A CASE STUDY OF ERRA FOCUSING ON RECONSTRUCTION ACTIVITIES IN DISTRICT ABBOTTABAD

By

TAJ HUSSAIN SHAH
(2010 – NUST – MS – CE&M – 19)

A thesis submitted in partial fulfillment of
the requirements for the degree of
Master of Science
in
Construction Engineering and Management

Department of Construction Engineering and Management
National Institute of Transportation (NIT)
School of Civil and Environmental Engineering (SCEE)
National University of Sciences and Technology (NUST)
Islamabad, Pakistan

(2012)

This is to certify that the

thesis entitled

A CASE STUDY OF ERRA FOCUSING ON RECONSTRUCTION ACTIVITIES IN DISTRICT ABBOTTABAD

Submitted by

Taj Hussain Shah

has been accepted towards the partial fulfillment

of the requirements for the degree

of

Master of Science in Construction Engineering and Management

Dr. Rafiq Muhammad Choudhry, Ph.D.
Professor and Head
Department of Construction Engineering and Management
National Institute of Transportation
School of Civil and Environmental Engineering
National University of Sciences and Technology, Islamabad

DEDICATED

TO

MY FAMILY, TEACHERS AND COLLEAGUES

ACKNOWLEDGEMENT

Firstly, all the glory and thanks to Almighty ALLAH for His provisions, mercy and help, without which this thesis would have been impossible to complete. I would like to express my profound and sincere gratitude to my supervisor Professor Dr. Rafiq Muhammad Choudhry for his invaluable contribution, continuous support and in time guidance in the course of this research. His methodical knowledge and deep understanding of the field were instrumental in accomplishing this research effort. My deep appreciation also goes to committee members; Dr. Hamza Farooq Gabriel, Engineer Muhammad Sarwar Jamal and Engineer Zia Ud Din for their continuous support and encouragement throughout my thesis. I would also like to extend my gratitude to staff of District Reconstruction Unit Abbottabad, especially Engineer Muhammad Javaid Abbassi (Program Engineer) who assisted me throughout my research work by extending their full support in provision of data. Many thanks to my family including my wife, my sweet daughter, my sisters and brother who always prayed for my success. Finally many thanks to my friends of CE&M - 2, who had to bear me for the whole year and who were there for my help whenever I got stuck.

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ABBREVIATIONS

AJK	Azad Jammu and Kashmir
AWP	Annual Work Plan
CDWP	Central Development Working Party
CM	Chief Minister
CRE	Chief Resident Engineer
DMRD	Disaster Management Reconstruction Division
DRU	District Reconstruction Unit
ECNEC	Executive Committee of National Economic Council
ERRA	Earthquake Reconstruction and Rehabilitation Authority
IDB	Islamic Development Bank
KPK	Khyber Pakhtun Khwa
M&E	Monitoring and Evaluation
NESPAK	National Engineering Services Pakistan
PERRA	Provincial Earthquake Reconstruction and Rehabilitation Authority
PEC	Pakistan Engineering Council
PMIU	Project Management Implementation Unit
RE	Resident Engineer
SERRA	State Earthquake Reconstruction and Rehabilitation Authority

ABSTRACT

October 05 Earthquake not only tested our unity as a nation but gave us a chance to turn this devastation into opportunity. The gigantic task of reconstruction and rehabilitation spreading over a vast area of 30,000 Sq Km was not possible without having an organization that could coordinate and integrate all the efforts; pertaining to post disaster reconstruction and rehabilitation in quake affected areas. ERRA (Earthquake reconstruction and rehabilitation Authority) was established on 24 Oct 2005. The task of rehabilitation and reconstruction being executed in 9 districts of Khyber Pakhtun Khwa (KPK) and Azad Jammu and Kashmir (AJK) has been divided into 12 sectors consisting of 14,095 projects. At present in this rehabilitation and reconstruction program 80 - 90 % task has been completed in three important sectors of Housing, Water and sanitation and Telecommunication, whereas in remaining 9 sectors progress ranges from 40 – 60 %. Following the earthquake the scale of reconstruction work necessitated the establishment of dedicated institutions within the Provincial and State governments down to District level, to look after reconstruction activity and oversee construction contracts. Analysis of the project implementation and monitoring bodies at District level is necessary to find out strengths and weaknesses with a view to suggest improvements. There is also a need to identify reasons of delays and slow progress in these projects to improve the progress and incorporate correction during the ongoing construction process.

This study is combination of qualitative and quantitative research. To analyze project implementation and monitoring set ups at district level qualitative method of research incorporating interviews of key officials and documents review was adopted. While reasons of slow progress and delayed completion were analyzed using quantitative method of research i-e questionnaire survey. A total of 125 respondents from Client, Consultant and Contractor category participated in survey.

Results showed that, in Abbottabad District out of 1222 projects 880 projects fall in reconstruction category. Out of these 390 projects (44%) are still in construction stage. Most of 390 projects (95%) are in education, health, governance and transport sectors. Out of 144 contractors involved in reconstruction activity in these sectors only 28 contractors have achieved 100 % performance in their projects while 85 have yet to complete any of their projects. Concept of ‘building back better’ has earned ERRA a good name in achieving quality in construction which is really a sore issue in other public sector projects. ERRA achieved this through

involvement of consultant, incorporating concept of monitoring and evaluation that also monitors consultants and well organized implementation setups. Analysis also revealed that involvements of all stakeholders particularly end users or a line department in this reconstruction process has also contributed towards achieving quality and ensuring fairness in contract awards. Tracking progress of such huge number of projects would have been difficult if ERRA would not have developed a comprehensive software i-e ERM (ERRA Reconstruction Monitor). Few weaknesses observed in ERRA set up at District level include, initial wrong estimates that resulted in project revisions causing delay in execution and shortage of funds, non adherence to prequalification of contractors inviting non performing contractors to participate in bidding process and acquire projects, inability of employer to guard against unofficial subletting , and active involvement of traditional Works and Services department in reconstruction, restricting the role of District reconstruction units only to coordination agency. As regards to reasons of delay, a total of 31 contributing factors were considered in questionnaire based survey of District Abbottabd. Most significant contributing factors highlighted as result of field survey were delayed progress payments , delay in producing design documents , contractor's capacity, unrealistic contract durations, inadequate planning and scheduling of projects, shortage of materials and skilled labor and unofficial subletting.

Recommendations for further improvements in present set ups of ERRA at district level include, amalgamation of Engineering Wing and District reconstruction unit, prequalification of contractors, prioritization of projects experiencing delays, system of reward for performing contractors, and incorporation of contractor's performance index in their license by Pakistan Engineering Council. Research also suggested that a comparative study of ERRA projects (experiencing physical and dedicated involvement of consultants) with other public sector projects of similar nature (without involvement of consultant) may be carried out with a view to incorporate modern trends in our public sector projects.

Chapter 1

INTRODUCTION

1.1 BACKGROUND

Vast and huge devastation and destruction as a result of October 05 earthquakes, not only tested our unity as a nation but also gave us a chance to turn this devastation into opportunity. The rescue and relief efforts were initiated immediately to minimize the effects of disaster on the victims. The Government and people of Pakistan, humanitarian organizations and international community participated wholeheartedly in these efforts to revive life in these areas. The gigantic task of reconstruction and rehabilitation spreading over a vast area of 30,000 sq Km was not possible without having an organization that could coordinate and integrate all the efforts; pertaining to post disaster reconstruction and rehabilitation in quake affected areas (www.erra.gov.pk accessed on 10 Nov 11). As a result ERRA (Earthquake reconstruction and rehabilitation Authority) was established on 24 Oct 2005. The task of rehabilitation and reconstruction being executed in 9 districts of Khyber Pakhtun khwa (KPK) and Azad Jammu and Kashmir (AJK) has been divided into 12 sectors consisting of 14,095 projects (www.erra.gov.pk accessed on 10 Nov 11). At present in this rehabilitation and reconstruction program 80 - 90 % task has been completed in three important sectors of Housing ,Water and sanitation and Telecommunication ,whereas in remaining 9 sectors progress ranges from 40 – 60 %.This achievement that spans over a period of 6 years (that also includes establishment of organization , relief , recovery and planning) is really commendable. Main reason behind this progress is establishment of dedicated institutions equipped with traits of flexibility, participation, outreach and specialization enabling the reconstruction and rehabilitation effort to make the progress it has (Akram 2010).

Down in the ladder of ERRA's hierarchy District Reconstruction Units (DRUs) along with National Engineering Services Pakistan (NESPAK) Offices and Engineering Wing of Communication and Works Department are only setups involved in physical

implementation of projects and their monitoring at District and Tehsil level thereby making positive contributions towards efficiency of ERRA. An in depth study of these institutions is needed to find out strengths and weaknesses of these set ups in order to further improve the system. Due to time limitations only one District will be studied in detail and the findings suggested for improvement may also be applicable to other affected Districts as well.

1.2 RATIONAL FOR THE STUDY

No research has been done on functioning of reconstruction institutions particularly those involved in project execution and monitoring, however a lot has been done on reasons of delayed completion of projects.

Following any disaster the governments need to decide fairly quickly on the institutional arrangements for recovery and reconstruction management. There can be at best three organizational models for post disaster recovery and reconstruction and these are (www.housingreconstruction.org accessed on 15 Nov 11) :-

a. Creation of new dedicated organization or Task force.
b. Creation of dedicated organization or Task force drawn from existing line ministries / departments.
c. Existing government agencies managing recovery under national disaster plan.

Prior to earthquake, construction of public infrastructure would have been undertaken by Communication and Works, and Public Works Departments of KPK and AJK Governments respectively. Following the earthquake the scale of reconstruction work necessitated the establishment of dedicated engineering wings within the provincial and state governments, which perform the function of Employer or Client in all construction contracts (Akram 2010). At District level ERRA is amalgamation of option a & b i.e. DRUs are altogether new set ups and Creation of Engineering Wing is basically a Task Force established for the purpose drawn from existing departments. Analysis of functions and organizations of these project implementation and monitoring bodies at District level is necessary for further improvements

Construction is one of the major sectors of economy. Its direct and indirect contribution to GDP and employment rank second to agriculture and manufacture in

Pakistan. It is an industry which transforms various resources into constructed economic and social infrastructure and facilities. There is no doubt that to a large extent, the progress of a country depends on the success of its development plan with high construction content (Muneer and Riaz 1998)

Project success can be defined as meeting goals and objectives as prescribed in the project plan. A successful project means that the project has accomplished its technical performance, maintained its schedule, and remained within budgetary costs. Project management tools and techniques play an important role in effective management of a project. Project management involves managing the resources i.e. workers, machinery, money, materials and, methods used. Some projects are effectively and efficiently managed while others are mismanaged; incurring much delay and cost overruns (Yaw et al. 2003).

Many projects in underdeveloped and developing countries are not completed on time and by doing so valuable time, human effort and money is wasted. For a successful completion of a project in such countries ,availability of adequate capital , sufficient land ,raw materials and proper supply chain management, availability of skilled and non skilled labor, latest technology know how and technology management , viable roads and nonstop communication mediums, suitable political support and security provision from state, better project management team , better governance, better coordination ,cooperation and synergy among governmental and nongovernmental parties, are basic considerations (Manohar and Ashish 2010).

Delay occurs when the contractor and owner/employer jointly or severally contribute to the non completion of project within stipulated or agreed contract period. Delay is caused by no of factors, some of which are within owner's responsibility and some are within contractor's responsibility. Effect of delay is also different for different stakeholders of the project. To the owner delay means the loss of revenue through production facilities or continuing dependence on present facilities. To the contractor, delay means the loss of money to be able to continuous pay for equipment and persons hired on daily wages. Contractor's running capital is also tied up and other projects cannot be pursued. To the public it means that buildings and facilities are not available for use as planned (Shaikh et al. 2010).

In public utility projects the most important factor causing delay is cash flow and financial difficulties. These may be due to contractor's inadequate capabilities or due to delay by the owner in making progress payments. Another factor which is important to consider in public utility projects is the government practice of assigning contracts to the lowest bidder without regard to qualification. The lowest bidder may not be able to work with the increased project complexity or the increased demand on management expertise for large public utility projects. The owner may also have a tendency to underestimate project duration (Khalil and Ghafly 1999).

Once the project is extended beyond scheduled completion date and is delayed this result in cost overrun that is common practice in construction industry worldwide but it is more severe in developing countries (Apolot et al. 2011).

According to the ERRA Figures, out of 14,095 projects earmarked for reconstruction, only 7,690 have been completed, where as 4,385 are under construction and 2,020 projects are still in designing stage. These Figures need to be investigated so as to find out reasons of delays and slow progress thereby improving execution process of future projects and incorporating mid course correction in ongoing projects.

1.3 REASONS FOR THE STUDY

Few important reasons for selection of this topic for subject research are:-

a. Various articles have been published in the newspapers commenting slow progress of ERRA but no professional research has been done so far to analyze project implementation and monitoring mechanism of ERRA, in order to find out reasons of slow progress and delays in execution.
b. Analysis will give a chance to study project implementation and monitoring mechanism at District level from construction engineering and management perspective with a view to suggest suitable measures for further improving its efficiency.
c. Study of selected under construction projects experiencing delays and slow progress will give a chance to study Contract Documents , meet with Contractors of varying experience and expertise , Analyze different types of project related correspondence, obtain view point of Consultants and study involvement of Monitoring and Evaluation (M&E) mechanism and DRU set

up .This entire exercise will not only enhance my personnel knowledge and experience regarding contract management but will also prove fruitful for the Organization.

d. At present ERRA is only organization in the country involved in a construction activity on such a large scale ,therefore studying one of its outfit will not only add to experience and knowledge but will also give chance to positively contribute towards its efficiency.

e. Majority of recommendations and conclusions drawn towards end of this case study may also be applicable to other Districts thereby will make positive contributions towards betterment of Organization.

1.4 OBJECTIVES

a. To analyze reconstruction activities of ERRA in District Abbottabad with special emphasis on project implementation and monitoring mechanism with a view to suggest improvements.

b. To find out reasons of delays and slow progress with a view to suggest improvements.

1.5 PROPOSED RESEARCH METHODOLOGY

a. Literature review. This study will review the literature relevant to ERRA, focus will be on Organizational structure and roles of institutions at District level that are physically involved in project implementation and monitoring. Emphasis will also be placed on procedures and inter departmental coordination aspects required for implementation and monitoring of projects at district level. Study will also review literature relevant to the causes of delays in the construction projects.

b. A detailed review is to be conducted by studying text books, publications published by ERRA from time to time including Annual Reviews, monitoring and evaluation reports, surfing internet for relevant articles and studying project reports to achieve the desired objectives.

c. **Interviews.** Apart from literature review pertinent to ERRA activities at district level, interviews of key officials heading the institutions involved in reconstruction activity at district level will also be conducted. Main focus of

interview will be to extract from experience of these individuals about any improvement required in these setups apart from knowing about reasons of slow progress based on their experience.

d. Questionnaire survey. In order to find out reasons of slow progress and delayed completion, the study will be carried out in two stages. In first stage, a questionnaire survey will be conducted. The questionnaire will be constructed on the basis of literature review. The pilot study will be carried out to check the validity of the questionnaire and to further refine it. Later on, the questionnaire will be distributed to all stake holders involved at district level for obtaining the underlying information for the study. The collected data will be analyzed using SPSS.

e. Writing up. In this stage, the contents of the thesis will be written.

1.6 LAYOUT OF THESIS

This dissertation has been structured in five chapters. Detail of the chapters is listed below:

a. Chapter - 1. In this chapter introduction and rationale for the study has been discussed. This chapter also encompasses reasons of this research, research objectives and proposed research methodology being followed in this research. Chapter ends with a brief discussion on how this research work has been organized.

b. Chapter - 2. This chapter gives an overview of ERRA. It also discusses in a chronological order how events unfolded following Oct 05 earthquakes. Establishment of various institutions down to district level including their organization structure and roles is included in this chapter. Project preparation and implementation rules being followed in ERRA are also discussed in this chapter.

c. Chapter - 3. This chapter discusses about definition of construction delay and its types. Prior research on reasons of delay in construction industry of Pakistan has also been discussed in this chapter. How delayed projects are categorized in ERRA is also covered in this chapter. Chapter ends with listing down contributing factors affecting construction progress of ERRA projects.

d. Chapter - 4. Research Design and Methodology followed for this research is covered briefly in this chapter.
e. Chapter - 5. This chapter covers how data for this research work was collected and then analyzed to meet research objectives. It also covers discussion on analysis of results.
f. Chapter - 6. As result of data analysis and literature review pertinent to ERRA important conclusions are drawn in this chapter and basing on these conclusions few recommendations are suggested in this chapter. This chapter also suggests few future guidelines for further research work.

1.7 SUMMARY

Brief summary of the research is introduced in this chapter. Rational and reasons of this research are also discussed in this chapter. Research objectives outlined for this research are also mentioned in this chapter. Chapter also discusses summary of proposed research methodology. Chapter ends with outline of thesis chapters.

Chapter 2

AN OVERVIEW OF ERRA

2.1 INTRODUCTION

In this chapter literature relevant to research is reviewed and it is presented. It encompasses an overview of ERRA, mentioning background of October 05 earthquake, brief history about establishment of ERRA and its subsidiary setups and project planning and implementation rules being followed in ERRA.

2.2 BACKGROUND OF OCT 05 EARTHQUAKE

On October 8, 2005, at 8:50 PST, a magnitude 7.6 earthquake struck Pakistan. The earthquake epicenter was located 100 kilometers north-northeast of Islamabad, along a fault associated with the Indian subcontinent moving northward at a rate of about 40 mm/yr and colliding with the Eurasian continent. Tremors were felt across a wide swath of South Asia, from central Afghanistan to western Bangladesh.

It was indeed debilitating natural disaster in Pakistan's history. AJK and the eastern Districts of the KPK province bore the full force of the earthquake in terms of number of lives lost, injuries sustained, and destruction of infrastructure and economic assets. In at least four Districts in AJK and five in KPK, public and private housing and shelter infrastructure, social service delivery, governance structures, commerce, and communications were either damaged or destroyed.

Damage assessment was conducted in collaboration with UN agencies, a detailed account of damages as result of this catastrophe was as under:-

a.	Death	-	7,338
b.	Injured	-	1,28,304
c.	Population Affected	-	3.5 Million
d.	Families Affected	-	500,000
e.	Area Affected	-	30.000 Sq Km
f.	Houses Destroyed	-	600,000
g.	Educational Institutions Destroyed	-	6,298

h.	Health Facilities Destroyed	-	796
i.	Government Sector Buildings	-	715
j.	Roads Damaged	-	2,393 Km
k.	Bridges Destroyed/Damaged	-	92
l.	Services Destroyed / Damaged	-	50%

2.3 CHALLENGES FOLLOWING THE DISASTER

a. Reconstruction and Rehabilitation of Destroyed Infrastructure (About 14,000 Projects)

b. Renewal of Livelihood, Protection of Environment, Re-establishment of Telecom and Power Networks and Rehabilitation of Vulnerable Population.

c. Clearance of Massive Slides and Tons of Rubble.

2.4 GOVERNMENT'S INITIATIVE

a. Immediate move of two Army Divisions into KPK and AJK and setting up of five advanced staging posts for facilitation and distribution of relief goods.

b. Employment of existing and call for additional unprecedented number of helicopters to assist with the distribution of relief goods.

c. Establishment of President's Relief Fund to mobilize resources for relief efforts.

d. To undertake early Recovery & Relief Operation, Government established Federal Relief Commission and corresponding Relief Coordinator on 10th Oct, 2005, with the overall responsibility for overseeing relief efforts targeting shelter, food, clean water and immediate medical care. At the District and grassroots levels, military relief personnel were stationed to facilitate the distribution of relief goods.

e. Requirement for an independent organization to undertake massive and challenging task of rehabilitation and reconstruction was felt, resultantly Earthquake Reconstruction and Reconstruction Authority (ERRA) was established at Federal Level on 24th October, 2005.

2.5 RESPONSE – AREAS OF FOCUS

After establishment of a well articulated relief, reconstruction and rehabilitation framework, the response was divided into following four phases:-

a. Immediate
   - Rescue and relief operations.
   - Maintenance and restoration of Infrastructure.

b. Short Term
   - Sustaining population and displaced persons
   - Revival of civil administration & essential services

d. Mid Term
   - Early Recovery operations.

d. Long Term
   - Rehabilitation and Reconstruction.

2.6 UN-ERRA EARLY RECOVERY PLAN (ERP)

Main purpose of ERP was to bridge and coordinate the transition from relief to reconstruction phase. It spanned over 12 months starting from May 2006. All programs under this plan were coordinated by ERRA and implemented by concerned departments, provincial and local authorities with help of implementing partners and NGOs.ERP was implemented in a transparent manner with active participation of communities taking into account key principles of alignment, ownership, capacity building, prioritization of activities, economic recovery and equity between AJK and KPK. In order to ensure effective implementation of ERP following important aspects were ensured by ERRA:-

a. Resource mobilization in all sectors.
b. Capacity building of organizations involved in ERP.
c. Imparting Camp management training and skills training in construction.
d. Debris removal to facilitate reconstruction.
e. Provision of CGI sheets, one month’s ration to affected families and encouraging them to start building their homes.

2.7 ESTABLISHMENT OF REHABILITATION AND RECONSTRUCTION INSTITUTIONS

To undertake mammoth task of rehabilitation and reconstruction spreading over a vast area of 30000 sq km in nine districts of AJK and KPK, Government of Pakistan established ERRA under Prime Minister's Secretariat at Federal Level. It is further assisted by Provincial Earthquake Reconstruction and Rehabilitation Authority (PERRA) and State Earthquake Reconstruction and Rehabilitation Authority (SERRA) in KPK and AJK respectively .Various Consultants mainly NESPAK, DRUs, Engineering Wing under Chief Engineer Earthquake affected areas (EQAA) and District Level set up of ERRA's M&E wing are the institutions established at District Level involved in physical implementation and monitoring of projects. Detailed organization, roles and responsibilities of aforementioned institutions is discussed in ensuing paragraphs.

2.7.1 ERRA. It was established on 24 Oct 2005.

Mission. To "convert this adversity into an opportunity" by reconstructing lost and destroyed facilities, while following the highest standards of reconstruction and rehabilitation with an obligation of, "Build Back Better".

Role & Mandate of ERRA. Main role of ERRA is that of policy planning, financing, project approval and monitoring and evaluation. Additionally it ensures necessary coordination and provides facilitation to implementing partners' i.e. PERRA and SERRA at provincial and state level and DRUs at District level. Physical implementation of projects is the responsibility of respective Governments of KPK and AJK.

ERRA Response Mechanism.

