

CONTRACT MANAGEMENT PRACTICES AND SUSTAINABILITY PREPAREDNESS IN LOCAL GOVERNMENT ENGINEERING DEPARTMENT (LGED): A REVIEW STUDY

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**A thesis submitted to the Department of BRAC Institute of Governance
and Development in partial fulfilment of the requirements for the degree of
Masters in Procurement and Supply Management.**

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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.
5. I would like to request the embargo of my thesis for 06 months from the submission date due to some personal reasons.

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Approval

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Ethics Statement

This thesis, titled “Contract Management Practices and Sustainability Preparedness in Local Government Engineering Department (LGED): A Review Study,” was conducted in alignment with the ethical guidelines and academic standards of BRAC University.

As part of the research methodology, this study employed both qualitative interviews and case study analysis to gather in-depth insights into contract management practices and sustainability preparedness within the Local Government Engineering Department (LGED). All participants involved in the interviews were informed about the purpose, scope, and voluntary nature of the study.

Informed consent was obtained from all interviewees prior to participation. Participants were assured of the confidentiality and anonymity of their responses, and they were informed of their right to withdraw from the study at any stage without any negative consequences. No personally identifiable information has been disclosed or used in a way that could compromise participant privacy.

The case studies conducted were based on publicly available data and/or information shared with permission from relevant authorities within LGED. Proper permissions were sought where required, and all data were handled with integrity and respect for institutional confidentiality.

The study strictly adhered to ethical research practices, ensuring that no harm: psychological, professional, or social, was caused to any participant or institution involved.

This thesis was independently conducted and authored by the undersigned researcher, maintaining high standards of honesty, objectivity, and academic integrity throughout the research process.

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Abstract/ Executive Summary

Public sector infrastructure projects are vital to Bangladesh's socioeconomic progress, with the Local Government Engineering Department (LGED) leading their delivery. However, persistent weaknesses in contract management hinder timely and cost-effective outcomes. Challenges include poor planning, procurement delays, weak monitoring, limited accountability enforcement, and inadequate integration of sustainability principles.

This study employs a mixed-methods approach: a survey of 44 LGED officials and case studies of government-funded, mixed-funded, and donor-funded projects. Results show systemic shortcomings: only 14-20% of projects were completed on time, over 75% required extensions, and cost overruns occurred in up to 11.54% of cases. Liquidated damages were enforced in fewer than 7% of contracts. Digital tools are underutilized, with only 13.33% of officials using contract management software.

Sustainability preparedness is partial. Although half of respondents reported its inclusion, practices mostly address environmental aspects, while social and economic dimensions, such as gender inclusivity and life-cycle costing, remain overlooked. Donor-funded projects demonstrated stronger sustainability compliance due to external requirements.

The analysis, framed through Principal-Agent, Transaction Cost, and Institutional theories, reveals that LGED's challenges are systemic and institutional rather than individual. To address them, the study recommends reforms including a centralized Contract Management Information System (CMIS), mandatory pre-feasibility assessments, performance-based payments, sustainability scorecards, updated SOPs, a dedicated Contract Management and Sustainability Cell, and professional certification programs.

Strengthening contract management is a strategic imperative for enhancing transparency, accountability, and sustainability in public infrastructure, supporting Bangladesh's development goals and the SDGs.

Keywords: Contract Management; Sustainability; Public Procurement; LGED; Bangladesh; Project Delays; Cost Overruns; Institutional Reform.

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List of Acronyms

ADB	Asian Development Bank
BoQ	Bill of Quantities
CFR	Contractual Framework Requirements
CSR	Corporate Social Responsibility
DPP	Development Project Proposal
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
GOB	Government of Bangladesh
IFR	Interim Financial Report
IEM	Independent Environmental Monitoring
KII	Key Informant Interview
LD	Liquidated Damages
LGED	Local Government Engineering Department
HQ	Head Quarter
M&E	Monitoring and Evaluation
MoU	Memorandum of Understanding
NGO	Non-Governmental Organization
PPA	Public Procurement Act
PPR	Public Procurement Rules
RHD	Roads and Highways Department
SDG	Sustainable Development Goal
SIA	Social Impact Assessment
SOP	Standard Operating Procedure
SPSS	Statistical Package for the Social Sciences
TOR	Terms of Reference
UNDP	United Nations Development Programme
VFM	Value for Money
WB	World Bank

Glossary

ADB:	Asian Development Bank: A multilateral development finance institution that provides loans, technical assistance, and grants for sustainable development projects in Asia and the Pacific.
Accountability:	The obligation of individuals or institutions to report, explain, and be answerable for resulting consequences and performance.
BCP:	Business Continuity Plan: A strategic framework ensuring critical operations can continue during and after disruptive events like disasters or political unrest.
BoQ:	Bill of Quantities: A document listing materials, parts, and labour with estimated costs, used in tendering and cost control.
CMIS:	Contract Management Information System: A digital platform designed to track, monitor, and manage contracts throughout their lifecycle.
Contract Management:	The process of planning, executing, monitoring, and closing contracts to ensure compliance with terms and deliverables.
Cost Overrun:	The amount by which actual expenditure exceeds the originally estimated cost.
CPTU:	Central Procurement Technical Unit: A division under the Ministry of Planning in Bangladesh, responsible for public procurement policy and implementation. Currently known as BPPA (Bangladesh Public Procurement Authority).

Climate Resilience:	The ability of a system or project to anticipate, absorb, accommodate, and recover from climate-related events.
DPP:	Development Project Proposal: A formal document detailing the scope, objectives, costs, and execution plan of a development project in Bangladesh.
Donor-Funded Projects:	Infrastructure or development projects financed fully or partly by external development partners such as the World Bank, ADB, or JICA, etc.
e-GP:	Electronic Government Procurement: A digital platform used by public agencies in Bangladesh for online tendering and procurement processes.
EIA:	Environmental Impact Assessment: A process used to evaluate the environmental consequences of a proposed project before decisions are made.
Efficiency:	The ability to achieve project objectives using the least amount of resources within time and cost constraints.
Time Extension:	An approved extension to the original contract duration due to unforeseen delays or justifiable reasons.
Feasibility Study:	A preliminary analysis to determine whether a project is technically, economically, and legally viable.
GeBIZ:	Government Electronic Business: Singapore's e-procurement system known for its transparency and efficiency.

GIS:	Geographic Information System: A technology that analyses spatial and geographic data, used for infrastructure planning and monitoring.
GoB:	Government of Bangladesh: The primary source of funding for public infrastructure projects in Bangladesh.
IEE:	Initial Environmental Examination: A basic environmental screening conducted before full EIA for smaller or less risky projects.
Institutional Theory:	A theoretical framework explaining how organizational behaviour is shaped by formal and informal norms, rules, and expectations.
KPI:	Key Performance Indicator: Measurable values used to evaluate the success of a project or contractor in meeting objectives such as quality, time, and cost.
LD:	Liquidated Damages: Monetary penalties imposed on contractors for failing to complete work within the specified time without justifiable cause.
Life-Cycle Costing:	An economic evaluation method considering the total cost of ownership over the life of a project, including maintenance and disposal.
Monitoring and Evaluation (M&E):	Ongoing process of assessing progress and results to ensure accountability and facilitate learning in project implementation.
PPR 2008:	Public Procurement Rules, 2008: The regulatory framework that governs public procurement in Bangladesh.

Principal-Agent Theory:	A theoretical framework that analyses conflicts and misalignments between a delegator (principal) and a performer (agent), such as between LGED and contractors.
Procurement:	The process of acquiring goods, works, or services from external sources, usually via a competitive bidding or tendering process.
Public Sector Contract Management:	The application of contract principles and regulations to ensure that government-funded projects are completed effectively and in the public interest.
Quality Assurance (QA):	The systematic process of ensuring that the quality requirements of a project are met consistently during execution.
Retendering:	The process of issuing a new tender after the failure or cancellation of an original contract, often due to non-performance or procurement disputes.
Risk Assessment:	The process of identifying and analysing potential issues that could negatively impact project outcomes.
SOP:	Standard Operating Procedure: A set of step-by-step instructions that describe how to perform routine contract management tasks to ensure consistency and compliance.
Stakeholder Engagement:	The process of involving individuals, groups, or organizations affected by or interested in a project, such as communities, contractors, and officials.

Sustainability:	The integration of environmental, social, and economic considerations into infrastructure planning, execution, and maintenance to ensure long-term viability.
Sustainability Compliance Scorecard:	A tool or matrix used to assess whether a project meets defined sustainability criteria across environmental, social, and economic dimensions.
Transaction Cost Theory:	A theory used to understand the cost of participating in a market, applied here to explain inefficiencies in public contract execution.
Transparency:	The degree to which project processes are open and accessible to stakeholders, often a critical factor in reducing corruption.
Variation Order:	A formal change in the scope, price, or duration of a contract after its initial award, typically due to design changes or site conditions.

Chapter-1: Experience in Engineering and Public Procurement in Organization

I am Md. Ashik Eamin. I have been working in Local Government Engineering Department (LGED) for near about 11 (Eleven) years. Now at present I am working as a Senior Assistant Engineer in Construction of Important Bridges on Rural Roads (2nd Phase) Project (CIBRR-2) in deputation. I have completed B.Sc. in Civil Engineering from Khulna University of Engineering & Technology (KUET). Now I am currently doing my Masters in Procurement and Supply Management (MPSM) in BRAC University. I have joined in LGED in December of 2014. Till then I served LGED in various positions;

- Assistant Engineer (LGED HQ)
- Upazila Assistant Engineer (LGED Upazila office)
- Upazila Engineer (LGED Upazila Office)
- Senior Assistant Engineer (LGED District Office)
- Senior Assistant Engineer (LGED HQ)

1.1 Role within the organization

As a Senior Assistant Engineer in a development project of LGED, I am playing a pivotal role to achieve the goals and objectives of the project to ensure the customer satisfaction. In a broad sense for LGED customer can be defined as the people of Bangladesh. But in a segmented way it can be defined as local communities, government officials, local government institutes, suppliers, contractors etc. As a Senior Assistant Engineer, I have to perform the following duties;

- Reviewing project planning and feasibility studies of bridges.
- Review the design of bridge infrastructure and related structures along with approach road.
- Procurement of works, goods, and services necessary for project implementation.
- Preparation of Tender documents for both the project office and field level offices.
- Reviewing the procurement activities of district level offices related to this project.
- Supervising construction activities to ensure compliance with design specifications and quality standards of bridges.
- Review the performance of contractor according to contract document.

- Take required actions against contractors for non-compliance with the contract document.
- Collaborating with other departments, stakeholders, and contractors to ensure timely and cost-effective project delivery, such as BIWTA, Department of Environment, Local Administration etc.
- Collaborating with other units and projects within the department to ensure timely and cost-effective project delivery, such as design unit, procurement unit, administration unit etc.
- Etc.

1.2 Contribution to Stakeholder Satisfaction

My role directly impacts customer satisfaction by ensuring that each scheme (Bridge) meet the needs and expectations of the communities they serve. With engineering expertise and project management skills, I contribute to the delivery of high-quality bridges that enhances the lives of rural residents. This involves closely collaborating with stakeholders to understand their requirements and incorporate them into project planning and execution. Here are some key aspects of my contributions;

- **Project Planning and Execution:** I play a crucial role in planning the project timeline, resource allocation, and budget management. For projects are being executed within the specified timeframe and budget, I ensure the allocation of each scheme (Bridge) in right place and right time to fill the needs of the local people.
- **Quality Control:** Being A Senior Assistant Engineer, I have the responsibility to ensure the quality of the construction works. Customers/beneficiaries always want sustainable and quality work. To ensure the sustainable and quality works, I frequently visit the bridge construction site and strongly provide guidance all the people related to construction works for quality and sustainable works which will provide clear satisfaction of customers/beneficiaries.
- **Risk Management:** Identifying potential risks and implementing mitigation strategies is another aspect of my role. By proactively addressing risks such as supply chain disruptions or technical challenges, I help minimize project delays and ensure uninterrupted progress, thereby enhancing customer satisfaction.
- **Stakeholder Management and Communication:** Effective communication with stakeholders, including local communities, government officials, and contractors, is

essential for the success of any project. I facilitate open communication channels and keep stakeholders informed about project progress, developing trust and satisfaction among customers.

1.3 Management of Office Activities

Management of subordinates in an effective way within the supply chain is essential for the progressive execution of large infrastructure projects such as bridge construction project. In managing my subordinates within the supply chain, I adopt a collaborative and empowering approach:

- **Clear Communication:** Clear communication with the subordinates and transparency in all sorts of activities will boost up the morale of the individuals which will in turns gear up the project progress. With a view to achieving this, I always maintain a two-way horizontal communication system with the subordinates to make them understand about their roles, responsibilities, and authorities.
- **Leadership and Guidance:** A good leader always pull his/her followers and provide sound guidance. Proper guidance from a good leader will enhance the good control over subordinates, which will ultimately empower the project progress. I provide leadership and guidance to my subordinates, empowering them to perform their duties effectively and efficiently. By setting clear expectations, providing constructive feedback, and offering support when needed, I help to form a positive work environment conducive to high performance.
- **Resource Management:** Effective resource management will improve the efficiency of the subordinates. Efficient allocation and utilization of resources, including manpower, materials, and equipment, are critical for project success. I strongly monitor resource allocation to optimize productivity, minimize waste, and meet project timelines within budgetary constraints. With this option strong logistic supports can be provided to subordinates which will enhance work efficiency.
- **Conflict Resolution:** Inevitably, conflicts or challenges may arise during project execution. Conflicts between subordinates will hamper the project progression. So, conflicts or challenges should have to be treated carefully and proactively to find a solution as early as possible. In this regard, I always try to convince the conflicting persons/parties in a collaborative way like expanding the pie, which will satisfy the both.

- **Training and Development:** I invest in the professional development of my subordinates by providing training opportunities related to bridge construction & administrative issues and mentorship. By enhancing their skills and knowledge, I empower them to perform their roles effectively and contribute to the success of the project.
- **Team Collaboration:** I promote a collaborative work environment where team members are encouraged to share ideas, provide feedback, and support each other. By leveraging the collective expertise of the team, we can overcome challenges more effectively and drive continuous improvement within the supply chain. This collaborative team approach helps a lot to solve complex problems evolving during bridge construction.
- **Performance Measurement and Applause:** Regular performance evaluations and feedback sessions are conducted to recognize achievements and address any performance issues. Poor performers are guided to achieve improvement in future efficiently. Good performers are highly appreciated and praised. By providing constructive feedback and recognition, I motivate my subordinates to maintain high performance standards and contribute to customer satisfaction.

1.4 Bridging Academic knowledge with work experiences

Over the course of near about eleven years working with the Local Government Engineering Department (LGED), I have gained solid practical knowledge in engineering project implementation, procurement, contract administration, stakeholder management, and field-level supervision. My academic journey at BRAC University under the Master of Procurement and Supply Management (MPSM) program has significantly enriched this experience by providing structured, research-based, and globally informed knowledge that allowed me to improve my professional practices.

From an academic point of view, I developed a clear and comprehensive understanding of the contract lifecycle: ranging from pre-tender planning, bidding, evaluation, award, contract administration, and contract closer. These stages were not unfamiliar in my professional work, but academic study helped me to anticipate the importance of aligning each stage with compliance standards, risk management frameworks, and sustainability principles. For example, where I once viewed procurement mainly as a sequence of administrative steps, I

now understand it as a strategic function that must ensure value for money, fairness, transparency, and long-term efficiency.

Particularly those involving bridge construction or rural infrastructure, are often encountered delays, contractor non-compliance, and coordination gaps among stakeholders. The MPSM program enabled me to analyse these challenges not only through practical experience but also by applying data collection techniques, root cause analysis, and performance indicators that provide measurable insights. This analytical window proved useful during this thesis, where I used structured tools like questionnaires, case studies, and institutional benchmarking to assess LGED's contract performance.

Additionally, academic exposure to topics like sustainable procurement, supplier relationship management, and electronic government procurement (e-GP) enriched my concept of modern contract management practices. Although I had prior exposure to e-GP in my office role, my studies helped me understand how technology can be used beyond bidding: such as in performance tracking, contractor evaluation, and digital documentation: which are still underutilized in many field offices.

