

Elimination of Construction Contract Wastes for Enriching the Infra-Structural Development of Bangladesh.

by

Md. Abdur Razzaque

ID: 19282010

**A thesis Submitted to the BRAC Institute of Governance and Development in partial
fulfillment of the requirements for the Degree of**

Masters in Procurement and Supply Management (MPSM)

BRAC Institute of Governance and Development

BRAC University

August, 2021

© [2021]. [Md. Abdur Razzaque]

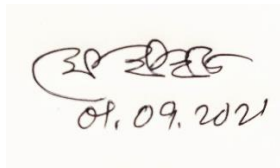
All rights reserved.

Declaration

It is hereby declared that

1. The thesis submitted is my own original work while completing degree at Brac University.
2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I have acknowledged all main sources of help.

Student's Full Name & Signature:

A handwritten signature in dark ink, appearing to read 'Md. Abdur Razzaque', is written above the date '09.09.2021'.

Md. Abdur Razzaque
ID: 19282010

APPROVAL

The thesis titled “Elimination of Construction Contract Wastes for Enriching the Infra-structural Development of Bangladesh”

1. Md. Abdur Razzaque (ID:19282010) of 6th semester 2nd year of has been accepted as satisfactory in partial fulfilment of the requirements for the degree of Masters in Procurement and Supply Management on 1st September 2021.

Examining Committee

Supervisor:
(Member)

Md. Mosta Gausul Hoque, PMP
Faculty, BIGD (BRAC Institute of
Governance and Development).
BRAC University

Program Coordinator:
(Member)

Full Name
Designation, Department
Institution

External Expert Examiner:
(Member)

Full Name
Designation, Department
Institution

Departmental Head:
(Chair)

Ethics Statement

Dissertation on “Elimination of Construction Contract Wastes for Enriching the Infra-structural Development of Bangladesh” is a new topic for innovating the doors to enrich the performance of development project activities in our country. This topic will help to make an effective and efficient utilization of public fund. During writing the thesis, the data collection process and analysis, correspondence to the respondents, writing ways have been performed sincerely and honestly with theoretical and practical field-oriented questionnaires to the knowledgeable officials. They are highly qualified with practical knowledge and are directly related to implementation of the project and they are also linked with Government policy making process. So that the collected data are very authentic and appropriate. The personnel involved in the stated topic have direct connection to the related development activities of a project and the performance of these professionals enrich the focus of the development indicators of a country. The implementation of the idea of this topic will help to improve the procurement process with appropriate implementation and completion of the construction works according to the stipulated time and the project performance must be increased. By reducing the wastes from the infrastructural construction contract will enhance the performance of goal achievement of the development project which is still far away from the target point of completion of the project.

Abstract

Bangladesh is a developing country. The development activities of Bangladesh are hindered by some related factors, the main objective of this study is to identify and eliminate these factors especially on construction contract wastes generated during procurement process. The factors impact on the development of Bangladesh are Corruption, Lack of skilled person, Favoritism, Bribery, Poor planning, Selection of Contractor (unethically), Political influence and Bureaucratic complexity in decision making in the construction contract. The resultant impact of these factors in procurement process are making the contract slow and reduce steadiness. These hindering elements are as slow poisoning in development activities and make the development work slower and ultimately the countries development goes slowly.

In my study “I have tried to identify the infrastructural construction contract wastes in the procurement process”. Presently the large part of governments procurement of works is performed with e-GP (electronic government procurement) through the web portal www.egp.gov.bd. This web portal is introduced by CPTU, Ministry of planning. The operation, maintenance, rules implementation, amendments are the responsibility of CPTU. So, the primary responsibility of CPTU is to eliminate the construction contract wastes by introducing acceptable, transparent, reliable and value adding web portal for both Procuring entity and contractors of Bangladesh that will ensure the development of Bangladesh.

The secondary and major procurement responsibility goes to Procuring Entity, Authority and implementing agency to eliminate the construction contract wastes. The unskilled planning in procurement, introduction of unreal specification in tender document for evaluation, unethical activities in contractor selection process, taking bribes in contractor selection process and giving them illegal facilities during implementation of the construction works.

The third responsibility is imposed on government or ruling party. The government imposed some rules and regulations for different purpose, if it implies the acts and rules for transparent, anticorruption activities, reduces the process of bureaucracy and the change the fiscal year which will start from January to December instead of July to June.

CPTU is trying to expand its mandate on implementing transparent, sustainability in public procurement in Bangladesh. Sustainability criteria which ensure the development is incorporated in STD's PPA-206 and PPR-2008 should be amended to assure development issue more.

Finally, there is plenty of opportunity to proceed further study on construction contract waste elimination in procurement process. Advance research will ensure more effective contract waste elimination process which enriches the sustainable development of Bangladesh.

Acknowledgement

I am gratefully recognized that, different people and organizations have provided their generous help and advice to carry out this dissertation work. I am also indebted to all who are related directly or indirectly to prepare and finalize my research work. Special thanks are due to those researchers, authors, and scholars whose contribution can be regarded as a foundation stone of this dissertation. I would like to express my deepest and sincerest gratitude to my respected supervisor Md. Mosta Gausul Hoque, PMP, Principal Project Management Consultant DIMAPP Project, CPTU, IMED, Ministry of Planning & Faculty of BIGD (BRAC Institute of Governance and Development) BRAC University who sincerely guided me for carrying out this study and the completion of research work.

I would like to express my gratitude to Dr. Lutfur Rahman X- Director Research (BARI) and all the respondents including the officials of BARI, BRRI NATA, GCC, BSMRAU, who provided me with necessary information and Support. I like to thank all officials and supporting staffs of BIGD who constantly helped and supported me to carry out my dissertation work.

Finally, I thank to all of my friends, well-wishers and family members who directly or indirectly helped and inspired me in completing my research work.

Table of Contents

Declaration -----	iii
Approval-----	iv
Acknowledgement -----	v
Abstract -----	vi
Table of Contents -----	viii
List of Acronyms -----	x
List of figures -----	xi
List of Tables -----	xii

CHAPTER 1 Introduction

1.1 Background of the study -----	1
1.2 Statement of the problem of study-----	4
1.3 Objectives of the study-----	5
1.4 Methodology-----	5
1.5 Questionary structure of the Study-----	6
1.6 Scope and limitation of the Study-----	7
1.7 Structure of the Research (arrangement)-----	7

CHAPTER 2 Literature review

2.1 Procurement and sourcing-----	8
2.2 Contract-----	11
2.3 Contract wastes-----	13
2.4 Contract document parts in construction works-----	14
2.5 The goals of construction contracts -----	15

2.6	The importance of construction contracts-----	15
2.7	Construction sector in Bangladesh where contract wastes are produced-----	16
2.8	The wastes found in contracts -----	17
2.9	Role of construction in national development -----	23
2.10	Challenges of Development faced Bangladesh as a developing country -----	24
2.11	Sustainable construction -----	25
2.12	Benefits of sustainable infrastructure -----	27
2.13	Principles of infrastructural development-----	29
2.14	Development indicators -----	29
2.15	Sustainable construction contracts enhance the development of Bangladesh-----	30

CHAPTER 3 Data Analysis and Findings

3.1	Analysis and Findings-----	31
3.2	The root causes of construction contract waste generation in procurement-----	36
3.3	Causes of contract waste generation and its type in procurement process-----	37
3.4	Impact of construction wastes in development -----	43

CHAPTER 4 Recommendations and conclusions

4.1	Recommendations-----	48
4.2	Limitations-----	50
4.3	Conclusion-----	50
References-----		53
Appendix-----		54

LIST OF ACRONYMS

ADB	Asian Development Bank
CPTU	Central Procurement Technical Unit.
MOP	Ministry of Planning
OTM	Open Tendering Method
LTM	Limited tendering Method
RFQ	Request for Quotation Method
PE	Procuring Entity
PPA	Public Procurement Act
PPR	Public Procurement Regulation
STD's	Standard Tender Documents
SPP	Sustainable Public Procurement
WB	World Bank
SDG's	Sustainable Development Goals
FY	Fiscal Year
LGED	Local Government Engineering Department
RHD	Roads and High ways Department
OSTM	One Stage Tendering Method
TSTM	Two Stage Tendering Method
BIDA	Bangladesh Investment Development Authority.
DPM	Direct Procurement Method
BBA	Bangladesh Bridge Authority
CAGR	Compound Annual Growth Rate
PW	Procurement of Works

LIST OF FIGURES

- Figure 1.1: Sustainability Goals (SDG's)
- Figure 1.2: The methodology of the proposed study in sequential frame work.
- Figure 2.1: The generic procurement cycle
- Figure 2.2: The offer and acceptance in contract.
- Figure 2.3: The construction contract implementation
- Figure 2.4: The types of construction wastes.
- Figure 2.5: The goals of construction contract
- Figure 2.6: The role of construction in development.
- Figure 2.7: Pillars of Sustainability
- Figure 2.8: Development indicators
- Figure 3.1: General information of the male and female respondent of the survey.
- Figure 3.2: The educational qualifications of the respondents of the survey
- Figure 3.3: The profile of the respondents considering their profession.
- Figure 3.4: Experience of the respondents on their procurement function.
- Figure 3.5: The position of the respondents in their organization.
- Figure 3.6: The major contract wastes associated with construction contract
- Figure 3.7: The impact of risks (wastes) in contract implementation.
- Figure 3.8: The root causes of contract waste generation.

Figure 3.9: The parameters of major wastes in construction contract

Figure 3.10: The impact percentages of wastes in construction contract.

Figure 3.11: The style of corruption and favoritism activity

Figure 3.12: The impact of natural calamities

Figure 3.13: The impact of political instability and pressure on development activity

Figure 3.14: The GDP outlook of Bangladesh in Asian region

LIST OF TABLES

Table – 1: ADP revised its growth projections for South Asia

CHAPTER-1

Introduction

1.1 Background of the study

In Bangladesh more than 40% of annual budget is spent on development activities for augmenting the development of the country. The lion share of development activities is comprised with the procurement of goods, works and services for the infrastructural development. There is a limited number of parameters for procurement of goods, while a huge quantity of goods (machineries, equipment's, etc.) are required to procure every year in Bangladesh. In case of Government procurement, almost all purchasing and procurement are usually made by following the public procurement rules (PPR) and public procurement act (PPA) guidelines. In the past, before initiating these rules and regulations, government financial rules (Government Financial Rules 1911) was applied. The public oriented organization must abide by these procurement rules. To ensure both quality and quantity of the targeted goods within the stipulated time frame some difficulties (wastes) are found in procurement process that make a bar to achieve the value for money in procurement. To eliminate these wastes the Government of Bangladesh 1stly introduced as Public Procurement Rules and Regulations in 2003 and then Public Procurement Act (PPA) 2006. The rules amended and revised in 2008. Due to introduction of PPR and PPA in the procurement system the waste reduction process improved and proceeded but its periphery didn't spreader. IMED (CPTU) under ministry of planning is being working in this issue by the grant of World Bank (WB). They established a web-portal for electronic government procurement (e-GP). This procurement system of is ruining now a days. The volume, nature, and type of procurement are changing rapidly in parallel to ICT uprising. To get qualitative products and effective services from the external sources or bidders in both national and international tendering system, the procuring entity can select the different methods of tendering. A number of discrepancies are found in preparation of tender document, tender evaluation criteria setting, TDS setting, PCC setting, preparing specification of the goods and in tender evaluation process, these discrepancies are generated or found in different organization in different way.

In case of private organization there is no particular rules and regulations in procurement process. They purchase their needed items according to their own set rules. They procure as per their needs

and choice from market directly or external or internal sources. There is no apex body or authority to control or monitor the private procurement system.

If we consider the investment amount of public and private development the total investment quantity will be about 77% of total investment in development which costs about 32 trillion USD. According to Bangladesh Investment Development Authority (BIDA) the private sector development budget with recommended amount of Tk.11,01,614.00 million, which stood at Tk.18,52,618.00 million in Fiscal Year 2016-17 for 1,745 projects.

A sustainable procurement can enrich the sustainable development. Sustainable procurement integrates requirements, specifications and criteria that are compatible and favorable for protection of environment, social progress and in support of economic development, by seeking resource efficiency, improving the quality of products and services and ultimately optimizing the costs.

The sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs. There are three pillars and 17 sustainability goals in sustainable development.

- (i) Social (recognizing equality and diversity, observing core labor standards, increasing employment and skills, developing local community benefits)
- (ii) Economic (efficiency, economic development, barriers to trade, open competition, fair treatment, non-discrimination, transparency) and
- (iii) Environmental (reduction of wastes, water quality, reduction of greenhouse gas emission and air pollution, preservation of bio-diversity and management of natural resources).

Only sustainable procurement can't ensure the sustainable development. The Sustainable Development Goals (SDG's) are determined for ensuring sustainable development. Sustainable procurement is a sub-part of these goals. All the goals are not feasible to apply for each country. The goal implementing factors are depended on the countries own social and economic safety developing nature and strength of financial position in comparison to the other countries.

The sustainable development goals are figured as follows:



Figure-1.1, Sustainable development Goals (SDG's)

- | | |
|--|--|
| 1. No poverty | 10. Reduced inequality |
| 2. Zero hunger | 11. Sustainable cities and communities |
| 3. Good health and well-being | 12. Responsible consumption and production |
| 4. Quality education | 13. Climate action |
| 5. Gender equality | 14. Life below water |
| 6. Clean water and sanitation | 15. Life on land |
| 7. Affordable clean energy | 16. Peace, justice and strong Institutions |
| 8. Decent work and economic growth | 17. Partnerships. |
| 9. Industry, innovation and infrastructure | |

If all the above goals are achieved the sustainable development can be possible to achieve. Achieving the above stated goals are the indicator of development level of a country. All of the above points of sustainability are not eligible to match for all countries of the world. According to countries development nature, financial conditions and social activities are the indicator of achieving the sustainability goals.

1.2 Statement of the problem of study

The research topic is new and has a view to attain a better perception of identifying the wastes in procurement construction contract in sustainable public procurement process that can play a significant role for ensuring sustainable development of a country.

In procurement contract the generated wastes are setting out the terms and conditions of the construction contract in contract document, completion time of the contract, poor risk identification of the contract, less social involvement and not considering the environmental impact of contract. The contract waste management in international contract is more difficult than that of local or national contract. In case of national contract, if the foreign bidder is selected then the waste reduction of the contract becomes more difficult due to the lacking's of poor terms and conditions of the contract.