- Establishment of Institutional Set up.
- Detail Damage Assessment.
- Preparation of 12 Sectoral Strategies.
- Development of operational and financial procedures supported by efficient Management Information System and Database System.
- Seismic mapping, Micro zoning and fault line mapping.
- Establishment of a Quality Control and M&E mechanism.

Scope. ERRA has intervened in 12 different sectors with 3 cross cutting sectors and is required to reconstruct and repair about 14000 projects at the cost of approximately 5 billion USD.

Umbrella of ERRA. Aforementioned 12 sectors also commonly known as Umbrella of ERRA comprise of Housing, Education, Health, Water & Sanitation, Governance, Livelihood, Power , Telecommunication, Social Protection, Environment, Transport (Roads & Bridges) and Tourism. While 3 cross cutting programs consists of Disaster Risk Reduction, Gender Equality and Environmental Safeguards.

International Partners. International partners of ERRA that assisted in relief ,rehabilitation and reconstruction process include, European Union, United Kingdom's Department of international Development (DFID), German Agency for Technical Cooperation (GTZ), German KFW, Japan Bank for International Cooperation (JBIC), Japan International Cooperation Agency (JICA), United States Agency for International Development (USAID), World Health Organization (WHO), Asian Development Bank (ADB), UN Food and Agriculture Organization (FAO), UN Children's Education Fund (UNICEF), United Nations Development Program (UNDP), and World Bank.

Organogram – ERRA. While Chairman ERRA heads ERRA Headquarters as well as ERRA board, the Dy Chairman ERRA (a serving Lt Gen from Pak Army) provides strategic guidance. Director Generals and advisors supported by Program Managers, Directors and Dy Directors are assigned various planning and support functions within their respective wings. Existing Organogram of ERRA HQs is shown in Figure 2.1 below:-

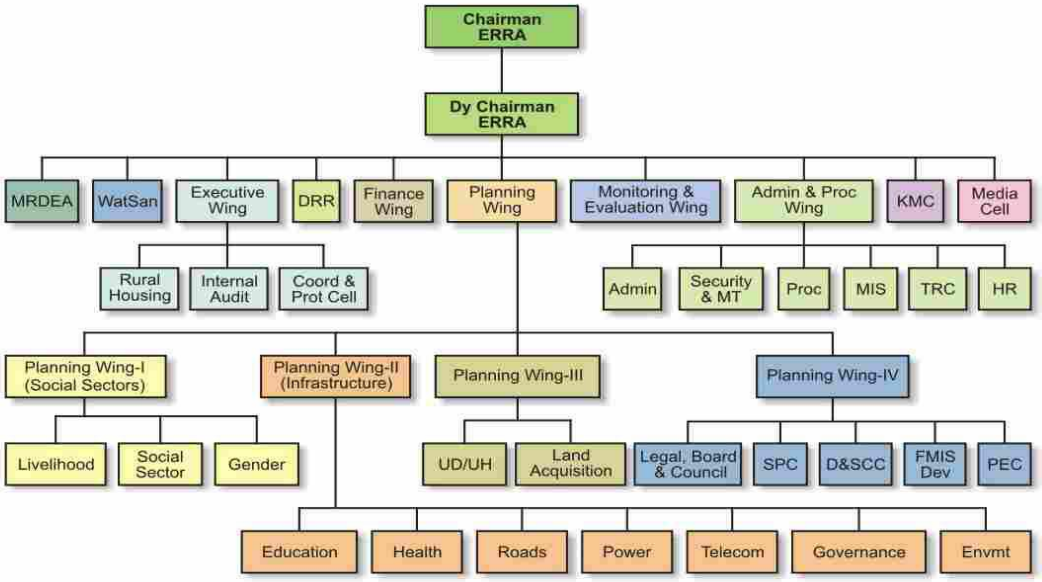

Figure 2.1: Organogram of ERRA HQ

2.7.2 ERRA Council

It is an apex body headed by Prime Minister and its members comprised of PM AJ&K, CM KPK, Minister for Kashmir Affairs and Northern Areas, Advisor to PM on finance, Deputy Chairman Planning Commission, Chairman ERRA and Deputy Chairman ERRA. The General direction, all matters of policy and administration of the authority and its affairs vest in the council which may exercise all powers, perform all functions and do all acts and things which may be exercised, performed or done by the authority.

2.7.3 ERRA Board

Board is responsible for implementation of approved programs, projects and policy decisions of the council. It has administrative and financial powers as delegated by the council. It is headed by Chairman ERRA, and includes Deputy Chairman ERRA, Additional Secretaries (Finance, Defence, Planning Division and EAD), Chief Secretaries (KPK and AJK), Four representatives of civil society to be nominated by Federal Government and a representative each of civil society to be nominated by KPK and AJK Governments. The Board shall perform following functions:-

- Approve projects up to sanctioning limits of Central Development Working Party (CDWP). Any project beyond that limit would be submitted to Executive Committee of National Economic Council (ECNEC) for approval.
- Approve the budget and accounts.
- Consider the quarterly and annual reports of the Authority for making recommendations to the Council.
- Appoint advisors and consultants and determine their conditions of appointment.
- Constitute such committees as it may consider appropriate.

2.7.4 State and Provincial Steering Committees

Governments of KPK and AJK have established Steering committees and Reconstruction agencies for rehabilitation and reconstruction works. These steering committees are headed by Chief Secretaries and include representatives of respective departments and ERRA. These are responsible for:-

- Approval of annual reconstruction plans;
- Over-viewing the Reconstruction Agencies; and
- Reporting to ERRA.

2.7.5 PERRA and SERRA

Provincial and State Earthquake Reconstruction and Rehabilitation Authorities have been established in KPK and AJK respectively. These authorities are responsible for:-

- Preparing annual work programs;
- Implementation of contracts in coordination with line agencies;
- Monitoring of regional and district programs and projects; and
- Reporting to the Steering Committees and the ERRA.

Organogram of PERRA at the time of Establishment. Headed by DG PERRA and on establishment comprised of Directors planning and Technical, M&E, Finance and admin and project execution bodies of Engg Wing, PM&IU for Saudi and Islamic development Bank funded projects and PCU for ADB funded projects. Different program coordinators were

also part of it at that time. With passage of time reduction in work load and paucity of funds necessitated reduction in PERRA staff. Both Organograms of PERRA are shown in Figure 2.2 and 2.3 below:-

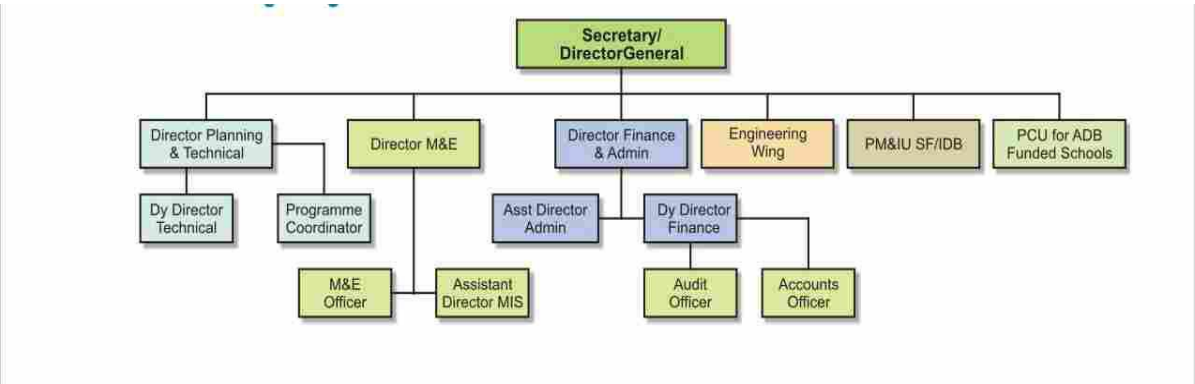

Figure 2.2: Organogram of PERRA (At time of Establishment)

Organogram of PERRA as in Dec 11

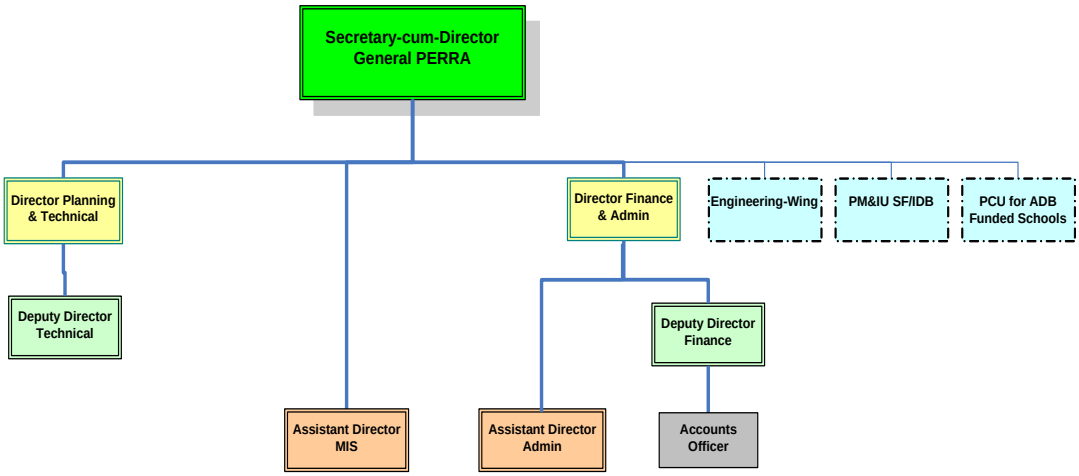

Figure 2.3: Organogram of PERRA (Present)

2.7.6 District Reconstruction Unit (DRU)

With establishment of PERRA and SERRA in May 2006 both provincial and state Governments established DRUs in all nine affected districts. These DRUs act as secretariats to District Reconstruction Advisory Committee (DRAC), which is headed by Deputy Commissioner in AJK and District Coordination Officer in KPK, with representation of elected state representatives and all relevant line departments of district. DRAC has power to approve

projects up to Rs 100 million and prioritize reconstruction activities as per their needs and requirements. They develop Annual Work Plan (AWP) and submit it to PERRA and SERRA.

Organogram of DRU at time of Establishment. DRU at time of establishment comprised of Program Manger who was assisted by Program Engineer, M&E Officer, Accounts Officer and a Office Manager along with various program coordinators looking after 12 sectors in the District. As in case of PERRA staff of DRU was also reduced due to reduction in work load and paucity of funds. Both Organograms of DRU are depicted by Figures 2.4 and 2.5 below:-

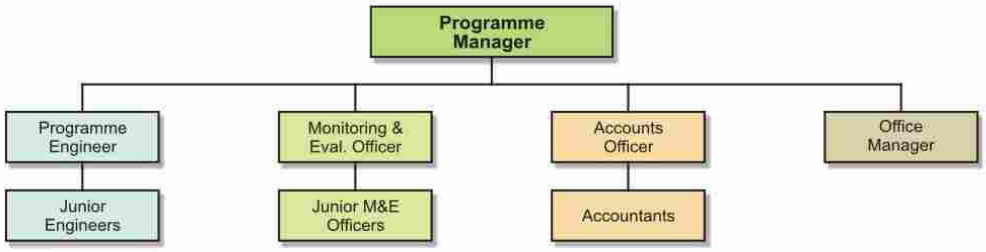

Figure 2.4: Organogram of DRU (At time of Establishment)

Present Organogram of DRU

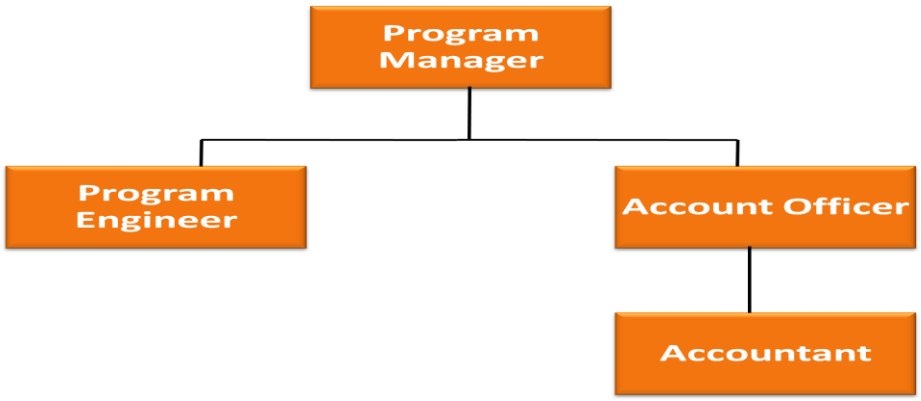

Figure 2.5: Organogram of DRU (Present)

Functions of DRU

DRU is responsible for:-

- Preparing district reconstruction plans;
- Implementation of small contracts in coordination with District

Governments and District level line agencies;

- Reporting to their respective Governments; and
- Coordinating and partnering with partner organizations.

2.7.7 Engineering Wing

Construction of all public and Government infrastructure in districts of KPK is executed by Works & Services Department in respective districts through the normal Annual Development Programs in addition to the ERRA portfolio of reconstruction and rehabilitation in these districts. After analyzing the reasons for slow pace of reconstruction and rehabilitation work in EQAA, need for a separate Engineering Wing was felt which would be responsible for reconstruction portfolio in EQAA. Main objective of establishment of Engineering Wing was to strengthen and build up the institutional capacity of Chief Engineer in EQAA in KPK.

Scope & Mandate

- Mandate of Engineering Wing is limited to reconstruction and rehabilitation portfolio in EQAA.
- Advertisement of tenders.
- Procurement of works and projects and goods.
- Approval of bids.
- Issue of technical sanctions.
- Monitoring of reconstruction activity in the field.
- Resolve the issues and disputes in the field.
- Strong coordination with all stakeholders.
- Sharing of periodic progress updates with stakeholders.
- Handing and taking over of completed projects.

Organogram of Engineering Wing at the time of Establishment. On establishment it comprised of a Wing HQ which was further assisted by 5 District offices as shown in Figure 2.6 below:-

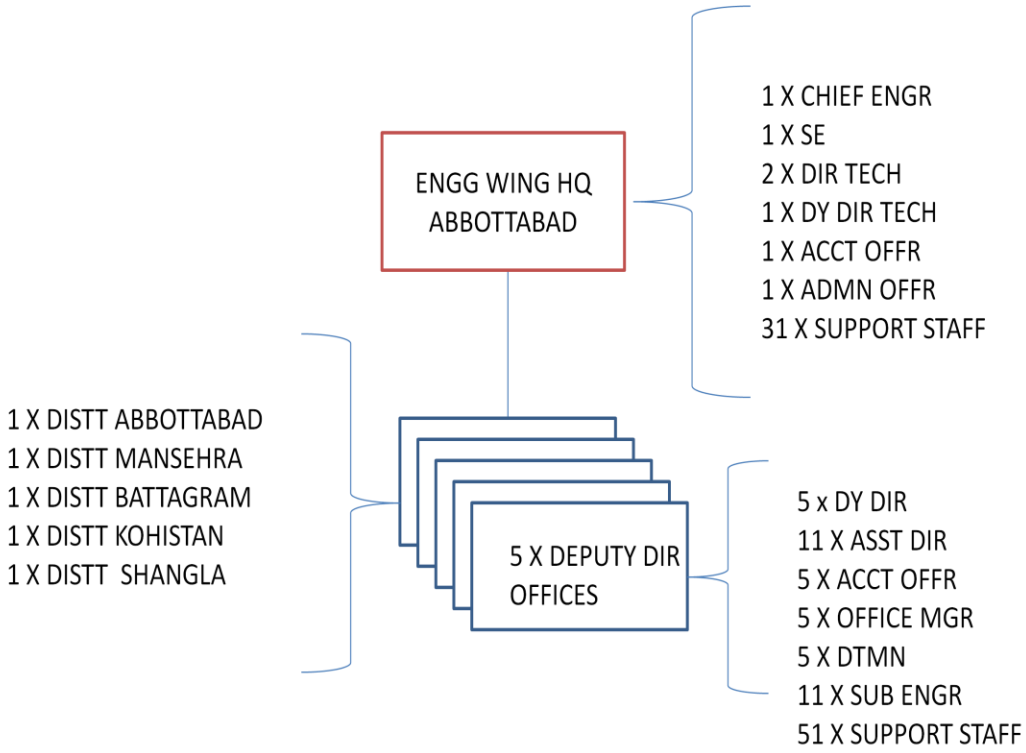

Figure 2.6: Organogram of Engg Wing (At time of Establishment)

2.7.8 Project Execution Set up for Kala Dhaka

Keeping in view remoteness of the area, a separate setup for execution of projects in kala Dhaka was formed .It comprised of total of 29 Staff members, consisting of 1 X Deputy Director, 3 X Assistant Directors, 1 X divisional account officer , 1 X Office Manager, 6 X Sub Engineers and 17 X Support Staff.

2.7.9 PMIU for Saudi and IDB funded Projects

PMIU (Project Management Implementation Unit) was established for implementation and monitoring of Saudi and IDB funded projects. Main purpose for establishing PMIU instead using existing institutional setup of PERRA and DRU , was scope and complexity of projects, secondly PERRA and DRU were already overburdened with reconstruction activities under various sectors .PMIU comprised of 34 Staff members including 1 X Chief Engineer (in addition to already existing Chief Engineer of Engineering Wing),1 x Director & Deputy Director Technical, 1 X MIS Network Manager, 2 X Deputy Dorectors1 x Assistant Director,2 X divisional Account Officers and 25 support staff.

2.7.10 Amalgamation of project Execution bodies for Kala Dhaka & Saudi and IDB funded project into Engineering Wing

In 2nd half 2010 a rationalization committee was formed for rationalization of project implementation and monitoring set ups. After a series of meetings in October 2010 the committee approved merging of Engineering Wing, Kala Dhaka and PMIU staff due to following reasons:-

- Financial crunch.
- Justification for creation of separate unit for Kala Dhaka and Saudi and IDB funded projects was not based on facts as there were no such projects which required some special treatment and were similar to those executed by Engineering Wing.
- Engineering Wing was already working in same area that means 2 agencies were working in same area.
- No experienced staff could be arranged from market or on deputation from other departments for these setups due to which they failed to achieve desired results.

Present Organogram of Engineering Wing after Restructuring.

Present organogram of Engg Wing is shown in Figure 2.7 below:-

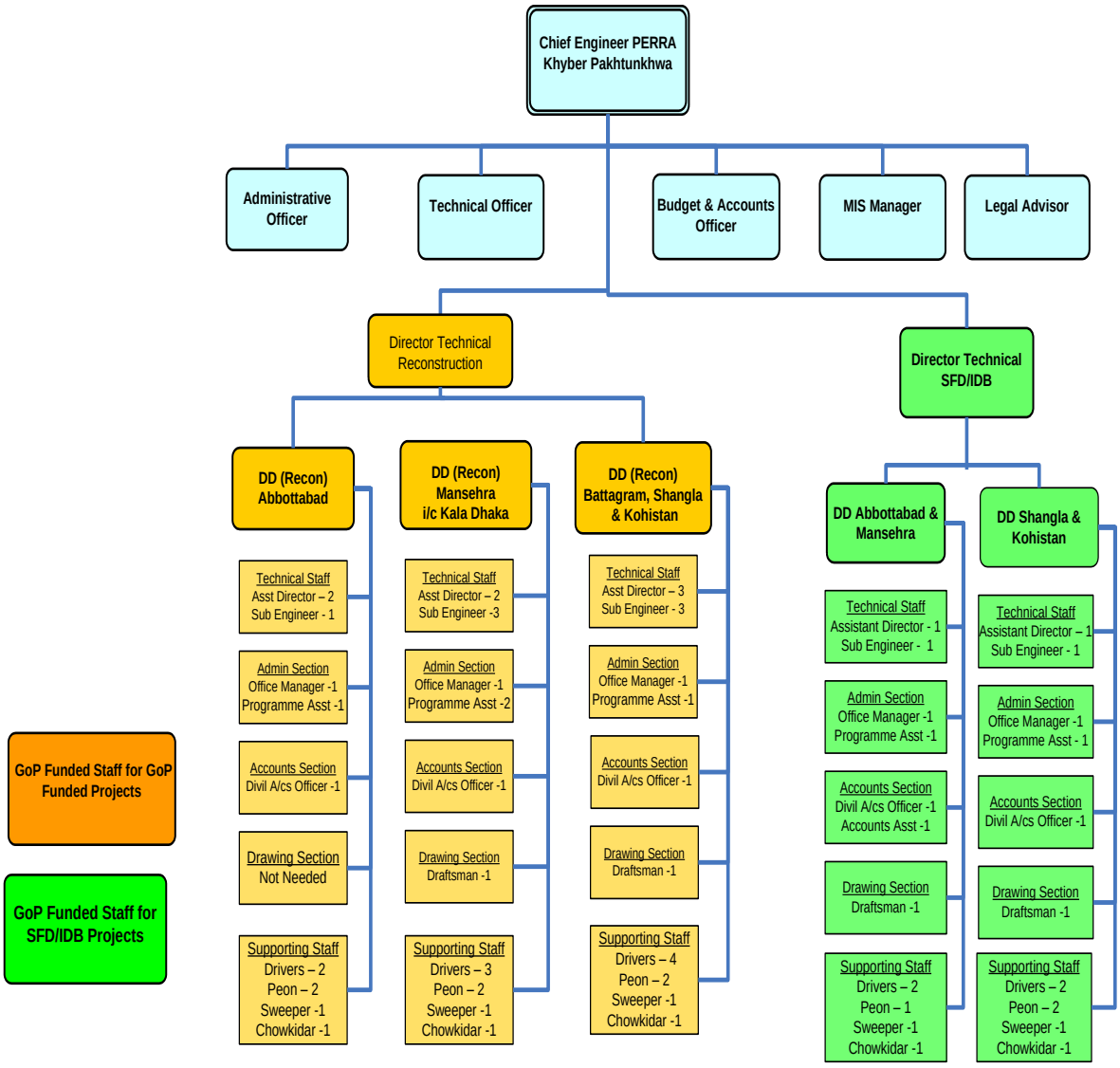

Figure 2.7: Organogram of Engg Wing (Present)

2.7.11 ERRA M&E Wing KPK Zone

Monitoring & Evaluation Wing is an integral part of ERRA. It has established two zonal offices one each in KPK and AJK. Aim is to provide robust progress summary information of the progress and challenges related to reconstruction and rehabilitation, support planning and implementation process and supply critical information required for mid course correction. These offices further narrow down to District level for monitoring and evaluation of projects.