Another major area where academic learning complemented my professional work was in stakeholder communication and grievance redress. While my field experience emphasized resolving issues informally and, on a case, -by-case basis, the academic perspective highlighted the need for institutional mechanisms and structured engagement that protect all parties and ensure accountability.

Through this thesis project, I was also able to apply qualitative and quantitative research skills—including survey design, data validation, cross-tabulation, and thematic analysis: which allowed me to critically assess LGED's practices. These are tools I had not previously applied in my routine office work but found extremely valuable in generating evidence-based recommendations.

Most importantly, the academic exposure allowed me to step back and critically evaluate the broader impacts of public sector contract management: especially on governance, transparency, cost-effectiveness, and sustainability. In office settings, it is often easy to focus on immediate outputs like completion certificates or budget utilization. The MPSM program, however, encouraged me to consider long-term outcomes, such as durability, user satisfaction, inclusiveness, and environmental safeguards.

Chapter-2: Overview of Organization

Local Government Engineering Department (LGED) is one the largest engineering agencies of the country. It began its journey in 1960s as Rural Works Program and with the passage of time its activities expanded from remotest corner of the country up to the cities.

2.1 Organizational Formation

The Local Government Engineering Department (LGED) of Bangladesh has a hierarchical organizational structure. This structure allows for clear lines of authority and responsibility, ensuring efficient implementation of LGED's projects across different regions. LGED has a total approved manpower of 13394 persons. LGED is headed by 01(one) Chief Engineer. Under the Chief Engineer, there are 15(Fifteen) Additional Chief Engineers. After that there are 34 (Thirty-Four) Superintending Engineers and 01(One) Senior Architect. Then 182 (One Hundred and Eighty-Two) Executive Engineers or equivalent posts. There after 580(Five Hundreds and Eighty) Senior Assistant Engineer/Upazila Engineer or equivalent posts. And then 858 (Eight Hundred and Fifty-Eight) Assistant Engineer/Upazila Assistant Engineer or equivalent posts. Besides this including Sub-assistant Engineer, Accountant and others, there are total 13394 (Thirteen Thousand Three Hundreds and Ninety-Four) employees (LGED website: www.lged.gov.bd).

Chief Engineer of LGED has all the administrative and financial power and the supreme authority for LGED. Then he sub-delegate the authority and other related activities to his downside of the organization. In the Field level, Upazila Engineer coordinates, implements, and supervises all the activities of LGED. All the upazila engineers within a district are under direct supervision of an executive engineer. District offices of LGED are headed by an Executive Engineer. Each three/four district form a region which is headed by a superintending engineer who guides directly executive engineers and upazila engineers. A division is headed by an additional chief engineer, who supervises superintending engineers, executive engineers and upazila engineers within his jurisdiction. All the additional chief engineers directly under the supervision of Chief Engineer. In Headquarter level, there are several units headed by additional chief engineer under the supervision of Chief Engineer. In each unit, there are some superintending engineers under the supervision of additional chief engineer. And each

superintending engineer of a unit controls Executive engineers, Senior assistant engineers, Assistant engineers under him. There are also some projects under the direct supervision of Chief Engineer. Each project is headed by a Project Director. There are Deputy Project Director(s), Executive Engineer(s), Senior Assistant Engineer(s), Assistant Engineer(s) and others under the supervision of Project Director.

With this hierarchical organizational structure, LGED has a clear roles, responsibilities, and authorities for each of the positions. All the employees are guided by their senior officials and supervise their sub-ordinates and their sub-ordinates always report to them.

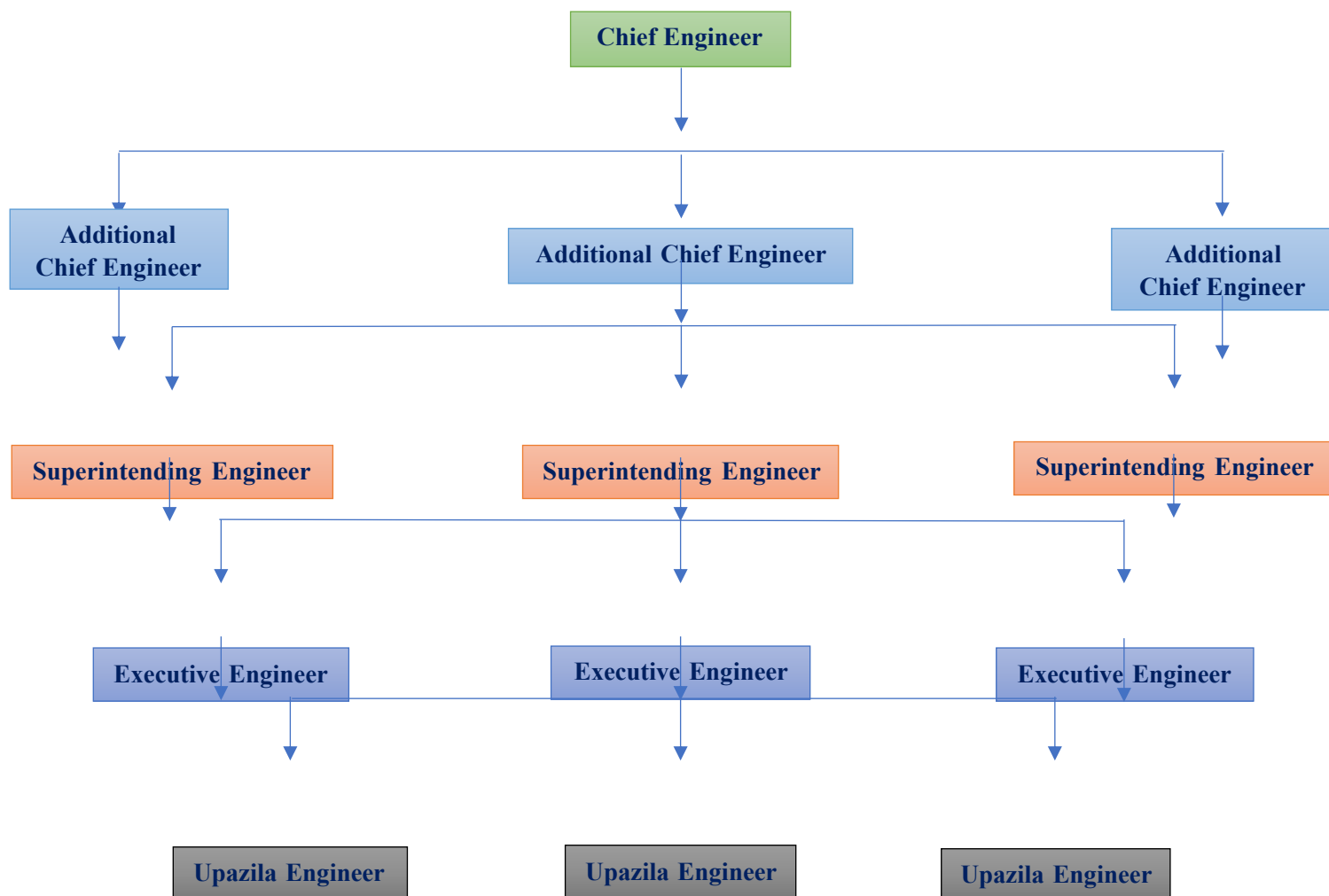


Figure-1: LGED's Typical Hierarchical Organizational Structure

2.2 History of LGED

Agriculture is the backbone of Bangladesh's economy. Rural development is an important sector for achieving country's economic progress. In the 60s of the last millenniums, four programs were adopted for rural development known as Comilla model. These included:

- Thana Training and Development Centre (TTDC)
- Rural Works Program (RWP)
- Thana Irrigation Program (TIP)
- Two Tier Cooperatives

The Rural Works Program included in the Comilla model was basically aimed at developing rural infrastructures. Later, in the 70s an Engineering Cell was created under the Ministry of Local Government, Rural Development & Cooperatives for implementation of the programs. In 1982 it was transformed into 'Works Program Wing' under development budget. Works Program Wing was reconstituted as Local Government Engineering Bureau (LGEB) in 1984 under revenue budget. LGEB was finally given the shape of a full-fledged department renaming it as Local Government Engineering Department (LGED) in 1992.

LGED is currently implementing the three programs out of four taken up under the Comilla model except the Two-Tier Cooperatives one. These programs are being executed under three sectors namely Rural, Urban and Small-Scale Water Resources Development. LGED runs on the philosophy of devolution of responsibilities as 98 percent of its total manpower discharge responsibilities at the field level (LGED website: www.lged.gov.bd).

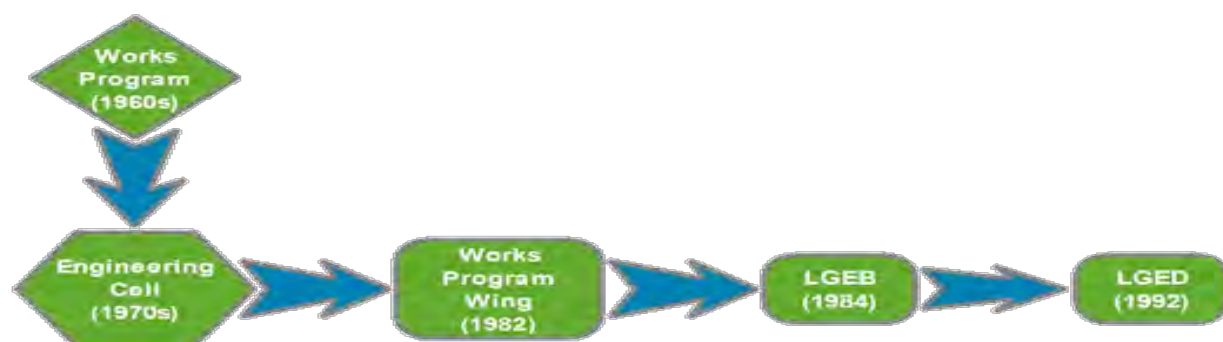


Figure-2: Formation of LGED

2.3 Mission and Vision of LGED

Mission of LGED is the Development and management of local infrastructure for increasing farm/non-farm production, generating employment, improving socio-economic condition, promoting local governance, reducing poverty and acting as agent of change at the local level.

LGED as a state-of-the-art government engineering agency will contribute to the execution of the following interrelated and complementary activities as its vision:

- Overall management and maintenance at all level of development including transportation, market, and small-scale water resources infrastructures with the participation of beneficiaries, stakeholders with proper emphasis on environmental and social safeguard issues; and
- Provide institutional and technical assistance to strengthen local government bodies and extend co-operation to local stakeholders and communities.

2.4 Functions of LGED

At the beginning LGED was involved in the rural infrastructure development but later the activities of the department expanded at a faster pace. LGED performs its functions through three sectors- Rural, Urban and Small-Scale Water Resources for creating local level infrastructural facilities thus contributing towards the goal of attaining economic growth. LGED as an agency also extends technical assistance to the Local Government Institutions (LGIs) while its project implementation leaves a positive impact in the overall progress of the country including the socio-economic development, employment generation and poverty alleviation.

❑ Rural Development

LGED is a national and internationally acclaimed world class engineering department in the field of rural infrastructure development. A study conducted by World Bank in 2016 states that most of the people living in remote rural areas have access to metaled road within two kilometres which are connected to highways. The achievement has been mentioned as an instance for developing countries.

Growth centres and rural markets are being developed to infuse dynamism in village economy, trade, and commerce. The facilities in place have enabled the farmers in the transportation of agricultural products to local markets and in ensuring fair prices. Enhanced income and creation of employment opportunities have left a positive impact in poverty alleviation.

LGED is also constructing Upazila Complex Buildings and its expansion as well as Union Parishad buildings so that the local people can have access to services from local government institutions under one roof. These rural infrastructures have facilitated in attaining the country's goal of graduating to the level of developing nations.

Bangladesh is gifted with a vast coastal belt along the Bay of Bengal. The zone is periodically lashed by cyclonic storm and tidal surge. LGED builds multipurpose cyclone shelters to save lives and properties of the coastal people from natural disasters. These cyclone shelters are also used as primary schools thus contributing to the expansion of education. Shelter connecting roads are also constructed for easy access to the shelters during natural disasters. The shelters are fitted with necessary amenities including safe drinking water, separate toilets for men and women, solar power, room for expecting mothers and new born as well as arrangements for keeping cattle heads at the shelter during natural disaster (LGED website: www.lged.gov.bd).

❑ Urban infrastructure development program

Bangladesh is experiencing a major rural to urban migration. Importance of cities and towns is ever increasing in the national development in view of fast urbanisation. Of the country's total population, 28 percent lives in urban areas and the contribution of cities and towns in GDP is more than 60 percent. Unplanned urbanization creates adverse impact on social and natural environment. Service delivery for the growing urban population like housing, water and sanitation, waste management, education, health, transportation etc. are major challenges. To address these challenges, LGED is extending assistance to municipalities and city corporations through various projects for the betterment of service delivery. These include formulation of master plans for municipalities, governance improvement and capacity development besides improvement of physical infrastructures of the townships (LGED website: www.lged.gov.bd)

❑ **Small scale water resources development program**

Bangladesh being an agrarian country is endowed with many rivers and water resources. Since 80s of the last millenniums, LGED initiated several schemes of small-scale water resources under the rural development projects with the objective to augment agricultural production using surface water. Subsequently the first small scale water resources development project was undertaken in the middle of 90s. Later, LGED started implementing small scale water resources development projects across the country with the participation of stakeholders in line with National Water Policy (NWP) of 1999 and the National Water Management Plan (NWMP) adopted in 2001 whereby LGED was given the responsibility of working in the command area up to 1000 hectares.

Activities like irrigation, pisciculture as well constructing embankment for protecting crop from floods are carried out under the small-scale water resources projects. Earthen mounds (Killa) are also built for protection of harvested crops from floods. The small-scale water resources projects implemented with participation of local people accelerated the pace of poverty reduction efforts of the government and above all the food autarky achieved in the country (LGED website: www.lged.gov.bd).

❑ **LGED's involvement with other ministries**

LGED is also involved in the implementation of infrastructure development work of other ministries side by side implementing its own projects. Notably, the Primary School and Primary Training Centres (PTI) build across the country by LGED under the Ministry of Primary and Mass Education is contributing to ensuring quality education and attaining one hundred percent enrolment in the school. PTIs are engaged in further upgradation of educational standard.

Upazila Freedom Fighters Complex Building Construction Project of the Ministry of Liberation War Affairs is also implemented by LGED. “Bir Nibash” (house of hero), a house building project for insolvent freedom fighters are being constructed so that the valiant sons of the soil can live with dignity and honour (LGED website: www.lged.gov.bd).

Besides, several projects undertaken by Ministry of Agriculture, Environment and Forest, Land and Chattogram Hill tracts Affairs are being implemented by LGED (LGED website: www.lged.gov.bd).

Functions of LGED can be viewed in the following figure;



Figure-3: Major Functions of LGED

2.5 Importance of LGED in Infrastructure Development

Local Government Engineering Department (LGED) is one the largest engineering agencies of the country. It began its journey in 60's as Rural Works Programme and with the passage of time its activities expanded from remotest corner of the country up to the cities. Role of LGED in strengthening of rural economy through development of rural transportation and improvement of rural markets and growth centers are visible across the country. Contribution of these infrastructures are enormous in achieving the ever-increasing national growth. People living in rural areas now have the access to metaled roads within two kilometers while the rural infrastructures play pivotal role in the improvement of lifestyle and reducing poverty. LGED also maintains its presence in the infrastructure development in urban areas. The department is also involved in providing technical assistance, governance improvement and capacity building of Urban Local Bodies (Municipalities and City Corporations). LGED's role in augmenting agricultural and fish production through small scale water resources (SSWR) development projects is remarkable. These initiatives have created short- and long-term employment opportunities for the low-income group of people. Besides, the activities mentioned above, LGED extending technical assistance to Local Government Institutions. Required technical assistance is also provided to various ministries.