This research is also knocking at the door of the government officials for realizing the level of understanding about the construction contract wastes generated in procurement process. Sustainable procurement is essential for sustainable development that pave the way of an effective elimination of construction contract wastes in the procurement process. Actually, the procuring entity himself are not interested to accept sustainability issues and not ready to adapt himself sustainability elements in procurement process due to different causes such as Financial, political, environmental etc. Generally, the adaption of sustainability increases the cost of the objectives that are required to procure.

1.3 Objectives of the study

Bangladesh is upgrading its position as a tiger (from under developed to developing country) in the world through its strong economy. The purpose of this study is to impart the developing factors by reducing the hindering elements from the construction process. To impart the development strength the objective of the study is to identify the contract wastes generated in construction contract and the probable way to eliminate the same for enriching procurement process that can contribute to impart infrastructural development of Bangladesh. The study also aims to determine the challenges of minimizing the wastes in procurement contract. The specific objectives are as follows:

1. To identify the wastes of construction procurement contract.
2. To identify the challenges of degenerating the contract wastes.
3. To eliminate the wastes of procurement (construction) contract that may contribute to enrich the infrastructural development of Bangladesh.

1.4 Methodology

To achieve the objectives of the study a mixed methods of literature review and questionnaire survey is undertaken where the researcher traversed the challenges of identifying the wastes in procurement contract and the techniques of elimination of the same from the procurement contract that will contribute a sustainable development of Bangladesh. Waste reduction in procurement contract for sustainable development includes the officials and organizations such as CPTU (e-gp), PE (Procuring Entity), Government intervention, activities of NGO's and the living beings. The literature review is required to understand the causes of waste generation in the procurement contract and the survey questionnaires included for both qualitative and quantitative data collection. The data collection is for clear idea and understanding the problem of the study, these data may be primary or secondary. The methodology of the study is briefly presented in the following flow chart (Figure-1.2).

Literature review:

- ❖ Definition of procurement waste,
- ❖ Root causes of procurement contract waste generation
- ❖ Impact of waste in procurement contract determine the path of eliminating waste.
- ❖ Sustainability element that enrich the development of Bangladesh.

Quantitative approach:

- ❖ Online base survey using google form to the targeted respondents.
- ❖ The targeted people are Project director (IQHDP), BARI, Project director (GCC), Project director (BRRI) Project director (NATA), Procurement expert of CPTU.

Analysis and findings of the study:

- ❖ Collection of information of the contract wastes as primary data and compare the same with information to the secondary data.

Conclusion:

- ❖ Findings, limitations and Recommendations.

Figure 1.2. The methodology of the proposed study in sequential frame work

1.5 Questionnaires survey

An online/telephonic/physically present based questionnaires are thrown to the selected respondents to identify the waste of contract and also the waste associated with procurement system. The survey aimed to find the root causes of the wastes exist in contract and the peripheral area of wastes in the development sector specially in procurement process.

1.5.1 Respondent and their selection process for questionnaires

The respondent selection process of the survey questionnaires is mainly depending on the type of questions and who can answer the questions. The major part of the waste in procurement is generated or exists in the policy making level such as organizations policy, countries policy, ethics of both organization and country. So, the respondent people are majority in senior policy making person and partially of implementing people. Generally, the procurement contract making persons of the organizations are the Project Director, Engineering wing, Deputy Project Director under the

guidelines of Central Technical Unit IMED (Implementation Monitoring and Evaluation Department), Ministry of planning. To take interview of the respondent the used method and questionnaires must be appropriate to the objective of the study. Due to their time and availability constraint, limited and appropriate questionnaires are required to ask them by using who, what, how, why, etc. Due to Covid-19 Pandemic the face-to-face questionnaires are not possible, so the online based (google plat form, whats app, telephone) questionnaires are sent/asked politely to the respondents and they sent/replied back the answer of survey questionnaires.

1.5.2 Questionary structure of the Study

The survey questionnaires are divided into four sections they are:

- Section A: Deals with personal and organizational information of the respondent
- Section B: Deals with root causes of waste type in procurement contract including goods, works and services.
- Section C: The questions related to the impact of the waste in procurement (in terms of cost, time and GDP of the country)
- Section D: Includes the basic knowledge of waste in contract, waste in procurement and waste in Development Bangladesh context.

The survey questionnaires are given in Appendix A.

1.6 Scope and limitations of the Study

The research area covers only procurement contract options in the particular projects (such as one projects of BARI, one project from NATA and one project from Gazipur City Corporation and also CPTU (CPTU adapts the Governmental policy, rules, regulations in procurement system through their web portal electronic government procurement). Considering Time and availability of the respondents and the key limitation of the study only 3 Project Director and two Superintending Engineers are interviewed in this survey. Due to some confidentialities all information may not be possible to address easily.

1.8 Structure of the Research (arrangement)

CHAPTER-1: Focuses on background of the study, statement of the problem of study, objective of the study, methodology, questionnaire survey, scope and limitation.

CHAPTER-2: Discussion about literature review of the research. This chapter will show a clear idea about the procurement waste, procurement contract waste and sustainable development waste and also possibility of adaptation of sustainable Construction contract which ensures sustainable development of Bangladesh.

CHAPTER-3: Analyses of the findings of this study.

CHAPTER-4: Provides conclusion and recommendations of this research

CHAPTER-2

Literature review

In ancient time the people traded goods by exchanging other goods through their traditional commitment. This system continued for a certain period. After a sometimes the both parties derailed from their commitment and an adversarial relationship was formed, to ensure the commitment some terms and conditions were required to adopt in black and white which were enforceable by law. To solve these issues the contract law was created and modified chronologically day by day which enriched in parallel to time horizon. The rules and acts were introduced in contract management and implementing process and were upgraded time to time which reduced the wastes in procurement (*The Basic Provisions on the Conclusion of a Contract, Article 433*). Still now the wastes in contract are not eliminated totally. According to the imagination of “*The lawyers and jurists*” the wastes in procurement are not possible to eliminate due to change of contract type and nature and type of generating contract wastes. The waste nature changes parallelly to the improvement of law-and-order situation. Use of improved technology and advanced modern traditional activity reduced their trustiness in each other that’s why they could not believe each other, this was not only in business contract but also in all cases of social life and economic activity. These procurement obstacles and challenges are increasing day by day exponentially. Procurement Contracts are the small part of procurement process. Before contracting some previous activities are required to perform by the procuring entity.

2.1. Procurement and sourcing

Sourcing is a part of procurement process for purchasing goods and services from an external source like a third-party vendor or supplier. It is the process of agreeing to the terms and conditions for acquiring goods, services or works from the source via tendering or any other competitive bidding methods. For manufacturing or buying goods procurement process must be involved in both parties under some conditions of contacts (www.hrzone.com). The goals of procurement are to provide efficient, transparent and equal opportunity for all bidders to ensure fair and effective use of public funds and resources. The main goals of the government purchaser are to provide service with appropriate quality of goods and services at a competitive price and to ensure a good value for money (VFM) and minimize the wastes in procurement process such as corruption and

favoritism in selecting the contractor/supplier. Before contracting, there are some procurement activities required to perform by the procuring entity (PE). According to generic procurement cycle the contract function started after completing 5 steps in the procurement cycle (*taulia.com*).

In a seminar (seminar was held in the conference hall of Bangladesh Institute of Management in June 2007) Director General (DG) of Central Procurement Technical Unit (CPTU) said that around the world the procurement system is updating tremendously. The upgraded procurement system is effective, transparent, qualitative and innovative through appropriate use of advanced technology such as e-procurement. Bangladesh is not behind of this system. From the year 2006 our country introduced a web portal for electronic government procurement (e-GP) (www.cptu.gov.bd) through CPTU, Ministry of Planning (MOP).

E-Procurement has adopted only in government sector of Bangladesh but till now the private organizations did not show interest to adapt e-GP system. They are still interested to remain with traditional (old haggard) procurement system such as manual procurement process. e- Procurement adaption in private sector is a challenge. The improved procurement process (e-gp) can be implied in the private organizations by showing the value gain of this process (such as in construction sector) by using e-procurement. The foreign construction companies are using web-based inter-organizational information systems (IOISs) (Cash and Kosinski, 1985) to support their inter-organizational processes with their key suppliers (Oyegoke *et. al.* 2009). The generic procurement cycle are as follows:

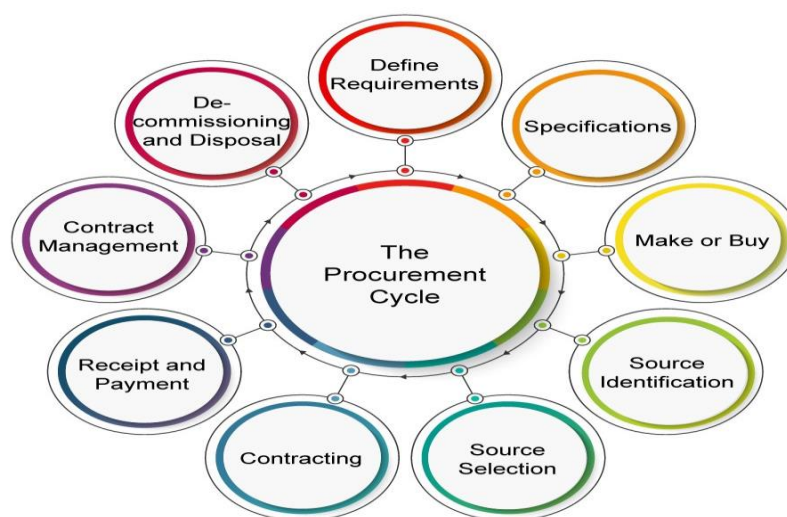


Figure-2.1, The Generic procurement cycle. (source: www.distancelearningcollege.co.uk)

1. **Define requirements:** The business should identify the need for new product. This would be a new or re-order. It is important to identify that the needed products will play an important role in the management process efficiently through the procurement cycle.
2. **Specifications:** It shows a clear description, detailed plan and how the product is made. It is the primary idea about the product which is mentioned in the specification.
3. **Make or buy decision:** It is a policy making decision of management people. The authority considers the cost-benefit, economic, uniqueness of the product, replicability of the product and all other elements related to product's demand and acceptability to the customer.
4. **Source identification:** The identification of sourcing includes the procurement system with the special terms and conditions introduced for both buyer and supplier.
5. **Source Selection:** Source selection is required for both buying or in manufacturing the product. There are different methods of selection of sourcing. These are different types of tendering methods Like OTM, LTM, RFQ, OSTM, TSTM and direct procurement Method (DPM).
6. **Contracting:** A contract is a legally written or oral binding document between two parties that defines and governs the rights and duties of the parties to an agreement. It is enforceable legally and meet the requirements and approval of law.
7. **Receipt and payment:** The supplied contracted products or goods should be checked against purchase order and make a delivery note immediately after delivery, any discrepancies or damages recorded and the delivery note initialed to show that this had been done. The delivery note would ensure that the delivery was according to the purchase order. All invoices were checked with the purchase order and delivery note which ensures that the goods were received according to contract or purchase order. If supplied goods satisfy all the requirements of contract documents then the payments (checks) are made and disposed to the supplier.
8. **Contract management:** Included the negotiation of contract terms and conditions during implementation of the contract as well as the changes or amendments arose during execution of the work are agreed by both parties in the contractual process. Managing contract are the creation, execution, and analysis for the purpose of maximizing financial and operational performance of the organization.

- 9. Decommissioning and disposal:** After full use of the equipment/goods if these are not repairable or repairing cost would not be cost-effective then the machineries are deactivated from the operation process and these are then termed as debris or wastes of the organization and required to dispose them to a safe place to save the environment (www.distancelearningcollege.co.uk).

2.2. Contract

Contract is a part of procurement process. The procurement has a greater periphery which includes some previous procurement activities before creating a contract. It is an agreement between two or more parties with legal bindings.

2.2.1. Legal definition of Contract

The legal definition of “contract” is formalistic. The statement said a contract is a promise or a set of promises for making breach of it which the law gives a remedy, or the performance of which the law in some way recognizes as a duty. According to Uniform Commercial Code “The Contract is the total legal obligation which resulted from the parties” it is an agreement affected by this Act and any other applicable rules of law. To reduce the hassles in contract the both parties are leaving themselves in a wide open for potential hassles that assigned and agreed upon contract would be eliminated. The major elements are considered to sign contracts must follow the rules that is legally accepted (www.britannica.com).

2.2.2. Conditions of a Contract

In contract there is an offeror who makes offer to enter into a contract with an offeree. The offeror offers to perform something such as a particular works/goods/services and if the offeree accepts this offer, then a contract is created. Both offer and acceptance might meet certain conditions.



Figure-2.2, The offer and acceptance in contract (source: courses.lumenlearning.com)

2.2.3. A contract is legally enforceable

If one party failed to complete what he/she had promised to do, the other could sue to the court to enforce the agreement or award damages for injury sustained due to the contract had breached. The promise made under the contract had not been kept or an act that had not been performed. A contract could be enforced only if it meets four requirements viz. Agreement, Consideration, Contractual capacity and Lawful object (www.britannica.com).



Figure-2.3, The Construction Contract implementation (source: Google.com)

2.3. Contract wastes

In procurement process the construction claims are called the wastes in contract. Actually, these are the understandings of the both parties involved in contractual terms, adversarial communication and understanding causes of claims. *Semple et.al. 2009* identified the critical elements in construction contract, investigating the causes of claims, categories of compensation of claims and quoted claims by studying similar contracts of other institutions. Sometimes, the construction contracts took long time, complex document, consequently the disagreement or disputes could arise in contractual obligations or expectations from both parties, when one party feels that the contractual expectations had not been meet the demand and they felt that they deserve monetary and time compensation, they might submit a claim to the respective authority (*Canadian Law Directory*).

Currently, the construction sector of Bangladesh such as Public Works Department (PWD), Roads and High Ways (RHD), Bangladesh Bridge Authority (BBA), Local Government Engineering Department (LGED) raised a number of disputes due to legal ground. Bangladesh is a growing up country, so the development activities (construction) had lots of competition for getting the project work among the contractors (bidders). The contractors are bidding less price and claiming more amounts. A client always tries to reduce overall costs of the project on the other hand the contractors tried to earn more profits from the contract at any cost, as a result, disputes are raised rapidly. Every claim put presser on client mentally and sometimes physically. It effected on increasing property price. That is why construction claims are considered as the most unpleasant event in construction industry. Disputes and claims can be reduced by appropriate arrangement of scope of work in contract document. Contract document is only the document which explains all roles and liabilities of both parties involved in it (www.jimersonfirm.com).

