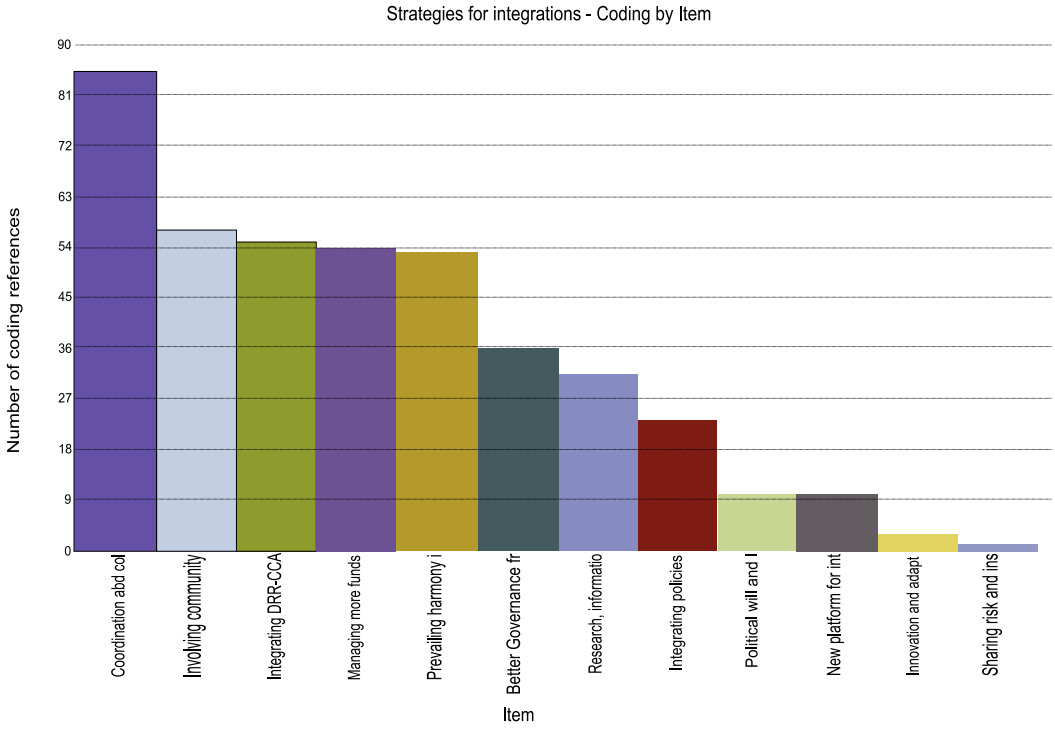


Figure 6: Key strategies-coding by items

Managing more Funds and Ensuring Better Funding Mechanisms

Both DRR- and CCA-related initiatives are struggling with a scarcity of funds, interviewees stated. They also said that more funds need to be mobilised from national revenue, and from development partners and global funds such as disaster related funds, the Green Climate Fund and the Climate Resilience Fund. This is because existing funds cannot cover the necessities for all districts and subdistricts. When the funds are divided, the amounts become too small to implement sustainable DRR or CCA efforts. Respondents also stated that public fund distribution for DRR and CCA needs to follow the established rules and policies so that they are spent in an appropriate manner at the right location and for the right beneficiaries. This is consistent with the literature.

Researchers have stated that cooperative funding and the efficient use of resources (Howes et al., 2014), collaborative funding practices (Ireland, 2010), and coherent funding structures (Begum et al., 2014; Birkmann & von Teichman, 2010) are needed for the effective integration of DRR- and CCA-related efforts.

Better Governance Framework

Participants stated that the inefficient use of resources, ineffective implementation techniques, and decision makers' discretionary use of power make it difficult to integrate the efforts of DRR and CCA. They also said that proper evaluation and monitoring, and strict controls to follow policies could benefit DRR, CCA and integrating their efforts. Researchers also argued that a shared framework for (de Leon &Pittock, 2016a), a sector level (health) governance framework (Banwell et al., 2018), reorienting institutional structures at the national level (Djalante & Thomalla, 2012), and decentralising authority and supervision (Seidler et al., 2018) can enhance DRR-CCA integration. Better governance in DRR and CCA involves bridging arrangements (Forino et al., 2017), increasing administrative capacity (Solecki et al., 2011) and flexible government structures and processes (Pilli-Sihvola & Väätäinen-Chimpuku, 2016).

Coordination and Collaboration

Participants mentioned that the MoDMR and the MoEF are mainly responsible for DRR and CCA respectively, with a lack of collaboration and coordination between ministries and departments. Regular dialogue, signing memorandums, having meetings, sharing views and communicating on issues for DRR and CCA among the actors of multiple sectors and departments could enhance the integration DRR and CCA. Respondents from district and subdistrict stated that the district-level Disaster Management Committee and sub-district-level Disaster Management Committee should coordinate their efforts on DRR and CCA. Similarly, the District Development Coordination Committee and Sub-district Development Coordination Committee should implement coordinated initiatives so that development works by all sectoral officers such as agriculture, education and cooperatives consider both DRR and CCA in their works. Literature recommended similarly that collaboration is necessary among institutions to increase resilience (SVRK Prabhakar, 2010) and expedite integration.

Innovation and Adaptation

In the IDIs, the view was expressed that new dimensions of disaster risk and climate change implications are evident. Therefore, innovative measures for DRR and CCA are necessary, such as accepting new techniques and procedures and adapting traditional methods for better addressing climate-related disasters. For example, a traditional

community centred early warning system works better in the hilly districts of Bangladesh where mobile networks are weak. Thus innovation and adaptation can amplify the process of DRR and CCA, for example, health-related innovation in DRR-CCA (Banwell et al., 2018) and merging science and knowledge surrounding DRR-CCA (Seidler et al., 2018).