2.6 Challenges Faced by LGED

Despite its achievements, LGED's contract management practices face numerous challenges:

- **Delays in Project Implementation:** Many LGED projects experience delays due to bureaucratic inefficiencies, lengthy approval processes, and disputes in contractor selection. For example, an internal audit report from 2022 revealed that over 30% of projects exceeded their planned timelines (LGED internal audit report, 2022).
- **Budget Overruns:** Cost escalations are a recurring issue, sometimes caused by inadequate planning, unforeseen technical challenges, and inefficient resource allocation. A 2021 report by the World Bank highlighted that 25% of LGED's infrastructure projects exceeded their original budgets by an average of 18% (World Bank. (2021). Bangladesh Public Expenditure Review: Enhancing Public Investment Effectiveness).

- **Limited Transparency:** Instances of corruption and biasness in procurement processes have been reported, reducing the department's accountability and efficiency (TIB (2021), National Integrity Strategy Review Report).
- **Inadequate Capacity:** A shortage of skilled personnel trained in modern contract management practices limits LGED's ability to effectively supervise and execute complex projects. Training and capacity-building initiatives are periodical, leaving significant gaps in technical and managerial expertise.
- **Technological Lag:** While global best practices increasingly rely on digital tools like e-procurement and blockchain for contract management, LGED's adoption of such technologies remains limited except e-procurement. This reliance on traditional methods hampers efficiency and transparency.

2.7 Sustainability and the Need for Reform

The growing emphasis on sustainability in infrastructure development adds another layer of complexity to contract management. Sustainable practices involve:

- Incorporating environmental considerations, such as using eco-friendly materials and minimizing carbon footprints.
- Promoting social balance by ensuring equitable access to infrastructure benefits.
- Enhancing economic efficiency through life-cycle cost analysis and long-term planning.

LGED's current practices often fall short of these sustainability criteria. For instance, a 2022 study found that only 40% of LGED projects explicitly incorporated environmental impact assessments during the planning phase (LGED internal audit report, 2022). Addressing this gap requires a strategic rebuild of contract management processes to integrate sustainability principles at every stage.

2.8 Relevance of the Study

Given LGED's pivotal role in Bangladesh's development, improving its contract management practices is critical for maximizing the impact of public investments. This study aims to identify gaps in current practices, explore opportunities for integrating sustainability, and provide realistic recommendations to improve efficiency, transparency, and accountability in LGED's contract management framework.

Chapter-3: Introduction

3.1 Background

In public infrastructure development, contract management serves as a critical component that governs how effectively resources are utilized and how successfully a project is implemented. The significance of this function increases exponentially in the public sector of a developing country like Bangladesh, where financial constraints, administrative inefficiencies, and accountability issues often hinder the success of infrastructure projects. Within this context, the Local Government Engineering Department (LGED) plays a vital role in implementing infrastructure projects across the nation, particularly in rural and semi-urban areas. LGED's broad mandate includes the development of roads, bridges, irrigation systems, growth centers, and markets: essential facilities that support the livelihoods and economic activities of millions of people.

As one of the largest public sectors implementing agencies in Bangladesh, LGED has evolved significantly since its inception in the 1960s. Initially launched as part of the Rural Works Programme, LGED has expanded its functions from local-level infrastructure to complex urban and national development projects. Its initiatives have contributed directly to poverty reduction, agricultural growth, and improved rural mobility. However, as project volumes and complexities have grown, so too have the challenges related to effective contract management. Issues such as frequent delays, budget overruns, weak supervision, limited use of digital systems, and inadequate enforcement of accountability mechanisms plague LGED's contract lifecycle management. These shortcomings often result in compromised project quality, inefficient resource use, and diminished public trust in the government's ability to deliver sustainable infrastructure.

At the heart of these challenges is the absence of a modern, standardized, and transparent contract management framework. Planning is often reactive rather than proactive, procurement processes are spoiled by inefficiencies and allegations of favoritism, and monitoring relies heavily on manual interventions rather than data-driven tools. This environment undermines project timelines, increases costs, and leads to dissatisfaction among beneficiaries (Nguyen, L., & Watanabe, T. (2022)).

Adding to this complexity is the growing global and national emphasis on sustainability. Modern infrastructure development is no longer measured by physical completion alone but also by its long-term social, environmental, and economic viability (Brammer, S., & Walker, H. (2011)). While LGED has begun to integrate sustainability considerations: particularly in donor-funded projects: such practices are still sporadic and largely absent in fully government-funded initiatives. Issues such as inadequate environmental assessments, limited stakeholder engagement, and minimal consideration of gender and social inclusion continue to persist. As a result, many projects fall short of aligning with Sustainable Development Goals (SDGs) and national climate resilience policies.

Contract management serves as the foundation of project execution, ensuring that projects adhere to defined scopes, timelines, budgets, and quality standards. This encompasses various stages, including:

- Planning: Establishing project objectives, risk assessments, and stakeholder engagements.
- Procurement: Tendering and awarding contracts to qualified contractors.
- Execution: Monitoring contractor performance, addressing unforeseen challenges, and ensuring compliance with project specifications.
- Monitoring and Evaluation: Assessing progress, verifying outputs, and ensuring accountability.

Effective contract management ensures that resources are utilized efficiently, risks are mitigated, and project outcomes meet stakeholders' expectations. Conversely, lack of efficiencies in contract management can lead to delays, cost overruns, and declined quality, hurting public trust and wasting taxpayer resources.

Therefore, the need for a comprehensive review of LGED's contract management practices is both urgent and essential. Understanding current procedures, identifying systemic gaps, and integrating sustainability into every stage of contract management can significantly enhance project outcomes. This study seeks to critically examine LGED's existing framework, assess the preparedness of the institution to adopt sustainable practices, and recommend evidence-based strategies that can improve transparency, efficiency, and accountability in contract execution.

3.2 Problem Statement

The Local Government Engineering Department (LGED) is the foundation of rural infrastructure development in Bangladesh, tasked with executing projects critical for socioeconomic development. Despite its significant contributions, LGED faces continuous challenges in contract management, which weaken the effectiveness of its projects and limit their impact.

- **Delays in Project Implementation:** Approximately 45% of LGED projects experience delays, often caused by inefficiencies in planning, lengthy approval processes, and disputes during contractor selection. Such delays disrupt timelines and increase project costs, reducing the overall efficiency of public spending (World Bank. (2021). Bangladesh Public Expenditure Review: Enhancing Public Investment Effectiveness).
- **Budget Overruns:** Ineffective cost estimation and resource allocation frequently result in budget overruns. Data from the World Bank (2021) indicates that 25% of LGED projects exceeded their initial budgets by an average of 18%, straining already limited resources (World Bank. (2021). Bangladesh Public Expenditure Review: Enhancing Public Investment Effectiveness).
- **Quality Deficiencies:** Many projects fail to meet quality standards due to inadequate monitoring mechanisms and contractor non-compliance.
- **Limited Transparency and Accountability:** Corruption and biasness in procurement processes erode public trust and contribute to minimal outcomes (TIB (2021), National Integrity Strategy Review Report).
- **Inadequate Capacity and Training:** A lack of trained personnel in contract management roles limits LGED's ability to address these challenges effectively.
- **Technological Gaps:** While global best practices emphasize the use of e-procurement, contract management software, and blockchain technology, LGED has been slow to adopt these innovations except e-procurement. This reliance on traditional, manual processes hampers efficiency and transparency.
- **Sustainability Concerns:** The integration of sustainability principles into contract management remains limited. Environmental impact assessments, green procurement practices, and life-cycle cost analysis are rarely prioritized, compromising the long-term benefits of infrastructure projects (Khan, M. M. H., & Muttakin, M. B. (2022)).

The persistent challenges in LGED's contract management practices not only impact the efficiency of public investments but also limit the department's ability to deliver high-quality, sustainable infrastructure. Addressing these issues requires a comprehensive review of existing practices, the identification of critical gaps, and the formulation of actionable strategies for improvement. This study seeks to bridge these gaps by providing a detailed analysis of LGED's contract management processes and offering recommendations to enhance their efficiency, transparency, and sustainability.

3.3 Objectives of the Study

The objectives of this study are designed to address the identified challenges in LGED's contract management practices and explore opportunities for improvement and sustainability. These objectives provide a structured approach to understanding the current landscape, identifying key gaps, and formulating actionable solutions;

- (i) Analyse Existing Contract Management Practices**
- (ii) Identify Key Challenges**
- (iii) Evaluate the Impact of Current Practices**
- (iv) Explore Prospects for Sustainability Preparedness**
- (v) Provide Realistic Recommendations**

□ Analyse Existing Contract Management Practices

The study aims to provide a detailed assessment of LGED's current contract management framework. This includes evaluating:

- The planning process, including project identification, risk assessment, and stakeholder engagement.
- Procurement procedures, focusing on tendering, contractor selection, and adherence to government regulations.
- Execution stages, assessing contractor compliance, resource utilization, and quality control mechanisms.
- Monitoring and evaluation practices, including project tracking, accountability measures, and post-completion audits.

❑ **Identify Key Challenges**

Understanding the barriers that hamper effective contract management is critical for developing targeted solutions. The study focuses on:

- Bureaucratic inefficiencies and procedural delays.
- Financial constraints, including budget overruns and resource misallocation.
- Transparency issues, such as corruption and biasness in procurement processes.
- Capacity gaps in terms of skilled personnel and institutional readiness.

❑ **Evaluate the Impact of Current Practices**

The study examines how existing practices influence project outcomes, focusing on:

- Timeliness: Assessing delays and their root causes.
- Cost efficiency: Analyzing budgetary compliance and cost overruns.
- Quality standards: Measuring the alignment of completed projects with predefined benchmarks.

❑ **Explore Prospects for Sustainability preparedness**

To align LGED's operations with global sustainability goals, the study explores:

- Incorporating green procurement policies to minimize environmental impacts.
- Adopting life-cycle cost analysis for long-term economic efficiency.
- Ensuring social involvement by addressing the needs of marginalized communities.

❑ **Provide Realistic Recommendations**

Based on the findings, the study aims to offer practical solutions for enhancing LGED's contract management practices. These include:

- Implementing digital tools such as blockchain for increased transparency.
- Establishing strong monitoring frameworks to ensure accountability.
- Designing capacity-building programs to upgrade LGED personnel.
- Proposing policy reforms to strengthen institutional frameworks and enforce compliance.

By achieving these objectives, the study seeks to contribute to the ongoing efforts to enhance public sector contract management in Bangladesh, ensuring that infrastructure projects are efficient, transparent, and sustainable.

3.4 Scope and Significance

The scope and significance of this study lie in its potential to address the critical gaps in LGED's contract management practices, ensuring the efficient utilization of public resources and the successful delivery of infrastructure projects. By focusing on both immediate and long-term improvements, the study provides a roadmap for upgrading operational efficiency, transparency, and sustainability in LGED's processes.

□ Scope of the Study

- **Geographical Focus:** The study is limited to LGED's operations within Bangladesh, covering projects in both rural and urban areas.
- **Thematic Focus:** The research focuses on contract management stages: planning, procurement, execution, and monitoring; with an emphasis on identifying inefficiencies and proposing sustainable practices.
- **Stakeholder Inclusion:** Key stakeholders, including LGED officials, contractors, policymakers, and beneficiaries, are considered to gain a comprehensive understanding of the issues.
- **Temporal Scope:** The study reviews contract management practices from 2018 to 2024, allowing an analysis of recent trends and challenges.
- **Methodological Scope:** A qualitative approach is employed, incorporating document analysis, case studies, stakeholder interviews, and comparative benchmarking.

□ Significance of the Study

- **Policy Implications:** The findings provide evidence-based recommendations for policymakers to enhance the regulatory and institutional frameworks to improve LGED's performance.
- **Operational Improvements:** By identifying inefficiencies, the study suggests realistic strategies to improve contract management processes, including the adoption of technology and capacity-building initiatives.

- **Sustainability Integration:** The study focusing the importance of incorporating environmental, social, and economic sustainability into LGED's projects, aligning with global best practices.
- **Knowledge Contribution:** The research contributes to the academic and professional discourse on public sector contract management, offering insights that can be applied to similar contexts in developing countries.
- **Improved Accountability:** By highlighting transparency issues, the study recommends for measures to strengthen accountability in LGED's procurement processes.

In summary, the study's scope and significance extend beyond addressing LGED's internal challenges. It aims to create a reverberation, improving public trust, optimizing resource utilization, and setting a benchmark for sustainable infrastructure development in Bangladesh and beyond.

3.5 Limitations of the Study

While this study provides valuable insights, several limitations must be acknowledged:

- The sample size (44 respondents) may not fully capture all regional or hierarchical variations within LGED.
- Only three case studies were analyzed, limiting the versatility across project types and regions.
- Access to some internal documents was restricted, affecting the depth of analysis for certain performance metrics.
- Subjective biases may exist in survey responses due to social desirability or fear of recrimination.

These limitations, however, do not diminish the validity of the findings, especially as triangulation and mixed-method analysis were used to mitigate bias.

Chapter-4: Literature Review

4.1 Theoretical Foundations

□ Principal-Agent Theory

Principal-agent theory provides a foundational framework for understanding the dynamics of contract management, particularly in scenarios where one entity (the principal) delegates tasks to another (the agent). In the context of LGED, the government officials act as the principal, while contractors serve as agents tasked with executing infrastructure projects. This theory highlights the inherent issues of goal disarrayed and information imbalance between principals and agents. Agents may act in their self-interest, prioritizing profit over quality and compliance. Effective contract management, therefore, requires mechanisms to:

- Align incentives between the principal and agent.
- Ensure strong monitoring and evaluation to minimize information imbalance.
- Introduce penalties or rewards to influence agent behavior positively.

For LGED, this involves setting clear performance benchmarks, regular audits, and transparent reporting mechanisms (www.investopedia.com/terms).

□ Transaction Cost Theory

Transaction cost theory focuses on minimizing the costs associated with the various stages of contract execution: negotiation, monitoring, enforcement, and adaptation. In public sector contract management, transaction costs can escalate due to inefficiencies, such as extended approval processes, disputes, and resource mismanagement.

Applying this theory to LGED highlights the importance of:

- Streamlining procurement processes to reduce delays.
- Employing digital tools to lower administrative costs.
- Establishing conflict resolution mechanisms to address disputes efficiently.

The adoption of e-procurement systems and contract management software can significantly reduce transaction costs, ensuring timely and cost-effective project delivery (www.investopedia.com/terms).

❑ Institutional Theory

Institutional theory examines how institutional norms, rules, and frameworks shape organizational behavior and decision-making. For LGED, adherence to government procurement regulations, compliance with international standards, and alignment with sustainability goals are critical institutional factors.

Key elements of institutional theory relevant to LGED include:

- The role of regulatory frameworks in ensuring transparency and accountability.
- The influence of organizational culture on decision-making processes.
- The importance of capacity building to adapt evolving institutional norms, such as sustainability mandates.

By integrating institutional theory into its operations, LGED can strengthen its adherence to best practices, enhance compliance, and align with global standards in public procurement (www.investopedia.com/terms).

4.2 Challenges in the Public Sector Contract Management

Contract management in the public sector, particularly in Bangladesh's infrastructure sector, remains a complex and often inefficient process. In institutions like the Local Government Engineering Department (LGED), multiple interrelated challenges compromise the effectiveness of project implementation, impacting cost, quality, timeliness, and sustainability. The following subsections elaborate on the major challenges identified through literature, institutional reports, and field evidence:

❑ Operational Delays

Operational delays are among the most widespread issues affecting public sector infrastructure projects. These delays typically begin at the planning and preparatory stages, where bureaucratic inefficiencies, interdepartmental coordination gaps, and slow decision-making prevent timely initiation (Alsuliman, J. (2019)). In the case of LGED, project delays frequently stem from:

- Slow approval of Development Project Proposals (DPPs) at ministerial levels, sometimes taking several months.
- Land acquisition delays, where ownership disputes or delayed compensations prevent project site handovers.

- Contractor mobilization issues, such as failure to start work on time due to financial or logistical constraints.
- Inadequate pre-construction risk assessments, resulting in unexpected site-related challenges like flooding, unstable soil conditions, or lack of utility relocation.