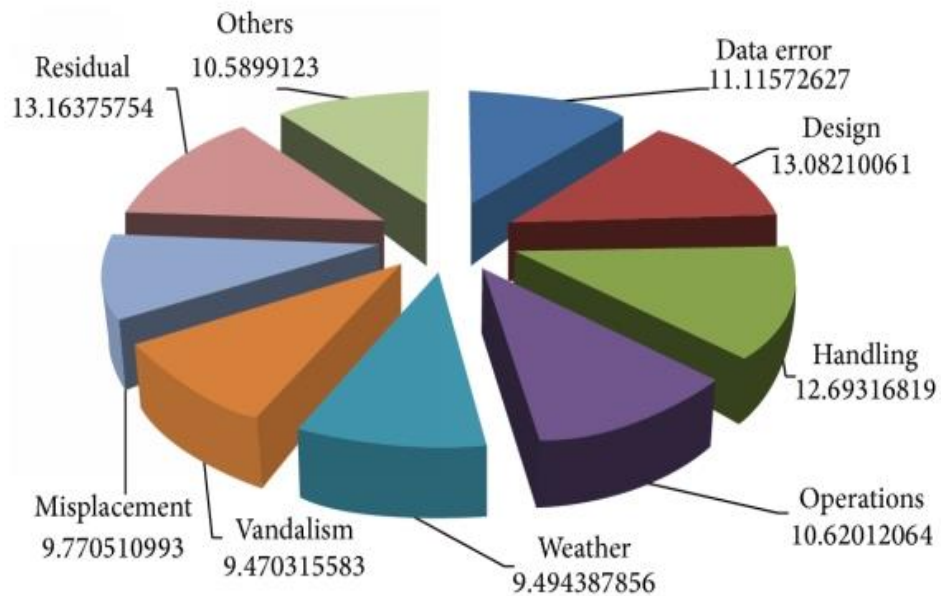


Figure-2.4, The types of construction waste (source: slideplayer.com)

2.4. Contract document sections in construction works

The following briefly described the Sections of Standard Tender Document and how a Procuring Entity should use these documents for preparing a particular Procurement contract (*Standard tender document PW 3, cptu.gov.bd*).

1. Instructions to Tenderers (ITT)
2. Tender Data Sheet (TDS)
3. General Conditions of Contract (GCC)
4. Particular Conditions of Contract (PCC)
5. Tender and Contract Forms
6. Bill of Quantities
7. General Specifications
8. Particular Specifications
9. Drawings

2.5. The goals of construction contracts

There are five goals in construction contract. These goals are Progress goal, Quality goal, Safety goal, Environment goal and Cost goal. The main goal is getting good and perfect quality of goods at a reasonable cost without any hassle.

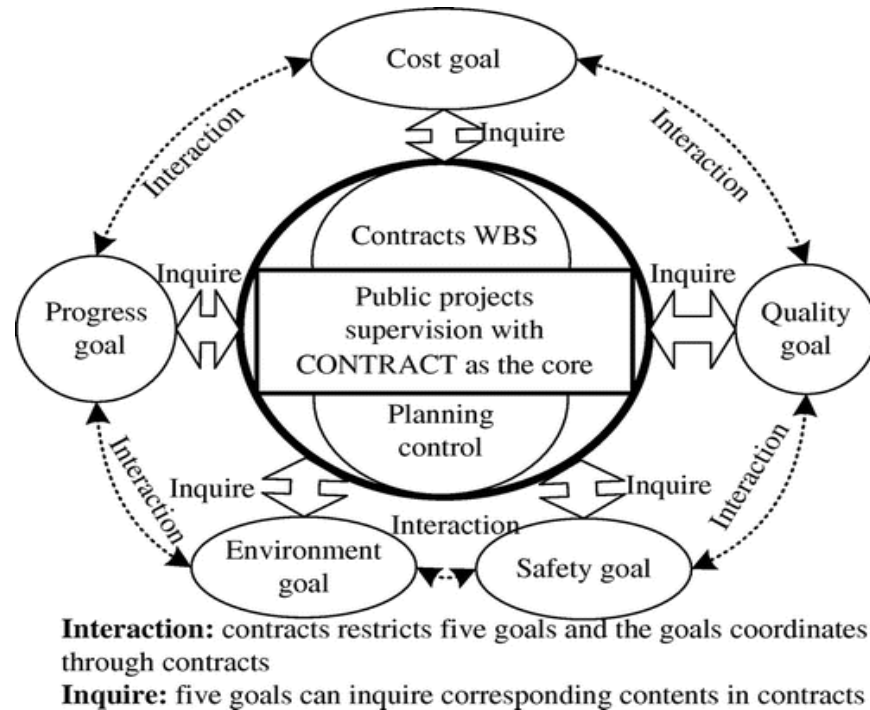


Figure-2.5, The Goals of construction contract (Source: <https://ascelibrary.org>)

2.6. The importance of construction contracts:

The Construction Contract plays an important role to form agreement that is recognized as binding by the law of contract and the parties can establish their rights and obligations in the knowledge that these rights and obligations can be enforced during contract disputes. The importance of contract in commercial relations is surprising that those procuring and providing work in the construction industry often deal with the inadequate information of their contracts. This lead not only to uncertainties about what was agreed and when but also create disputes about whether a binding agreement was concluded at all and legally enforceable obligations were created to complete work or to pay for it. Such disputes can arise during the work as well as after it was completed (*Bangladesh's Economic and Social Progress*).

2.6.1. Contractual terms used in contract formation

The obligations that the both parties are accepted when they conclude a contract that are contained in its terms and conditions. The terms used in contract document are Expressed Terms and Implied Terms (*the Sale of Goods Act 1979*).

2.6.2. Express terms

Express terms are those that the parties expressly stated in details when they make their contract document. Express terms are in written form and it might also be oral. Oral terms might be evidenced in writing according to the law.

2.6.3. Implied terms

Implied terms are the government rules which are not needed to include in the contract document. These are considered as written in the contract document and both the contracted parties must follow the implied terms of the contract.

2.6.4. Exemption clauses

In emergency case the exemption clause is introduced in a contract by one party usually it may be the Government or bank or other large financial donor agency but not invariably the party proposing the terms of contract seeks to avoid or exempt itself from what would be its obligations or liability under the contract. Exemption could work indirectly by restricting the enforcement of obligations under the contract.

2.7. Construction sector in Bangladesh where contract wastes are produced

Construction industry itself is a complex and vulnerable industry to generate different types of construction contract wastes. This chapter is based on literature, describes different types of contract waste in construction project and overall impact on project costs, time schedule, productivity, quality and profit. The common tools related to contract wastes and their impacts are discussed at the end of this chapter based on construction techniques and past research experience. The construction work of a country is the sign of its growth and shows the socio-economic condition of a country globally. The development activity shows the country's position and prestige to the other countries. So, construction industry becomes a booming industry in the world.

There are different types of construction work. In urban area construction of real estate properties, repairing and maintenance. This sector included basic categories of construction work namely (Economy-watch 2010)

1. Heavy and Civil Engineering Construction: Construction of large projects such as Multipurpose Bridge construction, Highway Road, Barrage construction, etc.
2. General Construction: These constructions are included Residential, commercial and real estate assets construction.
3. Construction projects involves specialty trades: These are construction work related to specialized building like Greenhouse, Cold room, Growth chamber, Electric power station, Heavy production industry, etc.

According to Lancinate market research report (December 2017) the future global construction industry omens good with the growth in development of residential and non-residential infrastructure. The global construction industry is expected to reach an estimated cost US \$10.5 trillion by 2023, and it will be forecasted at a compound annual growth rate (CAGR) of 4.2% from 2018 to 2023. The growth of construction industry will be increasing due to urbanization and rapid growth of population. They included increasing demand for green construction to reduce carbon emission, bridge lock-up device system to enhance the life of the structure, building information systems for building efficient management, and the use of fiber-reinforced polymer composites for rehabilitation of aging structures (Lancinate, 2017).

2.8. The wastes are found in contracts

In construction industry there are two types of wastes generated. One of them generated during implementation of the contract and pollute the environment and the other is generated during contract processing and also at the time of implementation of the contract and pollutes the social, economic and ethical environment. The involved parties in contract process created wastes in contract. Sometimes the outsiders become key players for generating contract wastes and responsible for creating construction contract wastes in the procurement process. Generally, the client always tries to reduce contract wastes but the other party (contractors) always try to earn more profit, to achieve more profit they try to find the weak point and take advantages of these weaknesses of the contract document. Sometimes the wastes generation in construction contracts

due to lack of Co-ordination and communication. Construction nature, complexity, Uniqueness, and labor intensity are the causes of creation of contract wastes (Hogan & Hart son 2008 The Construction Contract Procedures Part B (VOB/B) in German and English languages).

2.8.1. Participants involved in creating construction contract wastes

Every project is associated with plenty of participants such as client, architect, design Engineer and contractor through its process. Each of them has different role in construction sector. Due to different level of skillness and knowledge there may arise an adversarial relationship among them which causes negative impact (wastes) on the contract, sometimes political influence and pressure, may be the cause of waste generation in construction contract (STD PW-3, CPTU, www.cptu.gov.bd).

2.8.2. Construction management (CM) approach

A project manager works on behalf of owner. He offers his full support that starts from initial bidding process and it contributes to improve competitiveness in core business. The traditional construction management system carried out informally and leads to difficulties in managing the onsite supervision and schedule of management; Cost control and cash flow projections to the field review and project completion and hand-off. The project manager is well known within the construction industry and suitable for building a close relationship in the project, the construction management approach allows owners to know exactly what they need and what they are paying for through separate contracts with the construction manager and the contractors. The payment based on fixed fees.

Different projects have different approaches and multiple factors can impact on owners route the following guides to take right decisions in construction management approach (www.rdh.com). These are as follows:

1. More control over the project
2. The project scope would be more than one.
3. There must be a strict budgeting system.
4. Restricted timeliness is essential.

2.8.3. Lowest bid winner

Competitive bidding is the most popular tendering method applied in contractual management system. In this method the contractors provide rate quotes of the intended objects and the lowest price bidder wins and become successful for supply the client's objective. Sometimes this lowest rate is unprofitable to them as a result, they (the contractor/supplier) lack willingness to co-operate and co-ordinate with the client and achieving the objective according to the contract becomes very difficult (Global Journal of Management and Business Research, By Tariq Hussain Khan & Abdul Qadir Khan Army Public College of Management Sciences, Pakistan).

2.8.4. Multilayer subcontracting

It is almost impossible for a contractor to control all related tasks in the larger complex project. It will require more than one layer subcontracting management. There are tiers of subcontractors like 1st tier, 2nd tier and 3rd tier. These subcontracting can't be managed effectively due to lack of adequate controlling and supervision by the main contractor, over the subcontractor's work that increase complexity of communication and poor information flow which lead poor coordination of the contract. Lack of co-ordination, lack of skilled manpower hampered the completion of the project (www.researchgate.net.com).

2.8.5. Making Changes in contract

During implementation of the contract some unavoidable circumstances are created this critical clause allows the owner to change the work dimension that includes plan, specifications, and schedule time of performance, means and methods. If there arise any discrepancy in specification or in design, drawing this clause will help contractually to correct discrepancy with required adjustments. However, changes can result positive or negative variation in construction Industry (Dr. JR Chowdhury in Engineering conference of IEB).

2.8.6 Awareness of responsibilities

The owner's responsibility is project funding, required necessary permits, easy site excess etc. Contractor's responsibility is to complete the work within the stipulated time according to demanded quality, materials and other services required for smooth flow of the project. Submitting bills based on terms of contract documents (www.cohenseglias.com/contracting-database/responsibility).

2.8.7. Delaying in contract completing:

Delaying in contract is “Excusable delay” and “Non excusable delay”. Excusable delay means that the contractor’s performance time is extended due to excusable delay that is neither extension of costs nor to impose the late completion damages. If contractor delays in completing contract willingly the contractor required to make up the lost time and pay late completion damages (*PW-3 STD, PPR-2003*).

2.8.8. Differing Site Conditions or Changed Conditions

When the contractor and the client are encounters each other materially this clause provides an adjustment to the contract according to the performance of the work. This clause will give relief to the contractor when he will differ in site condition (raining or any other natural causes). These are enforcing events no one can predict these events. In this situation, this clause is very important in construction industry to restrict the contractor’s claims.

2.8.9. Force Majeure

According to the statement of standard tender document of CPTU the contracts may affect the force majeure so that the work caused delay which is beyond the control of both the client and the contractor. The natural calamities, acts of government, civil disorder, acts of war, adverse weather, fires, floods, strikes, etc. are the example of force majeure. These are excusable in procurement contract which has a great impact on construction contract.

2.8.10. Political Culture

According to the opinion of WB sometimes the ruling government implies additional terms and conditions (new tax provision, new order for restriction, limitation). Politically powerful interest groups exert influence over the contract. Their influence can therefore lead to a situation that managers enforcement authority is to undercut (WB report).

2.8.11. Corruption

Corruption is the result of weak state management and it exists when individuals or organizations have monopoly power over goods or service, discretion over making decisions, limited or no accountability and low level of income. World Bank describes corruption as “the abuse of public office for private gains”. James D. Wolfensohn, President of the World Bank in 1996, at an annual meeting declared that to achieve growth and poverty reduction in developing countries “we need to deal with the cancer of corruption”. A study on 69 developed and developing countries in 2005 by Transparency International (TI) Global Corruption Barometer found that 75% of the respondent said that political life affected by corruption in their countries are moderate or large in extent, while 65% said it affects the business sector and another 58% said that corruption is affecting their personal life directly (Vinay,2004). Corruption is an old age problem.

Mr. Klitgaard (1998) defined corruption as: $C = M + D - A - S$.

where C = Corruption,

M = Monopoly

D = Discretion

A = Accountability

S = Salaries (public sector)

The formula states that corruption is directly proportional to monopoly and discretion, and inversely proportional to accountability and salaries.

2.8.12. Late Completion

Due to late completion of the project the client faces two types of late complication. One is actual damages and the other is liquidated damages. When late completion creates losses to the revenue, increased Engineering involvement and project cost which is the ultimate loss of project achievement. Liquidated damages are expressed terms in contract document where the contractors have to pay a fixed amount to the client due to creation of damages in contract through delaying in completing the contract i.e., contractors’ fault if there is no justified excusable cause. The imposed fine is daily basis or on the percentage of contract value and not need to prove actual incurred damages (PCC, STD, CPTU)

2.8.13. Payments on contract

This is a key contract clause in terms of project cash flow. This clause sets forth how often the contractor is to be paid, in what manner, and what are the conditions precedents to the issuance of payment. In construction it helps the contractor to manage finance before commencement of the project. Delaying payment is the causes of late completion of the contract (*PW3, STD, GCC, CPTU*).