Organogram of M&E Zonal Office KPK. Headed by DG M&E comprised of two zonal offices one each for KPK and AJK as shown in Figure 2.8 below:-

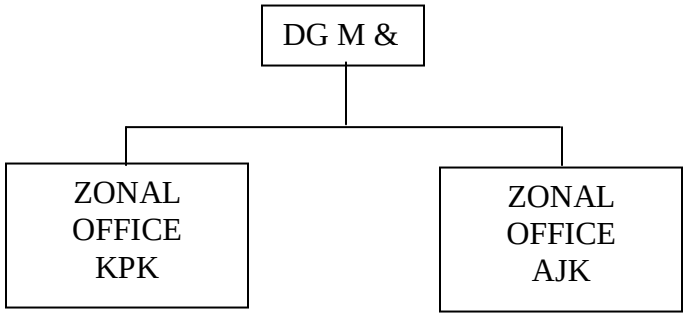

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Figure 2.8: Organogram of M& E Zonal Offices

Overall Objective

- The zonal M & E field office works for strengthening of monitoring and evaluation mechanism of M&E wing.
- Includes an internal quality control mechanism.
- Regular monitoring and Data collection.
- Carries out an annual third party validation to assess institutional and sectoral performance of ERRA.
- The outsourced component of the ERRA M&E wing which includes MDC (Monitoring and data Collection) and TPV (Third Party Validation) is guided by a joint government - donor advisory committee, and performs as part of the M&E Cell reporting to the Director General of the M&E Wing.

2.7.12 NESPAK – Disaster Management & Reconstruction Division

In order to successfully execute massive reconstruction projects spreading over a vast area, timely designing and then their supervision was utmost important. Since NESPAK was only consultancy firm which was rich in experience, resources, expertise and above all national and international reputation. It was decided to engage NESPAK for purpose of design and consultancy. NESPAK also responded in a responsive manner and established a

specialized Division to cater for rehabilitation and reconstruction works of areas subjected to catastrophes.

Services provided by DMRD

- Reconstruction and Fast Track Technologies.
- Geographical Information System.
- Disaster Risk Management & Geological Hazard Assessment.
- Project monitoring and Information Technology Services.

Special Support Services provided by DMRD

- Architectural Design.
- Structural Design.
- City & Regional Planning.
- Electrical works.
- Plumbing works.

2.8 PROJECT PLANNING AND IMPLEMENTATION RULES

2.8.1 Preparation of Strategy Paper

ERRA headquarters prepares it in consultation with the KPK Provincial Government and the Government of AJK. The strategy paper shall include the following:

- Assessment of the damage due to earthquake.
- Targets to be achieved by way of reconstruction.
- Broad outline of the strategy for reconstruction and rehabilitation.
- Minimum standards for the facilities and buildings to be created and constructed.

The Strategy Paper for each sector is approved by ERRA Council and notified.

2.8.2 Annual Work Plan (AWP)

Preparation of AWP

In line with the Strategy Paper, each DRU, in consultation with the respective line departments, prepares an AWP for each sector to be known as the District Work Plan for the respective sector. The

District AWP includes name, scope, estimated cost, funding source and gestation period of each project that the DRU plans to undertake in the respective sector during a year. A project spread over more than one year is also mentioned in the AWP along with annual phasing.

Approval of AWP

The DRU submits the District AWP for each sector to the DRAC for approval along with suggestions and comments, if any. The District AWPs approved by the DRAC are submitted by the DRAC to PERRA or SERRA.PERRA or SERRA compiles all District AWPs in a single document to be known as Provincial and State AWP for the respective sector and lay it before the Provincial and State Steering Committee, along with any suggestions and comments. Provincial and State AWP approved by the Provincial and State Steering Committee is then submitted by PERRA and SERRA to ERRA which compile the AWPs of the KPK and AJK into a single document to be known as AWP for the respective Sector, and lay it before ERRA Board for approval, along with any comments suggestions. While approving the AWP, ERRA Board also indicates the total amounts required for funding the execution of the plan. Once approved by ERRA Board the AWP for a sector is then notified.

2.8.3 Project Preparation

Project PC-I. For each project included in the AWP, the line department or the agency planning to execute the project, in consultation with the concerned engineering department and DRU prepare a Project on ERRA PC-I form.

The Project includes the following:

- The Project PC-I.
- Schedule of Running Expenditure, i.e., the details of manpower, equipment, and other requirements along with costs

of running the facility proposed to be created through the project.

ERRA may specify a separate format for the Schedule of Running Expenditure for each sector. A DRU or the engineering department with prior permission of ERRA may hire or arrange a consultant to facilitate the preparation of project.

2.8.3 Project Appraisal

While undertaking appraisal of a project, the relevant agencies take into account the following factors:

- Capacity of the implementing and executing agency.
- Arrangements and costs for running and maintenance of the project or a facility created there under.
- Participation of the community in the project
- Financial management arrangements of a project.
- Any concerns of the foreign and international/national donors.

2.8.4 Project Approval

Submission of PC - I to DRAC

Each Project is submitted to the District Reconstruction Advisory Committee for approval.

- The District Reconstruction Advisory Committee approves a project with such amendments and modifications as considered appropriate.
- A Project costing up to Rs.100 million, if approved by the District Reconstruction Advisory Committee requires no further approval.

Submission of PC - I to Provincial Steering Committee

A Project costing more than Rs.100 million, after its clearance by the District Advisory Committee, is sent to PERRA or SERRA, who lays it before the Provincial and State Steering Committee for approval, along with any observations, comments and suggestions. The Provincial and State Steering Committee may approve a

project with such amendments and modifications as considered appropriate. A Project costing up to Rs.250 million if approved by the Provincial and State Steering Committee requires no further approval.

Submission of Projects to ERRA Board and ERRA Council

A project costing more than Rs.250 million, after its clearance by the Provincial and State Steering Committee, is sent to ERRA, who lays it before the ERRA Board. The Board approves a project costing up to Rs.500 million. If the cost of the project is more than Rs. 500 million, the Board recommends it to ECNEC for approval. A Project costing up to Rs.500 million, approved by ERRA Board requires no further approval.

Administrative Approval

Administrative approval of a project is issued by DG PERRA and SERRA after approval of the PC-I by relevant fora.

Technical Sanction

The approval or clearance of a project by the District Reconstruction Advisory Committee, State and Provincial Steering Committee does not automatically mean the technical sanction of the project.

The technical sanction of a project is issued by the concerned Engineering Department of the State and Provincial Government in consultation with the concerned line department and the DRU, in accordance with the design and construction standards approved by ERRA.

2.8.5 Release and Disbursement of funds.

Release of Funds for AWP. Upon approval of the Annual Work and Cash Plan by ERRA Board, ERRA releases and transfers the amounts required for execution of the plan to PERRA and SERRA in such installments as deemed appropriate.

Release of Funds for projects. Each DRU formally requests PERRA and SERRA for release of funds after the issuance of the Administrative Approval of a Project.

- PERRA and SERRA releases the funds required for the project to the concerned DRU and sends a copy of the release advice to the line department implementing the project.
- Upon release of funds, the DRU requests the concerned engineering department to start execution of the project.

Power to Re-appropriate funds. The Deputy Chairman, ERRA has the power to re-appropriate funds from a sector to another or from one project to another.

- Any re-appropriation of funds within a project up to Rs.1.000 million is allowed by the respective DRU.
- Any re-appropriation of funds within a project up to Rs.5.00 million is allowed by PERRA and SERRA.
- Any re appropriation of funds within a project beyond Rs.5.000 million is allowed by Deputy Chairman.

Funds to remain with the DRUs. The funds required for execution of a project remains with the DRU and in no case transferred to any other account.

Disbursal of Project Funds. The DRU disburse funds to the contractors, vendors, consultants or employees engaged for a project directly according to the schedule provided in the bidding document, purchase order or agreement made for execution of a project.

- Funds for a construction contract are only disbursed after the line department and the concerned Engineering Department communicate in writing that the funds required to be disbursed are in line with the contract and that the contractor has done all that was required of him under the contract for the work.

- No funds are disbursed to a vendor without a certificate in writing from the line department that the goods purchased are according to the technical specifications required under the purchase order and agreement.
- No funds are disbursed to any consultants or employees employed under the project without a certificate in writing by the concerned line department indicating satisfactory performance of the consultant and employee.

Cost Overruns. Any cost overrun beyond 15 per cent of the total cost of a project requires approval of the forum by which the project was initially approved, provided that the revised total cost of the project still falls within the sanctioning power of that forum. This allowance of 15% is not available for a revised project.

Books of Accounts. Each DRU separately maintains accounts for each project on a format notified by ERRA and renders all accounts for inspection and audit as and when so required either by ERRA or PERRA/SERRA. While making any payments or disbursing any amounts the DRU also sends a copy of the release order as well as of the receipt to the concerned line department and the concerned engineering department.

Audit. All projects are subject to internal and external audit as specified by ERRA.

2.8.6 Bidding Documents

Preparation of bidding documents. All bidding and contract documents related are prepared by the respective Engineering Department or consultants, appointed for the purpose.

Approval of bidding documents. All bidding documents follow the standards, as closely as possible, of the Pakistan Engineering Council. All biding documents are approved by the Tender Evaluation Committee to be chaired by the concerned Chief Engineer and Comprise of representatives of PERRA or SERRA

and the line department at the Provincial and State level. At the district level, it is chaired by the EDO Works and Services department (in KPK) or Executive Engineer, PWD (in AJK), with representatives from DRU and line departments. A representative of consultants appointed by ERRA for this purpose is also included in the committee.

Advertisement, tender evaluation and work orders

- All tenders are floated by the Tender Evaluation Committee.
- All bids are evaluated by the Tender Evaluation Committee.
- All work orders are prepared and issued by the concerned engineering department in accordance with the decision of the Tender evaluation Committee.
- If there is an ambiguity in a tender document or any difference of opinion as to any provision, the decision from ERRA is final word.

2.9 SUMMARY

As is evident from chapter heading this chapter briefly covers organization and role of various institutions involved in reconstruction activity. It also encompasses project preparation and implementation rules being followed in ERRA.

Chapter 3

REASONS OF DELAY AND SLOW PROGRESS

3.1 INTRODUCTION

Construction industry produces various resources and infrastructure facilities. Progress of any country is widely dependent on success of its developmental plans. Successful development plan means completion of projects within stipulated time and cost (Sheikh et al. 2010).

Slow progress or delayed completion of projects is serious problem in construction industry even today despite of technological advances and improved project management techniques.

Many projects in underdeveloped and developing countries are not completed on time and by doing so valuable time, human effort and money is wasted. For a successful completion of a project in such countries ,availability of adequate capital , sufficient land ,raw materials and proper supply chain management, availability of skilled and non skilled labor, latest technology know how and technology management , viable roads and nonstop communication mediums, suitable political support and security provision from state, better project management team , better governance, better coordination ,cooperation and synergy among governmental and nongovernmental parties, are basic considerations (Manohar and Ashish 2010).

The aim of this chapter is to explore various aspects of construction delays. An effort has been done to provide an insight of construction delays, their types are mentioned and causes as investigated by other researchers are also mentioned .After thorough study of causes investigated by other researchers, causes of delay applicable to ERRA projects are shortlisted to further investigate them in context of ERRA projects.

3.2 WHAT IS A CONSTRUCTION DELAY

Different researchers have defined Delays in number of ways, in context of Construction management; the simplest definition of a delay is made by Mubarak (2005) as “an event or a condition that results in finishing the project later than stipulated in the

contract." Callahan et al. (1992) define delay in construction claims as "the time during which some part of the construction project has been extended or not executed owing to an unexpected event".

In another study, Trauner et al. (2009) describe delay as "to make something happen later than expected or to not act timely". It can further be clarified as the time lag between the contract original date of completion and the date of preliminary handing over of the project.

3.3 TYPES OF CONSTRUCTION DELAYS

According to Trauner et al. (2009), there are four main groups of construction delays:

1. Excusable or non-excusable
2. Compensable or non-compensable
3. Concurrent or non-concurrent
4. Critical or noncritical

Figure 3.1 presents a general overview of how a construction delay can be categorized. Firstly in the process of analyzing delay effects on the project it will be determined whether delay is critical or noncritical and concurrent or non concurrent. As shown in the Figure all construction delays are excusable or non- excusable. Then, excusable delays are further classified into compensable and non compensable delays.

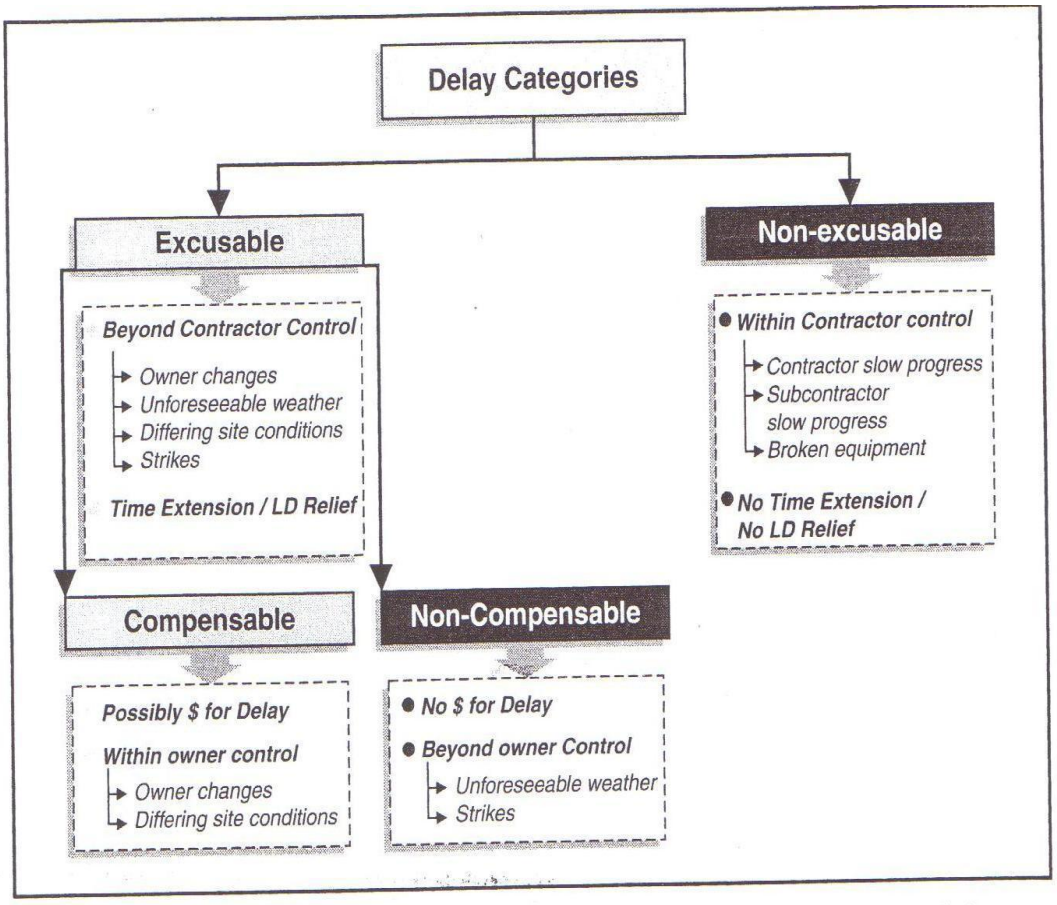

Figure 3.1: Delay Categories

(Source: Trauner et al 2009)

In another study by Yang et al. (2007) delay classification is given in different manner but its almost similar to those described by Trauner et al. It is explained in Figure 3.2. Kartam (1999) classified project delays into three main groups in terms of their origin, timings and compensability; same is explained in Figure 3.3. On basis of origin, delays are further classified into three type's i.e. Owner caused delays, Contractor caused delays, and third party caused delays. Based on their timings delays are further classified into Concurrent delays and non-concurrent delays .Based on compensability delays are further divided into excusable delays and non-excusable / non-compensable delays, excusable delays are further classified into excusable compensable and excusable non-compensable delays.

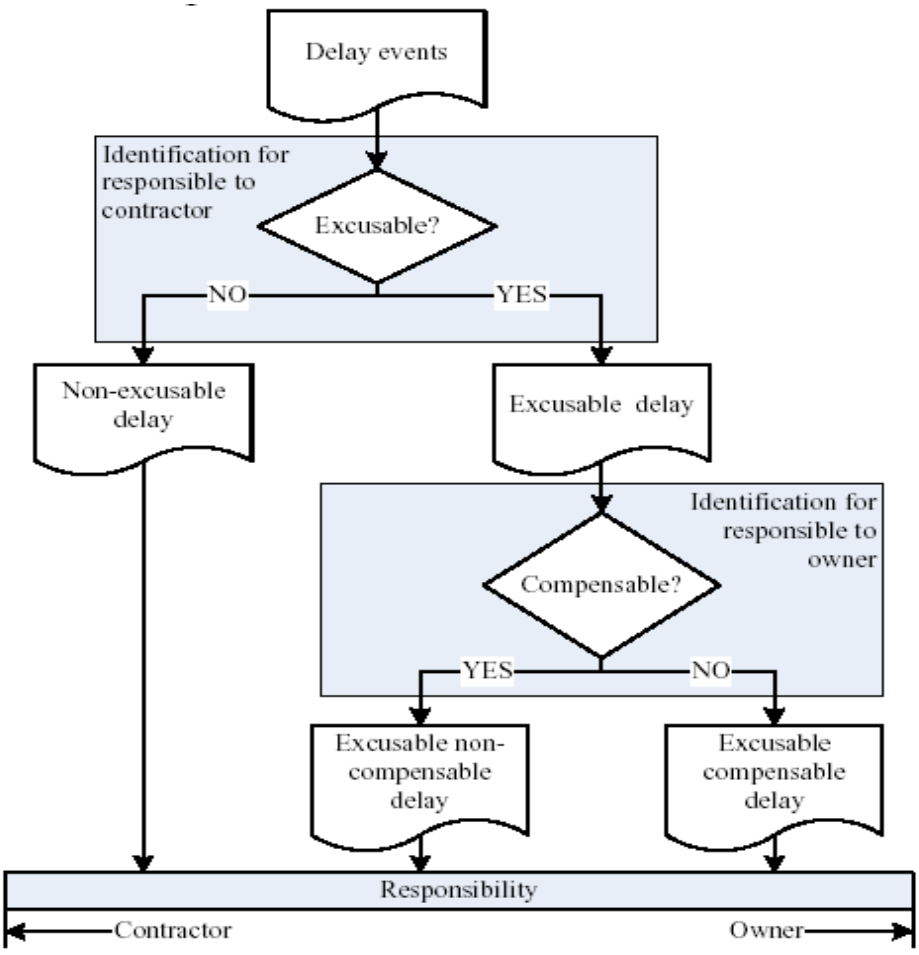

Figure 3.2: Delay Classification

(Source: Yang,Yin and Kao, 2007)

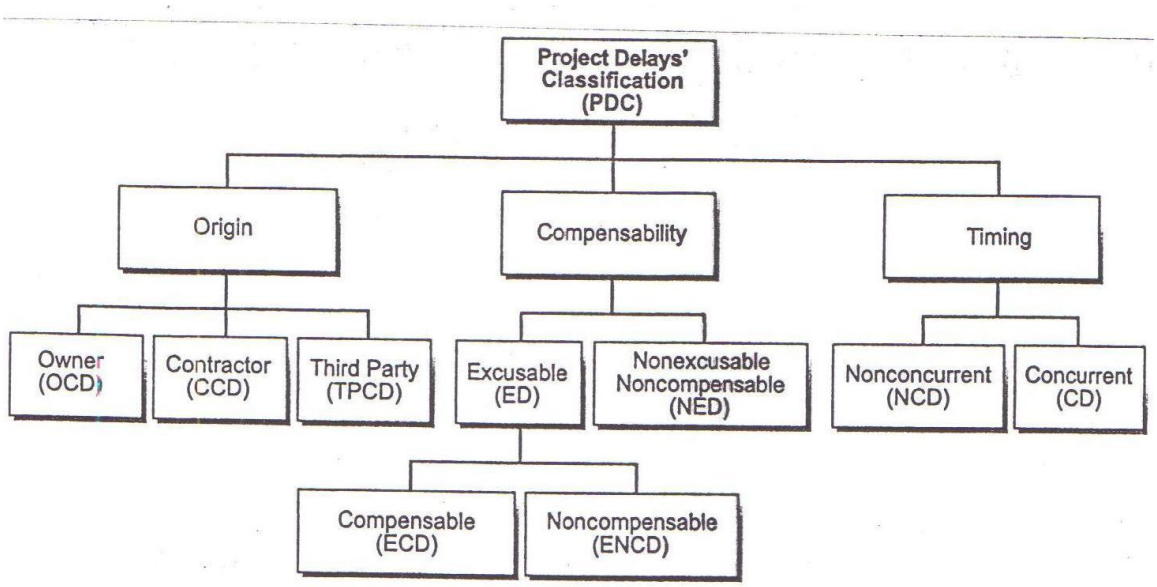

Figure 3.3: Delay Classification

(Source : Kartam , 1999)

3.4 EXCUSABLE VERSUS NON – EXCUSABLE DELAYS

Construction delays are either excusable or non excusable. Callahan et al. (1992) and Trauner et al. (2009) mentioned in their research that whether a delay is excusable or non excusable depends on contract clauses regarding delays. It is often mentioned in contract whether a particular type of delay is eligible for extension of time or not. For instance, in some contracts, unexpected and unusual weather conditions are not considered excusable, therefore, are not considered eligible for extension of time. An excusable delay, in general, is owing to an unforeseeable event beyond contractor's and subcontractor's control. Such a delay makes contractor or subcontractor eligible for EOT. An excusable delay also authorizes contractor or subcontractor for compensation if the delay is within owner's control otherwise such delay is non-compensable. Trauner et al. (2009) explained delays resulting from following issues as excusable:-

- General labor strikes,
- Fires,
- Floods,
- Acts of God,
- Owner-directed changes,
- Errors and omissions in the plans and specifications,

- Differing site conditions or concealed conditions,
- Unusually severe weather,
- Intervention by outside agencies,
- Lack of action by government bodies, such as building inspection.

Non-excusable delays are the "delays that are either caused by the contractor or not caused by the contractor but should have been foreseen by the contractor", Mubarak (2005). Non-excusable delay does not entitle the contractor to either a time extension or monetary compensation. Some of the examples of non- excusable delays as mentioned by Trauner et al. (2009) are as follows:-

- Late performance of subcontractors,
- Untimely performance by suppliers,
- Faulty workmanship by the contractor or subcontractors,
- A project-specific labor strike caused by the contractor's unwillingness to meet with labor representatives or by unfair labor practices.
- Contractor cash-flow problems,
- Accidents on the site caused by the contractor's negligence or lack of preparations.
- Late delivery of the contractor's furnished materials and equipment.

As in case of excusable delays, again the contract is determinant whether a delay is non excusable or not. Contractors before signing of contract should be aware of type of delays considered excusable and non excusable in the contract.