These operational setbacks significantly extend the project cycle, often leading to contract extensions, revised BoQs (Bills of Quantities), and administrative retendering: all of which increase costs and compromise outcomes.

❑ Corruption and Lack of Transparency

Corruption is a deeply entrenched issue in public procurement and contract execution. In Bangladesh, procurement processes are often perceived to be influenced by favouritism, political connections, and collusion among stakeholders. Within LGED, the following practices have been reported:

- Biased contractor selection, where qualified bidders are overlooked in Favor of politically backed firms.
- Manipulation of technical evaluation scores to favour specific bidders during tendering.
- Deliberate delays in payment processing or approvals to solicit informal benefits from contractors.
- Lack of transparency in contract award, implementation progress, and financial transactions.

A Transparency International Bangladesh (TIB) report in 2021 stated that more than one-third of public sector contracts had some form of irregularity, undermining the fairness and competitiveness of procurement. The absence of robust grievance mechanisms further exacerbates this problem, deterring contractors from reporting unfair practices (TIB (2021), National Integrity Strategy Review Report).

❑ Inadequate Technical Capacity

A major constraint within LGED is the shortage of adequately trained and experienced personnel in contract management. Despite being a technically oriented agency, LGED staff often lack specialization in areas such as:

- Advanced procurement planning
- Legal aspects of contract enforcement

- Monitoring and evaluation methodologies
- Integration of sustainability and climate resilience into contract clauses

Training, when available, is limited in scope, delivered irregularly, and rarely covers evolving global best practices. As a result, many engineers and procurement officials are ill-equipped to manage complex contracts, evaluate contractor performance, or ensure legal compliance. High staff turnover, workload pressure, and uneven distribution of skilled professionals across regions further weaken LGED's institutional capacity.

❑ **Inconsistent Monitoring and Evaluation**

Effective monitoring and evaluation (M&E) are crucial for ensuring that contracts are executed in accordance with scope, cost, and quality expectations. However, M&E systems within LGED projects are often underdeveloped or inconsistently implemented. Key issues include:

- Absence of standard performance metrics (e.g., KPIs related to time, cost, and quality).
- Lack of structured site inspections, particularly in remote project locations.
- Non-submission or falsification of progress reports, sometimes driven by fear of penalties or political pressure.
- Inadequate post-completion audits, limiting the department's ability to evaluate outcomes and learn from implementation gaps.

This inconsistency in M&E compromises accountability and allows underperforming contractors to escape consequences, ultimately reducing the effectiveness and value for money of public infrastructure ((ADB (2021), Guidance Note: Procurement Risk Framework).

❑ **Delays in Procurement**

Delays in procurement are a recurring bottleneck in the contract management cycle (Alsuliman, J. (2019)). Although Bangladesh has adopted the e-Government Procurement (e-GP) system, many critical processes are still delayed due to:

- Lengthy bid evaluation processes, often due to inadequate staffing or unclear evaluation criteria.
- Challenges in finalizing contract documents, including scope changes or disagreements over terms.
- Protests and appeals by unsuccessful bidders, which can put procurement on hold.

- Frequent cancellations or retendering, especially when corruption or collusion is suspected.

The World Bank (2021) reported that procurement delays in LGED projects added an average of 150 days to project timelines (World Bank. (2021), Bangladesh Public Expenditure Review). This not only increases administrative costs but also undermines the efficiency and continuity of project implementation.

❑ Technological Limitations

In a digital age, LGED's reliance on traditional, paper-based systems significantly reduces its ability to manage contracts efficiently. Although e-GP has improved tendering procedures, other areas remain largely manual or fragmented. Key gaps include:

- Lack of integrated contract management software, limiting real-time tracking of performance, payments, and milestone achievements.
- No centralized digital database, which makes inter-departmental information sharing difficult.
- Limited use of mobile applications or GIS tools for site-based monitoring.
- Absence of predictive analytics or AI tools to forecast risks, delays, or cost overruns.

This technological lag not only reduces operational efficiency but also contributes to data manipulation, reporting errors, and missed opportunities for process optimization.

❑ Environmental and Social Oversight

Sustainability is increasingly being recognized as a key pillar of public infrastructure development. However, environmental, and social dimensions are often neglected in LGED's contract management practices. Some critical oversights include:

- Superficial environmental impact assessments (EIAs) that are not rigorously implemented.
- Limited integration of climate-resilient designs, despite increased natural disaster risks.
- Lack of community engagement or social inclusion plans, especially for projects in marginalized or vulnerable areas.
- No mandatory requirement for life-cycle cost analysis or sustainable material sourcing in most GoB-funded projects.

These oversights lead to projects that are not only environmentally unsustainable but also socially inequitable, failing to deliver long-term development benefits (ADB (2021), Guidance Note: Procurement Risk Framework). Donor-funded projects tend to perform better due to stricter conditionalities, but such practices are not mainstreamed across all LGED operations.

4.3 Role of Technology in Contract Management

The integration of technology in contract management has the potential to restructure how public sector projects are planned, executed, and monitored. In the context of LGED, adopting technological solutions can address many of the existing challenges and enhance overall efficiency, transparency, and accountability.

❑ E-Procurement Systems

E-procurement systems streamline the procurement process by digitizing tendering, contractor selection, and bid evaluation. This reduces bureaucratic delays, minimizes human intervention, and enhances transparency. For instance, studies have shown that e-procurement adoption in similar contexts reduced procurement timelines by 25% and improved bidder participation by 30% (TIB (2021), National Integrity Strategy Review Report).

❑ Contract Management Software

Contract management software enables real-time tracking of project milestones, compliance, and financials. Features such as automated reminders for deadlines, digital document storage, and performance analytics improve project oversight. LGED's adoption of such tools could significantly mitigate delays and cost overruns.

❑ Blockchain Technology

Blockchain technology ensures secure, tamper-proof documentation and transparent record-keeping. It allows all stakeholders, including contractors and government officials, to access verified contract details, reducing the risks of fraud and disputes (Zulu, S., & Kilonzo, J. (2020)).

❑ **Geographic Information Systems (GIS)**

GIS tools are instrumental in planning and monitoring infrastructure projects. They enable LGED to visualize project locations, track progress remotely, and assess the environmental impact of projects in real-time.

❑ **Artificial Intelligence (AI) and Data Analytics**

AI-driven tools can analyze historical data to forecast project risks, optimize resource allocation, and recommend preventive measures. Predictive analytics powered by AI can help LGED identify potential delays or cost escalations before they occur.

❑ **Mobile Applications for Field Monitoring**

Mobile apps enable on-site monitoring and instant reporting of project progress. Field engineers and contractors can upload real-time data, including photographs and inspection reports, directly to centralized databases. This reduces communication lags and enhances accountability. This technology has been implementing in a pilot basis in LGED for last few years.

❑ **Integration of Sustainability Tools**

Technological solutions such as carbon footprint calculators and life-cycle assessment tools allow LGED to integrate sustainability metrics into contract management. This ensures that projects align with environmental and social goals, addressing the growing demand for sustainable infrastructure development.

4.4 Best Practices and International Experiences

4.4.1 Best Practices

❑ **Standardization of Processes**

- Develop standardized procedures and templates for contract management, ensuring consistency and reducing ambiguity.
- Use guidelines aligned with international standards like those from the World Bank or OECD (OECD. (2020)).

❑ **Technology Integration**

- Implement contract management software to improve tracking, reporting, and documentation.

- Explore blockchain technologies for secure and tamper-proof contract records.

❑ Capacity Building

- Regular training programs to enhance the skills of personnel involved in contract management.
- Certification courses in procurement and supply chain management.

❑ Robust Monitoring and Evaluation

- Set up performance indicators for assessing contract execution in terms of timeliness, cost-effectiveness, and quality.
- Conduct periodic audits to ensure adherence to contractual terms.

❑ Transparency and Accountability

- Establish clear reporting mechanisms for all stakeholders.
- Promote open communication channels to address grievances promptly.

❑ Sustainability Focus

- Incorporate environmental and social sustainability criteria in contracts.
- Encourage the use of sustainable materials and practices in project execution.

These best practices can enhance the contract management efficiencies in a significant way. These are practiced all over the world with better outcomes. (World Bank (2022), Transforming Infrastructure Contract Management: Lessons from Global Practices).

4.4.2 International Experiences

❑ United Kingdom - Government Commercial Function

The UK gives prior focus to develop professional attribute in contract management with dedicated roles, training, and standardized practices through its Commercial Capability Framework (UK Government Commercial Function (2022), Contract Management Standards and Capability Framework)

❑ Singapore - Public Sector Procurement

Singapore uses digital tools like the GeBIZ system for procurement and contract management, enhancing transparency and efficiency (GeBIZ (2024), Overview of Procurement Practices).

❑ World Bank Initiatives

The World Bank supports countries in adopting procurement reforms, including the integration of e-procurement platforms to reduce corruption and improve efficiency (World Bank (2023), Global Procurement Partnership: E-Procurement in Developing Countries).

❑ Ghana - Public Procurement Reforms

Ghana's efforts to implement a robust Public Procurement Law highlight the importance of legal frameworks and capacity building in enhancing contract management (Public Procurement Authority Ghana (2022), Procurement Reform Strategy 2019–2023).

❑ Australia - Sustainable Procurement

Australia integrates sustainability into public procurement by focusing on environmental and social outcomes, encouraging innovation and sustainable practices among suppliers (Australian Government (2022), Sustainable Procurement Guide. Department of Finance).

❑ Canada - Federal Contract Management

Canada's emphasis on supplier engagement and dispute resolution mechanisms showcases the importance of maintaining positive stakeholder relationships.

4.5 Gaps in Current Practices

❑ Inadequate Planning and Preparation

- **Lack of Comprehensive Needs Assessment:** Contracts are often initiated without thoroughly understanding project needs or aligning them with strategic objectives.
- **Insufficient Risk Analysis:** Failure to anticipate potential challenges, leading to helpless situations in mitigating risks such as delays, cost overruns, and legal disputes.

❑ Inefficient Procurement Processes

- **Limited Use of Technology:** Over-reliance on manual processes instead of adopting advanced digital tools like contract management software.
- **Procurement Delays:** Bureaucratic inefficiencies and prolonged approval cycles contribute to delayed contract initiation and execution.

- Vendor Selection Issues: Non-transparent or inconsistent criteria for vendor selection, sometimes influenced by biasness or corruption.

❑ Weak Monitoring and Evaluation

- Lack of Performance Metrics: Contracts often lack clear, measurable performance indicators, making it difficult to assess progress clearly.
- Inadequate Monitoring Mechanisms: Limited oversight during contract execution results in deviations from terms and quality standards going downward.
- Infrequent or Ineffective Audits: Audits, if conducted, are often retrospective and fail to provide actionable insights for ongoing projects.

❑ Capacity Deficiencies

- Inadequate Training and Expertise: Staff responsible for contract management often lack specialized skills in procurement, negotiation, and monitoring.
- High Staff Turnover: Frequent changes in personnel disrupt continuity and institutional memory, affecting contract management quality.

❑ Transparency and Accountability Challenges

- Ambiguous Processes: Limited transparency in procurement and contract awarding processes promotes mistrust among stakeholders.
- Weak Grievance Redress Mechanisms: Contractors and stakeholders often lack directions to raise concerns effectively, leading to unresolved disputes.

❑ Inefficient Communication and Stakeholder Engagement

- Poor Coordination: Lack of coordination between departments or teams results in misaligned priorities and delays.
- Minimal Stakeholder Input: Stakeholders, including contractors and beneficiaries, are often excluded from critical stages of contract management, resulting in solutions that do not fully address ground realities.

❑ **Legal and Policy Constraints**

- Rigid Legal Frameworks: Outdated rigid procurement and contract management policies restrict flexibility and adaptation to new challenges.
- Enforcement Gaps: Weak enforcement of contractual obligations results in non-compliance by contractors without significant outcomes.

❑ **Sustainability Oversight**

- Neglect of Sustainability Goals: Contracts rarely include criteria for environmental, social, and economic sustainability.
- Short-Term Focus: Emphasis on immediate cost and time efficiencies rather than long-term value creation and sustainability.

❑ **Financial Management Issues**

- Budget Overruns: Poor financial planning and weak control mechanisms lead to significant cost escalations.
- Delayed Payments: Contractors often face delays in payments, affecting their ability to meet project commitments.

❑ **Resistance to Change**

- Cultural and Institutional Resistance: Resistance to adopting new practices or technologies hampers efforts to upgrade contract management system.
- Limited Adoption of International Best Practices: A lack of benchmarking against successful models globally restricts innovation and improvement.

Addressing these gaps will require a composite approach, including policy reforms, capacity building, digital transformation, and improved stakeholder engagement. These gaps also highlight opportunities for LGED to improve its practices by adopting a structured, transparent, and technology-driven approach to contract management (LGED (2021), Internal audit report).

Chapter-5: Research Methodology

This chapter outlines the methodological framework adopted to explore contract management practices and sustainability preparedness in the Local Government Engineering Department (LGED) of Bangladesh. The study seeks to understand the effectiveness and gaps within LGED's current contract management processes and to assess how prepared the department is to integrate sustainability principles into its practices.

In public sector institutions like LGED, contract management is a critical function that ensures infrastructure projects are delivered within time, cost, and quality constraints. Meanwhile, sustainability: encompassing environmental, social, and economic aspects, has become an essential concern in public procurement globally. Thus, this study employed a mixed-methods approach, combining an individual questionnaire survey with case studies of selected LGED projects. The research leaned heavily on survey data to draw simplified conclusions, supported and enriched by case study findings (Creswell (2012); Creswell & Poth (2018)).

5.1 Research Philosophy and Approach

A research philosophy refers to the belief system or worldview that promotes the way research is conducted. It reflects assumptions about:

- How knowledge is generated (epistemology),
- The nature of reality being investigated (ontology),
- The role of values in research (axiology), and
- The logic of reasoning (methodology).

Understanding and clearly defining a research philosophy is critical, as it shapes the research design, data collection techniques, and interpretation of findings. For a study exploring both contract management practices and sustainability preparedness within a complex public institution like LGED, philosophical clarity ensures that methods are appropriately aligned with research goals.

❑ **Solution Focused Philosophy**

This study adopts the pragmatism research philosophy. Pragmatism focuses the practical application of research to real-world issues. It is especially appropriate for studies involving mixed methods: a combination of quantitative and qualitative approaches: as is the case here.

Pragmatism does not adhere rigidly to a single philosophical doctrine (such as positivism or interpretivism). Instead, it focuses on:

- Problem-solving orientation: How can research help improve contract management and sustainability in LGED?
- Methodological diversity: Using whatever methods are most appropriate to gain insight.
- Outcome-focused research: Emphasis on the utility of findings to practitioners and policymakers.

❑ **Reasons for Choosing Pragmatism**

There are several justifications for using Pragmatism as the philosophical foundation of this research:

- Complexity of the Subject Matter: Contract management and sustainability preparedness involve both technical systems (e.g., procurement, risk management) and human behavior (e.g., compliance, perception of sustainability), which require both numerical data and interpretative insights.
- Diverse Stakeholders: The LGED operates with engineers, procurement officials, contractors, consultants, and community members. A pragmatic philosophy allows the researcher to explore multiple perspectives using diverse data sources.
- Mixed Methods Strategy: The combination of a questionnaire survey and case studies aligns well with realism, which supports the integration of both deductive and inductive reasoning.
- Action-Oriented Results: The study aims to produce actionable recommendations for improving public contract practices in Bangladesh. Pragmatism supports this practical goal by focusing on results rather than methodological purity.

❑ **Ontological Assumptions (Nature of Reality)**

From a pragmatic ontological standpoint, reality is viewed as dynamic and socially constructed but also observable and measurable in parts. In the context of LGED:

- Certain aspects, such as contract timelines, variations, and budget performance, are objective and quantifiable.
- Other elements, like attitudes toward sustainability or perceptions of fairness in procurement, are subjective and require interpretive understanding.

Thus, the study assumes a mixed ontology—that both objective and subjective realities coexist (Saunders, M., Lewis, P., & Thornhill, A. (2019)).