2.8.14. Quantity Variations

All contracts contain an estimated quantities that to be supplied. In the event as estimated bid quantity may vary substantially up to 25% for individual item but the total amount will not be more than 15% of the contracted price. Many contract documents didn't contain the quantity variation clause which allows either the owner's or the contractor's request a predetermined bid price that affect the contract (*e-GP, CPTU*).

2.8.15. Suspension of Work

The contract suspension case is created due to major variation of contract nature or financial crisis or any other impact of natural calamities. This clause allows a client to suspend or stop all or some parts of the work. Such clauses provide some adjustment to the terms of the contract including a time extension and delaying of payment. However, the recovery of time and cost limited by the contract terms. Often, if the actual cause of suspension order is something for which the contractor is responsible (unsafe work conditions, work not in compliance with contract requirement, etc.) no recovery time or cost is allowed. This clause gives the owner choice to delete the some or whole part of work with legal way (www.belmontconstruction.com).

2.8.16. Termination

Almost all contracts have a provision allowing the owner to end, in whole or in part, of the work prior to project completion. This type of termination is called Termination for convenience. This type of termination occurs when the client decides to stop the project as designed or situations might arise if the owner need changes or project financing fails, or if the project economics changes substantially. In such circumstances, the owner may terminate the contract for convenience. The other type of termination is Termination for default. this default arises only when a contractor is

found to be in guilty and material breach of contract, and failed to remedy the breach in timely. Then the owner will terminate the contract from the project and call upon the contractor's financial guarantees as compensation due to breach of contract(www.belmontconstruction.com).

2.8.17. Defects and Liability

Defects Liability Period starts from Completion date and handed over the procured goods of the contract which is defined in the contract document. The Defects Liability Period shall be extended for as long as Defects remain to be corrected. The supplier or manufacturer for selling the defective products are liable (*STD, CPTU*).

2.9. The role of construction in national development

The construction industry plays a vital role in socio-economic development that are illustrated below in figure-1. This industry makes a direct contribution to the economic growth of a country. This sector also provides the physical facilities for different sector like health, education, communication navigation etc. There is a great employment opportunity generated for both technical and non-technical personnel. The construction sector increases the economy of other sector such as manufacturing, transport (roads, buildings). The construction activity demonstrates the gross domestic product (GDP) from 3% to 8% and increase national employment 2% to 10% (*Turin study in 1973*). The contribution of this sector to a country's economy concerns the relationship of a country's development and the level of activity in the construction sector. Macroeconomic studies tended to concentrate on developing countries (*Turin; World Bank; Wells; Bon*). The idea is an inverted 'U' relationship between construction activity and the level of per capita income (at early stage of development, the share of construction increases but ultimately declines, in relative terms, in industrially advanced countries) was put forward by Bon and has been empirically tested by Ruddock and Ruddock and Lopes (*As noted by Tan*) 'In low-income countries, construction output is low. As industrialization proceeds in 526 factories, offices, infrastructures and houses are required, and construction as a percentage of gross domestic product reaches a peak in middle income countries. It then tapers off as the infrastructure becomes more developed and housing shortages are less severe or are eliminated.' According to the study undertaken by the CIB project group, after allowing for cyclical fluctuations, the general trend in construction activity in every

developed country is for construction activity to be in relative decline. The role of construction is figured as follows (Figure 2.6).

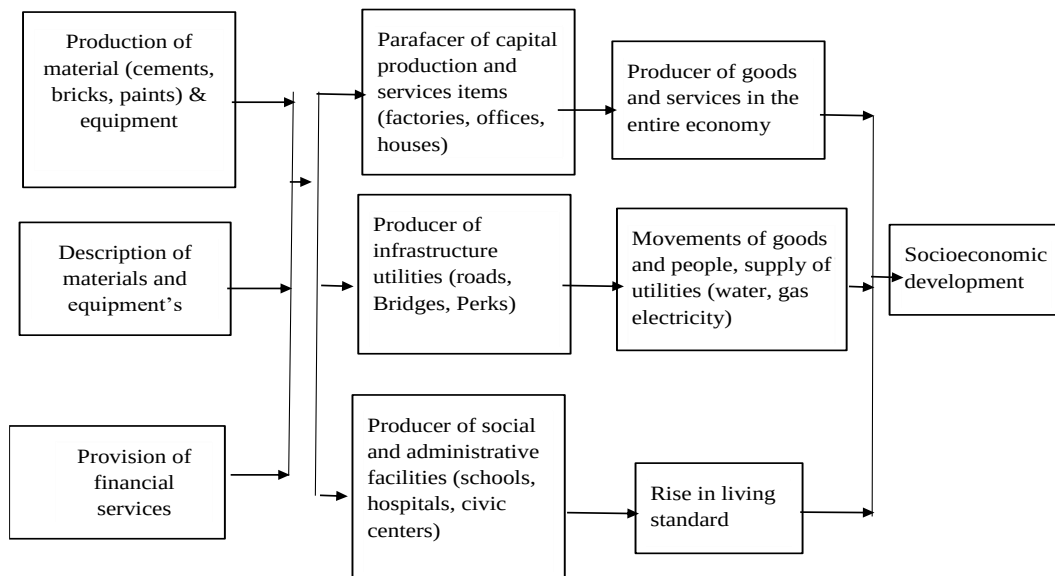


Figure-2.6, Role of Construction in Development (Source: Ofori, G)

2.10. The Challenges are facing Bangladesh of infrastructural contract waste generation in Bangladesh

According to Ashraf Ali, M Faizul Islam and Ruhul Kuddus (*Issues of Bangladesh development*) the developing challenges that Bangladesh faces are as follows:

1. Poor and unrealistic project planning
2. Lack of accountability
3. Corruption
4. Lack of stakeholder's involvement
5. Duplication of efforts.
6. No actual measure to evaluate quality.
7. Inadequate management skill
8. Poor inconsistent project management discipline.
9. Favoritism

Our study focuses on enriching the infrastructural development through eliminating the construction contract wastes. The above stated wastes are the main barrier to enrich and increase the infrastructural development activity in our country. The stated wastes can't be fully eliminated but these can be reduced at a minimum level under a control and it may be bound in a limited space.

2.11. Sustainability in construction

Presently the construction industry is facing an unescapable challenge by the term “sustainability”. The construction industry is considered as the largest industries for both developed and developing countries in terms of investment, employment and contribution to GDP. The environmental impact of this sector is also significant. The World Commission on Environment and Development produced a publication as the ‘Brundtland Report’ (*WCED, 1987*) which described the sustainable development as meeting the basic needs of all people and extending to all opportunity to satisfy their aspirations for a better life without compromising the ability of future generations to meet their own needs. The term ‘sustainable construction’, proposed to describe responsibility of the construction industry to attain sustainability’. By designing and securing sustainability best practices into the procurement process (supply chain, manufacturing, and work conditions) and by stabilizing the communities within which they function the business ensure strong, long-term sustainability of the bottom line of the business (Therma.com). Sustainability is a long-term concern but improving and maintaining sustainable best practices in procurement process can be a significant challenge. Built up the bottom line easier when fully understand the 3 pillars of sustainability and choose the right one to guide in making decision through the procurement process collaboratively. The three pillars of sustainability are as Environmental protection, Economic viability and social equity (Fig-2.7).

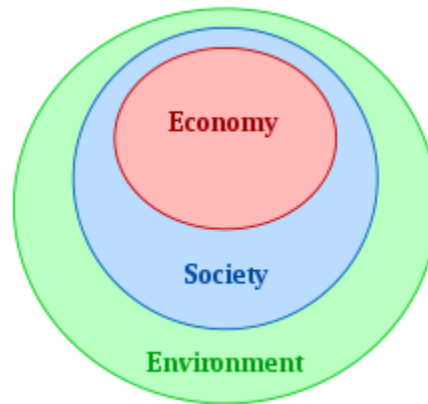


Figure-2.7, The **pillars of sustainability** Source: Sustainability Journal

The first International Conference on Sustainable Construction was held in November 1994 in Tampa, Florida, United States of America. The major objective of the conference was `to assess the progress in the new discipline that might be called “sustainable construction” or “green construction”. Green design principles are adopted in design phases of construction that leads to sustainable development. The principal effect on design is to provide sustainability in construction works. “Green design” tends to use environment friendly products and processes.

Hill and Bowen figured out a framework for attaining sustainability in construction. They outlined two multi-stage frameworks which would lead to sustainable construction. These are Application of Environmental Assessment (EA) and Implementation of Environmental Management system (EMS). In planning and design stages of projects, sustainability elements in construction contract are required to adopt and that can be achieved by applying the green principles, procedures and methods of Environmental Assessment. The EA ensures the efficiency which is the key criterion in proper use of water, energy and land. ‘If the construction industry is considered globally, it is the largest consumer of materials on Earth. The consumption means that the process, and use of materials in construction sector has a major impact on the environment. Economists, Engineers and Environmentalists have devoted to determine the ways of measuring of this impact. A number of indices of impact have been devised are numerical data, which can help in decision making. Qualitative assessments are useful to quantify the impacts of materials consumption. The concept of sustainable building incorporates and integrates a variety of strategies during design, construction and implementation of building projects. The use of green building materials and products represents important strategy in building design. The overall performance of construction

is the most important consideration in achieving more sustainable construction. Green materials increase the socio-economic prosperity. Materials selection for design and construction based on economic and technological considerations, it must meet ecological, health, and ethical impacts in design. The methods should allow comparison not only the technical performance and costs of materials, but also the immediate and long-term impacts of their use. These impacts comprise a measure of sustainability of materials and should be given consideration during preparation of materials specification.

2.12. Benefits of sustainable infrastructure

The characteristics of sustainable structure may vary depending on specific type of project. Sustainable infra-structure is generally expected to generate social, economic and environmental benefits throughout the lifecycle of the structure. Based on a review of the literature which focuses on three types of benefits (*Bhattacharya et al., 2016; Bielenberg et al., 2016; NCE, 2016; IISD, 2017; United Nations, 2017*) which provide a categorization that is useful to determine the sustainability consideration that can be integrated into infrastructure projects and ultimately how infrastructure contracts can contribute to achieve sustainability goals.

2.12.1. Economic benefits

Chief Economist of Asian Development Bank *Mr. Shang-Jin Wei* opined that high economic growth in Bangladesh indicates the country's continuing improvements in political and business environment. They assess the final happiness, prosperity, definitive satisfaction, thriving, even sadness and poverty, of the people based on those statistics. For instances, the planning ministry of Bangladesh claimed that in the fiscal year of 2016-17 the country's GDP growth would hit a record 7.24%. The National Economic Council also remarked that this would beat all previous records of development in Bangladesh.

The management professionals state (*Eduardo Mondlane University, Campus, GIU, P. O. Box 257, Maputo, Mozambique*) that infrastructures are economically expected sustainable to

- Optimize value for money for government, investors, taxpayers and users.
- Create employment opportunity for skilled and non-skilled person.

- Boosting green economic development through creation of core infrastructure in different economic sector.
- Build the capabilities of and create opportunities for local suppliers and developers. Guarantee reasonable returns for investors across the lifecycle of the project.
- Promote research and development activities, and technological innovation and make change, especially in green technologies, across domestic and international value chains. Increase real estate value for property owners in the vicinity of the project.
- Enhance capital and labor productivity. Crowd-in domestic investors and businesses, including small and medium-sized enterprises.
- Increase productive foreign direct investment (FDI) and domestic value added.

2.12.2. Social Benefits

According to *T. Pohlman* (U.S. Department of Defense, Washington, D.C) infrastructures that are expected socially sustainable to

- Generate income facilities, particularly for low-income households.
- Create jobs, including the generation of new specialized green jobs.
- Build skills and provide for mid-career up-skilling and re-skilling, especially in relation to improve productivity and green technologies.
- Contribute to reduce poverty and socioeconomic inequality.
- Meet and exceed compliance with core labor standards and human rights, contribute to improve in working conditions.
- Be inclusive, affordable and accessible to all economic strata in cities and rural areas.
- Engage all stakeholders positively or negatively affected by the infrastructure investment (particularly low-income households and other disadvantaged communities) decision-making, including informed prior consent.
- Provide for accessible and inclusive grievance and dispute settlement mechanisms available to all stakeholders affected by the infrastructure project, free of intimidation or retribution.
- Foster transparency and accountability of businesses that build, operate and manage infrastructure projects.
- Provide for safeguards against bribery and corruption.

2.12.3. Environmental Benefits

According *Brian Lagas (10 September 2015)* the infrastructures that are environmentally sustainable is expected to

- Limit and lower air, water, soil and all other forms of pollution.
- Provide for the stewardship of ecosystems.
- Contribute to ecosystem and biodiversity management and conservation.
- Enhance ecosystem services provided by green infrastructure.
- Promote and use clean and environment-friendly technologies.
- Support the conservation and the sustainable and efficient use of natural resources, including water, energy and materials.

2.13. Principles of infrastructural development activities

According to Supply Management (*CIPS,2021*) there are eight sustainable construction principles. these are as follows:

1. Seek a clear public commitment to sustainability at the highest level of organisation.
2. Prepare thoroughly in early consideration of sustainability.
3. Set specific, clear, and challenging sustainability targets from the outset.
4. Be an intelligent client to get the right people on board, define the project and set the budget.
5. Embed sustainability objectives throughout the team and supply chain.
6. Identify and use low impact, responsibly sourced products and materials and ensure good supply chain management.
7. Create a structure that supports a collaborative approach while maintaining an environment of challenge.
8. Organize procurement so that services can be shared.

2.14. Development indicators

According to *Mary Ikande (December 11, 2017)* the development indicators of a developing countries are as follows:

1. Air and noise pollution



Figure 2.8. Development indicators

2. Disease Control
3. Food and lifestyle
4. Chemical substances
5. Biodiversity
6. Innovation and new technology
7. Gender equity.