3.5 COMPENSABLE VERSUS NON COMPENSABLE DELAYS

Callahan et al. (1992), Kartam (1999) and Mubarak (2005) mentioned in some of their studies that excusable delay is either classified as excusable compensable or excusable non-compensable. Compensable delays are caused by the owner or designer (Architect / Engineer), and the contractor is entitled to EOT and cost compensation for said delay or both, Mubarak (2005). Differing site conditions, Changes in the work and access to site are some examples of excusable compensable delay.

Non-compensable delays are those which despite excusable don't entitle any cost compensation. Many researchers such as Barrie and Paulson (1992) and Mubarak (2005) mentioned that excusable non-compensable delays are beyond the control of either owner

or contractor. Unusual weather conditions, natural disasters, wars, national crises, floods, Fires or labor strikes are some examples of excusable non-compensable delays. For such kinds of delays contractor is only entitled EOT but no cost compensation. Compensability and non compensability for excusable delays is further defined in contract.

3.6 CONCURRENT DELAYS

Concurrent delay includes a combination of two or more independent causes of delay occurring within same time frame ,these causes may be either excusable or non excusable or combination of these. Mubarak (2005) and Callahan et al. (1992) defined concurrent delay as "more than one delay contributed to project delay, not necessarily that they occurred at same time". Trauner et al. (1999) explains concurrent delay as "Separate delays to the critical path that occurred at same time". Overlapping delays, Simultaneous Delays, Commingled Delays and Intertwined Delays are some other names used for such delays.

Levy (2006) explains that concurrent delays may be caused by the contractor or by the owner, but if it happens that both parties are responsible, and these delays overlap then neither party can be able to retrieve damages.

Concurrent delay analysis brings about many issues, since both owners and contractors view concurrent delays as a strong defense tool against each other. For example, owners use them to preserve their interest in order to get liquidated damages, however contractors use them to neutralize their inexcusable delays and avoid damage entitlement. Courts, practitioners, researchers are generally inconsistent in the subjects of definition and apportionment of concurrent delays.

3.7 CRITICAL VERSUS NON-CRITICAL DELAYS

Mubarak (2005), Kelleher (2005) and Levy (2006) mentioned three categories of construction delays as Excusable and non-excusable, Compensable and non compensable and concurrent and non concurrent. While certain authors such as Callahan et al (1992) and Trauner et al. (2009) mentioned an additional category of construction delays as critical and non critical delays. According to these authors delays which effect project completion date are considered as critical whereas delays which don't have any effect on project completion date are considered as non critical. In other words activities falling on

critical path of a project are critical to project completion and if delayed will cause an extension in completion date of the project , so the delays associated with these activities are critical otherwise they are non critical. The criteria determining the project completion date are as follows, Trauner et al. (2009):-

- The project itself
- The contractor's plan and schedule (particularly the critical path)
- The requirements of the contract for sequence and phasing
- The physical constraints of the project- how to build the job from a practical perspective.

3.8 PRIOR RESEARCH ON CAUSES OF DELAYS IN CONSTRUCTION INDUSTRY OF PAKISTAN

Causes of delays are not of the same kind in every project but they vary from project to project according to size and location. Delay in project is most important issue of construction industry. Various researchers have tried to identify most recurring delay causes, ranked them as per their research and suggested mitigation techniques for these delay causes.

Ali and Goraya (1998) investigated causes of construction delays based on questionnaire survey .They used two questionnaires for said survey , questionnaire 1 was prepared based on 16 projects completed in recent past and delayed for a period ranging from 3 to 33 months. Data revealed that most common reason of delay was non availability of complete funds during the fiscal year. Due to release of funds in phases, delayed payment to contractors resulted in slow progress of work. In almost all the projects original drawings were withdrawn by the consultant for revisions. Deficiency of skilled labor by contractor was another major reason of delay and employment of unskilled labor in lieu of skilled labor also resulted in low quality and delay. Lack of required labor during harvesting season was another main cause of delay. Improper planning for procurement of material, on part of contractor has also been reported as cause of delay by 5 to10%. Delay in availability of structural drawings especially in public sector projects is also one of causes of delay. Questionnaire 2 was prepared based on interviews conducted with several clients, consultants and contractors. Survey showed that most of the projects experience delay on basis of client's role. Main reasons causing

delay on part of client include late payments, untimely decisions, inequitable contract practices, vague conception of demand and unrealistic contract duration. Consultant seldom contributes towards project delay but at times it happens because of misunderstanding with client or due to mistakes or discrepancies in drawings or late provision of same. Study reveals that delay on part of contractor is mainly due to lack of qualified staff, employment of unskilled labor in place of skilled labor, untimely delivery and shortage of materials, non availability of suitable machinery and frequent breakdowns of employed machinery .Government agencies are also considered as reasons of delay as they delay project execution by delaying in issuing permits, loans and delaying in provision of utilities. Differing site conditions and unexpected weather conditions were also mentioned as reasons contributing to delay by some of respondents in said study.

Shah et al. (2010) in his research studied 10 mega projects executed in Islamabad from 2005 to 2010, to find out reasons of delay and cost overrun. Questionnaire survey was conducted and client, contractors and consultants were contacted for said survey. They identified 60 delay factors, out of these highest 10 frequently occurring causes of delay are lengthy and cumbersome payment process adopted by client, lack of qualified staff held by client, frequent change orders by client, poor financial capability of contractors, shortage of qualified staff held by contractors, unstable input prices faced by contractors, slow responses and feedback by consultants, shortage of qualified staff by consultants, lack of responsibility shared by consultant and lack of planning at site by contractors.

To find out reasons of delay and cost overrun Nadir et al. (2010) studied 65 projects of different departments including 48 completed and 17 running projects. Out of these 65 selected projects, 38 were road projects, 12 were infrastructure and development projects and 15 projects were of Government departments. Researchers found out 25 causes of delays and cost overrun, out of theses 10 top ranked factors are Inconsistent cash flow, Inappropriate cost and time estimation, Deficiencies in project planning, Lack of consultant and monitoring staff, Additional work because of design and scope changes, Late and incomplete provision of drawings, Delay and increased cost in land acquisition, Improper project financing, Poor financial control and fraud, kickbacks and corruptions.

As per findings of this research majority of projects in Pakistan experience delay and cost overrun due to inconsistent cash flow. The problem can be averted or minimized if requisite funds and resources are made available before commencement of construction activity.

Nida et al. (2008) analyzed the causes of delays in construction projects of Pakistan and reported top ten reasons of construction projects delays as fluctuation in prices of raw materials, unstable cost of manufactured materials, high cost of machineries, lowest bidding procurement procedures, poor project management / poor cost control, delays between design and procurement phases, incorrect/ inappropriate methods of cost estimation, additional works, improper planning, and unsupportive government policies.

Arain and Tipu (2009) has pointed out lack of proper project management education in our Engineering universities as one of major reasons of poor project management practices being followed in the country resulting in time and cost overrun.

As per World Bank Study on Pakistan Infrastructure Implementation Capacity (2007) main impediments in successful project execution are lack of skilled Human resource and materials, poor planning and management skills, and inability of Pakistan to timely attract "Substitute" external implementation resources for project execution.

3.9 ERRA CATEGORIZATION OF DELAYED PROJECTS

ERRA has classified under construction delayed projects into 3 categories i.e. halted, delayed and snailing. These are defined as:-

3.9.1 Halted Projects

A project becomes halted if more than 3 months have passed and no physical progress is received. Halted projects are further categorized into the following categories: -

a. **Halted - No Work Started**. Commencement Order is issued but work has not started since 3 months or more. The project should have zero (0) % physical progress.

b. **Halted - Sick Projects**. Construction is stopped between 1% and 80% since 3 months or more.

c. **Halted - Stuck Projects.** Construction is stopped between 81% and 95% since 3 months or more.

3.9.2 Delayed Projects

When a project fails to achieve the planned progress and lags behind the schedule, it is declared DELAYED whether the time is over run or not. The difference between planned and actual progress should be 30% or more. The delayed projects are further categorized into the following categories: -

a. **Delayed - Slow Progress**. Difference between planned and actual progress is between 30% and 49%.

b. **Delayed - Sick Projects**. Difference between planned and actual progress is between 50% and 74%.

c. **Delayed - Critical Projects**. Difference between planned and actual progress is equal to or greater than 75%.

3.9.3 Snailing Projects (Time Overrun Projects)

Time overrun projects which are neither "Halted" nor "Delayed". The construction pace of these projects is very slow. They cannot be called "Halted (Sick/Stuck)" because they do some progress in 90 days. They do not fall under the category of "Delayed Projects" because the difference between planned and actual progress is less than 30%.

3.10 CAUSES OF DELAY AND SLOW PROGRESS PERTINENT TO ERRA

After going through the research work of various researchers mentioned in paragraph 3.8, causes of delay that are applicable to ERRA projects are summarized in Tables 3.1, 3.2, 3.3 and 3.4 below:

Table 3.1 Client's Related Contributing Factors

S/No	Contributing Factors of Delay
1.	Delayed Progress Payments
2.	Changing the original scope of work during construction
3.	Frequent Design Changes

S/No	Contributing Factors of Delay
4.	Delay to furnish and deliver the site
5.	Inappropriate procedure for selecting the contractor
6.	Delay in approval of revised PC-1 by District administration.
7.	Excessive involvement of line deptt or End user
8.	Slow Decision making by Client

Table 3.2 Consultant's Related Contributing Factors

S/No	Contributing Factors of Delay
1.	Delays in producing design documents
2.	Mistakes and discrepancies in design documents
3.	Delay in inspection, testing & approval of works
4.	Slow decision making by Consultant
5.	Imposing unrealistic contract duration

Table 3.3 Contractor's Related Contributing Factors

S/No	Contributing Factors of Delay
1.	Inadequate Contractor's Experience
2.	Inadequate planning and scheduling of project
3.	Excessive and Unofficial Subletting
4.	Poor site supervision and management
5.	Incompetent project team of Contractor
6.	Financing and cash flow problems by contractor
7.	Insufficient Contractor's workforce
8.	Inadequate equipment
9.	Late preparation of shop drawings and material samples
10.	Contractors Capacity (Involved in no of projects at same time beyond capacity)
11.	Lack of Professional construction skills and tools

Table 3.4: Miscellaneous Contributing Factors

S/No	Contributing Factors of Delay
1.	Bad Weather
2.	Inaccessibility of site due to landslides enroute
3.	Shortage of technical and skilled labour due to large scale construction
4.	Shortage of Construction Materials in the Market due to large scale construction in the region
5.	Time consumed in dismantling (Not included in Original Contract) of damaged building
6.	Lack of Coordination and Communication b/w Client , Consultant and Contractor
7.	Changing Policies with Change in Government

3.11 SUMMARY

In order to meet research objectives it's imperative to study relevant literature not only to refresh and increase knowledge pertinent to own research but also to learn from prior research work in the same field. Knowledge about construction delays has been very rightly reviewed in this chapter in order to achieve second research objective.

Chapter 4

RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

The aim of this chapter is to define research methodology that will be used for collection of data to meet the objectives of said study. Data collection is very important in research work because the adopted method directly influences the results. Therefore, it is necessary to explain about the method that was used for obtaining the data. Moreover, the reader also needs to understand whether the data is gathered in a way that is recognized and normally practiced for research to ensure the authenticity of the data.

In this chapter research methodology flow chart, design of research questionnaire, conduct of pilot study, refinement of questionnaire, framing of interview questions, conduct of full scale survey and interviews, and data analysis software and technique used will be discussed in detail.

4.2 AIM AND OBJECTIVE OF RESEARCH

The study has been conducted to analyze the functioning of ERRA while focusing on reconstruction activities in district Abbottabad and finding out reasons of slow progress and delayed completion with a view to suggest improvements. The following objectives have been established to achieve the aforesaid aim:-

a. To analyze reconstruction activities of ERRA in district Abbottabad with special emphasis on project implementation and monitoring mechanism with a view to suggest improvements.
b. To find out reasons of delays and slow progress with a view to suggest improvements.

4.3 RESEARCH DESIGN

Research strategy defines the design showing how the researchers are going to carry out their study to achieve and answer research objectives and questions (Saunders et al. 2003). It comprises of sampling and questionnaire development, data collection sources and considering research constraints. The research strategy is selected on the

basis of research aim and objectives. Three different approaches are considered acceptable for the research in construction management. These are: quantitative methods, qualitative methods and combination of both quantitative and qualitative commonly known as 'mixed mode approaches'. Quantitative research methods use deductive approach and associated with collection of data and statistical analysis. On the other hand, using inductive approach, qualitative methods draw the results from interviews or observations rather than using statistical procedures (Amjad 2004-05). From 1983-1996, Construction, Engineering and Management (CEM) journals research papers showed that quantitative methods were dominated and used by fifty seven percent (57%) of the researchers. Only eight percent (8%) utilized qualitative research methods and thirteen percent (13%) used mixed methodology (Loose more et al. 1996). Wing et al. (1998) argued that quantitative approach of research in CEM produces more practical solutions. However, Association of Researchers for Construction Management (ARCOM) proceeding from period 1991-2001 reveals that qualitative and mixed mode approaches have increased slightly. Easterby-Smith et al. (1991) believed that most research studies in management are based on mixed approach. Raftery et al. (1997) despite of criticism also advocated the use of mixed approach. Root et al. (1997) argued that the choice between quantitative or qualitative methods is highly dependent on the research aim and objectives. Based on aforementioned research objectives both qualitative and quantitative methods for data collection have been used. Research methodology adopted for this study follows flow chart shown in Figure 4.1:-

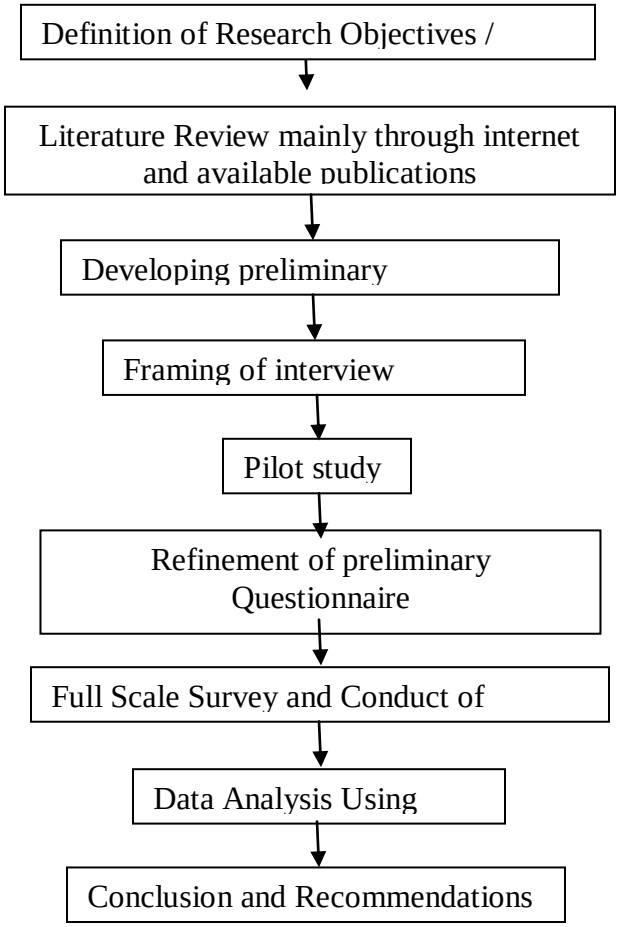

Figure 4.1: Research methodology flow chart

The research has been done on the steps shown in the Figure 4.1. To fulfill 1st objective of the study apart from literature review and observation, interviews of key officials were also incorporated, after literature review on organizational structure and functioning of various organizations at district level interview questions were framed. For second objective of the study, a delay factors questionnaire was developed. Pilot study was carried out for purpose of the questionnaire validation, refinement and improvement. Having done a feasibility survey, full scale survey was conducted to get the feedback of all the three key stake holders i.e. Client, Consultant and Contractor. Finally, statistical analysis has been done from the collected data to rank the delay factors.

4.4 DEVELOPING PRELIMINARY QUESTIONNAIRE

Shuwei (2009) suggested that survey questionnaire should be clear, precise and attractive for the respondents. In this study questionnaire has been developed in easy and understandable form keeping in mind Pakistani construction industry. A covering letter

was also attached with the questionnaire informing the respondents about the purpose of the study and ensuring them that information extracted through questionnaire will be kept confidential and will only be used for research purposes. (Appendix- I)

Questionnaire was divided into two parts , Part I pertained to general information about respondent i.e. his name , qualification , experience in construction industry, nature of job i.e. client , consultant or contractor, PEC registration category (in case of contractor) etc. while Part II comprised of delay factors distributed into four groups i.e. Client related, Consultant related, Contractor related and Miscellaneous. After thorough literature review and going through prior research on delay factors a total of forty two factors were included in that questionnaire.

Oppenheim (1992) argued that people's perception about some specific issue goes from low, through neutral to a degree of high level. Attitude measurement is suitable for measuring individuals' perception or feelings, called an attitude scale by Bell (2005). There are four commonly used methods of attitude scaling in social research: the Bogardus, Thurstone, Likert and Guttmann (cumulative) scales (Oppenheim 1992, Trochim 1997 and De Vaus 2002). Among them, Likert scale is widely used as it provides better reliability and less laborious (Oppenheim 1992 and De Vaus 2002). Therefore, Likert scale was selected to take opinion of all the three key stake holders, client, consultant and contractor in this research.

Several researchers have recommended 7-point scale (Alwin 1997 and De Vaus 2002); however, the fine distinctions can confuse and requires precision with greater accuracy (Shuwei 2009). Therefore, based on the above, five point scales was adopted for the survey questionnaire to get feedback on each factor and defined scales as 1 for Strongly Disagree, 2-Disagree, 3-Neither agree Nor Disagree or don't know, 4-Agree and 5-Strongly Agree to show their attitude towards each factor contributing delay in ERRA projects.

4.5 PILOT STUDY

The purpose of a pilot survey also known as feasibility survey is to test a questionnaire for its reliability, consistency and validity (Thompson 2010). De Vaus (2002) argued that while conducting a pilot survey, the emphasis should take on checking whether any problem exists with the questionnaire items, how long it will take to fill in

and whether respondents are interested in filling the questionnaire. Another important issue is how many pilot surveys be carried out? Shuwei (2009) believed that the number of pilot studies depends on research aim and objectives, size of the research study and available resources (time and money). For this purpose, a pilot survey has been carried out to test the questionnaire items as well as the whole questionnaire.

A sample of nine respondents three each from client, consultant and contractor category was taken to validate and refine preliminary questionnaire. The questionnaires were delivered by hand to ensure maximum feedback. The responses provided by the respondents were helpful in refining and improving the questionnaire for conducting full scale survey. Pilot study helped a lot in refining questionnaire; respondents gave valuable suggestions in refining it. As a result of pilot study questionnaire was reduced in size from four to a single page, grouping made in preliminary questionnaire was eliminated and all factors related to client, consultant and contractor were mixed in refined questionnaire as it was suggested that respondents would hesitate in giving their opinion if these factors were grouped under these groups, few factors were not considered appropriate to ERRA environment and were eliminated thus reducing them to thirty one in number and a third part was also included in the refined questionnaire asking about valuable suggestion from respondents. After this whole process of pilot study questionnaire was ready for carrying out a full scale survey. (Appendix - II)

4.6 FRAMING OF INTERVIEW QUESTIONS

In order to analyze functioning of project implementation and monitoring setups at district level, apart from reviewing literature pertaining to their organizational structure and roles and responsibilities ,project preparation and implementation rules, various monitoring reports , annual reviews it was also considered appropriate to conduct interviews of key officials involved in physical implementation and monitoring of projects at district level in order to incorporate their vast experience in this research. As a result interview questions for interviews of Dir Planning & Technical PERRA, PM DRU, CRE & RE NESPAK and President Contractor Association were drafted and then finalized after deliberations and discussions with few officials in ERRA. (Appendix - III)

4.7 DATA COLLECTION

Since only one district was to be surveyed i.e. district Abbottabad, so it was comparatively easy to assess the respondents personally especially clients and consultants. Bell (2005) argued that delivering questionnaires to respondents by hand have distinct advantages: respondents can get a better understanding of the research purpose, questionnaires can be filled through face to face communication, any difficulty in the questionnaires can be sort out easily and high response rate can be obtained.

4.8 STRATEGY FOR DATA ANALYSIS

Survey questionnaire designed for this research uses Lickert Scale i.e. it is ordinal one, to check the reliability of collected data Cronbach's Alpha coefficient method was used. Further analysis was done using descriptive statistics to find out mean score of each delay factors as reported by various respondents in each group of Client, Consultant and Contractor. Then the formula of Relative Importance Index (RII) was used to rank delay factors as reported by respondents of Client, Consultant and Contractor category. To see the percentage of disagreement and agreement between all the three key stake holders regarding ranking of the delay factors, crosstab test was performed and chi square test was done to see significance of association in perception of these respondents. An overall ranking of these thirty one delay factors was then obtained. Analysis details and results are discussed in next Chapter.

4.9 SUMMARY

Research methodology adopted for this research effort has been discussed briefly in this chapter. Importance of qualitative and quantitative research methods has also been highlighted, as this research is being carried out by using both these techniques. An effort has also been made to make readers understand proposed research methodology with help of a flow chart.

Chapter 5

DATA ANALYSIS, RESULTS AND DISCUSSIONS

5.1 INTRODUCTION

In this chapter data analysis and its results are discussed in detail. To achieve first objective of study data extracted through documents review at district level set ups, interviews and data gathered about district level setups through internet and through personnel observation of researcher has been analyzed. For the purpose of analysis of data obtained through questionnaire survey, most widely used software i.e. SPSS (Statistical Package for Social Sciences) Ver.18.0 and MS Excel 2007 were used. All three major stakeholders i.e. Client, Consultant and Contractors involved in reconstruction activity at District level gave their perception about contributing factors for delay. Different statistical tests such as reliability and descriptive statistics (mean, frequency etc.) calculation of Relative Importance Index (RII) for ranking of contributing factors and percentage agreement between three parties is done in order to derive the overall ranking of these contributing factors.

5.2 ANALYSIS OF PROJECT IMPLEMENTATION AND MONITORING SET UP IN DISTRICT ABBOTTABAD

5.2.1 District Abbottabad

History. The town of Abbottabad, under the British Raj was the headquarters of the Hazara District. It was named after Major Jammes Abbott, who founded the town and district in January 1853 .He remained the first Deputy Commissioner of the Hazara district from 1849 until April 1853. Hazara remained a district right up to its conversion into division in 1976. In Oct 1976, Mansehra was given a status of a full fledged District. Subsequently in 1991, tehsil Haripur was separated from Abbottabd and made a district. (Wikipedia accessed on 15 Jan 2012)

Topography. Abbottabad is situated in the Orash Valley lying between 34°09′N latitude and 73°13′E longitude at an altitude of 4,120 feet (1,260 m).(Wikipedia accessed on 15 Jan 2012).