❑ **Epistemological Assumptions (Nature of Knowledge)**

Under pragmatism, knowledge is viewed as context-specific, experiential, and changeable. Knowledge is generated by:

- Engaging with practitioners through surveys and interviews,
- Observing how policies are implemented on the ground (via case studies),
- Interpreting meaning from patterns, behaviors, and perceptions.

There is no one “true” version of reality, but multiple truths depending on stakeholder roles and experiences. Hence, both statistical and narrative knowledge are considered valuable (Saunders, M., Lewis, P., & Thornhill, A. (2019)).

❑ **Axiological Assumptions (Role of Values)**

Pragmatism acknowledges the influence of the researcher’s values in shaping the study. In this case:

- The researcher is motivated by the need to improve accountability, efficiency, and sustainability in public sector project delivery.
- Ethical concerns, such as fairness, inclusivity, and environmental management, guide the research focus.
- Reflexivity is practiced, meaning the researcher remains aware of their own assumptions and positionality throughout the process (Saunders, M., Lewis, P., & Thornhill, A. (2019)).

❑ **Methodological Implications**

The pragmatic philosophy leads directly to the adoption of a mixed-methods methodology, combining:

- Qualitative methods (e.g., surveys) to assess the prevalence, frequency, and statistical relationships of contract practices and sustainability factors.
- Quantitative methods (e.g., case studies, interviews) to understand stakeholder perspectives, contextual challenges, and institutional dynamics.

This approach allows for:

- Triangulation of findings from multiple sources,
- Greater validity and depth, and
- Flexibility to adjust data collection based on emergent perceptions.

5.2 Research Design

A research design is the design for conducting a study. It outlines how data will be collected, analyzed, and interpreted to answer research questions. A well-structured research design ensures the coherence, validity, and reliability of the study. In this research, focused on contract management practices and sustainability preparedness in the Local Government Engineering Department (LGED), a well-defined design is critical for exploring both procedural (contractual) and behavioral (sustainability-related) dimensions.

This study adopts a mixed-methods research design, which combines both quantitative and qualitative approaches. This design was selected to ensure that both numerical data (e.g., frequency of contract amendments, delays, sustainability integration rates) and narrative insights (e.g., perceptions of preparedness, implementation challenges) are captured. (Creswell, 2014)

An underlying parallel design was followed, where both quantitative and qualitative data were collected simultaneously, analyzed independently, and then merged for triangulation and interpretation.

5.2.1 Justification for Mixed-Methods Design

There are several reasons why a mixed-methods approach is most appropriate for this research:

- **Nature of the Research Topic:** Contract management is typically systematized and procedural, lending itself to quantitative measures (e.g., number of contract variations, dispute resolutions, etc.), while sustainability involves qualitative aspects such as stakeholder engagement, policy interpretation, and long-term impact.
- **Research Objectives:** The study seeks to evaluate practices and perceptions across multiple layers of LGED and its stakeholders. Quantitative methods alone would not reveal deeper insights into behaviors, values, or implementation challenges.
- **Complementarity:** The results of the survey help identify trends and gaps, while the case studies and interviews explain why those trends exist.
- **Triangulation:** The use of multiple methods allows for cross-validation of findings, increasing the study's reliability.

5.2.2 Components of the Research Design

The research design consists of two integrated components:

☐ Qualitative Design (Survey-Based)

- **Objective:** To gather broad data from LGED officials and stakeholders on contract management procedures and sustainability measures.
- **Method:** A structured questionnaire using close-ended questions.
- **Respondents:** Engineers, project directors, procurement specialists, and contractors.
- **Sample Size:** 44 valid responses out of 60 distributed questionnaires.
- **Sampling Technique:** Stratified random sampling (to ensure representation across LGED divisions and roles).
- **Data Analysis:** Descriptive statistics, cross-tabulation, and logical statistics using SPSS.

☐ Quantitative Design (Case Study and Interviews)

- **Objective:** To explore specific instances of contract execution and sustainability integration in LGED projects.
- **Method:** Multiple case study approach, combined with semi-structured interviews and document review.
- **Data Sources:** Project reports, procurement documents (DPP, ToR, BoQ), KIIs (Key Informant Interviews).
- **Data Analysis:** Thematic coding and SWOT.

5.3 Research Objectives

The methodology is framed around the following objectives:

- Analyse Existing Contract Management Practices
- Identify Key Challenges
- Evaluate the Impact of Current Practices
- Explore Prospects for Sustainability Preparedness
- Provide Realistic Recommendations

5.4 Population and Sampling

5.4.1 Target Population

The population includes LGED officials involved in project planning, design, procurement, implementation, supervision, and monitoring. This includes:

- Project Directors
- Executive Engineers
- Senior Assistant Engineers
- Assistant Engineers
- Procurement Officers
- Monitoring and Evaluation (M&E) Staffs

5.4.2 Sampling Strategy

❑ Questionnaire Survey

A purposive sampling technique was employed to target officials with relevant experience and job responsibilities.

- Sample Frame: LGED officials across central and district-level offices.
- Sample Size: 60 questionnaires were distributed; 44 were returned and validated, yielding a 73% response rate.

❑ Case Study Selection

Three LGED projects were selected using criterion-based purposive sampling, focusing on variation in:

- Project type (roads, bridges, urban infrastructure)
- Geographic location (rural, semi-urban, urban)

- Funding (government vs. donor-funded)

5.5 Data Collection Methods

☐ Questionnaire Survey

A structured questionnaire was designed, comprising five sections:

- Demographics – Position, years of experience, training history
- Contract Planning and Execution – Procurement procedures, contract types, documentation
- Contract Monitoring and Evaluation – Use of KPIs, penalty clauses, audit mechanisms
- Sustainability Preparedness – Awareness of environmental and social safeguards, training, policy support
- Barriers and Recommendations – Institutional, operational, and financial challenges

Pilot Testing: The questionnaire was piloted with 05 LGED officials. Based on their feedback, some items were rephrased for clarity, and ambiguous questions were removed.

Data Collection Process: Surveys were distributed both in person and electronically, ensuring geographical and departmental diversity.

☐ Case Study Data Collection

The case studies involved three components:

- Document Review: Project plans, contracts, procurement documents, audit reports, sustainability assessments
- Key Informant Interviews: Semi-structured interviews with project managers, engineers, contractors, and community stakeholders
- Field Observations: Visual inspection of sites to assess environmental, social, and economic sustainability features

Interview Guide: Focused on practical implementation of contract clauses, challenges faced, and examples of sustainability in design, materials, or operations.

5.6 Instrument Design and Validation

❑ Questionnaire Design

The survey instrument was informed by:

- Best practices from UNDP, World Bank, and ADB on sustainable procurement
- LGED's internal manuals and PPR 2008 (CPTU (2022), Public Procurement Rules (PPR), 2008 (Updated)).
- Academic literature on contract lifecycle management and sustainability in public sector

❑ Validity and Reliability

- Content Validity: Expert feedback from LGED senior officials ensured appropriateness.
- Construct Validity: Items were mapped to theoretical constructs and objectives.

5.7 Data Analysis

❑ Questionnaire Survey Analysis

Survey responses were coded and analyzed using SPSS.

- Descriptive Statistics: Frequencies, means, standard deviations
- Cross-Tabulations: For identifying regional or hierarchical variations
- Correlation Analysis: Tested relationships between training received and preparedness levels
- Open-Ended Responses: Categorized and coded for recurring themes

❑ Case Study Analysis

Thematic analysis was conducted using the following steps:

- Transcription of interviews
- Initial Coding – Identifying keywords, behaviors, gaps
- Axial Coding – Organizing codes into broader categories
- Theme Development – Derived themes included “Capacity Gaps,” “Donor Influence,” “Community Engagement,” and “Policy-Implementation Disconnect”

Case data were cross-validated with survey results to ensure alignment or highlight divergence.

5.8 Ethical Considerations

- **Informed Consent:** All participants were briefed on the research objectives and provided informed consent before participation.
- **Anonymity and Confidentiality:** Respondent identities were protected by using codes and reporting only aggregated data.
- **Voluntary Participation:** Participation was strictly voluntary, with no pressure or incentives influencing respondents' decisions.
- **Minimization of Risk:** The study posed minimal risk, with questions framed to avoid sensitive or distressing content.
- **Use of Secondary Data:** Only authorized or public documents were used, with proper citation and institutional permission where needed.
- **Data Protection:** All data were securely stored in password-protected folders; only the researcher had access.
- **Cultural Sensitivity:** Local norms and institutional protocols were respected throughout data collection and communication.
- **Researcher Reflexivity:** The researcher remained aware of personal bias and maintained a reflective journal during fieldwork.
- **Compliance with Guidelines:** The research adhered to national and international ethical standards, including APA and BERA codes.

5.9 Limitations of the Methodology

- **Limited Universality:** Findings may not fully represent all LGED divisions due to the focused sample size.
- **Case Study Scope:** Only three case studies were examined, limiting project-type diversity.
- **Potential Response Bias:** Respondents may have provided socially desirable answers, affecting objectivity.
- **Limited Access to Documentation:** Restricted access to some internal project files reduced analytical depth.
- **Time Constraints:** Academic deadlines limited extended data collection and in-depth analysis.

- Language Interpretation Issues: Terminology confusion may have impacted understanding among some respondents.
- Variation in Understanding of Sustainability: Not all participants had a uniform grasp of sustainability concepts.
- Absence of Baseline Indicators: Lack of standard sustainability benchmarks hampered comparative analysis.
- Analytical Tool Limitations: More advanced statistical or GIS tools were not used due to resource limits.

5.10 Methodological Strengths

- Triangulation of data increased validity.
- High response rate (73%) in survey ensured data quality.
- Geographically distributed sample provided representation.
- Rigorous case selection ensured contextual diversity.
- Combining quantitative and qualitative methods provided a comprehensive understanding.
- Grounded in actual LGED projects for practical applicability.
- Findings aligned with national and sustainability priorities.
- Maintained awareness of personal bias and documented decisions.
- Adapted research tools and timelines to field realities.
- Ethical robustness maintained throughout.

This chapter presented the research methodology used to explore contract management and sustainability preparedness in LGED. By employing a mixed-methods approach—with a survey-style emphasis complemented by case study analysis—the study ensured methodological rigor and practical relevance. The next chapter presents the findings derived from both quantitative and qualitative data.

Chapter-6: Findings & Discussions

This chapter presents and discusses the findings derived from the two primary sources of data used in this study: (1) an individual questionnaire survey of LGED personnel and (2) case study data from three types of representative infrastructure projects. The objective was to analyze contract management practices, identify sustainability preparedness levels, and assess gaps and opportunities for improvement within LGED.

The chapter is structured into two main parts: quantitative survey findings and qualitative case study results, followed by a discussion that synthesizes both data sources in relation to the study objectives.

6.1 Findings from Questionnaire Survey

A total of 44 LGED officials responded to the individual questionnaire survey. Respondents included Project Directors, Executive Engineers, Senior Assistant Engineers, Assistant Engineers, Procurement Officers, and other roles directly involved in contract management.

6.1.1 General Profile of Respondents

Focus Point	Responses
Role in LGED	Project Manager: 13.33% , Senior Engineer: 26.67% , Procurement Officer: 33.33% , Other: 26.67%
Duration in LGED	Less than 2 years: 14.30% , 2-5 years: 14.30% , 6-10 years: 28.60% , More than 10 years: 42.80%
Type of Projects engaged in LGED	Road construction: 37.04% , Bridge construction: 40.74% , Water resources projects: 22.22% , Others: 0.000%

Table-1: General Profile of Respondents

These demographics confirm that the data represent a cross-section of experienced LGED personnel engaged in critical infrastructure projects.

6.1.2 Contract Management Practices

❑ Planning and Procurement

Focus Point	Responses
Planning effectiveness	Very effective: 16.67% , Moderately effective: 58.33% Slightly effective: 16.67% , Ineffective: 8.33%
Procurement methods used in LGED	Open tendering: 62.50% , Limited tendering: 31.25% Direct procurement: 6.25% , Framework agreements: 0.00%
Tender evaluation criteria	Based on price only: 7.14% , Based on quality and price: 71.43% Based on prior experience: 21.43% , Based on recommendations: 0.00%

Table-2: Planning and Procurement scenario

These findings indicate a moderately strong planning framework but suggest limited excellence in pre-project preparation. While open tendering dominates, ensuring competitiveness, there is strong emphasis on quality and prior experience during contractor evaluation: a positive trend toward value-based procurement.

❑ Monitoring and Quality Control

Focus Point	Responses
Monitoring mechanism	Regular site visits: 33.33% , Digital tracking systems: 44.45% Progress reports: 22.22% , Contractor self-assessments: 0.00%
Quality assurance techniques	Regular inspections: 84.62% , Independent audits: 15.38% Contractor certifications: 0.00% , Other: 0.00%
Tools for contract management	Manual processes: 60.00% , Contract management software: 13.33% E-procurement systems: 26.67% , None: 0.00%

Table-3: Monitoring and Quality Control scenario

This reflects a reliance on traditional systems, though there is a clear recognition of the potential of digital tools. The gap in software adoption indicates a significant area for improvement.

❑ Documentation and Standardization

Focus Point	Responses
Use of standardized templates	Always: 58.34% , Often: 25.00% Rarely: 8.33% , Never: 8.33%

Table-4: Documentation and Standardization scenario

This suggests widespread but inconsistent use of templates, affecting document quality and contract transparency.

6.1.3 Challenges in Contract Management

❑ Planning Stage Constraints

Focus Point	Responses
Significant challenge during planning	Budget constraints: 52.94% , Lack of technical capacity: 23.53% Delays in approvals: 17.65% , Other: 5.88%
Affects in project outcome for delayed procurement	Always: 41.67% , Often: 25.00% Sometimes: 33.33% , Never: 0.00%
Challenges during monitoring	Lack of staff: 45.00% , Inadequate reporting systems: 20.00% Resistance from contractors: 20.00% , Other: 15.00%
Resource constraints affect contract management	Significantly: 58.34% , Moderately: 33.33% Slightly: 8.33% , Not at all: 0.00%
Ways to resolve conflicts or disputes	Through arbitration: 18.75% , By negotiation: 37.50% By involving higher authorities: 43.75% , Other: 0.00%
Challenges for ensuring transparency or accountability	Corruption: 38.89% , Lack of monitoring tools: 38.89% Inadequate policies: 16.67% , Other: 5.55%

Table-5: Planning Stage Constraints

These results highlight systemic issues: resource gaps, manpower shortages, procedural delays, and weak transparency frameworks: all affecting contract execution and governance.

6.1.4 Sustainability Preparedness

Focus Point	Responses
Incorporation of sustainability considerations	Always included: 50.00% , Often included: 16.67% Rarely included: 25.00% , Never included: 8.33%
Measures for environmental sustainability	Use of eco-friendly materials: 50.00% , Energy-efficient designs: 20.00% Waste management plans: 15.00% , Other: 15.00%
Inclusion of social and economic sustainability	Yes, fully included: 33.34% , Partially included: 50.00% Rarely included: 8.33% , Not included: 8.33%
Role of technology in enhancing sustainability	Significant role: 75.00% , Moderate role: 16.67% Minimal role: 8.33% , No role: 0.00%

Table-6: Sustainability Preparedness scenario

While sustainability is recognized, its integration remains inconsistent. Environmental aspects are more visible than social or economic components, and guidelines appear fragmented across contracts.