2.15. Sustainable construction contract enriches the infrastructural development of Bangladesh

Sustainable construction contracts contain a complete overview of the latest know-how on sustainability and durability of materials, buildings, and structures throughout the entire life cycle. It targets the players in planning, design and implementation process and discuss several models used to describe contractual and environmental impact, emphasize the appropriate uses of materials, energy and water. Contractual and environmental criteria are specified with a view to minimize the negative impact when taking technical on-site performance. In sustainable contract there exists minimum or limited contract wastes so that the construction contract activity (such as project planning, contracting, operation and implementation works) will run according to schedule

time without any hassle, there exists minimum disputes, no major barriers to implement contract, the project output achievement will be smoother, the contract plays as asocial, viable bearable, economic and environment friendly. It reduces the waste creation through proper planning, procurement contracting, effective operation and implementation management which increase the performance of the contract and ultimately enriches the objective achievement of the project. The objective achievement of all the project increases the service achievement which is directly related to the social and economic development, this is ultimately impacted on the development indicators (such as Gross Domestic Product (GDP), Gross National Product (GNP), Birth and death rates, The Human Development Index (HDI), Infant mortality rate, Literacy rate, and Life expectancy of the people) of Bangladesh that will enrich development. According to world Bank classification (2020-21) Bangladesh is upgrading its economical position from lower to lower-middle income country for its satisfactory economical achievement. The classification based on Gross National Income per-capita in US dollar (\$1036-4045). The view of this country is more updating and improving the social, environmental and economic activity through reducing the wastes in different field and achieving the target to increase GDP of per-capita income. This will make our country as a strong economic position in comparison to other countries.

CHAPTER-3

Data findings and Analysis of this study

This Chapter is represented analysis of collected data through questionnaire survey from respondent of different departments and provided information in detail from the survey. Due to Covid-19 pandemic the questionnaire was sent to the respondent through e-mail, Telephone and Google platform. The questionnaire survey was done to find out the causes of generating construction wastes and its impact on development of our country. The main problem was to identify the challenges of determining the construction contract waste, if the challenges were identified then it would be easy to solve and eliminate the causes of waste creation in the construction contract.

3.1. Analysis and Findings of the study

The questionnaire was served to three Project Directors (One from BARI, one from NATA & other from Gazipur City Corporation), two Deputy Project Directors one from BRRI (Bangladesh Rice Research Institute), one from BARI and one Executive Engineer from Local Government Engineering Department (LGED) and a Director from CPTU, all are mostly procurement practitioners and are related to implementing the contract agreement and they are different -level government officials. The data had been collected through answering the questionnaire from the respondent in order to achieve the research objectives of the study mentioned in chapter-1. The questionnaires were designed as a set of questions which covered the challenges of construction contract during implementation for achieving development of our country.

3.1 (a) Questionnaires in section A

This section was dealt with general information and experience of the interviewed personnel in the procurement and engineering sector where mentioning the name of the respondent was optional so that the respondent might feel free to participate in the survey.

3.1.(b) Questionnaires in Section B

Questionnaires included the basic knowledge of contract waste in construction contract, wastes created in procurement process, risks are found in procurement process and the contract wastes that hinders the Development of Bangladesh.

3.1. (c) Questionnaires in section C

Questionnaires in this section were dealt with the root causes of generating construction contract waste, type of contract wastes that was created in procurement process including goods, works and services procurement, elimination of these wastes from the procurement process.

3.4 Questionnaires in Section D

Questionnaires were asked to the respondent about the impact of these construction contract wastes in development of our country. How the development issues were influenced by the contract wastes in procurement (in terms of cost, time and GDP of the country) process.

3.1.1. General information of the Respondent (Section-A)

In the study total 21 officials had been interviewed including 1 female respondent. Among them 4 were high officials, 6 of them were mid-level officials and the rests were lower-level personnel that consisted of 95.25% male and 4.75% female respondents (Figure-3.1).

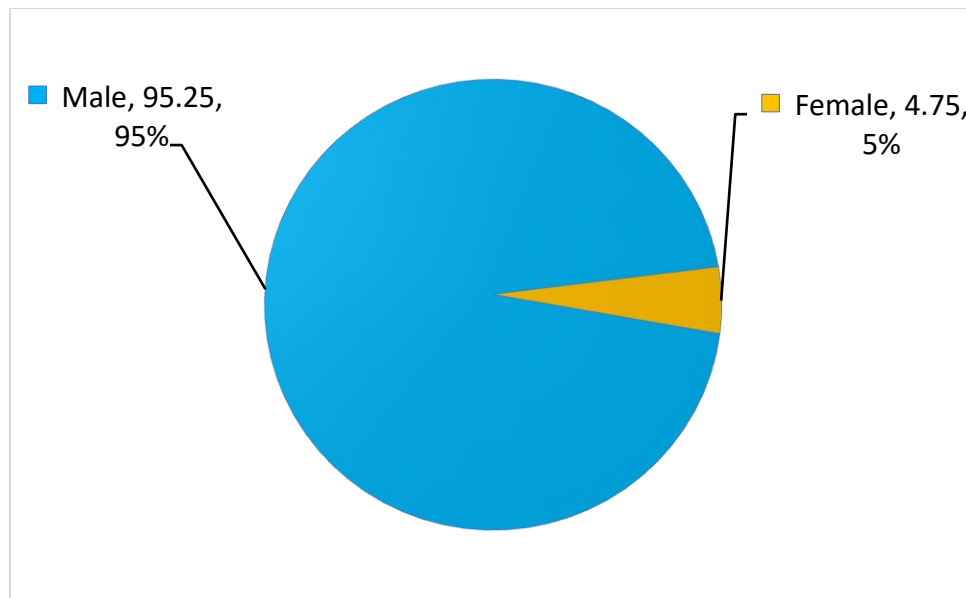


Figure-3.1. General information of the male and female respondents of the survey

3.1.2. Respondent's educational qualification

The survey respondents were three categories, viz. (1) Highly qualified respondent (2) Graduated respondent and (3) Under graduate or lower-level respondent. The highly qualified respondents are those who had a Ph D degree or post-graduate degree. The highly qualified respondent officials were Project Director of BARI, BRRI, NATA, Director (Joint Secretary) CPTU (Central Procurement Technical Unit) and Chief Engineer Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur. The respondents were asked for their position and educational qualification with the options (a) Educational background (b) Professional background (c) Professional experience (d) Respondent's position (designation) of their organization.

3.1.2. (a) Educational qualification

Among the 21 personnel 4 officials (Project Director Integrated Quality Horticultural Development Project, Project Director Bangladesh Rice Research Institute (BRRI), Project Director Bangladesh Agricultural Research Institute (BARI), and Project Director National Agriculture Training Academy NATA) had Doctorate degree (24%), Chief Engineer (Bangabandhu Sheikh Mujibur Rahman Agricultural University), Director Central Procurement Technical Unit(CPTU), Deputy Project Director BRRI, Superintending Engineer BARI, SE Dhaka University of Engineering and Technology, XEN (Executive Engineer) BRRI all had post graduate degree. The assistant engineers were graduate in engineering including Chief Engineer, Gazipur City Corporation. The other officials were under graduate (Figure-3.2). The educational qualifications categorized as Post Graduate (24%), Graduate (22%) and under Graduate (27%).

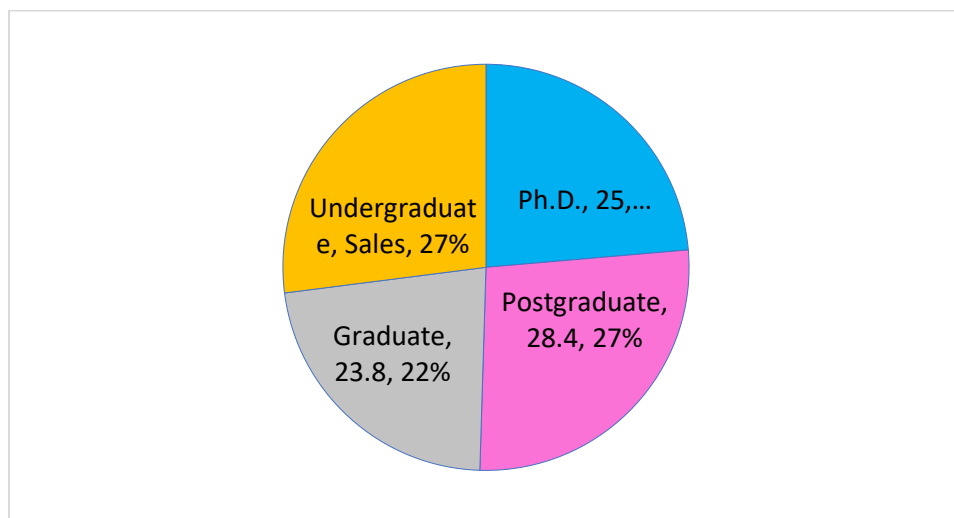


Figure-3.2. The educational qualification of the respondents of the survey

3.1.2. (b) Professional background

Among the respondents the Project Directors (BARI, BRRI, NATA), Director (CPTU) and the related technicians had no Engineering degree (60%), while the remaining 40% of the respondents had Engineering degree (Figure 3.3).

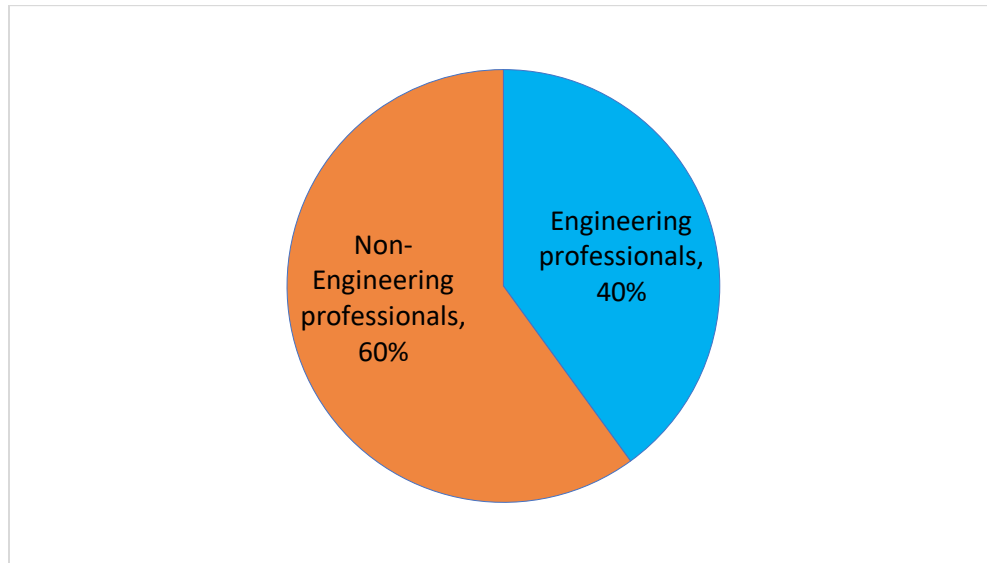


Figure-3.3. The Profile of the respondents considering their Profession

The respondents interviewed were engineer and other professionals such as scientists, procurement specialist and technical skilled persons.

3.1.2. (c) Respondents Experience on Procurement function

Most of the survey respondents were somehow related to the procurement activity directly or indirectly. Some of them were procurement specialist and some were controlling the whole procurement system of Bangladesh. Here, the respondents interviewed were working as policy maker of their respective organizations. Only lower-level subordinates viz. Sub-Assistant Engineers, Technicians, Mason, and Labors were not involved in procurement process but they were directly involved in project implementation works (Figure 3.4).

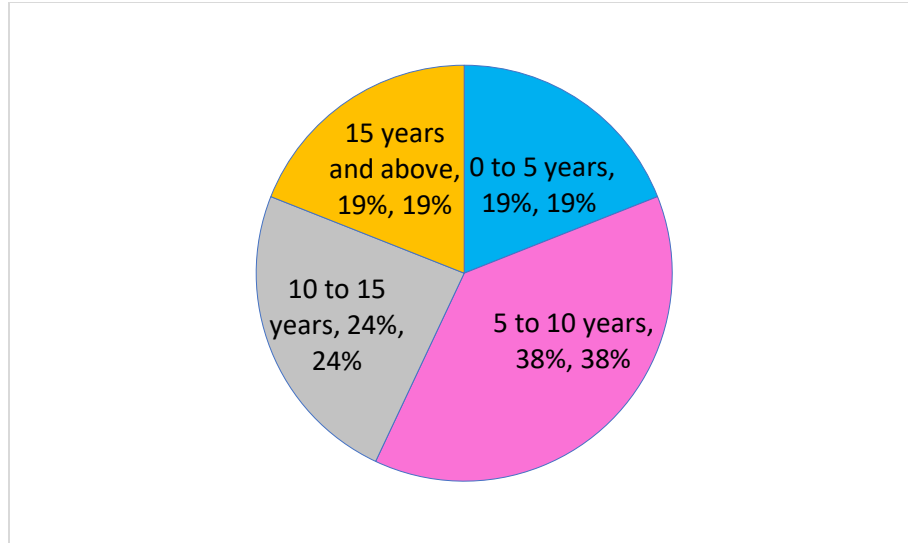


Figure-3.4. Experience of the respondents on their procurement function

3.1.2. (d) Respondent's position (designation) in their organization

In the questionnaire survey the interviewed four (19%) officials were Highly experienced in construction industry having more than 20 years of experience. There were 5 persons (24%) having utmost 10 to 15 years practical construction work experience. Besides, the interviewed entry level officer had 5 to 10 years work experience (38%). Limited personnel (4 persons) were working at lower level (19%) with 1 to 5 years work experience (Figure-3.5).

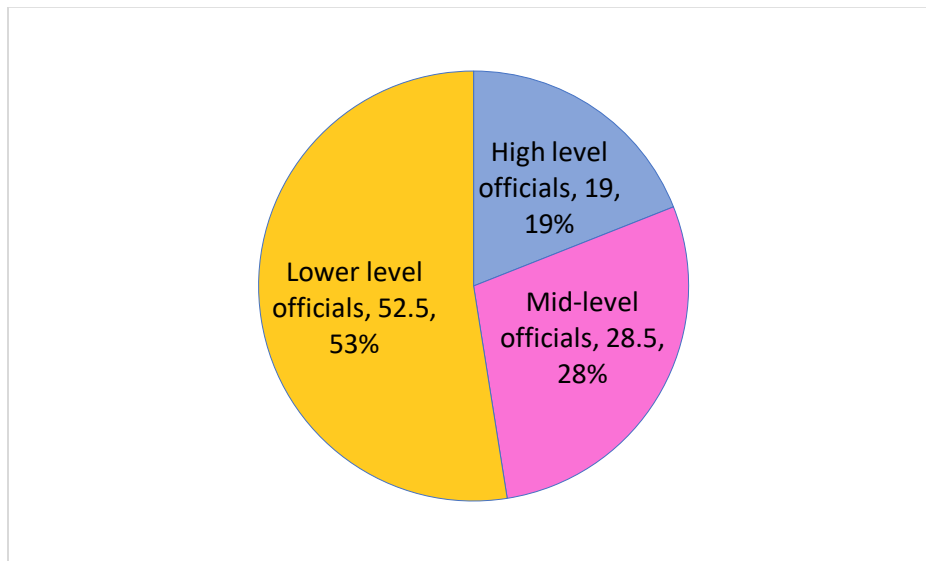


Figure-3.5. The position of respondents in their organization

The respondent's position in their organization were Chief Engineers, Chief Scientific Officers, Joint Secretary Superintending Engineer, Executive Engineer, Principal scientific officer, Senior

Scientific Officer and lower-level officials were Assistant Engineer, Sub- Assistant Engineer and Technicians.