Integrating Policies and Updating

Interviewees said that the analysis of policies demonstrates that some DRR-CCA policy integration in Bangladesh has been significantly achieved. However, as DRR-CCA integration connects all other sectors and ministries, all relevant rules, policies guidelines and regulations should accept and comply with the necessity of DRR-CCA integration. They also said that conformity between local and national policies and similarities between global guidelines and national actions should be achieved. Respondents also suggested that the guidelines and mechanisms should be appropriately adjustable to the need of each district and subdistrict. Therefore, all relevant DRR-CCA policies need to be regularly evaluated, integrated and updated. An increased convergence in DRR-CCA policies (Seidler et al., 2018), avoiding fragmented policies (Howes et al., 2017), and a shared policy vision (Begum et al., 2014; Ireland, 2010), are mandatory for DRR-CCA integration.

Integrating DRR and CCA in Development Work

In the IDIs it was claimed that development works are often implemented with DRR- and CCA-related funds but DRR and CCA are not included in the design of the projects. They suggested that all development works should include DRR and CCA measures, and this would enhance the mainstreaming of DRR and CCA in all sectors and promote the process of DRR-CCA integration. Researchers have similarly pointed out that development without reference to the local context can result in dualistic efforts (Birkmann & Pardoe, 2014), so mainstreaming DRR-CCA integration efforts in national and local development plans (Dovers & Hezri, 2010), and linked planning for development and DRR programs bring better results with less cost (Agrawala et al., 2003).

Involving the Community and Listening Local Voices

Interviewed local level practitioners and researchers argued for including the community in the decision-making processes of both DRR and CCA. Interviewed district and subdistrict level stakeholders suggested that the district- and sub-district-level local governments should clarify the divisions of tasks and responsibilities between different key government offices and should work together to implement disaster risk reduction and climate change adaptation following guidelines and funding distribution formula provided by the national government. They also claimed that the community are the ultimate

beneficiaries who deal with disaster risks and climate risks, so they should be consulted before the planning, designing, location selection and implementation of DRR- and CCA-related projects. Listening to local voices could increase the effectiveness of DRR-CCA integration. However, in the literature it has been stated that DRR has been operating at the community level for a long time whereas CCA is just beginning to embrace community based initiatives (Ireland, 2010). Community based DRR could thus be a suitable entry point for CCA measures (Lei, 2014; Mercer, 2010; Solecki et al., 2011). State-sponsored community participation (Howes et al., 2013)and using the experience of community based CCA (Kabir et al., 2018), can expedite DRR-CCA integration in Bangladesh.

New Platform for Integrating DRR-CCA

Some interviewed researchers and academics suggested the formation of a team of independent experts to develop and design the fund distribution formula in consultation with all relevant stakeholders at local, national and regional levels. This could reduce the conflict of resource grabbing by DRR and CCA actors and ensure the appropriate selection of locations and beneficiaries. Other researchers have stated that an independent body for DRR-CCA integration can increase cooperation among institutions (Ayers et al., 2014) and reduce the conflict between agencies (Banwell et al., 2018).

Political Will and Leadership

Interviewed practitioners stated that the National Disaster Management Council and BCCTF include almost all ministers and secretaries of the ministries. Therefore, without political will and leadership it is not possible to integrate DRR and CCA efforts. Key decision makers should appreciate the necessity for this integration to achieve the efficient use of resources and the effective implementation of DRR and CCA. In the literature it has also been argued that when issues are coupled with political interest, integration of decisions, works and programs surrounding DRR and CCA are difficult (Birkmann & Pardoe, 2014; SVRK Prabhakar, 2010). Therefore political will and leadership are necessary for increasing resilience to climate-related disaster in Bangladesh (Alam et al., 2011).

Prevailing Harmony in Power Relations

Interviewees agreed that both the MoDMR and the MoEF struggle and compete over funding sources and financial control. They experienced that tension also exists between the local government representatives and Member of Parliament at the local level, on decisions of who will receive funds, and to which locations where they will be allocated. Therefore, actors surrounding DRR and CCA need to consider the stated policies relevant

to properly address disaster and climate risks, and should act harmoniously in fund distribution and the implementation of projects. The power play which constantly operates between agencies locally, nationally and globally, needs to be curbed (de Leon & Pittock, 2016a). The struggle between the DRR-related ministries and CCA-related ministries for controlling funding mechanisms needs to be replace with transparent processes (Dias, Amaratunga, & Haigh, 2018; S. M. Rahman & Ahmad, 2016; Transparency International Bangladesh, 2017).

Research, Information and Knowledge Sharing

In IDIs it was agreed that Bangladesh still does not have countrywide disaster and climate change related vulnerability assessments for each district and subdistrict. Therefore, they argued for more research locally, nationally and regionally which could be effectively used for funding distribution, project making, and future actions. Interviewees also stated that with Bangladesh's vast experience on DRR, this could complement the scientific on dealing with climate change impacts, which in Bangladesh' case, is still scant. Thus, experiences from both DRR and CCA should be shared. This is consistent with other studies. Participants also claimed that global and regional organisations, and largest carbon emitting countries should invest in assessing regional and global disaster risks and climate risks. These assessment reports should be disseminated to the relevant authorities in vulnerable countries and regions. A reduction of the knowledge gap between DRR and CCA is needed for DRR-CCA integrated planning (Hallegatte et al., 2018) and scientific research organisations surrounding DRR-CCA can build cooperative networks and translate research findings in applicable actions (Forino et al., 2017; Thomalla et al., 2009).

Sharing Risks and Insurance:

Respondents stated that sharing risks from disaster and climate change is being implemented in many countries. However, Bangladesh still does have not such practices and mechanisms. Bangladesh should initiate and implement those experiences from countries where this has already occurred. Some researchers also suggested insurance as an effective risk management tool which is a cost effective way of risk mitigation through DRR and CCA mechanisms such as through building regulations and land-use planning (SV Prabhakar, Abu-Bakar, Becker, Pereira, & Solomon, 2015; Wamsler & Lawson, 2011).