6.1.5 Improvement Opportunities

Focus Point	Responses
Effectiveness of training programs	Very effective: 83.33% , Moderately effective: 16.67% Slightly effective: 0.00% , Ineffective: 0.00%
Digital tools to improve contract management	Contract management software: 37.50% , Blockchain technology: 12.50% E-procurement systems: 50.00% , Other: 0.00%
Measures to enhance transparency	Independent audits: 33.33% , Digital reporting systems: 38.10% Public disclosure of contracts: 23.81% , Other: 4.76%
International best practices relevant to LGED	Standardized templates: 47.06% , Capacity building programs: 41.18% Robust monitoring frameworks: 11.76% , Other: 0.00%
Most critical area for improvement in LGED	Planning and procurement processes: 30.00% , Monitoring and evaluation systems: 25.00% Training and capacity building: 20.00% , Transparency and accountability: 25.00%

Table-7: Improvement Opportunities

6.1.6 Open Recommendations Summary

Recommendations from participants in the questionnaire survey,

☐ Problems Identified

- Poor contract drafting
- Project delays
- Lack of technical knowledge
- Political interference
- Corruption

☐ Suggested Solutions

- Assign the right person to the right role
- Regular monitoring and auditing
- More training and capacity-building
- Use of IT tools (including AI)

6.2 Findings from Case Studies

All three projects are categorized as Investment Projects, but differ by source of funds:

- Project Type-1: Fully government-funded (GoB)
- Project Type-2: Mixed funding (GoB and Donor Agencies)
- Project Type-3: Fully donor-funded (Foreign Aid/Loan)

This financial distinction plays a crucial role in shaping project management styles, compliance levels, and sustainability preparedness, as will be discussed in the following sections.

6.2.1 Analysis of Contract Performance Metrics

❑ Contract Completion on Time

Project Type	Total Contracts	Completed on Time	Percentage
Type-1	188	27	14.36%
Type-2	256	52	20.31%
Type-3	156	22	14.10%
Standard Deviation	51.0686	16.0728	3.5127%

Table-8: Contract completion status

The data show that less than 21% of contracts were completed on schedule across all projects. Notably, donor-supported projects (Type-2) performed relatively better, though still far below ideal standards.

The standard deviation analysis shows that while the number of contracts varied considerably across project types ($SD = 51.0686$), the on-time completion percentages had only a small spread ($SD = 3.5127\%$). This means workload distribution differs, but efficiency problems are system-wide rather than type-specific. The variation in absolute completions ($SD = 16.0728$) further indicates that some project types deliver more individual successes, yet overall performance remains consistently low.

Implication: Time overruns are systemic and not limited to a single project type. Causes include planning inefficiencies, unrealistic deadlines, and poor forecasting of site and environmental risks.

❑ Contract Time Extensions

Extension Type	Type-1	Type-2	Type-3	Standard Deviation
1st Extension	30.85%	24.22%	17.95%	6.4508%
2nd Extension	33.51%	30.47%	34.62%	2.1485%
3rd Extension	15.43%	13.28%	23.08%	5.1508%

Table-9: Contract time extension status

Approximately 80% or more contracts required at least one extension, with some extended up to three times. The highest incidence of 3rd extensions was observed in donor-only projects (Type-3).

The standard deviation values highlight how extension patterns varied across project types. For the 1st extension, the SD (6.4508%) indicates a moderate spread, with Type-1 projects relying more on extensions than Type-3. In the 2nd extension, the SD (2.1485%) is very low, showing that extension practices were almost uniform across all types. However, in the 3rd extension, the SD (5.1508%) again reflects noticeable variation, as Type-3 projects required far more extensions than others. Overall, the data suggest that while some stages of extension requests are consistently applied across project types, others show uneven patterns, pointing to differing management challenges.

Interpretation: While donor projects show slightly better initial completion, they also suffer prolonged execution delays—possibly due to complex monitoring or compliance obligations.

❑ Liquidated Damages (LD)

Project Type	LD Imposed (nos)	Percentage
Type-1	4	2.13%
Type-2	18	7.03%
Type-3	10	6.41%
Standard Deviation	7.0238	2.6681%

Table-10: Liquidated damages imposing status

Only a small fraction of contracts was penalized with LD for non-performance, despite widespread delays.

The standard deviation results provide useful insights into the imposition of Liquidated Damages (LD) across project types. The number of LD cases shows a high spread (SD = 7.0238), meaning some project types particularly Type-2 faced significantly more penalties compared to others. However, the percentage of LD imposed has a relatively smaller spread (SD = 2.6681%), suggesting that although the absolute number of cases varied, the proportionate use of LD remained more consistent across project types. This indicates that while certain categories attracted heavier penalties in total, the overall application of LD as a corrective mechanism reflects a relatively uniform practice. Such patterns highlight both uneven project performance and consistent enforcement of contractual accountability.

Observation: This suggests a reluctance to enforce accountability. LD imposition is more frequent in donor-influenced projects, indicating stronger contractual oversight.

❑ Contract Cancellations and Dropped Schemes

Category	Type-1	Type-2	Type-3	Standard Deviation
Retendered Contracts	6.91%	6.25%	5.77%	0.5724%
Dropped Contracts (Schemes)	3.72%	4.69%	3.85%	0.5265%

Table-11: Contract Cancellations and Dropped Schemes

The data shows that retendered contracts consistently have higher percentages across all contract types (Type-1: 6.91%, Type-2: 6.25%, Type-3: 5.77%) compared to dropped contracts (Type-1: 3.72%, Type-2: 4.69%, Type-3: 3.85%).

The standard deviation is slightly higher for retendered contracts (0.5724%) than for dropped contracts (0.5265%), indicating marginally greater variability among contract types. However, both deviations are relatively low, suggesting that the data is closely clustered around the mean for each category. This consistency reinforces the reliability of observed trends. The higher average for retendered contracts implies better retention or continuation patterns. Overall, the data supports a more stable performance for retendered contracts, with slightly more variation in outcomes.

Key Takeaway: Though not prevalent, retendering and scheme drops represent administrative inefficiencies and opportunity costs for public spending.

❑ Cost Variations

Variation Type	Type-1	Type-2	Type-3	Standard Deviation
Cost Increases	7.45%	10.16%	11.54%	2.0807%
Cost Reductions	2.13%	2.73%	2.56%	0.3092%

Table-12: Cost variation status

The data shows that cost increases are significantly higher than cost reductions across all variation types, with Type-3 experiencing the highest cost increase (11.54%). The incidence of cost escalation was highest in Type-3 projects, indicating a tendency for post-award changes, including addition of non-tendered items or poor cost estimation. In contrast, cost reductions are relatively small, with Type-2 showing the greatest decrease (2.73%).

The standard deviation for cost increases is 2.0807%, indicating considerable variability, especially between Type-1 and Type-3. Meanwhile, cost reductions display much lower variability, with a standard deviation of just 0.3092%, reflecting more consistent performance. This suggests that cost increases are less predictable and may require more robust control mechanisms.

Implication: Initial planning and cost control mechanisms are weak across LGED. Donor scrutiny may not fully mitigate variations but does improve documentation.

6.2.2 Common Causes and Observations

❑ Reasons for Time Extensions

- Inadequate original time allocation
- Natural calamities (e.g., floods, excessive rain)
- Scarcity of construction materials (e.g., bricks, stone)
- Delays in land/site handover

❑ Reasons for Contract Cancellations

- Contractors do not intend to complete the works on time.
- Due to financial inability of contractors.
- Due to Procuring Entity's convenient (specially for design change, dropped scheme etc.)

❑ Reasons for Contract Variations (Cost Increase)

- Due to design change during construction phase.
- Due to mistake while preparing the cost estimate.
- Inclusion of new items (non-tender items) during construction.

❑ Reasons for Contract Variations (Cost Reduction)

- Due to reduction of scope of works during construction.
- Due to mistake while preparing the cost estimate.
- Due to design change during construction phase.

❑ Reasons for dropped contracts

- Due to duplication with other projects.
- As already completed with other projects.
- The scheme is no longer valid or not required.

These observations indicate a pattern of reactive contract management rather than proactive, forecast-driven planning.

6.3 Discussion

The discussion elaborates on the findings of the case study survey by interpreting and viewing them considering the research objectives. It compares practices across project types (GoB-funded, GoB & Donor-funded, and Donor-funded), highlights systemic weaknesses, and evaluates sustainability preparedness and accountability. The key discussion themes are:

6.3.1 Contract Completion and Time Management

The percentage of contracts completed on time is notably low across all project types:

- Type-1 (GoB): 14.36%
- Type-2 (Mixed): 20.31%
- Type-3 (Donor only): 14.10%

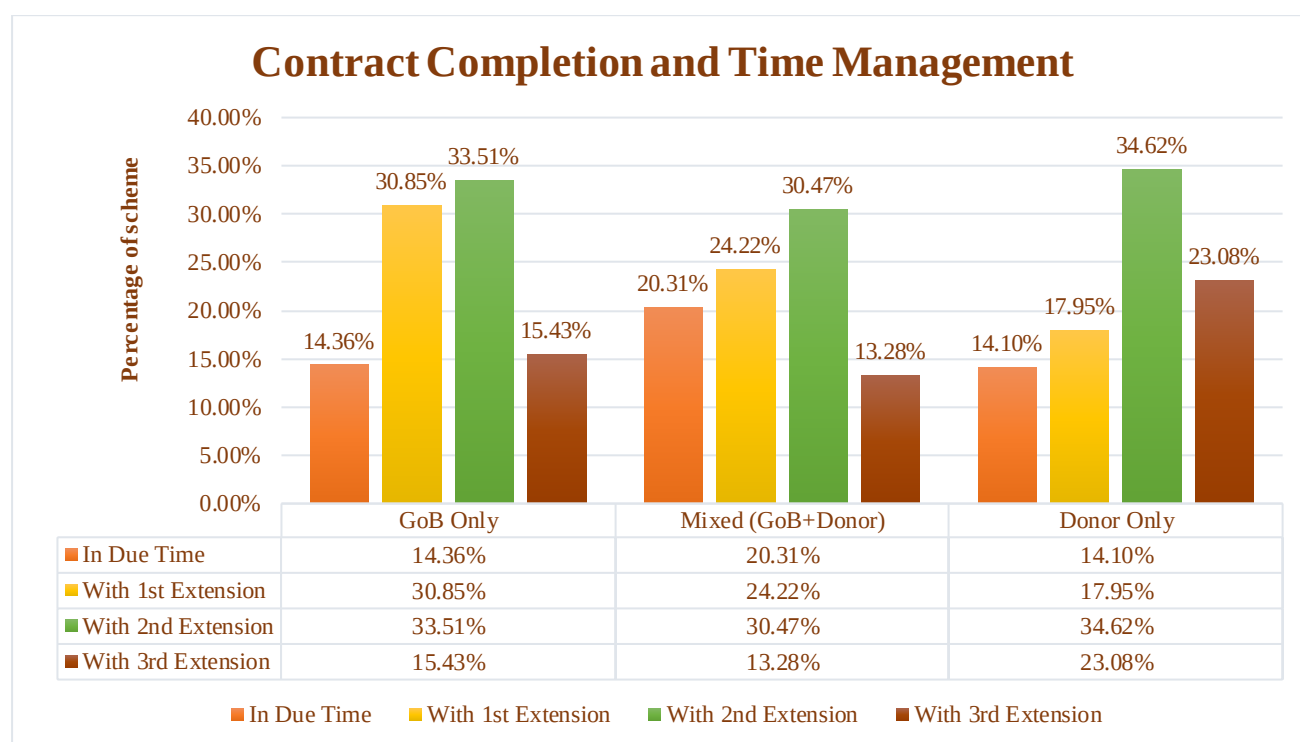


Figure-4: Contract Completion and Time Management

These figures suggest widespread inefficiency in timeline planning, project readiness, and contractor mobilization. The relatively better performance of Type-2 projects implies that donor oversight and milestone-driven planning frameworks positively influence completion rates. However, all project types share similar systemic weaknesses that go beyond funding structure.

The frequency of time extensions further supports this. More than 65–75% of all projects required at least a 1st extension, and a substantial proportion required second and even third extensions. This reflects chronic weaknesses in feasibility assessments, poor risk mitigation strategies, and weak site readiness planning.

6.3.2 Cost Control and Budget Variation

Cost variation is a prominent indicator of planning reliability. The data shows percentage of cost increase:

- Type-1 (GoB): 7.45%
- Type-2 (Mixed): 10.16%
- Type-3 (Donor only): 11.54%

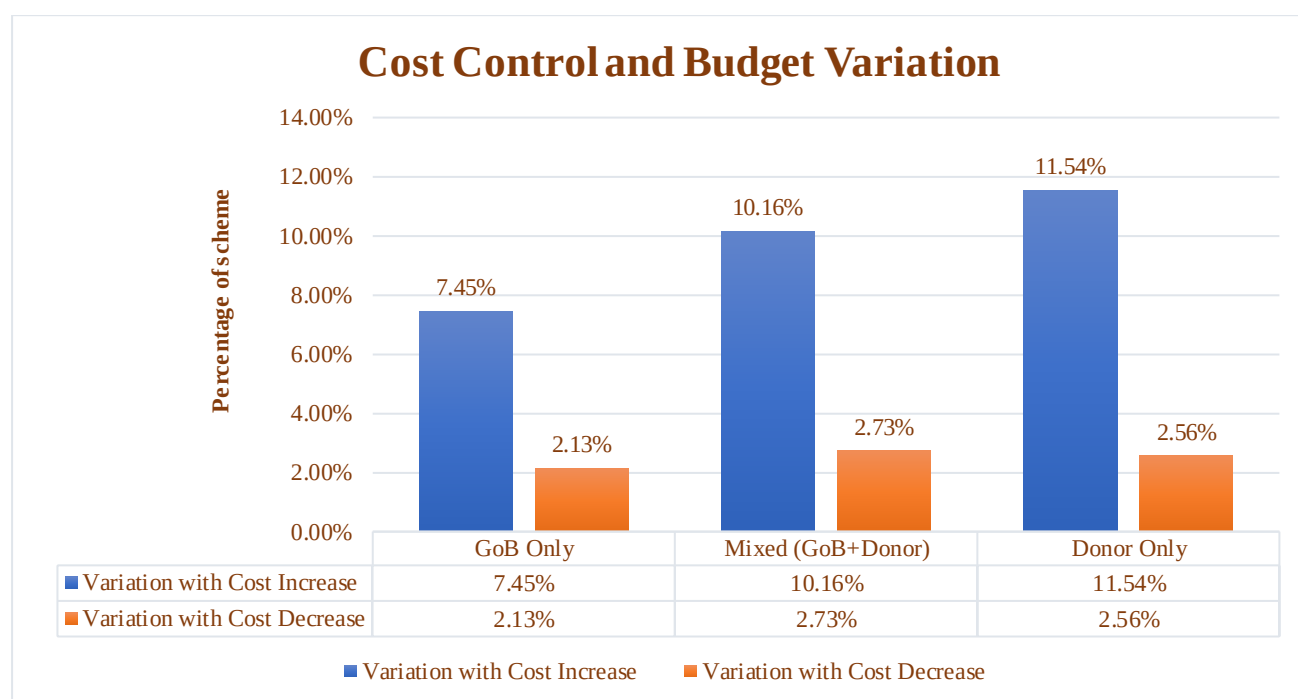


Figure-5: Cost Control and Budget Variation

The cost increase pattern suggests that design corrections and inclusion of non-tendered items were common across all types. Type-3 projects, while more carefully documented, still saw the highest cost variations: potentially due to flexible donor rules that allow design revisions during execution.

Cost reductions were less frequent and generally reflected minor adjustments, scope reductions, or corrections in original BoQ estimates. These patterns reveal weaknesses in estimation processes, engineering design validation, and contract scoping.