3.2 Root causes of generation of construction contract waste in procurement process.

In section B the questionnaire survey participants were asked about the (a) Contract waste generated during procurement process and implementation of the contract. (b) The risks of the identified wastes. Though the respondents were high level officials (such as the engineers, policy makers and the implementing personnel) and were busy but they are interested about the study and provided the information about the contract wastes generated during contract period and also at the time of implementation. The respondents (engineers and policy makers) report about the construction contract wastes are shown in the following figures (Figure 3.6).

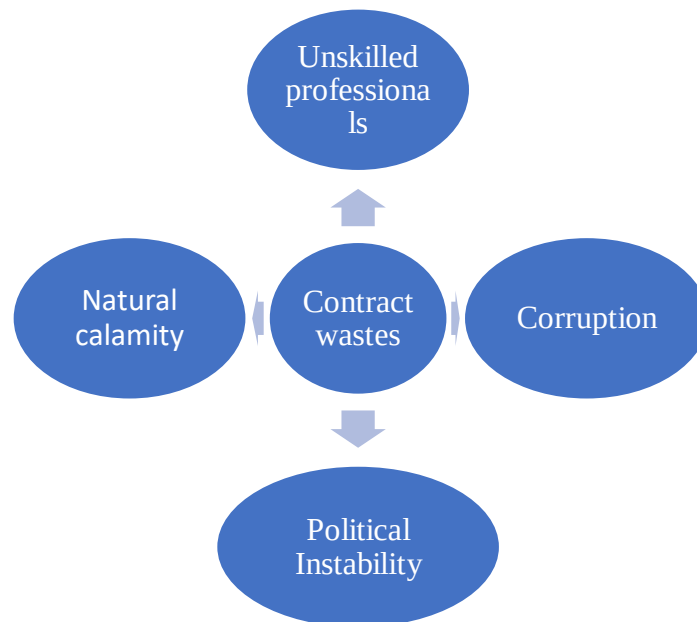


Figure-3.6. The major construction contract waste associated with construction contract

According to the opinion of the respondents the risks (wastes) in contract are identified in the procurement systems were as follows (Figure 3.7):

1. Risks involve legal accountability (such as breach of contract and infringements in intellectual property).

2. Construction contract operational risks (operational i.e., image, structure, implementation, etc.) the risks are faced during operation of the contract with unskilled poor staff.
3. Engineering design risks (Architectural, structural design, Cost estimate)
4. Other risks (Ethical risks such as taking or giving bribes, favoritism to the contractor or supplier, fraudulent practice, coercive and collusive practices in procurement)

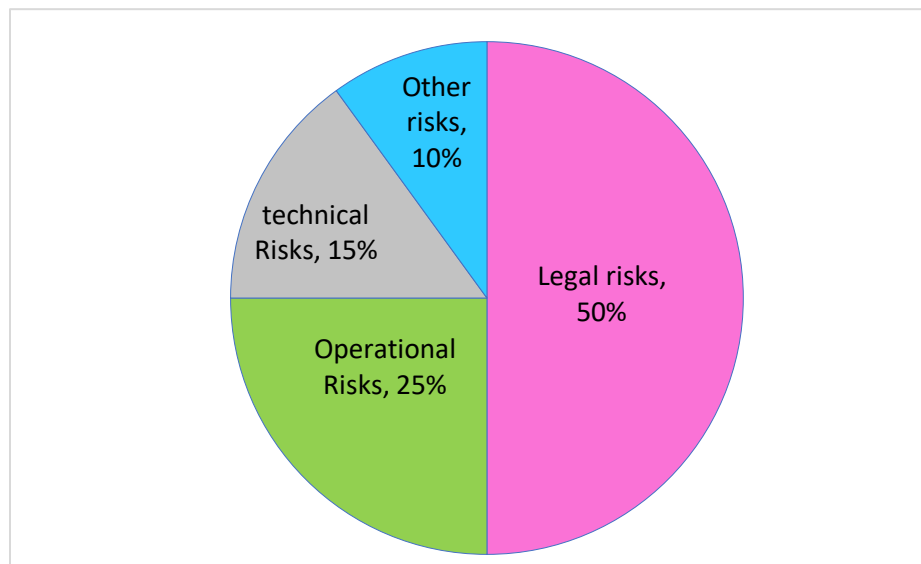


Figure-3.7. The Impact of risks (wastes) in contract implementation

According to the opinion of the respondents the above stated risks (contract wastes) could be removed or eliminated by using 4T (Tolerate, Treat, Transfer and Terminate the risks) method in the procurement process. The morality of human being and nature could not be possible to eliminate though imparting training to the concerned personnel could improve the morality from negativism to affirmative.

3.3. The contract waste generation field and type in procurement process

In section C the questionnaires were thrown to the respondents about the following construction contract waste generation in practical field.

- (a) The root cause of waste generation
- (b) The major wastes in construction contract
- (c) Types of wastes created in construction contract

(d) The impact of contract wastes on the performance of the project

The respondents opined that the contract wastes were created during procurement process and at the time of implementation of the contract. The volume and types of waste and its impact usually depend on the nature and type of construction contract. The wastes in smaller contract and that of in the large complex construction contracts are not similar in nature. It is very difficult to identify the main player who is responsible for creating contract wastes through corruption and favoritism. It might be engaged with the procuring entity (PE) or the Approving authority (AO) to the contractor or it may be other personnel. The possible entities which involved in hindering (generate wastes) the procurement process are natural calamities, sometimes the government itself, or any other issues were seemed to be involved in creating the contract wastes in procurement process.

3.3.1. Causes of construction wastes generation

The respondent's opinion on causes of generating the contract wastes in the procurement process mainly depend on lack of skilled professionals in project planning, procurement function and construction contracting and at the time of implementation of construction contract. Some of these contract wastes are generated due to natural causes and some are created artificially through corruption and favoritism during selection of contractor. The respondent opined that unskilled and unethical professionals taking undue facilities from the contractor (use of inferior quality of materials) create irresponsibility, haggard technical professional create wastes in designing of the structure it out breaks after the of completion of the contract. Govt's willingness, Political instability and influence also create the wastes in contract. (Figure3.7).

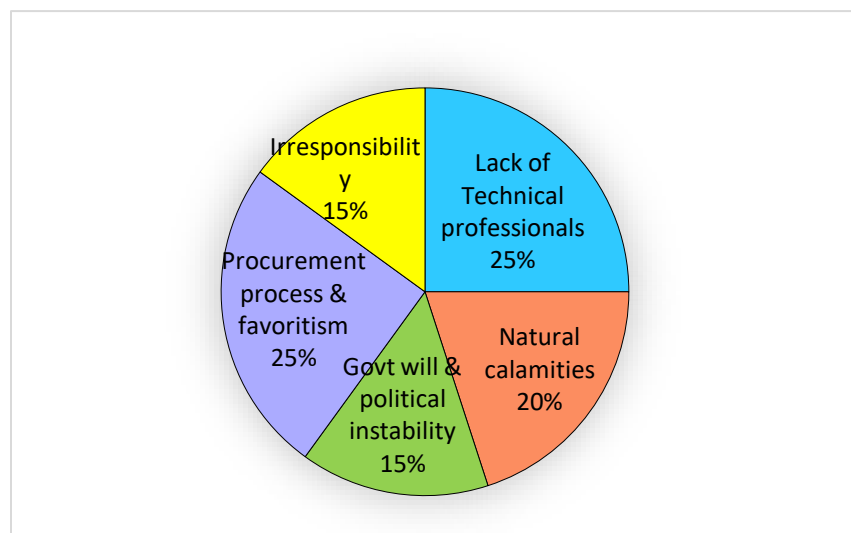


Figure-3.8. The root causes of generation of construction contract waste

3.3.2. The major wastes in construction contract

The respondents were asked about generation construction contract wastes. They described about the major construction wastes which are generated from procurement process to completion of the contract (Figure 3.8). The wastes in contract and their impact percentages on project performance are stated as natural calamities (5% to 30%), increasing project cost (30% to 50%), project time extension (20%), inefficient in technical decision (15%), and irresponsibility (5% to 10%).

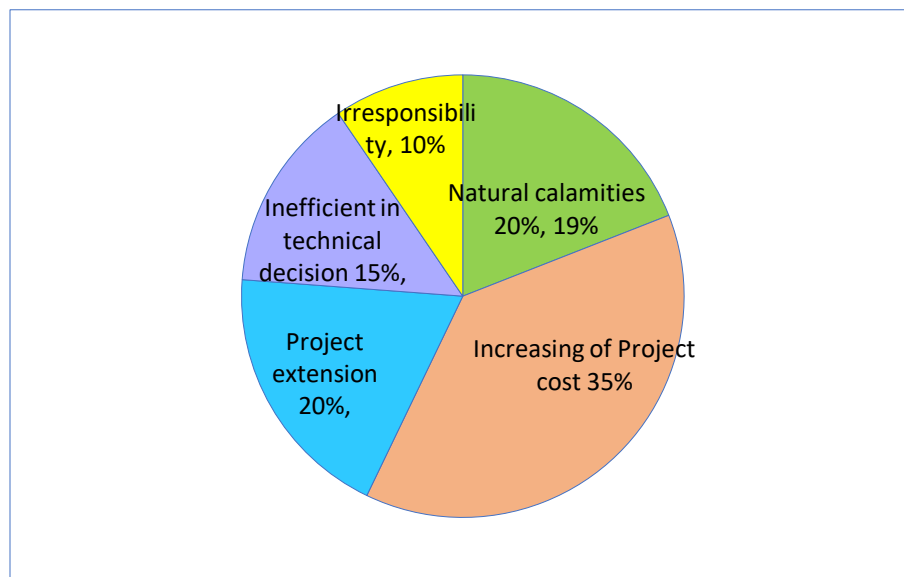


Figure-3.9. The parameters of major wastes in construction contract

3.3.3 Contract wastes and their percentages in construction contract

The respondents were asked about the type of contract wastes that are created in construction sector of Bangladesh. They opined that these wastes are intangible and immaterial type. The waste type detection is very difficult and mere possible. The anticipated contract wastes are created in procurement process are as below and shown in the (figure 3.10)

- (a) Unskilled professional's activity in the project impacts 20% on the total performance of the project.
- (b) Corruption, favoritism, Unethical practices in the project affect about 30% of the project performance (Figure 3.9)
- (c) Unskilled planning (10%) impacted the project

(d) Political influence and political instability (15%) create impact on the performance of the project.

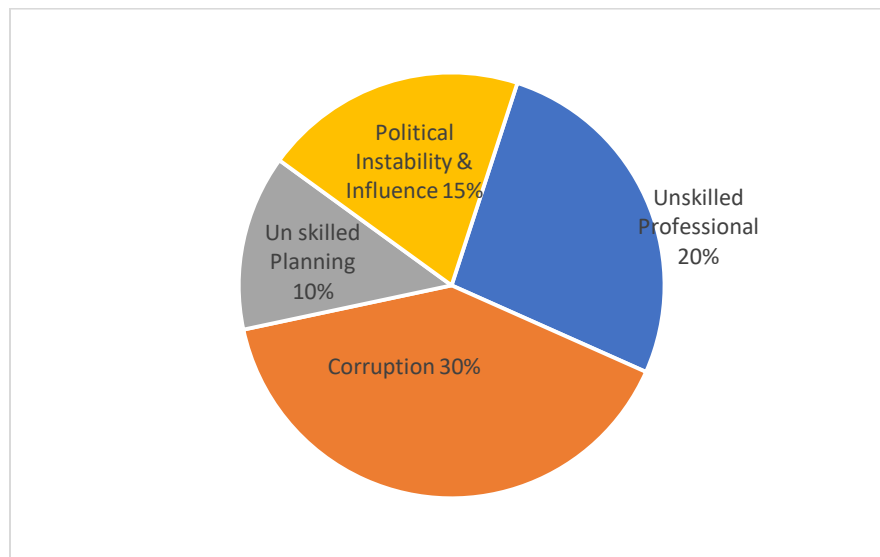


Figure-3.10, The impact percentages of wastes in construction contract.

The respondent cited the World Bank report that was printed in the “Daily Star” which displayed the corruption in the procurement process of Bangladesh. In fiscal year 2019-20, the government purchase was estimated around \$24.1 billion (US dollar) which was 85% of ADP, 45.2% of the annual budget and 8% of the GDP (WB report) where the procurement wastes are found stated as below and style of corruption is shown in figure-3.11.

- i. 31% bidders provided gifts to the government officials and 62% of them gave gifts worth above Tk. 25000/-
- ii. 17% bidders paid dinner for government officials while 4% invited the officials to trips.
- iii. Large bidders were monopolizing the procurement market and the small bidders were marginalized
- iv. Electronic Government Public Procurement system was yet to be achieved to the expected level of transparency.
- v. Natural Calamities (30%)



Figure-3.11, The style of Corruption and favoritism (WB Study, Source: Daily Star 24 June 2021)

According to respondents, the natural calamities (flood, cyclone, tidal wave, earthquake, drought, storm surge, fire, tsunami) affect the construction work directly and the effects of natural calamities are increasing day by day (Figure 3.10). The impact of natural calamities such as cyclone Mora are shown in figure 3.11 as below.



Figure-3.12, The impact of cyclone “Mora” in Bangladesh source: Daily Star, 1 June 2017.

(e) Political influence and instability (15%)

Political influence played a significant role in getting work order in the procurement process of Bangladesh despite of e-GP which has introduced in the procurement system to mitigate these wastes. Collusion and syndication are still the major obstacles to ridding the procurement process from corruption. Development activities need a politically stable government for its continuation.