Discussion and Conclusion

This case study, based on findings from IDIs with key stakeholders, supported by review of the literature, institutions and relevant policies, has clearly outlined common concerns of DRR and CCA, and identified the strategies for integration of DRR and CCA in

Bangladesh. The common concerns of both approaches are:climate-related disaster-risks and uncertainties, increasing resilience, reducing vulnerabilities, focusing on similar communities, and engaging with similar socio-economic and governance apparatus. Linking these approaches should reduce the overlapping efforts, and increase efficient use of scarce resources. Key strategies include: i) managing more funds and ensuring better funding mechanisms; ii) better governance frame work; iii) coordination and collaboration; iv) innovation and adaptation; v) integrating and updating policies; vi) integrating DRR-CCA in development work; vii) involving the community and listening to local voices; viii) a new platform for integrating DRR and CCA; ix) political will and leadership; x) prevailing harmony in power relations; xi) research, information and knowledge sharing; xii) sharing risks and insurance.

Previous studies also found many of these strategies in the integration of DRR and CCA, including: better governance in Australia (Howes et al., 2014); harmonious coordination and collaboration in Indonesia (Dwirahmadi et al., 2013, Gaillard et al., 2013), policy integration in South Asia (Mall et al., 2019); involving communities in local governments (Forino et al., 2017), vulnerability and risk assessment and knowledge sharing in the Philippines (Banwell et al., 2018), mainstreaming DRR and CCA in small island developing states (Robinson, 2019) and implementing ecosystem based DRR and CCA in Rio De Janeiro (Lange et al., 2019). Our study has contributed new insights by exploring all possible strategies for DRR and CCA integration in Bangladesh.

Based on the strategies identified from the IDIs, this study identified the 12 strategies for the effective integration of DRR and CCA in Bangladesh. While we hold that the results and findings from this case study from Bangladesh remain valid and interesting and that lessons can be learned from this, it is likely that some of these findings can be generalised to other low-income resource-constrained countries that share the socio-economic-cultural features of Bangladesh. Notwithstanding this limitation, we argue that this Bangladesh case study sheds light on the effective integration of DRR and CCA.

The practical insights and local dynamics found in this study should serve as a guide to stimulate policymakers and practitioners and assist them in taking the steps required to foster effective integration of DRR and CCA in Bangladesh. In reality, is there a political desire to attempt different strategies to link DRR and CCA considering social issues, equality, and equity in allocation? These important overarching questions should be addressed further in future research. These will further facilitate the practitioners of both approaches to take decisions for reducing overlapping of efforts and increasing efficiency.

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Electric Vehicles: A Sustainable Way Out for Vehicular Air Pollution in Dhaka City

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Abstract

Vehicular Air Pollution (VAP) is a significant reason why the quality of the air of Dhaka city is being worsened day by day. Vehicles using fossil fuels emit harmful gases and particles detrimental to human health. This paper is a qualitative study based on secondary data from an array of sources endeavored to find out a sustainable solution to this problem using Multi-Level Perspective (MLP) of transition studies. Air pollution problem and its dimensions have been explored here as a socio-technical landscape which is a driving force to make a transition happen in existing vehicle fuel regime in Dhaka. Later, the response of government to address vehicular air pollution and the success and failure of those initiatives were analyzed. Primarily, those initiatives were not proved that much effective and sustainable. After that Electric Vehicle (EV) was introduced as a potential sustainable solution for VAP in Dhaka. Some policy initiatives with the introduction of electric bus service as niche initiative was provided for wider diffusion of Electric Vehicles in Dhaka. At last, main challenges and recommendations in the way of adopting electric vehicles are incorporated.

Key Words: Vehicular Air Pollution, Multi-Level Perspective, Electric Vehicles

1. Introduction

Air pollution, the greatest environmental challenge of modern world is responsible for more than sixty lakh death around the world (?About Air,?n.d.). This problem is a matter of grave concern here in Dhaka which is the administrative headquarter of Bangladesh and is now the ninth biggest megacity in the earth with 19.578 million people. At the speed it is expanding, within 2030, it will secure the fourth position worldwide (United Nations Department of Economic and Social Affairs, 2016). As urbanization is happening at a great speed in Bangladesh like many developing nations on the planet, Dhaka is being loaded with a huge number of people consistently. The quantity of enlisted vehicles has increased multiple times during last decade in coping with the need of the consistently expanding urban individuals (Motor Vehicle Registered, 2018). This is the situation of enrolled vehicles while unregistered vehicles are considerably more than this. Very few cities in Bangladesh are facing vehicle blast as much as Dhaka. Practically, all the vehicles

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use petroleum, diesel and other type of fuels which emanate destructive gases like carbon oxides, Nitrogen Oxides, sulfur oxides, Particulate Matter (PM 2.5 and PM 10) and some more. These gases are primarily responsible for deadly air pollution in the city. These contaminations are dirtying the air as well as making lethal sicknesses city inhabitants. Likewise, these gases are responsible for climate change also as air pollution and climate change are connected with each other (Begum, B.A., Hopke, P.K. and Markwitz, A., 2013).

The issue of transition in any socio-technical system arises mainly due to various environmental difficulties which destabilize the existing regime gradually. Sometimes, these environmental issues create a great social challenge. The source of such challenges can be of diversified in nature. Lately, Multi-Level Perspective (MLP) on socio-technical transitions has become important in analyzing transitions in energy sector. Besides clarifying technical aspects and consumer habits, it also scrutinizes social aspects in the way of transition. Transition as a process involving different actors is seen to be the result of interactions among three levels of socio-technical systems namely, protective niches for innovations, conventional regimes and landscapes destabilizing existing regimes. Generally, it takes ages to make a successful transition happen (Darnhofer, I., 2015).