6.3.3 Enforcement of Penalties: Liquidated Damages

Despite extensive delays, Liquidated Damages (LD) were imposed in only a minority of cases:

- Type-1(GoB): 2.13%
- Type-2(Mixed): 7.03%
- Type-3(Donor only): 6.41%

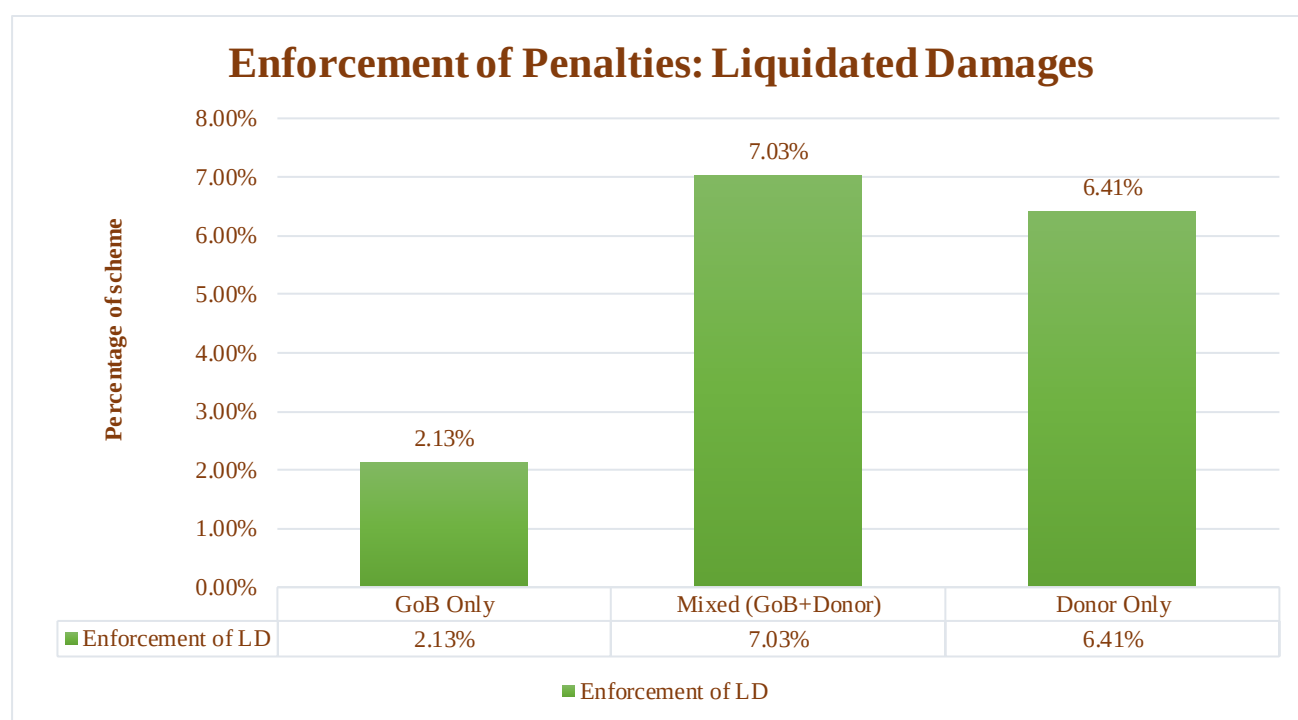


Figure-6: Enforcement of Penalties: Liquidated Damages

This suggests a reluctance to penalize non-compliance, especially in GoB-funded projects. In contrast, donor-funded projects show slightly stronger enforcement, possibly due to predefined escalation clauses in their contracts and regular external audits.

The low use of LD in Type-1 projects indicates a culture of indulgence or possibly political or hierarchical constraints that discourage strict enforcement. This hinders the reputation of LGED's contract management system and may reduce future contractor accountability.

6.3.4 Procurement and Contractor Behaviour

The retendering rates were as follows:

- Type-1(GoB): 6.91%
- Type-2(Mixed): 6.25%
- Type-3(Donor only): 5.77%

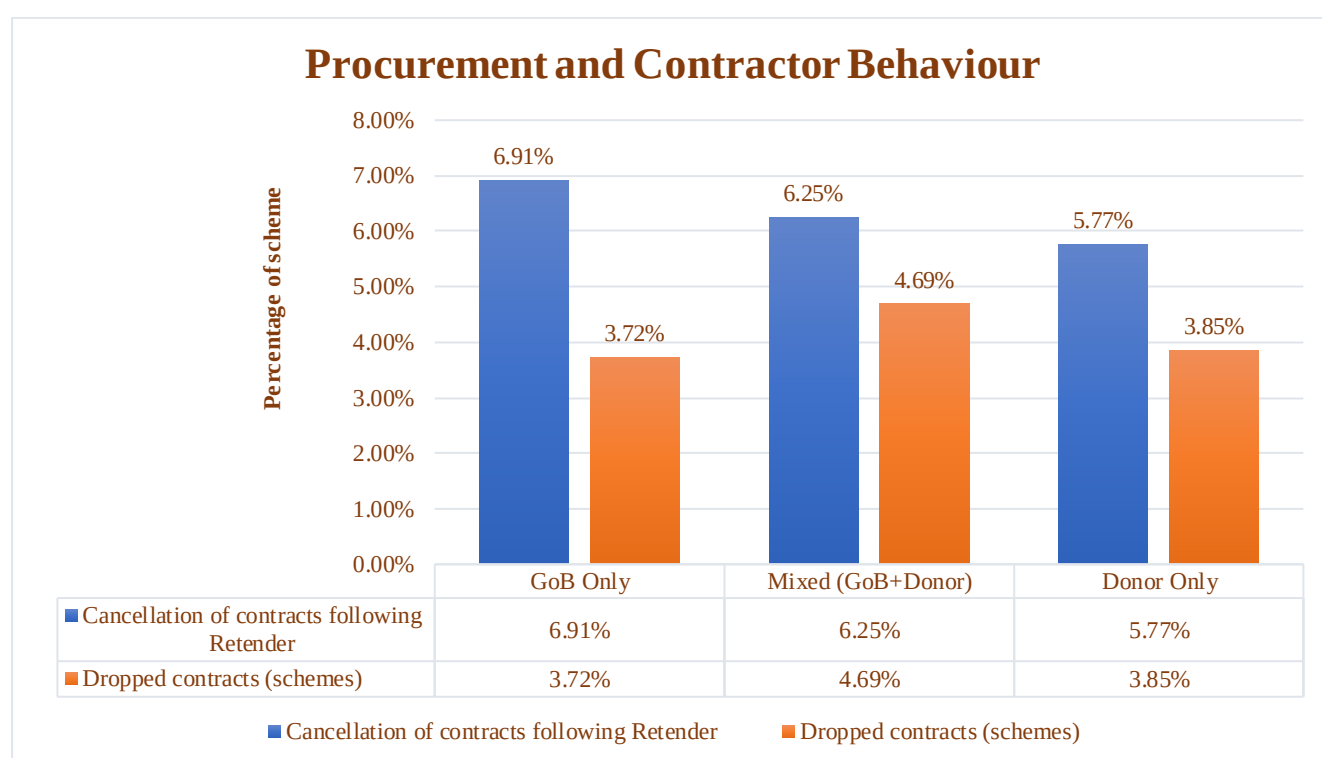


Figure-7: Procurement and Contractor Behaviour

These retendering events were mostly due to non-performance, lack of financial capacity, or delayed mobilization by contractors. This indicates that contractor screening procedures are not sufficiently diligent. In GoB-funded projects, political influence, and reliance on low-bid selection often led to contract awards to underqualified firms.

Additionally, dropped contracts due to duplication or withdrawn schemes point to flaws in interdepartmental coordination and project scoping.

6.3.5 Planning and Site Readiness

From the responses on reasons for time extensions and delays, the following were most cited:

- Inadequate original time allocation
- Natural disasters (floods, excessive rainfall)
- Scarcity of materials
- Delays in land acquisition or handover

These are not unforeseeable issues, which points to gaps in pre-construction planning, risk assessments, and stakeholder consultation. Particularly for GoB-only projects, the lack of a formal risk management process results in reactive management rather than proactive execution.

6.3.6 Monitoring, Documentation, and Record-Keeping

A significant contrast was observed between the documentation practices in donor-supported versus GoB-only projects:

- Donor projects had regular progress reports, milestone-based evaluations, and documentation of community consultations.
- GoB-only projects lacked such precision, with instances of missing site inspection logs, delayed submission of reports, and unverified contractor claims.

This underlines a digital and procedural gap in LGED's internal systems. Without real-time contract management tools or centralized monitoring dashboards, performance tracking is inconsistent and vulnerable to manipulation.

6.3.7 Institutional Practices and Donor Influence

Donor-funded projects showed:

- Better enforcement of timelines
- Higher rates of documentation and audits

- Inclusion of social and environmental safeguards
- Use of third-party monitoring agents

This confirms that donor conditions drive discipline, but also raises a concern: why aren't such practices institutionalized across all LGED projects? Relying on donor pressure is not sustainable. LGED must mainstream best practices into its standard operating procedures, regardless of funding source.

6.3.8 Sustainability Integration

While not always explicitly measured, sustainability integration was notably stronger in donor-funded projects. These projects often included:

- Environmental assessments
- Climate resilience clauses
- Gender and social inclusion targets

GoB-funded projects, in contrast, treated sustainability as peripheral or optional. This reveals a policy-to-practice gap: even though national frameworks (like the SDGs and climate action policies) exist, contractual clauses and monitoring indicators often fail to reflect them.

6.3.9 Lessons for Contract Management Reform

The case studies point to several institutional lessons:

- Digitalization is critical: Manual tracking leads to delays and weak transparency. LGED must adopt digital contract management software.
- Planning must improve: Timeline realism, BoQ accuracy, and site readiness assessments must be mandatory before contract awards.
- Enforcement must be institutionalized: LDs and blacklisting must be applied consistently to discourage underperformance.
- Donor best practices should be standardized: LGED should incorporate donor-style checklists, reporting formats, and audit systems in all projects.
- Sustainability must be made central: Environmental and social requirements should be included in the bidding, execution, and handover phases.

6.3.10 Linking Back to Research Objectives

Research Objective	Findings
Assess contract management practices	Planning delays, low on-time completion, weak documentation
Evaluate sustainability preparedness	Moderate in donor projects; weak in GoB-only
Identify institutional gaps	Weak enforcement, poor risk planning, lack of accountability
Suggest improvements	Mainstream digital tools, enforce penalties, mandate sustainability clauses

Table-13: Linking Back to Research Objectives

Chapter-7: Recommendations

7.1 Strengthen Planning and Pre-Contract Preparation

Recommendation 7.1.1: Introduce Mandatory Pre-Feasibility and Risk Assessment

- Require a pre-contract feasibility checklist including: site readiness, environmental risks, stakeholder needs, and seasonal/weather impacts.

Justification: Many projects were delayed due to natural calamities and land acquisition issues—indicators of weak risk forecasting and readiness.

Recommendation 7.1.2: Implement Standardized Time and Cost Estimation Tools

- Regularly update unit cost databases (BoQ references) using market trends and project history.

Justification: Faulty initial planning and estimates causes cost escalation and frequent time extensions.

7.2 Digitize and Streamline Contract Management

Recommendation 7.2.1: Introduce an Integrated Contract Management Information System (CMIS)

- Should include modules for tendering, contractor performance, milestone tracking, documentation, and payments.
- Use unique project codes for traceability.

Justification: 60% of officials still use manual systems; software adoption was below 15%.

Recommendation 7.2.2: Deploy Mobile-Based Monitoring Apps for Field Engineers

- Include GPS, photo uploads, milestone validation, and deviation alerts.
- Link directly to CMIS and project dashboards.

Justification: Such tools reduce misreporting, promote transparency, and were recommended in both literature and survey responses.

7.3 Improve Capacity and Training

Recommendation 7.3.1: Create a Certification-Based Training Program on Contract and Sustainability Management

- Partner with national institutes or development partners (e.g., ADB, World Bank).
- Make certification mandatory for promotions or procurement roles.

Justification: 60% of procurement officers had no formal training; 83.33% considered training highly effective.

Recommendation 7.3.2: Build Internal Pools of Expert Evaluators and Planners

- Rotate highly trained staff to high-value or complex projects.
- Maintain an internal registry of certified specialists.

Justification: High turnover and inadequate specialization reduce institutional memory and planning accuracy.

7.4 Enhance Transparency and Accountability

Recommendation 7.4.1: Establish a Public-Facing Project Dashboard

- Display real-time progress, contractor info, financials, and M&E reports for all active contracts.

Justification: Limited transparency and corruption were major issues; digital disclosure can reduce discretion and increase trust.

Recommendation 7.4.2: Ensuring Liquidated Damages (LD) Enforcement and Blacklisting

- Include LD clauses in every contract with enforcement protocols.
- Publish penalties and blacklist underperforming contractors.

Justification: LD was imposed in only 2–7% of delayed contracts despite over 75% requiring time extensions.

7.5 Mainstream Sustainability Across All Project Stages

Recommendation 7.5.1: Introduce a “Sustainability Compliance Scorecard”

- Cover environmental (eco-materials, EIA), social (inclusion, employment), and economic (life-cycle costing) aspects.
- Require a minimum score at each project stage (planning, procurement, execution).

Justification: Only 33.34% of respondents reported full inclusion of social/economic guidelines; donor-funded projects performed better.

Recommendation 7.5.2: Include Climate and Disaster Resilience Clauses

- Require contractors to adopt climate-resilient designs and provide contingency plans.

Justification: Many projects faced natural delays; integrating resilience would reduce extension frequency.

7.6 Institutional Reforms and Policy Measures

Recommendation 7.6.1: Update LGED’s Standard Operating Procedures (SOPs) and Manuals

- Include technology adoption, M&E, sustainability, and dispute resolution guidelines.
- Align with international standards like those from OECD, World Bank.

Justification: Reliance on outdated manual-based Standard Operating Procedures (SOPs) limits innovation and consistency.

Recommendation 7.6.2: Establish a Dedicated “Contract Management and Sustainability Cell” within LGED

- Staffed with specialists in procurement law, green design, and digital systems.
- Acts as a central unit for training, compliance, vendor vetting, and reforms.

Justification: Coordination gaps and ad-hoc sustainability practices can be mitigated by a specialized internal team.

7.7 Leverage International Best Practices

Recommendation 7.7.1: Adoption of Best Practices Observed in Donor-Funded Projects

- Regular audits, milestone-based payments, third-party monitors, and gender/social inclusion clauses should be replicated in GoB-funded projects.

Justification: Donor-funded projects showed better planning, reporting, and sustainability preparedness.

Recommendation 7.7.2: Pilot Blockchain for Procurement Documentation

- Begin with a small project or district to test blockchain for transparency and permanent records.

Justification: Literature review supports blockchain for fraud prevention and contractor accountability.

7.8 Improve Legal and Contractual Safeguards

Recommendation 7.8.1: Standard Model Contracts with Legal Safeguards

- Develop and mandate LGED-approved standard contract templates with predefined clauses for:
 - Termination conditions
 - Variation limits
 - Arbitration and dispute resolution
 - Sustainability obligations

Justification: Frequent contract extensions and variations indicate weak contract enforceability and loopholes in current templates.

Recommendation 7.8.2: Strengthen Legal Capacity within LGED

- Establish a legal review team to vet all high-value or complex contracts before signing.
- Train field-level engineers on contract law basics, claim management, and dispute avoidance.

Justification: Many project managers rely on discretionary decision-making due to limited legal understanding, weakening contract compliance and risk mitigation.

7.9 Promote Data-Driven Decision-Making and AI Integration

Recommendation 7.9.1: Develop a Central Project Analytics Dashboard

- Aggregate data from CMIS, GIS, and financial modules to provide:
 - Project completion trends
 - Risk hotspots (e.g., regions with frequent extensions or budget issues)
 - Real-time contractor performance analytics

Justification: The absence of data-driven decision support tools leads to repeated errors and poor forecasting.

Recommendation 7.9.2: Introduce Predictive Analytics and AI Tools

- Use machine learning models to forecast:
 - Potential project delays based on past patterns
 - Risk of contractor default
 - Budget deviation risks based on initial estimates and site conditions

Justification: International experience and academic literature support the role of AI in early warning systems and resource optimization—areas where LGED is lagging.

7.10 Develop Resilience and Continuity Frameworks

Recommendation 7.10.1: Integrate Disaster Risk Reduction (DRR) into Contract Lifecycle

- Require all projects to include DRR strategies such as climate risk mapping, flood-resilient materials, and emergency response protocols.
- Adopt DRR performance criteria in contractor evaluation.

Justification: Natural disasters are cited as frequent causes of delays. Proactive inclusion can reduce reactive damage control.

Recommendation 7.10.2: Establish Business Contingency Plans for Project Interruptions

- Develop Contingency Plan templates for contractors and LGED teams, covering:
 - Material supply disruptions
 - Pandemic response
 - Political unrest or land disputes

Justification: Lack of preparedness for external shocks was noted as a major factor in repeated time extensions and stalled projects.