Geography. Abbottabad is bounded by district Mansehra on the north, district Haripur on the west and southwest, district Muzaffarabad of AJK on the east, district Rawalpindi on the south and federal capital Islamabad on the southeast. River Jhelum flows on eastern side and River Kunhar flows on northeastern side of District Abbottabad. Abbottabad's total area is 1,969 square kilometers and is divided in two tehsil divisions' i.e. Abbottabad and Havellian. Abbottabad district has a population of over 875,157(1998 census), where around 300,000 live in Abbottabad city.

Climate. Abbottabad is endowed with scenic and green mountains and temperature that is not too cold in winters and nor too hot in summers. The weather has made Abbottabad one of the sought after summer resorts of Pakistan. Abbottabad has a humid subtropical climate, with mild to warm temperatures during the spring and autumn months, humid temperatures during June and July and cool to mild temperatures during the winter. The temperature can rise as high as 35 °C (95 °F) during the mid-summer months and drop below 0 °C (32 °F) during the winter months. Snowfall can occur in January, though it is sparse, while most rainfall occurs during the monsoon season stretching from July to September and frequently causes flooding.

Losses in Oct 05 Earthquake. District Abbottabad is a part of the geological set up of KPK that can transmit earthquake waves. Major faults that can affect Abbottabad are the Main Mantle Thrust (MMT), the Main Boundary Thrust, Oghi Shear Zone Mansehra, Jhelum Boundary Thrust, Darband Fault Tarbela , Khairabad Fault , Kalabagh Fault and other small scale faults common in KPK province. Scientists from Quaid-e-Azam University and NESPAK identified the MBT fault as the source of Oct 05 earthquake. Reportedly in Abbottabad District 521 people were killed, 767 were injured, 49,745 houses were totally or partially damaged, 239

Schools were destroyed while 262 were partially damaged, and 17 Basic Health Units out of 5,31,110 Km of roads and 144 administrative government buildings were fully or partially damaged. Tehsil Havelian was not affected as much as tehsil Abbottabad.

5.2.2 Significance of District Abbottabad In ERRA

Since Abbottabad is Gateway to beautiful Northern Areas of Pakistan; therefore its importance in post earthquake scenario can't be negated. Secondly out of five affected districts of KPK, district Abbottabad was most developed and already housed offices of line departments and C&W department which were major stakeholders in reconstruction. To facilitate inter department coordination and speed up reconstruction activity, important offices of PERRA , NESPAK and M&E Wing Zonal Office for KPK were also established at Abbottabad.

5.2.3 Projects Portfolio – District Abbottabad

A total of 1222 projects were identified for rehabilitation and reconstruction in District Abbottabad in various sectors. Out of these 795 (65%) have been completed to date where as 390 are under construction 30 are in tendering stage while 6 are in designing stage. Sector wise detail is attached as Appendix IV.

5.2.4 Institutional Arrangements in the District

Huge task of rehabilitation and reconstruction was not possible without establishing a comprehensive project implementation and monitoring mechanism. In order to successfully complete this gigantic task a well thought out set up of DRU, Engineering Wing, and District office NESPAK and M&E Zonal Office was established to look after the affairs at District level.

DRU Abbottabad. It is basically representation of ERRA Head office in Islamabad at District level answerable to both PERRA and ERRA. Main purpose to establish this set up was to streamline and smooth the coordination process between different stakeholders involved in reconstruction activity. Main functions and duties of this set up are:-

- Preparation of AWP for the District

- Prior to establishment of Engineering Wing it was also involved in project implementation as an Employer.
- Updating projects progress in ERRA Reconstruction Monitor a software used in ERRA to view projects progress.
- Receive payments from PERRA and further disburse them to different contractors as verified by Engineering Wing and Consultant.
- Reporting to Government at District and Provincial level.
- Coordinating and partnering with partner organizations.

Engineering Wing PERRA. keeping in view workload and paucity of technical resources at DRU level as well as slow progress of ERRA projects it was decided to create an Engineering Wing working under already existed set up of C&W department .It comprised of staff posted on deputation from C&W department along with staff working on contract. Duties of project execution through contractors were assigned to this newly established set up .At District level it comprised of a Deputy Director (Reconstruction) as its executive who is assisted by two Assistant Directors along with support staff.

NESPAK set up for District Abbottabad. Like other districts NESPAK set up for district Abbottabad consists of two sections i.e. roads and buildings each headed by a RE. Organogram of this set up is shown in Figure 5.1 below:-

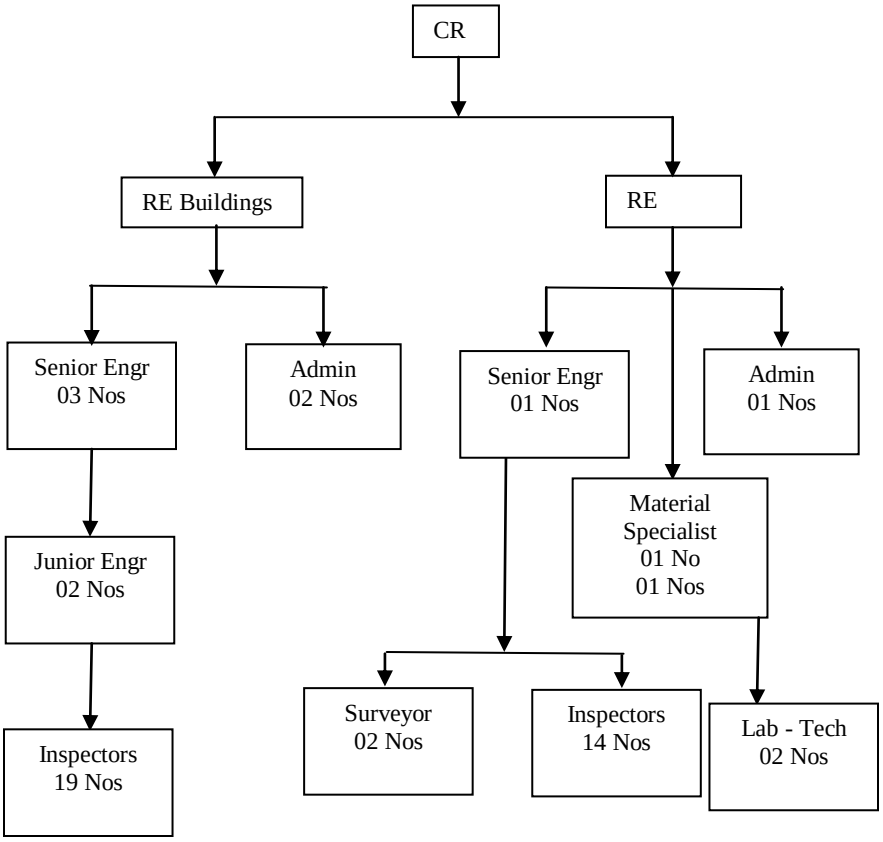

Figure 5.1: NESPAK Set Up at Abbottabad

M&E Wing's set up for District Abbottabad. M&E Wing's set up for Zonal office Abbottabad comprised of 3 Construction monitoring teams (Each consists of 2 Engineers and 3 Sub Engineers along with requisite support staff). These three teams look after Projects of District Abbottabad, along with District Mansehra and Shangla.

5.2.5 Contractors Working In Abbottabad District

PEC Registration Category Wise Distribution

There are 204 contractors of different PEC registration categories working in Abbottabad District. Category wise detail of these contractors is listed in Table 5.1 bellow:-

Table 5.1 Category wise Contractor's Distribution

S/No	PEC Registration Category	No of Contractors
1.	C-A (No Limit Contracts)	2
2.	C-B (Up to Rs 2000 Million)	2
3.	C-1 (Up to Rs 1000 Million)	4
4.	C-2 (Up to Rs 500 Million)	7
5.	C-3 (Up to Rs 250 Million)	13
6.	C-4 (Up to Rs 100 Million)	17
7.	C-5 (Up to Rs 30 Million)	65
8.	C-6 (Up to Rs 15 Million)	94

Contractor's Performance. Out of 204 contractors working in the district, 144 contractors are working in sectors of Education, Health, Governance and Transport. Out of these 144 contractors working in these important sectors only 27 contractors are pre qualified to work on ERRA projects (www.erra.gov.pk accessed on 25 Jan 2010). Completion performance of these contractors has been worked out keeping projects being executed by them in these four aforementioned sectors. Performance summary of contractors is shown in Table 5.2:-

Table 5.2 Contractor's Performance in Four Sectors

S/No	Percentage Performance	No of Contractors
1.	0%	85
2.	0-10%	2
3.	10-20%	2
4.	20-30%	3
5.	30-40%	6
6.	40-50%	8
7.	50-60%	1
8.	60-70%	5
9.	70-80%	1
10.	80-90%	3
11.	100%	28

5.2.6 Present Progress of District Abbottabad

Out of total of 1222 projects being executed in district Abbottabad, 569 projects are in education sectors showing 45% completion progress (256 projects) while 281 projects are under construction, 26 projects are in tendering stage and 6 are in designing stage. In Health sector a total of 24 projects are under execution, showing completion of 33% (8 projects), whereas 13 projects are in construction and 3 are in tendering stage. In governance sector a total of 239 projects are included, showing completion progress of 77 % (184 projects), while 54 projects are still under construction and 1 project is yet to be tendered. In transport sectors a total of 37 roads are included, showing completion of 46% (17 roads) while 20 roads are still in construction phase. Sector wise summary of projects completed and still under construction is attached as Appendix IV.

5.2.7 Delayed Projects in the District

Overall status of District Abbottabad. At present a total of 390 projects are in construction stage in district Abbottabad in 7 sectors.

Delayed Projects of the District. Overall status of delayed projects in district Abbottabad , including details of projects in Education, Health, Governance and Transport sectors is shown in Table 5.3 below :-

Table 5.3: Delayed Projects in District Abbottabad

Category	Total	Delayed	Further Details of delayed projects		
			Slow progress	Sick	Critical
Overall	390	278	89	80	109
Education	280	223	57	74	92
Health	13	4	1	1	2
Governance	54	7	6	1	0
Transport	20	29	21	0	8
Total 4 Sectors	367	263(95%)	85	76	102

Halted Projects of the District. Details about total no of halted projects in the district including projects in Education, Health, Governance and Transport sector are shown in Table 5.4:-

Table 5.4: Halted Projects in District Abbottabad

Category	Total	Halted	Further Details of Halted projects		
			Not started	Sick	Stuck
Overall	390	226	18	181	27
Education	280	156	10	137	9
Health	13	3	0	3	0
Governance	54	33	6	11	16
Transport	20	12	0	12	0
Total 4 Sectors	367	204 (90%)	16	163	25

Snailing Projects of the District. Details about total no of snailing projects in the district including projects in Education, Health, Governance and Transport sector are shown in Table 5.5:-

Table 5.5: Snailing Projects in District Abbottabad

Category	Total	Snailing	Further Details of Snailing projects by overrun		
			4-6 months	10-12 months	>12months
Overall	390	35	1	7	27
Education	280	26	-	5	21
Health	13	2	-	2	-
Governance	54	3	1	-	2
Transport	20	4	-	-	4
Total 4 Sectors	367	35 (100%)	1	7	27

Sector Wise Status of Delayed Projects

Education Sector. In education sector out of total of 569 projects, 280 projects are in construction stage. About 74 % of under construction projects fall in education sector. Projects in education sector are further categorized into 10 categories i.e. 5 categories each for boys and girls respectively. These include colleges, Higher Secondary Schools, High Schools, Middle Schools and Primary Schools both for boys and girls.

In 280 under construction projects 223 projects fall in category of delayed projects. In delayed projects 57 projects are “Delayed – Slow projects” i.e. difference between planned and actual progress is from 30-49 % , 74 projects are declared as “Delayed- Sick projects” i.e. difference between planned and actual progress falls between 50-74 %, whereas 92 projects are declared as “Delayed-Critical projects” i.e. difference between planned and actual progress is beyond 75 %. While 156 projects fall in category of “Halted” projects out of these 10

projects fall in category of “Halted – No work started”, whereas 137 projects fall in “Halted-Sick” i.e. work on these is stopped since 3 months or more and 9 projects come in “Halted-Stuck” projects i.e. these are nearing completion but work on these is stopped since 3 months or more. 26 projects in under construction are classified as “Snailing” i.e. their completion is overrun and are progressing at slow pace. Tabularized summary of under construction projects in education sector is shown in Table 5.6:-

Table 5.6: Delayed Projects in Education Sector

Total under construction	Satisfactory	Delayed	Details of Delayed Projects			
			Delayed	Halted	Snailing	Delayed & Halted
280	-	280	223	156	26	125

Health Sector. In Health sector a total of 13 projects are under construction and out of these 5 projects are progressing as planned while 8 projects are experiencing problems. Out of these 8, 4 projects fall in category of delayed projects**.** Out of these 4 projects 2 projects are declared as ”Delayed- Sick projects” i.e. difference between planned and actual progress falls between 50-74 % , whereas 2 projects are declared as “Delayed-Critical projects” i.e. difference between planned and actual progress is beyond 75 %. 3 Projects fall in contractor of halted sick i.e. work on these is stopped between 1-80% since 3 months.2 projects come in category of snailing projects i.e. their completion is overrun by 10-12 months. Out of these 8 projects 1 projects fall in delayed sick and halted sick i.e. difference between planned and actual progress is between 50-80 % and work on it is also stopped since 3 months. Summary of Health sector projects is as shown in Table 5.7:

Table 5.7 : Delayed Projects in Health Sector

Total under construction	Satisfactory	Delayed	Details of Delayed Projects			
			Delayed	Halted	Snailing	Delayed & Halted
13	5	8	4	3	2	1

Governance Sector. In Governance sector in the district 29 out of 54 under construction projects are declared as delayed projects. Further distribution of these projects is like 21 projects are "Delayed – Slow projects" i.e. difference between planned and actual progress is from 30-49 %, whereas 8 projects are declared as "Delayed-Critical projects" i.e. difference between planned and actual progress is beyond 75 %. Whereas 33 projects fall in category of "Halted" projects, out of these 33, 6 projects come in category of "Halted-No work started", 11 projects fall in "Halted-Sick" projects i.e. work on these is stopped since 3 months or more, and 16 projects fall in category of "Halted – Stuck" projects i.e. these are nearing completion but work is stopped since 3 months or more. Similarly 4 projects are included in "Snailing" projects i.e. their completion is overrun and are nearing completion , in these case their completion date is overdue by 12 over 12 months. While 12 projects are included in delayed as well as halted categories. Tabularized representation of delayed projects of governance sector is as per Table 5.8:-

Table 5.8: Delayed Projects in Governance Sector

Total under construction	Satisfactory	Delayed	Details of Delayed Projects			
			Delayed	Halted	Snailing	Delayed & Halted
54	-	54	29	33	4	12

Transport Sector. Out of total of 20 projects being executed in Transport sector, 19 projects are experiencing delay**.** Out these 19 projects, 9 projects are fall in delayed projects and out of these 9, 6 are classified as "Delayed – Slow projects" i.e. difference between planned and actual progress is from 30-49 %, and 3 project are declared as "Delayed- Sick projects" i.e. difference between planned and actual progress falls between 50-74 %. In under construction projects 12 projects are also classified as "Halted –sick" projects i.e. work on these are stopped since three months or more. Out of these 12 projects, work on 2 is stopped since 3 months; work on 9 months is stopped since 4-6 months while work on 1 project is stopped sine 7-9 months. 3 under projects are classified as "snailing" projects i.e. they are nearing completion but overrun completion time and are progressing at a very slow pace .Out of these 2 are overrun by over 12 months while 1 is overrun by 4-6 months. Out of these under construction projects 4 fall in combined category of "Delayed-Slow" and "Halted – Sick" while 1 project fall in combined Category of "Delayed-Sick" and "Halted –Sick". Tabularized summary of transport sector projects is as shown in Table 5.9:

Table 5.9: Delayed Projects in Transport Sector

Total under construction	Satisfactory	Delayed	Details of Delayed Projects			
			Delayed	Halted	Snailing	Delayed & Halted
20	1	19	9	12	3	5

5.2.8 Interviews of Key Officials

The qualitative research method of interviewing was used in order to gain a diversity of experiences from the key officials who were actively and physically involved in reconstruction activity since establishment of these institutions. A questionnaire was developed for each interviewee and structured interviews of selected officials were conducted to incorporate their experiences in the research. The interviews were focused on finding out reasons of slow progress as per experience of interviewees, knowing about status of human and material resources of these institutions, any changes to be incorporated in working procedures of ERRA as envisaged by interviewees, performance of consultants, strengths and weaknesses of the system and improvements required.

Interviewees

- Director Planning and Technical , PERRA
- Deputy Director Reconstruction, Engg Wing.
- Project Manager , DRU
- Chief Resident Engineer, NESPAK
- Resident Engineer, NESPAK
- President Contractor's Association

Analysis Technique

The interviews provided a rich data base that helped answer the questions aimed at. A grounded theory approach was adopted for analysis as was done in a research, "Why operatives engage in unsafe behavior" (Choudhry 2008). Interviews were noted down by the researcher for subsequent analysis. After repeated readings of interview contents, related

pieces of conversation regarding target questions were identified and placed under one theme. Themes emerged as result of this analysis are discussed in ensuing paragraphs.

Salient's of interviews.

Reasons of Slow Progress and Delay.

While commenting on said reasons there seemed to be consensus amongst the interviewees, but director planning and technical expressed these in a chronological order as they happened. Reasons of slow progress and delay as per interviewees were:-

a. Time consumed in establishment of institutions. As expressed by interviewee, it was unprecedented disaster and district level set up present at that time was not able to handle such disasters, so it consumed time in establishing a set up and starting the reconstruction activity.

b. Time consumed in Planning and Designing. Planning and designing was not an easy task, it required a qualified consultant that were lacking at that time and only NESPAK was able to handle such task as it was not a simple design rather it was seismic resistant design so it took almost 1.5 year to complete the process.

c. Late start of execution process. Physical implementation started by end 2008, after whole exercise of institutional establishment and planning and designing.

d. Lack of capacity of majority of contractors. As implementation progresses it was realized that most of contractors have acquired work beyond their capacity but instead of getting into cumbersome and laborious process of termination and retendering it was decided to get the work done through these contractors.

e. Floods 2010. As a result of unprecedented monsoon and worst floods in 2010, funds for ERRA projects were frozen and diverted to rescue and relief efforts for flood victims. Status of

funds remained so for almost a year, thereby causing most of contractors to slow down their progress.

f. Freezing of funds in 2010, resulted in trust deficit of contractors in ERRA, and despite of release of funds in 2011 contractors were reluctant to work further without payment of previous bills.

g. Unrealistic Contract Durations. Another major reasons highlighted by interviewees was unrealistic contract durations and consultants also agreed on same. Durations were set keeping in mind overall objective of ERRA that was to complete its tasks by 2009/10 without considering scope of work and ground realities.

h. Improper planning and scheduling of projects by majority of contractors. Majority of contractors either acquired projects beyond capacity or subletted them unofficially to newly emerging inexperienced contractors. This phenomenon resulted in improper planning and scheduling of majority of projects thereby affecting progress of reconstruction.

i. Delayed Payments. As per interviewees this remained and still is a sore issue. As per interviewees progress can only improve further if current projects are fueled properly.

Status of Human and Material Resources

While commenting on human and material resources of their institutions, interviewees looked satisfied with present status except few changes suggested by them which included, amalgamation of DRU and Engg Wing and placing it under a qualified PM so as to economize the resources and increase efficiency. They further reiterated that results would have been much better if engineering wing would not have been created, same technical manpower should have been provided to DRU to enhance its capacity. At present Chief Engineer and DG PERRA are of same grade thereby causing problems in smooth execution

further more as per contract Engineering Wing is the employer thus PM DRU has no position in the contract to direct, punish or harm any contractor for any defective or unsatisfactory work**.** Interviewees also suggested timely funding to consultants so that they could maintain their existing resources and didn't bank on contractor's resources while going for inspections.

Performance of NESPAK

Interviewees were also asked about performance of NESPAK as it was sole consultant for majority of projects and performance would have improved if there would have been number of other consultants as well. Interviewees commented that credit of present quality of work goes to NESPAK; it is only because of consultant that they could produce such good quality projects. At the time of engagement of consultants no other consultant with expertise and capacity to handle such huge quantum of work was available to ERRA at that time. National and international reputation of NESPAK also helped in engagement of NESPAK as consultant for majority of ERRA projects.

Changes suggested in working procedures

Changes suggested by the interviewees were enhancement of financial powers of DRAC to Rs 250 million, PSC to Rs 500 million and ERRA board to more than Rs 500 million. Efficiency of Engg Wing (Client) and NESPAK (Consultant) can be further improved by extending these facilities to tehsil level; this will result in distribution of work load down to tehsil level. Refinements suggested in procedure of award of contracts were prequalification of contractors to participate in the bidding process. One of the interviewee also suggested that the departments of ERRA, C&W and NESPAK should constitute a body out of existing employed staff to analyze, refine and suggest a framework for future.

Strengths and weaknesses

Involvement of consultant, concept of building back better and turning this devastation into opportunity, concept of monitoring and evaluation, involvement of all stakeholders and fairness in award of projects are strengths of this system while weaknesses include, initial wrong estimates, funding problems, inability to guard against unofficial subletting, involvement of traditional W & S deptt in reconstruction and non adherence to prequalification of contractors.

Problems faced by contractors to be resolved by Employer

While answering to this question president contractor's association said that major problem is delayed payment on part of the employer, besides this there are three other issues that need to be resolved and these are:-

a. Delay in issuing administrative approval for the projects which resultantly delay release of contractor's payments.

b. Grant of EOT by employer is very slow and at present no of EOT cases duly approved by consultant are lying pending with employer.

c. Timely decision by the employer is another issue that needs to be addressed.

Difference between ERRA awarded projects and Conventional public sector projects

Involvement of a qualified consultant was unanimously declared difference between both. President contractor's association further added that although presence of consultant had been a problem for majority of my colleagues but it had helped a lot in ensuring quality and timely processing payment requests.

Changes need to be made to improve our system of public sector projects to ensure quality projects within reasonable cost and on time

It was suggested that planning of public sector projects should be done involving all stakeholders including end users so that all the changes that are incorporated latter during execution are made in planning phase. It was also suggested that traditional method of project award for these projects be set aside giving chance to DBB, DB or turnkey methods of project award.