In addition, my study is focusing Vehicular Air Pollution (VAP) in Dhaka for some obvious logics: Firstly, Dhaka is the largest city in both the number of people living there and vehicles plying on roads. These ever increasing vehicles are polluting its air disastrously and make it more unlivable than any other city of Bangladesh (Chowdhury et al., 2018). Vehicular emission which is one of the main causes of air pollution in this city is making the dwellers vulnerable to various lethal diseases (Begum, B.A. et al., 2011). ?A recent report on the environment of Bangladesh by the World Bank shows that by reducing the ambient level of particulate matter (PM10) under two scenarios, a reduction of 20 percent and a reduction to the proposed national standard of 50 g/m3 annually, the number of cases of mortality and morbidity that can be avoided come to between 1,200 to 3,500 and 80 million to 235 million, respectively (P.1, Chowdhury, T. and Imran, M., 2010).

The main query of the study is: can electric vehicles be the possible way out for vehicular pollution in Dhaka? Electric Vehicle (EV) initiative is described here briefly in response to the main research question. There are few more secondary queries which I tried to find out through this dissertation: the reasons why polluted air severely detrimental to dwellers of Dhaka city, the socio-technical landscape destabilizes existing regime of vehicle fuel and requires the transition to take place, the initiatives already taken by the government

of Bangladesh to deal with vehicular air pollution, the process of building up a niche for diffusing electric vehicles and potential barriers of such initiative in the context of developing country like Bangladesh.

2. Problem Statement:

The advancement of modern life is determined by the total use of power and vehicles. Megacities like Dhaka where modern life is attracting more and more people day by day is facing a huge leap in the number of vehicles for last few decades. The rate of this increasing number is minimum 10% per year and it has been polluting the air of the city drastically (Dhaka has very high air pollution level,? 2008). These vehicles emit harmful gases like Sulphur Di Oxide (SO2), Nitrogene Di Oxide (NO2), Carbon Monoxide (CO), Carbon Di Oxide (CO2), Benzene, Ozone (O3), Hydrocarbons (HCs), Particulate Matters specially PM2.5 & PM10 and other substances. As a result, Dhaka has one of the worst air qualities in the world. Among many sources of such severe air pollution in Dhaka city, Emissions from vehicles is the most prominent one ((PDF) Analysis of Exhaust Emission of Vehicles in Dhaka City of Bangladesh, n.d.). According to Azad, A.K. & Kitada, T., The major sources for SO2 emissions are traffic vehicle (55.8%) followed by brick field (28.8%), industry (10.5%) and navigation vessel (4%); for NO2, they are traffic vehicle (54.5%) followed by brick field (17.5%), residential activity (9.5%), industry (8.8%) and navigation vessel (7.7%) (P. 2004, Azad, A.K. and Kitada, T., 1998). Another report on air pollution conducted in 2009 stated that the air of Dhaka had a high quantity of Particulate Matter 2.5 also. It also revealed that motorized cars emitted the greater portion of PM2.5. (Wadud, Z. and Khan, T., 2013).The concentration of lead another deadly substance in the air of Dhaka is ten times higher than the normal level. It‘s even higher than Mexico which is the city with highest concentration of lead in the world. And again the culprit is emission vomiting‘vehicles (Air Pollution Kills 195,000 Bangladeshis Each Year, 2011).

3. Research Questions:

Main Research Question of this study is:

Can Electric Vehicles (EV) be the possible way out to reduce vehicular air pollution in Dhaka?

Secondary research questions are:

a) Why is the polluted air severely detrimental to dwellers of Dhaka?

b) Which socio-technical landscape destabilizes existing regime of vehicle fuel?

c) What kinds of steps have already been taken by Dhaka City Corporation (DCC) or the government to reduce VAP?

d) How can a niche for electric vehicles be developed?

e) What are the impediments for such initiative?

4. Literature Review:

The change in world climate has been a major concern from last few decades which has brought about significant alterations in socio-technical systems in every region. There are lots of environmental problems created from man-made reasons which need to be addressed by bringing change in existing path dependent technologies, rules and regulations, societal values and institutions (Bagherian and Lettice, n.d.). These changes lead to a successful transition towards sustainability. The multi-level perspective which is a theoretical framework for evaluating social and technical transition sees sustainability transition as an output of interactions among social and technical regimes, niches and external landscapes (Geels, F.W., 2011). It primarily focuses on the chronological development of different components of socio-technical systems. It also reveals that transition in a system takes place when that system doesn‘t work properly or the coordination among the sub systems is not in a harmony. And the transition itself is a slow and steady process which takes a long time to happen. In most cases, the relations among various drivers of socio-technical system control the speed of the transition. In a nutshell, the alignment of the three stages: niche, socio-technical regime and socio-technical regime is solely important for a successful transition in energy sector (Darnhofer, I., 2015).

Those actors who wish to make the transition happen create niche to protect the innovation in order to help it flourish. Niche is said to be the most unsteady phase of transition process where kind of tryouts happen. Unlike niches, social and technical regimes are steadier phase of the transition framework. This phase contains traditions and values of other actors like creators, users, government and private institutions etc. Another phase is the macro form of transition which is called socio-tech landscape. It provides the broadest perspective of transition occurred like climate change or lasting financial advancement. The scholars of social and technical transition emphasizes on niche innovations with a view to framing newer regulations and expressions of manner and etiquette but they put more light on state consultants, local elites, non-government organizations, entrepreneurs and similar actors of socio-technical regimes. These actors prioritize a specific way which creates stability in the regime. Consequently, it locks in a precise way of socio technical system. On the other hand, in case of influence of some outer factors of the system, the system loses its steadiness. This creates the opportunity for

innovation and triggers a transition (Lawhon, M. and Murphy, J.T., 2012).

The major challenge for this modern world is not the distance. It is the impact of distance overcoming transportation system of present world which is posing a major threat to combat against air pollution. Fuel is the prime cause of air pollution from motorized vehicles. The process how it is burnt inside the engine specifies the quantity of pollutants discharged from it. So, the possible solution for emission pollution should look for decreasing fuel use, alternative and less harmful fuels, developing more efficient car engines and setting up emission regulator (Goyal, S.K., et al., 2006). The transition from heat engine vehicles to electric vehicles (EVs) can have a significant impact in facing climate change targets. Electric vehicles (EVs) have the prospect to cut the emission of Green House Gases (GHG) up to half in comparison with traditional vehicles. Moreover, EVs can be a potential solution for poor air quality of the cities. As Electric vehicles are going to bring a revolution in locomotive transport sector in coming years, governments can consider adopting these vehicles as cleaner substitute of conventional vehicles (Electric vehicles: driving the transition - Business, Energy and Industrial Strategy Committee - House of Commons,(n.d.).