7.11 Short, Medium and Long Term Phased Roadmap

Time Horizon	Actions
Short-Term (0–1 yr)	Capacity-building programs; standardize planning templates; introduce KPIs; pilot mobile apps.
Medium-Term (1–3 yrs)	CMIS rollout; dashboard launch; SOP revisions; public grievance mechanism.
Long-Term (3–5 yrs)	Adoption of blockchain; scale sustainability scorecard; implement certification-based promotions.

Table-14: Short, Medium and Long Term Phased Roadmap

These recommendations provide a structured and actionable path for enhancing LGED’s contract management practices and sustainability integration. Rooted in empirical evidence and global best practices, the reforms aim to foster transparency, efficiency, and resilience in public infrastructure delivery—ensuring that Bangladesh’s development objectives are met with integrity and planning.

Chapter-8: Conclusion

8.1 Overview

This study aimed to critically examine the contract management practices and sustainability preparedness of the Local Government Engineering Department (LGED) in Bangladesh. By combining survey data, case studies, and theoretical frameworks, the research offers a multidimensional analysis of existing institutional practices, their limitations, and opportunities for reform. The conclusions drawn from this study are both diagnostic and prescriptive, providing a foundation for enhancing the efficiency, accountability, and sustainability of LGED's infrastructure project delivery mechanisms.

8.2 Summary of Key Findings

❑ Contract Planning and Execution

The study revealed that contract planning processes in LGED are moderately structured but often fail to incorporate precise risk assessment, stakeholder analysis, and site readiness verification. Over 45% of projects experienced significant delays due to issues that could have been foreseen: such as weather disruptions, material shortages, and land acquisition barriers. The absence of standardized feasibility assessments and realistic scheduling emerged as a key weakness.

❑ Procurement and Contractor Selection

While open tendering is widely practiced, selection criteria often prioritize cost over capability. This price-based awarding approach results in the selection of underqualified contractors who later struggle to deliver. Inadequate vetting weakens transparency and competitiveness. The survey data and case study perceptions confirmed that procurement inefficiencies directly impact both cost and time performance.

❑ Monitoring, Compliance, and Enforcement

The monitoring mechanisms in place are inconsistent, heavily reliant on manual inspections, and lack digital integration. Liquidated Damages (LD), despite being contractually mandated, were rarely enforced: applied in only 2–7% of cases across project types. Contractor

accountability is undermined by mercy in performance penalties, absence of centralized performance databases, and weak documentation practices.

❑ **Sustainability Integration**

While sustainability awareness exists among LGED personnel, actual implementation remains partial and inconsistent. Environmental components such as eco-material usage and EIA compliance are occasionally included, but social and economic sustainability (e.g., gender inclusion, life-cycle costing) are largely absent from most GoB-funded projects. In contrast, donor-funded projects demonstrated better sustainability compliance, driven by external conditionalities.

❑ **Technological and Institutional Capacity**

The study observed a significant gap in the use of digital tools for contract lifecycle management. Only 13.33% of survey respondents reported using contract management software. Moreover, 60% of officials reported never receiving formal training in contract management or sustainability practices. High staff turnover and fragmented knowledge systems make worse this capacity deficiency.

8.3 Theoretical Contributions

The study applied three foundational theories: Principal-Agent Theory, Transaction Cost Theory, and Institutional Theory to interpret LGED's challenges and opportunities.

- Principal-Agent Theory highlighted the risks of goal misalignment between LGED (principal) and contractors (agents), particularly in the absence of strong enforcement mechanisms.
- Transaction Cost Theory explained how delays, renegotiations, and monitoring inefficiencies raise the operational cost of contracts.
- Institutional Theory emphasized the importance of adapting organizational norms to emerging needs such as sustainability and digitalization, where LGED is lagging.

These theoretical perspectives confirmed that many of LGED's challenges are systemic, not project-specific, and that reforms must focus on institutional structures rather than isolated practices.

8.4 Linkage to Research Objectives

Research Objective	Findings
Assess contract management practices	Planning delays, low on-time completion, weak documentation
Evaluate sustainability preparedness	Environmental components are sometimes addressed, but social and economic aspects are largely neglected.
Identify institutional gaps	Budget overruns, political interference, capacity gaps, and limited transparency were consistently observed.
Suggest improvements	Suggested reforms in digitalization, training, legal frameworks, stakeholder engagement, and sustainability integration.

Table-15: Comments on Research Objectives

8.5 Policy and Practical Implications

The conclusions derived from this study have major implications for public sector contract management in Bangladesh:

- For LGED Leadership: There is a critical need to institutionalize reforms beyond donor requirements. Best practices must be adopted across all project types.
- For Policymakers: Amendments to the PPR 2008 are needed to enforce sustainability mandates, promote e-CMS, and recognize digital documents legally.
- For Development Partners: Aid effectiveness can be enhanced by supporting institutional reform—particularly in capacity building, digital transformation, and regulatory updates.
- For Practitioners: Engineers, procurement officers, and M&E staff must embrace digital tools, continuous training, and transparency as core professional values.

8.6 Recommendations Summary

The study proposed a series of 11 reform areas and over 21 detailed recommendations, including:

- Mandatory pre-feasibility assessments
- Integrated contract management systems (CMIS)
- Certification-based training programs
- Sustainability scorecards and green registries
- Blockchain-enabled transparency measures
- Strengthen legal capacity
- Establish Business Continuity Plan

These reforms are organized into a phased roadmap (short, medium, and long-term) to guide LGED's transformation into a more accountable, efficient, and sustainability-oriented institution.

8.7 Limitations of the Study

While this study provides valuable insights, several limitations must be acknowledged:

- The sample size (44 respondents) may not fully capture all regional or hierarchical variations within LGED.
- Only three case studies were analyzed, limiting the versatility across project types and regions.
- Access to some internal documents was restricted, affecting the depth of analysis for certain performance metrics.
- Subjective biases may exist in survey responses due to social desirability or fear of recrimination.

These limitations, however, do not diminish the validity of the findings, especially as triangulation and mixed-method analysis were used to mitigate bias.

8.8 Future Research Possibilities

This study opens several avenues for future research:

- Longitudinal studies tracking the impact of digital and sustainability reforms in LGED projects.
- Comparative analyses between different local government departments or between countries with similar development contexts.

- In-depth studies on political economy and informal practices that influence contractor behavior and project outcomes.
- Evaluation of AI and blockchain pilot programs for public procurement transparency and fraud prevention.

8.9 Final Remarks

Contract management is not merely a technical function: it is a strategic driver of public value. In the context of Bangladesh's development ambitions, LGED must transform from a project-implementing agency into a learning organization capable of managing contracts with precision, accountability, and sustainability. This study underscores that the challenges are real, but so are the opportunities. With political will, strategic investments, and institutional leadership, LGED can become a model for infrastructure governance in South Asia.

References

a) Books and Academic Sources

1. Nguyen, L., & Watanabe, T. (2022). Enhancing contract management in public sector projects: A case study. *Journal of Public Administration Research and Theory*.
2. Zulu, S., & Kilonzo, J. (2020). Contract management in public sector projects: Challenges and solutions. *African Journal of Business Management*, 14(6), 234-245.
3. Alsuliman, J. (2019). Causes of Delay in Saudi Public Construction Projects. *Alexandria Engineering Journal*, 58(2), 801–808.
4. Brammer, S., & Walker, H. (2011). Sustainable procurement in the public sector: An international comparative study. *International Journal of Operations & Production Management*, 31(4), 452–476.
5. Creswell, J. W. (2012). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (4th ed.). Boston: Pearson.
6. Creswell, J. W., & Poth, C. N. (2018). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches* (4th ed.). Thousand Oaks, CA: Sage Publications.
7. Khan, M. M. H., & Muttakin, M. B. (2022). Sustainable Procurement Practices in the Local Government Sector of Bangladesh. *Public Organization Review*, 22, 617–635.
8. Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research Methods for Business Students* (8th ed.). Pearson Education Limited.

b) Reports, Guidelines & Institutional Documents

9. ADB. (2021). *Guidance Note: Procurement Risk Framework*. Asian Development Bank.
10. Australian Government. (2022). *Sustainable Procurement Guide*. Department of Finance.
11. CPTU. (2022). *Public Procurement Rules (PPR), 2008 (Updated)*. Central Procurement Technical Unit, Bangladesh.
12. OECD. (2020). *Government at a Glance 2020*. OECD Publishing.
13. Transparency International Bangladesh. (2021). *National Integrity Strategy Review Report*. Dhaka: TIB.
14. LGED. (2021). *Internal audit report*.

15. World Bank. (2021). Bangladesh Public Expenditure Review: Enhancing Public Investment Effectiveness. Washington, DC: The World Bank.
16. World Bank. (2022). Transforming Infrastructure Contract Management: Lessons from Global Practices. Washington, DC.

c) Web and Online Sources

17. GeBIZ (Singapore Government Procurement Portal). (2024). Overview of Procurement Practices. <https://www.gebiz.gov.sg>
18. Local Government Engineering Department. www.lged.gov.bd
19. www.investopedia.com
20. Public Procurement Authority Ghana. (2022). Procurement Reform Strategy 2019–2023. <https://ppa.gov.gh>
21. UK Government Commercial Function. (2022). Contract Management Standards and Capability Framework. <https://www.gov.uk/government/publications/contract-management-standards>
22. World Bank. (2023). Global Procurement Partnership: E-Procurement in Developing Countries. <https://www.worldbank.org/en/programs/global-procurement-partnership>.

d) Thesis-Specific and Internal Sources

23. Author's Survey Data. (2025). Questionnaire responses from LGED officials.
24. Author's Case Studies. (2025). Analysis of three types of infrastructure project according to sources of funding.

Appendix

1. Individual Questionnaire Survey Summary:

<i>Si No</i>	<i>Questions</i>	<i>Answer Options</i>	<i>Number of Responses</i>	<i>Remarks</i>
Section A: General Information				
1	What is your role in LGED?	Project Manager	6	
		Senior Engineer	12	
		Procurement Officer	15	
		Other	12	
2	How long have you been involved in contract management within LGED?	Less than 2 years	6	
		2-5 years	6	
		6-10 years	12	
		More than 10 years	18	
3	What type of projects do you primarily manage in LGED?	Road construction	30	
		Bridge construction	33	
		Water resource projects	18	
		Others	0	
Section B: Current Contract Management Practices				
4	How effective is the planning stage in your projects?	Very effective	6	
		Moderately effective	21	
		Slightly effective	6	
		Ineffective	3	
5	What procurement method is most commonly used in LGED?	Open tendering	30	
		Limited tendering	15	
		Direct procurement	3	
		Framework agreements	0	
6	How are contractors evaluated during the procurement stage?	Based on price only	3	
		Based on quality and price	30	
		Based on prior experience	9	
		Based on recommendations	0	
7	Which monitoring mechanism is most effective in tracking project progress?	Regular site visits	18	
		Digital tracking systems	24	
		Progress reports	12	
		Contractor self-assessments	0	
8	How is quality assurance maintained during project execution?	Regular inspections	44	
		Independent audits	8	
		Contractor certifications	0	
		Other	0	

Si No	Questions	Answer Options	Number of Responses	Remarks
9	What tools or systems are used for contract management?	Manual processes	27	
		Contract management software	6	
		E-procurement systems	12	
		None	0	
10	Are standardized templates used for contract documentation?	Always	21	
		Often	9	
		Rarely	3	
		Never	3	
Section C: Challenges in Contract Management				
11	What is the most significant challenge during the planning stage?	Budget constraints	27	
		Lack of technical capacity	12	
		Delays in approvals	9	
		Other	3	
12	How often do delays in procurement affect project outcomes?	Always	15	
		Often	9	
		Sometimes	12	
		Never	0	
13	What challenges arise in monitoring contractors?	Lack of staff	27	
		Inadequate reporting systems	12	
		Resistance from contractors	12	
		Other	9	
14	How do resource constraints affect contract management?	Significantly	21	
		Moderately	12	
		Slightly	3	
		Not at all	0	
15	How are conflicts or disputes during project execution resolved?	Through arbitration	12	
		By negotiation	24	
		By involving higher authorities	28	
		Other	0	
16	What challenges do you face in ensuring transparency and accountability?	Corruption	28	
		Lack of monitoring tools	28	
		Inadequate policies	12	
		Other	4	
Section D: Sustainability Preparedness				
17	How are sustainability considerations incorporated into contracts?	Always included	18	
		Often included	6	
		Rarely included	9	
		Never included	3	

<i>Si No</i>	<i>Questions</i>	<i>Answer Options</i>	<i>Number of Responses</i>	<i>Remarks</i>
18	What measures are taken to promote environmentally sustainable construction?	Use of eco-friendly materials	30	
		Energy-efficient designs	12	
		Waste management plans	9	
		Other	9	
19	Are social and economic sustainability guidelines included in contracts?	Yes, fully included	12	
		Partially included	18	
		Rarely included	3	
		Not included	3	
20	What role does technology play in enhancing sustainability?	Significant role	27	
		Moderate role	6	
		Minimal role	3	
		No role	0	
Section E: Improvement Opportunities				
21	How effective are training programs for staff?	Very effective	30	
		Moderately effective	6	
		Slightly effective	0	
		Ineffective	0	
22	What digital tools can improve LGED’s contract management?	Contract management software	24	
		Blockchain technology	8	
		E-procurement systems	32	
		Other	0	
23	What measures can enhance transparency in contract management?	Independent audits	21	
		Digital reporting systems	24	
		Public disclosure of contracts	15	
		Other	3	
24	Which international best practices are most relevant to LGED?	Standardized templates	24	
		Capacity building programs	21	
		Robust monitoring frameworks	6	
		Other	0	
25	What is the most critical area for improvement in LGED’s contract management?	Planning and procurement processes	18	
		Monitoring and evaluation systems	15	
		Training and capacity building	12	
		Transparency and accountability	15	
Section F: Overall Comments				
1	Problems: ✓ Poor Contract Drafting ✓ Project Delay ✓ Lack of Knowledge ✓ Political Pressure ✓ Corruption			

<i>Sl No</i>	<i>Questions</i>	<i>Answer Options</i>	<i>Number of Responses</i>	<i>Remarks</i>
2	Solutions: ➤ Right Person Right Place ➤ Regular Auditing/Monitoring ➤ Training and Capacity Building ➤ Application of Technology (IT/AI etc.)			

Note:

- a. Multiple answers/opinions were allowed
- b. Escaping any questions due to personal reasons were allowed.

2. Project Case Study Survey Summary:

<i>Sl No.</i>	<i>Title of cases/sections</i>	<i>Project Type-1</i>	<i>Project Type-2</i>	<i>Project Type-3</i>	<i>Remarks</i>
01	Type of Projects	Investment Project	Investment Project	Investment Project	
02	Sources of Funds	GoB	GoB & Foreign Aids/Loan	Foreign Aids/Loan	
03	Total number of Contracts (schemes) (nos)	188	256	156	
04	Completed Contracts in due Time (nos)	27 (14.36%)	52 (20.31%)	22 (14.10%)	
05	Completed contracts with 1 st time extension (nos)	58 (30.85%)	62 (24.22%)	28 (17.95%)	
06	Completed Contracts with 2 nd time extension (nos)	63 (33.51%)	78 (30.47%)	54 (34.62%)	
07	Completed Contracts with 3 rd time extension (nos)	29 (15.43%)	34 (13.28%)	36 (23.08%)	
08	Completed Contracts with adopting Liquidated Damage (LD) (nos)	4 (2.13%)	18 (7.03%)	10 (6.41%)	
09	Cancellation of contracts following Retender (nos)	13 (6.91%)	16 (6.25%)	9 (5.77%)	
10	Dropped contracts (schemes) (nos)	7 (3.72%)	12 (4.69%)	6 (3.85%)	
11	Number of contracts completed with Variations (Cost Increase) (nos)	14 (7.45%)	26 (10.16%)	18 (11.54%)	
12	Number of completed contracts with Variations (Cost reduction) (nos)	4 (2.13%)	7 (2.73%)	4 (2.56%)	
13	Remarks				