5.2.9 Weaknesses of Implementation and Monitoring Set Up

Initial Wrong estimates. One of major drawback that came out as result of this research is initial wrong estimates prepared following the disaster. These were square footage estimates prepared by multiplying square footage cost of C & W department with area of lost and destroyed facility without incorporating seismic considerations and additional facilities which were added in the design stage. These initial estimates were used to calculate the losses and subsequent planning. Even after initial estimates estimate worked out by "The Engineer" after the design also kept on changing because of price escalation as well as because of changes in scope requested either by line department or by the community. Because of this phenomenon funds earmarked at the initial stage for this reconstruction activity kept on changing thereby creating financial difficulties for ERRA.

Funding problems. During the research while discussions with majority of stakeholders this point highlighted clearly that major reason of slow progress is funding problems by ERRA , majority of contractors are struck up for want of funds for works already completed .It was also highlighted during the discussion that main reasons for this unavailability and shortage of funds are increase in project cost because of revisions and price escalation, diversion of funds for rehabilitation of flood affectees of 2010 floods, and prevailing financial crunch in the country. This aspect

has tarnished image of ERRA and resulted in slow progress of projects being executed in various sectors.

Inability to guard against unofficial subletting and ringing of contractors. During research another weakness observed is inability of implementation and monitoring setups to guard against unofficial subletting. In this phenomenon contractors enlisted with PEC used to get contracts awarded on their name and then further award it to small contractors of the area who were not eligible to participate in bidding process while keeping their own commission. This concept has also resulted in non completion and slow progress in number of projects. It could not be curbed because main contractor has shown these small contractors as their representatives in paper formalities. Similarly another concept that was practiced prior to bidding process is known as ringing by the contractors. In this contractors decide amongst themselves before the bidding process to whom this contract is awarded, the contractor selected in the process pays other colleagues commission for making him lowest bidder. In this way contractor declared as lowest bidder is virtually a contractor who came up after paying to his colleagues for declaring him lowest.

Involvement of traditional W & S Department as employer

Another weakness observed during course of research is involvement of traditional W&S department in reconstruction activity ,there are two main reason for its involvement, first reason is huge amount of work load to be handled by DRU that comprised of 3 qualified engineers during peak construction activity (at present its just 1 qualified engineer) and second reason is as subsequent maintenance will rest with W & S department so their involvement in construction process is essential. In my opinion and in opinion of number of officials working in PERRA and DRU involvement of W & S is also a major cause of slow progress as staff employed in W & S department also handles routine maintenance and construction work in addition to reconstruction works of

PERRA. Instead of creating Engineering Wing progress would have improved if existing set up of DRU would have been strengthen with technical staff.

Prequalification of Contractors. Another important issue that came to light during research and study is prequalification of contractors. Initially it was considered while awarding contract but latter on once workload started increasing this aspect was waived off. Results would have been much better if prequalification of contractors prior to bidding was mandatory.

Weak knowledge of Contractors and Employer regarding Contract Management and contract document. Another weakness observed is weak knowledge of contract documents and contract management of both contractors and employer. Although FIDIC IV is being used as contract document but neither the contractors nor employers are aware of majority of its clauses.

5.2.10 Strengths of Implementation and Monitoring Set Up

Involvement of Consultant. One of the most important aspects of this reconstruction activity is involvement of well equipped team of consultants to ensure quality of works. Although it is a common phenomenon in case of public sectors road projects but its new experience in case of building sector construction. Following the disaster NESPAK (that is presently providing consultancy for 95 % of ERRA projects) also responded very promptly in assessing the need and reacted in a responsive manner in establishing a specialized Division to cater for rehabilitation and reconstruction works of areas subjected to catastrophes. Their performance in engaging and hiring staff for this newly established outfit, establishment of offices in quake affected district and prompt mobilization to sites is also worth mentioning. Bringing this new concept in public sector projects not only ensured a quality construction but also helped a lot in curbing tendency of maul practices which are usually followed in our public sector projects .This phenomenon also helped in educating

contractors in aspects of quality assurance in construction, economical utilization of resources, proper management of construction sites, rooting of proper interim payment certificates, proper planning of construction activities, and important material tests and inspection which are normally performed by the consultants.

Concept of Build Back Better. One of major strength of ERRA lies in its mission that is to "convert this adversity into an opportunity" by reconstructing lost and destroyed facilities, while following the highest standards of reconstruction and rehabilitation with an obligation of, "Build Back Better". The main purpose of this concept was to reconstruct the lost facilities as per requirement of present times incorporating all necessities which were not included in previous facilities, for example in case of schools inclusion of well equipped science and computer labs, modern and user friendly furniture, design of schools keeping in mind projected strength of students, and above all a quality construction. This concept of "Building back better" has placed ERRA far superior then conventional construction departments.

Concept of Monitoring and Evaluation. Another Strength of ERRA in project planning and implementation is concept of monitoring and evaluation. Apart from monitoring of projects by Consultants and employer i.e. Engineering wing and DRUs purpose of this set up at ERRA HQ level assisted by zonal and district offices is to provide a set of independent information and analysis on overall progress and effectiveness of reconstruction and rehabilitation process including the social impact. This not only provides input for mid-course corrections but is also an important tool for accountability. Performance measurement and reporting systems enhance information to all stakeholders, ensuring quality service delivery and successful implementation of strategies. M&E Wing is not a stand-alone activity; it also serves as a decision making tool at all levels. M&E monitors the pace and quality of work awarded to

contractors. This is done by technical staff which carries out frequent visits to site. Technical monitoring by M&E includes following tasks:-

- Measuring Physical progress and conducting monitoring of completed and under construction works by using yard sticks established for measuring physical progress and monitoring proformas prepared for the purpose.
- Also assess and reports severity of violation observed in under construction works.

Use of Software i.e. Reconstruction Monitor in tracking progress

ERRA is handling a large number of reconstruction and rehabilitation projects in sectors of education, health, environment, livelihood, roads and bridges, water supply and sanitation, and government buildings. To manually manage and monitor these projects is both cumbersome and time consuming.

ERRA Reconstruction Monitor is an IT tool devised to effectively monitor progress and take timely decisions, and also make use of monitoring and evaluation reports shared by the monitoring teams on the ERM. This tool is really helpful not only in viewing latest progress but it also covers comprehensively district wise projects of KPK and AJK covering all sector giving project title , contractor name, PC-1 cost , Contract cost, date of award , duration , date of completion, physical progress , financial progress ,name of tehsil and village, etc. Data entry rights are only with DRUs and Knowledge management cell at ERRA HQ. Manual record keeping of such a large quantum of work would not have been possible without such a comprehensive and user friendly software.

Involvement of All Stakeholders in planning of projects

Another positive point is involvement of all stake holders in planning and execution of projects. This representation is ensured at district level in form of District Reconstruction Advisory Committee (DRAC). This committee comprise of district administration, tehsil administration, PM DRU, Representative of planning Wing ERRA, EDO

works, EDOs of line departments, EDO finance and planning. This forum at district level is empowered to approve AWP prepared for the district. This platform also meets frequently to review the progress and sort out issues related to reconstruction activity. This way it has given an opportunity to representatives at district levels to plan projects as per their requirement which was not being practiced in conventional development Plans at district level.

Fairness in Award of Contracts. A positive sign observed in award of contracts is fairness in evaluation and award. Once the contractor submits its bid, it's evaluated separately by NESPAK, DRU, Engineering Wing and at times District office of ERRA M&E Wing. These all departments carry out their own scrutiny in finding out lowest bidder and bid evaluation. After separate evaluation of these departments, meeting is held to finalize the lowest bidder and award of contract. After discussion between aforementioned stakeholders lowest bidder is decided.

5.2.11 Suggested Improvements

Few suggestions for improvement in existing project execution and monitoring set up are appended below:-

- Thorough deliberations should be done in preparing initial estimate to avoid repeated amendments and revisions. All stakeholders should be involves in planning , initial designing and estimation phase so as to produce a final product right at the outset thereby saving time in execution.
- Prequalification of contractors should be carried out prior to bidding phase to ensure participation of only qualified contractors in bidding process. Prequalification process should not be restricted only to projects of large amounts it should also be adopted for small amount projects. Prequalification criteria can be tailored to meet requirements of small amount projects.
- Major reason of slow progress that came out after interviews of different officials is funding problems and capacity of contractors. For

such type of construction where timely completion of projects is must funds must be placed at disposal of setups involved in execution and projects must be prioritized as per availability of funds and no project must be started unless required funds are not placed at disposal of executing agency in this case PERRA. Second important reason i.e. capacity of contractors, it must be tracked while awarding the contract keeping in mind works already executed by the contractor. This aspect must also be considered in prequalification of contractors. Capacity of prequalified contractor must be mentioned in terms of no of projects the contractor can execute as per his experience, human and material resources and financial capacity.

- In collaboration with PEC short courses of officials working in execution set ups must be run at regular interval thereby polishing their knowledge of contract management and contract clauses. PEC while renewing PEC category of contractors can also devise some mechanism to check contract management knowledge of their qualified staff employed in the firm.
- Amalgamation of Engineering Wing and DRU. This is major observation of this research and study and it was also highlighted by few officials during their interview. Construction progress will substantially improve if both setups are amalgamated headed by a qualified PM at district level. Suggested organ gram of the set up is as Figure 5.2:-

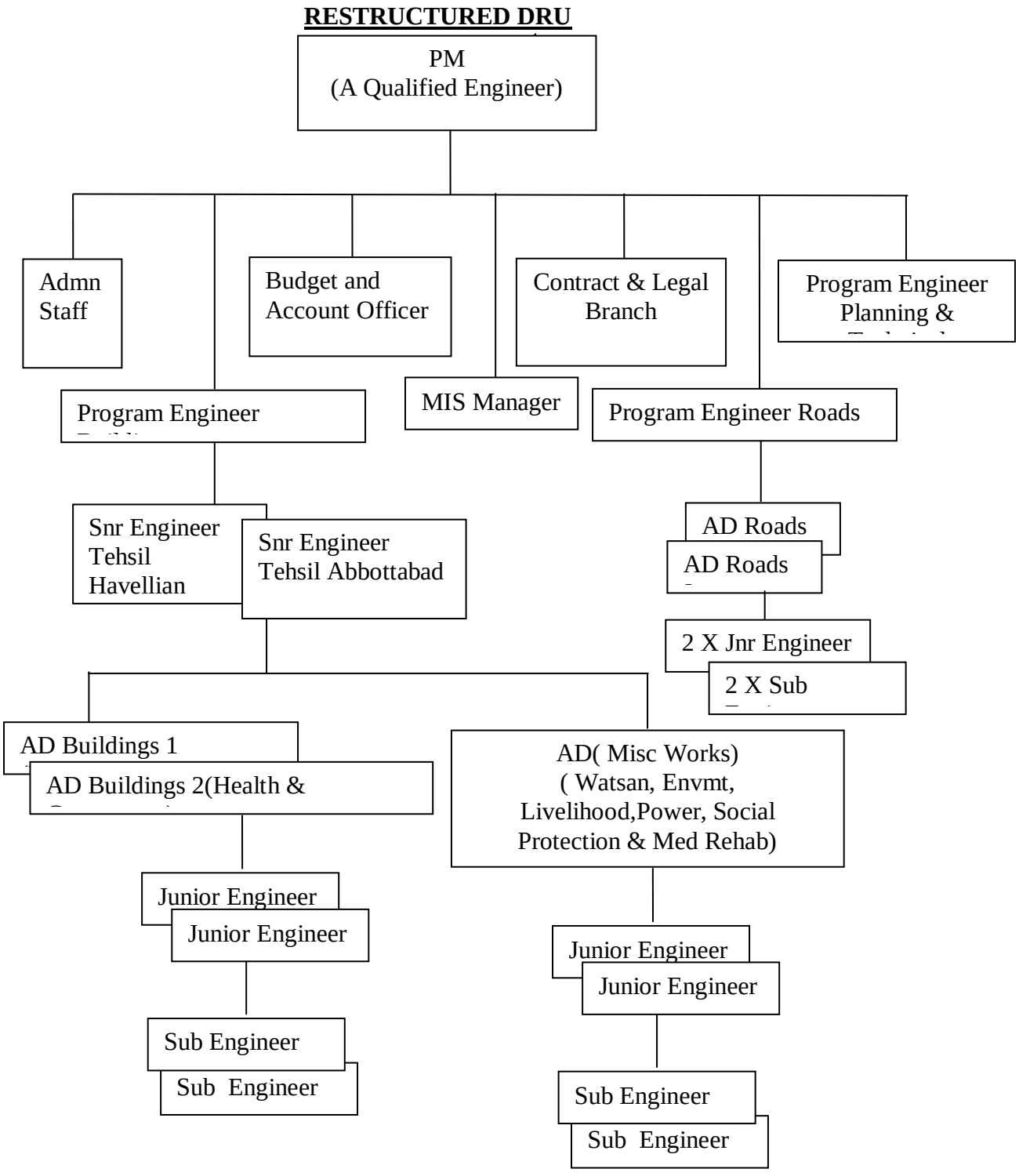

Figure 5.2: Organogram of Restructured DRU

5.3 ANALYSIS OF REASONS OF DELAY AND SLOW PROGRESS IN ERRA PROJECTS

5.3.1 Defining Variables

For the purpose of analysis it was imperative for SPSS software to firstly define the variables. In this case all the factors contributing delay in physical implementation of projects were taken as variables and were coded as (DF1, DF2…….up to DF31) as mentioned in the questionnaire.

Before carrying out the descriptive statistics, calculations of Relative Importance Index (RII) and Mutual Agreement Percentage Analysis of three major stake holders, it was imperative to first check the reliability of collected data.

5.3.2 Reliability Analysis

Different researchers have defined reliability in different ways. Oppenheim (1992) concluded that, "Reliability refers to the consistency of a measure and to the probability of obtaining similar results if the measure is to be duplicated". Hinton et al. (2004) linked reliability to survey questionnaire and as per their definition, "a questionnaire tested to study any topic at different times and across different populations, if produces same results, the questionnaire is a reliable one". Reliability is the ability of the questionnaire to consistently measure the topic under study at different times and across different populations (SPSS Explained, 2004).

In SPSS, widely used method for assessing reliability for continuous data (Likert – scale type items) is Cronbach's Alpha (Hinton et al. 2004 and Leech et al. 2005). Hinton et al. (2004) explained that Cronbach's Alpha value range from 0 (un-reliable) to 1 (Reliable) with 0.75 being considered the most sensible value. Guideline to assess the reliability of any data is shown in Table 5.10.

Table 5.10: Guideline for Assessing Reliability Results

a.	0.9 & above	Excellent reliability	**b.**	0.7 to 0.9	High reliability
c.	0.5 to 0.7	Moderate reliability	**d.**	0.5 and below	Low reliability

In reliability analysis, un-dimensionality i.e. correlation of each item with the total scale can be checked as well. De Vaus (2002) and Hinton et al. (2004) argued that if the item-to scale coefficient is below 0.3, the item should be removed. Since the data gathered was based on Likert-scale; therefore Cronbach's Alpha method was used to check the reliability in this research. The summary of the reliability analysis conducted on SPSS is presented here.

Delay Factors Data Reliability It is tabularized in Table 5.11 below:

Table 5.11: Cronbach's Alpha for Delays Factors

Serial	**Delay Factor**	Cronbach's Alpha
1	Delayed Progress Payments	0.785
2	Changing the original scope of work during construction	0.786
3	Frequent Design Changes	0.790
4	Delay to furnish and deliver the site	0.778
5	Delays in producing design documents	0.777
6	Mistakes and discrepancies in design documents	0.775
7	Late preparation of shop drawings and material samples	0.781
8	Delay in inspection, testing & approval of works	0.787
9	Inappropriate procedure for selecting the contractor	0.778
10	Inadequate Contractor's Experience	0.778
11	Inadequate planning and scheduling of project	0.769
12	Bad Weather	0.775
13	Excessive or Unofficial Subletting	0.776
14	Poor site supervision and management	0.768
15	Incompetent project team of Contractor	0.773
16	Financing and cash flow problems by contractor	0.778

Serial	Delay Factor	Cronbach's Alpha
17	Insufficient Contractor's workforce	0.775
18	Inadequate equipment	0.775
19	Inaccessibility of site due to landslides enroute	0.776
20	Shortage of technical and skilled labour due to large scale construction	0.780
21	Shortage of Construction Materials in the Market due to large scale construction in the region	0.774
22	Delay in approval of revised PC-1 by District administration.	0.771
23	Excessive involvement of line deptt or End user	0.774
24	Time consumed in dismantling (Not included in Original Contract) of damaged building	0.779
25	Slow decision making by Client	0.772
26	Slow decision making by Consultant	0.770
27	Lack of Coordination and Communication b/w Client , Consultant and Contractor	0.770
28	Contractors Capacity (Involved in no of projects at same time beyond capacity)	0.777
29	Imposing unrealistic contract duration	0.782
30	Lack of Professional construction skills and tools	0.765
31	Changing Policies with Change in Government	0.771

As per the above Table of Cronbach's Alpha values for all the contributing factors were above 0.3, thus all the contributing factors were retained basing on the reliability analysis.

Overall Alpha Value for the Questionnaire

In order to determine the overall Alpha value for our questionnaire, and hence judge the measured reliability of our construct measurement, we need to examine the Table 5.12 below:

Table 5.12 Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.782	.774	31

Since Cronbach's Alpha value is > 0.75, so our Questionnaire is Highly Reliable.

5.3.3 Descriptive Analysis

Sample Characteristics

In this survey there is a sample of 125 valid responses out of 194 targeted population showing response rate of 64.4 % as mentioned in Table 5.13 below:-

Table 5.13 Response Rate Analysis

S/No	Category	Population	Sample	Valid Percent
1.	Client	18	11	61%
2.	Contractor	144	98	68%
3.	Consultant	32	16	50%
4.	Total	194	125	64.4%

Respondent's Information

Respondent's Qualification. Respondent's qualification is shown in Table 5.14 below

Table 5.14: Respondent's Qualification

Qualification	Masters (Engg)	Bachelors (Engg)	Diploma Engr	Others
Percentage	4%	16%	42%	38%

Respondent's Experience. Respondent's experience is shown in Table 5.15 below

Table 5.15: Respondent's Experience

Experience in years	1-5 years	6-10 years	11 – 20 years	0ver 20 years
Percentage contribution	13%	30%	37%	20%

Ranking of Contributing Factors of Delay

In order to find out most significant factors contributing towards project delay, ranking of these factors was done based on Client's, Consultant's and Contractor's perceptions individually as well as on their overall response. For this purpose first descriptive statistics was applied using SPSS to rank these contributing factors based on their mean scores, then this ranking was further rechecked using Relative Importance Index (RII) as per following formula:-

$$RII = \frac{\sum w}{A \times N} \quad \text{..... Equation (1)}$$

Where : w = weighting as assigned by the each respondent in a range from 1 to 5, where 1 implies Strongly Disagree and 5 implies Strongly Agree; A = the highest weight (5); N = the total Number in the sample (In this case it is no of respondents belonging to Client, Consultant and Contractor category). On verification of ranking by RII it was revealed that ranking obtained by using mean scores is similar to that obtained by using RII.

Mean Scores and Ranking corresponding to all the key stake holders' i.e. client, consultant and contractor for each contributing factor causing delay computed as per the field survey is tabulated in Table 5.16 below:

Table 5.16: Mean Scores and Ranking of Contributing Factors

Contributing Factors	Client		Consultant		Contractor		Overall	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Delayed Progress Payments	4.9	1	5	1	4.7	1	4.9	1
Changing the original scope of work during construction	3.8	11	3.875	2	4.6	2	4.1	2
Frequent Design Changes	2.5	31	3.3	7	3.7	8	3.2	16
Delay to furnish and deliver the site	3.4	18	3.3	7	3.9	4	3.5	7
Delays in producing design documents	4.4	3	3.5	5	3.9	6	3.9	3
Mistakes and discrepancies in design documents	3.4	18	2.3	22	3.7	7	3.1	19
Late preparation of shop drawings and material samples	3.4	18	2.6	16	2.1	31	2.7	29
Delay in inspection, testing & approval of works	2.5	30	2	25	2.3	30	2.3	31
Inappropriate procedure for selecting the contractor	2.6	29	3.1	11	2.9	24	2.9	25
Inadequate Contractor's Experience	3.55	15	3	12	2.91	25	3.15	17
Inadequate planning and scheduling of project	3.82	11	2.63	6	3.28	18	3.24	13
Bad Weather	3.55	15	2.25	22	3.9	5	3.23	14
Excessive / Unofficial Subletting	3.91	9	3.25	7	3.02	22	3.39	10
Poor site supervision and management	3.18	22	1.5	31	2.78	27	2.49	30
Incompetent project team of Contractor	4.09	6	2.75	15	2.67	29	3.17	15

Contributing Factors	Client		Consultant		Contractor		Overall	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Financing/ cash flow problems by contractor	4.36	3	3.38	6	3.31	17	3.68	4
Insufficient Contractor's workforce	3.91	9	3.28	7	2.74	28	3.31	12
Inadequate equipment	3.18	22	2.63	16	2.8	26	2.89	24
Inaccessibility of site due to landslides enroute	3	27	2.13	24	3.56	10	2.9	22
Shortage of technical / skilled labour due to large scale construction	3.36	18	3.63	3	3.54	11	3.51	8
Shortage of Construction Materials in the Market due to large scale construction in the region	3.73	13	3	12	3.39	16	3.37	11
Delay in approval of revised PC-1 by District administration.	3.18	22	2	25	3.09	19	2.76	27
Excessive involvement of line deptt / End user	3.64	14	2	25	3.04	21	2.89	23
Time consumed in dismantling (Not included in Original Contract) of damaged building	4.09	6	1.88	28	3.42	13	3.13	20
Slow decision making by Client	2.91	28	2.5	21	3.43	12	2.95	21
Slow decision making by Consultant	3.09	26	1.88	28	3.4	14	2.79	26
Lack of Coordination and Communication b/w Client , Consultant and Contractor	3.18	22	2.88	14	3.4	14	3.15	18

Contributing Factors	Client		Consultant		Contractor		Overall	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Contractors Capacity (Involved in no of projects at same time beyond capacity)	4.45	2	3.63	3	2.95	23	3.68	5
Imposing unrealistic contract duration	4.36	3	2.63	16	3.98	3	3.66	6
Lack of Professional construction skills and tools	3.55	15	1.63	30	3.06	20	2.75	28
Changing Policies with Change in Government	4.09	6	2.63	16	3.62	9	3.45	9

Most Significant Contributing Factors of delay

15 most significant contributing factors of delay in ERRA projects are listed in Table 5.17:

Table 5.17: Most Significant Contributing Factors of Delay

Ranking	Contributing Factors
1	Delayed Progress Payments
2	Changing the original scope of work during construction
3	Delays in producing design documents
4	Financing/ cash flow problems by contractor
5	Contractors Capacity (Involved in no of projects at same time beyond capacity)
6	Imposing unrealistic contract duration
7	Delay to furnish and deliver the site
8	Shortage of technical / skilled labour due to large scale construction
9	Changing Policies with Change in Government
10	Excessive / Unofficial Subletting
11	Shortage of Construction Materials in the Market due to large scale construction in the region

12	Insufficient Contractor's workforce
13	Inadequate planning and scheduling of project
14	Bad Weather
15	Incompetent project team of Contractor

5.3.4 Crosstab and Chi Square Test for Most Significant Contributing Factors

In order to find out individual perception of respondents regarding most significant contributing factors in terms of percentage crosstab test was performed and in order to check the significance of results chi square test was done .Results of these two tests regarding most significant contributing factors are appended below.