4.1 Data collection:

I have gathered data from secondary sources and summarized the gist of them. Then I also tried to set up a direct linkage of summarized outputs with my aim of the research. Finally, I have formed an outline from the data that I have found in different sources. For analyzing data, I was interested in using inductive method of sorting out information from secondary sources which helped me to make my output more realistic and widely accepted (Thomas, D.R., 2006). Accordingly, the exploration was founded on the research works done by different scholars from both developed and developing countries. The investigation reviewed scholarly and articles from various sources. A niche initiative considering the government efforts in this regard has been tried to develop according to the multi-level perspective theory. As niche creation is a key point of MLP theory, this research work has tried to study the niche initiatives of different countries for creating one for Dhaka city transport fuel regime. For theoretical framework, I have gone through the research articles form Nature, Science Direct, Emerald journals, Taylor & Francis, Social, Technical and Environmental Pathways to Sustainability (STEPS) Centre of University of Sussex.

Applying The Multi-Level Perspective (MLP):

For providing the dissertation with a solid theoretical base, I took multi-level perspective as a theoretical framework for explaining the problem of vehicular air pollution in Dhaka city and finding out a solution as well. Different academicians like F. W. Geels, I. Darnhofer, M. Lawhon, F. Avelino and many more have contributed a lot in the field of multi-level perspective. Rationally, I went through their enriched articles for shaping the problem according to their assumptions. The core of multilevel perspective constitutes the niche initiative for coming out from an existing regime. I have tried to make a framework for establishing a protective place for electric vehicles for Dhaka where it will be grown up and diffused gradually across the country. Moreover, I have searched in government documents of the UK, Netherlands, the USA, Japan, China and obviously Bangladesh for finding out a structure for niche for electric vehicles in Dhaka city.

4.2 Air Pollution in Dhaka

Air pollution is the presence of contaminant or pollutant substances in the air that do not disperse properly and those interfere with human health or welfare, or produce other harmful environmental effects (OECD Glossary of Statistical Terms - Air pollution Definition, 2001). According to this definition the air of Dhaka is severely polluted because the presence of contaminant in the air of Dhaka and its effect on city dwellers is proved by different researches. According to the World Health Organization (WHO), Dhaka is within their top list among three thousand cities in terms of the presence of PM2.5. Because of this deadly substance almost fourteen thousand people died in this city (Bangladesh‘s Air Pollution Problem Grows, Brick by Brick, 2018). Vehicular emission is considered to be the greatest cause of polluted air of Dhaka city. Another particulate matter PM10 is the contribution of automobiles specially two-stroke three wheelers. And more or less fifty percent of PM less than 2.5 is sourced from motor vehicles plying in the roads of Dhaka. Not only PM2.5 or PM10 but also many other hazardous gases and substances are present in the air of Dhaka (Begum, B.A. et al., 2006).

The air of megacity Dhaka (Hackenbroch, K., 2012) is polluted in two ways: emissions from manufacturing industries like brick-laying, garments factories, leather industries etc. and from automobiles (Air Pollution In Dhaka City,n.d.). Though both the sources pollute the air of Dhaka, later one causes more havoc than the first one because city dwellers are directly exposed to such kind of pollution. Furthermore, most of the industrial establishments are around city area not within it (Hoque, M.S. et al., 2006) which makes it tough for their harmful emissions and discharges to affect city people directly. So, it is a bit clear that a different category of vehicles‘emission has major contribution in

polluting city air. The main fuels used by vehicles in Dhaka are gasoline, petrol, diesel and octane etc. These fuels sometimes impure and mixed with other substances emit following disastrous gases:

a) Diesel- Suspended Particulate Matter (SPM), Sulphur Oxides, Nitrogen Oxides etc.
b) Petrol & Octane – CO, HC, NOx, SOx, Lead particles and carbon elements etc.

4.3 Air Pollution as Landscape:

At least 0.123 million individuals died on account of air contamination a year ago in Bangladesh as indicated by an exploration on worldwide air contamination. It additionally said that the life expectancy of a Bangladeshi child will be diminished all things considered by 30 months since they are raised in present huge phases of air contamination. Air pollution is responsible for more deaths than any other reasons here. The nature of air in Bangladesh proceeded with tenaciously poor, particularly in Dhaka where local people are exposed to excess level of PM2.5 from 90s (United News of Bangladesh, 2019).

Opportunities of creating niche for innovative technologies are shaped by traditions or governmental efforts or severe change in environmental issues which are popularly known as socio-technical landscape. These sometimes force energy areas which influence policy makers to bring alterations in regulations. To find out landscape actors, it can be necessary to go beyond national boundaries. In case of a transformation in a regime in a consequence of interactions among different levels, it is not abnormal that fresher regime can bring alteration in socio-technical landscape. On the other hand, landscape issues can remove existing regime encouraging policymakers by creating protective space for sustainable solution (Leipprand, A. and Flachsland, C., 2018). Similarly, severe air pollution of Dhaka increased concern at government level and they tried to address this socio-technical landscape issue through different policy initiatives as they realize the impact of reducing the pollution could be worth 0.5 billion dollar annually (Anon, 2014).

5. Destabilization of Fossil Fuel Regime & Government Initiatives:

5.1 Destabilization of Fossil Fuel Regime:

Existing fossil fuel regime of vehicles in Dhaka has been being weakened since the beginning of last decade. There are reasons behind destabilization of a regime like scarcity of resources or lack of backing from the government and entrepreneurs or declining performance of present regime actors and factors. In addition, few other causes haven identified in different literatures:

Newer inventions lead the way to weaken existing regime as these have some advantages comparing to previous system. These advantages always work as cutting edge technology.