3.3.4. The impact of construction contract wastes on performance of the project

According to the respondents, the performance of the projects is impacted as:

- a) Prolonged the project completion period (due to contract disputes and litigation).
- b) Increased project cost, delayed project completion and hampered development (Due to miscommunication, misinformation and mismanagement).
- c) Incurred economic loss (Political influence and instability)
- d) Handicapped project implementation, increased project cost and time (Insufficient information and poor forecasted planning)

In reply to the question “How can you help eliminate the wastes in construction contract” for ensuring sustainable development? The respondent’s answer was as follows-

- a) Increase inclusive development activities with a good governance (education, research, training and practicing)
- b) Application of forecasted planning, Instant dispute solution, prompt decision making
- c) Foster the maximum use of resources faster execution through the reuse of common processes and Promote freedom of effective leadership
- d) Better and effective expectation-setting through up-front project planning and estimating.
- e) Better organizational decision making through more effective project communication.
- f) High donor/beneficiary satisfaction and low rework by delivering a higher quality output at the first time.

The respondents answered to the question “How construction contract wastes hinder the development and growth of a country”?

- e) Potential contract disputes and litigation prolonged the contract completion period.
- f) Mismanagement (misinformation and miscommunication) can play a massive role in project completion which have a great impact on social, environmental and economic.
- g) Political instability plays a vital role in development
- h) Project planning with poor forecasted and insufficient information is practically impossible to implement, the major shortfall of the projects is increase of the completion cost and extension required due to extension of contract completion time of the project.

3.4 Impact of construction wastes in development

In Section D the questionnaires were asked to the respondents about the impact of construction wastes on development indicators of a country. According to the respondent the development indicators are:

- a) Gross Domestic Product (GDP) and Gross National Product (GNP)
- b) Birth and death rates.
- c) The Human **Development** Index (HDI)
- d) Life expectancy

These indicators are hindered by the contract wastes (corruption, political influence and pressure) in the procurement process. It increases the project cost (due to late completion of the project contract) and decreases the performance achievement of the project. The development indicators are impacted by Corruption, Political instability and pressure and foreign investment.

3.4.1 Corruption

According to respondent corruption, political instability, natural calamities, over population and inequality, lower per-capita income, absence of investment, backwardness in technology and tendency of inferior quality acceptance are the wastes in procurement process (Figure 3.12). The contract wastes in procurement impede economic development, distort market mechanisms and create inefficiencies in the total development system and reduce competitiveness, trade and foreign investment. The wastes occurred through violations of procurement rules or through legitimate

deviations from the rules. Corruption impacted on governance deficiencies (lack of transparency, lack of competition, monopoly, weak transparency)

The practical impact of corruption in construction sector are indicated in figure-3.13. It reduces the construction quality, High cost incurred, reduces the performance of the output of the contract. increase unemployment that impede the development.

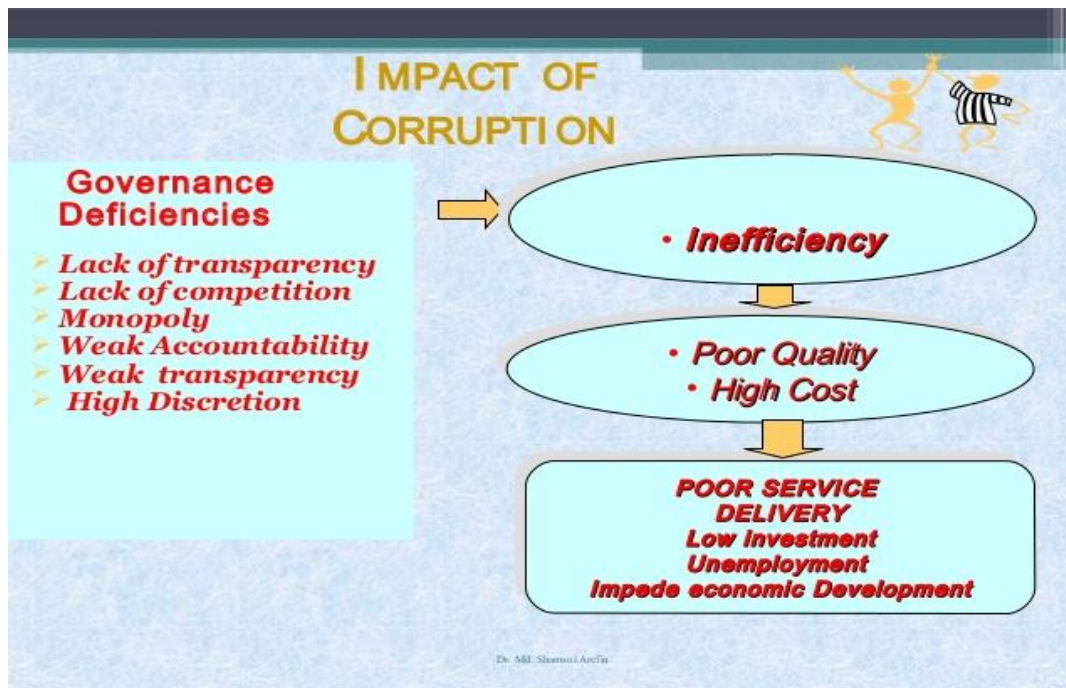


Figure-3.13. The impact of corruption in contract waste

Other findings on impact of wastes included as

- The quality of goods and services are affected when purchasing is engaged in bribes.
- Corruption caused state capture, whereby bribing firms begins to determine the policy and process.
- The risk of corruption depends on the amount of money and complexity of technology involved, the urgency of goods and level of discretionary authority among officials.
- Procurement rules violated by limiting the call for bids, or designing tenders and providing confidential information to favor the bribing company.
- There are some legitimate reasons for evading the rules, such as the need for speed during emergencies, but these reasons could be misused to obtain bribes.

3.4.2. Political instability and pressure

According to the opinion of the respondents the potential sources and major indicators of political instability were social unrest (45.8%), attitudes of nationals (37.5%), policies of host governments (37.5%) these are the affecting elements that decrease the development of a country (Figure 3.13).

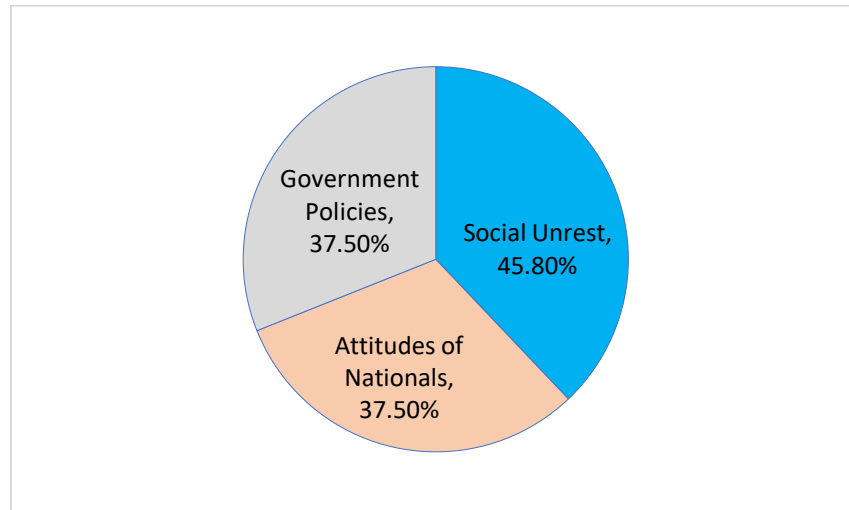


Figure-3.14. The impact of political instability and pressure on development activity

3.4.3 Foreign investment

Due to lack of foreign investment the development activity will be limited for weak economic condition of a country. The employment opportunity, income source, physical and social infrastructure enrichment will be reduced chronologically. The government promotes the foreign investors, the renowned companies, private sector-led growth, to invest here. The government also provides some additional facilities for foreign investors such as tax reduction, quick plot allocation for establishment of industry etc. Here foreign currency is abundant due to remittances, and the central bank respects the transferability of foreign currency. A number of more developed Asian countries have outsourced their factory production, mainly textile, to the country. Foreign investment company don't more interested to invest in this country by this time Bangladesh has signed 30 bilateral investment agreements.

Inspite of these barriers the development activities of Bangladesh is becoming the tiger among the Asian region that is reflected in the ADP's regional GDP outlook through its export, import,

and earnings of foreign exchange. The financial strength is also increasing chronologically (Figure3.14 and Table-1).

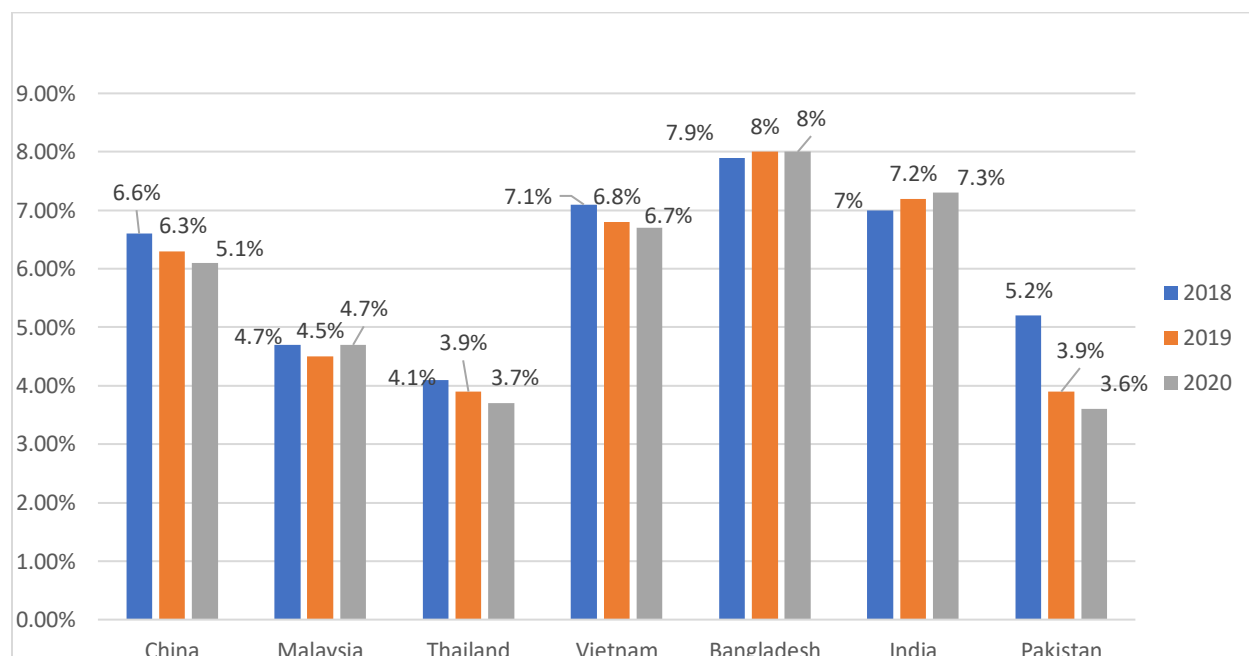


Figure-3.15. The GDP outlook of Bangladesh in Asian region (Source: ADB)

Table-1. ADP revised its growth projections for South Asia (source: ADB)

SL	Name of the Country	Growth Projections for South Asia	
		2020	2021
1	Afghanistan	- 4.50%	3.00%
2	Bangladesh	4.50%	7.50%
3	Bhutan	2.40%	1.70%
4	India	- 4.00%	5.00%
5	Maldives	- 11.30%	13.70%
6	Nepal	2.30%	3.10%
7	Pakistan	- 0.40%	4.10%
8	Sri Lanka	- 6.10%	4.10%

The respondents were asked about the major issues of sustainable development of Bangladesh. In response to the question, they answered that the development of a country has a big periphery the major issues of sustainable development are poverty, good health and well-being, quality education and gender equality clean air, water and sanitation.

In Bangladesh context the respondents replied to the question “How can you ensure sustainable development” are as follows

- a. Share resources. (Fewer resources an average family uses)
- b. Promote education and inequality.
- c. Empower women.
- d. Negotiate strategic political instability.
- e. Reform food and aid distribution systems.
- f. Demote corruption

The above stated factors are not sufficient to ensure sustainable development. These factors are changeable and all the sustainability issues are not eligible for all country. It depends on various factor such as economy, GDP, HDI, development budget etc.

CHAPTER-4

Conclusion and Recommendation

The construction works are the external focus of development activities in the country and sustainability is the burning issue in the present world to create a better future and that is our common goal. A sustainable procurement contract can enrich the development activities that can be ensured by providing sustainability issues into the procurement process and ensure a sustainable development of a country. The procurement process plays a crucial role in development activities. We put more attention to implement the development works but we don't put much attention to our purchasing process. As a result, we have to face lots of conflicts, disputes or wastes in the procurement activities. The wastes finding in procurement starts from preparation of specification, tender document preparation, Evaluation criteria setting, tendering, evaluating, contracting, implementing and operating process. A sustainable efficient purchasing is the foremost criteria to ensure effective performance of the project. The procurement process must follow the procurement guidelines, rules and regulations to ensure sustainable public procurement.

In our country CPTU has formulated a web portal www.egp.gov.bd (followed by procurement rules and Acts) for procurement procedure and implementing the government purchase in public sector of Bangladesh. e-GP system reduces both environmental and contractual wastes but the contract wastes are not reduced according to the level of demand. The objective of the study is to identify the contract wastes and to eliminate the wastes from construction contract in procurement and implementing process, the CPTU, the authority, PE (Procuring Entity), Implementing officials, field level officials and the respective contractors all should have an effective positive attitude and play a role to eliminate the contract wastes in construction contracts in Bangladesh. By introducing sustainability issues in government procurement can enrich the sustainable development of Bangladesh through reduction of contract wastes in the procurement process.