Delayed progress payments

Table 5.18: Crosstab Result – Delayed Progress Payments

Respondents			Delayed Progress Payments	Total
			AGREE	
	CLIENT	Count	11	11
		% within RESPONDENTS	100.0%	100.0%
	CONSULTANT	Count	16	16
		% within RESPONDENTS	100.0%	100.0%
	CONTRACTOR	Count	98	98
		% within RESPONDENTS	100.0%	100.0%
Total		Count	125	125
		% within RESPONDENTS	100.0%	100.0%

Table 5.19 Chi-Square Tests – Delayed Progress Payments

Test details	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.074[a]	4	.002
Likelihood Ratio	9.377	4	.052
Linear-by-Linear Association	3.949	1	.047
N of Valid Cases	125		

Tests results show that 100% respondents agree with this contributing causing delay and there is significance association between their perception as pearson Chi square value (.001)<.05

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Changing the Original Scope of work during Construction

Table 5.20: Crosstab Results – Changing original Scope of work during construction

Respondents		Changing original Scope of Work during Const			Total
		DISAGREE	NEUTRAL	AGREE	
CLIENT	Count	2	1	8	11
	% within RESPONDENTS	18.2%	9.1%	72.7%	100.0%
CONSULTANT	Count	4	0	12	16
	% within RESPONDENTS	25.0%	.0%	75.0%	100.0%
CONTRACTOR	Count	2	1	95	98
	% within RESPONDENTS	2.0%	1.0%	96.9%	100.0%
Total	Count	8	2	115	125
	% within RESPONDENTS	6.4%	1.6%	92.0%	100.0%

Table 5.21 Chi Square Test

Test details	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	19.471[a]	4	.001
Likelihood Ratio	14.351	4	.006
Linear-by-Linear Association	12.790	1	.000
N of Valid Cases	125		

Test results show that 92 % percent respondents are agreeing to this contributing factor and this is strong association between these perceptions as confirmed by chi square test as its value is less than 0.05.

Delay in Producing design documents

Table 5.22 Crosstab Results – Delay in producing Design Documents

Respondents			Delay in producing design documents			Total
			DISAGREE	NEUTRAL	AGREE	
	CLIENT	Count	1	0	10	11
		% within RESPONDENTS	9.1%	.0%	90.9%	100.0%
	CONSULTANT	Count	7	1	8	16
		% within RESPONDENTS	43.8%	6.3%	50.0%	100.0%
	CONTRACTOR	Count	5	1	92	98
		% within RESPONDENTS	5.1%	1.0%	93.9%	100.0%
Total		Count	13	2	110	125
		% within RESPONDENTS	10.4%	1.6%	88.0%	100.0%

Table 5.23 Chi-Square Tests

Test details	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	25.339[a]	4	.000
Likelihood Ratio	18.050	4	.001
Linear-by-Linear Association	5.899	1	.015
N of Valid Cases	125		

Third most significant Factor contributing towards delay in ERRA projects is delay caused by Consultant in producing design document as pointed out by 88 % of respondents during field survey and chi square test a significant association between their perceptions as its value is < 0.05.

Financing and Cash flow problems by the Contractors

Table 5.24 Crosstab Results - Financing and Cash flow problems by contractors

Respondents			Financing / cash flow problem by contractor			Total
			DISAGREE	NEUTRAL	AGREE	
	CLIENT	Count	0	1	10	11
		% within RESPONDENTS	.0%	9.1%	90.9%	100.0%
	CONSULTANT	Count	6	0	10	16
		% within RESPONDENTS	37.5%	.0%	62.5%	100.0%
	CONTRACTOR	Count	34	1	63	98
		% within RESPONDENTS	34.7%	1.0%	64.3%	100.0%
Total		Count	40	2	83	125
		% within RESPONDENTS	32.0%	1.6%	66.4%	100.0%

Table 5.25 Chi-Square Tests

Test details	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.311[a]	4	.054
Likelihood Ratio	10.970	4	.027
Linear-by-Linear Association	2.825	1	.093
N of Valid Cases	125		

4th most significant factor highlighted by 66 % respondents is financing and cash flow problems being faced by contractors and contributing towards delay and significant association is their between perception of respondents.

Contractors Capacity (Involved in number of projects beyond Capacity)

Table 5.26 Crosstab Results – Contractor's Capacity

Respondents			Contracotr's Capacity			Total
			DISAGREE	NEUTRAL	AGREE	
	CLIENT	Count	0	0	11	11
		% within RESPONDENTS	.0%	.0%	100.0%	100.0%
	CONSULTANT	Count	4	0	12	16
		% within RESPONDENTS	25.0%	.0%	75.0%	100.0%
	CONTRACTOR	Count	47	2	49	98
		% within RESPONDENTS	48.0%	2.0%	50.0%	100.0%
Total		Count	51	2	72	125
		% within RESPONDENTS	40.8%	1.6%	57.6%	100.0%

Table 5.27: Chi-Square Tests

Test details	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.506[a]	4	.014
Likelihood Ratio	16.856	4	.002
Linear-by-Linear Association	11.948	1	.001
N of Valid Cases	125		

Next important contributing factor that is ranked fifth in significance is Contractor's capacity i.e. involvement of contractors in number of projects beyond their performance capacity. Almost 60% respondents are agreeing to this and their perception is significant as per chi square test.

Imposing Unrealistic Duration

Table 5.28 : Crosstab Results – Imposing Unrealistic Contract durations

Respondents		Imposing unrealistic contract durations			
		DISAGREE	NEUTRAL	AGREE	Total
CLIENT	Count	0	0	11	11
	% within RESPONDENTS	.0%	.0%	100.0%	100.0%
CONSULTANT	Count	8	2	6	16
	% within RESPONDENTS	50.0%	12.5%	37.5%	100.0%
CONTRACTOR	Count	14	0	84	98
	% within RESPONDENTS	14.3%	.0%	85.7%	100.0%
Total	Count	22	2	101	125
	% within RESPONDENTS	17.6%	1.6%	80.8%	100.0%

Table 5.29: Chisquare Test

Test details	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	30.223[a]	4	.000
Likelihood Ratio	24.485	4	.000
Linear-by-Linear Association	.565	1	.452
N of Valid Cases	125		

Unrealistic contract duration was established in majority of projects by consultant that has also resulted in contributing factor towards delay. 80% respondents agree to this factor and their perception is significant in terms of chi square test statistics.

Delay to furnish and deliver the site

Table 5.30: Crosstab Results-Delay to furnish and Deliver site

Respondents			Delay to furnish and Deliver the site			Total
			DISAGREE	NEUTRAL	AGREE	
	CLIENT	Count	5	0	6	11
		% within RESPONDENTS	45.5%	.0%	54.5%	100.0%
	CONSULTANT	Count	6	2	8	16
		% within RESPONDENTS	37.5%	12.5%	50.0%	100.0%
	CONTRACTOR	Count	8	1	89	98
		% within RESPONDENTS	8.2%	1.0%	90.8%	100.0%
Total		Count	19	3	103	125
		% within RESPONDENTS	15.2%	2.4%	82.4%	100.0%

Table 5.31 Chi-Square Tests

Test details	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	26.810[a]	4	.000
Likelihood Ratio	21.102	4	.000
Linear-by-Linear Association	18.109	1	.000
N of Valid Cases	125		

Delay to deliver and furnish site has been agreed upon by 82 % respondents as most significant contributing factor causing delay in completion of ERRA projects and there is significant association in their perception as highlighted by chi square value.

Shortage of skilled labor due to large scale construction in the region

Table 5.32: Crosstab Results – Shortage of skilled labor

Respondents			Shortage of skilled labor			Total
			DISAGREE	NEUTRAL	AGREE	
	CLIENT	Count	4	0	7	11
		% within RESPONDENTS	36.4%	.0%	63.6%	100.0%
	CONSULTANT	Count	2	0	14	16
		% within RESPONDENTS	12.5%	.0%	87.5%	100.0%
	CONTRACTOR	Count	22	2	74	98
		% within RESPONDENTS	22.4%	2.0%	75.5%	100.0%
Total		Count	28	2	95	125
		% within RESPONDENTS	22.4%	1.6%	76.0%	100.0%

Table 5.33: Chi-Square Tests

Test details	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.711[a]	4	.607
Likelihood Ratio	3.115	4	.539
Linear-by-Linear Association	.165	1	.685
N of Valid Cases	125		

76 % of respondents have marked shortage of skilled labor in the region due to large scale construction as one of the significant contributing factors but their perception lack significance in association as shown by chi square results.

Changing policies with change in Governments

Table 5.34 Crosstab Results – Changing policies with change in Government

Respondents			Changing policies with change in govt			Total
			DISAGREE	NEUTRAL	AGREE	
	CLIENT	Count	2	0	9	11
		% within RESPONDENTS	18.2%	.0%	81.8%	100.0%
	CONSULTANT	Count	8	0	8	16
		% within RESPONDENTS	50.0%	.0%	50.0%	100.0%
	CONTRACTOR	Count	6	26	66	98
		% within RESPONDENTS	6.1%	26.5%	67.3%	100.0%
Total		Count	16	26	83	125
		% within RESPONDENTS	12.8%	20.8%	66.4%	100.0%

Table 5.35: Chi-Square Tests

Test details	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	29.179[a]	4	.000
Likelihood Ratio	28.098	4	.000
Linear-by-Linear Association	1.645	1	.200
N of Valid Cases	125		

Another important reason of delay marked by 66 % respondents is change in policies with change in governments and its significance is confirmed by chi square value.

Excessive/ unofficial subletting

Table 5.36 : Crosstab Results – Excessive/ unofficial subletting

Respondents			Excessive / Unofficial subletting			Total
			DISAGREE	NEUTRAL	AGREE	
	CLIENT	Count	1	1	9	11
		% within RESPONDENTS	9.1%	9.1%	81.8%	100.0%
	CONSULTANT	Count	6	2	8	16
		% within RESPONDENTS	37.5%	12.5%	50.0%	100.0%
	CONTRACTOR	Count	43	0	55	98
		% within RESPONDENTS	43.9%	.0%	56.1%	100.0%
Total		Count	50	3	72	125
		% within RESPONDENTS	40.0%	2.4%	57.6%	100.0%

Table 5.37 Chi-Square Tests

Test details	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.543[a]	4	.004
Likelihood Ratio	14.679	4	.005
Linear-by-Linear Association	2.773	1	.096
N of Valid Cases	125		

Almost 58% respondents mentioned excessive / unofficial subletting as one of most significant reasons of delay and there is significant association in their perception as shown by chi square value.

Shortage of Materials in the Market

Table 5.38: Crosstab Results – Shortage of Const Materials

Respondents			Shortage of const materials			Total
			DISAGREE	NEUTRAL	AGREE	
	CLIENT	Count	2	0	9	11
		% within RESPONDENTS	18.2%	.0%	81.8%	100.0%
	CONSULTANT	Count	8	0	8	16
		% within RESPONDENTS	50.0%	.0%	50.0%	100.0%
	CONTRACTOR	Count	27	5	66	98
		% within RESPONDENTS	27.6%	5.1%	67.3%	100.0%
Total		Count	37	5	83	125
		% within RESPONDENTS	29.6%	4.0%	66.4%	100.0%

Table 5.39 : Chi-Square Tests

Test details	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.306[a]	4	.257
Likelihood Ratio	6.087	4	.193
Linear-by-Linear Association	.000	1	.998
N of Valid Cases	125		

This factor has been agreed by 66 % respondents as most significant contributing factor but there also exists difference of opinion amongst the respondent as chi square test doesn't fulfill significance criteria.

Insufficient Contractor's work force

Table 5.40: Crosstab Results – Insufficient Contractor's work force

Respondents		Insufficient Contractor's work force			Total
		DISAGREE	NEUTRAL	AGREE	
CLIENT	Count	1	0	10	11
	% within RESPONDENTS	9.1%	.0%	90.9%	100.0%
CONSULTANT	Count	16	0	0	16
	% within RESPONDENTS	100.0%	.0%	.0%	100.0%
CONTRACTOR	Count	22	3	73	98
	% within RESPONDENTS	22.4%	3.1%	74.5%	100.0%
Total	Count	39	3	83	125
	% within RESPONDENTS	31.2%	2.4%	66.4%	100.0%

Table 5.41: Chi-Square Tests

Test details	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	41.814[a]	4	.000
Likelihood Ratio	44.850	4	.000
Linear-by-Linear Association	3.110	1	.078
N of Valid Cases	125		

Insufficient contractor's work force is yet another important issue contributing towards project delay as agreed by 66 % respondents in this case and their assessment about this factor is also significant as shown by chi square value.

Inadequate planning and scheduling of project

Table 5.42: Crosstab Results – Inadequate planning and Scheduling of project

Respondents			Inadequate planning and scheduling of project			Total
			DISAGREE	NEUTRAL	AGREE	
	CLIENT	Count	2	0	9	11
		% within RESPONDENTS	18.2%	.0%	81.8%	100.0%
	CONSULTANT	Count	10	0	6	16
		% within RESPONDENTS	62.5%	.0%	37.5%	100.0%
	CONTRACTOR	Count	36	5	57	98
		% within RESPONDENTS	36.7%	5.1%	58.2%	100.0%
Total		Count	48	5	72	125
		% within RESPONDENTS	38.4%	4.0%	57.6%	100.0%

Table 5.43: Chi-Square Tests

Test details	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.287[a]	4	.121
Likelihood Ratio	8.270	4	.082
Linear-by-Linear Association	.162	1	.687
N of Valid Cases	125		

Correct planning and scheduling of project is very important in its successful completion in this case insufficiency in planning and scheduling of project has been pointed out by 58 % of respondents thus making it a significant contributor towards project delay , but association in their opinion is not significant as shown by chi square value.

Bad weather

Table 5.44: Crosstab Results – Bad Weather

Respondents		Bad weather			Total
		DISAGREE	NEUTRAL	AGREE	
CLIENT	Count	3	0	8	11
	% within RESPONDENTS	27.3%	.0%	72.7%	100.0%
CONSULTANT	Count	8	6	2	16
	% within RESPONDENTS	50.0%	37.5%	12.5%	100.0%
CONTRACTOR	Count	10	2	86	98
	% within RESPONDENTS	10.2%	2.0%	87.8%	100.0%
Total	Count	21	8	96	125
	% within RESPONDENTS	16.8%	6.4%	76.8%	100.0%

Table 5.45 : Chi-Square Tests

Test details	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	51.716[a]	4	.000
Likelihood Ratio	41.832	4	.000
Linear-by-Linear Association	12.564	1	.000
N of Valid Cases	125		

This has been agreed upon by 77 % of respondents as delay contributing factor and this result is also significant as per chi square value.

Incompetent Project team of contractor

Table 5.46: Crosstab Results – Incompetent project team of contractor

Respondents		Incompetent project team of contractor		Total
		DISAGREE	AGREE	
CLIENT	Count	1	10	11
	% within RESPONDENTS	9.1%	90.9%	100.0%
CONSULTANT	Count	3	13	16
	% within RESPONDENTS	23.07%	76.92%	100.0%
CONTRACTOR	Count	52	46	98
	% within RESPONDENTS	53.06%	46.94%	100.0%
Total	Count	56	69	125
	% within RESPONDENTS	44.8%	55.2%	100.0%

Table 4.47: Chi-Square Tests

Test details	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.086[a]	2	.006
Likelihood Ratio	11.213	2	.004
Linear-by-Linear Association	6.207	1	.013
N of Valid Cases	125		

Last factor in list of most significant contributing factors towards delaying ERRA projects is incompetent project team of contractors and it's agreed upon by 55 % respondents and there is significant degree of association between their perceptions.

5.3.5 Explaining Most Significant Factors in Perspective of ERRA

Total of 31 contributing factors were considered in questionnaire based survey of District Abbottabd. 15 most significant contributing factors highlighted as result of field survey are discussed in ensuing paragraphs.

Delayed Progress Payments. It was the foremost significant factor causing delay and was unanimously declared as major contributor in causing time overrun in ERRA projects. Few important reasons for this issue are; (1) funding problems being faced by the by the government, at present there is shortage of funds with the government to fuel these projects and it is supplemented by payments being released to ERRA by government (There was a shortfall of Rs 351 Millions against AWP of 2009-10, and a shortfall of Rs 258 Millions against AWP of 2010-11), (2) Diversion of funds dedicated for ERRA projects to recovery and rehabilitation efforts following 2010 floods, (3) initial wrong estimates also contributed towards paucity of funds and lastly price escalation also played significant role in increasing cost of projects thereby causing shortage of funds to complete them in time.

Changing Scope of work during Construction. Although involvement of all stakeholders played a significant role in ensuring quality and incorporating all needs of users in these facilities, but this involvement also resulted in frequent scope and design changes during course of construction thereby causing revisions in cost and scope resulting in late completion. This factor was ranked 2nd by respondents during survey.

Delay in producing Design Documents. This construction activity differs from routine construction projects in the sense that in routine construction projects planning and design is done well in advance of construction phase, but in this case these were simultaneous activities. Due to quantum of work and lack of resources initially timely production of design documents was a major issue for design teams of consultant. It was reported that initially consultant could only produce design documents of 20 facilities in a month.

Financing and Cash flow problems of contractors. This was another serious issue observed that also resulted in delaying completion of projects. At

present although there is a problem of delayed progress payments by the client but most of contractors involved in reconstruction activity also lack financial capacity and are unable to financially manage their projects. There are few reasons for this weakness like lack of experience, involvement in more number of projects than their resources, involvement of consultants in these projects who ensure quality both in construction as well as materials thereby reducing profit margin of contractors as anticipated by them.

Contractor's Capacity. Another main reason of slow progress or delay in these projects is contractor's capacity i.e. they have acquired projects beyond capacity. Now they are lacking capacity both in terms of finances and human and material resources to complete them. Resultantly they concentrate on one odd project do some work and then shift their resources to other project. Had this factor been considered during award of projects, this problem would not have been there?

Imposing unrealistic Contract duration. This was yet another major observation contributing towards time overrun of ERRA projects. It has been noticed that contract duration for majority of these projects have not been worked out keeping in mind scope of work and ground realities. Like a primary school and a high school have been given 1 year to complete, similarly 3 km road and 10 km road both have been given same timeframe to complete. Unfavorable weather conditions were also not considered in mapping up contract duration, like a primary school at a location where there is no snowfall in winters and a primary school located in a snow bound area have been given equal time period for completion.

Delay to furnish and deliver site. This was also highlighted as one of major reasons of delay by most of respondents. This issue arose in those projects which required relocation resultantly involving acquisition of land by line department. Due to involvement of land acquisition delay occurred in furnishing site to contractors thereby causing delay in completion.

Shortage of skilled labor in the market due to large scale construction in region. This was also main problem faced by contractors during peak working

season once reconstruction activity was at full swing. Massive construction activity in the region not only created shortage of skilled labor but also caused escalation in their rates and majority of labor was diverted towards private construction activates thereby causing shortage for contractors of public sectors works.

Changing policies with change in government. This is a major issue in our country that most of our policies are dependent on people in power at that time and are governed and molded as per their desires. This aspect also played a major role in ERRA projects as well and due to government change funding of these projects also suffered a lot.

Excessive / Unofficial Subletting. One of the sore issues of delayed completion of these projects is excessive and unofficial subletting. Most of enlisted contractors just acquired work by using their PEC registration and then further sold / passed on these projects to small and newly emerging inexperienced contractors of the area who could not directly acquired these due to lack of PEC registration . But despite knowing this fact client or consultant can't do anything as they have declared them as their representatives.

Shortage of construction Material in the market. Large scale construction in the region has also resulted this issue of shortage of materials in the market thereby causing delay in completion of these projects.

Insufficient Contractor's work force. Acquisition of work beyond working capacity and excessive/ unofficial subletting by contractors has also given rise to this issue. Due to aforementioned reasons coupled with their ill financial planning and cash flow problems have resulted insufficiency of workforce thereby causing delay / slow progress in project execution.

Inadequate planning and Scheduling of projects. This was also one of significant contributing factor that came out as result of field survey. It was also observed during study of few bidding documents of contractors that those documents lacked important project planning details like project schedule of activities and resources. Despite absence of these important documents bids were

accepted and contract was awarded. Latter on this aspect remained neglected during entire construction phase thereby contributing towards time overrun.

Bad Weather. This was also highlighted as one of contributing factors of delay and mainly bad weather covers snow season and floods of 2010 that affected progress of these projects.

Incompetent project team of contractors. Selection of well qualified and experience project team is key to successful completion of any project. It has been highlighted as one of reasons of slow progress and delayed completion of ERRA projects. Few reasons investigated by researcher about this aspect are; (1) most of our contractors are illiterate and they don't have any qualified and educated member in their team except for few diploma engineers at times, (2) Mostly public sector projects are acquired through unfair means and they also lack important stakeholder in project execution i.e. a dedicated consultant therefore timely completion of these projects is not considered important thereby giving leverage to contractor to plan these as per his own resources, (3) works subletted to newly emerging contractors mostly faced this issue because they lacked construction experience and knowledge regarding construction management practices.

5.4 SUMMARY

In first phase of this research project implementation and monitoring mechanism of the district was analyzed through literature review and interviews of key officials of the district. As result of this analysis few important weaknesses and strengths observed were identified and improvements were suggested. In second phase of this study questionnaire based survey was conducted to find out reasons of slow progress and delayed completion. 15 most significant reasons were identified and their contribution towards delay in ERRA environments was discussed in detail.

Chapter 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

In this chapter the conclusions on the basis of this research study are discussed. The initial research objectives are reviewed and conclusions are drawn. Recommendations and future guidelines are provided for further study.

6.2 REVIEW OF OBJECTIVES

Research objectives set for this study are as under:-

6.2.1 To analyze reconstruction activities of ERRA at district level with special emphasis on project implementation and monitoring mechanism with a view to suggest improvements.