Sometimes, the market for existing technology has become narrow or altered by another similar but better option or new competitor enters into the same space. Any of these options can phase out existing technology.

Policy makers can change their policy against present system due to environmental concern. This also can weaken the existing regime.

Some theorists described destabilization of a regime as a result of internal dysfunction which declines the regime step by step (Turnheim, B. and Geels, F.W., 2012).

None of the reasons mentioned above is solely responsible for making transition in transport fuel sector in Dhaka. Multiple reasons influenced political actors to bring change in fuels for vehicles. Moreover, vehicles of Dhaka have polluted the air severely and millions of people have affected directly by this pollution. This socio-technical landscape mainly destabilized the fossil fuel regime which created pressure on government to take steps to address the issue.

5.2 Government Initiatives:

The Government of Bangladesh has taken several initiatives including prohibiting buses already used more than twenty years and trucks already used more than twenty five years, setting ideals of emission, subsidizing Compressed Natural Gas (CNG) and gasoline powered vehicles. These initiatives lessened the scale of pollution than before. Nevertheless, the presence of PM and other harmful gases in the air is higher than the standard level of the city (Chowdhury, T. and Imran, M., 2010). This chapter will go in detail about the major initiatives taken by government in changing paradigms of vehicle fuel in Dhaka city.

- Refined or unleaded Gasoline
- Banning scooters (two-stroke three wheelers)
- Promoting CNG Conversion of Vehicles

5.3 Effectiveness of Initiatives

According to World Air Quality report of 2018, Dhaka is still stood second amongst the capitals of the world in terms of air pollution (Anon, 2019). Another real time scoring by Air Visual, the air of Dhaka is termed as ?hazardous‘ even in this year (?Dhaka air pollution today world‘s worst,? 2019) These information makes it clear that the quality of air in Dhaka is not up to the mark nowadays. Even if we consider the air quality comparison from 2014 to 2017 (Table 1), it will show that the air quality is decreasing day by day. From table 2, we can see that there is no significant change even after taking some steps to improve air quality of Dhaka rather the number of days with acute pollution has increased significantly.

		Number of Days with			
Year	**Total Days**	**AQI≤100**	**AQI 101-200**	**AQI 201-300**	**AQI≥300**
2014	**295**	**108**	**117**	**16**	**54**
2015	**356**	**121**	**119**	**48**	**68**
2016	**340**	**148**	**108**	**45**	**39**
2017	**359**	**133**	**130**	**23**	**73**

Table: 2 Condition of air quality of Dhaka after previous initiatives
Source: (“Reports & Publications.” n.d)

6. *Electric Vehicles & Policy Support* for Introducing EVs:

6.1 Electric Vehicles:

What we have seen from previous lesson is the destabilization of present regime irrespective of petrol, diesel or natural gas for multifarious reasons. As almost all the vehicles in Dhaka are entirely reliant on fuels from unsustainable sources, transport sector in Dhaka is a prime source of greenhouse gases and air polluting gases. With the development of high capacity battery in recent years, EVs have become a burgeoning sector in transport around the world which is helpful in removing pollution from air. Many countries like the UK, USA, Norway, Germany, China, Japan and Singapore have already initiated electric vehicles regime (Tran, M.et al., 2012). They adopted electric vehicles to address climate change and local pollution because these vehicles run by electricity

Topic of Comparison	Electric Car	Automobile
1. Consumption with the daily mileage	11KWh	3751 KWh
2. The cost of daily run	127.5 Kazakhstani Tenge/ 0.27 Pound	401.5 Kazakhstani Tenge/ 0.85 Pound
3. Time for charging/ refueling	8 hours	2 minutes
4. Cost of charging/ refueling	267.6 Kazakhstani Tenge/ 0.57 Pound	800 Kazakhstani Tenge/ 1.70 Pound
5. Average consumption per month	320 KWh	861 KWh
6. Average cost per month	3600 Kazakhstani Tenge/ 7.66 Pound	9235 Kazakhstani Tenge/ 19.65 Pound

Table 3: Calculation of average rates of the EVs with regular automobiles in present situation (Page 4, Gelmanova et al., 2018)

release far less harmful gases than traditional vehicles both for human health and world climate. These also ensure fuel safety and security for the countries specially which hardly have any energy resources (Grauers et al., 2013). From table 3, we can see that the cost for EVs at present is at least 2.5 times less than traditional automobiles. The only drawback is charging time which is going to be solved very soon.

6.2 Policy Support for Introducing EVs :

The policy makers of Bangladesh have to keep recent advancements in this field in mind while planning for future transportation, as they are facing a disastrous landscape of air pollution across the country specifically in Dhaka. Following points are to be incorporated for the purpose of diffusing EVs across the country:

a) Financial Benefits for People or entrepreneurs:

People of developing countries like Bangladesh have main problem with the money as most of them are lower class and lower middle class. So, encouraging the poor buyers, government can proclaim a supportive financial benefit for buyers of electric vehicles. With a view to flourishing EVs to address massive air pollution and climate change, some developed countries offer sponsorships for electric vehicle adoption and utilization. Motivators for EV reception exist at the government level in many countries of advanced

economy. In a similar fashion, the government of Bangladesh can introduce two kinds of subsidies: for EV manufacturers and for buyers. These endowments can be immediate, similar to tax reductions or then again direct installments (Bosworth, Ryan, C., et al., 2017).

b) Building up Permanent and semi-permanent Structure:

Different types of agents regarding their importance in managing set up for charging have to be identified initially. The agents who are already present in the scenario and fresh agents have their role to play in shaping the infrastructure for EVs (San Román, T.G., et al., 2011). Required number of charging places and their connectivity with supply line must be adjusted for easier charging facilities. Charging ports is considered to be the lifeline for electric vehicles.

c) EV Friendly Regulations:

Sometimes, apparently less important regulatory initiatives have enormous impact on common people towards using a new technology. These initiatives do not cost that much in comparison with their great influence over the local community. Free access to city centres, free parking, special lanes and free charging for electric vehicles can be few of them which can change psychology of common people in favour of EVs. When people are getting easy access to city centres with EVs, they are encouraged to buy EVs.