4.1 Some recommendations for organizations and procurement related persons.

a). Organization

- i. Rules and regulations of the organization must integrate with the Governmentt rules and regulations.
- ii. Encourage the transparency in procurement process.

iii. The authority must be in quick and consistent in decision.

b). Personal development

1. Professionals' Personal improvement (Lack of Professionalism, incorrect specification, improper deliveries)
2. Training on Knowledge and skills, internal control, Ethics, policies, Guidelines and principles.
3. e-GP Training (Procuring entity, Approving authority, Contractors)
4. Change of mindset (Officials and procurement related personnel).

c). To reduce the construction contract waste, the government should change the financial year instead of July-June to January-December. This will reduce the tendency of spending the money within June'30. Because this time the weather condition of our country is always remains cloudy and rain fall continuously, so that the construction work hinders and the contractor always try to take this opportunity of spending to fulfill the targeted performance committed in APA (Annual Performance Agreement). In the Past time, the government prepared budget with the financial aid of developed countries (the aid amount was fixed in their meeting, this meeting was held in June, for this reason fiscal year was fixed as July to June, British administration also responsible for setting this FY), but today we don't need any foreign aid for our financial budget. So, the fiscal year changing is not difficult only willingness of government is sufficient.

d). Contractor

- Should attain in e-GP Training for effective participation in (e-gp) tendering.
- Changing mindset from selfness to patriotism, following of ethics, mental preparation for providing services for development,
- Abstain from tendency of taking unlawful advantages and activities.
- Be honest in working and abide by the contractual responsibilities.

e). e-GP system (CPTU).

1. CPTU should arrange training in a large scale for PE, HOPE, TEC, TOC, Contractor and other technical professionals who are directly or indirectly involved in e-GP system.
2. Removal of $\pm 10\%$ cap from the open tendering method and alternative solutions to tackle the issue of abnormally low number of bids.
3. Getting rid of the lottery system and $\pm 5\%$ (plus/minus) cap in limited tendering method.
4. Making an assessment on how the tendering method could be used to give preferential treatment to small and medium bidders and women-led enterprises and start-ups.
5. Rolling out the newly developed e-CMS module of the e-GP and monitoring contract management performance and also scaling up citizen monitoring of contract implementation to reduce delaying contract.
6. The capacity of the Central Procurement Technical Unit (CPTU) remains restrained due to its legal structure, lack of autonomy in decision making, and limited staffing.
7. Need for speeding up the process of conversion of the CPTU to the proposed Bangladesh Public Procurement Authority with enhanced authority and autonomy.

4.2 Limitations

The study has been carried out with some limitations such as the survey was online basis and all their own opinion on the basis of their experience and field level working. This would be more dependable if the number of respondents would be more the data and information would be more dependable. There is no authenticated indicator of dependency of the answer of the respondents.

4.3 Conclusion

So far, the respondents have clear idea on construction wastes that hinders the development activities. They were all agreed that PE, CPTU, Contractor, Authority have gigantic role to ensure sustainable development practices in public procurement in Bangladesh. To eliminate the challenges of development contracts the sustainability issues including contract wastes elimination should be legally binding to implement as mandatory criteria for public procurement. Without sustainable construction infrastructure, local and national development including universal infrastructure services cannot be met. In case of business sustainable infrastructure has been progressively mainstreamed. At the same time integrating sustainability criteria including

amendments of PPR for procurement process then contracts can play an effective and significant role in private sector investment to sustainable infrastructure. Several approaches have been advanced to incorporate to ensure wastes elimination into infrastructure contracting to maximize its value for money in terms of economic, social and environmental co-benefits. Waste removing criteria introduced in contract will ensure the supplier is contractually bound to deliver them. Most of the purchases were done through the e-GP since its introduction in 2011.

The government introduced the online tendering system aiming at eliminating corruption and malpractices previously attributed to the traditional paper-based lengthy procurement system. This makes the bidding process less competitive indirectly. The number of competing contractors decreased in the open tender process. On average, 4.2 contractors used to compete in open tender in the past but the number has come down to two. On the other hand, the participation of only one contractor in single tenders increased to 50 percent from 20 percent.

The capacity and scope created by modernisation of public procurement including the e-GP have failed to deliver any reasonable degree of positive outcome in terms of open and fair competition as well as control of the practice of manipulated capture of the lion's share of contracts by vested groups. Syndicates of unscrupulous bidders continued to secure contracts "in collusion with a section of officials and the politically powerful who control the submission of proposals by eliminating the possibility of fair and open competition". "Since the devil lies in the hands of the politically powerful with direct or indirect linkages with the ruling party, the angel is to be found in the removal of political influence over public procurement." This can be achieved by banning any form of direct or indirect business relations of public representatives and politically exposed persons and their families with the state. Despite the introduction of the e-GP, the public procurement process is yet to achieve the expected level of transparency.

Despite of the impact of the construction contract wastes and other barriers Bangladesh is upgrading itself from under developed country to developing country through showing its healthy economic activities such as export, import, GDP, per-capita income etc. As a developing country Bangladesh begins to show its strength regionally through lending 200million Dollar to Sri Lanka in response to their application where India denied. This is the turning point from being poor helped country to powerful (economically) and uplifting their continuous increase of GDP.

After getting freedom in 1971 the country was apparently futureless but today's Bangladesh with 16 crore people becomes a self-dependent country and it has reliable export future which enhances the economic growth continuously and increases the economic growth rate as 6% in due to Covid-19 the economic growth rate was 5.2% in 2020. In 2021 the expected growth rate will be 6.2%. The per capita income (US \$ 2227) is greater than India and Pakistan. The social indicators such as health, Living Standard, average life time Growth and death rate woman empowerment and social security are more than India and Indian sub-continent. If we can eliminate corruption, favoritism, bribes in procurement system the country will be more self-dependent and we can achieve the targeted goal as developed country in 2030 or 2041.

References

- [1] Central procurement technical unit, IMED, Ministry of planning www.cptu.gov.bd
- [2] Asian development Bank [http:// www.adb.org](http://www.adb.org)
- [3] World Bank at www.wb.org
- [4] Bangladesh bureau of statics at www.bbs.gov.bd
- [5] Ministry of finance at www.mof.gov.bd
- [6] Bangladesh Institute of development studies at: www.bids.org.bd
- [7] Bangladesh Bureau of Statistics (2018). Gross Domestic Product (GDP). Available:
http://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/057b0f3b_a9e8_4fde_b3a6_6daec3853586/F2_GDP_2017_18.pdf. Last accessed 30th Nov 2018.
- [8] United Nations Global Compact. 2010. Supply Chain Sustainability, A Practical Guide for Continuous Improvement, http://www.unglobalcompact.org/Issues/supply_chain/guidance_material.html (28 February 2012)
- [9] PPA 2006: Public Procurement Act, 2006.
- [10] PPR 2008: Public Procurement Rules, 2008.
- [11] Chartered Institute of Procurement and supply (CIPS), Available at <https://www.cips.org>
(Accessed on 15 April, 2019)
- [12] Wikipedia: Retrieved 10 November 2011 from <http://en.wikipedia.org/wiki/procurement>
- [13] Akili, E.A. (2008); Green Supplier Selection criteria
- [14] Development Issues of Bangladesh Edited by Ashraf Ali, M. Faizul Islam and Ruhul Kuddus Published jointly by BDI and UPL (University Press Limited) Dhaka, Bangladesh in 1996
- [15] “E-governance in public procurement: Deal with Indian firm signed” (2010).
- [16] New Nation. [On- line]. Available at
<http://nation.ittefuq.com/issues/2010/04/13/news0606.htm>
(Accessed on April 13, 2010). “E-purchase to check rigged bids” (2009b). Daily Star.
[Online]. <http://www.thedailystar.net/story.php?nid=77043>. (Accessed on April 25, 2010).
- [17] “Public procurement and corruption.” (2010). Daily Star. [Online]. Available at
www.thedailystar.net/law/2010/04/04/watch.htm. (Accessed on April 25, 2010).

- [18] “Public Procurement Govt's rules change to rock WB aid flow” (2009). Daily Star. [Online]. Available at <http://www.thedailystar.net/newDesign/newsdetails.php?nid=92787>.(Accessed on April 25, 2010).
- [19] “Procurement and Corruption.” (2009). New Nation. [On- line]. Available
- [20] e-paper: 12:00 AM, September 24, 2020 / LAST MODIFIED: 02:17 PM, September 24, 2020
- [21] Researcher's Construct (2019) available at: www.sciencedirect.com

Appendix; A

Title of Dissertation: Identify and Eliminate the Wastes of Construction Contracts for Ensuring Sustainable Development of Bangladesh.

Name of the Researcher: Md. Abdur Razzaque, PEng. MPSM ID: 19282010 BRACU and
Superintending Engineer of Bangladesh Agricultural Research Institute, Gazipur.

This survey questionnaires are dedicated to academic research only for the above-mentioned topic offered by BIGD (BRAC Institute of Governance and Development) of BRAC University.

Questionnaires

Section A: General Information of Respondent

- 1. Name of the respondent (optional):**
- 2. Designation and organization of the respondent:**
- 3. Sex: a) *Male b) *Female**
- 4. Age: Years**
 - a) 25 — 35
 - b) 36 --- 45
 - c) 46 --- 55
 - d) 56+
- 5. Educational Qualification:**
 - Academic Qualification
 - a) PhD
 - b) Post graduate
 - c) Graduate
 - d) Under graduate

- Professional qualification:
 - Engineering Background
 - Non-Engineering (Procurement, Business, other background).

6. Experience in Procurement and Implementation of construction works

- More than 15 years
- 10 to 15 years
- 5 to 10 years
- 0 to 5 years

7. Respondent's position in their organization

- **High-level**
- **Mid-level**
- **Lower-level**

Section B: Concept of Construction Contract wastes

8. What is contract waste?

- a) The wastes are created during contract in procurement process.
- b) These wastes are complex type of wastes that includes natural, technical and human morality.
- c) Corruption and favoritism are the major part of contract wastes.
- d) All the above.

9. What is the major contract waste in construction contract in construction sector in procurement process?

- a) Unskilled professional.
- b) Corruption
- c) Natural calamity
- d) Political instability
- e) All the above

10. What are the risks (wastes) identified in the Construction contract procurement process?

- a) Legal accountability risks

- b) Construction contract operational risks
- c) Engineering design risks
- d) Other risks (ethical)
- e) All the above.

11. How can these wastes be eliminated in the construction industry?

- a. Treat
- b. Tolerate
- c. Transfer
- d. Terminate
- e. All the above.

Section C: Causes of contract waste generation, Types of contract waste, its impact and elimination of these wastes from procurement process.

12. What are the causes of extension and increasing the project cost (contract wastes) of a complex construction project in Bangladesh?

- a) Government's willingness and Political instability (15%)
- b) Lack of Technical professionals (contractor and client) for the unique project (25%)
- c) Natural calamities (vulnerable climate change) of Bangladesh (20%)
- d) Procurement process and favoritism (25%)
- e) Irresponsibility (client and contractor) (15%)
- f) All the above.

13. What are the major wastes in construction contract and please identify their impact percentage in development of Bangladesh?

- a. Natural calamities (up to 25%)
- b. Increasing the project cost (35%)
- c. Project period extension due to late completion of Contract (20%)
- d. Inefficient in technical decision (15%)
- e. Irresponsibility (5% to 10%)

14. In your consideration what are the major types of construction contract wastes in the procurement process? Please identify their impact percentages on development activities?

- a) Unskilled professional (20%)
- b) Corruption (30%)
- c) Natural Calamities (25%)
- d) Political instability and influence (15%)
- e) Unskilled Planning (10%)
- f) All the above

15. What are the impacts of construction contract wastes on performance of the project?

- a. Prolonged the project completion period.
- b. Increased project cost (Misinformation and mismanagement).
- c. Incurred economic loss (Political instability)
- d. Handicapped project implementation, increased project cost and time (Insufficient information and poor forecasted planning)
- e. All the above.

16. How can you help to eliminate the wastes in construction contract for ensuring sustainable development?

- a. Increase inclusive development activities with a good governance (education, research, training and practicing)
- b. Application of forecasted planning, Instant dispute solution, prompt decision making
- c. Foster the maximum use of resources faster execution through the reuse of common processes and Promote freedom of effective leadership
- d. Better and effective expectation-setting through up-front project planning and estimating.
- e. Better organizational decision making through more effective project communication.
- f. High donor/beneficiary satisfaction and low rework by delivering a higher quality output at the first time.
- g. All the above.

17. How construction contract wastes hinder the development and growth of a country.

- a. Potential contract disputes and litigation prolonged the contract completion period.
- b. Mismanagement (misinformation and miscommunication) can play a massive role in project completion which have a great impact on social, environmental and economic.
- c. Political instability plays a vital role in development
- d. Project planning with poor forecasted and insufficient information is practically impossible to implement, the major shortfall of the projects is increase of the completion cost and extension required due to extension of contract completion time of the project.
- e. All the above statements are facts.

Section D:

Questionnaires are asked to the respondent about the impact of construction waste in development activities of our country. How the development issues are impacted due to contract wastes in procurement (in terms of cost, time and GDP of the country) process.

18. What are the development indicators of a country?

- a. Gross Domestic Product (GDP) and Gross National Product (GNP)
- b. Birth and death rates.
- c. The Human **Development** Index (HDI)
- d. Life expectancy

19. Which wastes are responsible for development of a country?

- a. Corruption
- b. Political instability and pressure F
- c. Foreign investment.
- d. All the above.

20. What are the impacts of corruption in construction contract?

- a. Increase inefficiency
- b. Poor quality
- c. High cost
- d. Poor service delivery.
- e. All the above.

21. What are the impacts of political instability in construction contract?

- a. Social unrest (45.8%),
- b. Attitude of nationals (37.5%)
- c. Government policy (37.5%)
- d. All the above.

22. What are the negative impacts of foreign investment in Bangladesh?

- a. Unemployment increases
- b. Reduce Income source
- c. Reduces physical and social infrastructure
- d. Slow down the economy
- e. All the above.

23. What are the major issues of sustainable development of Bangladesh?

- a) Poverty, No hunger
- b) Good health and well being
- c) Quality education and gender equality
- d) Clean air, water and sanitation.
- e) All the above.

24. What is the present position of GDP of Bangladesh in comparison to Asian region?

Respondent reported according to ADP the GDP of Asian region are as:

SL	Country	GDP (2018)	GDP (2019)	GDP (2020)
1	Bangladesh	7.9%	8%	8%
2	India	7%	7.2%	5.3%
3	Pakistan	5.2%	3.95	3.6%
4	China	6.6%	6.3%	5.1%
5	Malaysia	4.7%	4.5%	4.7%
6	Vietnam	7.1%	6.8%	6.8%
7	Thailand	4.1%	3.9%	3.7%

25. How can you ensure sustainable development?

- a) Share resources. (Fewer resources an average family uses).
- b) Promote education and inequality.
- c) Empower women.
- d) Negotiate strategic political instability.
- e) Reform food and aid distribution systems.
- f) Demote corruption