6.2.2 To find out reasons of delays and slow progress with a view to suggest improvements.

The first objective regarding analysis of project implementation and monitoring mechanism at district level was achieved through reviewing the literature relevant to ERRA including Annual Reviews, monitoring and evaluation reports. Focus was placed on Organizational structure and roles of institutions at District level that were physically involved in project implementation and monitoring. Emphasis was also laid on procedures and interdepartmental coordination aspects required for implementation and monitoring of projects at district level. After studying relevant literature, projects experiencing delays in selected four sectors were segregated and contractors' performance was evaluated. Interviews of selected officials of major stakeholders were also conducted to incorporate their experience. Finally strengths and weaknesses of implementation and monitoring mechanism were listed.

The second objective is pertaining to reasons of delays / slow progress in ERRA projects. Reasons / Contributing factors of delay were extracted from number of research studies already carried out in the same field .A list of contributing factors was compiled. To include only those factors that were really pertinent to ERRA

environments selected list was refined during a pilot survey and after discussions with ERRA officials in the district. These contributing factors were then included in questionnaire designed for field survey. As result of this survey most significant factors contributing towards project delays were highlighted.

6.3 CONCLUSIONS

6.3.1 Analysis of Project Implementation and Monitoring Set up

In Abbottabad District out of 1222 projects 880 projects fall in reconstruction category. Out of these 390 projects (44%) are still in construction stage. Most of these projects are in education, health, governance and transport sectors. Out of 144 contractors involved in reconstruction activity in these sectors only 28 contractors achieved 100 % performance in their project while 85 are yet to complete their projects.

Concept of building back better has earned ERRA good name in achieving quality in construction which is really a sore issue in other public sector projects. ERRA achieved this through involvement of consultant, incorporating concept of monitoring and evaluation that also monitors consultants and having somewhat well equipped and organized implementation setups.

Another positive aspect observed in reconstruction process is involvement of all stakeholders particularly end users or line departments. Although this aspect also hampered progress of work but has proved very helpful in producing a quality product as per needs of end users. Involvement of all stakeholders has also helped in ensuring fairness in award of works.

Tracking progress of such huge number of projects would have been difficult if ERRA would not have developed a comprehensive software i.e. ERM (ERRA Reconstruction monitor). It really helps project managers and other officials to monitor progress and take timely decisions.

Even the most perfect setups do require continuous improvements and same is the case in construction organizations. Few weaknesses were observed in ERRA set up at District level these include:-

- Initial wrong estimates that resulted in project revisions causing delay in execution and shortage of funds.

- Non adherence to prequalification of contractors inviting non performing contractors to participate in bidding process and acquire projects.
- Inability of employer to guard against unofficial subletting and ringing concept used by contractors.
- Active involvement of W&S department in reconstruction and restricting the role of DRUs only to coordination agency.
- Weak knowledge of contractors and majority of officials in project implementation regarding construction and contract management.

6.3.2 Contributing factors of Delay

Total of Forty Two (42) delay contributing factors were identified as result of extensive literature review. As result of pilot study these were reduced to thirty one (31) because factors which were not pertinent to ERRA projects were eliminated from the questionnaire. As result of this questionnaire survey of the district 15 most significant factors contributing towards slow progress and delayed completion were identified.

A total of One hundred and twenty five (125) respondents participated in this survey resulting in response rate of 64.4 %. 57% of these respondents were having over 10 years of experience in construction industry while 58% of these respondents were having requisite engineering qualification i.e. 16 % were Bachelors in Engineering while remaining 42% were diploma holders in Civil Engineering.

Results of statistical analysis showed that data collected from the respondents were in the range of high to extremely reliable, yielding Cronbac's Alpha value of 0.782.Similarly readings of chi square test also verifies that there is significant relationship between perceptions of respondents while responding to questionnaire survey i.e. all values of Chi square test were less than 0.05.

Out of 390 under construction projects in Abbottabad, 367 projects fall in selected 4 sectors i.e. Education, Health, Governance and Transport. Out of these work on 204 projects is stopped since 3 months or more while 35 projects are

time overrun projects. These Figures also support the aim of this research that was to inquire into reasons of slow progress and delayed completion.

Out of 15 most significant factors highlighted as result of this survey Contractor caused factors, Client caused factors, Consultant caused factors, Miscellaneous factors whose responsibility can't be placed on these stakeholders and Factors having combined responsibility of these stakeholders are listed as under:-

Contractor caused factors

1. *Financing and Cash flow problems of contractors*
2. *Contractor's Capacity*
3. *Excessive / Unofficial Subletting*
4. *Insufficient Contractor's work force*
5. *Inadequate planning and Scheduling of projects*
6. *Incompetent project team of contractors*

Client caused Factors

1. *Delayed Progress Payments*
2. *Delay to furnish and deliver site.*

Consultant caused factors

1. *Delay in producing Design Documents*
2. *Imposing unrealistic Contract duration*

Factors sharing mixed responsibility

1. *Changing Scope of work during Construction*
2. *Changing policies with change in government*

Miscellaneous Factors

1. *Shortage of skilled labor in the market due to large scale construction*
3. *Shortage of construction Material in the market*
4. *Bad Weather*

So the maximum responsibility for slow progress rest on contractor and client, that is because of failure to properly plan and failure to properly fund these projects. These all aforementioned factors are pointed out on the basis of survey conducted in district Abbottabad as per views of

contractors, consultants and clients working in the district .These factors may vary in other districts.

6.4 RECOMMENDATIONS

After having gone through research findings and conclusions, some recommendations to improve reconstruction activity, minimize delays and improve progress pace are listed below:-

Amalgamation of Engineering Wing and DRU. This is major observation of this research and it was also highlighted by few officials during their interview. Construction progress will substantially improve if both setups are amalgamated with one PM at district level. Suggested Organogram of the set up is also shown in Chapter 5 (Figure 5.2).

Prequalification of contractors should be carried out prior to bidding phase to ensure participation of only qualified contractors in bidding process. Prequalification process should not only be restricted to mega projects but it should also be adopted for small projects. Prequalification criteria can be tailored to meet requirements of all types of projects.

Thorough deliberations should be done in preparing initial estimate to avoid repeated amendments and revisions. All stakeholders should be involves in planning , initial designing and estimation phase so as to produce a final product right at the outset thereby saving time in execution.

Projects experiencing delays should be prioritized for completion keeping in mind available funds and funds be arranged accordingly. Suggested priority can be snailing projects followed by halted stuck projects followed by projects that have achieved 50% plus progress. In order to further improve the progress incentives can be incorporated for contractors, like award of handsome bonus on timely completion.

Involvement of consultant in public sector project as is done in ERRA should be started in routine public sector projects. This will definitely improve the quality and will reduce completion time as well as subsequent maintenance cost.

In collaboration with PEC short courses of officials working in execution set ups must be run at regular interval thereby polishing their knowledge of contract management and contract clauses.

PEC while renewing PEC category of contractors should also devise some mechanism to check the performance of contractor during the enlistment period in terms of timely completion of projects. And this performance index can be mentioned in renewed license of that particular contractor. This can be made possible by linking PEC, employers of public sector and consultancy firms involved in public sector projects via some software.

Major reason of slow progress that came out after interviews of different officials is funding problems and capacity of contractors. For such type of construction where timely completion of projects is must funds must be placed at disposal of setups involved in execution and projects must be prioritized as per availability of funds and no project must be started unless required funds are not placed at disposal of executing agency in this case PERRA.2nd important reason i.e. capacity of contractors, it must be tracked while awarding the contract keeping in mind works already executed by the contractor. This aspect must also be considered in prequalification of contractors. Capacity of prequalified contractor must be mentioned in terms of no of projects the contractor can execute as per his experience, human and material resources and financial capacity.

Other reasons of delay as highlighted in this research should be seriously looked into by relevant stakeholders in order to improve construction progress. ERRA should devise some mechanism to share important lessons learnt as result of this massive reconstruction activity with relevant educational institutions, planning bodies and disaster management bodies at provincial and federal level so that important aspects neglected in this process can be taken care off in any future disaster.

6.5 FUTURE DIRECTIONS

- Similar study may also be conducted in one of the Districts of AJK to find out strengths and weaknesses of reconstruction activity being carried out in that district along with reasons of delay.
- A comparative study of ERRA projects (experiencing physical and dedicated involvement of consultants) with other public sector projects of similar nature (without involvement of consultant) may be carried out with a view to incorporate modern trends in our public sector projects.

- A study of Contractor's registration procedures with PEC may be conducted in order to remove flaws in present system and incorporate positive things like Contractor's performance index in Contractor's license along with designing of a software to link PEC with key employers of public sector projects and key consultancy firms so as to keep track of performing and non performing contractors in construction Industry of Pakistan.

REFRENCES

Ahsan, A., and Gunawan, I. (2010). "Analysis of cost and schedule performance of International development projects." *International Journal of Project Management.,* 28 (1), 68-78.

Akram, S. (2010). "Built Back Better , Lessons learned from the Experience of ERRA." 6 - 10.

Alwin, D. F. (1997). "Feeling Thermometers versus 7-Point scales, which are better?" *Sociological Methods and Research.,* 25(3), 318-340.

Amjad, A. A. (2004-2005). "Cost Benefit Analysis for construction projects." *IEP- SAC Journal.,* 85-90.

Apolot, R., Alinaitwe, H., and Tindiwensi, D.(2011). "An Investigation into the Causes of Delay and Cost Overrun in Uganda's Public Sector Construction Projects." *Second International Conference on Advances in Engineering and Technology*.

Bell, J. (2005). "Doing your research project: a guide for first time researchers in education, health and social science." Maidenhead Open University Press.

Choudhry, M. R., Fang, D. P. (2008). "Why operatives engage in unsafe work behavior: Investigating factors on construction sites." *Safety Sci*., 46, 566-584.

De Vaus, D. (2002). "Surveys in Social Research." Routledge, London.

Hinton, P. R., Brownlow, C., McMurray, I., and Cozens, B. (2004). "SPSS Explained." Routledge, New York.

Kelleher, A. H. (2004). "An Investigation of the Expanding Role of the CPM by Engineer's Top 400 Contractors." M.S. Thesis, Virginia Polytechnic Institute and State University.

Leech, N. L., Barrett, K. C., and Morgan, G. A. (2005). "SPSS for Intermediate Statistics: Use and Interpretation. " Lawrence Erlbaum Associates Publishers.

Levy, S. M. (2009). "Construct Process Planning & Management." Elsevier Inc, Burlington.

Loosemore, M., Dainty, A., and Lingard, H. (2003). "Human Resource Management in Construction Projects." Spon Press, London.

Manohar, G. U., and Ashish, M. U. (2010). "Why projects fail around the world? The Reasons and Concern."

Mohammed, I. Al-Khalil., and Mohammed, A. Al-Ghafly.(1999). "Delay in public utility projects in Saudi Arabia.", *International Journal of Project Management.,* 17(2), 101-106.

Mubarak. (2005). "Construction Project Scheduling and Control." Pearson Prentice Hall.

Muneer, M., and Riaz, G.(1998). "Causes of delays in the construction industry of Pakistan." Paper No.588, 307-315.

Nadir, M., Abbas, C. M., Aftab, S.(2010). "Cost overrun and its Monitoring in Construction Projects in Pakistan", *Second International Conference on Construction in Developing Countries (ICCIDC-II), "Advancing and Integrating Construction Education, Research & Practice" August 3-5, Cairo.*

Nida, A., Rizwan, U. F., Syed, M. A. (2008). "Cost overrun factors in Construction Industry of Pakistan.", *First international Conference on Construction in Developing Countries (ICCIDC-I,) "Advancing and integrating construction Education, research & practice" August 4-5, Karachi.*

Oppenheim, A. N. (1992). "Questionnaire design, interviewing and attitude measurement." New Edition, Printer Publishers, London and NewYork.

Root, D., Fellows, R., and Hancock, M. (1997). "Quantitative versus Qualitative or Positivism and Interactionism- A reflection of ideology in the current methodological debate." *Journal of Construction Procurement*, 3(2), 33-44.

Sambasivan, M., and Soon, Y.W. (2007). "Causes and effects of delays in Malaysian Construction industry.". *International Journal of Project Management.,* 25(5), 517- 526.

Saunders, M., Lewis, P., and Thornhill, A. (2003). "Research methods for business students." Harlow FT Prentice Hall.

Shaikh, A.W., Muree, M.R., Soomro, A.S. (2010) "Identification of Critical delay factors in Construction." *Sindh University Research Journal.,* 42 (2), 11-14.

Shah, A., Haq, E., Khan, S., and Jan, I. U. (2010). "Causes of delays and cost overrun in the Mega projects of Islamabad – Pakistan." *Second International Conference on Construction in Developing Countries (ICCIDC-II), "Advancing and Integrating Construction Education, Research & Practice" August 3-5, Cairo.*

Shuwei, W. (2009). "The impact of collaborative working on construction project performance," University of Northumbria, Newcastle.

Thompson, K. N. (2010). "Servant Leadership: An Effective Model for Project Management." Doctoral Dissertation, Capella University, Minneapolis.

Trauner, T. J. Jr., Manginelli, J. S.L., Nagata, M.F., and Funiss, B.J.(2009). "Construction Delays: Understanding Them Clearly, Analysing Them Correctly." 2nd edn. London: Elsevier.

Trochim, W. M. K. (1997). "The Research methods knowledge base."

Yaw, F., Jacobe, O., and Lynn, C. (2003). "Causes of delay and cost overruns in construction of groundwater projects in developing countries; Ghana as a case study." *International Journal of Project Management.*, 21, 321-326.

www.erra.gov.pk (Accessed on 10 Nov 2011).

www.erra.gov.pk:82/ExecutiveReconstructionProgressSummary.aspx (Accessed on 10 Nov 2011).

www.housingreconstruction.org/housing/Chapter13 (Accessed on 15 Nov 2011).

ERRA Annual Review 2009-10

ERRA Monitoring and Evaluation Report 2008

ERRA Operational Manual

Appendix - I

Survey Questionnaire Form

Dear All,

The purpose of this survey questionnaire is to conduct a research to partially fulfill the requirements for the degree of Master of Science in Construction Engineering and Management at National University of Sciences and Technology, Islamabad. The research objective is **to analyze implementation and monitoring mechanism of ERRA in district Abbottabad also focusing on reasons of slow progress and delayed completion with a view to suggest improvements.**

We shall be very thankful for your valuable time to complete this questionnaire. Your participation will provide an insight of the perceptions and practices in ERRA. Please note that the information provided will be treated as Confidential and will be used for research only.

Thanks & regards

Dissertation Supervisor
Prof.and Head of Department Dr. Rafiq Muhammad Choudhry
Construction Engineering & Management
NUST,Islamabad

Taj Hussain Shah Regn.No. CE&M-19
Mob: 0300-5308784, Shah_great103@yahoo.co.uk

Appendix - II

QUESTIONNAIRE FOR SURVEY

CAUSES OF DELAYED COMPLETION / SLOW PROGRESS - ERRA PROJECTS

SECTION -1 : PERSONNEL INFORMATION (WILL BE KEPT CONFIDENTIAL)								
Name & Designation								
Nature of Organization	Client □□			Consultant □□			Contractor □□	
Experience in Construction Industry	1-5 Years □□		6-10 Years □□		11-20 Years □□		Above 20 Years □□	
Contractor's Registration category with PEC	C-A □	C-B □	C-1 □	C-2 □	C-3 □□	C-4 □	C-5 □□	C-6 □ □
Contractor's Project Detail in ERRA(No of Projects)	Total Acquired ----------		Completed ----------		In Progress ----------		%age Progress	
Qualification	Masters (Engg) □		Bachelors(Engg) □		Diploma(Engg) □		Others (Specify)	

SECTION – 2 : CONTRIBUTING FACTORS							
S/No	Factors	Importance Level (Low to High) 1 : Strongly Disagree , 2 : Disagree , 3 : Neutral , 4 : Agree , 5 : Strongly Agree Please Tick appropriate Box as per your experience in ERRA					
1.	Delayed Progress Payments	1	2	3	4	5	
2.	Changing the original scope of work during construction						
3.	Frequent Design Changes						
4.	Delay to furnish and deliver the site						
5.	Delays in producing design documents						
6.	Mistakes and discrepancies in design documents						
7.	Late preparation of shop drawings and material samples						
8.	Delay in inspection, testing & approval of works						
9.	Inappropriate procedure for selecting the contractor						
10.	Inadequate Contractor's Experience						
11.	Inadequate planning and scheduling of project						
12.	Bad Weather						
13.	Excessive / Unofficial Subletting						
14.	Poor site supervision and management						
15.	Incompetent project team of Contractor						

16.	Financing/ cash flow problems by contractor					
17.	Insufficient Contractor's workforce					
18.	Inadequate equipment					
19.	Inaccessibility of site due to landslides enroute					
20.	Shortage of technical / skilled labour due to large scale construction					
21.	Shortage of Construction Materials in the Market due to large scale construction in the region					
22.	Delay in approval of revised PC-1 by District administration.					
23.	Excessive involvement of line deptt / End user					
24.	Time consumed in dismantling (Not included in Original Contract) of damaged building					
25.	Slow decision making by Client					
26.	Slow decision making by Consultant					
27.	Lack of Coordination and Communication b/w Client , Consultant and Contractor					
28.	Contractors Capacity (Involved in no of projects at same time beyond capacity)					
29.	Imposing unrealistic contract duration					
30.	Lack of Professional construction skills and tools					
31.	Changing Policies with Change in Government					
	SECTION – 3 ANY VALUABLE SUGGESTION (MAY USE REVERSE SIDE OF PAGE)					

Appendix - III

INTERVIEW QUESTIONS

DIR PLANNING AND TECHNICAL

Q-1 In your opinion what are main causes of slow progress?

Q-2 Are present setups working under PERRA are well equipped in terms of human and material resources to deliver their best?

Q-3 Are you satisfied with Engineering Wing working separately and DRU as separate entity or they will produce better results if combined under PM (A qualified Engineer) posted on deputation for the purpose.

Q-4 Are you satisfied with performance of NESPAK as sole consultant for 95 % of projects under execution, or you think performance would have improved if there would have been no of other consultants as well.

Q-5 What changes would you like to incorporate in organizational structure of PERRA and under command setups to improve the performance?

Q-6 What changes would you like to introduce in working procedures to further improve present System?

Q-7 As you have plenty of experience working in PERRA and looking after its affairs as Dir P&T in your opinion what are major strengths and weaknesses of this institution in rehabilitation and reconstruction works?

PM DRU

Q-1 In your opinion what are main reasons of delay in project execution?

Q-2 Are you satisfied with Human and material resources of your organization are these sufficient, satisfactory or insufficient?

Q-3 Now that it's more than 3 years working as PM in DRU, what do you think can be an ideal set up of DRU for smooth execution of assigned tasks?

Q-4 Are you satisfied with performance of a sole consultant for 95 % of projects under execution or you think it would have been much better had there been certain other consultants as well?

Q-5 What are major strengths and weaknesses of present project execution set up (Engg Wing and DRU) of ERRA?

RE NESPAK

Q-1 In your opinion what are main reasons of slow progress?

Q-2 Keeping in mind quantum of work being handled by your office, are you satisfied with human and material resources of your department?

Q-3 What changes or improvements would you like to suggest in organizational structure, resources and working procedures of your office?

Q-4 In my opinion employment of a sole consultant for majority of ERRA projects is a major contributing factor of slow progress, what are your comments?

Q-5 What are few strengths and weaknesses of your set up in context of rehabilitation and reconstruction task?

CRE NESPAK

Q-1 In your opinion what are main reasons of slow progress?

Q-2 Keeping in mind quantum of work being handled by your office, are you satisfied with human and material resources of your department?

Q-3 What changes or improvements would you like to suggest in organizational structure, resources and working procedures of your office?

Q-4 In my opinion employment of a sole consultant for majority of ERRA projects is a major contributing factor of slow progress, what are your comments?

Q-5 What are few strengths and weaknesses of your set up in context of rehabilitation and reconstruction task?

Q-6 Now that it almost 6.5 years following the disaster, what do you think is present set up of PERRA, C & W Department and NESPAK well equipped to handle such disasters in future or it needs to be further improved what improvements would you like to suggest?

PRESIDENT CONTRACTOR'S ASSOCIATION

Q-1 Contractor is main stakeholder in this reconstruction activity, who is physically involved in construction works, besides payment problems from employer what do you think are major reasons of delay?

Q-2 Are you satisfied with organizational structure and working procedures of Engineering Wing, DRU office and NESPAK Office or you think these need to be further improved ?Suggest few improvements in these set ups ?

Q-3 Are you satisfied with procedure for award of contract or it need to be further refined if yes than what refinements you think are appropriate to incorporate in this procedure?

Q-4 You must be having plenty of experience working on public sector projects ,what differences can you differentiate between ERRA awarded projects and previously executed public sector projects?

Q-5 Being president of contractor's association what powers do you enjoy to blacklist or punish any member of your association involved in maul practices?

Q- In your opinion what changes need to be made to improve our system of public sector projects so that we can get a quality project within reasonable cost and on time?

Appendix - IV

Reconstruction Portfolio- Abbottabad

Sector Wise Summary

Sector	Total Projects	Completed		Under Construction		Tendering		Designing		Planning	
		#s	%	#s	%	#s	%	#s	%	#s	%
Grand Total:	**1,222**	**795**	**65.06 %**	**391**	**32.00 %**	**30**	**2.45 %**	**6**	**0.49 %**	**0**	**0.00 %**
Education	569	256	44.99 %	281	49.38 %	26	4.57 %	6	1.05 %	0	0.00 %
Environment	54	43	79.63 %	11	20.37 %	0	0.00 %	0	0.00 %	0	0.00 %
Governance	239	184	76.99 %	54	22.59 %	1	0.42 %	0	0.00 %	0	0.00 %
Health	24	8	33.33 %	13	54.17 %	3	12.50 %	0	0.00 %	0	0.00 %
Livelihood	98	89	90.82 %	9	9.18 %	0	0.00 %	0	0.00 %	0	0.00 %
Medical Rehabilitation	1	1	100.00 %	0	0.00 %	0	0.00 %	0	0.00 %	0	0.00 %
Power	1	1	100.00 %	0	0.00 %	0	0.00 %	0	0.00 %	0	0.00 %
Social Protection	3	0	0.00 %	3	100.00 %	0	0.00 %	0	0.00 %	0	0.00 %
Transport	37	17	45.95 %	20	54.05 %	0	0.00 %	0	0.00 %	0	0.00 %
WatSan	196	196	100.00 %	0	0.00 %	0	0.00 %	0	0.00 %	0	0.00 %