d) Making people Aware of advantages of using EVs:

An ongoing study showed that a great number of people are not interested in electric vehicles because of the apparent absence of charging locations or the staggering expenses or worries over the range. In fact, these reasons are quite common for commoners as there are some truths in it. From a similar study in America, it was found that more than sixty people in every hundred people are not really conscious of electric vehicles (Lambert, 2017).

e) Adopting Pilot Project For EVs:

As EV technology is entirely new to the users in Bangladesh, they will be afraid of adopting this unknown technology. Someone has to remove their fear of knowing the unknown. In developing countries, these risks are taken by governments usually. Implementation of electric vehicles must need a protective place where it will get a support from government for competing with traditional vehicles in the market. A

provision of niche market for electric vehicles at a limited space must be incorporated in policy measurers otherwise these vehicles will face difficulty to get flourished. When public project for EV will be in operation, people will know it is easy, comfortable and safe travelling in such vehicles. They will also come to know the environmental impacts of EVs.

f) Specifying Allocation of Business for Better Coordination:

The adoption of electric vehicles is a multi-departmental effort. It is impossible to implement this project by a single department of a government or by a local government body. So, it requires participation of each actor related with the introduction of EVs. Most of the time central government omits the interest of localities for serving national interest but local issues need to be addressed properly by the central body. For an operational and successful policy collaboration among different stages of government is urgently needed. This can be congenial for commoners to get accurate information about availability of EVs and charging locations countrywide.

6.3 Creating Niche for EVs:

The core of transition lies in creating a protective niche for possible users of a particular technology. It includes exclusive areas where it can be applied for further dissemination. This effort helps a transition endevour to find out its faults for final application. Niche is basically a test case for preparing it for competitive market through learning by doing. It is prepared for seasoning the new innovation effort with a different and unknown setting by offering an array of supportive measures like tax incentives, subsidies and interest free loans etc. These protective places are useful for diffusing new knowledge which can help in forming a web of social relation in favour of new practice. It also has the ability to substitute existing system pushing innovation (Raven, R.et al., 2010).

Naturally, government has to play a pivotal role in creating a test place for new inventions or efforts. If it is the case where transition effort requires heavy investment which is quite impossible for private investors, there is no alternative to government initiatives (Electric Buses Are Not Only Clean but Less Costly to Run, (n.d.). Therefore, government of Bangladesh should come forward to create an experimental space for electric vehicle for mass people so that they can learn through experience. This paper suggests the introduction of electric buses in Dhaka as niche for transition of vehicle fuel from patrol, diesel to electricity. There are few reasons behind adopting public electric buses as an experimental case:

a) Public buses are the most popular transport in Dhaka city which is used by 41% of the total city dwellers. At present, public buses emit black smoke and these buses are noisy enough to discourage citizens to use them. On the contrary, developed and less emitting electric buses can attract more passenger than before because these are almost smokeless and noiseless (Mahmud, K., Gope, K. and Chowdhury, S.M.R., 2012).

b) Electric vehicles are unknown in the local auto market and investment in such initiative is highly risky. Common people will invest only when they will be sure of the fact that there is required infrastructure. It will be difficult for government like Bangladesh to provide necessary infrastructure for private vehicles as an experimental case. On the other hand, limited numbers of public buses cover a limited area in the city which will be more realistic to be used as protected place.

c) Most of the buses, to speak the truth 90% of the buses in Dhaka city are badly managed and have no fitness at all and they discharge a huge amount of harmful fume. Other vehicles' emission has somehow been managed partially by some measures taken by government. However, buses are still unmanaged in terms of emitting poisonous gases and particles (Air Pollution In Dhaka City, n.d.). So, adoption of electric buses can play a significant role in curbing the rate of pollution to a great extent.

Following factors need to be addressed by the government of Bangladesh to set up experimental space for electric buses in Dhaka:

i) Breaking Myths and Facilitate Availability of Electric Vehicles

It is very important to bring all the actors in confidence about EVs so that they feel interested about it. Government of Bangladesh can raise awareness through arranging seminars, focus group discussions, advertisements etc. At this juncture, government has to introduce sufficient number of electric buses in the city for public transport. For this purpose, it needs to import electric buses from the countries which already have reputation in manufacturing electric buses. As it was said before the buying price for electric buses is higher than traditional ones but it's ultimately cheaper if you consider maintenance and fuel cost during their lifetime which is on an average 13-15 years. In addition to that traditional buses require massive repairing works at its middle age while an electric one doesn't require such repair works usually (Electric Buses Are Not Only Clean but Less Costly to Run, n.d.). From this aspect, it can be an effective idea to import refurbished buses and create such market here in Bangladesh. It may help local investors in this sector. Government can also provide private importers with zero interest loans.

ii) Set Ups for Charging:

If not the most important, it must be one of the most important preconditions for facilitating EVs to get a solid start. Most of the buses are run for a long shift of 10-12 hours and more than 250 kilometer every day and it is mandatory to set a charging infrastructure in the roads. If any country doesn‘t have that capacity, it should not present electric buses for mass transit (Angeles and Beach, n.d.).Thus, without a proper set up of charging EVs, it is next to impossible to nurture local markets for electric vehicles. Likely, it is also crucial for establishing a protective experimental space for EVs.

iii) Ensuring Sufficient Power Supply:

Electricity supply must be affected by the provision of introducing EVs in the city. As the number of vehicles is increasing, it will require additional amount of power if these are converted into electric ones. Initially, for introducing electricity led buses in Dhaka, government must ensure sufficient power generation for this purpose. Bangladesh has got the capacity of generating 17,340MW of electricity at this moment (?Key Statistics,? n.d.) but it is building power generation plants planning 24,000MW in 2021 and 40,000MW within 2030 (Express, n.d.).

iv) Technology Transfer:

EV technology is not a stable one so it is being developed day by day. Basically, developed countries control the technology which makes it difficult for developing country like Bangladesh to deal with it. Bangladesh is dependent on technological know-how derived from other countries irrespective of sectors. It is obvious that Bangladesh will be largely reliant on the countries like UK, Germany and China who have advanced knowledge regarding EVs (M. Bell, 2007). So, the government of Bangladesh needs to measure how many buses it will need, how to by those and from where these can be bought. It is very important how much technical support it will get from the exporter country.

Major Challenges to Implement EVs in Dhaka & Recommendations:

Electric vehicle, a solution to fight with climate change issues and local air pollution taken by many developed countries could be a potential initiative for Dhaka to control its vehicular air pollution. Nevertheless, it has not got that much importance by policy makers of Bangladesh for various and multidimensional reasons (Steinhilber, S., Wells, P. and Thankappan, S., 2013). Government of Bangladesh has to identify the barriers in the ways of introducing and diffusing EVs in local market and find out the solutions. Few

possible recommendations are given below:

- Sufficient Electricity supply is the most vital precondition for building infrastructure and encouraging investors for EVs. Besides setting up new high capacity power stations, government has to ensure that the power stations must use renewable sources or nuclear energy to produce electricity otherwise the main objective of using EVs instead of ICE vehicles will not be fulfilled.
- One of the basic challenges for diffusing EVs and creating markets is charging facilities as this facility offers sufficiency, accessibility and mobility to owners of EVs in recharging vehicles. Government has to take necessary steps to improve its supply network consisting of cables, feeders and transformers as additional electricity demand will create pressure on national grid.
- Electric transports are more costly to produce than ordinary diesel transports. The vast majority of the additional costs comprise of the costly electric segments, for example, battery, electric engine and power hardware, and the building improvement work particularly on the framework the board. Since the vast majority of the electric parts require generally relentless activity conditions, fluid cooling is frequently used to deal with the warm balance which requires extra subsystems and control the executives.
- Another important impediment for electric vehicle diffusion in Dhaka is lack of knowledge of common people about new technological advancement in the field of electric vehiclesOn the contrary, the policy makers here in Dhaka do not have that much knowledge about electric vehicles let alone common people. Certainly, government has to take steps to spread the idea of electric vehicles and its advancements.
- Government has to lead the unknown sector of electric vehicles. Bangladesh government should take a policy to phase out traditional petrol or diesel run vehicle step by step within a specific timeframe. To be more specific, for the procurement of new vehicles in coming years, they can adopt the policy of buying only electric vehicles. When there will be a large number of electric vehicles on the road, investors will be inspired to invest their capital in infrastructure for EVs.

7. Conclusion:

The air quality of Dhaka has become so bad that the government had to think of finding alternative ways to get rid of it. Simultaneously, this exogenous environment of air

pollution in Dhaka as a socio-technical landscape leads to a transition in the prevailing vehicle fuel regime. As a part of vehicle fuel transition government has tried several options including using developed emission technology in vehicles, refined fuels as substitute of petrol, diesel or gasoline and Compressed Natural Gas (CNG) as vehicle fuel. Those efforts were successful in the sense that they have brought a short-term change in retaining quality air in the city. However, it does not have a long-term effect on improving air quality. That is why even after a decade of introducing those efforts of replacing traditional vehicle fuels, in 2012, Dhaka was termed as 2nd worst megacity in context of air quality by a UK based weekly ? The economist‘ (Neema, M.N. and Jahan, J., 2014.). So, it was found in this research that the efforts were not successful to address the issue of severe air pollution of the city after exploring the answers for second and third sub question. Furthermore, Bangladesh is totally dependent on imported petrol and diesel and it has a limited reserve of natural gas which will be finished within next few decades. In a nutshell, government decision of using unleaded gasoline and CNG in vehicles is not sustainable at all.

Regarding fourth secondary question, introducing Electric Bus in Dhaka city was suggested as a niche initiative where it can grow up within a protective space avoiding pressure of present regime. Majority of public buses with poor fitness are most widely used in Dhaka and they are one of the major contributors to air pollution. Electric bus as an experimental project recommended because governments of developing countries should play the central role here and public buses in Dhaka are managed and operated by Bangladesh Road Transport Authority (BRTA) which is a government organization. Government can easily provide sufficient budgetary and infrastructural help. In this respect, required supports for electric buses like sufficient power supply, charging points and technological backing staffs can be easily ensured by government with proper policy formulation and coordination. As a vital part of multi-level perspective, scaling up niche initiative of electric bus in the city could help in the further diffusion of Electric Vehicles (EVs) in Dhaka.

The latest secondary question was about the potential challenges of adopting EVs in Dhaka. In identifying the possible challenges for EVs adoption in Dhaka, I have found establishing more renewable power plants, ensuring sufficient power supply and setting up adequate charge stations for EVs most influential. Dhaka has immense possibility to implement EVs in a large scale but it has to overcome the challenges successfully to diffuse the niche of EVs in Dhaka. Nevertheless, to make a transition happen is not an easy task as it takes a long time to bring manifold components in an alignment so that they head towards one direction (Rotmans, J. et al., 2001).

To be honest, some restrictions make it harder to find out and explore necessary

information regarding this dissertation. Shortage of time and no funding for travel are two the limitations which impede my research work. For doing a proper research it is very important to have some interviews as the dissertation has connection with policy initiatives of Bangladesh government. The interview of responsible officials of relevant ministry or local government body could enrich my dissertation. In addition to that some quantitative analysis with responses from the stakeholders of EVs in Dhaka (using a structured or semi-structured questionnaire) and then mixed analysis of both quantitative and qualitative information might make the dissertation a better one. Nonetheless, I have left no stone unturned to find out proper information regarding initiative of EVs in Dhaka. I would like to add that there is hardly any case where Multi-Level Perspective (MLP) on socio-technical transition has been applied in context of Dhaka. So, there are scopes to conduct further research on sustainable transition in vehicle fuel regime specially focusing on the role of transport leaders within political actors.

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